Guemes Island Ferry Replacement Project (Electric)

2018 BUILD Discretionary Grants Program Application

Prepared by:
Skagit County Public Works
1800 Continental Place
Mount Vernon, WA 98273

Submitted to:
US Department of Transportation
BUILD Discretionary Grants Program

July 2018

Table of Contents

Section 1 Project Description

Skagit County Public Works seeks contract design and construction funding to procure a 32-car electric ferry for service to Guemes Island, WA, a rural community 65 miles north of Seattle. Established in the early 1960's, the county's ferry service provides the only publicly available means of transit between Guemes Island and the mainland, functioning as a lifeline for the delivery of passengers, vehicles, goods, and emergency services to the island.

The route is currently served by a single 39-year-old diesel-powered ferry, the M/V Guemes. The 21-car, 100-passenger M/V Guemes transports roughly 200,000 vehicles and 400,000 passengers annually. M/V Guemes has had regular maintenance over the years and a major re-power in 2006, but has remained largely unchanged since entering service in 1979. Since 2014, the ferry division has spent nearly $750,000 annually on drydock, and associated maintenance and repair costs of the aging vessel. This has become increasingly burdensome on the County's road fund, which subsidized the ferry at approximately $1 million per year in the last few years. A study conducted in 2013 concluded that it would be more economical to replace the ferry than to preserve it, as discussed in Section 4.2 and Appendix A, Reference 1. In addition to nearing the end of its useful economic life, M/V Guemes is undersized with respect to the ferry route's future ridership demand projections (see Section 5.1 and Appendix A, Reference 2), potentially burdening economic activity in the surrounding project area if a higher-capacity replacement that supports reliability and future ferry needs is not acquired.

Skagit County began considering replacement options in earnest in 2014, and in 2017 hired Seattle-based naval architecture firm Glosten to develop a concept design for a replacement ferry. The concept design (Appendix A, Reference 3) was completed in 2017. Major areas of design emphasis included vessel capacity, propulsion system type, and vessel emergency service capability.

In order to size the replacement vessel appropriately, Glosten carried out a parametric ridership study that used historical ferry ridership and County population data to forecast vehicle and passenger demand through the year 2060 (Appendix A, Reference 2). This data was used to determine the optimal size for the new vessel, accommodating the ferry service's projected ridership growth while keeping vessel capacity below thresholds that would generate additional crewing costs and regulatory burden.

A significant portion of the design effort focused on propulsion system selection. Skagit County's Board of Commissioners requested that battery electric propulsion be considered due to the environmental protection, quality of life, and operating cost benefits such a system could provide. Lifecycle cost estimates were developed to show total cost of a battery electric vessel, along with the shoreside infrastructure and terminal upgrades necessary to operate it (see Section 3.1). These cost studies revealed significant operating cost savings, but with increased initial capital expenditures necessary to complete essential shoreside infrastructure and terminal upgrades.

Skagit County conducted an environmental review process under the State Environmental Policy Act, completing the evaluation as of July 2018. The County offered two early comment periods with the Guemes Island public and other state and local agencies in February and April 2018, and issued a Determination of Non-Significance and environmental assessment with a formal

comment period in June 2018. The County responded to public comments by analyzing a wider range of ferry sizes and addressing the potential for growth.

Receiving funding to complete design and construction of the 32-car electric ferry and the requisite terminal improvements would enable the County to operate its ferry service at lower costs than with a conventional propulsion system while utilizing an innovative propulsion system, reducing environmental impacts, improving the ferry system's state of repair, and improving the quality of service to island residents and visitors. Furthermore, acquiring a replacement ferry will ensure the continued availability of the ferry service's important emergency service function of transporting emergency vehicles and personnel to the island. The BUILD grant is also essential to helping the County securing the necessary construction funds and designing the ferry terminals allowing the NEPA process to commence consistent with Washington State Department of Transportation (WSDOT) guidance.

Existing Ferry (M/V Guemes)

Passenger Capacity	100
Vehicle Capacity	21
Annual Operating Cost	$1,246,455
Propulsion	Geared Diesel
Service Life	1979-present

32-Car Electric Ferry (Concept Design)

Passenger Capacity	150
Vehicle Capacity	32
Annual Operating Cost	$714,075
Propulsion	Battery Electric
Service Life (Estimated)	2021-2060

Section 2 Project Location

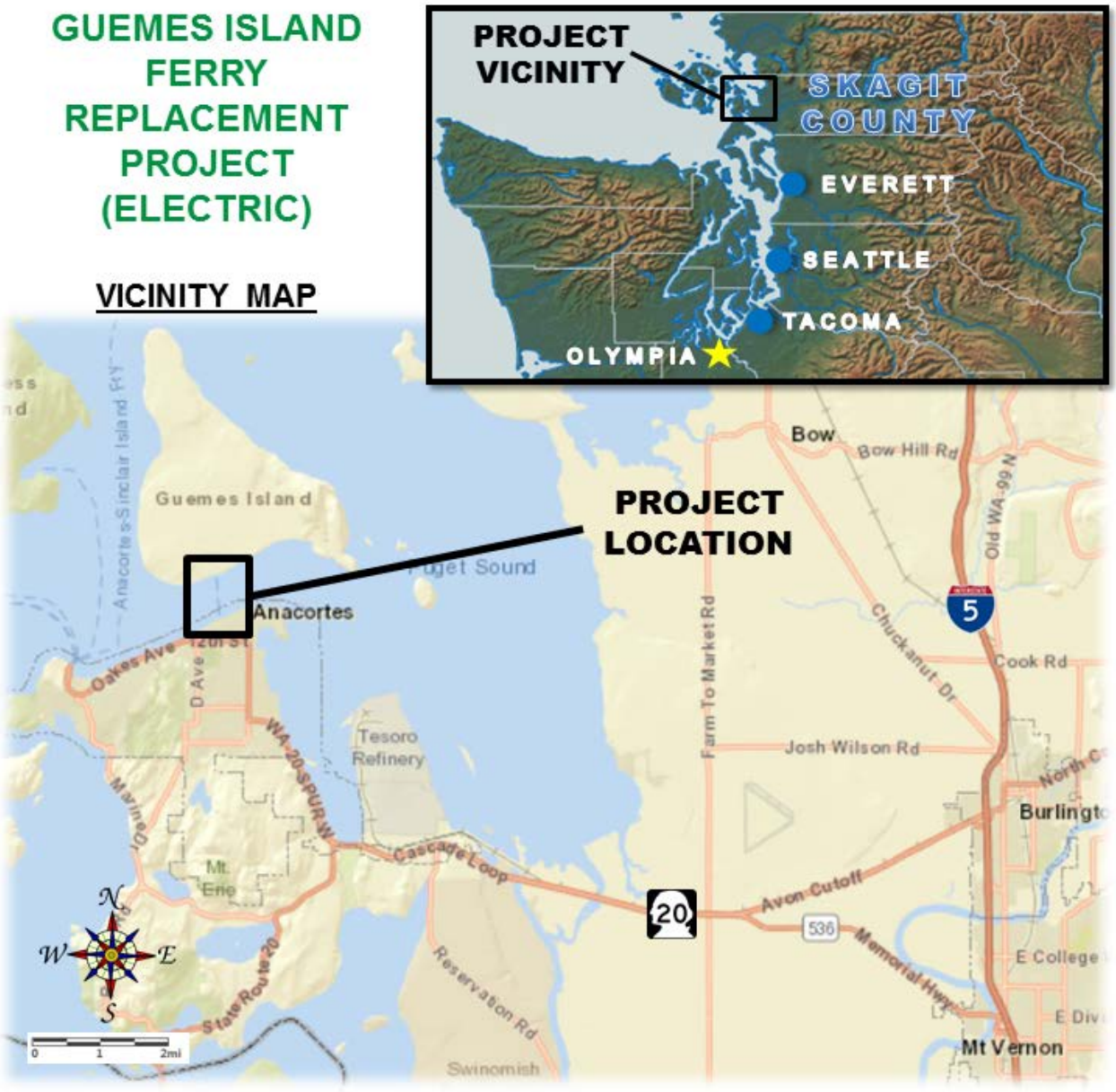


Figure 1 Guemes Island Ferry Replacement Project (Electric) Vicinity Map

The project location is in northwest Washington, with the mainland ferry terminal located in Anacortes, WA, at 48.518638° N, 122.623565° W, and the Guemes Island terminal located on the southern side of the island at 48.529037° N, 122.624656° W. Anacortes is a small city with a US Census Bureau estimated population of 16,953 as of 2017, designated in the 2010 US Census as an Urban Cluster and therefore classified by USDOT as a rural area for purposes of the BUILD Grant. Guemes Island is rural, with 774 year-round residents reported in by the Washington State Office of Financial Management in April 2017. As a popular tourist destination, the island hosts a number of part-time residents during the summer months, in

addition to daily visitors who arrive and depart on the ferry without remaining on the island overnight. Skagit County Public Works estimates that the summertime resident population swells to approximately 2,500.

The ferry service operates in Guemes Channel, which is the body of water that separates Guemes Island to the north and Fidalgo Island to the south and leads east from Rosario Strait to Padilla Bay. The channel is about 3 nautical miles (nm) long and 0.5 nm wide at its narrowest point, with depths ranging from 4 to 18 fathoms (48 to 108 feet). Guemes Channel is part of the Salish Sea, and is thus marine (salt) water with significant tidal fluctuation. The route itself crosses Guemes Channel near its narrowest point and is approximately 0.5 nm in length. Water depth is at least 60 ft for the majority of the route, and at least 14 ft at each terminal. As discussed in Section 4.4, the project location is home to an abundance of sensitive marine life, including Endangered Species Act-listed salmon and southern resident killer whales.

Section 3 Grant Funds, Sources, & Uses of Funding

3.1 Project Costs

Capital costs for replacing the M/V Guemes with a 32-car electric ferry are shown in Table 1. A full discussion of cost analysis methods used to determine project costs may be found in Appendix A, Reference 3.

Shipyard costs, the largest vessel expense, include all labor and materials used to construct the vessel. These funds would be spent at a US shipyard, pending a competitive bid of the replacement vessel construction contract. The following metrics were used to develop the estimate:

- $70/hr shipyard labor rate – representing a national average
- 70 hrs/LT production rate for steel
- 300 hrs/LT production rate for aluminum
- 20% plate wastage
- 10% shape wastage
- 12.5% material markup to cover material shipping, storage, handling
- 20% estimating allowance
- 2% builders risk insurance and bonding

Construction management costs represent the design, contract management, and Owner's representation to oversee construction at the shipyard. Shoreside electrical upgrade costs include design, utility connection, and permitting costs, as well as installation of a shoreside battery bank, charging apparatus, and emergency services generator. Terminal improvements include design and modifications to the existing transfer span apron and dolphins. The following metrics were used:

- 20% estimating allowance
- 5% remaining design costs for vessel
- 10% design costs for terminal upgrades
- 4% construction management
- 2% County oversight and contracting
- 1% permitting fees where appropriate
- 8.5% tax on all shoreside improvement

Section 5.1 provides additional details on the required shoreside infrastructure and terminal improvements.

Description	Category	2018	2019	2020	2021	Total Cost
Total Replacement Cost		**$372**	**$750**	**$13,080**	**$7,503**	**$21,704**
Vessel Total		**$221**	**$445**	**$9,540**	**$5,478**	**$15,685**
County Oversight	*Vessel Construction*	$0	$0	$179	$104	$283
Vessel Design	*Design and Preliminary Work*	$221	$445	$41	$0	$707
Construction Management	*Vessel Construction*	$0	$0	$358	$207	$565
Shipyard Contract		$0	$0	$8,962	$5,168	$14,130
Bonding and Risk Insurance	*Vessel Construction*	$0	$0	$177	$102	$279
Material Markup	*Vessel Construction*	$0	$0	$424	$244	$668
Estimating Allowance	*Vessel Construction*	$0	$0	$1,404	$810	$2,214
Shipyard Engineering and Services	*Vessel Construction*	$0	$0	$1,185	$684	$1,869
Structure	*Vessel Construction*	$0	$0	$1,728	$997	$2,725
Propulsion	*Vessel Construction*	$0	$0	$799	$460	$1,259
Electric Plant	*Vessel Construction*	$0	$0	$1,291	$744	$2,035
Command and Surveillance	*Vessel Construction*	$0	$0	$490	$282	$772
Auxiliary Systems	*Vessel Construction*	$0	$0	$511	$295	$806
Outfit and Furnishings	*Vessel Construction*	$0	$0	$953	$550	$1,503
Shoreside Electrical Total		**$106**	**$214**	**$2,595**	**$1,485**	**$4,398**
Utility Connection	*Shoreside Electrical Improvements*	$0	$0	$62	$36	$98
County Oversight	*Shoreside Electrical Improvements*	$0	$0	$49	$29	$78
Permitting	*Design and Preliminary Work*	$12	$25	$2	$0	$39
Shoreside Design	*Design and Preliminary Work*	$94	$189	$17	$0	$300
Shoreside Electrical Subtotal		$0	$0	$2,463	$1,421	$3,884
Infrastructure	*Shoreside Electrical Improvements*	$0	$0	$1,650	$952	$2,602
Charging Apparatus	*Shoreside Electrical Improvements*	$0	$0	$667	$384	$1,051
Emergency Services Generator	*Shoreside Electrical Improvements*	$0	$0	$147	$84	$231
Terminal Improvements Total		**$45**	**$91**	**$945**	**$540**	**$1,621**
County Oversight	*Terminal Improvements*	$0	$0	$18	$11	$29
Terminal Design	*Design and Preliminary Work*	$45	$91	$8	$0	$145
Terminal Improvements Subtotal		$0	$0	$918	$529	$1,447
Apron Modifications	*Terminal Improvements*	$0	$0	$219	$126	$345
Dolphin Upgrades	*Terminal Improvements*	$0	$0	$699	$403	$1,102

Table 1 Guemes Island Ferry Replacement Project Costs by Year, 2018-2021 (in 1000s, 2018$)

Note: Subtotals may vary by 1 ($1,000) due to rounding error.
Source: PFM, 2017; Glosten, 2018; and BERK, 2018.

3.2 All Funding Sources

Capital costs for this project are expected to total $21.7 million in 2018 dollars, as detailed in Section 3.1 With the grant application this BCA is supporting, Skagit County is requesting $10 million (again, in year of estimates or 2018$) from the BUILD federal grant program. Skagit County will be responsible for all project costs beyond the BUILD grant amount, above, for a total funding/financing responsibility of $11.7 million. Skagit County intends to finance these direct capital costs with a Skagit County Limited Tax General Obligation (LTGO) Bond. These primary direct funding sources are described following:

Federal Grant

- **Better Utilizing Investments to Leverage Development (BUILD).** The BUILD grant program provides a unique opportunity for the DOT to invest in road, rail, transit and port projects that promise to achieve national objectives. **$10,000,000**.

Non-Federal

- **Skagit County Limited Tax General Obligation (LTGO) Bonds.** Skagit County is statutorily authorized to issue up to 2.5% of its assessed value $17,747,214,025 in bonds. Up to 1.5% of this can be limited tax general obligation (LTGO) bonds, which are non-voted and can be implemented via Commissioner action. LTGO bonds do not include a funding tool – that is, the County would still have to identify a source for funding the debt service associated with the LTGO bond. For this project it is anticipated that any resulting debt service costs would be funded with non-federal grant, Skagit County ferry replacement surcharge and Skagit County Road Fund revenues. Additional analysis of Skagit County's debt capacity is provided in Appendix B (BCA Report), Section 1.4.2. **$11,879,560 in bonds to finance $11,704,000 in project costs.**

Skagit County can move forward with the project if the BUILD Grant funds are awarded. The County has the necessary revenue resources to cover the remaining project costs for which they would be responsible. Based on total project costs less the $10,000,000 BUILD grant, an LTGO bond to fund the remainder of the project would be equal to $11,704,000 plus an additional 1.5% in issuance costs for a total bond of $11,879,560. Issued over a 20-year horizon and with an interest rate of 4%, the annual bond repayment would be $874,118.82. It is anticipated that the County would be able to prioritize this debt service within its existing transportation budget. The County intends to fund debt service through three additional funding sources (see Table 5 for more detail):

Non-Federal Grant

- **Washington State County Road Administration Board, County Ferry Capital Improvement Program.** Created in 1991 specifically to assist the four counties in the state of WA operating car ferries. This competitive state grant funding was approved for Skagit County, but requires final legislative allocation. **Estimated at $7,500,000 (approximately $375,000 per year).**

Non-Federal

- **Guemes Ferry Surcharge.** In June 2018, the Board of Skagit County Commissioners voted unanimously to adopt a resolution to implement a vessel replacement surcharge expected to raise approximately $235,000 annually. Collected surcharge funds can only be used for the purchase or construction of a new ferry vessel or debt service resulting from the construction of a new vessel. **Estimated at $4,941,379 (approximately $235,000 per year).**
- **Skagit County Road Fund.** The County Road fund is funded by property taxes levied on the unincorporated county. In 2018, the assessed value of the unincorporated county was $8,595,846,321. This assessed value was taxed at a rate of 1.7535 per $1,000 of assessed value for total anticipated revenues of $15,073,104. As per RCW 36.82.020, all road levy funds to be spent for "proper county road purposes," which includes the acquisition and operation of ferries. **Estimated at $4,486,821 (approximately $236,410 per year).**

3.3 Non-Federal Funds Documentation

Full documentation of non-federal funding commitments is shown in Appendix C, and includes:

Washington State County Road Administration Board, County Ferry Capital Improvement Program

- *County Road Administration Board Technical Review Committee Report*
- *Skagit Ferry Replacement, April 2018 News Release*

Guemes Ferry Surcharge

- *Skagit County Resolution R20180123, Establishing a Vessel Replacement Surcharge*

Skagit County Road Fund

- *Skagit County Information on Property Tax Procedures 2018, Statement of Assessments (page 15)*

Skagit County Limited Tax General Obligation (LTGO) Bonds

- *CAFR, year ending December 31, 2016 (pages 191-192)*
  The comprehensive annual financial report (CAFR) for the year ending December 31, 2017 is not yet available (it is anticipated in September 2018), so the CAFR for the previous year (year ending December 31, 2016) is provided as additional funding documentation for Skagit County's LTGO debt capacity. Analysis providing the County's debt capacity updated to 2018 is provided in Section 5.4.

3.4 Matching Funds Documentation

This BUILD Grant application seeks $10 million to support the Guemes Island Ferry Replacement Project, which has a total capital cost of $21.7 million. This represents approximately 46% of the overall project costs. The BUILD grant can be used for up to 80% of the costs of a project (and can fund a greater share for those projects serving rural areas, like this one, at the discretion of the Secretary of Transportation); therefore, this request meets the requirements of the grant program.

At this time, no Federal funds requiring a match have been obligated for this project, so no match requirements have been identified. Further, none of the identified state funds require a match.

3.5 Detailed Project Budget

Table 2 presents capital uses, summarizing project costs by year within the construction period and categorizes costs by the four major construction activities anticipated as part of this project:

1. Design and Preliminary Work
2. Vessel Construction
3. Shoreside Electrical Improvements
4. Terminal Improvements

Capital Uses	2018	2019	2020	2021	Total
Design and Preliminary Work	$372	$750	$69	$0	$1,191
Vessel Construction	$0	$0	$9,500	$5,478	$14,978
Shoreside Electrical Improvements	$0	$0	$2,575	$1,484	$4,059
Terminal Improvements	$0	$0	$936	$540	$1,476
TOTAL CAPITAL USES	**$372**	**$750**	**$13,080**	**$7,503**	**$21,704**

Table 2 Guemes Island Ferry Replacement Project Costs by Year and Cost Category (in 1000s, 2018$)

Note: Subtotals may vary by 1 ($1,000) due to rounding error.
Source: PFM, 2017; Glosten, 2018; and BERK, 2018.

Table 3 presents capital sources, showing when capital funding is anticipated to be expended within the construction period.

Capital Sources	2018	2019	2020	2021	Total
BUILD Grant					
Better Utilizing Investments to Leverage Development (BUILD) Grant			$10,000		$10,000
Non-Federal					
Guemes Ferry Surcharge	$235				$235
Skagit County Roads Fund	$137				$137
Skagit County Limited Tax General Obligation (LTGO) Bonds		$750	$3,080	$7,503	$11,333
TOTAL CAPITAL SOURCES	**$372**	**$750**	**$13,080**	**$7,503**	**$21,704**

Table 3 Guemes Island Ferry Replacement Project Funding by Year (in 1000s, 2018$)

Note: Subtotals may vary by 1 ($1,000) due to rounding error.
Source: PFM, 2017; Glosten, 2018; and BERK, 2018.

Table 4 shows how funding sources will be used across the four construction activities.

	Design and Preliminary Work	Vessel Construction	Shoreside Electrical Improvements	Terminal Improvements	Total
BUILD Grant					
Better Utilizing Investments to Leverage Development (BUILD) Grant	0.0%	63.4%	19.4%	0.0%	46.1%
Non-Federal					0.0%
Guemes Ferry Surcharge	19.7%	0.0%	0.0%	0.0%	1.1%
Skagit County General Fund	11.5%	0.0%	0.0%	0.0%	0.6%
Skagit County Limited Tax General Obligation (LTGO) Bonds	68.7%	36.6%	80.6%	100%	52.2%
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table 4 Guemes Island Ferry Replacement Project Funding by Project Category (1000s, 2018$)

Source: PFM, 2017; Glosten, 2018; and BERK, 2018.

Table 5 shows the total capital costs expected and how Skagit County anticipates issuing three LTGO bonds during the construction period to fund a total of $11,333,000 in capital project costs. The first bond to fund $750,000 of project costs will be issued in 2019 for approximately $761,250 (in 2018$ and which includes 1.5% in issuance costs) over a 20-year horizon and with an interest rate of 4%, making the annual bond repayment $56,014 annually between 2020 and 2039.

The second bond to fund $3,080,000 of project costs will be issued in 2020 for approximately $3,126,200 (in 2018$ and includes 1.5% in issuance costs) over a 20-year horizon and with an interest rate of 4%, making the annual bond repayment $230,031 annually between 2021 and 2040.

The third bond to fund $7,503,000 of project costs will be issued in 2021 for approximately $7,615,545 (in 2018$ and includes 1.5% in issuance costs) over a 20-year horizon and with an interest rate of 4%, making the annual bond repayment $560,365 annually between 2022 and 2041.

	Bond 1	Bond 2	Bond 3	Total	LTGO Bond Repayment Revenues		
Bond Issuance	**$761,250**	**$3,126,200**	**$7,615,545**	**$11,502,995**	**CRAB CFCIP**	**Guemes Ferry Surcharge**	**Skagit County Roads Fund**
2020	$56,014	$0	$0	$56,014	$0	$56,014	$0
2021	$56,014	$230,031	$0	$286,045	$0	$235,000	$51,045
2022	$56,014	$230,031	$560,365	$846,410	$375,000	$235,000	$236,410
2023	$56,014	$230,031	$560,365	$846,410	$375,000	$235,000	$236,410
2024	$56,014	$230,031	$560,365	$846,410	$375,000	$235,000	$236,410
2025	$56,014	$230,031	$560,365	$846,410	$375,000	$235,000	$236,410
2026	$56,014	$230,031	$560,365	$846,410	$375,000	$235,000	$236,410
2027	$56,014	$230,031	$560,365	$846,410	$375,000	$235,000	$236,410
2028	$56,014	$230,031	$560,365	$846,410	$375,000	$235,000	$236,410
2029	$56,014	$230,031	$560,365	$846,410	$375,000	$235,000	$236,410
2030	$56,014	$230,031	$560,365	$846,410	$375,000	$235,000	$236,410
2031	$56,014	$230,031	$560,365	$846,410	$375,000	$235,000	$236,410
2032	$56,014	$230,031	$560,365	$846,410	$375,000	$235,000	$236,410
2033	$56,014	$230,031	$560,365	$846,410	$375,000	$235,000	$236,410
2034	$56,014	$230,031	$560,365	$846,410	$375,000	$235,000	$236,410
2035	$56,014	$230,031	$560,365	$846,410	$375,000	$235,000	$236,410
2036	$56,014	$230,031	$560,365	$846,410	$375,000	$235,000	$236,410
2037	$56,014	$230,031	$560,365	$846,410	$375,000	$235,000	$236,410
2038	$56,014	$230,031	$560,365	$846,410	$375,000	$235,000	$236,410
2039	$56,014	$230,031	$560,365	$846,410	$375,000	$235,000	$236,410
2040	$0	$230,031	$560,365	$790,396	$375,000	$235,000	$180,396
2041	$0	$0	$560,365	$560,365	$375,000	$185,365	$0
Total Bond Lifecycle Cost	**$1,120,280**	**$4,600,620**	**$11,207,300**	**$16,928,200**	**$7,500,000**	**$4,941,379**	**$4,486,821**

Table 5: Total Skagit County LTGO financing for capital costs and expected revenues for repayment, 2018$

Source: PFM, 2017; Glosten, 2018; and BERK, 2018.

Debt service on all three bonds together will be fully funded by a combination of CRAB CFCIP, Guemes Ferry Surcharge, and Skagit County Road Funds. Including issuance and interest on the bonds between 2019 and 2041 (equal to $5,595,200), total capital project costs, including debt service, equal $27,299,200.

Section 4 Merit Criteria

4.1 Safety

Emergency Services

The Guemes Island ferry provides a critical emergency service function for residents and visitors of Guemes Island by transporting emergency vehicles and personnel to and from the mainland.

The most recent large fire response on Guemes Island, in 2012, resulted in continual ferry service from 3:00 pm until 3:10 am on May 20th, for a total of 17 unplanned trips. The response involved approximately 100 emergency responders and 23 emergency vehicles coming from 13 fire districts (Appendix A, Reference 5). Although this was an uncommon event, the ferry played a crucial role in enabling emergency service vehicles to access the island.

Calls for transport of an ambulance are a much more common occurrence, but no less critical as life depends on response time. A rural emergency heliport exists on the island, but in most situations, helicopter travel is neither the fastest nor the most practical means of transporting patients to the care they need. Emergency vehicles cannot be transported when the M/V Guemes is out of service since the only available ferry to charter by Skagit County is a passenger-only vessel. Both planned and unplanned shipyard repairs and maintenance have increased in frequency and duration as the vessel ages and approaches the end of its useful life due to failing equipment, limited availability of parts, and deteriorating structure.

Replacing the existing 39-year-old diesel ferry with a new electric ferry will decrease out-of-service time and ensure that reliable vehicle and passenger transportation to the island continues to be available. The new ferry will be able to make multiple trips on a single battery charge, and will be able to recharge during power outages either through an on-vessel or on-shore generator.

From 2012 to 2017, the M/V Guemes was out of service for an average of 21 days per year for planned shipyard work, and a combined total of 26 days per year for both planned and unplanned maintenance and repairs. It is estimated that the replacement ferry will be dry-docked less often (once every two years) for a duration of 14 days, resulting in 7 days per year for planned shipyard work. This is a 300% reduction in planned out of service days. New equipment will permit condition monitoring and allow for enhanced predictive maintenance. This will decrease unplanned repairs that are very disruptive to the ferry service, which will result in faster response times by emergency services and reliability.

Segregation of Passenger and Vehicles

The new ferry will be designed to segregate walk-on passengers and vehicles throughout the entire trip. Current operations of the M/V Guemes require walk-on passengers to load and unload directly onto an area of the deck that is shared by vehicles. The County has mitigated most of the safety risk through procedures and policies, but at the cost of loading efficiency. To increase the safety and loading efficiency of the replacement ferry; separated areas for walk-on passengers and vehicles will be provided on the new vessel and terminal.

Airborne Noise

United States Coast Guard document NVIC-12-82 discusses recommendations for control of excessive noise on vessels. Similar international regulations also exist. Hearing loss is a well-recognized issue within the marine industry, and many operators have incurred millions of dollars in hearing loss claims. Diesel engines are the primary source of noise on typical marine vessels, with engine room noise levels often exceeding 110 dBA. As a point of reference, hearing protection is required above 85 dBA per OSHA regulations, and abrasive blasting produces noises in the 105 to 112 dBA levels.

