WETA WATER EMERGENCY TRANSPORTATION AUTHORITY

Members of the Board

Jody Breckenridge, Chair
Jeffrey DelBono
Anthony J. Intintoli, Jr.
Nicholas Josefowitz
James Wunderman, Vice Chair

SAN FRANCISCO BAY AREA
WATER EMERGENCY TRANSPORATION AUTHORITY
BOARD OF DIRECTORS MEETING
Thursday, February 7, 2019 at 1:30 p.m.
Port of San Francisco
Pier 1
San Francisco, CA

The full agenda packet is available for download at weta.sanfranciscobayferry.com

AGENDA

1. CALL TO ORDER – BOARD CHAIR

2. PLEDGE OF ALLEGIANCE/ROLL CALL

3. REPORT OF BOARD CHAIR — ***Information***

4. REPORTS OF DIRECTORS — ***Information***
   Directors are limited to providing information, asking clarifying questions about matters not on the agenda, responding to public comment, referring matters to committee or staff for information, or requesting a report to be made at another meeting.

5. REPORTS OF STAFF — ***Information***
   a. Executive Director's Report on Agency Projects, Activities and Services
   b. Monthly Review of Financial Statements
   c. Federal and State Legislative Updates

6. CONSENT CALENDAR — ***Action***
   a. Board Meeting Minutes – January 10, 2019

7. STATUS OF TREASURE ISLAND TRANSPORTATION PROGRAM — ***Information***

8. AUTHORIZE PUBLIC OUTREACH FOR SPECIAL EVENT FARE CHANGE — ***Action***

9. REQUEST FOR WETA TO CONDUCT A FEASIBILITY STUDY OF HOVERCRAFT SERVICE — ***Information/Action***

10. RECESS INTO CLOSED SESSION — ***Action***
    a. PUBLIC EMPLOYEE PERFORMANCE EVALUATION — ***To Be Determined***
    Title: Executive Director (pursuant to Government Code Section 54957)

11. REPORT OF ACTIVITY IN CLOSED SESSION — ***Action To Be Determined***

Chair will report any action taken in closed session that is subject to reporting at this time. Action may be taken on matters discussed in closed session.

12. PUBLIC COMMENTS FOR NON-AGENDA ITEMS

ADJOURNMENT

All items appearing on the agenda are subject to action by the Board of Directors. Staff recommendations are subject to action and change by the Board of Directors.

PUBLIC COMMENTS WETA welcomes comments from the public. Each person wishing to address the Board of Directors is requested to complete a Speaker Card. Please forward completed Speaker Card and any reports/handouts to the Board Secretary. Speakers will be allotted no more than three (3) minutes to speak and will be heard in the order of sign-up. Said time frames may be extended only upon approval of the Board of Directors.

Non-Agenda Items: A 15 minute period of public comment for non-agenda items will be held at the end of the meeting. Please indicate on your speaker card that you wish to speak on a non-agenda item. No action can be taken on any matter raised during the public comment period.

Agenda Items: Speakers on individual agenda items will be called in order of sign-up after the discussion of each agenda item.

WETA meetings are wheelchair accessible. Upon request, WETA will provide written agenda materials in appropriate alternative formats to individuals with disabilities. In addition, WETA will arrange for disability-related modifications or accommodations including auxiliary aids or services to enable individuals with disabilities to participate in public meetings. Please send a written request including your name, mailing address, telephone number and brief description of the requested materials in preferred alternative format and/or auxiliary aid or service at least five (5) days before the meeting. Requests should be made by mail to: Board Secretary, WETA, 9 Pier, Suite 111, San Francisco, CA 94111; by e-mail to: contactus@watertransit.org; or by telephone: (415) 291-3377.

WETA WATER EMERGENCY TRANSPORTATION AUTHORITY

M E M O R A N D U M

TO: WETA Board Members

FROM: Nina Rannells, Executive Director

DATE: February 7, 2019

RE: Executive Director's Report

CAPITAL PROJECT IMPLEMENTATION UPDATE

4 New Vessels – Central Bay

This project will construct four new 400-passenger high-speed 27-knot propeller vessels; two to replace the MV *Encinal* and MV *Harbor Bay Express II* and two to support the growing demand for WETA services.

The Board of Directors approved a contract with Aurora Marine Design (AMD) for vessel construction management services in December 2013, and with Kvichak Marine Industries - now Vigor Kvichak (Vigor) - in April 2015 for the construction of two new replacement vessels. Vessel construction began in September 2015. The first of these vessels, the MV *Hydrus*, was completed in March and put into revenue service in April 2017. The second of these vessels, the MV *Cetus*, was placed into revenue service in August 2017.

On October 6, 2016 the Board of Directors approved a contract award to Vigor for construction of two additional vessels. The first of these vessels, the MV *Argo,* was placed into revenue service in June 2018. Work continues on the fourth vessel, the MV *Carina*. December work included vessel relaunch, dockside commissioning, United States Coast Guard (USCG) inspection and builder's trials. Owner's acceptance trials were conducted January 8-11. The MV *Carina* departed Seattle and arrived in Alameda on January 28, 2019. The MV *Carina* will be ready for service mid-February after final USCG and dry-dock inspections.

3 New Vessels – North Bay

This project will construct three new 445-passenger high-speed 34-knot jet propulsion vessels to support WETA's Vallejo and North Bay services. In December 2015, the Board of Directors approved a contract with Fast Ferry Management for vessel construction management services. On September 1, 2016 the Board of Directors approved a contract award to Dakota Creek Industries for vessel construction. Vessel construction is in full swing.

The design and engineering work for the three new vessels is complete; all structural drawings have been approved. Main engine exhaust emissions testing was completed and Environmental Protection Agency (EPA) Tier 4 compliance for emissions was demonstrated at the factory. An agreement between WETA, MTU, Pacific Power Group and Dakota Creek for field testing of these first-ever MTU Tier 4 compliant engines has been finalized. MV *Pyxis* was launched on October 6. Systems testing and dock trials were conducted in December. Owner's acceptance trials were completed on January 24, 2019. The MV *Pyxis* construction is complete and ready to depart the shipyard in Anacortes, WA with anticipated arrival in the Bay Area in early February (date is weather dependent). We anticipate that this vessel will be ready to be

place into service towards the end of the month. Hull and superstructure construction on the second vessel MV *Vela* is at 90% complete. Waterjets have been installed on the MV *Vela* and the shipyard is starting the work to install mechanical and electrical systems. Hull framing for the third vessel, MV *Lyra,* is complete and construction is well under way.

New Commuter Class Vessel
In December 2017, the Board of Directors approved a release of a Request For Proposals (RFP) to procure a mid-sized high-speed passenger vessel, with potential options, that will establish a new class of WETA vessel with the versatility to support WETA's diverse system of services. On March 1, 2018, the Board of Directors approved a contract award to Glosten for Construction Management Services to support vessel construction. This mid-size high speed vessel will meet WETA's needs for serving both long and short routes and facilities constrained by vessel size and water depth. On October 4, 2018, the Board of Directors approved award of a contract for the vessel to Mavrik Marine, Inc. for this vessel. Design and engineering work is well underway. Keel laying and construction commenced on December 18.

Central Bay Operations and Maintenance Facility
This project constructed a new ferry operations and maintenance facility at Alameda Point to serve as the base for WETA's existing and future Central Bay ferry fleet and operations. The project was led by Overaa/Power, a Joint Venture, and construction management was provided by 4Leaf, Inc. The project is largely complete. Blue & Gold has moved all WETA Central Bay vessel operations and administrative staff to the new facility. Facility and system modifications and final move-in details remain and will continue to be addressed as Blue & Gold settles into this new facility and operating environment. An opening ceremony was held on December 13, 2018 at the the new facility.

Downtown San Francisco Ferry Terminal Expansion Project
This project will expand berthing capacity at the Downtown San Francisco Ferry Terminal in order to support new and existing ferry services to San Francisco. The project also includes landside improvements needed to accommodate expected service expansion and increases in ridership, and to support emergency response capabilities. Project construction is being provided by Power Engineering under a Guaranteed Maximum Price contract, and construction management is being provided by Jacobs Engineering.

Construction began in February 2017 and is scheduled to be fully completed by January 2020. On December 20, a major milestone occurred with the opening of Gate G for riders of the Alameda/Oakland service. The transition went smoothly. Gate F is scheduled to open in February for riders of the Harbor Bay and Richmond services. After both Gates F & G are open, the contractor will proceed with reconstruction of Gate E and completion of the north side of project. WETA will continue to notice passengers prior to the service transitions and will provide on-site assistance to help passengers queue at the new gates.

Richmond Ferry Terminal and Service
This project constructed a ferry terminal in Richmond to support new public transit ferry service between Richmond and San Francisco. Construction consisted of replacing an existing facility (float and gangway) and the expansion and upgrading of an existing surface parking lot. Manson Construction was the main contractor and construction management was provided by Ghirardelli Associates. New service will be operated with the support of Contra Costa County Measure J funds authorized by the Contra Costa County Transportation Authority (CCTA) in March 2015.

On January 10, 2019, WETA officially launched San Francisco Bay Ferry service from the new Richmond Ferry Terminal to San Francisco. The inaugural service run at 6:10 a.m. had 161 passengers, including Executive Director Rannells and Director DelBono and several local elected officials and representatives. An estimated 800 people attended WETA's celebration event later that day at the Craneway Pavilion.

WETA earned 73 news media mentions about the launch including stories in all major local newspapers and websites and robust television coverage of the start of service. The success of the launch outreach is reflected in the strong early ridership numbers. WETA staff will continue to promote Richmond ferry service in the coming months with a renewed focus on community outreach.

Terminal Dredging
At the August 2018 Board meeting a contract was awarded to the Dutra Group for South San Francisco Ferry Terminal dredging at the Oyster Point Marina. The BCDC permit for this project was delayed beyond the anticipated start date, causing work to extend beyond the normal dredge window. Work is now underway and is 50% complete but offshore disposal has been slowed by weather conditions.

At the September Board meeting a contract was awarded to R.E. Staite for dredging and float and gangway rehabilitation work at the Vallejo Ferry Terminal. Dredging and related gangway/float work was completed at the end of January.

SERVICE DEVELOPMENT UPDATE

Mission Bay Ferry Landing
The Port of San Francisco released an engineering feasibility and site selection study for a future Mission Bay ferry landing in March 2016. WETA staff participated in the study and provided input regarding ferry operations and potential service models. In December 2016, the Port of San Francisco awarded a contract to COWI/OLMM to complete preliminary design, permitting and entitlement activities, and began the process in partnership with WETA. To support the effort, the City and Port of San Francisco placed $7 million in its capital budget. A project Memorandum of Understanding (MOU) between the Port and WETA was adopted by the WETA Board in January 2017. Staff has been working together with Port staff and their consultants on initial design and environmental testing activities. The environmental document is complete. The Port is working to identify funds to move the project forward to construction and has submitted a request for WETA to program $25 million in Regional Measure 3 (RM3) funding to support project construction, estimated to cost approximately $40 million.

Temporary Service to Golden State Warriors Chase Center Events
WETA staff is currently working with a team consisiting of the Golden State Warriors, the Port of San Franciso and Golden Gate Ferry to identify and explore options for a temporary terminal and service to Chase Center events prior to the opening of the Mission Bay Ferry Landing. The service would be to either China Basin (Oracle Park) or a new temporary facility at Pier 48. The team is currently exploring engineering and design solutions that would enable service to start with the opening of the new Chase Center Arena in late October 2019. Staff will bring forward a discussion item on this effort once plans for a temporary terminal and early service concepts take shape.

Oakland Athletics Howard Terminal Stadium Proposal
WETA staff has met with the Oakland Athletics organization and the Howard Terminal stadium development team. Discussions thus far have been high level and have not been detailed to

the point of developing service plans or evaluating infrastructure needs. However, WETA staff anticipates being an active participant in the project transportation discussions moving forward. WETA submitted a comment letter during the scoping phase for the anticipated Environmental Impact Report identifying terminal capacity limitations at the existing Jack London Square terminal in Oakland for consideration during the EIR process.

Alameda Seaplane Lagoon Ferry Terminal
In April 2016, the Alameda City Council and WETA Board of Directors adopted a MOU defining a future service concept for western Alameda and identifying the terms and conditions under which a new Seaplane Lagoon Ferry Service would be implemented. The MOU defines roles and responsibilities for each party pertaining to the proposed construction of a new ferry terminal along Seaplane Lagoon on the former Naval Air Station at Alameda Point, future operation of the service, and the pursuit of funds necessary to support the new service. The City has contracted with Marcy Wong Donn Logan Architects to complete the final design of the ferry terminal. WETA staff is participating in the design effort. Staff continues to work with the City to fulfill WETA's commitments under the MOU with the common goal of achieving the start of service by 2020.

The transfer of property from the City to the development team - Alameda Point Partners - included a $10 million contribution toward the Seaplane Lagoon Ferry Terminal. The City previously secured $8.2 million from the Alameda County Transportation Commission for the terminal and has recently committed $2 million from City general funds. In August 2018, the WETA Board of Directors authorized a commitment of $2 million to the project to close a funding gap and keep the project on schedule for an early 2020 opening. Alameda Point Partners (APP) has begun construction on the overall Site A project, including the Seaplane Lagoon terminal. WETA staff is working with APP and City staff to support the construction effort and to plan for the ancticipated service enhancement for both Seaplane and Main Street terminals.

Redwood City Ferry Terminal
WETA prepared a draft Redwood City ferry terminal site feasibility report in 2012 in an effort to identify site opportunities, constraints and design requirements, and better understand project feasibility and costs associated with the development of a terminal and service to Redwood City. During the summer of 2016, staff from the Port of Redwood City (Port), WETA and Redwood City met to redefine a ferry project that could potentially be developed in phases given existing funding limitations. The project concept shifted the development toward a public facility available to multiple ferry operators in advance of formal WETA service given the lack of project funds for such service at this time. This alternative development model would allow the Port and City to move forward with construction of a terminal, allowing time for WETA and the City to advocate for operational and vessel funding for eventual WETA service.

In an effort to jump-start a regional conversation on the Redwood Ferry service, Board Chair Breckenridge, Vice Chair Wunderman and WETA staff participated in a site visit to the Port on May 25, 2018 that also included Port Commissioners, the Mayor of Redwood City, and Councilmembers from Redwood City and Burlingame. In addition, staff from multiple agencies and private sector stakeholders such as Google and Prop SF was in attendance. The two-hour site event consisted of a visit to an adjacent property to view a potential ferry terminal location and an hour of presentations and discussion among the group.

Redwood City is now leading an effort to prepare a Financial Feasibility Study and Cost Benefit Analysis Report for the Redwood City Ferry Terminal Construction and Service utilizing $450,000 in San Mateo County Measure A transportation sales tax funds. The City has entered

into an agreement with the San Mateo County Transportation Authority to develop and adopt the Feasibility Study and Business Plan. The feasibility will be completed in approximately 12-14 months and will kickoff on February 19. WETA staff is participating in this effort. Concurrent with this activity, Redwood City, Port of Redwood City and WETA staff are working to develop a draft MOU for future Board consideration that defines agency roles and responsibilities for working together to advance the terminal planning and development.

Berkeley Ferry Terminal
The proposed Berkeley service will provide an alternative transportation link between Berkeley and downtown San Francisco. In past years, staff worked to develop a draft environmental assessment for a project to build a new ferry terminal and service in Berkeley at a site just south of the Berkeley Fishing Pier. This work was ultimately suspended due to extraordinary mitigation measures required by National Marine Fisheries related to project dredging and due to the lack of full funding for project construction and operation; a prerequisite to Federal Transit Administration (FTA) completion of the federal environmental process (NEPA).

City of Berkeley staff recently initiated a study to explore strategies for rebuilding the city's Municipal Fishing Pier, including a concept for a dual-use pier facility that would serve as both a ferry terminal and public access space. This study seeks to address issues related to not only the City's loss of public access to waterfront, but also conflicts that have emerged with the operation of private ferry service within the Berkeley Marina. The study was not originally scoped to consider WETA as the primary ferry service operator; however, both City and WETA staff have expressed a mutual interest in expanding the study to do so. Staff is currently working with their respective counsels to draft an MOU that would define a partnership between the parties for expanding the City's ferry study and pursuing further development of the project, should a feasible concept be identified. Execution of the MOU would require approval by both the WETA Board and the Berkeley City Council. The Berkeley City Council may take this subject up as early as February 2019.

Treasure Island Service
This project - which will be implemented by the Treasure Island Development Authority (TIDA), the San Francisco County Transportation Authority (SFCTA), acting in its capacity as the Treasure Island Mobility Management Authority, and Lennar Urban, the prospective developer - will institute new ferry service between Treasure Island and downtown San Francisco in connection with the planned Treasure Island Development Project. SFCTA recently announced that it is hoping to advance the opening of the new ferry service from 2023 to 2021.

