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# MEMO

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*Date:* June 8, 2018  
*To:* Whatcom County Public Works and Lummi Island Ferry Advisory Committee (LIFAC)  
*From:* KPFF Marine Transit Group  
*Subject:* Service Alternatives for Lummi Island Ferry LOS Analysis

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Whatcom County Public Works and LIFAC are evaluating service delivery options to achieve the desired LOS and present a recommendation to the Whatcom County Council. As part of the Level of Services (LOS) initiative, the KPFF team prepared the following analyses:

- Established a baseline of existing conditions
- Prepared a ridership demand forecast
- Defined LOS and recommending how LOS is measured
- Identified vessel alternatives for this route
- Reviewed terminal improvement options
- Presented funding opportunities and a financial plan for the alternatives
- Conducted community and stakeholder outreach

Based on the analysis conducted, there are a number of service alternatives options available for the Lummi Island Ferry System. A summary of these options is provided in Attachment A.

Vessel size and propulsion system alternatives included 20-car and 34-car vessels, and diesel and hybrid-diesel engines. Of the alternatives initially identified for consideration, two alternatives were not carried forward in this analysis including the 28-car vessel and an all-electric vessel.

- **28-Car Vessel:** Based on the evaluation of LOS that considered capacity and frequency, the 28-car vessel would have essentially the same LOS as the 20-car vessel. The estimated capital investment for a 28-car vessel is about \$2 million more than a 20-car vessel. Considering these two factors, the 28-car vessel has not been included for consideration in the service alternatives.
- **All-Electric Vessel:** The all-electric propulsion system was considered as one of the vessel alternatives. Electric vessels require a consistent and substantial power grid to ensure the vessel can deliver ferry service. Because the vessel ties up overnight on Lummi Island and the power grid may not be sufficient on Lummi Island, this alternative was not carried forward. If advances in technology support this propulsion system when Whatcom County Public Works designs the vessel, this option could be reconsidered.

When comparing each alternative, there are a number of observations about the options for vessels and terminals:

### **COSTS**

- The full scope of terminal improvements to achieve the desired LOS requires significant capital investment.
- Operating costs for each vessel alternative are estimated to be lower than the Whatcom Chief with the reduction in annual maintenance required and major maintenance.

### **FUNDING**

- Capital projects will require funding from the road fund, bonding, competitive grants, special district and/or a surcharge.
- Operating funds will continue to be supported by fares, the road fund and other subsidies.

### **LOS**

- Because the 34-car vessel can accommodate all average weekday ridership in the peak afternoon period, the 34-car vessel provides the best opportunity to improve LOS as ridership demand increases.

To achieve the desired LOS and maintain the useful life of existing assets, we recommend LIFAC move forward with a phased approach to replacing the Whatcom Chief and completing terminal improvements. Benefits of this approach include maintaining service in the short term, replacing the vessel and Gooseberry Point Trestle that are reaching the end of their useful life, and planning for long-term future expansion that will provide operational improvements.

- Short term
  - Initiate vessel design: It is anticipated that design and construction of a new vessel could take a total of two years; therefore, the process of securing funding and beginning design of the new vessel should be started as soon as possible to ensure that the new vessel is in place before the Whatcom Chief is due for an overhaul in 2026.
  - Once the boat is designed, initiate design and permitting of marine structure upgrades.
  - Lummi Island terminal improvements: Short-term improvements at the Lummi Island terminal include replacing the existing timber dolphins to be compatible with the replacement vessel, expanding the holding capacity of queue lanes on the terminal site, and adding passenger amenities including ADA restrooms and queue lane cameras.
  - Gooseberry Point Trestle: Inspect the structure frequently and design repair and replacement upgrades when deficiencies are discovered. For planning purposes, this memo presents estimated costs and timeframes for design, permitting, and construction of the trestle replacement.

- Long term
  - Gooseberry Point terminal relocation: A new Gooseberry Point terminal would be constructed in conjunction with the proposed Lummi Nation Marina project. The new terminal would include dual-lane loading/unloading and improved pedestrian and bicycle queuing, which would decrease dwell time. In the long term, there is the potential for future expansion of queuing and parking at this location, depending on the availability of the private parcels northwest of the current terminal.
  - Lummi Island terminal improvements: Long-term improvements at the Lummi Island terminal include construction of a passenger-only ferry float and dual-lane queuing improvements.