Airborne noise from the existing ferry emanates from the above-deck diesel engines, located directly adjacent to the passenger cabin, passenger loading area, and parked vehicles. The

existing noise levels make it difficult for passengers to communicate, and even more so for crew members relaying orders to motorists loading and unloading, this becomes even more relevant during emergency situations.

The new ferry will utilize a much quieter battery electric propulsion system, running virtually silently from a passenger's perspective. Below the main deck of the vessel, the main equipment room will have some noise from ventilation fans, pumps, and power conversion equipment, but will be below the 85 dBA limit requiring hearing protection. If it is determined that a backup diesel generator is needed, it will only be expected to run for 5% of the vessel's total operating hours, will be located below the main deck, and will be fitted with a high attenuation silencer. By choosing to remove the single greatest source of noise on the vessel, the County will provide a major safety benefit to the passengers and is investing in the safety of their crew.

Release of Hazardous Materials

Unintended release of petroleum oil from marine vessels into U.S. navigable waters from 2007 to 2016 averaged about 1,650 incidents per year, with a total spilled amount averaging about 300,000 gallons per year (Appendix A, Reference 10). For many vessels, the highest oil spill risk occurs is during bunkering (taking on fuel) and tank to tank fuel oil transfers.

The existing ferry takes on approximately 2,200 gallons of diesel fuel every two weeks (57,200 gallons annually) via a fuel truck driven onto the vessel. Lube oil is brought onto the vessel in 55-gallon drums when oil changes on the deck mounted engines are required.

The new ferry will be powered via electricity transferred to the vessel via cables and stored onboard in lithium-ion batteries. A single diesel generator may be kept onshore or onboard for emergency and high demand times, but is estimated to use 5,000 or less gallons per year. Assuming the generator would be fueled with diesel four times per year, the probability of releasing diesel oil into the water is reduced by a factor of six. Combined with the reduced frequency of filling, overflow tanks with audible and visual alarms virtually eliminates the risk of an oil spill.

4.2 State of Good Repair

Oceangoing vessels are commonly designed around a 25-year expected life, and many are scrapped at this age due to hull and mechanical deterioration. Large ferry operators in the Pacific Northwest such as Washington State Ferries and Alaska Marine Highway Systems often run their vessels to 50 years and beyond. But maintenance on an older ferry increases significantly as structure, propulsion machinery, electrical systems, auxiliary systems, and outfitting require replacement due to deterioration or functional obsolescence.

While the M/V Guemes has been well maintained, the costs to maintain the vessel in a state of good repair continue to increase as the vessel ages. The existing ferry's average annual maintenance and repair cost from 2012-2017 was $649,792, more than double the anticipated maintenance and repair cost of $306,210 for the larger new ferry. In addition to maintenance costs, the annual number of out-of-service days has increased due to planned maintenance in shipyards and unplanned maintenance due to equipment failures. As discussed in Section 4.1, the County charters a passenger-only substitute ferry during scheduled shipyard periods (at an average cost of $77,262 per year) and may not be able to charter a substitute ferry during

unscheduled short-term out-of-service periods, in both cases disrupting the flow of passengers, goods, and emergency services to the island.

The replacement ferry's battery electric propulsion system will achieve additional long-term cost benefits beyond maintenance and repair cost savings. Table 6 below shows a side-by-side annual operating cost comparison between the existing ferry and the replacement ferry; the 32-car electric ferry achieves operating cost savings in fuel/powering costs and charter vessel rental during out-of-service periods. A 10% cost reduction was also assumed for professional services, such as marine engineering, and miscellaneous operating costs due to the improved condition of the replacement ferry.

Item	M/V Guemes[1]		32-Car Electric Ferry		Savings	
	Cost	% of Total	Cost	% of Total		
Fuel/Lube/Supplies[2]	$295,685	23.7%	$175,000	24.5%	$120,685	40.8%
Maintenance/Repair	$649,792	52.1%	$306,210	42.9%	$343,582	52.9%
Rentals[3]	$77,262	6.2%	$21,000	2.9%	$56,262	72.8%
Other Items[4]	$118,509	9.5%	$106,658	14.9%	$11,851	10.0%
Interfund Transfers	$105,207	8.4%	$105,207	14.7%	-	-
Total Costs	$1,246,455	100%	$714,075	100%	$532,380	42.7%

Table 6 Annual operating cost comparison – M/V Guemes versus 32-car electric ferry

(1) Six-year average of M/V Guemes costs (2012-2017)
(2) For the 32-car electric ferry, this line item is the cost of electricity
(3) This is the cost of the passenger-only charter vessel used during out-of-service periods
(4) Professional services, utilities, travel, communications, etc.

4.3 Economic Competitiveness

As the primary means by which residents, tourists, vehicles, consumer goods, and multiple essential services are transported to and from Guemes Island, the ferry is a lynchpin of economic activity on the island. Based on the U.S. Census Bureau employment statistics data for 2015 at the block group level (see Appendix F), half of the island's residents have jobs, nearly all occurring off-island, necessitating a reliable ferry. Many on-island jobs rely on ferry service to bring in customers and supplies. To ensure a vibrant local rural economy and secure employment for off-island commuters, a new ferry is needed. Section 4.5 contains further details on the ferry's impact on the local economy.

Guemes Island residents have stated that it is a priority to preserve the island's rural character. The Guemes Island Subarea Plan (Appendix A, Reference 8) details the sustainable development goals and ongoing areas of concern highlighted by the Guemes Island Sustainable Design Assessment Team. While residents have a range of opinions regarding the appropriate level of service for the ferry, there is broad agreement among residents regarding the overall importance of ferry service in maintaining Guemes Islanders' way of life. In addition to increasing the reliability of service over what the aging existing ferry provides, the proposed ferry would increase vehicle and passenger capacity while continuing to operate on the same schedule as the existing ferry; the proposed ferry would meet the demand for ferry service by future rural growth managed by Skagit County consistent with the Guemes Island Subarea Plan (Appendix A, Reference 8). The replacement vessel's increased vehicle and passenger capacity will ensure that Skagit County's ferry service can accommodate the expected growth of the ridership pool over

the course of the replacement ferry's anticipated service life, thereby maintaining the ferry's contribution to the island's economy. Section 5.1 and Appendix A, Reference 2 provide details on the methods used to estimate the size of the future ridership pool.

Once the funding necessary to carry out the ferry replacement project is acquired, there is a good chance that the ferry would be constructed at a Pacific Northwest shipyard. The City of Anacortes is home to Dakota Creek Industries, a shipyard that would likely be in contention for the project. Furthermore, as a Jones Act vessel, it is certain that the replacement ferry will be constructed at some United States shipyard, whether in the Pacific Northwest, Gulf of Mexico, or other US region.

Total Shipyard Labor Hours	**68,052**
Shipyard Engineering & Services	14,479
Structure	23,520
Propulsion	1,541
Electric Plant	8,193
Command and Surveillance	3,394
Auxiliary Systems	4,947
Outfit & Furnishings	11,978

Table 7 shows the estimated labor hours required to complete construction of the replacement ferry. For purposes of the project cost estimate in Section 3.1, the rate for shipyard labor was assumed to be $70/hour, resulting in an estimated $4,763,640 in labor billings for the shipyard selected to complete construction of the vessel.

Table 7 Shipyard labor hours

In addition, this proposal as a proof of concept has the potential to spur regional growth in new electric propulsion technologies for marine vessels:

> *The outcome of this project would provide an avenue for a whole new design field. It will provide boat yards with the experience to expand their abilities. The spin offs will inspire initiative for other ferries to explore electric repower projects, as Washington State ferries are beginning to do now. Advanced battery technology will also benefit from marine influence. (Fouts, Lieutenant, Guemes Island Fire Department, see Appendix D)*

> *ACES stands for Autonomous Connected Electric and Shared and we believe the Skagit electric ferry proposal will jump start electrification of marine propulsion in the Salish Sea that saves fuel/maintenance costs… (ACES Northwest Network, Cascadia Center, Bruce Agnew, Director; see Appendix D)*

4.4 Environmental Protection

The existing diesel-powered ferry negatively impacts the local environment by producing air pollution and emissions, airborne noise, underwater radiated noise, and water emissions. The replacement ferry has been designed for battery electric operation, using utility grid electricity as the primary form of energy instead of diesel fuel. Shifting the dependence from diesel oil to electricity is not only good for the environment but also provides a more stable cost of energy for Skagit County.

The Guemes Island Ferry Replacement Project provides an early proof of concept for battery electric propulsion for Washington State Ferries and mirrors the Governor’s executive order 18-

01 that calls for "the transition to a zero-carbon-emission ferry fleet, including the accelerated adoption of both ferry electrification and operational improvements that will conserve energy and cut fuel use." An electric ferry also supports the Governor's Executive Order 18-02 (Appendix A, Reference 9) to "develop strategies for quieting state ferries in areas most important to Southern Residents," killer whales that are federally and state endangered.

Air Pollution and Emissions

Air pollution is a concern to the future stakeholders of the replacement ferry. The electric replacement ferry was designed to produce almost no local air emissions, thereby reducing localized health risks. Reducing smog and air pollution in urban clusters like Anacortes benefits these communities, but the replacement ferry is intended to provide not only local benefits but overall emissions reductions as well. The local utility, Puget Sound Energy, produces electricity from several different energy sources, as shown in Figure 2. For purposes of the Benefit-Cost Analysis, it was assumed that the replacement ferry would be powered by the standard mix of fuel sources utilized by Puget Sound Energy (PSE) shown on the left. However, PSE also offers a green energy blend option, whereby homes or businesses may match some or all of their electricity usage to renewable energy sources sourced by PSE at an extra cost. Skagit County is investigating using this option to power the replacement ferry.

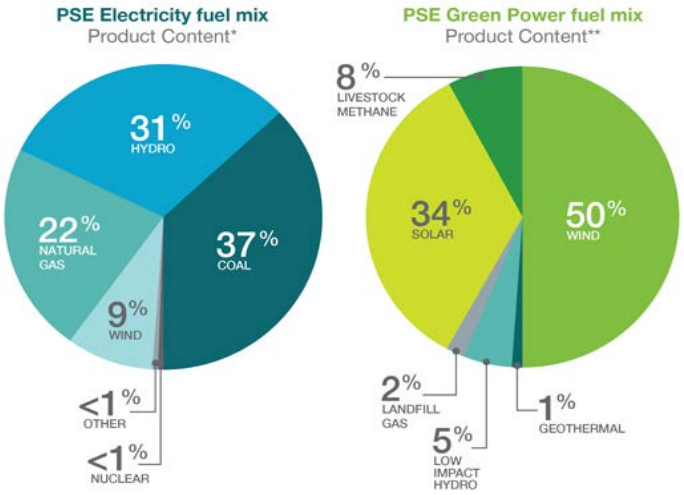


Figure 2 Blend of energy sources from the utility serving the Anacortes terminal; standard fuel mix on left, green power fuel mix on right (Source: https://pse.com/savingsandenergycenter/GreenPower/Pages/default.aspx)

Based on the standard blend of energy sources, an analysis was performed to compare the air emissions produced by powering a battery electric ferry to those produced by operating a new diesel electric ferry of the same size and capacity. Data was based on operating profiles detailed in Appendix A, Reference 3. Table 8 shows the annual emissions reductions achieved by a battery electric propulsion system versus a conventional diesel propulsion system.

Table 8 Annual emissions reduction, short tons

	NOx	CO	CO_2	HC	PM	Diesel Fuel	SO_2	CH_4	N_2O
Baseline w/ Diesel Engines	8.44	4.38	1352	0.84	0.62	387	0.013	0	0
Battery Electric Ferry	0	0	898	0	0	0	0	0.049	0.012
Annual Reduction	8.44	4.38	453	0.84	0.62	387	0.013	-0.049	-0.012

A battery electric ferry achieves approximately a 34% reduction in CO2 and eliminates the other major diesel engine emissions such as NOX, CO, HC, PM, and SO_2. This reduction represents a significant environmental protection benefit for the proposed replacement ferry.

Underwater Noise

Underwater noise emitted by ferries and other marine vessels has received increased attention in recent years due to growing scientific evidence that underwater noise can cause harm to marine mammals, including the Endangered Species Act listed southern resident killer whale, which inhabits the project location. On March 14, 2018, the State of Washington Office of the Governor issued Executive Order 18-02, which resolved to "develop strategies for quieting state ferries in areas most important to Southern Residents." Efforts will therefore be made to minimize the replacement ferry's underwater radiated noise to the extent possible.

Most underwater noise emitted by marine vessels is from propellers, especially from the cavitation that can occur with highly loaded propellers and the pressure pulses from passing propeller blades. Propellers and the associated thruster components will be designed to minimize excess noise and cavitation, mitigating to the extent possible the underwater radiated noise produced by the replacement vessel.

Water Emissions

The M/V Guemes has a single crew-only sink that discharges gray water directly overboard, and has no head (restroom facility). The replacement ferry will have a crew-only head with a sink, both leading directly to a holding tank for 100% containment. The area of operation (see Section 2) is home to sensitive marine life, including Endangered Species Act listed whales and salmon, which will benefit from the 100% containment of effluent.

4.5 Quality of Life

A reliable and multi-modal ferry is essential to the Guemes community's quality of life. Apart from a small restaurant and quick stop grocery and gas station at the Guemes Island ferry dock area, all necessary services are off-island including schools, health care, shopping, banking, vehicle repair, veterinary services, and more. Businesses on the island require deliveries of products and receivables, even the businesses which are home-based.

A survey of Guemes Island ferry users in late 2017 found that 58% of the 273 respondents use the ferry regularly for errands like groceries and banking, and 36% use the ferry regularly for doctor's visits. Survey results are available at https://publicinput.com/1970/. Imagine you are elderly with health concerns, or pregnant, and need weekly doctor's visits. Perhaps you have to plan ahead three hours to ensure you have a spot on the ferry that will get you to your appointment on time in Mount Vernon, where most medical services are available.

> *When I was pregnant with my daughter, I'd often have to get in line 3 hours before my scheduled Doctors appointment in Mt. Vernon just to… be sure I could arrive in time. …It becomes a hardship when a good portion of your day is wasted sitting in line just to make it on a scheduled trip over. This is obviously something you learn to expect and live with being an island resident, but when minute waits have now turned to hours to cross the mile wide channel, more and more often, it has become difficult to navigate successfully. (Lynch; see Appendix D)*

Now imagine 26 days on average per year the aging Guemes Island ferry has been unavailable, some of them being unplanned emergency stoppages. You probably need a second car on the other side of the channel, which compounds your ferry cost and the existing parking shortage, or you're left wondering if your ferry run will work with the bus schedule. The new electric ferry

would not need a "break" for mid-day maintenance or fueling like the current diesel ferry, and could instead add more runs during its current window of operation. Having a larger more reliable ferry will positively impact your quality of life by increasing the predictable movement of people and goods.

A new electric ferry will improve reliability, and thus connectivity for Guemes Island residents working off island. Census Bureau data (Appendix F) shows that there are 351 island residents that have jobs, with over 87% of jobs located off island. About 25% of residents' jobs require commuting less than 10 miles, many of these jobs being in Anacortes. A larger more reliable ferry would support Guemes' working residents to be on time for their jobs, and perhaps allow them more choices of jobs if commuting is more secure. This will benefit businesses in Anacortes and elsewhere in Skagit County that employ Guemes Island residents.

> *As a resident of Guemes Island, I depend on safe and reliable transportation. Not only have we been experiencing month-long maintenance-and-repair haul-outs and unexpected outages, where our only transportation off the island is a passenger-only ferry, but the current capacity of 21 vehicles is often exceeded. This requires lining up for our five-minute crossing up to two hours early in order not to miss an important meeting or doctor's appointment or get to work late. (Monahan, HR Manager, PACCAR Technical Center; see Appendix D)*

The Guemes Island Ferry Replacement Project will also support a rural economy on the island. Island jobs include many occupations: accommodation and food service, retail, elderly and child care, construction, manufacturing, and agricultural. While Guemes Island jobs represented less than 1% of the unincorporated Skagit County jobs in 2013, the average annual taxable retail sales per business was over $57,000 for Guemes Island businesses versus $46,000 per business in unincorporated Skagit County as a whole (Appendix F) As with off-island commuters, ferry outages that have increased over the last five years interfere with local businesses' viability and productivity. Imagine you are harvesting your crops and need to get the product to market. During harvest season if there are lengthier outages of ferry service, agricultural producers need to carry produce onto the temporary foot ferry, which is difficult due to the produce weight and the small passenger compartment. Imagine you have a home business where you make clothing and need regular deliveries. Or you operate the on-island store and gas station and must also receive necessary food and materials for on-island residents and visitors. On the days the current ferry has been out of service, you must reschedule deliveries or your appointments or meet deliveries at the dock to pick up essential materials. The larger ferry would result in more reliable deliveries and accommodate more trucks and allow daily business to continue uninterrupted. Thus, the Guemes Island Ferry Replacement Project can support self-sufficiency and entrepreneurial activity on the island.

Skagit County's ferry survey in late 2017 found that 28% of the 319 respondents walked or rode bikes on the ferry. A new electric ferry would expand the capacity for walk on passengers by 50%. The new design of the passenger holding area allows more space for bikers, parents with strollers, deliveries with dollies, etc., allowing more transportation choices.

The median age in Census Tract 9501 containing Guemes Island was about 58.8 in 2010, far higher than the countywide median age 41.3 years. As islanders age, they need reliable access to healthcare as stated above, plus they can benefit from the larger passenger area that can accommodate wheelchairs or walkers. This accommodation of older islanders can have a spin off benefit of allowing them to age in place longer.

As a population ages, passenger ferry service becomes more important. The current passenger cabin is small and is often crowded, requiring people to stand outside without shelter. Passengers must enter and exit the ferry on the car deck, which delays loading and increases safety concerns. The current ferry is not ADA compliant. The lack of safe and adequate passenger space results in fewer transportation choices for older people with canes, walkers, wheelchairs, failing eyesight, or other chronic and disabling conditions or injuries. Taxi and bus service is available in Anacortes, but getting there as a passenger may be impossible. During our almost annual month-long haul-outs for our aging ferry, the passenger-only boat is extremely unsuitable for many elders in inclement weather, which is frequent during the fall or spring haul-outs. The stairs into the cabin are steep and easy to trip over and most of the deck is uncovered, with only two benches that seat six people. (Walden; see Appendix D)

Improved ferry service will benefit not only the quality of life for nearly 800 fulltime residents, but also improve the quality of life for up to 2,500-seasonal residents and visitors during summer and weekends. Additionally, Guemes Island is a known day trip place for other Skagit County residents who come to bicycle or to visit parks and beaches, or to attend a wedding at the Guemes Island Resort. Culturally, the Island hosts events for the broader Skagit County community including poetry readings, chamber music concerts, sustainability workshops, the Fall Festival, Fourth of July Parade and Picnic, the Dog Island Dog Show, the Woodchoppers' Ball, the Holiday Bazaar, weekly live music at the restaurant, and others. With a new ferry, the reliable and higher capacity service will strengthen this island's cultural connection to the rest of the County and its 125,000 residents.

Guemes Island residents have urged Skagit County to consider the positive 40-year impact the new electric ferry will have on the quality of life for future generations; they have encouraged the County to do the "right thing" (see Section 4.7).

4.6 Innovation

The new ferry will utilize an innovative battery electric propulsion system that will lower point source emissions, reduce engine noise, and operate at a decreased cost relative to a similar-sized diesel ferry and the existing ferry. Battery electric ferries are currently in service in Norway, thus the technology has been proven; however, the new Guemes Island Ferry would be among the first in the US, putting Skagit County at the forefront of this rapidly developing area of innovation. As discussed in Section 4.7, adoption of battery electric propulsion technology will also make Skagit County a leader in the effort to carry out Governor's Executive order 18-01 (Appendix A, Reference 11), which calls for the transition to a zero-carbon-emission ferry fleet, providing proof of concept to state agency Washington State Ferries, which is pursuing possible conversion of its three largest ferries.

As discussed in Section 5.1, all vessel functions, including propulsion, navigation, habitability, and auxiliary systems, will be powered by two lithium-ion battery banks installed onboard the vessel. A backup diesel generator may also be installed onboard but is included for redundancy and will not be in regular use. The vessel will connect to a shoreside charging station each time it docks at the mainland terminal to unload, receiving sufficient charge to complete a round trip to and from the Guemes Island terminal, plus sufficient margin to allow for unplanned power demand due to emergency assistance maneuvers, moderately heavy weather, or other emergent needs. The environmental benefits of this system are discussed in Section 4.4, and the operating cost benefits are discussed in Section 4.2.

Use of an electric propulsion system will require the installation of shoreside battery banks, as discussed in Section 5.1. The shoreside battery banks will offer a means of recharging the shipboard battery more quickly than conventional grid power would permit, which is necessary due to the ferry's short turnaround time at the terminal. Design and installation of shoreside infrastructure improvements is not expected to impact overall project schedule, as these tasks can be undertaken concurrently with vessel design and construction. Section 5.2 - Figure 8 provides a graphic that shows the expected project timeline; terminal electrical design is scheduled to occur from 13 March 2019 - 5 December 2019, concurrent with vessel design and solicitation of shipyard bids, and the construction schedule for terminal electrical modifications is scheduled for 24 April 2020 - 14 May 2021, concurrent with vessel construction.

4.7 Partnership

Skagit County has collaborated with non-profit, private industry, utility, regional government, state government, and tribal entities to develop the Guemes Island Ferry Replacement Project. County partners and stakeholders represent economic, energy, environmental, and transportation interests, and neighboring rural communities.

Skagit County convened an Electric Ferry Partnership Roundtable on July 10, 2018 and has been active regionally with other marine transit stakeholders, for example by sharing the project at the FERRIES Conference in October 2017 in Seattle, WA. Feedback from these activities has made it clear that the Guemes Island Ferry Replacement Project will support and dovetail with state, regional, and county rural transportation, economic, and environmental goals. Letters of support quoted throughout the Project Narrative may be found in full in Appendix D.

An all-electric replacement ferry would provide an early proof of concept for Washington State Ferries and mirrors the Governor’s executive order 18-01 (Appendix A, Reference 11) that calls for “the transition to a zero-carbon-emission ferry fleet, including the accelerated adoption of both ferry electrification and operational improvements that will conserve energy and cut fuel use.” The project also supports the Governor’s Executive Order 18-02 to “develop strategies for quieting state ferries in areas most important to Southern Resident” killer whales that are federally and state endangered (Appendix A, Reference 9). Indeed, for these reasons of energy efficiency, carbon reduction, and environmental conservation, Washington State Ferries is pursuing the conversion of its three largest ferries in 2021-2023. As a transportation partner, Washington State Ferries “is committed to collaboration with Skagit County as it pursues this important initiative.”

The Samish Indian Nation also supports the electric vessel and its ability to “reduce carbon dioxide”, and to serve as a “commitment to protecting the environment.”

Promoting commerce, community, and conservation, the private ACES Northwest Network has noted “the Skagit electric ferry will jump start electrification of marine propulsion in the Salish Sea that saves fuel/maintenance costs and gives a noise break to orcas.” The Port of Skagit also supports the County’s “willingness to embrace new technology and network with industry leaders” – this ability to attract industry leaders was also highlighted at the Partnership Roundtable in July 2018 by the Economic Development Alliance of Skagit County (EDASC) to help attract businesses and industry to Skagit County who embrace new technology and an environmental stewardship ethic.

Skagit County is working closely with power and electric providers both with Puget Sound Energy who will provide power to the new shoreside electrical equipment at the Guemes Ferry's Anacortes terminal, and Orcas Power and Light Cooperative who is pursuing several energy conservation initiatives. Orcas Power and Light Cooperative highlights that "Any information gleaned from this Project will undoubtedly benefit future projects in Washington State and the U.S. as Skagit County blazes a trail for others to follow."

Neighboring counties with ferry dependent rural communities, including San Juan County and Whatcom County, see this proposal as providing a "real world opportunity to study an alternative and possible replacement fuel source" and will rely on Skagit County's "shared knowledge and resources." Likewise, other county-to-county ferry providers will benefit in Puget Sound. Kitsap Transit recently started foot ferry service between Kitsap County and Seattle. Kitsap Transit supports Skagit County's all-electric vessel, and notes that "Kitsap Transit will soon put into service a hybrid vessel on our water route between Bremerton and Port Orchard."

Skagit County is "an effective partner in implementing the region's vision for the transportation network" by the Skagit Council of Governments, who also states the project is consistent with regional plans. Skagit County attracts its stakeholder support because it is known for collaboration and for delivering quality public works projects. Skagit County won Washington's Chapter of the American Public Works Association 2013 Project of the Year for the Anacortes Ferry Dock Rehabilitation and Guemes Island Ferry Dock Repairs Project. Nationally, US Congressman Rick Larsen supports the project "As the first all-electric passenger ferry in the United States, further exemplifying Washington states' commitment to protecting the environment and becoming leading investors in tomorrow's technology."

The County's supportive partners who attended the County's Electric Ferry Partnership Roundtable July 10, 2018, or who submitted letters of support for this BUILD grant or letters of support for the recently successful Washington State County Road Administration Board grant are listed below. Partners and stakeholders with an asterisk (*) have provided letters of support, which are included in Appendix D. Others who attended the electric ferry partnership meeting are identified in the sign-in sheet also included in Appendix D.

- ACES Northwest Network, Cascadia Center*
- Bravinder, Phyllis D., Guemes resident*
- City of Anacortes*
- City of Mount Vernon*
- Curtis, Gary Noble, Structural Engineer, Guemes resident*
- Dakota Creek Industries
- Economic Development Alliance of Skagit County (EDASC)*
- Eagen, Sally and Jeff, Guemes residents*
- Fouts, Tom, Lieutenant, Guemes Island Fire Department*
- Kitsap Transit*
- Lynch, Jessica, Guemes resident/ business owner*
- Monahan, Ryan, Guemes resident*
- Nelson, J. Forrest, Guemes property owner*
- Orcas Power and Light Cooperative*
- Ohms, Barbara, Guemes resident*
- Phillips Publishing Group*
- Port of Skagit*
- Puget Sound Energy
- Samish Indian Nation*
- San Juan County Council*
- Skagit Council of Governments*
- Snell, Connie and Bob, Guemes residents*
- United States Congressman, Representative Rick Larsen, Washington State Second District*
- Walden, Edith, Guemes resident/business owner*
- Washington State Department of Transportation, Ferries Division*
- Whatcom County Public Works Department*

Additionally, Skagit County has engaged ferry users through surveys and newsletters, and met with residents through several on-island forums. See Appendix E for newsletters. Resident and business owner comments identify the necessity for an efficient, sustainable, reliable, and safe ferry, and the necessary connection the ferry provides for their daily lives. See more comments in Section 15, Quality of Life.

4.8 Non-Federal Revenue for Transportation Infrastructure Investment

To support the replacement of the Guemes Island Ferry, in June 2018 the Skagit County Board of Commissioners implemented, by resolution, a vessel replacement surcharge expected to raise approximately $235,000 annually. The surcharge is collected as an additional fee on ferry passenger and vehicle fares. Collected surcharge funds can only be used for the purchase or construction of a new ferry vessel or debt service resulting from the construction of a new vessel.

Additional information about the Guemes Island Ferry Surcharge is provided in Sections 3.2 and 3.3. Relevant documentation is provided in Appendix *C.*

Skagit County's primary constraint in generating non-Federal revenue for transportation infrastructure are the limited sources of revenues state and local revenues and revenue generating mechanisms dedicated to transportation capital, tax-limiting measures that constrain the size of those revenues, and the consequently highly prioritized nature of general capital revenue sources in the Washington policy context.

4.9 Benefit Cost Analysis Summary

A Benefit-Cost Analysis (BCA) has been developed to assess the economic benefits of the Guemes Island Ferry Replacement Project, relative to the resources required to implement it. The full BCA Report is available in Appendix B.