WETA staff has worked with City of San Francisco staff over the years to support development of this project. Staff from the SFCTA/TIMMA will provide an update on their plans and work efforts to move this project forward at the February 7 Board meeting.

Tideline Marine Group Private Shuttle Pilot Status
In September 2018, the WETA Board approved Tideline Marine Group's request to conduct scheduled, small vessel, private charter landings with the vessel *Osprey* at the Harbor Bay Ferry Terminal for the exclusive use of Exelixis employees on a six month demonstration basis subject to meeting WETA's conditions and requirements. This includes meeting WETA's landing agreement requirements, providing WETA all appropriate vessel documentation, completion of a successful fit-up of the vessel *Osprey* at the Harbor Bay terminal, receipt of required approvals from the Harbor Bay Isle Associates and the City of Alameda, and execution of a landing agreement by all parties. To date, Tideline has worked to meet WETA requirements and has received approval from HBIA. The City of Alameda is scheduled to

consider approving the landing at their February 19, 2019 City Council meeting. In the meantime, Tideline announced in January that they have purchased a new used vessel, the *Peregrine*, which is a 149 passenger high speed shallow draft vessel, and will expand Tideline's service profile to something other than a small vessel operator (their current fleet consists of two 45 passenger and one 25 passenger small ferries). The *Peregrine* would not be authorized to operate on the proposed private charter service to the Harbor Bay terminal without further discussion or action by the WETA Board of Directors.

SYSTEM PLANS/STUDIES

Alameda Terminals Access Initiatives

The City of Alameda City Council authorized a residential parking permit program for the Harbor Bay Ferry Terminal area in February 2017. City of Alameda staff coordinated with the Harbor Bay Master Homeowner's Association to develop a strategy for implementing the residential permit and enforcement program, including outreach to surrounding communities and ferry riders. On June 27, the City began the outreach effort with cooperation from WETA through the Bay Alerts system. The City continued its outreach process through the end of August and began active enforcement in September 2017. To make up for the loss of parking, WETA began working with the City to develop strategies to enhance alternative access to the terminal, and staff executed an agreement with AC Transit to offer a reciprocal free transfer to ferry riders who take the bus to the ferry. In addition, bike lockers were upgraded and new bike racks were installed.

Recently, the City submitted an application to allow on-street parking on Harbor Bay Parkway and Adelphian Way, two streets where BCDC has imposed no parking or limited parking rules. A group of Harbor Bay riders have submitted letters of support for the City proposal and WETA staff has also written to support the proposed change as a benefit to ferry riders.

At the request of the Harbor Bay Homeowner's Association and the City of Alameda, WETA has been working with the City in considering a parking fee at the Harbor Bay lot. WETA staff has engaged CDM Smith to evaluate potential parking fee programs, not just for Harbor Bay but for the entire WETA system. A program of systemwide parking fee program policy goals was approved by the WETA Board in November 2016 that can be used to guide the development of a specific paid parking program for the Harbor Bay Terminal site. Staff has recently asked City of Alameda staff to confirm that there is still interest in paid parking at Harbor Bay and how this would be integrated into the City's overall plans for parking at the other two terminals in Alameda once Seaplane Lagoon is operational in 2020.

At Main Street, WETA worked with City of Alameda staff beginning in spring 2015 to open the Officer's Club parking lot as an overflow lot for the many riders who had been parking on dirt lots or on the shoulders of Main Street. WETA funded a new crosswalk and minor improvements to the lot, which opened to ferry riders in May 2016. In addition to the parking improvements, 20 bicycle lockers were installed at the Main Street terminal in February 2016. Staff has since shifted focus to identify additional access improvement possibilities - such as buses, shuttles, bicycles, and pedestrian improvements - after the parking improvements were underway, and has met with private companies like Lyft, Chariot and Scoop in an effort to explore alternative options for improving transportation options for ferry riders in Alameda and elsewhere.

WETA recently submitted a letter of support for a City of Alameda proposal to restripe Main Street to allow for Class 2 bike lanes, narrowing vehicular lanes from four to three. The proposal

is intended to improve bicycle access and overall safety for ferry commuters accessing the terminal.

Solano County Water Transit Plan and Financial Feasibility Study
The Solano Transportation Authority (STA) has begun a feasibility study of potential ferry and water transit routes in and around Solano County. WETA is a partner on the study by serving on a Technical Advisory Committee and funding the necessary ridership forecasting tasks, similar to the role WETA played in the 2014 Ferry Feasibility Study in Contra Costa County. The STA study is expected to be complete by the end of 2019. Staff will provide the Board with updates as the study progresses.

Small Vessel Service Study
An Advisory Committee of the Board has been formed and has met on four occasions to initiate study of small vessels as a complement to WETA's service. The Advisory Committee consists of Board members Josefowitz and Intintoli, and a transportation consultant, ARUP, has been engaged to perform the analysis. Staff has also convened and met with a Technical Advisory Committee (TAC) to solicit input on the project and held meetings with individual stakeholders. An item to discuss the small vessel study work was presented by the consultant at the January 10 WETA Board of Director's meeting. Staff will work with the consultant to finalize the initial study work in the coming months.

EMERGENCY RESPONSE ACTIVITIES UPDATE

WETA's enabling legislation directs the agency to provide comprehensive water transportation and emergency coordination services for the Bay Area region. The following emergency response related activities are currently underway:

- Staff is continuing to work on ordering emergency communications equipment for the Central Bay Operations & Maintenance Facility, and is developing a functional layout for converting the conference room into an Emergency Operations Center (ECO) during an event requiring EOC activation.

- On December 5, the CBOMF hosted K9 training on board moored ferry vessels. Participating agencies included the USCG, BART Police, Alameda Police, Oakland Police and WETA's contract operator Blue & Gold Fleet.

- On December 6, the CBOMF hosted Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) and Active Shooter training dockside aboard a WETA ferry. Participating agencies included the USCG, Department of Homeland Security, Federal Bureau of Investigation, Lawrence Livermore Lab and WETA's contract operator Blue & Gold Fleet.

OPERATIONS REPORT

Monthly Operating Statistics - The Monthly Operating Statistics Report for December 2018 is provided as ***Attachment A***.

KEY BUSINESS MEETINGS AND EXTERNAL OUTREACH

From January 10 through January 17, WETA staff greeted passengers at the Richmond Ferry Terminal to answer questions, take feedback and distribute promotional items. Clipper outreach staff were also on hand each morning.

The week of January 13, Mike Gougherty and Taylor Rutsch attended the Transportation Research Board's 2019 Annual Meeting and gave presentations highliting the recent passenger survey results and WETA's system performance metrics.

On January 16, Kevin Connolly attended the City of Alameda, AC Transit Interagency Liaison Meeting.

On January 17, Thomas Hall participated in the quarterly Clipper Customer Education/Service and Distribution call.

On January 19, Mike Gougherty attended the annual Passenger Vessel Association meeting and participated in a panel discussion on plans for future ferry services around the country.

On January 25, Kevin Connolly and Chad Mason made a presentation to the West Contra Costa Transportation Advisory Committee, highlighting the opening of the Richmond Ferry service.

On January 29, Thomas Hall attended Adobe's annual transportation fair in San Francisco to share ferry information with employees.

On January 30, Thomas Hall gave a presentation to the Point Richmond Neighborhood Council in Richmond on the launch of the new ferry service.

From January 28 through January 31 WETA staff and the California Air Resource Board (CARB) conducted emission testing on the MV *Hydrus* to help CARB develop current emissions standards for the industry and set new future regulations.

OTHER BUSINESS

Regional Measure 3

Senate Bill 595 (Beall), authorized a new bridge toll measure - Regional Measure 3 - to raise the tolls on the state-owned bridges to fund a program of regional transportation improvements in the San Francisco Bay Area. In June 2017, during the development of this bill, the WETA Board adopted a Regional Measure 3 Principles and Investment Program. The final measure adopted by the legislature included $300 million in capital funds to support construction of WETA vessels, terminals and facilities and an operating subsidy of up to $35 million annually to support WETA's growing regional ferry system.

On January 24, 2018, the Bay Area Toll Authority (BATA) authorized moving forward to place RM3 on the June 5, 2018 ballot. The measure, which passed by a majority of Bay Area voters, will raise tolls by $3 over a six year period starting with a $1 increase on January 1, 2019 followed by additional $1 increases in January 2022 and January 2025. This measure has been challenged by two lawsuits that are currently pending in the Superior Court in the City and County of San Francisco.

On January 1, 2019 BATA began collecting the first dollar of the approved toll increase. Toll revenues collected will be placed into an escrow account and will not be allocated to project sponsors until the lawsuits are settled.

END

Attachment A

Monthly Operating Statistics Report
December 2018

			Alameda/ Oakland	Harbor Bay	South San Francisco	Vallejo	Systemwide
Boardings	vs. last month	Total Passengers December 2018	88,935	22,637	8,559	71,560	191,691
		Total Passengers November 2018	85,881	27,394	11,097	72,053	196,425
		Percent change	3.56%	-17.37%	-22.87%	-0.68%	-2.41%
	vs. same month last year	Total Passengers December 2018	88,935	22,637	8,559	71,560	191,691
		Total Passengers December 2017	86,593	23,035	9,109	73,511	192,248
		Percent change	2.70%	-1.73%	-6.04%	-2.65%	-0.29%
	vs. prior FY to date	Total Passengers Current FY To Date	737,277	173,727	70,362	561,425	1,542,791
		Total Passengers Last FY To Date	687,915	163,788	69,172	542,953	1,463,828
		Percent change	7.18%	6.07%	1.72%	3.40%	5.39%
		Avg Weekday Ridership December 2018	3,335	1,078	408	2,897	7,718
Ops Stats - December 2018		Passengers Per Hour	111	151	66	118	114
		Revenue Hours	801	150	130	604	1,685
		Revenue Miles	11,098	2,873	2,142	18,244	34,358
		Farebox Recovery	52%	33%	31%	56%	49%
		Cost per Available Seat Mile	$0.26	$0.38	$0.58	$0.29	$0.31
		Average peak hour utilization, AM	55%	70%	36%	78%	60%
		Average peak hour utilization, PM	61%	60%	42%	83%	62%
Fuel - December 2018		Fuel Used (gallons)	41,051	10,890	8,093	149,913	209,947
		Avg Cost per gallon	$2.26	$2.26	$2.26	$2.22	$2.23

AGENDA ITEM 5b
MEETING: February 7, 2019

MEMORANDUM

TO: **Board Members**

FROM: **Nina Rannells, Executive Director**
Lynne Yu, Finance & Administration Manager

SUBJECT: **Monthly Review of FY 2018/19 Financial Statements for Six Months Ending December 31, 2018**

Recommendation
There is no recommendation associated with this informational item.

Summary
This report provides the attached FY 2018/19 Financial Statements for six months ending December 31, 2018.

Operating Budget vs. Actual

	Prior Actual	Current Budget	Current Actual
Revenues - Year To Date:			
Fare Revenues	$10,456,470	$11,319,800	$11,202,677
Bridge Toll Revenues	8,376,822	10,574,150	8,417,661
Other Revenues	975	364,000	6,750
Total Operating Revenues	**$18,834,267**	**$22,257,950**	**$19,627,088**
Expenses - Year To Date:			
Planning & Administration	$829,465	$1,500,000	$1,000,283
Ferry Services	18,004,802	20,757,950	18,626,805
Total Operatings Expenses	**$18,834,267**	**$22,257,950**	**$19,627,088**
System-Wide Farebox Recovery %	**58%**	**55%**	**60%**

Capital Actual and % of Total Budget

	YTD Actual	% of FY 2018/19 Budget
Revenues:		
Federal Funds	$8,694,251	
State Funds	38,908,099	
Bridge Toll Revenues	9,544,553	
Other Revenues	410,690	
Total Capital Revenues	**$57,557,593**	**49.31%**
Expenses:		
Total Capital Expenses	**$57,557,593**	**49.31%**

Fiscal Impact
There is no fiscal impact associated with this informational item.

END

San Francisco Bay Area Water Emergency Transportation Authority
FY 2018/19 Statement of Revenues and Expenses
For Six Months Ending 12/31/2018

% of Year Elapsed *50%*

	Dec-18 Actual	Year - To - Date FY2017/18 Actual	Year - To - Date FY2018/19 Budget	Year - To - Date FY2018/19 Actual	Total FY2018/19 Budget	% of Total Budget
OPERATING EXPENSES						
PLANNING & GENERAL ADMIN:						
Wages and Fringe Benefits	$84,584	$506,455	$775,900	$575,550	$1,551,800	*37.1%*
Services	93,913	391,586	683,700	445,519	1,367,400	*32.6%*
Materials and Supplies	7,399	10,727	90,250	21,333	180,500	*11.8%*
Utilities	4,020	16,552	20,550	22,320	41,100	*54.3%*
Insurance	-	1,201	14,150	1,200	28,300	*4.2%*
Miscellaneous	29,373	74,714	156,400	84,026	312,800	*26.9%*
Leases and Rentals	31,753	184,993	194,350	189,302	388,700	*48.7%*
Admin Overhead Expense Transfer	(50,701)	(356,762)	(435,300)	(338,967)	(870,600)	*38.9%*
Sub-Total Planning & Gen Admin	**$200,340**	**$829,465**	**$1,500,000**	**$1,000,283**	**$3,000,000**	***33.3%***
FERRY OPERATIONS:						
Harbor Bay FerryService						
Purchased Transportation	$257,331	$948,930	$1,140,000	$1,243,276	$2,280,000	*54.5%*
Fuel - Diesel & Urea	30,896	194,600	303,750	236,826	607,500	*39.0%*
Other Direct Operating Expenses	49,980	189,609	376,200	273,442	752,400	*36.3%*
Admin Overhead Expense Transfer	6,268	45,108	50,400	41,839	100,800	*41.5%*
Sub-Total Harbor Bay	**$344,475**	**$1,378,246**	**$1,870,350**	**$1,795,383**	**$3,740,700**	***48.0%***
Farebox Recovery	***33%***	***54%***	***45%***	***46%***	***45%***	
Alameda/Oakland Ferry Service						
Purchased Transportation	$670,058	$4,354,657	$4,667,700	$4,491,673	$9,335,400	*48.1%*
Fuel - Diesel & Urea	116,545	763,205	1,006,950	905,703	2,013,900	*45.0%*
Other Direct Operating Expenses	156,378	623,198	1,269,600	932,868	2,539,200	*36.7%*
Admin Overhead Expense Transfer	22,325	154,528	191,750	150,317	383,500	*39.2%*
Sub-Total Alameda/Oakland	**$965,306**	**$5,895,588**	**$7,136,000**	**$6,480,561**	**$14,272,000**	***45.4%***
Farebox Recovery	***52%***	***62%***	***56%***	***63%***	***56%***	
Vallejo FerryService						
Purchased Transportation	$791,613	$5,843,355	$5,968,050	$5,271,712	$11,936,100	*44.2%*
Fuel - Diesel & Urea	332,588	2,108,062	2,874,000	2,583,151	5,748,000	*44.9%*
Other Direct Operating Expenses	116,552	1,032,326	992,700	729,619	1,985,400	*36.7%*
Admin Overhead Expense Transfer	18,739	132,729	157,250	125,635	314,500	*39.9%*
Sub-Total Vallejo	**$1,259,492**	**$9,116,473**	**$9,992,000**	**$8,710,118**	**$19,984,000**	***43.6%***
Farebox Recovery	***56%***	***61%***	***58%***	***66%***	***58%***	
South San Francisco FerryService						
Purchased Transportation	$227,087	$1,210,922	$1,200,000	$1,212,041	$2,400,000	*50.5%*
Fuel - Diesel & Urea	22,959	179,636	288,600	179,396	577,200	*31.1%*
Other Direct Operating Expenses	32,350	199,540	249,250	228,130	498,500	*45.8%*
Admin Overhead Expense Transfer	3,369	24,397	21,750	21,176	43,500	*48.7%*
Sub-Total South San Francisco	**$285,765**	**$1,614,495**	**$1,759,600**	**$1,640,743**	**$3,519,200**	***46.6%***
Farebox Recovery	***24%***	***31%***	***36%***	***32%***	***36%***	
Total Operating Expenses	**$3,055,378**	**$18,834,267**	**$22,257,950**	**$19,627,088**	**$44,515,900**	***44.1%***
OPERATING REVENUES						
Fare Revenue	$1,383,557	$10,456,470	$11,319,800	$11,202,677	$22,639,600	*49.5%*
Regional - Bridge Toll	1,671,370	8,376,822	10,574,150	8,417,661	21,148,300	*39.8%*
Regional - Alameda Tax & Assessment	-		364,000	-	728,000	*0%*
Other Revenue	450	975	-	6,750	-	*0%*
Total Operating Revenues	**$3,055,378**	**$18,834,267**	**$22,257,950**	**$19,627,088**	**$44,515,900**	***44.1%***