Attachment B provides two implementation schedule options for the 34-car vessel. These options include one that is not restricted by funding and the other based on the useful life of assets.

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# Attachment A

Summary Matrix

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	<b>Baseline<sup>3</sup>:</b> <b>Vessel:</b> Whatcom Chief <b>Terminals:</b> based on useful life	<b>1: Vessel:</b> 20-car; diesel <b>Terminals:</b> based on useful life and funding constraints	<b>2: Vessel:</b> 20-car; hybrid-diesel <b>Terminals:</b> based on useful life and funding constraints	<b>3: Vessel:</b> 20-car; diesel <b>Terminals:</b> all projects as soon as possible	<b>4: Vessel:</b> 34-car; diesel <b>Terminals:</b> based on useful life and funding constraints	<b>5: Vessel:</b> 34-car; hybrid-diesel <b>Terminals:</b> based on useful life and funding constraints	<b>6: Vessel:</b> 34-car; diesel <b>Terminals:</b> all projects as soon as possible
<b>Costs<sup>1</sup></b>							
<b>Capital Costs (millions)<sup>2</sup></b>							
Vessel	\$ 2.0	\$ 9.0	\$ 10.5	\$ 9.0	\$ 13.0	\$ 15.0	\$ 13.0
Mods for Vessel		\$ 8.0	\$ 8.0	\$ 8.0	\$ 10.0	\$ 10.0	\$ 10.0
Gooseberry Point Trestle Replacement	\$ 4.5	\$ 4.5	\$ 4.5	-	\$ 4.5	\$ 4.5	-
Lummi Island Upland Improvements		-	-	\$ 1.5	-	-	\$ 1.5
Passenger-only Emergency Float		-	-	\$ 1.0	-	-	\$ 1.0
New Gooseberry Point Terminal		-	-	\$ 35.0	-	-	\$ 35.0
<b>Total est. ROM Capital Cost</b>	<b>\$ 6.5</b>	<b>\$ 21.5</b>	<b>\$ 23.0</b>	<b>\$ 54.5</b>	<b>\$ 27.5</b>	<b>\$ 29.5</b>	<b>\$ 61.5</b>
<b>Annual Operating Cost</b>							
Labor	\$ 1,200,284	\$ 1,200,284	\$ 1,200,284	\$ 1,200,284	\$ 1,200,284	\$ 1,200,284	\$ 1,200,284
Fuel/Lube Oil	\$ 120,657	\$ 142,000	\$ 127,800	\$ 142,000	\$ 206,000	\$ 185,000	\$ 206,000
Annual Maintenance	\$ 522,443	\$ 145,000	\$ 145,000	\$ 145,000	\$ 228,000	\$ 228,000	\$ 228,000
Insurance/Terminal costs/ Lease/Admin	\$ 1,196,738	\$ 1,054,000	\$ 1,054,000	\$ 1,054,000	\$ 1,068,000	\$ 1,068,000	\$ 1,068,000
<b>Subtotal</b>	<b>\$ 3,040,122</b>	<b>\$ 2,541,284</b>	<b>\$ 2,527,084</b>	<b>\$ 2,541,284</b>	<b>\$ 2,702,284</b>	<b>\$ 2,681,684</b>	<b>\$ 2,702,284</b>
Annualized Major Maintenance	\$ 200,000	\$ 47,000	\$ 46,000	\$ 47,000	\$ 74,000	\$ 71,700	\$ 74,000
<b>Total Annual Operating Cost</b>	<b>\$ 3,240,122</b>	<b>\$ 2,588,284</b>	<b>\$ 2,580,184</b>	<b>\$ 2,588,284</b>	<b>\$ 2,776,284</b>	<b>\$ 2,762,984</b>	<b>\$ 2,776,284</b>
Fares	Current fares	Same unless policy is made to increase					
Funding Options	<b>Operating Costs:</b> Fares, road fund, grants <b>Capital Costs:</b> Road fund, bonds, competitive grants, special district, surcharge						
<b>LOS</b>							
Short-term LOS	Same as today	Slightly better than today	Slightly better than today	Slightly better than today	Better than today	Better than today	Better than today
Long-term LOS	Poor	Poor	Poor	Poor	Better than today– meets future demand	Better than today – meets future demand	Better than today – meets future demand
<b>Evaluation</b>							
Benefits	<ul style="list-style-type: none"> <li>Maintains status quo</li> </ul>	<ul style="list-style-type: none"> <li>Least expensive option</li> </ul>	<ul style="list-style-type: none"> <li>Sets stage for electric conversion</li> <li>Lower operating costs than today</li> </ul>	<ul style="list-style-type: none"> <li>Better LOS than today</li> <li>Lower operating costs than today</li> </ul>	<ul style="list-style-type: none"> <li>Better LOS than today</li> <li>Lower operating costs than today</li> </ul>	<ul style="list-style-type: none"> <li>Better LOS than today</li> <li>Lower operating costs than today</li> <li>Sets stage for electric conversion</li> </ul>	<ul style="list-style-type: none"> <li>Best LOS</li> <li>Lower operating costs than today</li> </ul>
Challenges	<ul style="list-style-type: none"> <li>LOS deteriorates</li> <li>Risk of service outages</li> <li>Operating cost increase</li> </ul>	<ul style="list-style-type: none"> <li>LOS similar to today and anticipated to be worse in future</li> <li>Remain at current Gooseberry Point longer</li> <li>Difficult to convert to electric in future</li> </ul>	<ul style="list-style-type: none"> <li>LOS similar to today and anticipated to be worse in future</li> <li>Remain at current Gooseberry Point longer</li> </ul>	<ul style="list-style-type: none"> <li>Most expensive</li> <li>LOS similar to today and anticipated to be worse in future</li> <li>High risk of not enough funding</li> <li>Risk of property acquisition</li> </ul>	<ul style="list-style-type: none"> <li>Remain at current Gooseberry Point longer</li> </ul>	<ul style="list-style-type: none"> <li>Remain at current Gooseberry Point longer</li> </ul>	<ul style="list-style-type: none"> <li>Most expensive</li> <li>High risk of not enough funding</li> <li>Risk of property acquisition</li> </ul>