The BCA was completed in accordance with USDOT's BCA guidance for discretionary grant programs, and, wherever possible, uses assumptions and methodologies outlined in its July 2017 guidance document (*Benefit-Cost Analysis Guidance for Discretionary Grant Programs, July 2017).* Where additional assumptions and methodologies are used, they are documented and described in detail in the full BCA Report (Appendix B).

The scope of the BCA is limited to the replacement of the M/V Guemes and assumes a full year of benefits (aligned to the beginning of the new vessel's operations) starting in 2022 over an 18-year time horizon to 2039. The baseline or "no build" scenario for this analysis is defined as continued maintenance and operations of the existing vessel to a total life of 60 years (to 2039), significantly past the vessel's current expected economic life.

Project costs were identified with respect to this schedule and include the capital costs of the vehicle and annual operations and maintenance costs for each year of its operations (again, 2022 to 2039). Per USDOT's BCA guidance, all analysis is presented in real 2018 dollars discounted 7 percent per year to discount benefits and costs to their present value in the BCA. Additionally, for comparison, we've provided a sensitivity analysis discounting results 3 percent per year.

The BCA monetizes benefits from vehicle operating cost savings and emissions reductions, as well as the residual value of the 32-vehicle electric replacement ferry after the analysis period, quantifies benefits to reliability and benefits to existing and additional users, and qualitatively

describes benefits to reduced noise pollution, loss of emergency services, hazardous material release risk reduction, and water emission elimination.

The monetized benefits are summarized in Table 9. Benefits accrue to a positive benefit-cost ratio at the 3 percent discount rate. However, benefits do not accrue to a positive benefit-cost ratio at the 7 percent discount rate. This is due to limitations to the data and a large number of project benefits which the BCA guidance specifies are not monetizable, which reduced our ability to monetize the project's benefits.

Benefit Category	**Social Benefit**	**Value**	**Monetized Value *(7% discount rate)***	**Monetized Value *(3% discount rate)***
Vehicle Operating Cost Savings	Cost savings to taxpayers related to ongoing operations of Guemes Ferry route	$15,473,660 in vehicle operating cost savings	**$10,740,176**	**$13,002,824**
Emissions Reductions	Improved air quality and reduced environmental impacts through reduction in emissions, including nitrogen oxides, particulate matter, and sulfur dioxide	151.92 short ton reduction in nitrogen oxides, 11.16 short ton reduction in particulate matter, and 0.23 short ton reduction in sulfur dioxide	**$2,802,462**	**$3,831,729**
Residual Value	Additional operating life of vessel, shoreside electrical, and terminal improvements	$8,576,090 in undiscounted residual value	**$2,534,693**	**$5,032,262**
Capital Costs			**$18,622,195**	**$20,295,617**
Net Present Value			**($2,544,864)**	**$1,571,198**
Benefit to Cost Ratio			**0.86**	**1.08**

Table 9 Benefit Matrix, 2018$ (Source: BERK Consulting, 2018)

A full summary of the project benefits, including those benefits that are only quantifiable or described qualitatively is provided in Appendix B.

Section 5 Project Readiness

5.1 Technical Feasibility

Vessel Particulars

The 32-car battery electric replacement ferry is a double-ended vehicle and passenger ferry, with a three-tiered deckhouse located to one side of the vessel. The design consists of four vehicle lanes, able to accommodate highway-rated trucks and emergency vehicles. The Project design

used the existing vessel as a baseline while updating aspects necessary to increase the system's safety, reliability, environmental protection, and economic competitiveness. Concept design-stage renderings of the ferry are shown in Appendix H.

Design Requirements

The following requirements are some of the major design drivers that needed to be addressed. The complete Concept Design Report is provided in Appendix A, Reference 3.

- The existing terminals will receive minor modifications but in general will not be replaced. The bow shape of the replacement vessel must closely match the existing vessel and the breadth is limited by the dolphin placement.
- The vessel operates in a channel with tidal currents acting on the vessel's beam exceeding 4 kts (up to 5.5 kts at times). The installed power of the vessel is governed by maneuvering in these high currents.
- The replacement vessel was sized to carry 32 vehicles. Given the beam limit imposed, the vessel must be longer than the M/V Guemes to accommodate more vehicles.

The vessel will operate under the same regulatory regime as the M/V Guemes, as a US Coast Guard-inspected passenger vessel of less than 100 gross regulatory tons (GRT) and a passenger limit of 150. Crewing of the replacement vessel is not intended to change; it will be operated by one Master and two Deckhands. Table 10 displays principal characteristics of the replacement vessel.

Table 10 Principal characteristics of replacement vessel

Parameter	Value	Parameter	Value
Length, overall	178'-0"	Vehicle capacity	32 AEQ (17'-9" long)
Length, waterline	170'-0"	Passenger capacity	150 persons
Beam, overall	53'-0"	Delivered power	2 x 725 kW
Beam, waterline	39'-11"	Propulsor type	Z-drive with Nozzles
Depth to main deck, at side	13'-6"	Main deck seating	40 seats @ 24" wide
Draft, full load	7'-6"	Upper deck seating	20 seats @ 24" wide
Displacement, at full load	615 LT	Gross registered tonnage	Less than 100

Vessel Size

The replacement vessel was designed with a capacity of 32 vehicles and 150 passengers, which was determined using the 2017 Guemes Island Ferry Replacement Vessel Capacity Study (Appendix A, Reference 2). This study analyzed past Guemes Island Ferry ridership and countywide population growth data in order to estimate future Guemes Island Ferry ridership, which became the basis for calculating the capacity of the Project.

A 40-year forecasting period was chosen to match a common economic life of a steel ferry in the Pacific Northwest. The study developed a ridership forecasting model that took into account increased ridership for population growth, as well as ridership reductions for increases in fares and available parking over a 40-year span. The study found that these three factors have statistically significant impacts on ridership, whereas no substantial correlation was found between ridership and the housing market, unemployment, ferry schedule, and weather.

The study concluded that the Guemes Island Ferry's capacity and size are dominated by vehicle demand. The range of Glosten's vehicle ridership forecasts is shown in Figure 3 and the resulting vessel capacity is presented in Figure 4, along with the capacities of the existing and previous ferries (M/V Guemes and M/V Almar respectively) for reference. A capacity of 32 vehicles corresponds with Skagit County's medium-low forecast target; it is also identified by a point.

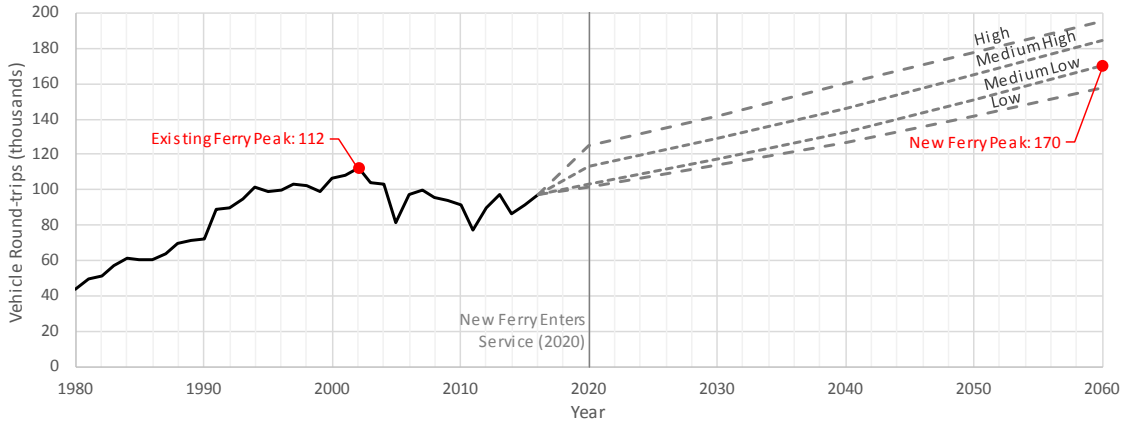


Figure 3 Vehicle ridership history and forecast with four growth trends (medium-low chosen)

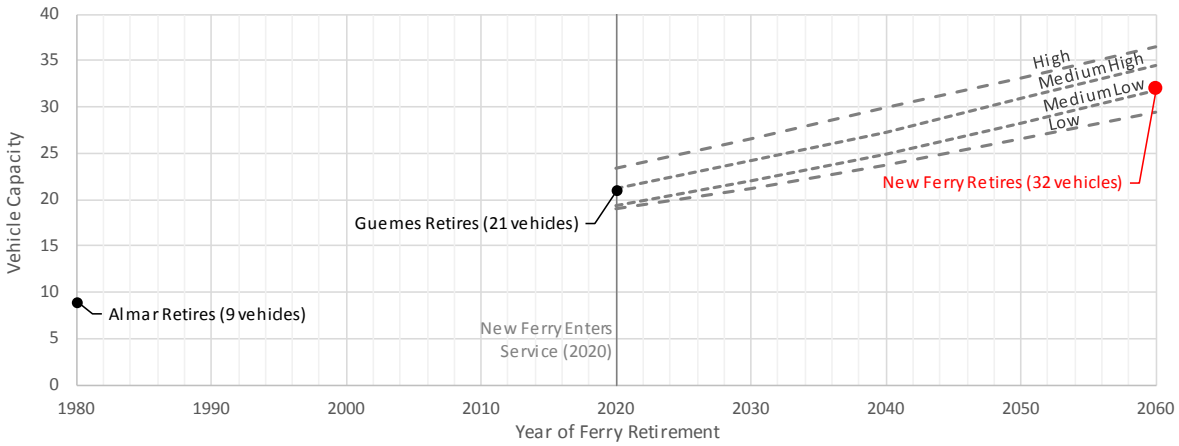


Figure 4 Vehicle capacity history and forecast with four growth trends (medium-low chosen)

Propulsion System

The propulsion system will be battery electric, as shown in the schematic in Figure 5. In this arrangement, electrical power is provided to the main switchboard by two sets of battery banks. Electric motors are used to power the propeller shafts. The batteries are charged via a shorepower connection while the vessel is at the terminal.

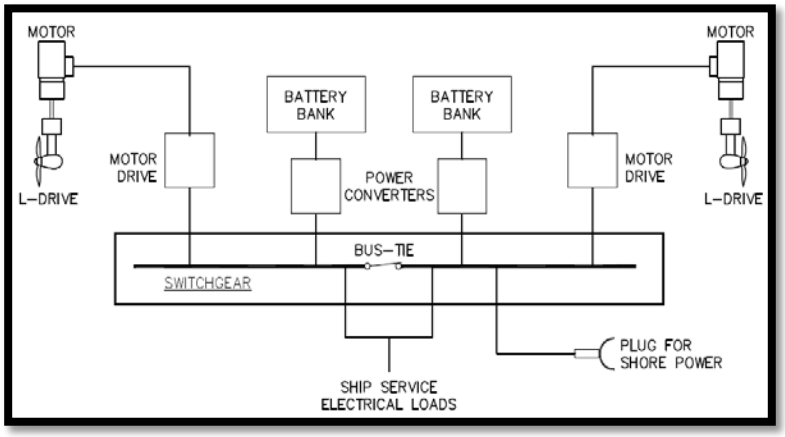


Figure 5 All-electric configuration

Propulsion Capabilities - Emergency Service

The existing Guemes Island ferry provides a critical emergency service link to the mainland for the residents and visitors of Guemes Island, as described in Section 4.1. The replacement vessel design included the capability to accommodate the following emergency scenarios:

1. A catastrophic event requires evacuation of the island and the electrical grid is disabled. The island population varies seasonally, ranging from approximately 750 to 2,750. This could significantly increase in the next 40 years. The duration of continuous operation would be up to 24 hours. The ferry would have to provide power to the ramp and apron on each side.
2. A significant fire/emergency on the island requires continuous operation of the ferry for up to 24 hours. The vessel must be able to complete two round trips without charging.
3. Rendering assistance to a distressed vessel or person in Bellingham Channel. Approximately 2-nm distance from ferry route to site of assistance. On station for 1 hour in 18 knots of wind (95th percentile), with associated waves, and 1 knot of current.
4. Man overboard recovery of a ferry passenger. On station for ½ hour in 32 knots of wind (99.9th percentile), with associated waves, and 2 knots of current. Man overboard recovery is a required operation of all USCG inspected ferries.

Infrastructure

A Transportation System Assessment (Appendix A, Reference 4) was performed to optimize the ferry system as a whole. This includes analysis on shoreside infrastructure, ferry terminal operations, total system throughput, ferry system alternatives, emergency services provided by the ferry system, and environmental considerations.

Infrastructure associated with the ferry is critical to the operation, especially for a battery electric ferry which requires charging by a shoreside plugin system and possible use of energy storage onshore. One of the major hurdles with electric ferries is the magnitude of the shore-side infrastructure modifications that are often required.

The M/V Guemes ferry schedule dictates quick turnaround times with limited time at the dock for additional tasks when a full load of vehicles is waiting to be loaded. Several options for automatic battery charging were investigated in the Concept Design report (Appendix A, Reference 3). It was determined a number of potential technologies exist in the size range required for the replacement Guemes Island ferry.

Figure 6 Example Automatic Plug-in System

The connection to the utility is a critical aspect of providing adequate shore-power for the ferry at the Anacortes terminal. Discussions with the local utility company, Puget Sound Energy (PSE), have indicated peak power loading associated with charging the batteries is a major concern for their electrical infrastructure. Due to the vessel's possible operation during heavy

winds and tidal currents, required energy per round trip varies greatly. Installing shoreside batteries substantially reduces average and peak loading on the utility connection. Current capital cost estimates include installation of large onshore battery banks (costs shown in Section 3.1).

Other infrastructure changes included widening the transfer span aprons at both terminals to allow for concurrent loading of vehicles and passengers. Without this modification, the throughput of the replacement ferry will be constrained by loading operations, resulting in schedule delays, long vehicle queues, and a lower overall level of service than would otherwise be possible.

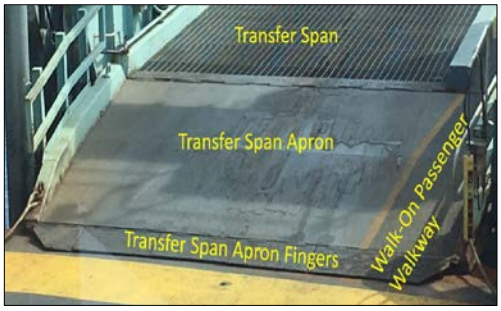


Figure 7 Transfer span components

The replacement ferry will be larger and heavier than the existing ferry. Reinforcing the dolphin fenders is recommended to protect the equipment and prevent potential out-of-service time.

Vehicle queues are expected to increase slightly in Anacortes and decrease on Guemes Island by 2060. This calculation assumes that a new ferry will be acquired, modifications will be made to the transfer span, and improvements will be made to the ticketing system. These three changes will significantly improve the service rate of the ferry system (the maximum number of vehicles and passengers per hour the system is capable of carrying).

Project Costs

See Section 3.1. The outlined infrastructure changes and new vessel design directly reflect the costs and contingency measures required to provide a successful new ferry design for Guemes Island.

5.2 Project Schedule

The project schedule is shown in Figure 8. This schedule has three sections of design for the vessel, shore-side electrical equipment, and terminal upgrades. Three sections of construction (for the abovementioned components) and a permitting section are also provided. The critical path can be seen in the red highlighted items.

The vessel design subtask has been ongoing since August 2017, and planning for start of design included several years of review and studying. Several public forums have been held to engage the community in the design and procurement process.

A SEPA review has been completed and it is unlikely that this will need to be revisited. The NEPA process is assumed to take nine months including preparation; however this process cannot proceed until all construction funding is in place. Based on this timeline, it is estimated that construction can begin once all permits are in place, which is conservatively estimated to be April 2020. Construction of all project phases is estimated to be complete by September 2021. Following a crew training period and final inspections by the United States Coast Guard, the replacement ferry should go into service before the end of 2021.

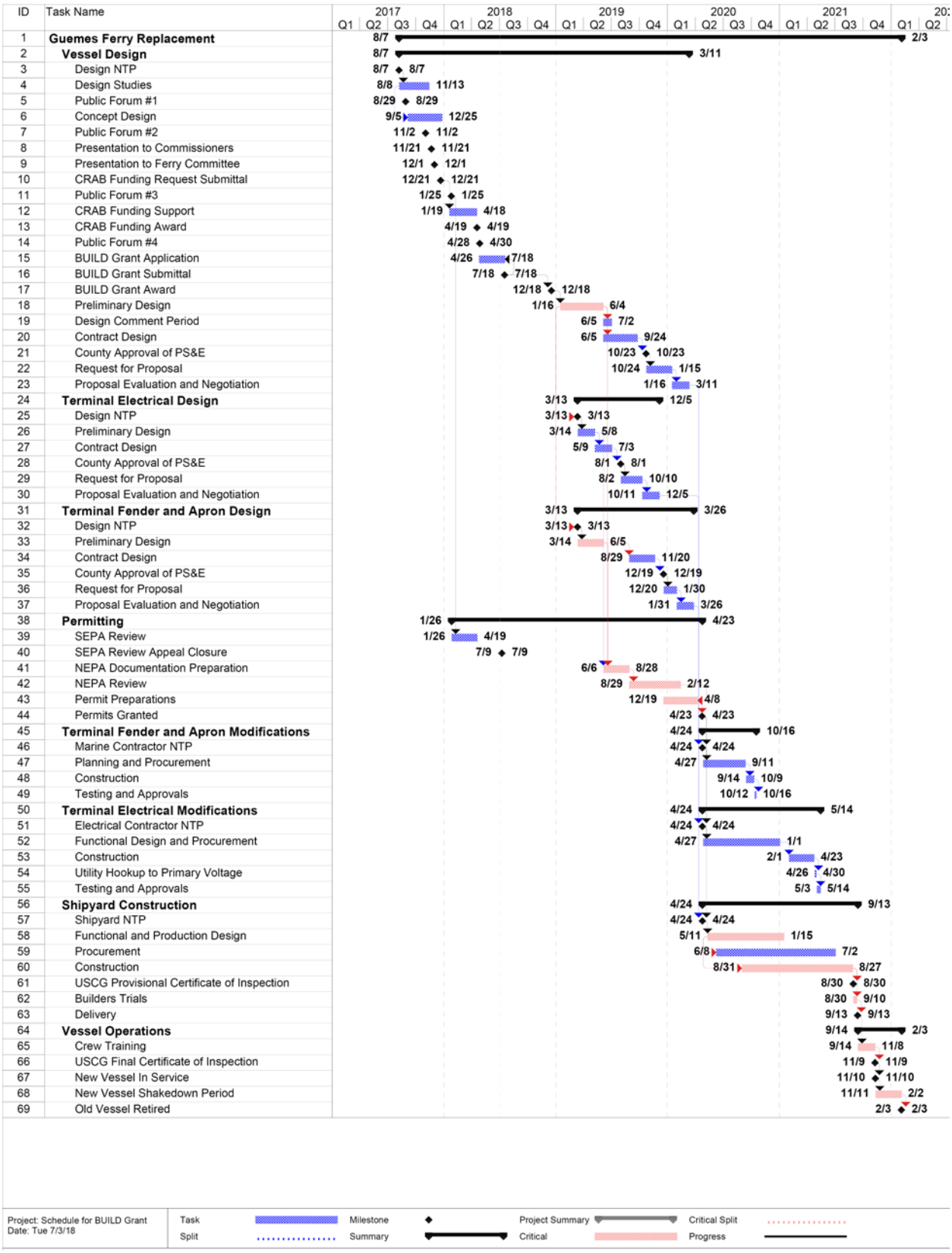


Figure 8 Project schedule

5.3 Required Approvals

5.3.1 Environmental Permits and Reviews

NEPA Status and WSDOT Discussions

NEPA will be conducted when the County secures construction funds and the terminal and new electric ferry designs have reached a 30% design level. With the BUILD Grant, Skagit County can prepare the necessary 30% design, secure remaining construction funds, and complete the NEPA process. Skagit County anticipates completion of the NEPA process as a categorical exclusion per 23.CFR 771.117 (c): (29), and (30) addressing the ferry vessel replacement, rehabilitation, or reconstruction of existing ferry facilities, and (2) addressing utility installations along a transportation facility (Appendix A, Reference 12).

Skagit County held an informal consultation call with WSDOT Local Programs Environmental staff on March 7, 2018, confirming the most efficient and timely process above. The schedule includes the recommended NEPA review period well ahead of the September 30, 2020 maximum timeframe.

Reviews, Approvals, and Permits: Federals, State, and Local Approvals

Skagit County completed the State Environmental Policy Act process as of July 9, 2018. The proposed project also requires Federal, State, and Local reviews or approval actions, summarized below. Most reviews and approvals would be sought in coordination with the NEPA process.

Agency	Reviews, Approval Actions
Federal	▪ National Environmental Policy Act (NEPA), Categorical Exclusion, WSDOT ▪ Rivers and Harbors Act of 1899, U.S. Army Corps of Engineers, Work in Navigable Waters Section 10 permits ▪ Endangered Species Act (ESA) of 1973, Section 7 Consultation, US Fish and Wildlife and/or National Marine Fisheries ▪ National Historic Preservation Act (NHPA) in 1966 (16 U.S.C. 470 et seq.), Washington Department of Archaeology and Historic Preservation, Section 106 Consultation ▪ Clean Water Act of 1972, Washington Department of Ecology, Section 401 Water Quality Certification (Section 404 may apply if there is placement of structures below the MHW line.)
State	▪ Revised Code of Washington (RCW) 77.55 Construction Projects in State Waters: Washington Department of Fish and Wildlife Hydraulic Project Approval ▪ RCW Chapter 79.105 Aquatic Lands: Washington Department of Natural Resources Aquatic Lease Agreement
Local	▪ Skagit County: Guemes Terminal - Shoreline, Zoning, Floodplain, and Building Permits ▪ City of Anacortes: Anacortes Terminal - SEPA Review, Shoreline Substantial Development, Zoning, Floodplain, and Building Permits

Environmental Studies

Skagit County has completed a Determination of Non-Significance and associated Environmental Assessment effective July 9, 2018. It is available at this website:

https://www.skagitcounty.net/Departments/PlanningAndPermit/ferryEnviro.htm. That documentation can inform other permits and approvals by other agencies.

Public Engagement

Skagit County has engaged with the Guemes Island community about the replacement Guemes Island ferry since 2013, when the county worked with Elliot Bay Design Group to publish a Ferry Replacement Plan. In addition to televised presentations made to the Skagit County Board of Commissioners regarding ferry replacement, the Ferry Division has made additional effort to engage and inform the community about the Ferry Concept Design process, State Environmental Policy Act review process, other recent State grant applications, and a County vessel replacement surcharge on ferry fares through a combination of web content, news releases, mailed newsletters, emails to island residents, social media posts, surveys and public meetings.

A dedicated page on the Skagit County website features common questions and answers about the project, an archive of all documents and reports pertaining to the replacement project, as well as links to videos and documents showing the evolution of the proposed ferry design. Additionally, Skagit County put forth two online surveys – in the fall of 2017 – to gauge public input and support for the new ferry concepts. The surveys were very popular, garnering more than 7,500 responses and hundreds of actionable comments. For more information, see https://publicinput.com/Hub/Index/5.

Skagit County hosted its first official ferry replacement public meeting with the Guemes Island community at the Guemes Island Community Hall on Tuesday, Aug. 29, 2017. The meeting was well-attended by both community members and Skagit County staff. Additional well-attended community meetings were held on Nov. 2, 2017, and Jan. 25 and April 28, 2018, to present the ferry concept and draft environmental assessment findings, respectively. Comment periods were held prior to preparing the environmental assessment in February 2018, after the availability of a draft environmental assessment in April 2018 and following the formal issuance of the Determination of Non-Significance in June 2018.

The Skagit County Public Works Department also met with the resident-led Guemes Island Ferry Committee on Sept. 1, Oct. 6, and Nov. 3, 2017 and March 2 and May 11, 2018 to discuss and collaborate on the Guemes Island Ferry Replacement Project.

In 2017, when Skagit County hired Glosten, a member of the Guemes Island Ferry Committee was appointed to assist with the County's review and selection of a naval architecture firm. In addition, the County solicited assistance from a citizen retired naval architect from the community. Both volunteers brought a perspective that was very valuable in the process.

The County responded to public comments on the Guemes Island Ferry Replacement proposal by evaluating a range of ferry sizes (e.g. 28-car boat as well as 32-car boat) and preparing a growth analysis as part of the Environmental Assessment. Please see Appendix A, References 12 and 13 for more details on meetings and environmental review.

5.3.2 Federal Transportation Requirements Affecting State & Local Planning

Skagit County has planned for several years for the Guemes Island Ferry Replacement Project. Skagit County has included the project in the following plans and programs: Comprehensive

Plan 2016, 2018-2023 Transportation Improvement Program, 2018–2023 Capital Facility Plan, and Fourteen Year Ferry Capital Improvement Plan 2018-2026.

The Skagit Council of Governments (SCOG), the area's designated Metropolitan Planning Organization, has referenced ferry and revenue needs in the Regional Transportation Plan and included the project in its Regional Transportation Improvement Program for 2018-2023.

WSDOT has included the project in the Statewide Transportation Improvement Program (STIP) 2018-2021.

Minor amendments to these local, regional, and state plans or programs are in process to standardize the project title and cost consistent with the latest information developed for this BUILD grant application; these minor amendments are anticipated to be completed over summer and fall 2018. See Appendix G.

5.4 Assessment of Project Risks and Mitigation Strategies

Funding Risks

Skagit County is prepared to move forward with the project if the BUILD Grant funds are awarded. The remaining project costs will be bonded and paid back using County Road Administration Board funds, surcharge fees, and the County road fund. If the BUILD Grant funding is not awarded, the County will be required to look for funding elsewhere and delaying the project, jeopardizing vital economic and quality of life services.

The County is statutorily authorized to issue up to 2.5% of its assessed value $17,747,214,025 in bonds. Up to 1.5% of this can be limited tax general obligation (LTGO) bonds, which are non-voted and can be implemented via Commissioner action. LTGO bonds do not include a funding tool – that is, the County would still have to identify a source for funding the debt service associated with the LTGO bond. For detailed information about Skagit County's debt capacity, see Appendix B (BCA Report), Section 1.4.2.

Based on total project costs less the $10,000,000 BUILD grant, an LTGO bond to fund the remainder of the project would be equal to $11,704,000 plus an additional 1.5% in issuance costs for a total bond of $11,879,560. Issued over a 20-year horizon and with an interest rate of 4%, the annual bond repayment would be $874,118.82. It is anticipated that the County would be able to prioritize this debt service within its existing transportation budget.

Legal Action Risks

Critical path tasks in the project schedule (Figure 8) show the specific tasks that are driving the overall schedule. The preliminary design tasks for the vessel and terminal modifications are the first critical tasks. Next is the NEPA review, which cannot begin until the entire design is at a 30% complete and the construction is fully funded. Only when the NEPA review is complete and the required permits are in hand can the notice to proceed be given to the selected shipyard and contractors. To mitigate the risk of a delayed start of construction, we have included the following into the schedule:

1. Adequate time for preliminary design of the vessel and terminal, including time for subcontracting critical components of this work

2. The NEPA documentation preparation is shown to start at the end of preliminary design, overlapping if necessary
3. The NEPA review should take less than six months given the "categorically excluded" level, but six months is included in the schedule plus an additional two months to acquire the required permits

The County has taken steps to minimize this risk by consulting with WSDOT on the appropriate path described in Section 5.3.1. The categorical exclusion process is a well-trodden process, and the County has managed three NEPA reviews on its terminals since 2010, completing them successfully. We believe there is adequate time in the schedule to accomplish the required tasks prior to the start of construction. Should the project be notified of full funding prior to December 18th, 2018, preliminary design and the NEPA review can start sooner.

The estimated delivery of all components will be at the end of 2021. Delays in detail design and procurement of materials and equipment could delay the delivery, but would not threaten the 2025 deadline for fully expended funds.