San Francisco Bay Area Water Emergency Transportation Authority
FY 2018/19 Statement of Revenues and Expenses
For Six Months Ending 12/31/2018

Project Description	Dec-18 Total	Total Project Budget	Total Prior Expense	Total FY2018/19 Budget	Total FY2018/19 Expense	Total Future Year	*% of Total Project Budget Spent*
CAPITAL EXPENSES:							
FACILITIES:							
Terminal Construction							
Downtown Ferry Terminal Expansion - South Basin	2,668,785	$97,965,000	$46,780,727	$34,556,273	21,793,477	$16,628,000	*70%*
Richmond Ferry Terminal	1,724,353	21,000,000	11,134,262	9,865,738	8,582,949	-	*94%*
Maintenance and Operations Facilities							
Ron Cowan Central Bay Operations & Maintenance Facility	42,930	69,500,000	60,723,722	8,776,278	2,284,462	-	*91%*
Terminal Improvement							
Terminal Dredging - Vallejo and South San Francisco	1,357,414	5,100,000	106,999	4,993,001	2,159,303	-	*44%*
FERRY VESSELS:							
Vessel Construction							
445-Pax Replacement Vessel - M/V Vallejo	383,921	23,372,000	12,443,000	10,929,000	6,691,708	-	*82%*
445-Pax Expansion (Waterjet) Vessels - 2 vessels	776,473	46,745,000	15,557,743	20,187,257	5,532,974	11,000,000	*45%*
400-Pax Expansion (Propeller) Vessels - 2 vessels	768,625	33,400,000	26,533,692	6,866,308	3,905,729	-	*91%*
New Commuter Class High-Speed Vessel	3,089,905	15,300,000	93,374	9,106,626	4,466,359	6,100,000	*30%*
Vessel Rehabilitation and Refurbishment							
Vessel Mid-Life Refurbishment - M/V Peralta	2,170	5,117,000	2,929,906	2,187,094	2,026,465	-	*97%*
Vessel Engine Overhaul - M/V Intintoli and M/V Mare Island	2,438	3,000,000	-	1,500,000	4,950	1,500,000	*0%*
Vessel Qtr-Life Refurburbishment - M/V Scorpio	15,095	2,500,000	-	2,500,000	26,966	-	*1%*
Vessel Engine Overhaul - M/V Taurus	-	800,000	-	800,000	261	-	*0%*
Vessel Service Life Extension - M/V Solano	9,549	13,000,000	-	3,375,000	38,672	9,625,000	*0%*
CAPITAL EQUIPMENT / OTHER:							
CCTV Install and Network Intergration - East Bay Terminals	-	400,000	-	400,000	-	-	*0%*
Purchase Service Vehicles	-	500,000	27,088	472,912	43,319	-	*14%*
Purchase Selective Catalyst Reduction (SCR) System	-	200,000	-	200,000	-	-	*0%*
Total Capital Expenses	**$10,841,656**	**$337,899,000**	**$176,330,514**	**$116,715,486**	**$57,557,593**	**$44,853,000**	
CAPITAL REVENUES:							
Federal Funds	$1,401,936	$79,920,140	$33,033,731	$37,986,409	$8,694,251	$8,900,000	*52%*
State Funds	7,303,349	201,533,450	112,665,044	61,852,046	38,908,099	27,016,360	*75%*
Regional - Bridge Toll	2,132,918	53,222,010	29,605,664	14,899,706	9,544,553	8,716,640	*74%*
Regional - Alameda Sales Tax Measure B / BB	3,453	1,723,400	586,075	1,137,325	410,690	-	*58%*
Regional - Alameda TIF / LLAD	-	400,000	-	400,000	-	-	*0%*
Regional - San Francisco Sales Tax Prop K	-	1,100,000	440,000	440,000	-	220,000	*40%*
Total Capital Revenues	**$10,841,656**	**$337,899,000**	**$176,330,514**	**$116,715,486**	**$57,557,593**	**$44,853,000**	

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TO: **WETA Board Members**

FROM: **Peter Friedmann, WETA Federal Legislative Representative**
Ray Bucheger, WETA Federal Legislative Representative

SUBJECT: **WETA Federal Legislative Board Report – February 2019**

This report covers the following topics:

1. Government Shutdown Ended – For Now
2. Impacts of Government Shutdown – A Mixed Bag
3. Bay Area Members of Congress Get Key Subcommittee Slots

Government Shutdown Ended – For Now

Congress sent legislation to President Trump on January 25 that re-opened the portions of the federal government that had been shuttered since December. This includes the Department of Transportation, which houses Federal Transit Administration (FTA) and the Department of Homeland Security, which houses the U.S. Coast Guard. While this is positive news, the legislation only provides funding for those agencies through February 15. In other words, Congressional leaders must still come to agreement with President Trump on a deal that will fund the government through the end of the fiscal year (September 30).

It is too early to say whether an agreement can come together by February 15. It is not out of the question that the government could be shut down again starting February 16 if the more structural political issues cannot be resolved in the near term. We are tracking closely and are keeping WETA staff updated on the negotiations.

Impacts of Government Shutdown – A Mixed Bag

Due to WETA's diverse funding sources and the short length of the closure, the government shutdown did not have a significant impact on WETA's finances. The same cannot be said for some transit agencies around the country, including some of the nation's small, midsize and rural transit systems, which were forced to scale back service and furlough employees. This is because many of the smaller transit agencies (especially bus transit) don't receive significant support at the state and local level and are, therefore, more dependent on regular payments from the FTA – and all FTA payments were held up during the shutdown. Now that the government has re-opened, agency leaders worry that it could take months to process all the funding requests from all 50 states that have languished for a month. Also notable is that while WETA found the Coast Guard to be generally responsive, and managed to secure critical approvals related to new vessels under construction, other organizations that work with the Coast Guard found that the shutdown set them back a month (if not more), especially if the work they needed from the Coast Guard is generally performed by civilian employees at the agency, most of whom were furloughed during the shutdown.

Bay Area Members of Congress Get Key Subcommittee Slots
The House Transportation and Infrastructure (T&I) Committee formally “organized”, meaning that subcommittee assignments were awarded to committee members. All three T&I Committee members from the Bay Area (Reps Huffman, Garamendi and DeSaulnier) are on the Highways and Transit subcommittee, which means that all three will be in a good position to support additional funding for ferries, and in particular, will be well-positioned to advocate for WETA priorities, including additional funding for the Federal Highway Administration (FHWA) ferry formula program and the Federal Transit Administration (FTA) ferry grant program. Higher funding levels would mean additional funding for WETA capital projects. Increasing the level of funding for either program requires Congress to pass legislation.

Respectfully Submitted,

Peter Friedmann and Ray Bucheger

AGENDA ITEM 5c
MEETING: February 7, 2019

MEMORANDUM

TO: **Board Members**

FROM: **Nina Rannells, Executive Director**

SUBJECT: **State Legislative Update**

Recommendation
There is no specific staff recommendation at this time.

Background/Discussion
At the December 2018 meeting of the WETA Board of Directors, Barry Broad and Shane Gusman of Broad & Gusman LLP, WETA's state lobbying firm, provided the Board with an update on activities in Sacramento and noted the start of the upcoming 2019 state legislative session. As a part of this discussion, Board members identified the potential interest in new legislation that would address WETA's primary concern of funding limitations, especially given the current court challenge to RM3. Suggestions included:

- Pursuing legislation to provide WETA flexibility to roll over RM2 funds not spent in a fiscal year for use in future years, consistent with the provisions in RM3;
- Funding for other specific projects that may be critical to WETA's program that are at risk due to the unavailability of new RM 3 funds; and
- Funding for green vessel initiatives.

Staff is working with our state lobbyists to secure a placeholder for these or other items that the WETA Board may choose to pursue through the state legislative process in 2019.

END

AGENDA ITEM 6a
MEETING: February 7, 2019

SAN FRANCISCO BAY AREA WATER EMERGENCY TRANSPORTATION AUTHORITY
MINUTES OF THE BOARD OF DIRECTORS MEETING

(January 10, 2019)

The Board of Directors of the San Francisco Bay Area Water Emergency Transportation Authority (WETA) met in regular session at the Craneway Pavilion in Richmond, CA.

1. CALL TO ORDER – BOARD CHAIR

Chair Jody Breckenridge called the meeting to order at 11:02 a.m.

2. ROLL CALL

Chair Breckenridge, Vice Chair Wunderman, Director Anthony Intintoli, Director Jeffrey DelBono, and Director Nick Josefowitz were in attendance.

3. REPORT OF BOARD CHAIR

Chair Breckenridge welcomed attendees and reminded guests about the new Richmond ferry service launch celebration event that was scheduled to begin after the Board meeting. She said that she has continued to speak with state government and private entities about green initiatives and looks forward to sharing more about that as those discussions continue.

4. REPORTS OF DIRECTORS

Vice Chair Wunderman welcomed attendees and said that Directors were very excited about launching the new Richmond ferry service that day. He said that the passing of Regional Measure 3 by Bay Area voters in June of 2018 would allow even further expansion if the measure is able to survive the threats of several lawsuits challenging its validity. Vice Chair Wunderman said that in his conversations with the Metropolitan Transportation Commission about the Measure he remained optimistic. He added that he had joined the WETA Board to help make it into a cutting edge, world class transportation agency and continued expansion and green technology objectives will help to make it so. Vice Chair Wunderman further pointed to a letter he had sent to WETA Directors on hovercraft technology possibilities for WETA ferry service.

Director Intintoli congratulated the City of Richmond on the new ferry service.

Director DelBono said he would like to see WETA sponsor trips from Richmond to San Francisco for economically disadvantaged youth riders and indicated that he would work to further develop this concept. Chair Breckenridge agreed that the idea should be further explored.

Director Josefowitz said he was also very excited about launching the new Richmond service.

5. REPORTS OF STAFF

Ms. Rannells shared her written report with Directors. She noted that more than 400 passengers had ridden the new Richmond ferry service that morning. Ms. Rannells said that the launch of the new Richmond service had been achieved with the help of many entities, and she was very happy to see this day finally arrive.

Chair Breckenridge asked for an update on Treasure Island ferry service planning developments. Planning & Development Manager Kevin Connolly said that the City is presently in the process of identifying their specific transportation plans related to the Treasure Island development. He said WETA staff had continued to meet with the planning team regularly and had recently learned of two target dates; the residential unit buildout-driven date of approximately 2023 or 2024 for ferry service to be operational, and the optimistically ideal date of 2021, when the Board of Supervisors would like to see a working ferry on the island. Mr. Connolly said that WETA's regular meetings with the planners would continue.

Director Josefowitz said he would like to see a representative from the San Francisco County Transportation Authority make a presentation on the progress and plans for the Treasure Island development at a future Board meeting.

6. CONSENT CALENDAR

Director DelBono made a motion to approve the consent calendar which included:

a. Board Meeting Minutes – December 13, 2018
b. Approve Actions Related to Downtown San Francisco Ferry Terminal Expansion Project Enhancements
c. Approve Amendment to Agreement with FOTH Infrastructure & Environment, LLC to Provide Additional Engineering and Construction Management Services for the Ferry Terminal Dredging Projects

Director Intintoli seconded the motion and the consent calendar carried unanimously.

Yeas: Breckenridge, DelBono, Intintoli, Josefowitz, Wunderman. Nays: None.

7. OVERVIEW OF SMALL VESSEL EXPLORATORY STUDY

Mr. Connolly presented this informational item on the recent exploratory study to identify opportunities for WETA to pursue possible development of a small vessel fleet and services. He explained that the study was tasked to identify specific routes best suited for small vessel services and potential pilot routes where small vessels could be used to test market potential for ferry service.

Mr. Connolly introduced Anthony Bruzzone, Associate Principal from Arup North America (Arup) who, along with Lauren Dong from Arup, helped facilitate the Small Vessel Exploratory Committee's work. Mr. Bruzzone presented a slideshow for the Board of the Committee's findings thus far. There followed a robust conversation with general comments and concerns shared by Directors, including;

- the careful assessment of a community's geography when considering small vessel potential;
- the interest to connect existing public transit to WETA ferries;
- hub and spoke service ideas for North and South Bay communities;
- the possibility of contracting out the operation of smaller vessels;
- the passenger experience on smaller vessels;
- the interest in building less expensive terminal facilities faster than has been done historically, while still assuring public safety and ADA accessibility at all facilities, and;
- the interest in exploring hovercraft technology.

Directors agreed that the work to date was a good first step and that these efforts represent an exciting opportunity for future WETA service expansion. The Board directed staff to continue refining the work and to bring it back to Directors for discussion at a future date.

PUBLIC COMMENTS

City of Richmond Mayor Tom Butt said he was very happy that Richmond ferry service was launching. He said that it has been a full twenty years since the Richmond City Council first passed a resolution to institute ferry service. Mayor Butt thanked Ms. Rannells and Directors for their partnership and efforts to bring the ferry service to Richmond at last.

Dave Shoenthal of the Point Richmond Neighborhood Council said his wife commutes into San Francisco and is thrilled that the ferry has arrived in Richmond. He thanked Directors and the City of Richmond for bringing the new service to the City.

Sun Power Senior Director of Product and Brand, Mike Tonsing thanked the City of Richmond and WETA for bringing the ferry to Richmond. He said that many of Sun Power's 200 employees live in San Francisco and will be commuting via the new ferry service. Mr. Tonsing noted that WETA had been a great partner throughout the construction work on the terminal, grounds and parking lot.

Marsha Mather-Thrift, Executive Director of the Rosie the Riveter Trust, said that the museum has recently experienced an increase in visitors – from 20M to 70M visitors annually. She explained that the National Park was located exactly where guests of the meeting were presently sitting. Ms. Mather-Thrift said that she was very excited about the ferry and in partnering with WETA to add future weekend service to bring even more visitors to the museum to learn about Richmond's rich and vibrant waterfront history.

Matt Lewis from Visit Richmond said he worked in the tourism office for the City of Richmond and was very happy to be promoting the new ferry service to visitors.

Brandon Evans of the City of Richmond Economic Development Commission extended an invitation to Directors to come out and talk with the Commission about WETA's service offerings and future plans for expansion.

Richmond City Councilmember Demnlus Johnson III welcomed WETA to Richmond and thanked Directors and Mayor Butt for their partnership and work to bring the new ferry service to the City. He said he was very excited about the new service, the possibilities it will afford Richmond residents, and most especially the cars that will be removed from Highway 80 commute traffic because of it.

Chair Breckenridge acknowledged receipt of three letters received by the Board since the last meeting including:

- A December 18, 2018 letter from City of Richmond Mayor Tom Butt requesting that WETA use RM3 funds to supplant Measure J funds earmarked by Richmond to support the new Richmond ferry service in order to provide the City of Richmond the flexibility to leverage Measure J money to fund other ferry-related projects and/or services in West Contra Costa County.
- A January 7, 2019 letter to the Board from the Bay Area Council, signed by Vice Chair Wunderman in his capacity as a WETA Board Director, detailing the potential benefits of hovercraft technology and requesting that WETA conduct a study on its use in the Bay Area.
- A January 9, 2019 letter, from City of Alameda Senior Transportation Planner Rochelle Wheeler, expressing support for WETA's small vessel study and encouraging WETA to consider a pilot route between Alameda and Jack London Square to test out the viability of smaller vessels.

All business having been concluded, the meeting was adjourned at 12:15 p.m.

- Board Secretary
END

AGENDA ITEM 7
MEETING: February 7, 2019

MEMORANDUM

TO: **Board Members**

FROM: **Nina Rannells, Executive Director**
Kevin Connolly, Planning & Development Manager

SUBJECT: **Status of Treasure Island Transportation Program**

Background
Staff has invited representatives from the San Francisco County Transportation Authority (SFCTA), acting in their capacity as staff to the Treasure Island Mobility Management Agency (TIMMA), to provide an overview and status report on plans for Treasure Island transportation, including ferries.

A development partnership led by Lennar Urban Corporation secured approvals to redevelop the former Treasure Island Naval Station in 2011. The Treasure Island Transportation Implementation Plan was also adopted by the San Francisco Board of Supervisors in 2011. The Plan conceived of ferry service as an integral part of transportation improvements on the island including buses, shuttles, bicycling and pedestrian infrastructure, and strict parking fees and toll charges for private automobiles.

Discussion
WETA staff has worked with SFCTA staff for the last ten plus years to support the planning and development of Treasure Island ferry service. Work has included terminal design activities, service concept development, exploration of vessel size and type and development of potential system budgets and fares. This work involved significant good-faith efforts to develop a project Memorandum of Understanding outlining roles and responsibilities of the various partner agencies, including WETA as the service operator, for moving this new public ferry transit service project forward. Plans and discussions regarding this service have historically assumed a WETA-operated service with Treasure Island terminal and vessels to be funded through the developer or TIMMA program consistent with the City's plans. In recent years, as a part of the ongoing staff dialog and work on the service concept and budget, WETA has - amongst other things - participated in discussions with SFCTA staff regarding opportunities to partner to seek additional external grant funds to support the planned program, explored the potential to utilize hybrid-electric or all-electric ferries to operate the service, and most recently, studied the option of utilizing small vessels to provide the planned level of service. WETA has focused its capital resources on expanding the downtown San Francisco ferry terminal in order to be able to accommodate this new service along with other planned WETA ferry expansion services.