Notes:

- All costs are represented in 2018 dollars
- Includes contingency and rounded to nearest \$500,000
- Baseline included for comparative purposes only

# Attachment B

Implementation Schedule

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**Alternative 2: Useful Life**

This alternative programs capital projects by replacing when they have reached their useful life

	Total Cost	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050			
Overhaul Chief																		GP Trestle										Lease Ends									
<b>Whatcom County Process</b>																																					
Biennial Budget																																					
<b>CRAB Funding Process</b>																																					
Project planning																																					
County requests CRABoard to issue call for projects in Spring																																					
Submit project application to CRABoard																																					
Technical review committee completes review and report																																					
If approved, project funding request included in biennial budget																																					
WA Legislature reviews budgetary request																																					
Funds available for expenditures July 1st																																					
<b>Project Elements in Prioritized Order</b>																																					
<i>New Vessel (Design, Contracting, Construction)</i> - 34-car hybrid diesel-electric engine	\$15.0 M																																				
<i>Modifications to Existing Fendering System</i> - for 34-car vessel at both terminals	\$9.7 M																																				
<i>Gooseberry Point Trestle Replacement (Design, Permitting, Construction)</i> - replace existing trestle (if needed)	\$4.5 M																																				
<i>Lummi Island Improvements (Design, Permitting, Construction)</i> - ADA Restrooms - Cameras - Dual-lane queuing improvements - Breakwater	\$5.3 M																																				
<i>Gooseberry Point Terminal Relocation (EIS, Design, Permitting, Construction)</i> - EIS - Replace marine structures with dual loading transfer span - POF float - Cameras	\$35 M																																				
<i>Lummi Island Improvements (Design, Permitting, Construction)</i> - Passenger-ferry float	\$1 M																																				
<b>Annual Capital Expenditures (Millions)</b>																																					
Improvement Projects (Millions)			\$3.80	\$23.90						\$0.70	\$3.70	\$0.50	\$4.80			\$3.00												\$3.00	\$29.00	\$0.20	\$0.80						
Major Maintenance (Millions)												\$0.06															\$0.06								\$0.06		
<b>Total Annual Capital Expenditures (Millions)</b>		\$0.00	\$3.80	\$23.90	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.70	\$3.70	\$0.56	\$4.80	\$0.00	\$0.00	\$3.00	\$0.00	\$0.00	\$0.36	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.06	\$3.00	\$0.00	\$29.00	\$0.20	\$0.80	\$0.00	\$0.06	\$0.00			

\*All estimates include contingency and are in 2018 dollars