Appendix A Project Narrative References

1. *M/V* Guemes, *O.N. 601686: Ferry Replacement Plan*, Elliott Bay Design Group, Reference No. 13039-001-043-3, Rev. B, 22 November 2013.
URL:
https://www.skagitcounty.net/PublicWorksFerry/Documents/Replacement/MV%20GUEMES%20Ferry%20Replacement%20Plan_22Nov2013.pdf
2. *Guemes Island Ferry Replacement – Vessel Capacity Study*, Glosten, Inc., Rev. -, 20 October 2017.
URL:
https://www.skagitcounty.net/PublicWorksFerryReplacement/Documents/designreport/2a_Vessel%20Capacity%20Study.pdf
3. *Guemes Island Ferry Replacement – Concept Design Report*, Glosten, Inc., Rev-, 18 December 2017.
URL:
https://www.skagitcounty.net/PublicWorksFerryReplacement/Documents/designreport/1b_Concept%20Design%20Report.pdf
4. *Guemes Island Ferry Replacement – Transportation System Assessment*, Glosten, Inc., Rev-, 14 December 2017.
URL:
https://www.skagitcounty.net/PublicWorksFerryReplacement/Documents/designreport/2b_Transportation%20System%20Assessment.pdf
5. Walden, E.; "A Long, Long Night of Fire," The Guemes Tide, Vol. 3 No. 5, June 2012.
http://www.guemestide.org/backissues/The%20Guemes%20Tide%20-%20Vol%203%20No5%20-%20June2012.pdf
6. 46 USC § 2301 – 2305, *U.S. Code Title 46 – Shipping*, 2006.
https://www.gpo.gov/fdsys/pkg/USCODE-2011-title46/html/USCODE-2011-title46-subtitleII-partA-chap23.htm
7. *Guemes Island SDAT: Creating a Sustainable Guemes*, AIA Center for Communities by Design, June 2006.
https://www.brikbase.org/sites/default/files/sdat_aias078143_guemesisland_2006.pdf
8. *Guemes Island Sub-Area Plan*, Skagit County Board of Commissioners, December 2010.
https://www.skagitcounty.net/PlanningAndPermit/Documents/GuemesPlan2010/Guemes%20Plan%20FINAL.pdf
9. *Southern Resident Killer Whale Recovery and Task Force*, Executive Order 18-02, State of Washington Office of the Governor, 14 March 2018.
https://www.governor.wa.gov/sites/default/files/exe_order/eo_18-02_1.pdf
10. *Petroleum Oil Spills Impacting Navigable US Waters*, Bureau of Transportation Statistics Excel Dataset, accessed 7/16/2018.
https://www.bts.gov/content/petroleum-oil-spills-impacting-navigable-us-waters
11. *State Efficiency and Environmental Performance*, Executive Order 18-01, State of Washington Office of the Governor, 16 January 2018.
https://www.governor.wa.gov/sites/default/files/exe_order/18-01%20SEEP%20Executive%20Order%20%28tmp%29.pdf.

12. *NEPA Categorical Exclusions, A Guidebook for Local Agencies.* Washington State Department of Transportation, October 1, 2017. *https://www.wsdot.wa.gov/NR/rdonlyres/87901EB4-008A-43A0-9DB7-2179E0BC939F/0/LP_CEGuidebookSecure.pdf*.
13. Guemes Island Ferry Replacement Project Website, accessed 7/16/2018. https://www.skagitcounty.net/Departments/PublicWorksFerryReplacement/main.htm .
14. Guemes Island Ferry Replacement Project Environmental Review, accessed 7/18/2018 *https://www.skagitcounty.net/Departments/PlanningAndPermit/ferryEnviro.htm*

Appendix B Benefit Cost Analysis

Contents

1.1 Executive Summary

1.1.1 Project Overview

Skagit County currently operates a passenger and vehicle ferry between Guemes Island, WA, a rural community with a population of 774 year-round residents 65 miles north of Seattle, and Anacortes, WA, a small city with an estimated population of 16,953 as of 2017. As a popular tourist destination, Guemes Island hosts a number of part-time residents during the summer months, in addition to daily visitors who arrive and depart on the ferry without remaining on the island overnight. Skagit County Public Works estimates that the summertime resident population swells to approximately 2,500.

Since it was established in the early 1960's, the County's ferry service has been the only publicly available means of transit between Guemes Island and mainland Washington State, functioning as a lifeline for the delivery of passengers, vehicles, goods, and emergency services to the island. The route is currently served by a single 39-year-old diesel-powered ferry, the M/V Guemes, which is reaching the end of its expected life. A 2013 study, *M/V Guemes O.N. 601686 Ferry Replacement Plan,* identified that it would be more economical to replace the ferry than to refurbish it. Further, the M/V Guemes will reach the end of its economic life (40 years) in 2019.

Skagit County began considering ferry replacement options in earnest in 2014 and the conceptual design process has been comprehensive, considering travel demand needs (vessel capacity), propulsion system type, and vessel emergency service capability. Skagit County's Board of Commissioners requested that battery electric propulsion be considered due to the environmental protection, quality of life, and operating cost benefits such a system could provide.

The Guemes Island Ferry Replacement Project will replace the existing, undersized 21-vehicle diesel propulsion ferry with a 32-car electric propulsion ferry which will reduce vehicle operating costs and emissions, increase reliability and the benefits to existing and additional passengers, increase support for emergency services, increase Guemes Islanders' quality of life, and reduce noise pollution, hazardous material release risk, and water emissions elimination. This Benefit-Cost Analysis (BCA) monetizes, quantifies, and, where neither is possible, discusses the benefits of this project qualitatively.

1.1.2 BCA Findings

This BCA has been developed to assess the economic benefits of the Guemes Island Ferry Replacement, relative to the resources required to implement it.

The BCA was completed in accordance with USDOT's BCA guidance for discretionary grant programs, and, wherever possible, uses assumptions and methodologies outlined in its July 2017 guidance document (*Benefit-Cost Analysis Guidance for Discretionary Grant Programs, July 2017).* Where additional assumptions and methodologies are used, they are documented and described in detail.

The scope of the BCA is limited to the replacement of the M/V Guemes and assumes a full year of benefits (aligned to the beginning of the new vessel's operations) starting in 2022 over an 18-year time horizon to 2039. The baseline or "no build" scenario for this analysis is defined as continued maintenance and operations of the existing vessel to a total life of 60 years (to 2039), significantly past the vessel's current expected economic life. The problem being addressed is summarized in the executive summary matrix in Table 1, following.

Problem that the Guemes Island Ferry Replacement Project is Addressing	Change to Baseline or Alternatives	Types of Impacts
Skagit County currently operates a passenger and vehicle ferry between Guemes Island, WA, which is the primary means of transportation between the Island and Mainland Washington state. The current ferry is at the end of its economic life and undersized for future ridership demand.	Skagit County proposes replacing the existing ferry with a new 32-vehicle electric ferry.	• Operating cost savings to taxpayers. • Improved air quality and reduced environmental impacts through reductions in emissions, reduced risk of hazardous material release, and elimination of water emissions. • Reduction in airborne and underwater noise pollution. • Improved reliability for passengers and emergency services. • Benefits to additional users due to increased ferry capacity. • Improved quality of life for Guemes Island residents and businesses.

Table 1 Executive Summary Matrix

Source: BERK Consulting, 2018.

Project costs were identified with respect to this schedule and include the capital costs of the vehicle and annual operations and maintenance costs for each year of its operations (again, 2022 to 2039). As per USDOT's BCA guidance, all analysis is presented in real dollars (in this case, 2018 dollars) and discounted 7 percent per year to discount benefits and costs to their present value in the BCA. Additionally, for comparison, we've provided a sensitivity analysis discounting results 3 percent per year.

The BCA monetizes benefits from vehicle operating cost savings and emissions reductions, as well as the residual value of the 32-vehicle electric replacement ferry after the analysis period, quantifies benefits to reliability and benefits to existing and additional users, and qualitatively describes benefits to reduced noise pollution, loss of emergency services, hazardous material release risk reduction, and water emission elimination.

The monetized benefits are summarized in Table 2. Benefits accrue to a positive benefit-cost ratio at the 3 percent discount rate. However, benefits do not accrue to a positive benefit-cost ratio at the 7 percent discount rate. This is due to limitations to the data and a large number of project benefits which the BCA guidance specifies are not monetizable, which reduced our ability to monetize the project's benefits.

Benefit Category	Social Benefit	Value	Monetized Value *(7% discount rate)*	Monetized Value *(3% discount rate)*
Vehicle Operating Cost Savings	Cost savings to taxpayers related to ongoing operations of Guemes Ferry route	$15,473,660 in vehicle operating cost savings	**$10,740,176**	**$13,002,824**
Emissions Reductions	Improved air quality and reduced environmental impacts through reduction in emissions, including nitrogen oxides, particulate matter, and sulfur dioxide	151.92 short ton reduction in nitrogen oxides, 11.16 short ton reduction in particulate matter, and 0.23 short ton reduction in sulfur dioxide	**$2,802,462**	**$3,831,729**
Residual Value	Additional operating life of vessel, shoreside electrical, and terminal improvements	$8,576,090 in undiscounted residual value	**$2,534,693**	**$5,032,262**
Capital Costs			**$18,622,195**	**$20,295,617**
Net Present Value			**($2,544,864)**	**$1,571,198**
Benefit to Cost Ratio			**0.86**	**1.08**

Table 2 Benefit Matrix, 2018

Source: BERK Consulting, 2018.

Beyond the monetizable benefits, this project has several quantifiable benefits, below:

- **Reliability.** As discussed in Section 1.5.2.1, replacing the M/V Guemes will significantly improve the reliability of the ferry route, supporting residents and visitors in traveling between the Island and mainland Washington State in the absence of other options.

In addition, this project generates that could not be reliably quantified, but are described qualitatively, following:

- **Reduced Noise Pollution.** The existing diesel propulsion vessel generates significant airborne noise. The proposed battery electric propulsion vessel is much quieter, eliminating a significant share of the airborne noise. The concept design does call for a backup diesel generator, however, it is expected that that generator will run for only 5% of its expected total operating hours.
- **Loss of Emergency Services.** The existing Guemes Island ferry provides a critical emergency service function for residents and visitors of Guemes Island by transporting emergency vehicles and personnel to and from the mainland. The ferry Skagit County Public Works charters when the Guemes is out of service is passenger-only, adding to the difficulty of responding to emergencies on the island if they occur during out-of-service periods. A rustic emergency heliport exists on the island, but in most situations,

helicopter travel is neither the fastest nor the most practical means of transporting patients to the care they need.

- **Hazardous Material Release Risk Reduction.** As discussed in Section 1.5.3.3, the existing ferry takes on approximately 2,200 gallons of diesel fuel every two weeks (57,200 gallons annually) via a fuel truck driven onto the vessel which leads to a significant risk of hazardous material release. The 32-vehicle electric replacement ferry is anticipated to use 5,000 gallons or less of diesel fuel per year, significantly reducing this release risk.
- **Water Emission Elimination.** As discussed in Section 1.5.3.4, The M/V Guemes has a single crew-only sink that discharges gray water directly overboard, and has no head (restroom facility). The 32-vehicle electric replacement ferry will have a crew-only head with a sink, both leading directly to a holding tank for 100% containment.
- **Quality of Life.** As discussed in Section 1.5.3.5, Guemes Island residents have stated that it is a priority to preserve the island's rural character. There is broad agreement among residents regarding the overall importance of ferry service in maintaining Guemes Islanders' way of life.
- **Benefits to Existing and New Users.** As discussed in Section 1.5.3.6, and 1.3.4, the M/V Guemes is undersized with respect to the ferry route's future ridership demand projections, potentially hindering economic activity in the project location if a higher-capacity replacement is not procured. The vehicle overhaul/refurbishment needed to support its continued operations will only minimally address the expected additional demand. Thus, the larger replacement vessel will benefit additional users.

1.2 Introduction

Skagit County currently operates a passenger and vehicle ferry between Guemes Island, WA, a rural community with a population of 774 year-round residents[1] 65 miles north of Seattle, and Anacortes, WA, a small city with an estimated population of 16,953 as of 2017[2]. As a popular tourist destination, Guemes Island hosts a number of part-time residents during the summer months, in addition to daily visitors who arrive and depart on the ferry without remaining on the island overnight. Skagit County Public Works estimates that the summertime resident population swells to approximately 2,500.

Since it was established in the early 1960's, the county's ferry service has been the only publicly available means of transit between Guemes Island and mainland Washington State, functioning as a lifeline for the delivery of passengers, vehicles, goods, and emergency services to the island. The route is currently served by a single 39-year-old diesel-powered ferry, the M/V Guemes, which is reaching the end of its expected life. A 2013 study, *M/V Guemes O.N. 601686 Ferry Replacement Plan,* identified that it would be more economical to replace the ferry than to refurbish it.

In addition to nearing the end of its useful economic life, the M/V Guemes is undersized with respect to the ferry route's future ridership demand projections, as documented in the *Guemes Island Ferry Replacement Vessel Capacity Study, October 2016.*

Skagit County began considering ferry replacement options in earnest in 2014, and in 2017 hired Seattle-based naval architecture firm Glosten to develop a concept design for a replacement ferry, completed in December 2017. The conceptual design process was comprehensive and considered travel demand needs (vessel capacity), propulsion system type, and vessel emergency service capability. A significant portion of the design effort focused on propulsion system selection. Skagit County's Board of Commissioners requested that battery electric propulsion be considered due to the environmental protection, quality of life, and operating cost benefits such a system could provide.

Lifecycle cost estimates were developed to show total cost of a battery electric vessel, along with the shoreside infrastructure and terminal upgrades necessary to operate it. These cost studies revealed significant operating cost savings, but with increased initial capital expenditures necessary to complete essential shoreside infrastructure and terminal upgrades.

The Guemes Island Ferry Replacement Project will replace the existing, undersized 21-vehicle diesel propulsion ferry with a 32-car electric propulsion ferry which will reduce vehicle operating costs and emissions; increase reliability and the benefits to existing and additional passengers; increase support for emergency services; increase Guemes Islanders' quality of life; and reduce noise pollution, hazardous material release risk, and water emissions elimination. This BCA monetizes, quantifies, and, where neither is possible, discusses the benefits of this project qualitatively.

[1] Washington State Office of Financial Management, 2017 estimates.
[2] US Census

1.3 Methodology

This BCA aims to quantify and monetize all potential benefits and costs of the Guemes Island Ferry Replacement project. Where benefits or costs could not be monetized, they have been quantified based on the physical units in which they naturally occur and described qualitatively.

The BCA was completed in accordance with USDOT's BCA guidance for discretionary grant programs, and, wherever possible, uses assumptions and methodologies outlined in its July 2017 guidance document (*Benefit-Cost Analysis Guidance for Discretionary Grant Programs, July 2017).* Where additional assumptions and methodologies are used, they are documented and described in detail in this report.

1.3.1 Scope of the Analysis

The scope of the BCA is limited to the replacement of the M/V Guemes and the requisite terminal improvements needed to allow operations of the new vessel.

1.3.2 Baseline (No-build) Alternative

The route is currently served by a single 39-year-old diesel-powered ferry, the M/V Guemes. Guemes has had regular maintenance over the years and a major re-power in 2006, but has otherwise remained largely unchanged since entering service. At 39 years, the current vessel is approaching the end of its expected useful life (40 years). Further, consistent with expectations due to the ferry's age, ferry service outages and vessel maintenance costs have increased in recent years, and a 2013 study, *M/V Guemes O.N. 601686 Ferry Replacement Plan,* identified that it would be more economical to replace the ferry than to refurbish it.

Because the current vessel is still operational, we have chosen to define the baseline or "no build" alternative as continued maintenance and operations of the existing vessel to a total life of 60 years (to 2039), significantly past the vessel's expected economic life. This is within the realm of possibility for larger ferry operators in the Pacific Northwest such as Washington State Ferries and Alaska Marine Highway Systems who often run their vessels to 50 years and beyond. However, it is expected that extending the service life of the M/V Guemes for this additional 20-year period would necessitate a full vessel overhaul and vessel refurbishment (Reference 1). The vessel overhaul would include, but not necessarily be limited to:

- Replacement of propulsion system foundations
- Replacement of propulsion system components (engines, gears, drives)
- Replacement of propulsion system controls
- Mid-body extension of 20 feet
- Refurbishment of hull steel
- Blast & paint entire vessel
- Refurbishment of piping systems

The overhaul would minimally increase the capacity of the vessel by four vehicles to 25 total vehicles. The vessel overhaul was estimated to cost $4,794,000 in 2013 dollars (Reference 1) and has been escalated to $5,081,640 in 2018$. During that time, Skagit County would have to lease an alternate vessel at an expected 2013 cost of $1,095,000 or $1,215,450 in 2018$ (Reference 1).

The full vessel refurbishment would involve refurbishing the vessel from a passenger and crew perspective as well as items not covered in the overhaul, and would include, but not necessarily be limited to:

- Replacement of engine houses & relocation of exhaust systems
- Replacement of generator housing & relocation of exhaust systems
- Replacement of navigation & communication electronics
- Refurbishment of passenger spaces & crew accommodations (including replacing all paneling, doors & locks)

It was estimated that this refurbishment would cost $929,000 in 2013 dollars, or $984,740 in 2018 dollars. The above items are recommended on top of the typical maintenance costs.

Acknowledging that maintaining the current vessel over the full life of the 32-vehicle ferry (40 years) is not possible and that, per the BCA guidance (page 7) "baselines should not assume that the same (or similar) improvement will be implemented later," we've defined the analysis period based on this baseline, described in Section 1.3.3, following.

1.3.3 Analysis Period

Oceangoing vessels are commonly designed around a 25-year expected life, and many are scrapped at this age due to hull and mechanical deterioration. Large ferry operators in the Pacific Northwest such as Washington State Ferries and Alaska Marine Highway Systems often run their vessels to 50 years and beyond. The existing ferry, the MV *Guemes* has a 40-year life expectancy which it has almost reached (and will reach in 2019). The 32-vehicle electric replacement ferry is expected to have the same 40-year life expectancy, the common economic life of a steel vessel in the Pacific Northwest.

It is expected that design of the vessel, shore-side electrical improvements, and terminal upgrades will occur starting in 2019, with construction of the new vessel being completed in Fall 2021 (although the project overall may be finalized in early 2022), as per the project schedule, which is discussed in more detail in Section 1.4.3.

Based on this schedule, the BCA assumes a full year of benefits (aligned to the beginning of the new vessel's operations) starting in 2022. Full benefits will accrue over a 40-year time horizon to 2062, based on the common economic life of a steel vessel in the Pacific Northwest. However, the baseline or "no build" alternative (maintenance of the existing ferry, the MV Guemes*)* is only possible over an additional 20 years to 2039, so this BCA assumes 18 full years of benefits.

Demand forecasting (described in Section 1.3.4, following) extends to 2060, supporting this BCA period.

Project costs (provided in Section 1.4.1) were identified with respect to the project schedule (provided in Section 1.4.3) and include the capital costs of the replacement vessel (including design and permitting), shoreside electrical, and terminal improvements (incurred and to be incurred between 2018 and 2021) and annual operations and maintenance costs for each year of its operations (for the purposes of this BCA, 2022 to 2039). Since the 32-vehicle ferry has a 40-year economic life, it has an expected 23 years of service after the analysis. The shoreside electrical improvements are expected to have a total lifespan of 20 years, with a remaining life of three years after the analysis period. The terminal improvements are expected to have a total

lifespan of 40 years, with a remaining life of 23 years after the analysis period. To incorporate these remaining lifespan values into the BCA we have calculated the residual values of the investments in Section 1.5.1.3.

1.3.4 Demand Forecasting

To size the replacement vessel appropriately, Glosten carried out a parametric ridership study, the *Guemes Island Ferry Replacement Vessel Capacity Study, October 2017* that used historical ferry ridership and county population data to forecast vehicle and passenger demand through the year 2060.

The study developed a ridership forecasting model that accounts for local population, fares, and parking at the terminals. It was found that increasing population increases ridership, whereas increasing fares reduces ridership, and increasing parking reduces vehicle ridership. The study found that these three factors have statistically significant impacts on ridership, whereas no substantial correlation was found between ridership and the housing market, unemployment, ferry schedule, and weather.

The study concluded that the Guemes Island Ferry's capacity and size are dominated by vehicle demand. The range of Glosten's vehicle ridership forecasts for 2020 to 2060 is shown in Figure 1 below.

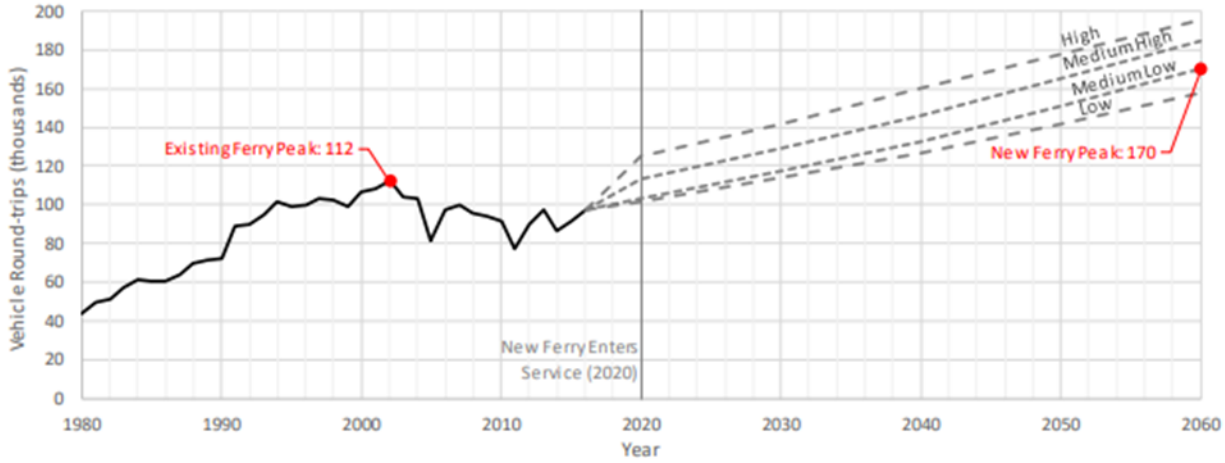


Figure 1. Vehicle ridership history and forecast with four growth trends (medium-low chosen)
Source: Glosten, Guemes Island Ferry Replacement Vessel Capacity Study, October 2017.

These forecasts represent average lines about which annual ridership is predicted to oscillate and they assume that demand is independent of vessel size.

Glosten scaled the capacity of the new vessel from the capacity of the existing vessel by the ratio of forecasted ridership in 2060 to the existing vessel's ridership in its busiest year. The resulting vessel capacity is presented in Figure 2, along with the capacities of the existing and previous ferries (*Guemes* and *Almar* respectively) for reference. A capacity of 32 vehicles corresponds with Skagit County's medium-low forecast target; it is also identified by a point.

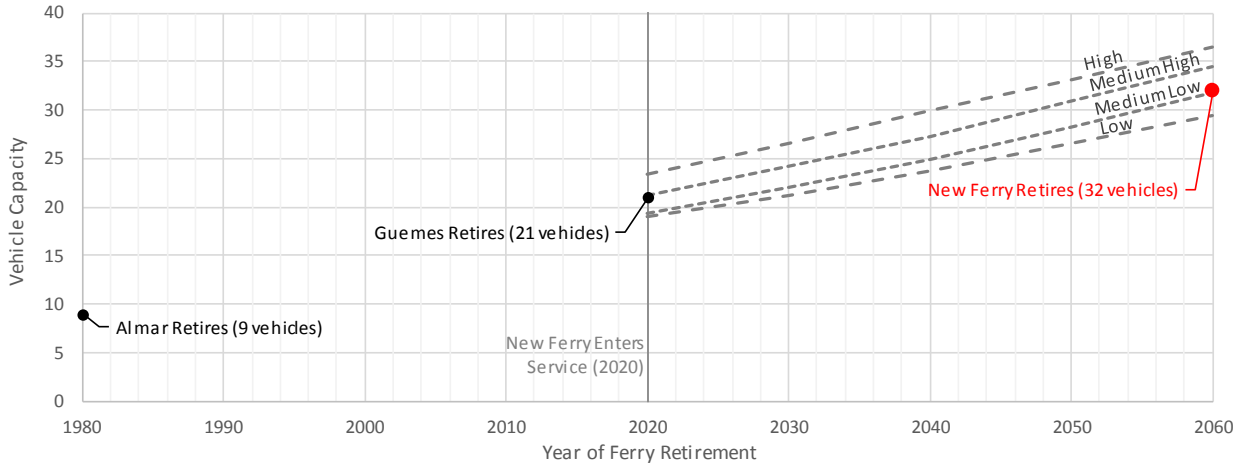


Figure 2 Vehicle capacity history and forecast with four growth trends (medium-low chosen)
Source: Glosten, *Guemes Island Ferry Replacement Vessel Capacity Study, October 2017.*

Annual ridership and vehicle demand for 2022 through 2039 (the full years of benefits within the analysis period), based on the medium-low forecast, supports the monetization and quantifications in this BCA, and is provided in a tabular format in Table 3, following.

	Vehicle Ridership	Passenger Ridership
2022	114,900	219,650
2023	116,350	222,975
2024	117,800	226,300
2025	119,250	229,625
2026	120,700	232,950
2027	122,150	236,275
2028	123,600	239,600
2029	125,050	242,925
2030	126,500	246,250
2031	127,950	249,575
2032	129,400	252,900
2033	130,850	256,225
2034	132,300	259,550
2035	133,750	262,875
2036	135,200	266,200
2037	136,650	269,525
2038	138,100	272,850
2039	139,550	276,175

This data was used to determine the optimal size for the new vessel, accommodating the ferry service's projected ridership growth while keeping vessel capacity below thresholds that would generate additional crewing costs and regulatory burden. The resulting ideal replacement vessel has a capacity of 32 vehicles and 150 passengers.

Demand forecasts are under the baseline and grant-project (ferry replacement) alternatives are expected to be the same, however, there is the possibility of additional induced vehicle demand. due to additional vehicle capacity as discussed in Section 1.3.4.1, following.

Table 3 Tabular passenger and vehicle ridership forecast for medium-low growth trend
Source: Glosten, *Guemes Island Ferry Replacement Vessel Capacity Study, October 2017.*

1.3.4.1 Limitations

Overall

Many of the benefits of the Guemes Island Ferry Replacement Project are not monetizable due to data limitations and limits to what is monetizable based on BCA guidance. It is believed that project benefits are much greater than what can be monetized in this report. Where possible, we have provided qualitative data to support this belief.

Demand Forecasting

Glosten's forecast model and ridership demand results, as published in the *Guemes Island Ferry Replacement Vessel Capacity Study, October 2017,* are subject to the following limitations:

- **Demographic changes:** The demand pool could expand, shrink, or shift in a way that is no longer represented by Skagit County total population. Riders' requirements and attitudes could change over time, affecting their responses to operational practices. Seasonal demand patterns could change over time.
- **Economic cycles:** Economic cycles affect ridership mildly, but they cannot be predicted.
- **Induced demand:** When the new ferry enters service, there may be a surge in vehicle ridership to absorb the extra vehicle capacity, because driving on is more convenient than parking and walking on.
- **Natural events:** Adverse weather generates spikes in truck traffic. Major natural disasters could reduce population, housing, and demand.
- **Policy changes:** Changes in land-use, planning, and development policies could change the population on and around Guemes Island and the ways in which the land on Guemes Island is used, ultimately changing the size and characteristics of the demand pool.
- **Technological changes:** Advances in technology and automation may change the quantity and pattern of passenger and vehicle demand. These advances may also affect operations in ways that cannot be foreseen today.

The full forecasting methodology, results, and limitations are available in the *Guemes Island Ferry Replacement Vessel Capacity Study, October 2017,* which is linked in the References at the end of this BCA.