The TIMMA Program will launch in the fall of 2021. The TIMMA Board is scheduled to adopt program policies later this year including recommended tolling hours and toll rates, an affordability program and recommended transit service levels. Additional planning activities will be completed prior to the program launch including tolling and ferry service planning and completion of the infrastructure required to accommodate the new tolling and new ferry service.

Ferry terminal construction is the responsibility of the development team, and construction is scheduled to start this summer. Ferry vessel purchase and operations and maintenance

costs are anticipated to be funded with a combination of toll and parking revenues, fares and other funding sources as available.

TIMMA staff will provide an update on the transportation program and current ferry service planning efforts, timeline and funding at the meeting.

END

AGENDA ITEM 8
MEETING: February 7, 2019

MEMORANDUM

TO: **Board Members**

FROM: **Nina Rannells, Executive Director**
Kevin Connolly, Planning & Development Manager
Mike Gougherty, Senior Planner/Project Manager

SUBJECT: **Authorize Public Outreach for Special Event Fare Change**

Recommendation
Authorize staff to initiate public outreach on proposed special event fare changes for Alameda/Oakland and Vallejo ballpark services.

Background
WETA currently operates two special event services featuring direct ferry service between AT&T Park and the cities of Alameda/Oakland and Vallejo during most San Francisco Giants home games. Fares for these special event services are evaluated and adjusted outside of the FY 2015-2020 WETA Fare Program for regular services, pursuant to the WETA Fare Policy objective that special event services recover their full incremental operating costs through farebox or other special revenues.

WETA established the current ballpark fare structure and rates in 2015. Fares for the ballpark services have remained unchanged since then as annual reviews have concluded that revenues generated by these services have been sufficient to cover operating expenses. Current fares for the Alameda/Oakland and Vallejo ballpark services are as shown in Table 1 below:

Table 1: Current WETA Ballpark Fares

Service	Adult	Youth	Senior/Disabled
Alameda/Oakland	$7.50	$5.60 (5-18)	$5.60
Vallejo	$14.20	$10.60 (5-18)	$10.60

Discussion
Staff has evaluated the financial performance of the special event ballpark services to determine if these services have recovered their incremental operating costs during the 2018 season and has prepared a financial projection for 2019 in order to determine whether a fare change is necessary for the next season. For purposes of this evaluation, staff considers a farebox recovery ratio in the range of 90% to 110% as indicative that a special event service has met the requirement of WETA's Fare Policy. A range is allowed to account for minor annual variations in revenues and costs and inherent challenges in precisely accounting for all incremental costs associated with each service. Based upon this financial review, staff has concluded that the fares collected for the 2018 year met the acceptable range, but that a change to the current special event fares is necessary for the 2019 season.

Alameda/Oakland Ballpark Service

The Alameda/Oakland ballpark service plan includes direct roundtrip service for weeknight and weekend ballgames (no direct service for weekday day games). During the 2018 season, the service carried 32,747 passengers and collected $232,461 in fare revenue. This revenue offset approximately $241,000 in incremental operating costs resulting in a farebox recovery ratio of 97%, as shown in Table 2 below.

Table 2: Alameda/Oakland Financial Performance

Season	Ridership	Total Revenue	Total Cost	Farebox Recovery
2016	35,846	$255,247	$275,968	92%
2017	33,536	$236,459	$225,743	105%
2018	32,747	$232,461	$240,855	97%
2019 (Projected)	32,747	$232,461	$298,026	78%

Ridership for the Alameda/Oakland ballpark service declined slightly from the previous 2017 season and substantially from the all-time high of 41,628 riders in 2015. This is likely due to higher capacity vessels that previously operated on the service being unavailable. Total costs for 2018 increased by approximately 7% from the 2017 season due to normal escalation of contract labor rates and a rise in the cost of fuel.

For the 2019 baseball season, the Giants have announced a plan to move up the start time of most weekday night games from 7:15 to 6:45pm. In previous seasons, WETA has directly served weekday games with a 7:15pm start time by incurring overtime expenses for afternoon crews already called into regular WETA services. Because the new 6:45pm start time overlaps with the peak afternoon commute period, WETA will no longer be able to do this without significantly impacting its regular commute services.

In order to continue providing direct service to the ballpark from Alameda/Oakland on weekday nights, staff has concluded that an additional afternoon weekday crew will be required. On game days, this crew will operate direct service between Alameda/Oakland and the ballpark. The cost of this crew will be partially offset by eliminating overtime expenses that were previous incurred using existing crews to serve weekday night games. On non-game days, this crew will be used to perform various tasks required for WETA such as support for United States Coast Guard security inspections, facility maintenance, and vessel fit-ups. Additionally, on non-game days this crew will available as an “extra board” to fill-in for absent crew members and potentially reduce the number of missed trips during afternoon commute periods.

Staff estimates that total operating expenses for the 2019 Alameda/Oakland ballpark service will increase by approximately 24%. This is largely due to the expense of hiring an additional afternoon crew to work weekday night games, but also takes into account normal escalation of contract labor rates and an anticipated increase in the cost of fuel. Consistent with previous seasons, staff does not project a change in ridership demand or total fare revenue. Based on these assumptions, the Alameda/Oakland ballpark service is projected to recover approximately 78% of its total operating expenses at current fares.

Vallejo Ballpark Service

The Vallejo ballpark service plan includes direct roundtrip service during weekday day and weekend games, and direct return service during weekday night games (no direct service to weekday night games). During the 2018 season, the service carried 29,103 passengers and

collected $381,378 in fare revenue. This revenue partially offset approximately $400,000 in incremental operating costs resulting in a farebox recovery ratio of 95%, as shown in Table 3 below.

Table 3: Vallejo Financial Performance

Season	Ridership	Total Revenue	Total Cost	Farebox Recovery
2016	30,757	$409,766	$347,831	118%
2017	29,240	$386,654	$356,629	108%
2018	29,103	$381,378	$399,679	95%
2019 (Projected)	29,103	$381,378	$426,050	90%

Ridership for the Vallejo ballpark service was virtually unchanged from the 2017 season and only slightly down from its all-time high of 30,757 riders during the 2016 season. Steady ridership for the Vallejo service is likely due to consistency in the size of vessels used for the service and relatively high vessel occupancy rates, indicating a generally strong demand for the service. For the 2018 season, total operating expenses increased by approximately 12% due to normal escalation of contract labor rates and an increase in the cost of fuel, which is a more significant cost factor for the long-haul Vallejo service than the Alameda/Oakland route.

For the 2019 season, the Vallejo ballpark service plan, ridership, and total revenue are all anticipated to remain unchanged. Staff estimates that total operating expenses for 2019 will increase by approximately 7% due to normal escalation of contract labor rates and an anticipated increase in the cost of fuel. Based on these assumptions, the Vallejo ballpark service is projected to recover approximately 90% of its total operating expenses at current fares.

Proposed Fare Changes

Staff analysis indicates that if fares are held at the current rate, the Alameda/Oakland ballpark service is projected to recover 78% of its operating costs and the Vallejo ballpark service is projected to recover 90% in 2019. In order to meet WETA's Fare Policy objective that special event services recover their full incremental operating costs through farebox or other special revenues, staff is proposing fare changes for each ballpark service for the 2019 Giants season, as shown in Table 4 below.

Table 4: Proposed 2019 Special Event Fares

Service	Adult	Youth	Senior/Disabled
Alameda/Oakland	$9.60 ~~$7.50~~	$7.20 ~~$5.60~~	$7.20 ~~$5.60~~
Vallejo	$15.90 ~~$14.20~~	$11.80 ~~$10.60~~	$11.80 ~~$10.60~~

The proposed fares are anticipated to generate enough revenue to fully offset the incremental operating costs for each service and would represent an increase of 28% for Alameda/Oakland ballpark fares and 12% for the Vallejo ballpark fares. The last fare increase for these services occurred in 2015.

Next Steps

Pending Board authorization, staff will begin the outreach process to solicit comments on the proposed new fares by notifying the general public and WETA passengers through on-board flyers, email and information on the WETA/San Francisco Bay Ferry website. After a period of thirty days, the following steps would be taken:

- February/March 2019: Consider public input and develop a final recommended special event fare structure and fares for the upcoming 2019 Giants season;
- March 2019: Hold public hearing to receive input on the recommended ballpark fare structure and fares and present a final recommendation to the Board for approval; and
- March/April 2019: Implement special event fare changes for 2019 Giants ball park service season, pending Board approval.

Fiscal Impact

The public outreach and public hearing are expected to cost less than $2,000 for materials production, public notification and other associated costs. These costs will be covered by this year's Operating Budget.

END

AGENDA ITEM 9
MEETING: February 7, 2019

MEMORANDUM

TO: **Board Members**

FROM: **Nina Rannells, Executive Director**

SUBJECT: **Request for WETA to Conduct a Feasibility Study of Hovercraft Service**

Recommendation
There is no staff recommendation associated with this item at this time.

Background
In June 2011, the WETA Board of Directors received and discussed a Hovercraft Feasibility Study, dated April 2011 (provided as ***Attachment A***), that represented a screening-level evaluation of the feasibility of using hovercraft to provide commuter service from the cities of Hercules, Martinez and Antioch to downtown San Francisco. The study was initiated at the request of these cities but was especially pertinent to WETA's work with the City of Hercules to develop plans for a ferry terminal located along the San Pablo Bay shoreline just north of Hercules Point, where the City of Hercules was planning an intermodal transit facility as a separate but related project. While a good location on the landside, serving this site with conventional vessels would have required WETA to dredge a new channel of about two miles in length which would require maintenance dredging every two to three years to ensure adequate navigational depth, making a conventional ferry terminal at this site infeasible.

The April 2011 Hovercraft Feasibility Study identified existing commercial hovercraft services, provided a high-level look at operating and capital costs, identified environmental and operational considerations and provided a first look at the pros and cons of utilizing hovercraft over conventional vessels in WETA's system. The study recommended more in-depth work in the event that WETA elected to proceed to consider developing a parallel hovercraft system. At the time, the WETA Board did not elect to further consider hovercraft and, in consultation with Contra Costa County transportation officials, WETA directed its attention to developing and building the new Richmond ferry service.

Discussion
At the January 10, 2019 meeting of the WETA Board of Directors, Vice Chair Wunderman requested that his January 7, 2019 letter requesting WETA to fund a feasibility study of hovercraft service be placed on the February meeting agenda. This letter, provided as ***Attachment B***, describes past and recent efforts by WETA and the Bay Area Council to investigate hovercraft vessel technology as a possible complement to existing WETA high speed catamaran service on the San Francisco Bay and requests that the WETA Board consider funding a feasibility study on hovercraft service as a follow up to WETA's previous work on this subject. This item provides the opportunity for the Board to discuss this request and provide staff with direction on this matter.

END

Attachment Ai

AGENDA ITEM 14
MEETING: June 2, 2011

MEMORANDUM

TO: **Board Members**

FROM: **Nina Rannells, Executive Director**
John Sindzinski, Manager Planning & Development

SUBJECT: **Hovercraft Feasibility Study Report and Discussion**

Recommendation
This is an information item only; no formal action by the Board is requested.

Background
In June 2006, WETA began work on the environment assessment and conceptual design of a project to construct a Hercules ferry terminal that would provide commuter service to Downtown San Francisco as one of the preferred expansion routes identified in the Implementation and Operations Plan. The proposed project is located along the San Pablo Bay shoreline just north of Hercules Point, where the City of Hercules is also planning an Intermodal Transit Facility as a separate but related project. To date, WETA has developed a conceptual plan and undertaken significant portions of the required environmental assessment. Further development of the ferry terminal project is currently on hold, as the City of Hercules continues to work through its environmental review process and project funding issues for the related Intermodal Transit facility, which is an integral part of the ferry terminal plan.

Notwithstanding the City's efforts to complete the environmental assessment of the Intermodal Transit Facility, WETA has identified potentially significant constraints that need to be addressed before resuming development of the Hercules ferry terminal project. One of the most significant issues to emerge is the extent and associated cost of dredging that will be required for the terminal site to be accessible to ferry vessels. A preliminary coastal engineering analysis completed by Coast and Harbor Associates indicates that the basin of San Pablo Bay near the shoreline of the project site is very shallow and subject to rapid sedimentation. In order for ferry vessels to access the proposed terminal site, WETA would need to dredge a channel of about two miles in length, which would require maintenance dredging every 2 to 3 years to ensure adequate navigational depth.

The extent and magnitude of this issue is compounded by the fact that at least the initial dredge spoils are likely contaminated. The project site is adjacent to a location where a dynamite factory previously existed and ships were loaded with high explosives. As a result of these factors, the analysis estimated that the initial dredging would cost upwards of $17 million due to the associated cost of removing and properly disposing of a high volume of potentially contaminated dredge materials. Subsequent maintenance dredging that would occur every 2 to 3 years is estimated to cost roughly $3 million per event, which would result in a long term operational cost unprecedented by any current services operated by WETA or planned services under study.

Officials for the City of Hercules are aware of the potential costs associated with dredging and the issues this presents to the financial feasibility of the project. In response, the City met with WETA staff during the fall of 2010 and proposed that hovercraft might be an alternative vessel technology that could work in Hercules and reduce or eliminate the need for initial and maintenance dredging. Staff agreed to evaluate the use of hovercraft for the project and hired URS Corporation to conduct a feasibility study, a copy of which is attached to this memorandum.

Discussion

As the attached Hovercraft Feasibility Study indicates, the implementation of hovercraft as an alternative vessel technology for ferry services such as the proposed Hercules project presents both some advantages and disadvantages. The most obvious advantage is that hovercraft vessels do not require dredged channels to access ferry terminal facilities and would therefore eliminate costly initial and recurring dredging requirements to provide a navigable channel. Furthermore, preliminary discussions with terminal construction contractors have indicated that a Hercules ferry terminal supporting hovercraft service could be built without any dredging of the nearby basin whatsoever.

Another significant advantage of hovercraft is that they can travel at 30% or faster speeds than conventional catamaran ferry vessels. This greatly reduces travel time and is accomplished at no appreciable increase in operating costs relative to catamarans, as evaluated in the Study. In this regard, hovercraft is suitable for longer distance commutes, such as planned ferry services from Martinez and Antioch to Downtown San Francisco, where faster travel times would reduce headways and potentially allow for more frequent peak period service.

Hovercraft vessels are also capable of operating in a broad range of locations with fewer facilities and terminal infrastructure required to support operations relative to conventional ferry vessels. However, hovercrafts are unable to access terminal facilities built and designed for conventional ferry vessels, such as those that facilities that currently exist in the Bay Area and are being planned and developed by WETA. The inability of hovercraft vessels to provide service to most, if not all, existing and future San Francisco Bay terminals would significantly limit their utility in the event of a regional disaster that required deployment of emergency water transit services.

Another significant drawback of utilizing hovercraft vessels are size and passenger carrying capacity. To date, the largest hovercraft built and operated in regular service can carry only 199 passengers. This limitation is significant as these vessels would only be able to be utilized on routes with lower ridership potential. This is especially important given that the demand for service could easily outstrip passenger carrying capacity during the typical 30-year useful life of ferry vessels or in the event of an emergency.

The amenities offered by hovercraft vessels, or lack thereof, are also a concern. From a passenger standpoint, hovercraft vessels are more akin to airplanes than typical ferry boats. On existing hovercraft vessels currently in operation, passengers sit in seats as they would on a plane and generally don't move around when the boat is in transit. There are no outside areas to view the Bay from or much space, if any, for bicycles. Altogether the ride is geared for speed, it does not provide many of the amenities and comforts most Bay Area ferry patrons like about their commute.

Staff is also concerned that there will likely be resistance, perhaps quite significant, to the implementation of hovercraft service from an environmental standpoint, particularly regarding potential noise impacts. While newer technologies are quieter, the perception is that

hovercrafts are far nosier than conventional ferry vessels. The major concern with noise would be where hovercraft vessels would dock in San Francisco as the Ferry Building area surrounding the Downtown San Francisco Ferry Terminal is heavily populated with pedestrians, restaurants, and other commercial visitors and office workers. At a minimum, some sort of demonstration of the hovercraft technology in operation would be needed to not only test the noise impact but also to gauge public acceptance of these vessels. Additionally, perception issues may exist concerning other potential environmental impacts relating to aquatic species, water quality, and safety, as summarized in the Study.

In terms of evaluating the feasibility of hovercraft as an alternative vessel technology for the proposed Hercules ferry service, staff concurs with URS' finding that additional research is needed. Of particular concern is how much utility hovercraft vessels will provide in meeting the long-term ridership estimates for the Hercules services, which are currently being updated by WETA. Another important consideration is whether the hovercraft vessel technology would work for other proposed ferry service routes currently under study by WETA. It should be emphasized that hovercraft are very different than catamarans and would require wholly different operations and maintenance practices and materials, as well as different docking facilities and maintenance berths. Staff is concerned that it would be difficult to justify a radical change to hovercraft for a single route.

Fiscal Impact

There is no direct fiscal impact as this is an informational item only.

Attachment Aii

The San Francisco Bay Area
Water Emergency Transportation Authority

Hovercraft Feasibility Study

Prepared by:
URS

April 2011

WATER EMERGENCY TRANSPORTATION AUTHORITY
WETA

Final Hovercraft Feasibility Study

Prepared for

Water Emergency Transportation Authority

Prepared by

URS Corporation
Post Montgomery Center
One Montgomery Street, Suite 900
San Francisco, CA 94104-4538

April 20, 2011

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1.0 INTRODUCTION

This report presents a screening-level evaluation of the feasibility of using hovercraft (air-cushion vehicles) to provide commuter service from the cities of Hercules, Martinez, and Antioch, to the San Francisco Ferry Building. The assessment was prompted by two considerations; that use of hovercraft could mitigate the need for a major dredging program at Hercules, and secondly, that hovercraft could reduce travel times from more distant terminals including Martinez and Antioch. Because hovercraft can cross the shoreline at any location where there is beach, mudflat, or other gradual transition from water to the shore, hovercraft also are well suited to assist emergency response activities.

A ferry terminal at Hercules using conventional catamarans would require a substantial initial dredging program (Water Emergency Transportation Authority [WETA], Draft Hercules Environmental Impact Statement). Due to historic industrial activity, some sediment is likely to be contaminated with residue from manufacturing processes. Maintenance dredging volumes are also expected to be significant at Hercules.

By water, Martinez and Antioch and are approximately 32 and 51 miles from San Francisco, respectively. Conventional catamaran ferries used on longer routes travel at service speeds of 35 knots (40 miles per hour [mph]) which, including time to slow and dock, results in trip times to Martinez and Antioch of approximately 1 hour and 1.5 hours respectively. In calm conditions, hovercraft can travel at service speeds of 45 to 50 knots (52 to 58 mph), resulting in a potential 25 to 30 percent reduction in trip time, and hence, a trip time to Antioch closer to 1 hour.

Hovercraft operations have proved to be feasible at locations where constraints such as shallow water access or remoteness preclude the use of conventional high-speed catamaran vessels. Existing services considered in this study that use hovercraft capable of carrying 100 or more passengers include the commercial and emergency service between King Cove and Cold Bay in the Alaskan Aleutians, and the long-running service operated by British Hovertravel in England connecting Southsea, Portsmouth with the Ryde on the Isle of Wight.

The remainder of this section provides an overview of existing large commercial hovercraft and two services from which performance data have been collected. Section 2 addresses capital and operation costs, and Section 3 presents environmental considerations. Operational considerations including docking requirements are discussed in Section 4. Section 5 presents conclusions and recommendations.

1.1 COMMERCIAL HOVERCRAFT

Griffon Hoverwork, Ltd (GHL) in Southampton, England, is the largest manufacturer of commercial hovercraft designed to carry 100 or more passengers. GHL's designs for British Hovertravel, the BHT-130 through BHT-180 design series, are configured to carry 130 through 180 passengers, respectively. GHL also builds emergency response and military hovercraft. The North American representative and builder of GHL designs, Kvichak Marine Industries, Seattle provided information on GHL hovercraft for this study. Kvichak is familiar with WETA's vessel needs having constructed the four WETA ferries, *Gemini*, *Pisces*, *Scorpio* and *Taurus.*

While a number of hovercraft designs capable of carrying 100 or more passengers have been proposed by manufacturers in the United States, including EPS (the EPS P-100), Sea Air, and Hover-Shuttle, no commercial hovercraft of this size have been manufactured by these companies. EPS is constructing a military version of the EPS P-100.

Kvichak constructed *Suna-X*, shown in Photograph 1, used on the King Cove, Alaska service that connects King Cove with the nearest airport 8 miles across Cold Bay. The hull for *Suna-X* is based on the BHT-150 design. While the BHT-150 design is capable of carrying 150 passengers, the upper deck was of *Suna-X* modified to carry emergency vehicles weighing up to 18,000 pounds (approximately equivalent to the weight of 100 passengers) hence, the *Suna-X* has a smaller cabin which can hold 49 passengers.

Photograph 1: BHT-150 Design *Suna-X*, King Cove, Alaska

Emergency vehicles drive onto the hovercraft using a bow loading ramp which can be seen in folded position in Photograph 1. Photograph 2 shows the *Suna-X* in loading position on the beach in Cold Bay, Alaska.

Photograph 2: *Suna-X*, Cold Bay, Alaska

Suna-X is powered by four MTU 2000 series diesel engines. Two 1,205-horsepower (hp) thrust engines are connected to 11-foot 5-inch diameter variable-pitch 5-bladed propellers. Two 905-hp engines provide both lateral control through the bow nozzles and lift. The 5-bladed propellers and bow nozzles can be seen in Photographs 1 and 2. Fully loaded operational speed is 35 knots but in good conditions with a light load it can reach 50 knots. Fuel consumption is approximately 80 U.S. gallons per hour (gal/hr) (J. McGrath, personal communication). *Suna-X* noise data are discussed below.

In 2007, GHL constructed the *Solent Express*, a BHT-130 design, to cross the Solent, the channel separating the Isle of Wight from England. Photograph 3 shows the *Solent Express* (5-bladed propellers) on the Ryde Hoverport ramp on the Isle of Wight between two older API-88 hovercraft (4-bladed propellers). The Ryde Hoverport is adjacent to the Esplanade, a commercial corridor. Aircraft-style side stairways are used for loading and unloading passengers. At both Ryde and Portsmouth (Photograph 4), sloping concrete ramps allow the hovercraft to use gravity to move towards the water before full thrust is engaged to push away from the ramps.

Photograph 3: BHT-130 *Solent Express* (center), Ryde, Isle of Wight

Photograph 4: *Solent Express* departing Portsmouth

Before entering service to the Isle of Wight, the *Solent Express* was chartered in July 2007 for trial runs on a proposed 12.9-mile, 20-minute, service crossing the Forth Estuary north of Edinburgh. The trial was monitored in detail, including both noise and fuel consumption data. A total of 32,099 passengers were carried on 288 trips yielding a load factor of 85.7 percent. Average fuel consumption was much better than had been projected measuring 77 gal/hr (209 liters per hour [L/hr]) at an operating speed of 37 knots (42.5 mph).

Both the BHT-130 and BHT-150 designs are designed to operate in significant wave heights of up to 6.5 feet (2 meters [m]) and maximum wave heights of 10.5 feet (3.2 m) while maintaining passenger comfort. As can be seen in Photograph 2, hovercraft can also travel over rougher surfaces such as sea ice ridges and can be configured to clear up to 4 m obstacles if necessary.

2.0 CAPITAL AND OPERATION COSTS

2.1 VESSEL COSTS

The capital costs for commercial 149 to 199 passenger hovercraft are in the range of $10 to $12 million. This range is based on actual costs to construct the *Suna-X* and *Solent Express* hovercraft, plus 2010 estimates to construct BHT-150 and BHT-160 vessels.

For comparison, the WETA 149-passenger catamarans *Gemini* and *Pisces*, ordered in 2006, and the 199-passenger *Scorpio* and *Taurus*, ordered in 2007, cost $17 million and $18 million respectively. Each price is for two vessels and includes some spares. If the vessels had been ordered individually, the price per catamaran would have been higher. Table 1 shows capital costs for hovercraft and catamarans are similar.

TABLE 1
VESSEL CAPITAL COSTS

Vessel	Passengers	Crew	Cost
BHT-150 (2007)	150	2+	$ 8.7M
BHT-150 (2010)	150	2+	$10.0M
BHT-160 (2010)	160	2+	$11.5M
WETA Catamaran (2006)	149	3	$8.5M
WETA Catamaran (2007)	199	3	$9.0M

2.2 OPERATING AND MAINTENANCE COSTS

The operating costs for a 150-passenger hovercraft including crew and fuel are estimated to be approximately $800/hr which includes approximately $100/hr in allocated maintenance costs for propellers, skirts, and engines. Amortization of the $11.5M capital cost for a BHT-160, assuming 100 percent financing over 20 years, yields an annual cost of $1.17M.

Catamaran operating costs in the Bay Area vary quite widely as shown in Table 2. The table shows bundled cost data (operating and maintenance expenses) per revenue hour for three Bay Area ferry services listed in the National Transit Database (NTD, 2010) for years 2007 through 2009, which is the most recent year in the database. In 2009, the operating costs per revenue hour ranged from $820 for the Alameda service to almost $1,700 for the Golden Gate Vallejo service

TABLE 2
BAY AREA FERRY SERVICES
VESSEL O&M EXPENSES PER REVENUE HOUR

Service	2009	2008	2007
City of Alameda	$820	$845	$756
City of Vallejo	$1,330	$1,434	$1,268
Golden Gate Ferry	$1,689	$1,551	$1,396

WETA will be taking responsibility for operating the City of Alameda ferry service in 2011. Based on the adopted budget for 2011, the bundled operating and maintenance cost of the ferries is approximately $900 per vessel revenue hour, consistent with the overall trend shown in Table 2.

Insurance is expected to be similar for hovercraft and catamarans. Insurance is dependent on location, operating conditions, support available, and the experience of the operating company. Since hovercraft and catamarans would be operating in the same location and with similar support by an experienced company, there should not be significant difference in insurance costs by vessel type.

Annual propeller maintenance costs are expected to be substantially reduced when advanced composite Hartzell propellers and hubs (made in the United States) replace the Hoffmann wood laminate propellers (made in Germany) currently used on BHT designs (see Section 3.1). The interval between maintenance for composite propellers is expected to be 5 to 6 times longer than that for wood laminate propellers. Skirt wear is a function of operating conditions; movement across rough surfaces such as concrete causes more wear than over water. Conceptual designs of landing pads and platforms would enable skirt life to be estimated for a San Francisco Bay service.

2.2.1 Lifecycle Costs

To provide context, the predicted lifecycle costs for hovercraft were compared with those for standard WETA catamarans. Engine maintenance for catamarans and hovercraft would be similar assuming that engine refits for catamarans would use engines similar to the 16V2000 MTU engines currently used on the WETA Gemini class ferries. The costs of maintaining the

main engines on 150 passenger variant BHT hovercraft are comparable to those on WETA catamarans. For example, BHT hovercraft use four similar engines as WETA – but lower powered - aboard the *Solent Express* in the UK. Hovercraft engine maintenance would utilize similar Time Between Overhauls (TBO) intervals (manufacturer's recommended maintenance interval) and hence the costs for interim engine maintenance (head swings) and full maintenance (top-end overhauls) also would also be similar, on a per engine basis.

In many cases, TBOs are based on fuel consumption rather than time in service, given that moderate engine use should extend the required overhaul periods. Since the fuel consumption of catamarans and hovercraft are fairly similar, the overhaul costs should also be similar.

The unique system costs associated with hovercraft related to the skirts, skirt fingers, and propellers, as follows:

Main Vessel Skirt

The main skirt on a 150-passenger hovercraft should have a service life on the order of 20,000 hours and has a replacement value on the order of a $1 million. The main skirt is typically replaced once every 5 or 10 years depending upon the duty cycle of the vessel. The life-cycle replacement cost for the main skirt translates to approximately $50 per operating hour.

Flexible Skirt Fingers

The main skirt has a number of flexible components which do require regular replacement including finger skirts which are used to direct air flow and to conform to terrain. The wear rate for these components varies as a function of the period of exposure to water versus harder wearing surfaces such as concrete, sand, and rocks. A typical rate of wear in heavy duty service (rough surfaces) would require 'finger' change outs every 1,000 operating hours. A full set of replacement fingers cost approximately $25,000. The potential impact to operating costs is therefore on the order of $25/hr. A more accurate estimate of this cost could be developed for the Bay Area operating environment based on a trials program that incorporated operating on/over the terrain the same as the proposed landing sites at Antioch, Martinez and Hercules.

Air Propellers

The maintenance cost for European-made wood-laminate propellers used on existing heavy duty commercial operations are on the order of $90 per operating hour (to cover cyclic overhaul and certification costs). These costs are based on TBO's of 2,000 hours or less. However, large hovercraft in Canada and the U.K. are currently concluding multi-year trials programs using North American-made composite propellers that have significantly longer TBO's and potential hourly operating costs on the order of $30/hr.

It should be noted that the amphibious ability provided by the skirts and air propellers allows complete hull inspections and maintenance work to be carried out at a terminal facility, thus negating the requirement for regular dry-dock inspections and repair.

2.3 FUEL CONSUMPTION

Fuel consumption rates for BHT-design vessels are better than equivalent high-speed catamaran ferries. Fuel rates are also substantially better than early hovercraft including the API-88 due to improvements in engine and propeller designs. The 130-passenger *Solent Express* has been shown to consume 290 L/hr or 77 gal/hr. The larger (1-bay longer) 150 passenger design *Suna-X* is achieving 80 gal/hr.

These fuel consumption numbers compare favorably with WETA's existing fleet of 149- and 199-passenger catamaran vessels which consume fuel at a rate of approximately 100 gal/hr at a service speed of 25 knots (Keith Stahnke, personal communication). Larger 350-passenger 35-knot catamaran ferries consume fuel at a rate of 150 gal/hr.

2.4 CREW

Crew of a captain plus two deck hands will be required for hovercraft carrying 150 passengers or less. Similarly, WETA 149 and 199-passenger catamarans operate with a crew of 3, consisting of a licensed master and two deckhands.

A 149-seat hovercraft, such as the *Suna-X*, operates under U.S. Coast Guard T-Class certification.

The U.S. Coast Guard requires training for hovercraft and type ratings can be issued once an accredited training program has been completed. For example, an approved training program has been developed by Seamasters Amphibious Solutions Inc., and the U.S. Coast Guard which allows Seamasters to issue approved type ratings. The rating includes 100 hours of time in control of a hovercraft, some of which can be logged during route proving and passenger runs. Experienced catamaran operators should not have difficulty getting this type rating.

2.5 TRAVEL TIME

The marine distances from Antioch, Martinez, and Hercules to San Francisco are 43, 28, and 20 nautical miles respectively (51, 32, and 23 miles). Hovercraft operational speeds in calm

conditions can reach 45 knots to 50 knots (52 to 58 mph) with more typical speeds closer to 40 knots. On the relatively short 12.5-mile Edinburgh service where departure and arrival contributed a greater percentage of total travel time, the average speed achieved during the trails was 37 knots. On the longer runs, departure and arrival modes are a smaller percentage of total time and 40 knots should be achievable.

At 40 knots and adding 10 minutes for transition time during departure and arrival, trip times from Antioch, Martinez, and Hercules to San Francisco would be 75, 52, and 40 minutes respectively. At 45 knots, the trip times reduce to 67, 47, and 37 minutes respectively.

3.0 ENVIRONMENTAL CONSIDERATIONS

Studies investigating the potential environmental impacts of hovercraft have been performed in North America and Great Britain. Environmental studies were performed during the planning stage of the King Cove service and separate studies were performed in Alaska for the U.S. Postal Service's use of API-88 hovercraft to delivery large items of mail to remote locations over water and ice. Environmental assessments have also been performed for Canadian Coast Guard operations and during the trail service in Scotland. Potential issues that have been addressed include surface and underwater noise, disturbance of birds and marine mammals, and wake.

Sound Levels:
Sound levels from thrust propellers and lift engines have been a primary environmental concern and continue to be the first issue raised when hovercraft are mentioned. However, improved engine and propeller designs focusing on reducing sound levels have be implemented with the result that hovercraft are now significantly quieter than the designs developed in the 1960s. Developments and data from recent sound studies are discussed in more detail in Section 3.1 below. Section 3.2 discusses air emissions.

Bird Disturbance:
The potential for hovercraft to disturb birds was studied for the Alaska King Cove service and for the Scottish Natural Heritage before the trials across the Firth of Forth in Scotland in 2007. Neither study found significant impacts. A Marine Mammal and Bird Protection Plan (Aleutian East Borough, 2003) was developed and implemented for the King Cove service due to the presence of threatened and endangered marine animals and birds (eiders, albatross, sea lions, and whales) as well as non-endangered marine mammals (sea otters, harbor seals). The plan requires avoidance and reporting of encounters with threatened and endangered marine animals. No such issues have been reported. This can be seen in the Friends of the Alaska Wildlife Refuge support for the hovercraft operations as it negates the need to build a road through the adjacent wildlife refuge (Izembek, 2008).