1.3.5 Inflation Adjustment and Discounting

As per USDOT's BCA guidance, all analysis is presented in real dollars – in this case 2018 dollars. Inflation factors were necessary in two instances:

- To escalate the costs of additional maintenance to support our baseline. Values provided in Elliott Bay Design Group's 2013 report, *M/V Guemes, O.N. 601686: Ferry Replacement Plan* (Reference 1) were escalated from 2013 dollars to 2018 dollars using the producer price indicies for 1.) Shipbuilding and repairing, product ship repair, non-military, and 2.) Marine cargo handling, product marine cargo handling (Reference 4).
- The recommended monetized values of emissions types from the BCA guidance were escalated to 2018 dollars (from 2016$) using the inflation index suggested in the BCA guidance (Gross Domestic Product deflator).

All values are then discounted 7 percent per year to discount benefits and costs to their present value in the BCA. Additionally, for comparison, we've provided a sensitivity analysis discounting results 3 percent per year.

1.4 Project Costs and Phasing

1.4.1 Project Capital Costs

Capital costs for replacing the M/V Guemes with a 32-car electric ferry are shown in Table 4. A full discussion of cost analysis methods used to determine project costs may be found in Reference 3.

Shipyard costs, the largest vessel expense, include all labor and materials used to construct the vessel. These funds would be spent at a US shipyard, pending a competitive bid of the replacement vessel construction contract. The following metrics were used to develop the estimate:

- $70/hr shipyard labor rate – representing a national average
- 70 hrs/LT production rate for steel
- 300 hrs/LT production rate for aluminum
- 20% plate wastage
- 10% shape wastage
- 12.5% material markup to cover material shipping, storage, handling
- 20% estimating allowance
- 2% builders risk insurance and bonding

Construction management costs represent the design, contract management, and Owner's representation to oversee construction at the shipyard. Shoreside electrical upgrade costs include design, utility connection, and permitting costs, as well as installation of a shoreside battery bank, charging apparatus, and emergency services generator. Terminal improvements include design and modifications to the existing transfer span apron and dolphins. The following metrics were used:

- 20% estimating allowance
- 5% remaining design costs for vessel
- 10% design costs for terminal upgrades
- 4% construction management
- 2% County oversight and contracting
- 1% permitting fees where appropriate
- 8.5% tax on all shoreside improvement

In addition to the capital costs of vessel construction, shoreside electrical infrastructure and terminal improvements are needed. Current capital cost estimates include installation of large onshore battery banks, widening the transfer span aprons at both terminals to allow for concurrent loading of vehicles and passengers, and upgrades to the dolphins.

Description	Category	2018	2019	2020	2021	Total Cost
Total Replacement Cost		**$372**	**$750**	**$13,080**	**$7,503**	**$21,704**
Vessel Total		**$221**	**$445**	**$9,540**	**$5,478**	**$15,685**
County Oversight	*Vessel Construction*	$0	$0	$179	$104	$283
Vessel Design	*Design and Preliminary Work*	$221	$445	$41	$0	$707
Construction Management	*Vessel Construction*	$0	$0	$358	$207	$565
Shipyard Contract		$0	$0	$8,962	$5,168	$14,130
Bonding and Risk Insurance	*Vessel Construction*	$0	$0	$177	$102	$279
Material Markup	*Vessel Construction*	$0	$0	$424	$244	$668
Estimating Allowance	*Vessel Construction*	$0	$0	$1,404	$810	$2,214
Shipyard Engineering and Services	*Vessel Construction*	$0	$0	$1,185	$684	$1,869
Structure	*Vessel Construction*	$0	$0	$1,728	$997	$2,725
Propulsion	*Vessel Construction*	$0	$0	$799	$460	$1,259
Electric Plant	*Vessel Construction*	$0	$0	$1,291	$744	$2,035
Command and Surveillance	*Vessel Construction*	$0	$0	$490	$282	$772
Auxiliary Systems	*Vessel Construction*	$0	$0	$511	$295	$806
Outfit and Furnishings	*Vessel Construction*	$0	$0	$953	$550	$1,503
Shoreside Electrical Total		**$106**	**$214**	**$2,595**	**$1,485**	**$4,398**
Utility Connection	*Shoreside Electrical Improvements*	$0	$0	$62	$36	$98
County Oversight	*Shoreside Electrical Improvements*	$0	$0	$49	$29	$78
Permitting	*Design and Preliminary Work*	$12	$25	$2	$0	$39
Shoreside Design	*Design and Preliminary Work*	$94	$189	$17	$0	$300
Shoreside Electrical Subtotal		$0	$0	$2,463	$1,421	$3,884
Infrastructure	*Shoreside Electrical Improvements*	$0	$0	$1,650	$952	$2,602
Charging Apparatus	*Shoreside Electrical Improvements*	$0	$0	$667	$384	$1,051
Emergency Services Generator	*Shoreside Electrical Improvements*	$0	$0	$147	$84	$231
Terminal Improvements Total		**$45**	**$91**	**$945**	**$540**	**$1,621**
County Oversight	*Terminal Improvements*	$0	$0	$18	$11	$29
Terminal Design	*Design and Preliminary Work*	$45	$91	$8	$0	$145
Terminal Improvements Subtotal		$0	$0	$918	$529	$1,447
Apron Modifications	*Terminal Improvements*	$0	$0	$219	$126	$345
Dolphin Upgrades	*Terminal Improvements*	$0	$0	$699	$403	$1,102

Table 4 Guemes Island Ferry Replacement Project Costs by Year, 2018-2021 (in 1000s, 2018$)
Note: Subtotals may vary by 1 ($1,000) due to rounding error.
Source: PFM, 2017; Glosten, 2018; and BERK, 2018.

As per the BCA guidance, we've limited our description and analysis of ferry operations and maintenance costs to only the difference in costs required to provide the enhanced service used in the BCA benefits calculations. This means that we can ignore operations and maintenance costs that will stay the same in both the baseline and project scenarios – this includes costs like staffing, benefits, and interfund charges. Relevant operating costs – those that are different between the baseline and project scenarios are described in Section 1.5.1.1.

1.4.2 Project Funding

Capital costs for this project are expected to total $21.7 million in 2018 dollars as detailed in Section 1.4.1.

With the grant application this BCA is supporting Skagit County is requesting $10 million (again, in year of estimates or 2018$) from the Better Utilizing Investments to Leverage Development (BUILD) federal grant program. Skagit County will be responsible for all project costs beyond the BUILD grant amount, above, for a total funding/financing responsibility of

$11.7 million. Skagit County intends to finance these direct capital costs with a Skagit County Limited Tax General Obligation (LTGO) Bond. These primary direct funding sources are described following:

Federal Grant

- **Better Utilizing Investments to Leverage Development (BUILD).** The BUILD grant program provides a unique opportunity for the DOT to invest in road, rail, transit and port projects that promise to achieve national objectives. **$10,000,000**.

Non-Federal

- **Skagit County Limited Tax General Obligation (LTGO) Bonds.** Skagit County is statutorily authorized to issue up to 2.5% of its assessed value $17,747,214,025 in bonds. Up to 1.5% of this can be limited tax general obligation (LTGO) bonds, which are non-voted and can be implemented via Commissioner action. LTGO bonds do not include a funding tool – that is, the County would still have to identify a source for funding the debt service associated with the LTGO bond. For this project it is anticipated that any resulting debt service costs would be funded with Skagit County Road Fund revenues. Additional analysis of Skagit County's debt capacity is provided in Section 5.4. **$11,879,560 in bonds to finance $11,704,000 in project costs.**

Skagit County can move forward with the project if the BUILD Grant funds are awarded. The County has the necessary revenue resources to cover the remaining project costs for which they would be responsible.

The County is statutorily authorized to issue up to 2.5% of its assessed value $17,747,214,025 in bonds. Up to 1.5% of this can be limited tax general obligation (LTGO) bonds, which are non-voted and can be implemented via Commissioner action. LTGO bonds do not include a funding tool – that is, the County would still have to identify a source for funding the debt service associated with the LTGO bond.

The remainder (up to the full 2.5% if the County has not issued any LTGO bonds) can be issued as unlimited tax general obligation (UTGO) bonds which must be passed through a 60% affirmative vote of the people, in an election with voter turnout equal to at least 40% of those who voted in the most recent general election. When voters are asked to approve UTGO bonds, they are simultaneously asked to approve an excess property tax levy to fund the debt service payments on the bond.

As of December 31, 2017, the County has $53,786,671 in general obligation debt. Therefore, based on 2018 assessed valuation ($17,747,214,025) the County has $389,893,680 in remaining debt capacity, $212,421,540 of which is LTGO debt capacity.

The County anticipates funding approximately 52.2% of the project with LTGO bonds – expecting to issue $761,250 in 2019, $3,126,200 in 2020 and $7,615,545 in 2021. If the BUILD Grant of $10,000,000 were awarded, the County has enough debt capacity to fund the remainder of this project with either LTGO or UTGO debt. If the County were accessing debt to fund the remainder of the project in the case other potential funding sources fell through, it would be most likely to use LTGO debt as it could be implemented with Commissioner action, and without a vote of the people.

Based on total project costs less the $10,000,000 BUILD grant, an LTGO bond to fund the remainder of the project would be equal to $11,704,000 plus an additional 1.5% in issuance costs for a total bond of $11,879,560. Issued over a 20-year horizon and with an interest rate of 4%, the annual bond repayment would be $874,118.82. It is anticipated that the County would be able to prioritize this debt service within its existing transportation budget, if need be.

The County intends to fund certain minimal design and permitting project costs and substantial debt service through three additional funding sources:

Non-Federal Grant

- **Washington State County Road Administration Board, County Ferry Capital Improvement Program.** Created in 1991 specifically to assist the four counties in the state of WA operating car ferries. Access to the funding is limited in frequency (every four years), and requires the County first seek funding through the Public Works Trust Fund. This competitive state grant funding was awarded to Skagit County, but is requires final legislative allocation. **Estimated at $7,500,000 over 20 years (approximately $375,000 per year).**

Non-Federal

- **Guemes Ferry Surcharge.** In June 2018, the Board of Skagit County Commissioners voted unanimously to adopt a resolution to implement a vessel replacement surcharge expected to raise approximately $235,000 annually. Collected surcharge funds can only be used for the purchase or construction of a new ferry vessel or debt service resulting from the construction of a new vessel. **Estimated at $4,941,379 (approximately $235,000 per year).**
- **Skagit County Road Fund.** The County Road fund is funded by property taxes levied on the unincorporated county. In 2018, the assessed value of the unincorporated county was $8,595,846,321. This assessed value was taxed at a rate of 1.7535 per $1,000 of assessed value for total anticipated revenues of $15,073,104. As per RCW 36.82.020, all road levy funds to be spent for "proper county road purposes," which includes the acquisition and operation of ferries. **Estimated at $4,486,821 (approximately $236,410 per year).**

1.4.3 Project Schedule

The current project schedule has three sections of design for the vessel, shore-side electrical equipment, and terminal upgrades. Three sections of construction (for the abovementioned components) and a permitting section are also provided. The critical path can be seen in the red highlighted items. The vessel design subtask has been ongoing since August 2017, and planning for start of design included several years of review and studying. Based on this timeline, it is estimated that construction can begin once all permits are in place, which is conservatively estimated to be April 2020. Construction of all project phases is estimated to be complete by September 2021. Following a crew training period and final inspections by the United States Coast Guard, the replacement ferry should go into service before the end of 2021.

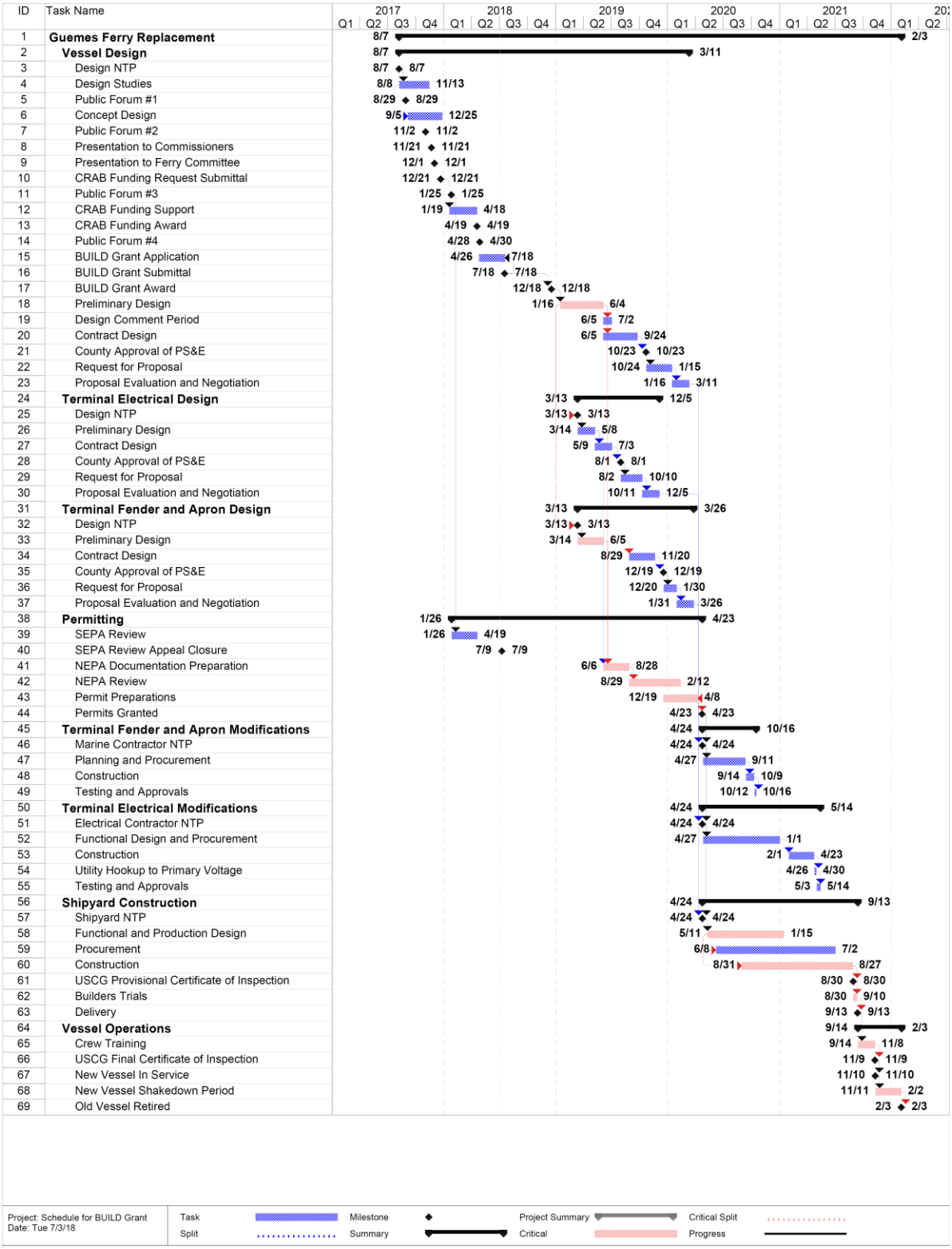


Figure 3 Project Schedule

Source: Glosten, 2018.

Project costs were identified with respect to this schedule and include the capital costs of the vehicle (incurred and to be incurred between 2018 and 2021) and annual operations and maintenance costs for each year of its operations (for the purposes of this BCA, 2022 to 2062).

1.5 Project Benefits and Benefit-Cost Analysis

The main groups benefitting from the Guemes Island Ferry Replacement project include:

- Guemes Island and Anacortes ferry users who benefit from increased ferry capacity and mobility between Guemes Island and mainland Washington state,
- Guemes Island and Skagit County residents who benefit from increased economic competitiveness and activity on Guemes Island,
- Guemes Island businesses and property owners who benefit from sustained property values due to the continued accessibility of their property and continued tourism that supports their businesses, and,
- Regional residents who benefit from improved air and water quality.

The following analysis monetizes benefits from vehicle operating cost savings and emissions reductions, as well as the residual value of the 32-vehicle electric replacement ferry after the analysis period; quantifies benefits to reliability and benefits to existing and additional users; and qualitatively describes benefits to reduced noise pollution, loss of emergency services, hazardous material release risk reduction, and water emission elimination.

The BCA analysis quantifies benefits to reliability, vehicle operating cost savings, emissions reductions, modal diversion, property value increases, and quality of life, summarized

1.5.1 Monetized Benefits

1.5.1.1 Vehicle Operating Cost Savings

The route is currently served by a single 39-year-old diesel-powered ferry, the M/V Guemes. Guemes has had regular maintenance over the years and a major re-power in 2006, but has otherwise remained largely unchanged since entering service. At 39 years, the current vessel is approaching the end of its expected useful life (40 years).

While the MV Guemes has been well maintained, the costs to maintain the vessel in a state of good repair continue to increase as the vessel ages. The existing ferry's average annual maintenance and repair cost from 2012 to 2017 was $649,792. This is more than double the anticipated maintenance and repair cost of $306,210 for the 32-vehicle replacement ferry, as shown in Table 5.

Item	M/V Guemes[1]		32-Car Electric Ferry		Savings	
	Cost	% of Total	Cost	% of Total		
Fuel/Lube/Supplies[2]	$295,685	23.7%	$175,000	24.5%	$120,685	40.8%
Maintenance/Repair	$649,792	52.1%	$306,210	42.9%	$343,582	52.9%
Rentals[3]	$77,262	6.2%	$21,000	2.9%	$56,262	72.8%
Other Items[4]	$118,509	9.5%	$106,658	14.9%	$11,851	10.0%
Interfund Transfers	$105,207	8.4%	$105,207	14.7%	-	-
Total Costs	$1,246,455	100%	$714,075	100%	$532,380	42.7%

Table 5 Annual operating cost comparison – M/V Guemes versus 32-car electric ferry

Notes:
(1) Six-year average of M/V Guemes costs (2012-2017)
(2) For the 32-car electric ferry, this line item is the cost of electricity
(3) This is the cost of the passenger-only charter vessel used during out-of-service periods
(4) Professional services, utilities, travel, communications, etc.
Source: Glosten, 2017.

The 32-vehicle electric replacement ferry's battery electric propulsion system will achieve additional long-term cost benefits beyond maintenance and repair cost savings. Table 5 shows a side-by-side annual operating cost comparison between the existing ferry and the 32-vehicle electric replacement ferry; the 32-car electric ferry achieves operating cost savings in fuel/powering costs and charter vessel rental during out-of-service periods. A 10% cost reduction was also assumed for professional services, travel, communications, and other miscellaneous operating costs due to the improved condition of the 32-vehicle electric replacement ferry.

Further, it is expected that extending the service life of the M/V Guemes for this additional 20-year period would necessitate a full vessel overhaul and vessel refurbishment (Reference 1). The vessel overhaul would include, but not necessarily be limited to:

- Replacement of propulsion system foundations
- Replacement of propulsion system components (engines, gears, drives)
- Replacement of propulsion system controls
- Mid-body extension of 20 feet
- Refurbishment of hull steel
- Blast & paint entire vessel
- Refurbishment of piping systems

The overhaul would minimally increase the capacity of the vessel by four vehicles to 25 total vehicles. The vessel overhaul was estimated to cost $4,794,000 in 2013 dollars (Reference 1) and has been escalated to $5,081,640 in 2018$. During that time, Skagit County would have to lease an alternate vessel at an expected 2013 cost of $1,095,000 or $1,215,450 in 2018$ (Reference 1).

The full vessel refurbishment would involve refurbishing the vessel from a passenger and crew perspective as well as items not covered in the overhaul, and would include, but not necessarily be limited to:

- Replacement of engine houses & relocation of exhaust systems
- Replacement of generator housing & relocation of exhaust systems

- Replacement of navigation & communication electronics
- Refurbishment of passenger spaces & crew accommodations (including replacing all paneling, doors & locks)

It was estimated that this refurbishment would cost $929,000 in 2013 dollars, or $984,740 in 2018 dollars. The above items are recommended on top of the typical maintenance costs.

Similarly, it is expected that the 32-vehicle electric replacement ferry would require two battery replacements at different times in the analysis period. These battery replacements would occur in 2028 and 2037 and would cost approximately $695,505 in 2018$.

	M/V Guemes	32-Car Electric Ferry	Annual Operating Cost Savings	Discounted Annual Operating Cost Savings *7% Discount*	Discounted Annual Operating Cost Savings *3% Discount*
2022	$8,528,285	$714,075	$7,814,210	$6,825,234	$7,365,642
2023	$1,246,455	$714,075	$532,380	$434,581	$487,203
2024	$1,246,455	$714,075	$532,380	$406,150	$473,013
2025	$1,246,455	$714,075	$532,380	$379,580	$459,236
2026	$1,246,455	$714,075	$532,380	$354,747	$445,860
2027	$1,246,455	$714,075	$532,380	$331,540	$432,874
2028	$1,246,455	$1,409,580	-$163,125	-$94,940	-$128,772
2029	$1,246,455	$714,075	$532,380	$289,579	$408,025
2030	$1,246,455	$714,075	$532,380	$270,635	$396,141
2031	$1,246,455	$714,075	$532,380	$252,930	$384,603
2032	$1,246,455	$714,075	$532,380	$236,383	$373,401
2033	$1,246,455	$714,075	$532,380	$220,919	$362,525
2034	$1,246,455	$714,075	$532,380	$206,466	$351,966
2035	$1,246,455	$714,075	$532,380	$192,959	$341,714
2036	$1,246,455	$714,075	$532,380	$180,336	$331,762
2037	$1,246,455	$1,409,580	-$163,125	-$51,641	-$98,693
2038	$1,246,455	$714,075	$532,380	$157,512	$312,717
2039	$1,246,455	$714,075	$532,380	$147,208	$303,609
TOTAL	**$29,718,020**	**$14,244,360**	**$15,473,660**	**$10,740,176**	**$13,002,824**

Table 6 Monetized Value of Operating Cost Savings, 2022 to 2039 (2018$)
Source: Glosten, 2018; and BERK, 2018.

1.5.1.2 Emissions Reduction Benefits

The M/V Guemes operates a diesel-propulsion engine that creates significant air pollution and emissions. The 32-vehicle replacement ferry will operate an electric propulsion system, powered primarily by grid electricity which will lead to significant emissions reductions as shown below.

	NOx	CO	CO_2	HC	PM	Diesel Fuel	SO_2	CH_4	N_2O
Baseline w/ Diesel Engines	8.44	4.38	1352	0.84	0.62	387	0.013	0	0
Battery Electric Ferry	0	0	898	0	0	0	0	0.049	0.012
Annual Reduction	8.44	4.38	453	0.84	0.62	387	0.013	-0.049	-0.012

Table 7 Annual Emissions Reductions, Short tons

Source: Glosten, 2018.

The BCA guidance allows for monetization of some of these emissions reductions, including:

- Nitrogen Oxides (NOx)
- Particulate Matter (PM)
- Sulfur Dioxide (SO2)

The monetized value of these emissions reductions is provided in Table 8, following.

	Emissions Reduction			Monetized Value of Emmissions Reduction				Discounted Monetized Value of Emmissions Reduction	
	Nitrogen Oxides (NOx)	Particulate Matter (PM)	Sulfur Dioxide (SO2)	Nitrogen Oxides (NOx)	Particulate Matter (PM)	Sulfur Dioxide (SO2)	Total	*7% Discount*	*3% Discount*
2022	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$260,374	$270,485
2023	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$243,340	$262,607
2024	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$227,421	$254,959
2025	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$212,543	$247,533
2026	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$198,638	$240,323
2027	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$185,643	$233,323
2028	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$173,498	$226,527
2029	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$162,148	$219,929
2030	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$151,540	$213,524
2031	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$141,626	$207,305
2032	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$132,361	$201,267
2033	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$123,702	$195,404
2034	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$115,609	$189,713
2035	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$108,046	$184,187
2036	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$100,977	$178,823
2037	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$94,371	$173,614
2038	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$88,198	$168,558
2039	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$82,428	$163,648
TOTAL				$1,147,683.13	$3,856,669.94	$10,447.91	$5,014,801	**$2,802,462**	**$3,831,729**

Table 8 Monetized Value of Operating Cost Savings, 2022 to 2039 (2018$)

Source: Glosten, 2018; and BERK, 2018.

1.5.1.3 Residual Value

Due to the availability of a baseline or "no build" alternative, the analysis period is only 20 total years, two years of project construction and 18 years of full project benefits, from 2022 to 2039. However, the transportation improvement in question, the Guemes Island Ferry Replacement Project, entails construction of a 32-vehicle capacity electric propulsion ferry which has an

expected economic life of 40 years – from 2022 to 2062 – meaning it has an additional expected 22 years of economic life after the analysis period.

To account for this additional expected life, we have calculated the residual value of the 32-vehicle replacement ferry and terminal improvements over the additional 22-years of their economic life and the residual value of the shoreside electrical improvements over the additional 2-years of its economic life. This is done by assuming the original value of the investments depreciate in a linear manner over their service lives, and are then discounted by 7 percent (and 3 percent for the sensitivity analysis) consistent with the rest of the analysis. However, we must also subtract the cost of two additional battery replacements anticipated in 2044 and 2052 that are estimated to cost approximately $695,505 in 2018$.

	32-Vehicle Replacement Ferry *40-year Life*	**Shoreside Electrical Improvements** *20-year Life*	**Terminal Improvements** *40-year Life*	**Total Residual Value of Improvements**
2022	$15,685,000	$4,398,000	$1,621,000	$21,704,000
2023	$15,292,875	$4,178,100	$1,580,475	$21,051,450
2024	$14,900,750	$3,958,200	$1,539,950	$20,398,900
2025	$14,508,625	$3,738,300	$1,499,425	$19,746,350
2026	$14,116,500	$3,518,400	$1,458,900	$19,093,800
2027	$13,724,375	$3,298,500	$1,418,375	$18,441,250
2028	$13,332,250	$3,078,600	$1,377,850	$17,788,700
2029	$12,940,125	$2,858,700	$1,337,325	$17,136,150
2030	$12,548,000	$2,638,800	$1,296,800	$16,483,600
2031	$12,155,875	$2,418,900	$1,256,275	$15,831,050
2032	$11,763,750	$2,199,000	$1,215,750	$15,178,500
2033	$11,371,625	$1,979,100	$1,175,225	$14,525,950
2034	$10,979,500	$1,759,200	$1,134,700	$13,873,400
2035	$10,587,375	$1,539,300	$1,094,175	$13,220,850
2036	$10,195,250	$1,319,400	$1,053,650	$12,568,300
2037	$9,803,125	$1,099,500	$1,013,125	$11,915,750
2038	$9,411,000	$879,600	$972,600	$11,263,200
2039	$9,018,875	$659,700	$932,075	$10,610,650
2040	$8,626,750	$439,800	$891,550	$9,958,100
Maintenance Needed in Residual Life	$1,391,010			$1,391,010
Residual Value	$7,235,740	$439,800	$891,550	$8,567,090
			Discounted 7%	$2,534,693
			Discounted 3%	$5,032,262

Table 9 Monetized Residual Value Calculation, 2022 to 2039 (2018$)

Source: PFM, 2018; and BERK, 2018.

As per the BCA guidance, this residual value can be added to the benefits, or numerator, when calculating the overall benefit-cost ratio for this proposed BUILD grant project.

1.5.2 Quantified Benefits

1.5.2.1 Reliability

Replacing the existing 39-year-old diesel ferry with a new electric ferry will decrease out-of-service time and ensure that reliable vehicle and passenger transportation to the island continues to be available. From 2012 to 2017, the existing ferry has averaged 26 days per year out of service for shipyard work, including both planned (approximately 21 days, on average) and unplanned/emergency dry-docking (approximately 5 days, on average). It is expected that, if the M/V Guemes were to continue to operate the total out of service days will double between now and the end of the analysis period (2039).

It is estimated that the 32-vehicle electric replacement ferry will be drydocked less often (once every two years) for a duration of 14 days, resulting in 7 planned days per year for planned shipyard work. This is a 300% reduction in planned out of service days. New equipment will permit condition monitoring and allow for enhanced predictive maintenance. This will decrease the unplanned repairs that are very disruptive to the ferry service.

This projection is an inference about a future population based on an extrapolation of historic trends – and does not attempt to meaningfully assume the dry-dock days for any one year, but rather attempts to assume the additional dry-dock days for the operating portion of the analysis period (2022 to 2039).