Wake:
The ground (air cushion) pressure under a hovercraft is low. The ground pressure under a fully loaded 150-passenger hovercraft 15 m wide and 30 m long weighing approximately 80 tons is less than 0.25 pounds per square inch (psi). For comparison, the ground pressure under a standing person is in the range of 7 to 8 psi. Because of low air cushion pressure, hovercraft generate very little wake; the water under a hovercraft is displaced only a few inches. In this aspect, hovercraft are superior to conventional catamarans in that wake is much smaller than typical wind induced waves.

Because hovercraft produce very little wake, the issue of vessel induced turbidity, which is typically caused by propeller driven vessels when they are in relatively shallow water, is not an issue for hovercraft.

Underwater Noise:
Similarly, the underwater acoustic signal associated with hovercraft is low compared to an equivalent high speed ferry. The Volpe Institute of the Department of Transport measured underwater noise for the U.S. Postal Service operations in Alaska and found that underwater sound levels were not significant (Roof and Fleming, 2001).

3.1 NOISE

The thrust propellers are the largest contributors to the sound footprint of a hovercraft. Photograph 5 shows shrouded five-bladed Hoffmann propellers on the *Solent Express*. Hoffmann propellers are constructed from wood laminate with steel leading edges.

Photograph 5: BHT-130 Hoffmann Propellers and Shrouds

The sound levels from thrust propellers have been reduced significantly by increasing the number of propeller blades from four to five, using larger diameter propellers, and reducing the spinning speed so that propeller tips do not generate supersonic shock waves. Sound data for the *Suna-X* collected by DLI Engineering for Kvichak Marine is shown in Attachment A (report provided by Keith Whittemore). With the hovercraft at cruising speed, mean sound levels of 71 to 75 A-weighted decibels (dBA) were measured when the hovercraft passed at 1,000 feet. The levels increased to 82 to 86 dBA at 500 feet. These levels are very similar to high-speed catamaran ferry data collected in 2003 during development of the Water Transit Authority Program Environmental Impact Report (e.g., 70 to 77 decibels [dB] at 1,000 feet and 80 to 87 dB at 300 feet).

Table 3 of the *Suna-X* report shows that loudest sound levels were recorded immediately behind the hovercraft at departure when the thrust engines face land. As mentioned in Section 1, an operational technique is used on the Isle of Wight service to reduce departure sound levels. Using the lift engines and a gravity assist to move down the sloping ramps means the thrust engines are not fully engaged until the hovercraft reaches the end of the ramp.

Further reduction in sound levels can be expected if hovercraft use U.S.-made Hartzell composite propellers. Figure 1 shows that the noise measurement data from unshrouded Hartzell propellers are a maximum of 82 dB at 900 feet, the same level that a shrouded Hoffmann propeller achieves at 500 feet. Hence sound levels from shrouded Hartzell propellers, currently being tested in Quebec, Canada, can be expected to show improvement over existing sound levels.

3.2 AIR EMISSIONS

The discussion of fuel consumption above indicates that hovercraft fuel usage is better than equivalent high-speed catamarans. Air emissions are a function of fuel usage and emission control equipment.

In 2003, WETA (then WTA) adopted air emission standards that are "85 percent better than Tier 2 standards" (by Senate Bill 915 in California Government Code, Chapter 714, Section 66540.27). The WETA standards are approximately equal to US EPA Tier 4 standards which require an 80 percent reduction in nitrogen oxides (NO_X) compared to Tier 2 standards and a 90 percent reduction in particulate matter (PM) compared to Tier 2. Tier 3 engine standards require a 50 percent reduction in PM and 20 percent reduction in NO_X compared to Tier 2 standards. The US EPA has ruled that Marine Tier 3 engine emission standards will be required as of January 1, 2014, and that Marine Tier 4 standards will be required as of January 1, 2017.

At this time, regulations have not been passed that control the emissions of green house gases, particularly carbon dioxide (CO_2).

In order to meet the adopted standards, the WETA catamaran ferries have been fitted with compact selective catalytic reduction (SCR) systems built by Engine, Fuel, and Emission Engineering Inc. The SCR for each engine weighs approximately 750 pounds per engine, not including the weight of liquid urea. Three Dutch Pilot Boats have also been outfitted with SootTech emission systems. Performance tests on both the WETA and Dutch vessels showed actual emissions lower than current WETA standards (C. Walther, personal communication).

While Tier 4 engines are not yet commercially available, naval architects have reasonable expectations that manufacturers will develop suitable technology well before the 2017 deadline. For example, despite manufacturer's concerns regarding the difficulty of developing Tier 3 engine technology, a 530-HP Cummins industrial diesel which meets Tier 3 standards has being installed in a "green-tug" being constructed by Jerico Products in Petaluma (Aaron Lind, personal communication). Tier 3 engine upgrades have also been installed on the 4,290 hp tug BRYNN FOSS using a catalyst installed in the high temperature pre-turbo engine manifold (C. Walther, personal communication).

The weight of SCRs and other equipment designed to meet the Tier 4 standards is expected to be reduced as the 2017 EPA deadline approaches. For example, the SCR's used on WETA's catamarans use a ceramic foil substate. A substantial weight reduction could be achieved using a stainless steel foil substrate, similar to that used in automobiles catalytic converters.

Based on existing and expected technology developments, the engines and after-treatment systems used in hovercraft will be able to meet (or exceed) current WETA and EPA Tier 4 emission requirements. The ability of the BHT class of hovercraft currently in service to handle a 150-passenger load and the added weight of an emission system with no degradation of performance is well documented (K. Whittemore, personal communication). While weight is not expected to be an issue, as with all vessel designs, the space for the emission system would need to be planned for and allocated during the design phase of a hovercraft project.

4.0 OPERATIONAL CONSIDERATIONS

4.1 LANDING PADS

The minimum hovercraft landing requirements are basic; an area 5 to 10 m wider than the footprint of the hovercraft and a surface strong enough to support a loading ramp. For the self-contained bow loading configuration used on the *Suna-X* in Alaska, the landing pads can be as straightforward as the prepared gravel strip shown in Photograph 2. Photograph 6 shows the King Cove landing area which includes gravel side berms and a landing area covered with "rig mats" made of oak planks.

Photograph 6: *Suna-X* on Landing Ramp, King Cove

The Isle of Wight service, which has been in operation since 1965, uses sloped concrete landing pads as shown in Photographs 3 and 4.

For the trials in Edinburgh, temporary landing pads were constructed on beaches at the Kirkcaldy and Edinburgh ends of the run. The temporary landing pad at Portobello near Edinburgh and the loading stairway are shown in Photograph 7.

Photograph 7: *Solent Express* loading on temporary landing surface, Edinburgh

Landing pads, approximately 30 m by 30 m made of interlocking composite tiles, and security fencing were installed in a very short time frame; 4 days for the landing pad at Kirkcaldy.

Construction of a composite tile or concrete landing pad similar to the above structures adjacent to the Hercules shoreline would be feasible. At low tide, there are extensive mudflats that a hovercraft can pass over easily. The conceptual layout would include a landing pad at the shoreline and a passenger bridge or tunnel to cross the railway tracks which run parallel to the shoreline at the location of the proposed Amtrak station. Similar concepts could be constructed at Martinez on the east or west sides of the marina, and at Antioch. Local contractors have confirmed that construction on mudflats is possible.

Vessel Accessibility

As shown in Photograph 7, access to hovercraft parked on a landing pad requires use of an aircraft-type loading stairway. The characteristics of such ramps limit access to those capable of climbing up the ramps, and, prevent loading of large items such as bicycles. Depending on demand and Americans with Disabilities Act (ADA) requirements, the stairways could be modified to allow wheelchair access. During the Edinburgh service trial, based on demand from wheelchair patrons, the loading stairway was modified to include a side-rail mounted wheelchair lift.

The bow loading used on the Alaska service, shown in Photograph 2, would allow loading of bicycles. However, the slope of the loading ramp is steeper than that required by ADA, so that assistance for wheelchairs would still be necessary.

4.2 FLOATING LANDING PLATFORMS

There is insufficient space to construct a land-based landing pad at San Francisco. However, floating landing platforms that have been used for other services would be viable at the San Francisco Ferry Terminal site or nearby. Between 1984 and 1994, a drive-on- drive-off floating platform was used by Scandinavian Air Service (SAS) for API-88 hovercraft feeder service between Malmo, Sweden and Copenhagen Airport in Denmark, see Photographs 8 and 9. At the airport, the hovercraft drove up onto the runway. At Malmo, the hovercraft drove onto the floating pontoon from one end, set down to load and unload passengers, and then drove off the other end of the pontoon.

While the drive-on-drive-off design has obvious operational advantages, a U-shaped, drive-in-back-out floating platform design is also feasible. Both concepts are shown on Figure 2. The drive-in-back-out design could be located at any of the San Francisco Ferry Terminal gates.

Photograph 8: API-88 on SAS Malmo Landing Platform

Photograph 9: SAS Malmo Landing Platform

4.3 HOVERCRAFT PERFORMANCE CHARACTERISTICS

Operations in San Francisco Bay will require safe performance in headwinds and crosswinds. Based on operational experience in Alaska, Canada, and England where severe and demanding weather has been encountered on a fairly frequent basis, safe operations can be confidently predicted in the relatively protected environment of San Francisco Bay. This section presents a summary of the development and current practice for hovercraft performance.

4.3.1 General Principles and Performance Characteristics

The first Air Cushion Vehicles (Hovercraft) were designed in the late 1950s to reduce the friction between the vehicles and the surfaces over which they operated. The fan systems and flexible skirt designs in the early 1960s proved effective in reducing friction and, by 1965, took the technology well beyond the early directionally-challenged technology. For the past 45 years, design teams have refined the control systems that allow the vehicles to be safely operated in confined waterways. At this time (2010) hovercraft can cope with the most demanding traffic environments, such as in the Solent in the U.K, and Vancouver Harbour and the St. Lawrence Seaway in Canada.

All vessel types have finite operating limits and manoeuvring characteristics. The ability to be fast and agile is informed by many design and environmental variables including the amount of thrust available to overcome a vessels inherent drag factors. For catamarans and hovercraft alike, the reduction of water-related (hydrodynamic) drag is a key factor in achieving relatively high speed per installed horsepower. Catamarans reduce their water-plane area and raise the weather deck above the sea surface, reducing hydrodynamic drag in the process. As weather worsens (sea-states increases) so too does wetted-surface area and wave-making drag for both catamarans and hovercraft, and both vessel types lose speed, ultimately reaching a weather maxima where safe operation is not possible. The rate of speed deterioration – particularly heading directly into waves - is greater for hovercraft than for catamarans and the operational techniques used to mitigate for this deterioration are discussed in 4.4.2 below.

Hovercraft virtually eliminate the drag from water by rising above the sea surface. Compared to catamarans, hovercraft do experience higher relative effects of wetted-area and wave-making drag as weather deteriorates, however their design also gives them higher dash-speeds than catamarans in calmer sea conditions. Whereas a catamaran at slow speed must still overcome the hydrodynamic drag proportional to its tonnage, a hovercraft at slow speed can still virtually eliminate the hydrodynamic drag associated with its tonnage by remaining ‘airborne’. These principles are important in appreciating that hovercraft retain a significant amount of available

power for manoeuvring at low speeds – by bow thrusters, rudders, asymmetric propeller thrust, and by increasing friction in low-speed semi-displacement modes. The ability to momentarily "drag" skirts by reducing lift pressure in one or more parts of the vessel cushion allows the vessel to induce higher turning rates and higher rates of deceleration as the conditions demand. This range of operational modes – airborne, semi-displacement, and displacement – can be used to meet operator demands in any number of challenging operating conditions.

4.3.2 General Sea-going Operating Techniques

Hovercraft typically utilize a rather non-traditional length to beam ratio of 2 or 3 to one. This "wide stance" gives them a relatively smooth ride when compared to displacement vessels of equal length. However, as a consequence, they are more susceptible to speed reduction and ride comfort deterioration as the sea state and wetted drag increase.

In a similar manner, propellers produce less effective thrust per rpm when they are working directly into a headwind. It is important to emphasize that the relationship is not a linear, or 'knot for knot' loss. AP1-88 and BHT hovercraft are capable of maintaining 30 or more knots speed over the ground while heading into 30 knot headwinds – if they do so over mudflats, ground, or very shallow water where wave height is limited. Speed deterioration in direct head wind conditions is a result of head seas (heading straight into waves), and the increase in wetted drag on the inflated skirts. SF Bay is more favorable than other open harbor and coastal areas because of the lack of fetch (straight-line distance over which wind blows to create waves) which reduces the relative sea states within the confines of the Bay compared to open water conditions.

For both of these reasons, the normal hovercraft operational technique is to plot weather courses which allow for the wind and waves to be taken on either side of the bow. Because hovercraft propellers are typically shrouded (see Photograph 5 above), such a 'weather' routing shields the propellers from the headwind and produces a "leeward effect" or a virtual increase in thrust. In the same way 'shaping' courses at an angle to oncoming waves causes a virtual increase in wavelength and reduction in wetted drag. This technique also allows the operator to maintain a higher speed on a given course.

Because hovercraft are amphibious and are safe to operate in zero draft environments, planning routes at an angle to waves and wind is normally part of route planning guidance manuals. While the traffic and collision avoidance regulations will prevail in all circumstances, hovercraft will normally take into account prevailing headwinds by applying the following route planning methodology: when short steep seas are present, attempt to run near-shore or in reaches where wave-height is reduced as a result of shallow water depth.

At some time, weather and navigation conditions will require hovercraft to operate directly into head wind and head sea conditions. The newest AP1-88 variant hovercrafts are capable of maintaining a speed of 21 knots (24.2 mph) in Beaufort scale 5 head winds (21 knots) with short seas (short period waves) up to 5 feet. A 30 knot (34.5 mph) headwind and 6 foot short sea could reduce the hovercraft speed to, or below, its "hump" speed (the speed at which it outruns its own wake) - typically around 18 knots (20.7 mph) for a 30 meter vessel. If strong headwinds are likely to be encountered routinely, WETA will need to select hovercraft, engines, propellers, skirt design, and lift system, to maintain operation of the hovercraft at a given speed.

4.3.3 Technical Statement of Requirements

Hovercraft are typically operated in environmentally sensitive and/or environmentally challenging locations. From shallow water geography to areas where shore-side infrastructure is limited, hovercraft technology can be scaled to meet payload, weather maxima, terminal limitations and other unique challenges. These issues are normally selected based on the owner's basic mission requirements: for example the vessel must carry 180 passengers at a block speed of 30 knots in weather conditions up to and including 30 knot head winds and 2 meter head seas. The performance, economic, and emissions requirements are typically specified in the Technical Statement of Requirements prepared after consultation with designers and builders.

4.4 HOVERCRAFT SAFETY AT SPEED IN TRAFFIC LANES

The high speed navigation safety techniques used for hovercraft would not vary significantly from the current techniques employed on WETA high-speed catamarans (techniques know as bridge resource management procedures). Effective initial training for the team in the bridge (captains and mates) is key to maintaining the safe operations of high-speed vessels in all visibility conditions – including the "maximization" of safe speed when traffic is heavy and sea-room is reduced. "Sterile cockpit techniques", that is, the disciplined procedures for traveling at high speed at night which include concise language and responses, and formalized reporting of navigational targets with lookouts backing up radar detection, allow the safe operational envelope of these vessels to include speeds in excess of 40 knots during periods of darkness and in busy waterways.

Passenger management would be much that same as that used with aviation safety in so far as passengers are expected to remain seated during the voyage, with exceptions for trips to washrooms or walking about lounges.

In rare circumstances, a hovercraft travelling at high speed can be induced to "trip" over its own forward flexible skirt, a phenomenon also known as "plough-in". When this happens, the vessel can experience a rapid deceleration if the pilot does not initiate corrective action. The factors which can induce such an event are related to changes in the vessel C of G (which can be avoided by minimizing passenger movement at high speed) or to changes in the vessels cushion (Centre of Pressure). Pilots control both of these factors by movement of fuel ballast, and by varying lift system power and the amount of propeller thrust in effect at a given time. Proper Operator training will virtually eliminate the likelihood of these phenomena in practice.

4.5 MANEUVERING NEAR SAN FRANCISCO

The harbor area near the San Francisco Ferry Building and adjacent piers is relatively small and constrained with a significant number of vessel traffic movements during peak commuter hours. Hovercraft operations in the proximity of the San Francisco Ferry Building would need to be compatible with other existing ferry and vessel traffic, and, allow for safe operations in windy conditions.

Other harbor areas in the world are equally or more constrained than that near San Francisco. Hovercraft have operated in the Solent between Portsmouth and the Isle of Wight since the 1960s and AP1-88s have been in operation since the 1980s without passenger injury. In 2009, 750,000 passengers were carried by hovercraft in the Solent which is more congested than San Francisco Bay and is more exposed to bad weather. Hovercraft can avoid normal navigation channels and can use shallow areas for better speeds and traffic avoidance.

Hovercraft have proved to be very adept at operations in severe weather conditions. For example, the Canadian Coast Guard (CCG) utilizes the API-88 variant hovercraft as a Search and Rescue vessel and for buoy-tending, and mass evacuation platforms on both coasts of North America. The CCG vessels are required to be capable of:

- Coming about (turning around) in their own length in confined areas;
- Coming about in 2.4 meter seas;
- Operating astern (moving backwards) at four knots;
- Steering effectively while towing a 100 tonne vessel;
- Station-keeping within 1 meter in wind speeds of 30 knots, and to within 2 meters in all orientations of the wind.
- Capable of station keeping for buoy tending purposes in tidal currents and river rapids, with currents of up to 8 knots.

- Capable of maintaining intended course over ground in cross winds of thirty knots.

For operations in San Francisco Bay, we have assumed the hovercraft would be capable of meeting similar operational requirements (not necessarily the towing capability, although this could be useful during emergency response,)

4.6 SEA ROUTE FROM HERCULES

A route between Hercules and the San Francisco Ferry Building would have three primary navigation legs; Hercules to Pinole Point, Pinole Point to the East Brothers Rock, and the East Brothers to San Francisco. Each navigation leg is addressed below. The prevailing winds offshore of Hercules are from the west. A "fresh" breeze is defined as Beaufort scale 5 with winds at 18 to 24 mph (16- 20 kts). A "strong" breeze is defined as Beaufort scale 6 with winds at 25 to 30 mph (21- 26 kts).

The first and shortest reach from Hercules and the San Francisco reach is the 3.7 nautical mile (NM) leg between Hercules and Point Pinole (see Photograph 10). The prevailing westerly winds will affect the average (block) speed of hovercraft on this leg more than any other – conversely the same prevailing westerly's will contribute to higher average speeds on the outbound trips to Hercules. The average speed will not suffer significantly as this leg constitutes only 20% of the total voyage distance.

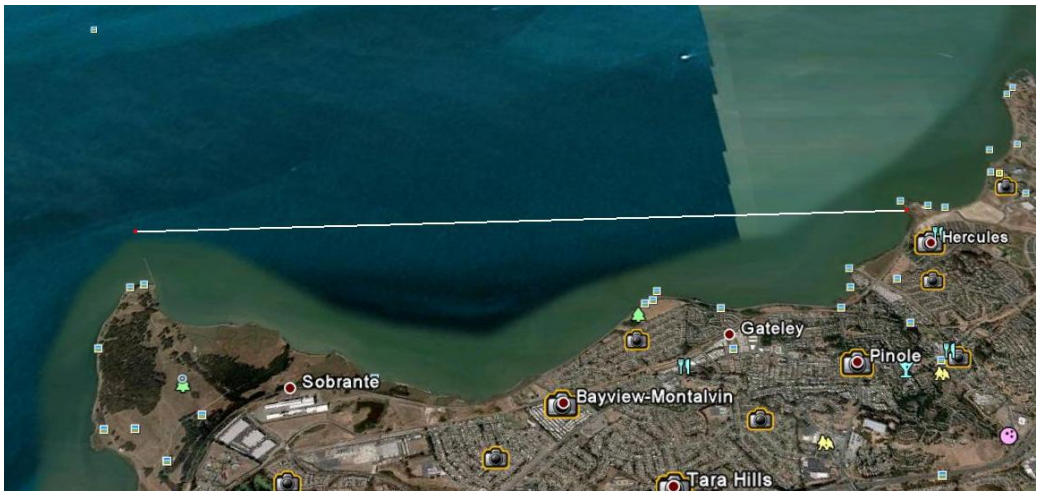
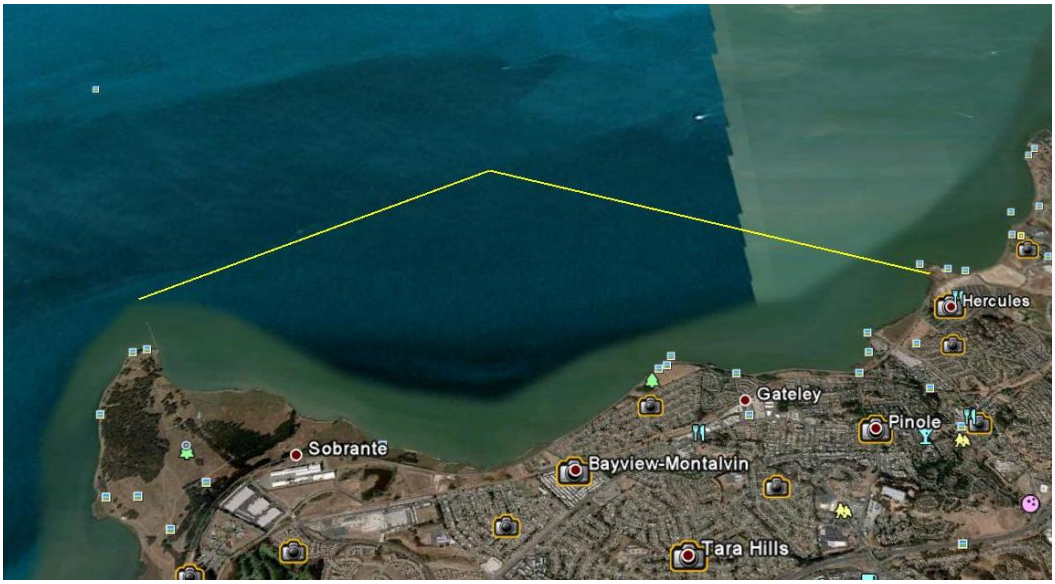


Photo 10: Reach 1 - Hercules to Point Pinole (3.7 NM with 25kt headwind = 9 minutes)

One of the operator techniques that can be applied during head wind and head sea conditions is to "tack". In Photograph 10 a hypothetical course line between Hercules and Point Pinole is considered for a Hovercraft heading directly into a 25 knot headwind. It takes 9 minutes for the

vessel to reach its first wheel-over at Point Pinole. Photograph 11 demonstrates the tacking principle with the same hovercraft commencing its voyage with the prevailing wind on its port bow followed by a wheel-over to put the wind on its starboard bow after two miles (subject to the safety constraints of sea-states and traffic conditions). By "tacking" the hovercraft would arrive at Point Pinole in 8 minutes having traveled an additional 0.3 nautical miles.



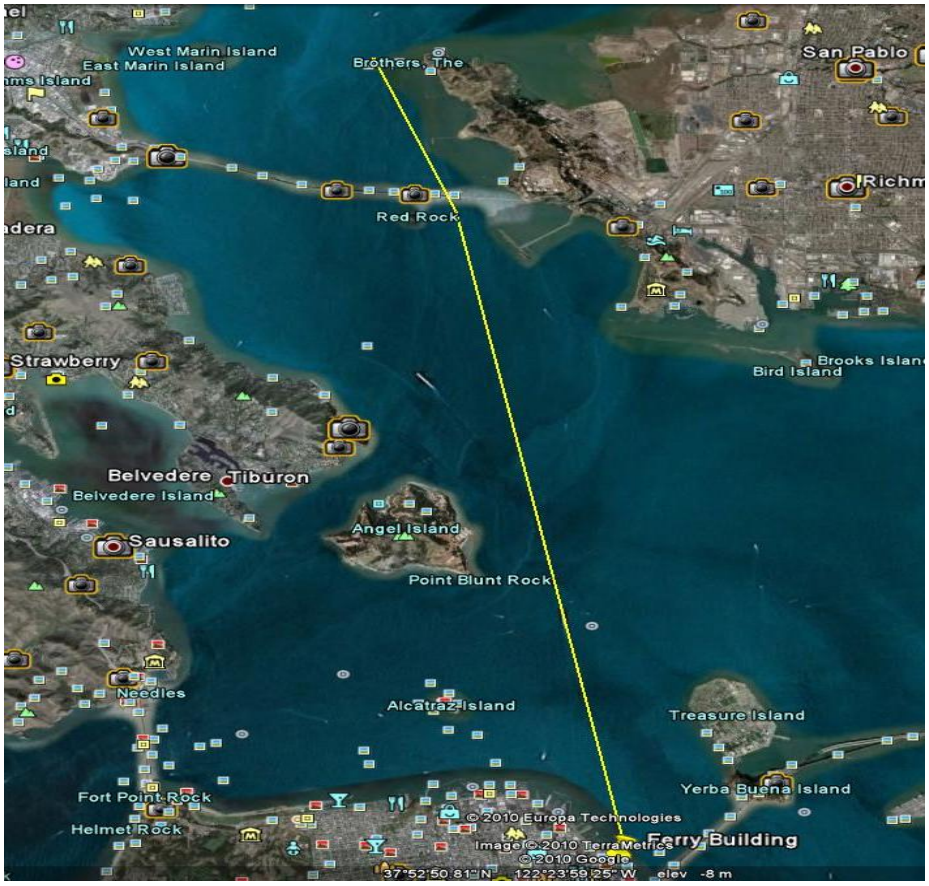
Photograph 11: Reach 1 - Hercules to Point Pinole: (4.0 NM at 30 knots = 8 minutes tacking across 25 knot westerly wind)

The second reach from Pinole Point to the East Brothers Rock is slightly longer at 4.5 nautical miles (Photograph 12). The middle reach allows the hovercraft to take a southwesterly course which places the prevailing wind more broadly on the bows during the inbound voyages from Hercules. Average speeds on this reach will increase and should allow the vessel to reach its second course change in 8 to 9 minutes in a fresh westerly.

Photograph 12: Reach 2 – Pinole Point to the East Brothers (4.5 NM in 8 to 9 minutes)

The third and final leg from the East Brothers to the San Franciso Ferry Building is the longest at just over 10NM in length and, importantly, is oriented North/South (Photograph 13). This reach will experience the least amount of headwind or head sea drag and consequently will provide the most stable average speeds. In the case of fresh westerly's, this reach will run on the order of 16 minutes. Understanding the effects of local wind and route planning one might expect gate to gate service times (Inbound from Hercules) to range from 24 minutes in light winds to 40 minutes under the influence of gale force westerly. The prevailing westerly winds will shorten the time of the return trip to Hercules. The range of "Outbound" service times to Hercules from San Francisco would be from 24 to 34 minutes.

Note that operations in sustained winds above 40 knots are only conducted on hovercraft engaged in emergency response and SAR duties.



Photograph 13: Reach 3 – Brothers to San Francisco (10 NM in 16 minutes)

4.7 SEA ROUTE FROM MARTINEZ AND ANTIOCH

The Martinez and Antioch routes would experience the same general trends as the Hercules route, that is, "Inbound" trips to the San Francisco Ferry Building would be generally be slower than "Outbound" return trips under the prevailing westerly winds. Both of these locations would benefit from the shelter provided by the relatively protected channel between Carquinez Bridge and Winter Island near Antioch. While westerly winds will funnel down this body of water, the channel bends a number of times effectively reducing the available wave-making fetch. This should keep the effects of 'wetted drag' to a minimum - which translates to higher average speeds in westerly winds than the equivalent experienced off Hercules.

Best case fair weather transit times from Antioch to the Ferry building could be achieved in 55 minutes each way. Under the influence of gale force westerly winds the "outbound" times could degrade to 85 minutes while "inbound" times in gale force westerly conditions could degrade to 75 minutes.

5.0 DISCUSSION AND RECOMMENDATIONS

The advantages and disadvantages of adding hovercraft to the WETA fleet are summarized below:

Advantages	Disadvantages
• Removes need for dredging to obtain access to shallow water terminal locations such as Hercules	• Requires WETA decision to operate two different types of vessel
• Provides shorter travel times making transit to distant locations more attractive to riders, particularly if service is faster and less delay prone than driving	• Terminals designed for hovercraft service crossing shallow water or mudflats cannot be served by other WETA catamarans
• Faster travel to more distant locations allows shorter cycle times which increases the effective hourly ridership capacity	• Hovercraft capacity using existing designs are limited to 199 passengers
• Provides emergency response capability to access any Bay side location with a shore crossing	• Would require additional maintenance facilities for servicing and layovers
• Vessel capital and O&M costs similar to WETA's existing fleet	• Aircraft-type operations constrain ability to carry more than a limited number of bicycles
• High-tech uniqueness creates appeal to young, high-tech, and time-conscious demographics	• Perception of noise would need to be addressed with detailed studies

At the screening level, hovercraft service from Hercules to San Francisco could be viable using recent proven hovercraft designs, which at the moment, are limited to 199 passengers. Use of hovercraft would preclude the need for initial channel dredging and maintenance dredging at Hercules and there is sufficient room for a landing pad at the shoreline near the proposed Amtrak transit hub. Similarly, hovercraft could reduce travel time from Martinez and Antioch by 25 to

30 percent, and thereby increase the appeal of this transit mode to commuters. Further evaluation of a landing platform at San Francisco would be necessary.

A 199-passenger hovercraft, equivalent to the carrying capacity of the WETA ferry *Taurus*, is the largest capacity that could be commercially available at this time. The BHT-180 design, which can carry 180 passengers, can be stretched by one bay to carry 199 passengers and a crew of four. While this capacity is less than the 350- to 400-passenger ferries planned by WETA, the 149- to 199-passenger range, at the moment, appears to represent an optimum balance between power requirements and load for hovercraft. A 149-passenger hovercraft has U.S. Coast Guard classification advantages in that the U.S. Coast Guard is familiar with 149-passenger vessels and has already given them the T-class certification.

Other studies of potential environmental concerns have not identified unmitigable issues. Sound is the issue which continues to receive most attention. Through propeller and engine design improvements, particularly subsonic propeller tips speeds, sound levels from hovercraft are now much lower than on older hovercraft such as the early Saunders-Roe and API-88 craft which created the perception that hovercraft are noisy. Advanced propeller design enables sound levels from hovercraft to be controllable. In addition, operational solutions can be developed to reduce the loudest sound levels experienced when hovercraft depart from a landing facility.

Air emissions would require further evaluation to ensure that the hovercraft service would meet WETA's goals. Advances in engine technology and the operational characteristics of the service (shorter trip times) indicate that hovercraft emissions would be comparable to the existing fleet.

5.1 RECOMMENDATIONS

If WETA elects to proceed with further evaluation of adding hovercraft to its fleet, the following four recommendations build on the findings and conclusions of this study:

1. Evaluation of the conceptual design and location of a hovercraft landing platform at, or near, the San Francisco Ferry Terminal. WETA, in conjunction with the Port of San Francisco, is currently performing an evaluation of expansion of the San Francisco Ferry Terminal, adding up to three new gates. We recommend that evaluation of a hovercraft gate be included in that planning process. It is of note that a hovercraft bay was included in planning for Phase 1 of the Ferry Building rehabilitation process in the mid 1990s.

2. Development of conceptual designs for landing pad layouts at Hercules, Martinez, and Antioch.

3. Detailed evaluation of operational and maintenance costs for a BHT-180 design stretched by one bay to carry 199 passengers. In particular, develop maintenance costs for skirt wear given the specifics of service on San Francisco Bay, propellers maintenance costs, requirements for protection such as a hanger during high winds events, and evaluation of US Coast Guard classification.