Because USDOT does not have specific recommended guidance for monetizing reliability benefits we have only quantified the estimated reduction in out-of-service time.

1.5.3 Qualitative Benefits

1.5.3.1 Noise Pollution Reduction

Airborne Noise

United States Coast Guard document NVIC-12-82 discusses recommendations for control of excessive noise on vessels. Similar international regulations also exist. Hearing loss is a well-recognized issue within the marine industry, and many operators have incurred millions of dollars in hearing loss claims. Diesel engines are the primary source of noise on typical marine vessels, with engine room noise levels often exceeding 110 dBA. As a point of reference, hearing protection is required above 85 dBA per OSHA regulations, and abrasive blasting produces noises in the 105 to 112 dBA levels.

Airborne noise from the existing ferry emanates from the above-deck diesel engines, located directly adjacent to the passenger cabin, passenger loading area, and parked vehicles. While no direct measurements have been made, passengers indicated during a recent community roundtable that it is often necessary to shout to carry on a conversation onboard the vessel. Furthermore, the existing noise levels make it difficult for crew to relay orders to motorists loading and unloading and in case of vessel emergencies.

The 32-vehicle electric replacement ferry will utilize a much quieter battery electric propulsion system, running virtually silently from a passenger's perspective. Below the main deck of the vessel, the main equipment room will have some noise from ventilation fans, pumps, and power conversion equipment, but it is expected to be below the 85 dBA limit requiring hearing

protection. The 32-vehicle electric replacement ferry may be fitted with a backup diesel generator, but it is expected to run for only 5% of the vessel's total operating hours. Additionally, it will be below the main deck, soft mounted to the structure, and will have a high attenuation silencer. By choosing to remove the single greatest source of noise on the vessel, the County will provide a major benefit to the passengers and is investing in the safety of their crew.

Underwater Noise

Underwater noise emitted by ferries and other marine vessels has received increased attention in recent years due to growing scientific evidence that underwater noise can cause harm to marine mammals, including the Endangered Species Act listed southern resident killer whale, which inhabits the project location. On March 14, 2018, the State of Washington Office of the Governor issued Executive Order 18-02, which resolved to "develop strategies for quieting state ferries in areas most important to Southern Residents." Efforts will therefore be made to minimize the 32-vehicle electric replacement ferry's underwater radiated noise to the extent possible.

Most underwater noise emitted by marine vessels is from propellers, especially from the cavitation that can occur with highly loaded propellers and the pressure pulses from passing propeller blades. Propellers and the associated thruster components will be designed to minimize excess noise and cavitation, mitigating to the extent possible the underwater radiated noise produced by the replacement vessel.

1.5.3.2 Loss of Emergency Services

The Guemes Island ferry provides a critical emergency service function for residents and visitors of Guemes Island by transporting emergency vehicles and personnel to and from the mainland.

The most recent large fire response on Guemes Island, in 2012, resulted in continual ferry service from 3:00 pm until 3:10 am on May 20th, for a total of 17 unplanned trips. The response involved approximately 100 emergency responders and 23 emergency vehicles coming from 13 fire districts. Although this was an uncommon event, the ferry played a crucial role in enabling emergency service vehicles to access the island.

Calls for transport of an ambulance are a much more common occurrence, but no less critical as life depends on response time. A rustic emergency heliport exists on the island, but in most situations, helicopter travel is neither the fastest nor the most practical means of transporting patients to the care they need.

When the M/V Guemes is out of service, the only available ferry to charter by Skagit County Public Works is a passenger-only vessel. Both planned and unplanned shipyard periods increase in frequency and duration as vessels approach the end of their useful life due to failing equipment, limited availability of parts, and deteriorating structure. Emergency vehicles cannot be transferred when the M/V Guemes is out of service.

Replacing the existing 39-year-old diesel ferry with a new electric ferry will decrease out-of-service time and ensure that reliable vehicle and passenger transportation to the island continues to be available. The new ferry will be able to make multiple trips on a single battery charge, and will be able to recharge during power outages either through an on-vessel or on-shore generator.

From 2012 to 2017, the M/V Guemes was out of service for an average of 21 days per year for planned shipyard work, and a total of 26 days per year for planned and unplanned maintenance and repairs. It is estimated that the 32-vehicle electric replacement ferry will be drydocked less often (once every two years) for a duration of 14 days, resulting in 7 days per year for planned shipyard work. This is a 300% reduction in planned out of service days. New equipment will permit condition monitoring and allow for enhanced predictive maintenance. This will decrease the unplanned repairs that are very disruptive to the ferry service.

1.5.3.3 Hazardous Material Release Risk Reduction

Unintended release of petroleum oil from marine vessels into U.S. navigable waters from 2007 to 2016 averaged about 1650 incidents per year, with a total spilled amount averaging about 300,000 gallons per year (Reference 10). For many vessels, the highest oil spill risk occurs is during bunkering (taking on fuel) and tank to tank fuel oil transfers.

The existing ferry takes on approximately 2,200 gallons of diesel fuel every two weeks (57,200 gallons annually) via a fuel truck driven onto the vessel. Lube oil is brought onto the vessel in 55-gallon drums when oil changes on the deck mounted engines are required.

The 32-vehicle electric replacement ferry will be powered via electricity transferred to the vessel via cables and stored onboard in lithium-ion batteries. A single diesel generator may be kept onshore or onboard for emergency and high demand days but is estimated to use 5,000 or less gallons per year. Assuming the vessel would be fueled with diesel four times per year, the probability of releasing diesel oil into the water is reduced by a factor of six. If applicable, the new vessel will be fitted with a fuel oil overflow tank. If any of the fuel tanks is overfilled, fuel will cascade into the overflow tank before spilling onto the deck. Overflow tanks are typically sized based on the filling rate to allow several minutes of filling prior to any spillage. Combined with the reduced frequency of filling, overflow tanks with audible and visual alarms virtually eliminate the probability and risk of an oil spill.

1.5.3.4 Water Emissions Elimination

The M/V Guemes has a single crew-only sink that discharges gray water directly overboard, and has no head (restroom facility). The 32-vehicle electric replacement ferry will have a crew-only head with a sink, both leading directly to a holding tank for 100% containment. The area of operation is home to sensitive marine life, including Endangered Species Act listed whales and salmon, which will benefit from the 100% containment of effluent.

1.5.3.5 Quality of Life

Guemes Island residents have stated that it is a priority to preserve the island's rural character. While residents have a range of opinions regarding the appropriate level of service for the ferry, there is broad agreement among residents regarding the overall importance of ferry service in maintaining Guemes Islanders' way of life. In addition to increasing the reliability of service over what the aging existing ferry provides, the proposed ferry would increase vehicle and passenger capacity while continuing to operate on the same schedule as the existing ferry; the proposed ferry would meet the demand for ferry service by future rural growth managed by Skagit County consistent with the Guemes Island Subarea Plan. The 32-vehicle electric replacement ferry’s increased vehicle and passenger capacity will ensure that Skagit County's ferry service can accommodate the expected growth of the ridership pool over the course of the 32-vehicle electric

replacement ferry's anticipated service life, thereby maintaining the ferry's contribution to the island's economy.

Census Bureau OnTheMap information for 2015 shows that there are 351 island residents that have jobs, with over 87% of jobs located off island. About 25% of residents' jobs require commuting less than 10 miles, most of them being within the City of Anacortes. About 75% of the residents' jobs are 10-50 miles or more in distance. Whether the jobs are in Anacortes or further, Guemes residents most often travel by ferry on foot or by vehicle. From 2012 to 2017 there was an average of approximately 26 days per year the ferry was out of service. The Guemes Island Ferry Replacement Project will improve reliability, and thus connectivity for Guemes residents working off island.

The Guemes Island Ferry Replacement Project will also support a rural tourist economy on the island, with jobs in accommodation and food service, retail, construction, manufacturing, and construction are found. Most of the approximately 45 to 50 on-island jobs support wages that are less than $1,250 per month. (Census on the Map 2015) While Guemes Island jobs represented less than 1% of the unincorporated Skagit County jobs in 2013, the average annual taxable retail sales per business was over $57,000 for Guemes Island businesses versus $46,000 per business in unincorporated Skagit County as a whole (Washington Department of Revenue, Taxable Retail Sales, 2013) As with off-island commuters, ferry outages that have increased over the last five years interfere with local businesses' viability and productivity. The Guemes Island Ferry Replacement Project will support self-sufficiency and entrepreneurial activity on the island.

1.5.3.6 Benefits to Existing and Additional Users

In addition to nearing the end of its useful economic life, M/V Guemes is undersized with respect to the ferry route's future ridership demand projections, as discussed in Section 1.3.4, potentially hindering economic activity in the project location if a higher-capacity replacement is not procured. The vehicle overhaul needed to support its continued operations will only minimally address the expected additional demand. Thus, the larger replacement vessel will benefit additional users.

Unfortunately, while it is known that a higher capacity ferry is needed to support long-term ridership and demand, were unable to quantify the riders that would not be served (either due to missed sailings, diversion to other routes, or choosing not to travel) if the M/V Guemes were not replaced. This is because that forecasting would require knowing the level of need of the travel and the tolerance of passengers for waiting for the ferry.

1.6 Comparing Benefits to Costs

To meaningfully compare benefits to costs, costs (like benefits) must also be discounted to present value. This calculation is presented in Table 10, following.

	2018	2019	2020	2021	Total
Project Costs	$ 371,929	$ 750,294	$ 13,079,602	$ 7,503,175	$ 21,705,000
Discounted 7%	$ 371,929	$ 701,209	$ 11,424,231	$ 6,124,826	$ 18,622,195
Discounted 3%	$ 371,929	$ 728,440	$ 12,328,779	$ 6,866,468	$ 20,295,617

Table 10 Guemes Island Ferry Replacement Project Costs Discounted to Present Value
Note: Totals may vary by $1,000 due to rounding error.
Source: BERK Consulting, 2018.

1.6.1 Net Present Value (NPV)

Net present value measures the projected value the Guemes Island Ferry Replacement project as an investment for Skagit County and other contributors. It was calculated by discounting the benefits and costs of the project over its lifecycle and then subtracting the costs from the benefits. The net present value of this project at a 7 percent discount rate is -$2,544,864. The net present value of this project at a 3 percent discount rate is $1,571,198. This project has a positive net present value at a 3% discount rate.

1.6.2 Benefit Cost Ratio (BCR)

The benefit cost ratio compares the benefits of a project to its costs. It was calculated by dividing the benefits by its costs. The benefit cost ratio of this project at a 7 percent discount rate is 0.86. The benefit cost ratio of this project at a 3 percent discount rate is 1.08. This project has a benefit cost ratio greater than 1 at a 3% discount rate.

1.7 Summary of Benefits and Benefit-Cost Findings

The BCA monetizes benefits from vehicle operating cost savings and emissions reductions, as well as the residual value of the 32-vehicle electric replacement ferry after the analysis period; quantifies benefits to reliability and benefits to existing and additional users; and qualitatively describes benefits to reduced noise pollution, loss of emergency services, hazardous material release risk reduction, and water emission elimination.

The monetized benefits are summarized in Table 11. Benefits accrue to a positive benefit-cost ratio at the 3 percent discount rate. However, benefits do not accrue to a positive benefit-cost ratio at the 7 percent discount rate. This is due to limitations to the data and a large number of project benefits which the BCA guidance specifies are not monetizable, which reduced our ability to monetize the project's benefits.

Benefit Category	Social Benefit	Value	Monetized Value *(7% discount rate)*	Monetized Value *(3% discount rate)*
Vehicle Operating Cost Savings	Cost savings to taxpayers related to ongoing operations of Guemes Ferry route	$15,473,660 in vehicle operating cost savings	**$10,740,176**	**$13,002,824**
Emissions Reductions	Improved air quality and reduced environmental impacts through reduction in emissions, including nitrogen oxides, particulate matter, and sulfur dioxide	151.92 short ton reduction in nitrogen oxides, 11.16 short ton reduction in particulate matter, and 0.23 short ton reduction in sulfur dioxide	**$2,802,462**	**$3,831,729**
Residual Value	Additional operating life of vessel, shoreside electrical, and terminal improvements	$8,576,090 in undiscounted residual value	**$2,534,693**	**$5,032,262**
Capital Costs			**$18,622,195**	**$20,295,617**
Net Present Value			**($2,544,864)**	**$1,571,198**
Benefit to Cost Ratio			**0.86**	**1.08**

Table 11 Benefit Matrix, 2018$

Source: BERK Consulting, 2018.

Beyond the monetizable benefits, this project has several quantifiable benefits, below:

- **Reliability.** As discussed in Section 1.5.2.1, replacing the M/V Guemes will significantly improve the reliability of the ferry route, supporting residents and visitors in traveling between the Island and mainland Washington State in the absence of other options.

In addition, this project generates that could not be reliably quantified, but are described qualitatively, following:

- **Reduced Noise Pollution.** The existing diesel propulsion vessel generates significant airborne noise. The proposed battery electric propulsion vessel is much quieter, eliminating a significant share of the airborne noise. The concept design does call for a backup diesel generator, however, it is expected that that generator will run for only 5% of its expected total operating hours.
- **Loss of Emergency Services.** The existing Guemes Island ferry provides a critical emergency service function for residents and visitors of Guemes Island by transporting emergency vehicles and personnel to and from the mainland. The ferry Skagit County Public Works charters when the Guemes is out of service is passenger-only, adding to the difficulty of responding to emergencies on the island if they occur during out-of-service periods. A rustic emergency heliport exists on the island, but in most situations,

helicopter travel is neither the fastest nor the most practical means of transporting patients to the care they need.

- **Hazardous Material Release Risk Reduction.** As discussed in Section 1.5.3.3, the existing ferry takes on approximately 2,200 gallons of diesel fuel every two weeks (57,200 gallons annually) via a fuel truck driven onto the vessel which leads to a significant risk of hazardous material release. The 32-vehicle electric replacement ferry is anticipated to use 5,000 gallons or less of diesel fuel per year, significantly reducing this release risk.
- **Water Emission Elimination.** As discussed in Section 1.5.3.4, The M/V Guemes has a single crew-only sink that discharges gray water directly overboard, and has no head (restroom facility). The 32-vehicle electric replacement ferry will have a crew-only head with a sink, both leading directly to a holding tank for 100% containment.
- **Quality of Life.** As discussed in Section 1.5.3.5, Guemes Island residents have stated that it is a priority to preserve the island's rural character. There is broad agreement among residents regarding the overall importance of ferry service in maintaining Guemes Islanders' way of life.
- **Benefits to Existing and New Users.** As discussed in Section 1.5.3.6, and 1.3.4, the M/V Guemes is undersized with respect to the ferry route's future ridership demand projections, potentially hindering economic activity in the project location if a higher-capacity replacement is not procured. The vehicle overhaul/refurbishment needed to support its continued operations will only minimally address the expected additional demand. Thus, the larger replacement vessel will benefit additional users.

References

Detailed analysis supporting the costs, and monetization and quantification of benefits is provided in the accessory Benefit-Cost Analysis Excel workbook provided with this BCA Report.

1. *M/V Guemes, O.N. 601686: Ferry Replacement Plan, Elliott Bay Design Group, Reference No. 13039-001-043-3, Rev. B, 22 November 2013.*
   URL: https://www.skagitcounty.net/PublicWorksFerry/Documents/Replacement/MV%20GUEMES%20Ferry%20Replacement%20Plan_22Nov2013.pdf
2. *Guemes Island Ferry Replacement – Vessel Capacity Study, Glosten, Inc., Rev. -, 20 October 2017.*
   URL: https://www.skagitcounty.net/PublicWorksFerryReplacement/Documents/designreport/2a_Vessel%20Capacity%20Study.pdf
3. *Guemes Island Ferry Replacement – Concept Design Report, Glosten, Inc., Rev-, 18 December 2017.*
   URL: https://www.skagitcounty.net/PublicWorksFerryReplacement/Documents/designreport/1b_Concept%20Design%20Report.pdf
4. Producer Price Index for industry Shipbuilding and repairing, product Ship repair, non-military and Producer Price Index for industry Marine cargo handling, product marine cargo handling, 2018.
   URL: https://www.bls.gov/ppi/#data

Appendix C Funding Documentation

PRESS RELEASE

April 20, 2018

Guemes Ferry Replacement Project in line for $7.5 million in state funding

At its April 19 meeting, the County Road Administration Board (CRAB) voted unanimously to forward a $7.5 million funding request for Skagit County's Guemes Island Ferry Replacement Project to the state Legislature for possible approval in 2019.

"Funding approval from CRAB is a tremendous momentum boost for our project to replace the M/V Guemes with a new, environmentally conscious vessel," said Public Works Director Dan Berentson. "With continued support from Guemes Island residents – and, hopefully, the 2019 Legislature – we're committed to building a new vessel that is reliable, efficient and safe for Guemes Island residents and visitors."

The unanimous vote by the CRAB board is not a guarantee of funding. It means that Skagit County's funding request for $7.5 million will be submitted to the 2019 Legislature for funding as part of the biennial or supplemental budget request.

Skagit County was the only county to submit an application for the County Ferry Capital Improvement Program, administered by CRAB. CRAB formed a technical review committee, comprised of the CRAB executive director, along with several other technical experts, to review the project proposal.

The County's application had to meet a variety of Washington Administrative Code standards, adhere to commonly held engineering practices and cost-effectiveness, and provide evidence that the county had also sought funding through the public works trust fund or other available revenue sources.

The CRAB technical committee recommended that Skagit County be awarded up to 50 percent of the project cost if it formed a ferry district, and up to 30 percent of the cost if it did not form a ferry district. The Board of County Commissioners clarified to CRAB on April 19 that they did not intend to form a ferry district, and officially requested $7.5 million in funding.

Find more information about the Guemes Island Ferry Replacement Project online at www.skagitcounty.net/ferryreplacement. For questions or more details, please contact Dan Berentson at 360-416-1400 or danb@co.skagit.wa.us.

2018
COUNTY FERRY CAPITAL IMPROVEMENT PROGRAM (CFCIP)

SKAGIT COUNTY FUNDING REQUEST

APPLICATION REVIEW AND RECOMMENTATION REPORT
County Road Administration Board (CRAB)

Background:

Because of concern that some of the county ferry system vessels were operating well past their useful life and the counties did not have the resources to replace them, the 1988 State Legislature directed County Road Administration Board and WSDOT to prepare the "County Ferry Systems Capital Improvement Needs" report for the Legislative Transportation Committee by December 1990. This report resulted in legislative adoption of RCW 47.56.725 (4), which states:

> "The county road administration board may evaluate requests by Pierce, Skagit, Wahkiakum, and Whatcom counties for county ferry capital improvement funds. The board shall evaluate the requests and, if approved by a majority of the board, submit the requests to the legislature for funding out of the amounts available under RCW 46.68.090(2)(h). Any county making a request under this subsection shall first seek funding through the public works trust fund, or any other available revenue source, where appropriate."

County Road Administration Board developed Washington Administrative Code (WAC) rules to accommodate this allowable process in November of 1991, later amended in April 2008. Key points of the WAC 136-400 rules are:

> WAC 136-400-040: Once every four years CRAB may issue a call for projects, with 2017 being one of those years a call for projects was issue by CRAB at the April Board meeting.
>
> WAC 136-400-050: Upon a call for projects, interested counties must submit a project application no later than December 31, 2017. The project application must include:
>
> (1) Project description and scope;
> (2) Engineering drawings accurately describing the complete project;

(3) Engineering analysis and cost estimate;
(4) Evidence the applicant first sought funding through the public works trust fund or any other available revenue source; and
(5) Comprehensive project financial plan including match funding amounts and sources as required by WAC 136-400-065 and amortization and cash flow schedules.

WAC 136-400-060 (1) & (2): Should one or more applications be received, CRAB will form a Technical Review Committee in order to review the project funding proposals, with the Technical review Committee will be comprised of:

(a) Executive director of the county road administration board;
(b) Washington state department of transportation highways and local programs director;
(c) A Washington state department of transportation marine engineer;
(d) One public works department representative from each of the WAC 136-400-010 named counties, each of whom shall serve as an ex officio, nonvoting member of the technical review committee.

WAC 136-400-060 (3) & (4): The Technical Review Committee will ensure that the application:

(a) Meet the applicable statutes and the standards of this chapter;
(b) Adhere to commonly held engineering practices and cost effectiveness; and
(c) Are complete and meet the project application requirements listed in WAC 136-400-050, including evidence the applicant first sought funding through the public works trust fund, or other available revenue source.

And, develop a report that provides:

(a) A project summary;
(b) A committee evaluation; and
(c) A committee recommendation based upon WAC 136-400-065 guidance and including any additional or clarifying terms established by the county road administration board's call for projects.

WAC 136-400-070: The County Road Administration Board will review project applications, along with the recommendations of the technical review committee, at its regular spring meeting:

(2) At that time, the county road administration board may approve, deny, or return the application to the technical review committee for further review.
(3) If the county road administration board returns the application to the technical review committee, the board may develop supplemental questions and criteria for the technical review committee to address.
(4) Final action by the county road administration board on project applications must occur no later than at the next regularly scheduled summer meeting following project application deadline.

WAC 136-400-080 details how the request receives funding by the legislature.

County ferry capital improvement project requests approved by the county road administration board shall be submitted to the legislature for funding out of amounts available under RCW 46.68.090 (2)(h) as part of the biennial or supplemental budget request of the county road administration board.

Skagit County CFCIP Request:

Under WAC 136-400-050, Skagit County has requested CRAB accept their application, dated December 29, 2017, for CFCIP funds, for a new (replacement) auto ferry serving Guemes Island, and to submit a request for funding to the state legislature during the 2019 session.

TOTAL PROJECT COST: (estimated)	$24,589,000 - Plug-in Hybrid, or $25,723,000 - All Electric
SOURCES OF FUNDING	
CFCIP	$10,000,000
Skagit County Ferry District	5% - 30%
Skagit County and Other	balance of need

Technical Review Committee Meeting #1, February 14, 2018, CRAB office:

Members Present:	John Koster, Executive Director, CRAB Ali Motevaselani, WSDOT Ferries Paul Randall-Grutter, Skagit County Engineer Christina Schoenfelder, Whatcom County
Staff Present:	Walt Olsen, Deputy Director, CRAB Jeff Monsen, Intergovernmental Policy Manager, CRAB Rhonda Mayner, Administrative Secretary, CRAB Jim Mickel, Skagit County Public Works Comptroller
Guests:	William Moon, Glosten Jeff Rider, Glosten
Members Absent:	Brian Stacy / Lauren Behm, Pierce County Paul Lacy, Wahkiakum County Kyle McKeon, WSDOT H&LP

CALL TO ORDER: Mr. Koster called the meeting to order at 10:10 am.

Background

Mr. Olsen noted that Skagit County has narrowed their initial proposal for the Guemes Island Ferry that listed five propulsion options to two; an all-electric vessel and a plug-in hybrid. He then outlined the program requirements under RCW 47.56.725(4) and WAC 136-400 for the funding program. The maximum contribution is $10,000,000 per project and $500,000 per year to one county.

He outlined the committee schedule, noting that a written report is due to the County Road Administration Board by March 21, 2018. The Board will review the report at their April 19, 2018 meeting, and may act on it at that time, or request further information. The Board must act at their meeting on July 26, 2018. If approved, the Board would then put the financial request in CRAB's budget submittal for the 2019-21 biennium. The final decision on funding would then be made by the Legislature in the 2019 session.

Mr. Monsen noted that the process is somewhat convoluted, but that is due to the nature of the

funding. If approved, the money comes off the top of all of the counties' share of the motor vehicle fuel tax; it is not a typical grant process.

Mr. Randall-Grutter noted that the Anacortes dock that would require some modifications is located on land leased from the Department of Natural Resources. The county owns the parking lot and approach areas.

Vessel Design

Mr. Moon reported that the proposed vessel is slightly wider and much longer than the existing vessel, and would raise the capacity from 21 vehicles and 100 passengers to 32 vehicles and 150 passengers. Minor changes will be made to the terminals to accommodate the longer vessel if needed. He noted that the county intends to continue the current two-round-trips per hour schedule of the half-mile crossing.

The proposed vessel will have a steel hull and aluminum deck house, and is designed for a 40-year life.

Mr. Moon noted that the channel frequently shows a current of four to five knots, requiring low—speed thrusters to dock the vessel and hold it in place on shore during transfers.

He reported that studies have shown a steady increase in both vehicle and pedestrian ridership over the last 35 years as Guemes Island has shifted from a vacation to a bedroom community.

Mr. Olsen asked how often the current vessel is full, requiring riders to wait for the next sailing. Mr. Moon said about 30% of the time, particularly in the summer.

In addition to shore-side improvements for the charging system, the proposal would change the aprons to allow simultaneous pedestrian and vehicle loading and unloading. Mr. Moon noted that a new ticketing system will also be needed to further speed the process. The existing dolphins will not require modification, but new fenders will be necessary.

Propulsion Systems

Mr. Rider outlined the two propulsion options. An all-electric vessel would have generators on the shore, with two independent electric motors on the vessel. Advantages would be low emissions, very little noise, low maintenance, and no need to purchase or store diesel fuel. Disadvantages include the higher cost of shore-side infrastructure needs and a more limited vessel range.

The plug-in hybrid would have generators on board. It would offer the same advantages as the all-electric option as well as a lower cost for shore-side infrastructure. The construction cost of the vessel would be higher.

He reported that they are considering an automatic charging system on the Anacortes dock, eliminating the need to have an additional employee on site to plug the vessel in as well as eliminating large cords running through the area. The cost to install a charging system on the island dock as well would be prohibitive. The batteries and charging system will be sized to accommodate peak demand conditions.

The system would experience a 20-30 % drawdown per round trip. The batteries are estimated to have an eight year life. Mr. Rider noted that the cost of batteries has been declining as new technologies are developed.

Mr. Mickel reported that the county is exploring grant programs for funding for the shore-side infrastructure needs.

Mr. Moon went over several different capital cost estimates, noting that the higher capital costs for these options is more than offset by the savings in operating costs.

Mr. Olsen thanked Mr. Moon and Mr. Rider for their report. He noted that the application covers the required engineering aspects. The remaining question is that of funding for the proposed project.

Funding

Mr. Randall-Grutter noted the possibility of funding through Results Washington, and reported that the county would be meeting with them on February 15. The county also plans to request $6,000,000 in capital funding from the legislature in the next biennium.

> *Note: After the conclusion of this meeting, Skagit County informed CRAB that the above grant request was for $1,200,000, not $6,000,000.*

Mr. Mickel reported that the county anticipates both forming a Ferry District and imposing a surcharge, as well as a rate increase. He stated that the Board of County Commissioners is committed to qualifying for the maximum reimbursement $10,000,000 from the CFCIP, which requires that a Ferry District be formed.

Mr. Mickel noted that the county is assuming they will receive significant grant funds, and will be taking out a $25,000,000 bond as they are committed to constructing a new vessel. Their hope is to maximize the reimbursement options.

The committee recessed at 12:05 pm for lunch.
The committee reconvened at 1:05 pm.

Mr. Motevaselani asked what the risk of total failure of the electric engines is. Mr. Moon replied that it was less than that of a geared diesel system. He also noted concerns of the crew of the current vessel. Mr. Moon stated that they had interviewed the crew at length and documented their wants and needs.

Mr. Motevaselani also asked whether there was consideration of a locking mechanism that would automatically hold the boat in place at the dock, eliminating the need for powering the vessel into the ferry slip during unloading/loading. Skagit had not considered this in the design process to date, but would pursue investigation of the option.

At this point the committee did not see the need for a future face-to-face meeting. They decided that all future correspondence will be directed to Mr. Monsen, who will then disseminate it among the group.

Mr. Olsen noted that Mr. Randall-Grutter, Mr. Mickel and Mr. Moon should plan to be in attendance at the April 19, 2018 CRABoard meeting when the committee submits its report to the Board.

The minutes of this meeting will be sent to the committee by the end of the week, and a draft of the committee's report will be sent to all members as soon as it is completed.

Mr. Koster adjourned the meeting at 2:00 pm.

Supplemental materials provided to the Committee prior to the meeting
- Skagit County's project proposal notebook
- Letter from Skagit County clarifying its preferred project scope

Supplemental materials provided to the Committee during the meeting
- Summary of the CFCIP (WAC 136-400)
- Excerpts from WAC 136-400 pertaining to the Technical Review Committee process
- Project description Power Point presented by Glosten during the meeting
- Summary of CFCIP process and program financing Power Point presented by Walt Olsen

Supplemental materials provided to the Committee following the meeting
- Draft minutes from the February 14th committee meeting
- Draft v2 of the CFCIP report
- Content of email prepared by Ali Motevaselani, dated Feb 26th

Technical Review Committee Meeting #2, March 7, 2018 -- teleconference:

Members Present: John Koster, CRAB
Ali Motevaselani, WSDOT Ferries
Kyle McKeon , WSDOT Local Programs
Paul Randall-Grutter, Skagit County
Christina Schoenfelder, Whatcom County
Lauren Behm, Pierce County

Staff Present: Walt Olsen, CRAB
Jeff Monsen, CRAB
Dan Berentson, Skagit County
Rachel Rowe, Skagit County
Jim Mickel, Skagit County

Guests: William Moon, Glosten
Jeff Rider, Glosten
David Larsen, Glosten

Members Absent: Paul Lacy, Wahkiakum County

CALL TO ORDER: Mr. Koster called the meeting to order at 1:05 pm.

Mr. Monsen confirmed the names of participants on the conference call. Jeff also reminded the participants of the agenda for the meeting:
1. Answer any follow-up questions that the committee members may have;
2. Get an update from Skagit County on financing plans; and,
3. Develop a Technical Committee recommendation (to be finalized no later than March 21st).

Mr. Koster asked whether there were any follow-up questions or corrections to the February 14th minutes. The committee members were satisfied with the provided information and the minutes.

Mr. Koster then asked Skagit County to provide an update to the financing plan.

Mr. Mickel summarized what the committee had requested: (1) narrow the focus of the financing plan on the preferred option, including an update on the status of outside funding opportunities;

and, (2) provide an update on the status of forming a Ferry District, and the associated collection of an assessment and/or fare surcharge.

Mr. Mickel indicated that additional internal discussions have occurred at Skagit County, but very little has changed from the original proposal. Unfortunately, Skagit's financial consultant (PFM Financial Advisors) are not expected to finish the draft update until next Tuesday (March 13th). The release of the updated financial report should occur by next Thursday (March 15th). Skagit was reluctant to speculate on the details prior to its completion.

Mr. Mickel indicated that even though there remains questions about the timing and scope of Ferry District formation, the County is planning to institute a fare capital surcharge for boat replacement, starting this summer. The surcharge under consideration would generate approximately $250,000 annually.

Mr. Berentson informed the committee that the Skagit County Prosecuting Attorney's office remains very concerned about a county's ability to form a Ferry District for anything other than "passenger-only" services. The issue is not whether the County is willing to proceed, but rather the County's ability to defend a legal challenge.

Mr. Koster reminded the committee members that under current CFCIP rules, without a Ferry District, Skagit could receive a maximum of $7.5 million of potential CFCIP funding. With a Ferry District in place contributing more than 5% of the project cost, the potential CFCIP funding would increase to $10 million. Obviously this is a potential impact to Skagit County of $2.5 million in CFCIP funds.

Mr. Berentson stated that it is Skagit County's position to request $10 million of CFCIP funding, subject to finalization a Ferry District decision.

Following a brief discussion about concluding the Technical Committee process and finalizing a report by March 21, 2018, Mr. Koster and Mr. Monsen asked the committee:

> Other than the financing plan, does the committee concur that Skagit County has satisfied all WAC 136-400 required procedural steps, and has provided the required information in a timely manner.
>
> **The committee agreed, yes, without objection.**
>
> With regard to financing, is the committee's recommendation that:
>
> Should Skagit County not form a Ferry District, Skagit be awarded up to 30% of the project cost (currently estimated at $7.5 million)
>
> AND
>
> Should Skagit County successfully form a Ferry District, and the financial plan demonstrate the Ferry District will contribute more than 5% of the project cost, Skagit be awarded up 50% of the project cost, not to exceed $10 million (currently estimated at $10 million)
>
> **The committee agreed, yes, without objection.**

Mr. Koster thanked the participants and adjourned the committee meeting at 1:30 pm.

Note: March 15, 2018 -- Skagit County provided the updated financial plan to the committee.

Skagit County
Board of Commissioners

Ron Wesen, First District
Kenneth A. Dahlstedt, Second District
Lisa Janicki, Third District

April 18, 2018

Mr. John Koster, Executive Director
County Road Administration Board
2404 Chandler CT SW – Suite 240
Olympia, WA 98502-0913

Re: County Ferry Capital Improvement Program Application

Dear Director Koster:

We understand that with regard to financing, it is the technical review committee's recommendation that: *"Should Skagit County not form a Ferry District, Skagit (County) be awarded up to 30% of the project cost (currently estimated at $7.5 million), and should Skagit County successfully form a Ferry District, and the financial plan demonstrate that the ferry district will contribute more than 5% of the project cost, Skagit (County) be awarded up to 50% of the project cost, not to exceed $10 million (currently estimated at $10 million)."*

In order to be eligible for the full $10 million available, Skagit County interprets WAC 136-400-065(2) to require that a ferry district must be formed pursuant to RCW 36.54. Upon consultation with County legal counsel, Skagit County also interprets that ferry districts may only be formed pursuant to RCW 36.54 for passenger-only ferries.

In accordance with our above interpretations we request that the County Road Administration Board approve the grant amount of $7.5 million, as recommended by the technical review committee.

Thank you for your consideration of our project application. Our plan is to launch a new vessel by 2020 with your support.

Sincerely,
BOARD OF COUNTY COMMISSIONERS
SKAGIT COUNTY, WASHINGTON

Kenneth A. Dahlstedt, Chair | Lisa Janicki, Commissioner | Ron Wesen, Commissioner

RESOLUTION RESCINDING RESOLUTION R20150261, ESTABLISHING A VESSEL REPLACEMENT SURCHARGE & ESTABLISHING THE SKAGIT COUNTY FERRY FARE SCHEDULE

WHEREAS, Skagit County ("County") owns and operates a vehicle and passenger ferry (herein "ferry") between Anacortes, Washington, and Guemes Island, Washington; and

WHEREAS, on September 8, 2015, the Board of Skagit County Commissioners ("Board") adopted Resolution R20150261, establishing the Guemes Island Ferry fare schedule; and

WHEREAS, the Board of Skagit County Commissioners (Board) has determined that the current ferry (M/V Guemes) has reached the end of its useful and economic life and needs to be replaced; and

WHEREAS, RCW 36.54.200 allows a county operating a ferry to impose a vessel replacement surcharge on every fare sold to be used only for the construction or purchase of ferry vessels, and to pay the principal and interest on bonds authorized for the construction or purchase of ferry vessels; and

WHEREAS, per RCW 36.54.200, the vessel replacement surcharge must be at least equal to the surcharge amount included in Washington state ferry fares identified in RCW 47.60.315(7), currently in the amount of $0.25; and

WHEREAS, pursuant to Resolution R20180070, the Board held a public hearing on April 17, 2018, at 9:00 a.m., or shortly thereafter to allow for public comment on proposed changes to the ferry fare schedule, and also provided for the receipt of additional written comments from March 26 through April 27, at 4:30 p.m.; and

WHEREAS, the Board desires to rescind Resolution R20150261 and establish a new fare schedule to include the vessel replacement surcharge; and

WHEREAS, the new Guemes Island ferry fare schedule, attached as Exhibit A (and hereby incorporated by reference), establishes the vessel replacement surcharge and the new ferry fare schedule, taking into account recommended input from Public Works Department staff, the Guemes Island Ferry Committee, and the oral and written comments received; and

WHEREAS, it is the desire of the Board to enact the Guemes Island ferry fare schedule as shown as Exhibit A, effective August 1, 2018.

NOW, THEREFORE, BE IT RESOLVED AND IT IS HEREBY ORDERED, that Resolution R20150261 is hereby rescinded, effective August 1, 2018; and

NOW, THEREFORE, BE IT RESOLVED AND IT IS HEREBY FURTHER ORDERED, that a vessel replacement surcharge as shown, described, and depicted as Exhibit A (attached hereto and incorporated by reference) is hereby adopted and established, effective August 1, 2018.

DATED this 18 day of June, 2018.

BOARD OF COUNTY COMMISSIONERS
SKAGIT COUNTY, WASHINGTON

Kenneth A. Dahlstedt, Chair

Lisa Janicki, Commissioner

Ron Wesen, Commissioner

SKAGIT COUNTY COMMISSIONERS SEAL COURT STATE OF WASHINGTON

Attest:

Amber Emps
Clerk of the Board

For contracts under $5,000:
Authorization per Resolution R20030146

County Administrator

Recommended:

Department Head

Approved as to form:

6/14/18
Civil Deputy Prosecuting Attorney

Approved as to indemnification:

Risk Manager

Approved as to budget:

Budget & Finance Director

EXHIBIT A

Guemes Island Ferry Fare Schedule

	Fare schedule (includes surcharge)		Surcharge	
Fares	Non-peak	Peak	Non-peak	Peak dollar
Passenger	Oct 1 thru May 19	May 20 thru Sept 30	dollar amt.	amt.
Adult passenger	$4.00	$5.00	$1.00	$1.00
Senior (65+yrs) / disabled / youth (6-17yrs) passenger	$2.00	$3.00	$0.00	$0.50
Age 5 & under	Free	Free	Free	Free
Passenger punch cards - valid for 1 year from purchase date				
25-trip adult passenger	$77.00	$77.00	$10.00	$10.00
25-trip senior (65+yrs) / disabled / youth (6-17) passenger	$46.00	$46.00	$6.00	$6.00
Vehicle				
Motorcycle & rider	$7.00	$10.00	$1.00	$2.00
Motorcycle & senior / disabled rider	$6.00	$9.00	$1.00	$2.00
Vehicle & driver (under 20 feet including overhang)	$12.00	$15.00	$2.00	$3.00
Vehicle & senior / disabled driver (under 20 feet)	$10.00	$12.00	$2.00	$2.00
Vehicle & driver punch cards (under 20 feet including overhang) - valid for 120 days from purchase				
20-trip vehicle (under 20') & driver	$196.00	$196.00	$26.00	$26.00
20-trip vehicle (under 20') & senior / disabled driver	$156.00	$156.00	$20.00	$20.00
20-trip motorcycle & rider	$117.00	$117.00	$15.00	$15.00
20-trip motorcycle & senior / disabled rider	$98.00	$98.00	$13.00	$13.00
Vehicle convenience punch cards - valid until used				
***Non-peak 10-trip punch cards are not valid for use during the peak season**				
Peak 10-trip vehicle (under 20') & driver		$150.00		$30.00
Peak 10-trip vehicle (under 20') & senior / disabled driver		$120.00		$20.00
Non-peak 10-trip vehicle (under 20') & driver*	$120.00		$20.00	
Non-peak 10-trip vehicle (under 20') & senior / disabled driver*	$100.00		$20.00	
Oversize vehicles & vehicles w/ trailers (including driver)				
Vehicle over 20 ft to less than 25 ft	$17.00	$21.00	$4.00	$5.00
Vehicle 25 ft to less than 30 ft	$25.00	$30.00	$6.00	$7.00
Vehicle 30 ft to less than 35 ft	$33.00	$39.00	$8.00	$9.00
Vehicle 35 ft to less than 40 ft	$42.00	$51.00	$10.00	$12.00
Vehicle 40 ft to less than 45 ft	$52.00	$64.00	$12.00	$15.00
Vehicle 45 ft to less than 50 ft	$64.00	$78.00	$15.00	$18.00
Vehicle 50 ft to less than 55 ft	$77.00	$94.00	$18.00	$22.00
Vehicle 55 ft to less than 60 ft	$90.00	$109.00	$21.00	$25.00
Vehicle 60 ft to less than 65 ft	$105.00	$129.00	$24.00	$30.00
Each 5 ft increment over 65 ft	$8.00	$8.00	$2.00	$2.00
Over width charge (over 8 ft, 6 in)	Double Length Charge			
Miscellaneous				
Stacked Logging Truck	$124.00	$124.00	$29.00	$29.00
Extended Run (1 run at end of day) plus fare	$120.00	$120.00		
Guemes Special (crew call out) plus fare	$500.00	$500.00		
Charter Rate (3 hr min) plus fare	$1,200.00	$1,200.00		
$ per hour, each additional hour	$400.00	$400.00		

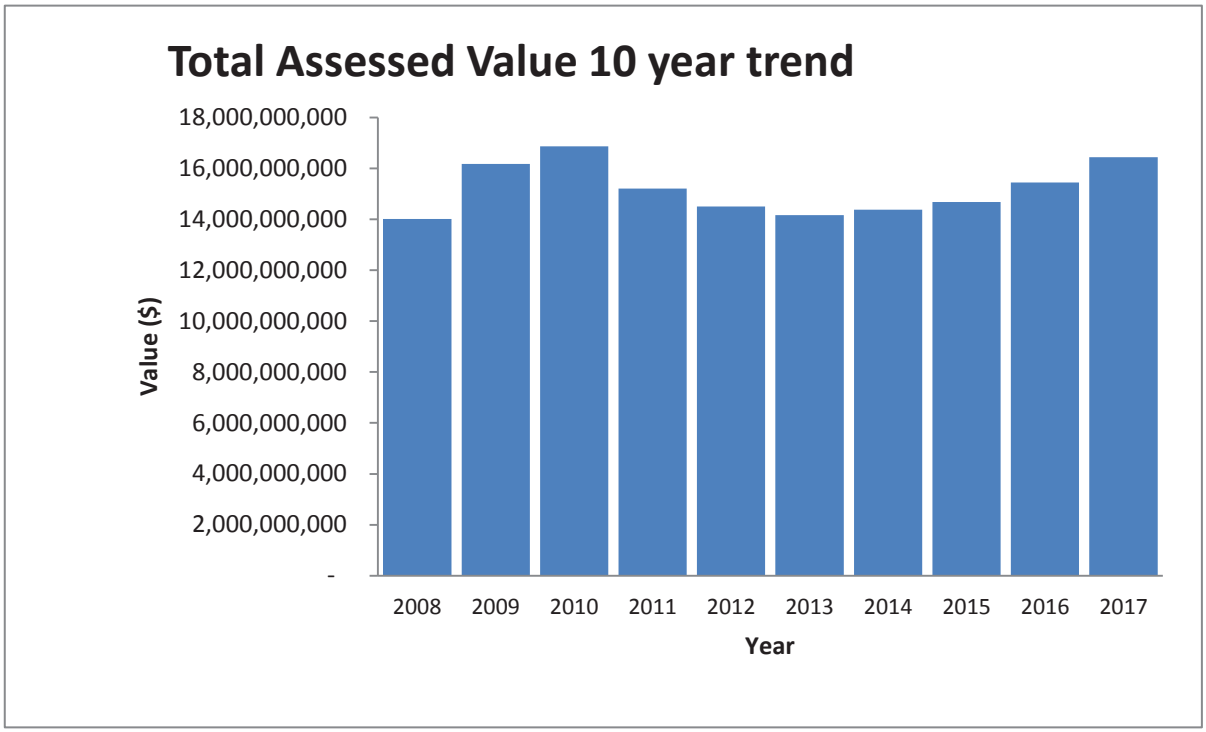
WASHINGTON STATE REAL & PERSONAL PROPERTY TAX LEVIES (Applied to Real & Personal Property)			
	VALUATION	LEVY RATE	TOTAL TAXES
STATE SCHOOL LEVY PART I	$17,695,717,325	1.8680	$33,056,375
STATE SCHOOL LEVY PART II	$17,461,427,342	1.0237	$17,876,914
TOTAL:		2.8918	$50,933,289

SKAGIT COUNTY			
GENERAL FUND	VALUATION	LEVY RATE	TOTAL TAXES
CURRENT EXPENSE	$17,747,214,025	1.4052	24,939,800
VETERANS RELIEF		0.0146	$259,210
MENTAL HEALTH/ DEV.DIS.		0.0199	$354,917
TOTAL:	$17,747,214,025	1.4398	$25,553,927
MEDIC I SERVICES	$17,728,409,787	0.3388	$6,007,437
CONSERVATION FUTURES	$17,747,214,025	0.0508	$902,572
COUNTY ROAD	$8,595,846,321	1.7535	$15,073,104

County, city, fire, hospital, port, and parks & recreational district general funds are regular levies subject to statutory limitations. Bonds are subject to voter approval.

SKAGIT COUNTY, WASHINGTON
ASSESSED VALUE OF TAXABLE PROPERTY
For a Ten Year Period

Year	Real Property Assessed Value	Personal Property Assessed Value	Total Assessed Value	Total Direct Tax Per Assessed Value
2008	12,954,570,410	1,049,853,451	14,004,423,861	3.24
2009	15,019,067,448	1,147,615,059	16,166,682,507	2.98
2010	15,696,268,675	1,171,931,494	16,868,200,169	2.90
2011	14,123,251,945	1,087,219,836	15,210,471,781	3.32
2012	13,630,153,404	864,518,340	14,494,671,744	3.52
2013	13,010,191,978	1,153,862,901	14,164,054,879	3.81
2014	13,150,792,759	1,219,229,512	14,370,022,271	3.80
2015	13,310,324,042	1,360,098,135	14,670,422,177	3.95
2016	14,244,891,656	1,201,242,030	15,446,133,686	3.75
2017	15,232,382,080	1,200,738,501	16,433,120,581	3.58



Source: Skagit County Assessors Office

Skagit County does not estimate actual value. Re-evaluations occur on a market resale base. The County is revalued in each four year period by area, and statistically updated annually. Valuation data of assessed property may not coincide with fiscal year end.

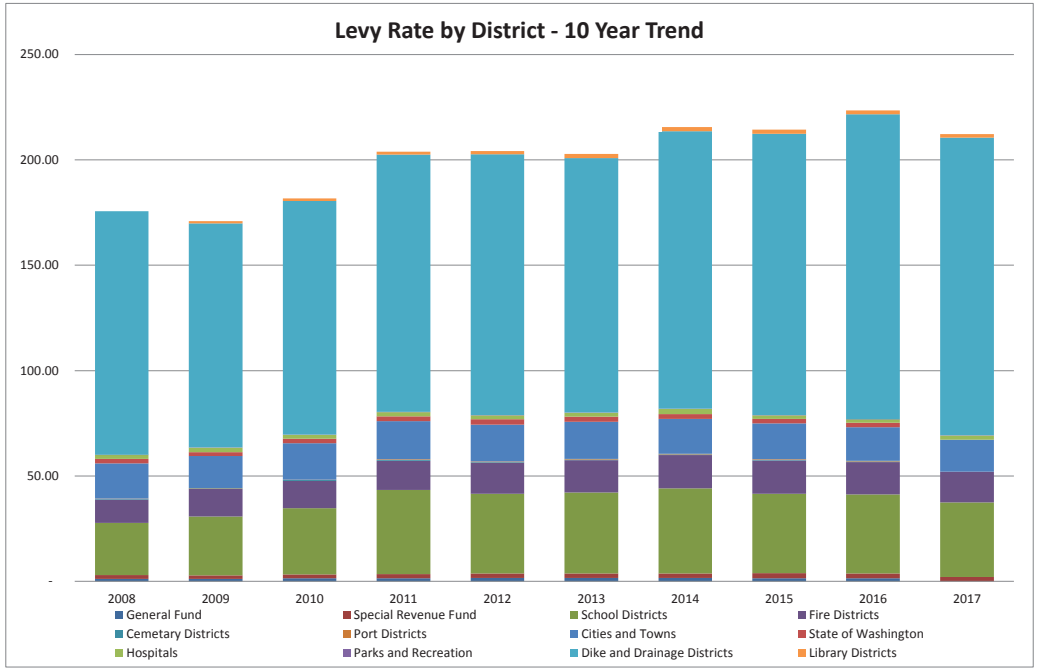
Reference: Skagit County Comprehensive Annual Financial Report

SKAGIT COUNTY, WASHINGTON
PROPERTY TAX RATES - DIRECT AND OVERLAPPING GOVERNMENTS
(Per $1,000 of Assessed Value)
For a Twenty Year Period

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
General Fund	1.21	1.24	1.45	1.55	1.62	1.62	1.59	1.56	1.51	1.44
Special Revenue Fund	1.77	1.66	1.87	1.97	2.19	2.19	2.21	2.39	2.24	2.14
Total	**2.98**	**2.90**	**3.32**	**3.52**	**3.81**	**3.81**	**3.80**	**3.95**	**3.75**	**3.58**
School Districts	24.83	27.91	31.39	39.90	37.82	38.30	40.31	37.68	37.45	35.37
Fire Districts	11.04	13.01	13.01	13.83	14.65	15.38	15.83	15.69	15.42	14.60
Cemetary Districts	0.29	0.29	0.34	0.35	0.36	0.35	0.29	0.28	0.27	0.26
Port Districts	0.20	0.20	0.20	0.30	0.30	0.30	0.32	0.31	0.32	0.30
Cities and Towns	16.72	15.12	17.26	18.09	17.41	17.64	16.51	17.03	15.97	15.17
State of Washington	2.01	1.96	2.21	2.37	2.55	2.41	2.30	2.15	2.04	2.89
Hospitals	2.01	2.06	1.80	1.93	1.82	1.80	2.47	1.74	1.68	1.95
Parks and Recreation	0.07	0.07	0.11	0.11	0.14	0.14	0.14	0.13	0.13	0.13
Dike and Drainage Districts	115.53	106.39	110.89	122.14	123.86	120.73	131.67	133.44	144.56	141.22
Library Districts	-	1.05	1.25	1.31	1.41	1.94	1.99	1.94	1.88	1.73
Total	**175.68**	**170.96**	**181.78**	**203.86**	**204.13**	**202.80**	**215.63**	**214.34**	**223.47**	**217.21**

Source: *Skagit County Assessor*

Note: *The County may levy up to $1.80 per $1,000 of assessed valuation for general government services, subject to Washington State law, RCW 84.55.010 and the Washington State Constitution. See Note IV A, Property Taxes.*



Reference: Skagit County
Comprehensive Annual Financial Report

Appendix D Letters of Support

2113 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225-2605

DISTRICT OFFICES:
119 N. COMMERCIAL STREET, SUITE 1360
BELLINGHAM, WA 98225
(360) 733-4500

2930 WETMORE AVENUE, SUITE 9F
EVERETT, WA 98201
(425) 252-3188

E-Mail: Rick.Larsen@mail.house.gov
http://larsen.house.gov

RICK LARSEN
2ND DISTRICT, WASHINGTON

COMMITTEES:
TRANSPORTATION
AND INFRASTRUCTURE

ARMED SERVICES

Congress of the United States
House of Representatives
Washington, DC 20515–4702

December 29, 2017

Captain Rachel Rowe
Ferry Operations Division Manager
Skagit County Public Works
500 I Avenue
Anacortes, WA 98221

Dear Captain Rachel Rowe:

I am writing to express my support for the Guemes Island Ferry Replacement Project. The M/V Guemes was built and put into service in 1979, and provides the only transportation on and off Guemes Island in Skagit County, Washington. This project would replace the M/V Guemes with an all-electric passenger ferry, creating a more efficient, sustainable and safe passenger ferry service for the people of Skagit County.

M/V Guemes operates 365 days a year and transports roughly 200,000 vehicles and 400,000 passengers annually. Elliot Bay Design Group's commissioned study found that an immediate or near-term replacement of the M/V Guemes would minimize the cost of ownership and allow for significant environmental improvements to the ferry. Building an all-electric vessel would reduce Carbon Dioxide emissions by approximately 619,359 kg while lowering the operational cost of the vessel and maintaining a high standard of safety and reliability. As the first all-electric passenger ferry in the United States, further exemplifying Washington states' commitment to protecting the environment and becoming leading investors in tomorrow's technology.

For these reasons, the Guemes Island Ferry Replacement project is an important undertaking for Skagit County. I support this project and look forward to its completion.

Sincerely,

Rick Larsen

Rep. Rick Larsen
United States Congress
Washington State, 2nd District

Samish Indian Nation
OF WASHINGTON

July 10, 2018

Skagit County Commissioners
Administration Building
1800 Continental Place
Mount Vernon, WA 98273

Re: Letter in Support of Electric Ferry

Dear Commissioners:

I write in strong support of the Guemes Island Ferry Replacement Project. The M/V Guemes was built and put into service in 1979, and provides the only transportation on and off Guemes Island. This project would replace the M/V Guemes with an electric ferry, creating a more efficient, sustainable, reliable, and safe ferry service for the people of Skagit County.

Building an electric vessel would reduce carbon dioxide emissions while lowering the operational cost of the vessel and maintaining a high standard of safety and reliability.

As the first electric ferry in the United States, this Project would further exemplify Skagit County's commitment to protecting the environment and in becoming a leader in investing in tomorrow's technology.

For these reasons, the Guemes Island Ferry Replacement Project is an important undertaking for Skagit County. We support Skagit County's innovative approach to replacing the aging M/V Guemes and the County Commissioner's willingness to embrace new technology and network with industry leaders.

Sincerely,

Thomas Wooten
Samish Chairman

MAILING ADDRESS: P.O. BOX 217 • ANACORTES, WA 98221
OFFICE: 2918 COMMERCIAL AVE. • ANACORTES, WA 98221
PHONE: (360) 293-6404 • FAX: (360) 299-0790 • www.samishtribe.nsn.us

EDASC
Economic Development Association of Skagit County

July 13, 2018

Skagit County Commissioners
Administration Building
1800 Continental Place
Mount Vernon, WA 98273

RE: Letter in Support of Electric Ferry

Dear Commissioners:

On behalf of the Economic Development Alliance of Skagit County (EDASC), I write in strong support of the Guemes Island Ferry Replacement Project. The M/V Guemes, nearly 40 years old and nearing the end of its useful life, provides the only transportation on and off Guemes Island. This project would replace the M/V Guemes with an all-electric ferry, creating a safer, quieter, more efficient, sustainable, and reliable ferry service for the people of Skagit County.

Building an all-electric vessel would reduce carbon dioxide emissions, lower fuel use and operational costs, and be quieter, safer and more reliable for passengers and the community. Also, as the first new all-electric ferry in the United States, the project would exemplify Skagit County's commitment to the environment and clean tech, thereby likely attracting attention from other green companies and projects to our area. Particularly given our focus on maritime, this would shine a spotlight on Skagit County and identify us as a trend-setter in sustainability and conservation. Also, for a rural, beautiful, pristine island such as Guemes, this all-electric replacement project fits perfectly.

For these and many other reasons, the Guemes Island Ferry Replacement Project is an important undertaking for Skagit County. We support Skagit County's innovative approach to replacing the ready-to-retire M/V Guemes, and the County's willingness to embrace new technology, funding opportunities, and partnerships with maritime industry leaders.

Sincerely yours,

John B. Sternlicht

John B. Sternlicht
CEO

(360) 336-6114 fax: (360) 336-6116 | 204 West Montgomery | P.O. Box 40 | Mount Vernon, WA 98273 USA | www.skagit.org

Washington State
Department of Transportation

WSDOT Ferries Division (WSF)
2901 3rd Avenue, Ste. 500
Seattle, WA 98121-3014
206-515-3400
TTY: 1-800-833-6388
www.wsdot.wa.gov/ferries

July 10, 2018

Skagit County Commissioners
Administration Building
1800 Continental Place
Mount Vernon, WA 98273

Re: Letter in Support of Electric Ferry

Dear Commissioners:

I write in strong support of the Guemes Island Ferry Replacement Project. The M/V Guemes was built and put into service in 1979, and provides the only transportation on and off Guemes Island. This project would replace the M/V Guemes with an all-electric ferry, creating a more efficient, sustainable, reliable, and safe ferry service for the people of Skagit County.

Building an all-electric vessel would reduce carbon dioxide emissions while lowering the operational cost of the vessel and maintaining a high standard of safety and reliability.