4. Collection of sound level data from hovercraft fitted with shrouded Hartzell propellers.

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6.1 PHOTOGRAPH CREDITS

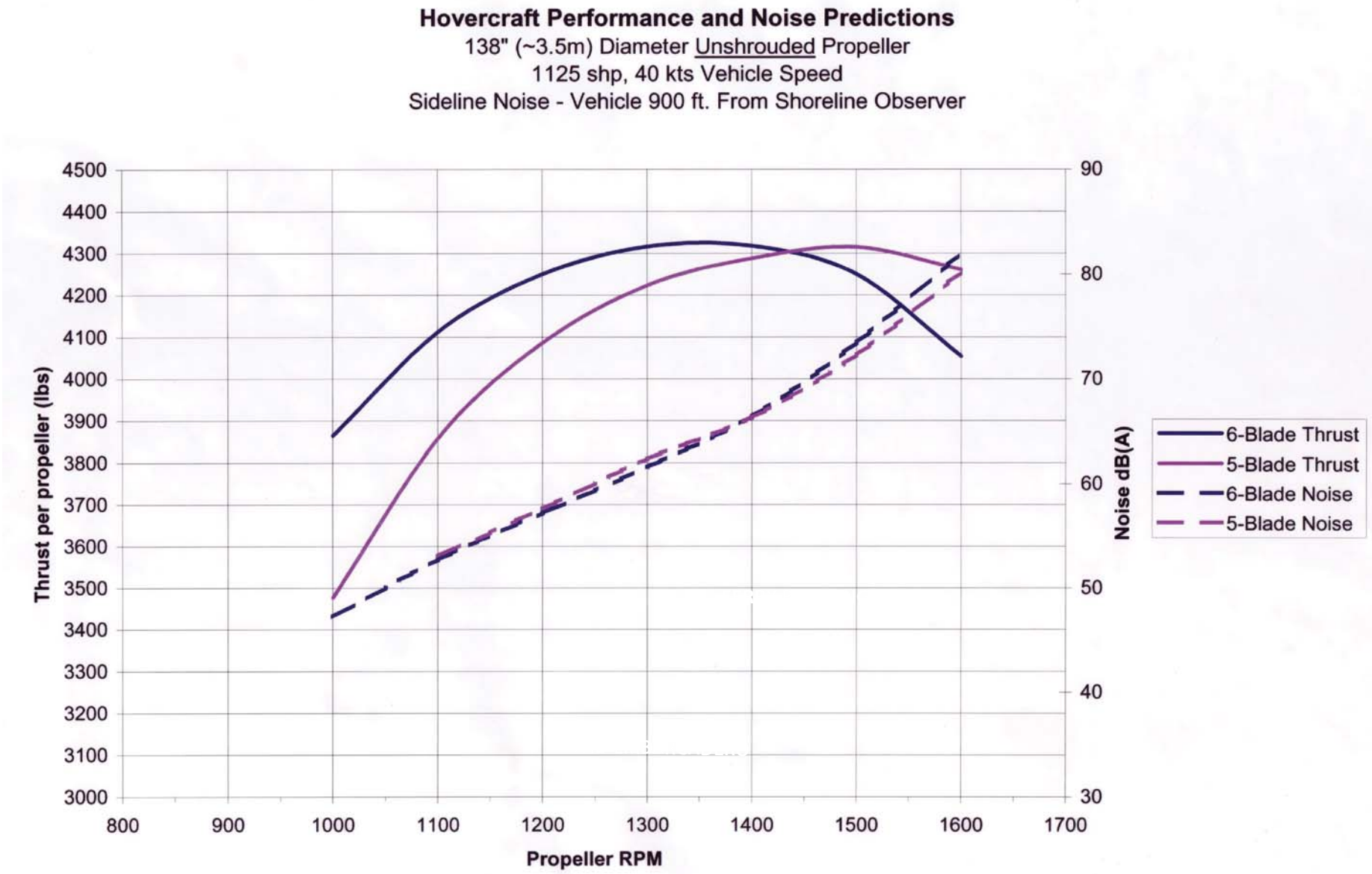
Photographs 1, 2, 5	http://www.griffonhoverwork.com/galleries
Photograph 3	http://en.wikipedia.org/wiki/File:Hovertravel_fleet_at_Ryde.JPG
Photographs 4, 5	http://www.simplonpc.co.uk/Hovertravel.html
Photograph 7	http://www.cityofkingcove.com/hovercraftphotos.html
Photographs 8, 9	provided by J. McGrath

6.2 CONTRIBUTORS

This report was prepared by URS Corporation in San Francisco. John McGrath, retired Canadian Coast Guard base commander, contributed significantly to the technical and operational data for this report. Captain McGrath's experience includes procurement and operation of Canadian Coast Guard hovercraft, hovercraft procurement for the King Cove, Alaska, hovercraft project, and advisor on numerous military and private hovercraft operations.

Keith Whittemore, President, Kvichak Marine Industries, also contributed and provided information on GHL hovercraft and the noise data study in Attachment A.

FIGURES



HARTZELL PROPELLER NOISE GRAPH

WETA
April 2011 — Hovercraft Feasibility Study
28067359 — San Francisco, California

URS

FIGURE 1

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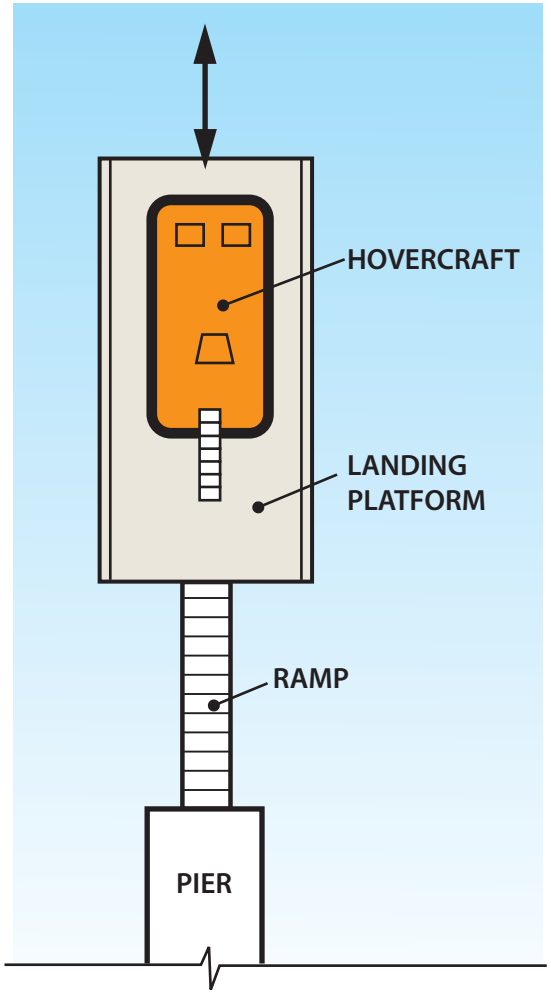
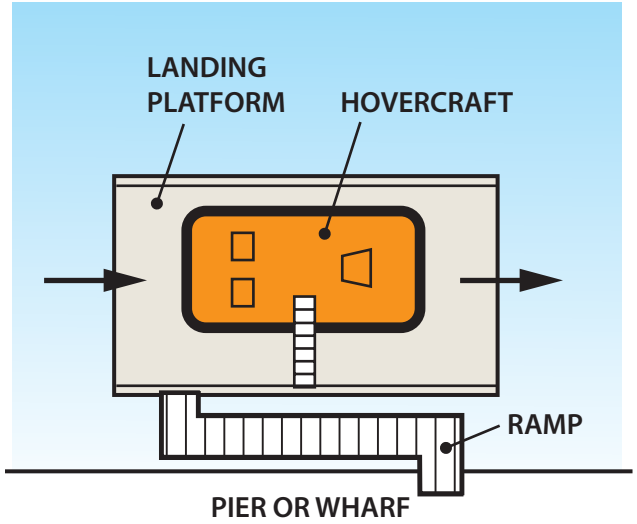


A) BOW LOADING



B) SIDE LOADING

LANDING OPTIONS

WETA
Hovercraft Feasibility Study
San Francisco, California

April 2011
28067359

URS

FIGURE 2

Not to Scale

Attachment A

Hovercraft Suna-X
Sound Level Testing

Report Number 4453.001

Hovercraft Suna-x
Sound Level Testing

Kvichak Marine Industries

21 August 2006

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1.0 Summary

DLI Engineering Corp. was tasked by Kvichak Marine Industries to conduct sound level testing onboard the hovercraft Suna-x. Sound level measurements were taken 15 August 2006 under multiple operating conditions described below.

2.0 Introduction

Survey Date:	15 August 2006
Engineer:	Laurent LaPorte
Vessel:	Hovercraft Suna-x
Equipment Tested:	Vessel sound levels
Location:	Port Madison, WA (Puget Sound)
Task Description:	DLI Engineering was tasked with measuring sound levels

3.0 Test Setup & Procedure

Sound measurements were taken under two general operating conditions; steady-state and approaching/departing. All data was collected with a B & K model 2260 sound level meter that was calibrated onsite (15 August 2006).

Sound level readings were taken around Port Madison (north end of Bainbridge Island, WA). This location was chosen because it provided the best shelter from wind and waves.

The steady-state sound measurements were taken with the vessel on a straight line course at steady speed. Sound levels were measured at a distance of 1000 ft and 500 ft as the vessel passed a point perpendicular to the straight line path of the vessel. Reciprocal course/heading tests were taken to compensate for any abnormalities. (Sound level measurements were 10 second A-weighted values.)

Vessel approaching and departing measurements were taken as the vessel landed and departed the shore. Sound level readings were taken at a point inline with the path of the vessel. Multiple 3 second A-weighted measurements were taken at various distances and can be found below.

4.0 Results

Collected data are presented in the tables below. Table 1 and 2 consists of steady-state noise levels listed as the overall A-weight value and the A-weighted octave band values. Table 3 lists the approaching and departing levels (overall and octave band). Ambient noise levels varied between 57.3 and 59.8 dBA, and averaged 58.5 during the testing. (The primary source of ambient noise was light shore break.)

Table 1:

Steady-State Sound Mean & Max Levels (dBA)

Ship Condition	Test	Distance (feet)	Heading (deg.)	RPM	Speed (knots)	Pitch (deg.)	**10-sec Mean (dbA)**	Max (dBA)
Cruising Speed	1	1000	330	1564	36.9	20	**71.6**	76
	2	1000	330	1687	38.5	20	**75.3**	78
	3	1000	160	1673	33.2	20	**71.7**	80
Cruising Speed	4	500	160	1665	29.0	20	**82.6**	84
	5	500	330	1650	36.0	20	**85.9**	87
55% Power	6	1000	160	1430	26.0	20	**63.7**	68
	7	1000	345	1458	26.0	20	**71.6**	73
	8	1000	165	1437	22.9	20	**69.2**	71

Table 2:

Steady-State Sound Octave Band Levels (dBA)

		Octave Band (Hz)								
Ship Condition	Test	31.5 (dBA)	54.7 (dBA)	125 (dBA)	250 (dBA)	500 (dBA)	1000 (dBA)	2000 (dBA)	4000 (dBA)	8000 (dBA)
Cruising Speed	1	36.4	54.7	58.6	66.3	67.2	63.6	61.0	56.1	43.6
	2	36.6	53.1	62.0	69.0	70.0	70.0	65.7	58.4	44.7
	3	36.2	50.1	60.2	65.8	67.4	65.0	59.8	54.0	44.7
Cruising Speed	4	41.5	58.5	68.5	74.6	79.8	74.6	71.1	67.0	61.3
	5	45.6	63.7	70.0	76.7	80.4	80.5	79.5	72.2	62.6
55% Power	6	0.0	49.7	58.8	55.6	56.4	55.4	53.9	50.2	41.8
	7	33.8	54.3	61.7	64.1	68.1	64.3	59.6	55.0	45.6
	8	0.0	49.9	62.1	62.9	63.4	61.3	58.6	55.8	47.9

Table 3:

Approaching & Departing Sound Levels & Octave Band Levels (dBA)

			Octave Band (Hz)									
Ship Condition	Distance	**3-sec Mean**	31.5	54.7	125	250	500	1000	2000	4000	8000	Comments
	(feet)	**(dBA)**	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	
Hovercraft Approaching	3000	**-**	-	-	-	-	-	-	-	-	-	Noise level did not exceed ambient
	2400	**-**	-	-	-	-	-	-	-	-	-	
	1800	**-**	-	-	-	-	-	-	-	-	-	
	1200	**61.6**	0	41.7	56.5	51.7	52.7	53.3	53.8	52.2	41.4	
	600	**65.9**	36.6	57.6	58.9	56.7	58.1	56.7	57.9	55.1	42.5	
	300	**71.9**	38.6	55.7	67.8	61.1	60.9	60.8	65.3	62.9	46.1	
	0	**82.3**	55	76.5	72.6	72.4	73.1	74.1	74.5	71.1	61.5	
Hovercraft Departing	0	**95**	Data set was collected by the Kvichak unit and octave bands are not available									
	600	**74.9**	39.6	58.3	73.1	65.6	61.5	62.4	64.2	56.6	45.3	
	1200	**69.9**	35.1	49.4	65.2	60.4	62.7	61.1	62.3	55.9	35.2	
	1800	**62.5**	0	46.1	55.5	54.1	56	56.7	53	58.9	37.1	
	2400	-	-	-	-	-	-	-	-	-	-	Noise level did not exceed ambient

BAYAREA COUNCIL

Attachment B

January 7, 2019

Chair Jody A. Breckenridge
Director Jeff Del Bono
Director Anthony J. Intinoli, Jr.
Director Nicholas Josefowitz

Re: Request WETA funding for Feasibility Study on Hovercraft Service

Dear Chair Breckenridge and WETA Board of Directors:

As we build on the solid momentum created by WETA of re-establishing robust water transit on San Francisco Bay, I believe we should take the next steps toward seriously considering the addition of hovercraft to our fleet. As you know, several areas of the Bay, that offer significant potential ridership, are hampered by the need to dredge and wake restrictions that slow down traditional ferry vessels. Hovercraft may offer the opportunity to overcome these hurdles and open up new areas of the region that badly need congestion relief, as well as provide avenues for response in the event of a major public emergency. I ask for your support to fund a study a study the topic to follow up WETA's previous work in 2011.

As you may recall, I recently traveled with Executive Director Nina Rannells and a delegation of business and local leaders to investigate hovercraft service and hovercraft manufacturing in England. I, along with other attendees of the delegation, came away very impressed with the robust service provided in conditions that in some ways mimic the Bay, or are even more difficult than the conditions we face here. The manufacturer we visited, Griffon Hoverwork, has built more than 200 hovercraft, and has more than 150 operating across the globe today. In North America, they are partnered with Vigor, based in Seattle, which has built several ferries for WETA, and has built hovercraft for other US clients.

While not the solution for every setting, and certainly not required where standard ferries are able to operate, hovercraft do offer several compelling features worthy of consideration:

- They float on a cushion of air, eliminating the need to dredge;
- With little to no water resistance, they can travel faster on the water than boats (25-30% faster than catamarans under normal conditions), and without a significant wake, don't need to slow when close to shorelines, bringing significant travel time improvements;
- The vessel cost is roughly the same as for catamarans;
- For 150 passenger craft, hovercraft operate at $800/hour (including fuel and crew costs), which is a potential 5-50% cost savings over catamaran operation at that size;
- Insurance costs are similar;
- They consume less fuel;
- They produce lower underwater sound than catamarans;
- With recent design improvements, they produce approximately the same decibel level as catamarans above water;

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- The "docking" and landside infrastructure costs can be significantly less, with a need only of a 30 m x 30 m ramp, made of gravel, wood, or concrete. In deeper water, they can use floating landing platforms;
- The hovercraft service in England carries nearly 1 million passengers a year and is heavily relied upon by persons living on or visiting the isle of Wight.

As stated above, makers of hovercraft agree that where you can use a regular ferry, you should use a regular ferry. It's only in areas and conditions ill-suited or too expensive for traditional ferries where hovercraft excel. And, they do have some downsides:

- While the technology has advanced by leaps and bounds in reality, a hard set perception of hovercraft is that they are very noisy;
- They can be slowed by very strong headwinds (this can be reduced with "tacking" maneuvers by the captain);
- The craft carry less passengers than many new catamarans (80-200 passengers);
- Putting the service into effect would require new operations and maintenance skills and materials;
- Compatibility with existing WETA passenger loading infrastructure may be a challenge, or infeasible. Therefore new, separate docking in some spots, such as the SF Ferry Building (if service goes there), may be required, or the new hovercraft would need to be custom built to fit current WETA facilities.

In 2011, WETA seriously considered hovercraft service to Hercules, as well as Martinez and Antioch. The report commissioned at the time had many favorable findings, though did point to the challenges of setting up a new parallel maintenance and operations system. Ron Cowan was a long proponent of hovercraft service, and several decades ago ran a pilot in the Bay that carried 25,000 Bay Area residents. Further, hovercraft have long been called for to bolster WETA's emergency response capabilities, which when partnered with existing craft, would allow the agency to pick up or deliver passengers or equipment to almost any spot on the Bay.

Hovercraft could deliver water transit service to the huge employment and population growth of the South Bay, especially cities and corporate office parks directly on the water. Many firms and cities have expressed strong interest in hovercraft. Hovercraft could also reach parts of the North Bay, such as the silted in Port Sonoma, or the previously studied Hercules, Martinez or Antioch.

The key word is this discussion is "could." In fact, we don't know. We don't know the operating costs in the Bay Area. We don't know how hovercraft would fit with existing regulations. We don't know which spots would be best for landing ports, given bayside characteristics and connecting roads and other transportation facilities. We don't know how to best model passenger capacity with potential ridership.

These are questions I believe WETA should be able to answer as the Board considers the agency's future direction. Therefore I propose we commission a study to answer them.

One possible approach, only a suggestion, would be to partner with Griffon Hoverwork, which offers a consultancy service on all aspects of hovercraft operation. They are able to do route analysis, business planning, terminal design, crew development, engineer training and a broad range of after sales services. They consult on all aspects of design and research into hover technology.

Whether performed with Griffon or not, I propose we commission a qualified local planning firm and/or university transportation institute to examine the best sites, the best craft configuration, the personnel requirements, the infrastructure requirements, ticketing plans, integration with other transport, and other matters Board members and WETA staff think best.

May we please place this issue on the agenda for an upcoming WETA Board meeting? Thank you for your consideration.

Sincerely,

Jim Wunderman
Vice-Chairman
WETA

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