As the first all-electric ferry in the United States, this Project would further exemplify Skagit County's commitment to protecting the environment and in becoming a leader in investing in tomorrow's technology.

Washington State ferries is also aggressively pursuing the electrification of its ferry fleet, beginning with the conversion of our three largest ferries in 2021-2023. WSF is committed to collaboration with Skagit County as it pursues this important initiative.

For these reasons, the Guemes Island Ferry Replacement Project is an important undertaking for Skagit County. We support Skagit County's innovative approach to replacing the aging M/V Guemes and the County's willingness to embrace new technology and network with industry leaders.

Sincerely,

Matthew S. von Ruden
Director of Vessel Engineering and Maintenance

GUEMES ISLAND FIRE DEPARTMENT
Lieutenant Tom Fouts

Skagit County Commissioner Ken Dahlstedt
Skagit County Commissioner Lisa Janicki
Skagit County Commissioner Ron Wesen
1800 Continental Place, Suite 100
Mount Vernon, WA 98273
commissioners@co.skagit.wa.us

Dear Commissioners,

I live on Guemes Island, adjacent to the city of Anacortes on Fidalgo Island in Skagit County, Washington. I have been a volunteer firefighter and EMT as a second career for close to 20 years. I have been fortunate enough to receive extensive training in hazardous materials, marine rescue, wildfire, high angle rescue, bomb school, terrorist incidents, and incident management.

I am writing this plea from the perspective of emergency preparedness and response.

The Guemes Island five-minute, twenty-car ferry of forty years is approaching the end of its useful life. Over time, this ferry has become the only Skagit County marine conveyance in a public service role in our area except for a small personal-rescue boat operated by Guemes Island volunteer fire department. The Coast Guard has left our community. The sheriff's boat is stationed in La Conner and is not always manned.

Our marine community has two major refineries for processing Alaskan crude oil. It has a dry bulk hazardous materials facility. It has a significant shipyard. Our community has three large marinas. We also have significant fish processing plants, as well as a state ferry terminal that serves the San Juan Islands and Victoria, BC.

To compound this situation, Fidalgo Island has only two means of ingress and egress. One road is adjacent to the two refineries; the other road passes over the Deception Pass Bridge that is adjacent to Ault Field Naval Air Station on Whidbey Island. Should any of these facilities have a significant event, our community would be severely compromised, and the Guemes Island roll-on, roll-off open ferry would be quickly pressed into public service she has not planned for.

Skagit County has been engaged in a process to replace the Guemes Island ferry with a new, larger, and more capable ferry. This process has been stymied by the costs of real estate and the taxes it demands. Because our area serves working people and provides military housing, these costs have made monies for a ferry replacement very dear. In an attempt to attract funds for the replacement of the Guemes ferry, our county has been trying to secure grant monies. Ideas to attract grant monies have focused on the concept of an electric ferry.

Guemes Island has been an advocate of alternate energy for more than twenty years. Efforts on Guemes include alternate energy education projects for over twenty years, several wind mills, fire department solar backup power, church solar system, and about

one hundred home-owner solar projects. All this has been accomplished with a year-round population of about eight hundred residents. The idea of an electric ferry sits well in this environment and bodes well for what could be America's first experiment with an electric car ferry.

I think there are several reasons the US is delinquent in efforts to promote an electric ferry, geography and need being paramount. The Jones Act and yard costs are others. Our community has done significant world-wide research on electric ferries and has found that US resources—intellectual, physical, and financial—have gravitated to other areas of the world to pursue electric-powered marine vehicles, including electric ferries. There are over one hundred and sixty electric-powered boats under construction around the world, including fifty-eight ferries, according to a recent article in *Bloomberg* (see www.bloomberg.com/news/features/2018-03-13/the-next-ship-you-board-might-run-on-batteries). To my knowledge, no car ferries from the US are among those tabulated.

I think it is about time we get our feet wet and sponsor an all-electric ferry under the Jones Act in America. I think we, Skagit County, have the project to support. We currently have a thirty-percent design for a thirty-two car ferry. This ferry will have about a five-minute each way run. The short run for this size ferry, and a supportive community, make for an excellent cost-effective proof-of-concept project.

The outcome of this project would provide an avenue for a whole new design field. It will provide boat yards with the experience to expand their abilities. The spin offs will inspire initiative for other ferries to explore electric repower projects, as Washington State ferries are beginning to do now. Advanced battery technology will also benefit from marine influence.

I must admit my own reasons for supporting this ferry revolve around emergency services. I am reasonably sure Skagit County vision does not revolve around my reasons, but I hope they will be considered by them in their electric-ferry design. Too little is done in our country these days concerning civil defense, and this is one small local project that could support that goal, as well as opening the door to electric-powered ferries.

We seldom think of ancillary concerns when we are focused on grant requests. In the case of public service assets, situations may occur that trump the original focus of the grants. This electric-ferry proposal has the potential to influence an industry, and do yeoman's work in times of need. I think it is an excellent candidate for BUILD grant monies.

Sincerely,

Tom Fouts, Lieutenant, Guemes Island Fire Department

Cc: Rachel Rowe, Skagit County Ferry Operations Division Manager
Dan Berentson, Skagit County Public Works Director

SCOG
SKAGIT COUNCIL OF GOVERNMENTS
315 South Third Street, Suite 100 • Mount Vernon • WA • 98273 www.scog.net

June 28, 2018

Skagit County Commissioners
Administration Building
1800 Continental Place
Mount Vernon, WA 98273

Re: Letter in Support of Electric Ferry

Dear Commissioners:

On behalf of the Skagit Council of Governments, I am writing to express my support for the Guemes Island Ferry Replacement Project. The M/V Guemes was built and put into service in 1979, and provides the only transportation on and off Guemes Island. The Guemes Island Ferry Replacement Project would replace the M/V Guemes with an all-electric ferry, creating a more efficient, sustainable, reliable, and safe ferry service for the people of Skagit County.

Building an all-electric vessel would reduce carbon dioxide emissions while lowering the operational cost of the vessel and maintaining a high standard of safety and reliability.

As the first all-electric ferry in the United States, this project would further exemplify Skagit County's commitment to protecting the environment and in becoming a leader in investing in tomorrow's technology.

Skagit Council of Governments works with Skagit County on regional planning efforts, and they have been an effective partner in implementing the region's vision for the transportation network. Listed in the 2018-2023 Regional Transportation Improvement Program, the Guemes Island Ferry Replacement Project is a regionally significant project that will help meet the present and future needs of Skagit County residents.

For these reasons, the Guemes Island Ferry Replacement Project is an important undertaking for Skagit County. We support Skagit County's innovative approach to replacing the aging M/V Guemes Ferry, and the County's willingness to embrace new technology and

Sincerely,

Kevin Murphy
Executive Director
Skagit Council of Governments

Laurie Gere, Mayor

CITY OF ANACORTES
904 6th Street Anacortes, WA 98221
p: 360-299-1950 | f: 360-299-1938
laurieg@cityofanacortes.org | www.anacorteswa.gov

July 11, 2018

Skagit County Commissioners
Administration Building
1800 Continental Place
Mount Vernon, WA 98273

Re: Letter in Support of Electric Ferry

Dear Commissioner Wesen, Commissioner Dahlstedt, and Commissioner Janicki:

I write in strong support of the Guemes Island Ferry Replacement Project. The M/V Guemes was built and put into service in 1979, and provides the only transportation on and off Guemes Island. This project would replace the M/V Guemes with an all-electric ferry, creating a more efficient, sustainable and safe ferry service for the people of Skagit County.

Building an all-electric vessel would reduce carbon dioxide emissions by approximately 619,359 kg while lowering the operational cost of the vessel and maintaining a high standard of safety and reliability.

As the first all-electric ferry in the United States, this Project would further exemplify Skagit County's commitment to protecting the environment and in becoming a leader in investing in tomorrow's technology.

For these reasons, the Guemes Island Ferry Replacement Project is an important undertaking for Skagit County. We support Skagit County's innovative approach to replacing the aging M/V Guemes and your willingness to embrace new technology and network with industry leaders.

Sincerely,

CITY OF ANACORTES

Laurie Gere
Mayor

Cc: Fred Buckenmeyer

City of
MOUNT
VERNON

June 14, 2018

Skagit County Commissioners
Administration Building
1800 Continental Place
Mount Vernon, WA 98273

Re: Letter in Support of Electric Ferry

Dear Commissioners:

I write in strong support of the Guemes Island Ferry Replacement Project. The M/V Guemes was built and put into service in 1979, and provides the only transportation on and off Guemes Island. This project would replace the M/V Guemes with an all-electric ferry, creating a more efficient, sustainable, reliable, and safe ferry service for the people of Skagit County.

Building an all-electric vessel would reduce carbon dioxide emissions while lowering the operational cost of the vessel and maintaining a high standard of safety and reliability.

As the first all-electric ferry in the United States, this Project would further exemplify Skagit County's commitment to protecting the environment and in becoming a leader in investing in tomorrow's technology.

For these reasons, the Guemes Island Ferry Replacement Project is an important undertaking for Skagit County. We support Skagit County's innovative approach to replacing the aging M/V Guemes and the County's willingness to embrace new technology and network with industry leaders.

Sincerely,

Jill Boudreau
Mayor

Port of Skagit

July 3, 2018

Skagit County Commissioners
Administration Building
1800 Continental Place
Mount Vernon, WA 98273

Re: Electric Ferry

Dear Commissioners:

This letter is in support of the Guemes Island Ferry Replacement Project. This project would replace the M/V Guemes with an all-electric ferry, creating a more efficient, sustainable, and reliable ferry service for the people of Skagit County.

This project is an important undertaking for Skagit County. I support Skagit County's innovative approach to replacing the aging ferry and the County's willingness to embrace new technology and network with industry leaders.

Sincerely,

Patricia H. Botsford-Martin
Executive Director

PHBM/ksh

WHATCOM COUNTY
PUBLIC WORKS DEPARTMENT

Jon Hutchings
DIRECTOR

ADMINISTRATION
CIVIC CENTER
322 N. Commercial Street, Suite 210
Bellingham, WA 98225-4042
Telephone: (360) 778-6200
FAX: (360) 778-6201
www.whatcomcounty.us
JHutchin@co.whatcom.wa.us

Dan Berentson
Director of Public Works
Skagit County
1800 Continental Place
Mount Vernon, WA 98273

RE: Support for CFCIP proposal

Dear Mr. Berentson,

The purpose of this letter is to express Whatcom County's support for financial assistance to Skagit County's Ferry Replacement Project through the County Ferry Capital Improvement Program (CFCIP).

Whatcom County and Skagit County have similar transportation needs and currently operate similar models of ferry service. We have committed to achieving greater service stability and better pricing of system improvements by maintaining close alignment and coordination. We expect future benefits of improved interoperability to include mutual aid agreements for emergency operations, leveraging better pricing for back up ferry services during dry dock and other maintenance outages, enhancing local technical knowhow for new ferry technologies, and sharing operational knowledge.

With these expectations in mind, our respective ferry system managers intend to leverage cost benefits for planned vessel replacements. Like Skagit County, Whatcom County is currently reviewing service levels and assessing needs in anticipation of upgrading its ferry and docking systems during the next ten years. We are positioning to apply for County Road Administration Board CFCIP in 2021.

Whatcom County looks to continue a strong partnership with Skagit County and the County Road Administration Board as we examine how to cost effectively recapitalize our local ferry service. That partnership relies heavily on shared knowledge and resources. We welcome and strongly support CFCIP funding to move Skagit's replacement program forward.

Sincerely,

Jon Hutchings,
Whatcom County Public Works Director

San Juan County Council

RICK HUGHES – CHAIR

District #2

350 Court Street, No. 1, Friday Harbor, WA 98250

Off: (360) 378-2898 Direct: (360) 370-7474

December 18, 2017

Mr. John Koster
Executive Director
County Road Administration Board
2404 Chandler CT SW, Suite 240
Olympia, WA 98502-0913

John:

Congratulations on being named Executive Director of the County Road Association Board. I look forward to working with you on CRAB sponsored projects and initiatives.

I am writing to you on behalf of the San Juan County Council to register our strong support for Skagit County's Application for County Ferry Capital Improvement Funds for a new all-electric vessel to serve the Anacortes-Guemes Island run.

The County believes the development of an all-electric ferry here in Washington State is a prime opportunity to show-case new transportation technology; an opportunity that shouldn't be missed. The benefits of an all-electric ferry are manifold when compared to an existing fossil fuel ferry: 1) a reduction in carbon based emissions, 2) positive public perception of electricity as a clean fuel source, and 3) a real world opportunity to study an alternative, and possible replacement, fuel source.

If the new all-electric ferry proves useful and dependable, then there is certainly a good chance that the Washington State Ferry system as well as the other Ferry Districts in the state, will want to learn from Skagit County's innovative experience.

I urge you to take into consideration San Juan County's support for Skagit County's application for capital funding.

Thank you again for your time and consideration.

Best regards,

Rick Hughes
Chair
San Juan County Council
District #2, Orcas/Waldron Island

60 Washington Ave. Ste. 200
Bremerton, WA 98337
Phone: 360.479.6962
Fax: 360.377.7086

www.kitsaptransit.org

July 10, 2018

Skagit County Commissioners
Administration Building
1800 Continental Place
Mount Vernon WA 98273

Re: Letter in Support of Electric Ferry

Dear Commissioners:

I write in strong support of the Guemes Island Ferry Replacement Project. The M/V Guemes was built and put into service in 1979, and provides the only transportation on and off Guemes Island. This project would replace the M/V Guemes with an all-electric ferry, creating a more efficient, sustainable, reliable, and safe ferry service for the people of Skagit County.

Building an all-electric vessel would reduce carbon dioxide emissions while lowering the operational cost of the vessel and maintaining a high standard of safety and reliability.

As the first all-electric ferry in the United States, this Project would further exemplify Skagit County's commitment to protecting the environment and in becoming a leader in investing in tomorrow's technology. Along these lines, Kitsap Transit will soon put into service a hybrid vessel on our water route between Bremerton and Port Orchard.

For these reasons, the Guemes Island Ferry Replacement Project is an important undertaking for Skagit County. We support Skagit County's innovative approach to replacing the aging M/V Guemes and the County's willingness to embrace new technology and network with industry leaders.

Sincerely,

John W. Clauson
Executive Director

ACES
Northwest Network

December 14, 2017

Mr. John Koster
Executive Director
County Road Administration Board
2404 Chandler CT SW, Suite 240 Olympia, WA 98502-0913

Dear John:

I write in strong support of the application by Skagit County for County Ferry Capital Improvement funds for a new <u>all-electric vessel</u> to serve the Anacortes-Guemes Island run.

On behalf of two organizations I represent, we are impressed with the data-driven, deep international research conducted by Skagit County, the political leadership, budget discipline and environmental commitment by the County Commission and the broad based community support for this exciting new technology.

Since 1994, as a private, non-profit transportation policy center, the Cascadia Center has advocated and participated in sustainable transportation initiatives from Vancouver, B.C. to Eugene, Oregon. As a charter member of the Farmhouse Gang of North Sound Communities, we showcased the Skagit electric ferry proposal to regional leaders at the Farmhouse meeting in March and to state and industry leaders in October at the Ferry Conference in Seattle – to positive reactions.

Cascadia also staffs the newly formed ACES NW Network, a private coalition of technology companies co-chaired by Tom Alberg from the Madrona Venture Group and Bryan Mistele from INRIX – a world wide traffic data management company. ACES stands for Autonomous Connected Electric and Shared and we believe the Skagit electric ferry proposal will jump start electrification of marine propulsion in the Salish Sea that saves fuel/maintenance costs and gives a noise break to orcas.

Today I heard Amy Scarton, director of WSFerries brief the Joint Transportation Commission on new initiatives including propulsion conversion to hybrid electric.

Your Skagit County colleagues can make this clean, green and smart vision a reality.

Sincerely,
Bruce Agnew
Director, Cascadia Center

ORCAS POWER & LIGHT COOPERATIVE

July 9, 2018

Skagit County Commissioners
Administration Building
1800 Continental Place
Mount Vernon, WA 98273

Re: Letter in Support of Electric Ferry

Dear Commissioners:

I write in strong support of the Guemes Island Ferry Replacement Project. The M/V Guemes was built and put into service in 1979 and provides the only transportation on and off Guemes Island. This project would replace the M/V Guemes with an all-electric ferry, creating a more efficient, sustainable, reliable, and safe ferry service for the people of Skagit County.

Building an all-electric vessel would reduce carbon dioxide emissions while lowering the operational cost of the vessel and maintaining a high standard of safety and reliability.

As the first all-electric ferry in the United States, this Project would further exemplify Skagit County's commitment to protecting the environment and in becoming a leader in investing in tomorrow's technology.

This Project will provide valuable information for other agencies who are considering replacing their ferries with all-electric (i.e. Washington State Ferries). Any information gleaned from this Project will undoubtedly benefit future projects in Washington State and the U.S. as Skagit County blazes a trail for others to follow.

For these reasons, the Guemes Island Ferry Replacement Project is an important undertaking for Skagit County. We support Skagit County's innovative approach to replacing the aging M/V Guemes and the County's willingness to embrace new technology and network with industry leaders.

Sincerely,

Foster Hildreth

Foster Hildreth
General Manager

Eastsound Headquarters
183 Mt Baker Road
Eastsound WA 98245-9413
phone: 360-376-3500
fax: 360-376-3505

www.opalco.com

Friday Harbor Office
1034 Guard Street
Friday Harbor, WA 98250-9240
phone: 360-376-3550
fax: 360-376-3548

Philips Publishing Group

December 4, 2017

County Road Administration Board
2404 Chandler Ct. SW,
Olympia, WA 98502

Dear Board,

I write today in support of Skagit County's effort to replace their 38-year-old Guemes Island Ferry with a more fuel efficient, and perhaps all-electric new vessel.

My company publishes several trade publications for the maritime industry and hosts annual conferences ranging from fisheries to ferries.

At our annual *FERRIES Conference,* held October 19, 2017 in Seattle, we asked Skagit County Public Works Director Dan Berentson to participate in a panel discussion on Ferry Operations facilitated by David Mosely, with Michael Gougherty with Water Emergency Transportation Authority, and Amy Scarton, Assistant Secretary for the Ferries Division of the Washington State Department of Transportation. We were impressed by the county's progress on this ferry project.

We also hosted Skagit County and other communities at a recent round table on marine transit held last month in Tacoma.

We support Skagit County's innovative approach to replacing their aging vessel and their willingness to embrace new technology and network with industry leaders.

With this funding, Skagit County would be well on the way to a cleaner more efficient vessel as well as building momentum for a cleaner and greener future for our marine highways.

Please support Skagit County's grant application.

Sincerely,

Peter Philips,
President

Philips Publishing Group * 4257 24th Ave. West, WA, Seattle, 98199
P: 206-284-8285 * F: 206-284-0391

GARY NOBLE CURTIS
GARY@gncurtis.com
4792 West Shore Road
Anacortes, WA 98221

Consulting
Structural Engineer
Office (360) 299 0419
Cell (562) 537 7287

July 13, 2018

Skagit County Commissioner Ken Dahlstedt
1800 Continental Place, Suite 100
Mount Vernon, WA 98273

Dear Commissioner Dahlstedt:

I am writing in support of the concept of a new Electric Ferry for Guemes Island. At some time in the not too distant future it will be necessary to replace the existing ferry and it appears that this is an opportune time to make this happen, and with advanced technology. In my opinion reverting to the fossil fuel past would be a mistake.

Guemes Island residents have been on the forefront of renewable energy use and production projects for many years helping to advance the applications of these technologies. An electric ferry is a natural fit to this inclination. A new electric ferry will help advance the technology, act as proof of concept, reduce fossil fuel consumption and the resulting air pollution and CO2 emissions, reduce noise to both passengers and crew; basically, a very environmentally friendly project. It seems to me that there will also be a substantial economic benefit as the price of fossil fuels rise. I think the County Staff has done an excellent job in evaluating these issues.

Having spent too much time waiting in the ferry line it would also be of personal benefit to me if a substantially larger ferry were built. Some contributors to the wait are the large delivery or service trucks that seem to share the times I need to use the ferry. My time and the service contractors time has some professional value that is wasted or charged to island residents. A number of contractors decline work on the island for this reason. That loss of competition is a well hidden but real cost.

In short, if our country and state do not help develop these technologies I am sure that China will.

Sincerely

Gary N Curtis
Structural Enginner
Served on Guemes Island Organization Boards over 23 years:
GIPAC, GIET, GICCA, GICC, SCVC (and consultant to the Space Needle renovation project)

cc: Rachel Rowe

Ryan Monahan
6167 S Shore Road
Anacortes WA 98221

July 16, 2018

Skagit County Commissioners
1800 Continental Place, Suite 100
Mount Vernon, WA 98273

Dear Skagit County Commissioners:

I am writing in support of Skagit County's application for a BUILD grant to help finance the replacement of the 39-year-old M/V *Guemes* ferry with a new electric ferry.

The estimated useful life of a new ferry will be 40 years. Because of the need to control harmful emissions and protect our planet, many modes of transportation are already moving to electric, battery-powered propulsion systems. Replacing the diesel-powered Guemes Island ferry with an all-electric or plug-in electric hybrid makes sense economically and environmentally—now rather than later.

As a resident of Guemes Island, I depend on safe and reliable transportation. Not only have we been experiencing month-long maintenance-and-repair haul-outs and unexpected outages, where our only transportation off the island is a passenger-only ferry, but the current capacity of 21 vehicles is often exceeded. This requires lining up for our five-minute crossing up to two hours early in order not to miss an important meeting or doctor's appointment or get to work late.

I've been a full time resident of Guemes Island for the past four years but I've been visiting my whole life since my family has been on the island since the 1930's. I have the unique perspective of visiting on weekends for many years and now relying on the ferry for my daily commute. In order for the island to continue being a viable option for me I strongly support a larger ferry. This will improve accessibility and reliability for full time residents as well as for family and friends when they visit.

The Washington State County Road Administration Board recently recommended that up to $7.5 million be allocated to help fund this viable ferry replacement project. I am asking for your assistance and support in shepherding Skagit County's BUILD grant application through the U.S. Department of Transportation's channels to a successful conclusion so that we will have adequate and modern transportation for the next four decades.

Sincerely,

Ryan Monahan
HR Manager
PACCAR Technical Center

July 16, 2018

J. Forrest Nelson
4884 North Indian Village Lane
Anacortes, WA 98221

Skagit County Commissioners
1800 Continental Pl #100
Mt Vernon, WA 98273

RE: Guemes Island Ferry Replacement

Dear Skagit County Commissioners:

I am long time (since 1958) part-time/summer resident of Guemes Island. I plan to retire to Guemes in the next two or so years.

I want to formally express my appreciation and support for Skagit County's effort to seek funding for a replacement Guemes Island ferry which is...

- Electric or Electric Diesel Hybrid – We do not need to continue using non-renewable fuels whose emissions contribute to air pollution and sea level rise
- Larger capacity which will shorten wait times and allow easier loading including large trucks and RV vehicles
- ADA accessible
- Greater foot traffic capacity including carts, bicycles, and ADA mobility devices
- Greater and more comfortable seating capacity
- New propulsion systems will increase speed and enhance maneuverability
- A new vessel will be better handle the weather and rough seas frequently experienced in Guemes Channel

Please do let me know how I might be able to aid in supporting this effort going forward.

Sincerely,
J. Forrest Nelson
206 972 6808

July 11, 2018

Skagit County Commissioner Ken Dahlstedt
Skagit County Commissioner Lisa Janicki
Skagit County Commissioner Ron Wesen
1800 Continental Place
Mount Vernon, WA 98273

Re: Replacement of the Guemes Ferry

Dear Commissioners,

As a full-time resident of Guemes Island and president of the Guemes Island Community Center Association, I want to express my gratitude to you and Skagit County Public Works for your tireless efforts to bring a new, modern and reliable ferry to Guemes Island. Your investigative process for determining our current and future needs has been transparent and inclusive. I am greatly encouraged by the decision of the Washington State County Road Administration Board (CRAB) to recommend allocation of up to $7.5 million to this ferry replacement project. I support your efforts and application to the U.S. Department of Transportation for another allocation through the BUILD Grant.

The Guemes Island Community Center is the heart of our community, providing a venue for many social, educational and organizational activities. Our facility also stands ready for use as an emergency shelter in the event of an area-wide emergency. All of these needs require planning for the future as our population increases and demographics change. It is imperative that our transportation needs also change to meet the future requirements for essential services.

The increased reliability of an electric ferry is critical to individuals and businesses on the island. Unplanned or extended ferry outages negatively affect the services that can be provided to our residents. There are a number of home businesses, farms, ranches as well as several commercial orchards that depend on the predictable transport of goods to and from the island. Every morning brings a string of construction vehicles and service trucks coming to Guemes Island. When we lose our car ferry for even a day, our island workers and those coming from surrounding communities face lost productivity. Mail and package delivery is also negatively impacted.

Increased capacity of a new ferry would address concerns that we islanders have regarding long waits in ferry lines. Many Guemes residents commute to jobs on the mainland. We also have no regular medical or veterinary services on the island. Appointments in town sometimes require waiting through several ferries to ensure getting to an appointment or job on time. A ferry with greater capacity would provide more timely access to medical services and jobs.

One of my additional responsibilities on the island is as coordinator of CERT (Community Emergency Response Team). We have a network of neighborhood volunteers who will follow procedures to assist emergency responders if we face a major catastrophe. Planning for the worst-case scenario includes potential evacuation of the entire island. A larger capacity and more reliable ferry would help to provide this function.

As residents of Guemes we value the rural character of our island. This does not mean we shun progress. The ferry is our umbilical cord keeping our community connected to vital services. Whether it is our young people going to the mainland for school, workers commuting to jobs or our elderly needing frequent and reliable access to medical care, modern transportation is a necessity. Many in this community are hoping that the BUILD Grant will add resources to the CRAB monies and put us well on our way to building a new electric ferry.

Best regards,

Barbara Ohms
President, Guemes Island Community Center Association

July 13, 2018

Dear Commissioners:

We strongly support Skagit County's application for a BUIILD grant to help finance the replacement of the 39 year old Guemes ferry with a new electric ferry.

We are concerned that our current ferry's useful life is approaching its expected end. It makes little sense to continue pouring money into an already outdated mode of transportation.

This Island's long standing advocacy of environmental responsibility which attracted us 26 years ago still exists. We believe that most Islanders would favor an electric ferry for obvious environmental and economic reasons.

We see the Guemes ferry as just a part of Skagit County's transportation system; albeit, a vital part for Islanders and many others. The addition of an electric ferry to Skagit County's transportation system would breathe new life into our environmental commitment, not just on Guemes, but regionally and farther. Guemes has an established legacy of environmental sustainability that would be even more profound with the advent of an electric ferry. Some of us are elders now, but we can imagine what a positive impact an electric ferry will have as the age of fossil fuel dependency fades. Our island lies in close proximity to a deep water port and we can envision a time in the near future when ships will leave Anacortes bearing renewable energy products rather than fossil fuel products. And workers will ride home on an electric ferry which will directly connect this Island's legacy of environmental concern with a future of environmental progress. It will also stimulate this region economically, so that, we do not fall behind as the energy transition takes place. The port of Anacortes will attract workers to sustainable industries, as the shipping and infrastructure is already present. Thus, the electric ferry would become a beacon of environmental and economic sustainability for our entire region. We hope you are doing everything possible to make the electric ferry a reality.

Connie and Bob Snell
Guemes Island

Skagit County Commissioner Ken Dahlstedt
Skagit County Commissioner Lisa Janicki
Skagit County Commissioner Ron Wesen
1800 Continental Place, Suite 100
Mount Vernon, WA 98273

Dear Skagit County Commissioners,

I am writing in support of Skagit County's application for a BUILD grant to help finance the replacement of the 39-year-old M/V *Guemes* ferry with a new electric ferry.

As a resident of Guemes Island, I depend on safe and reliable transportation. Unless one has a private boat, the Skagit County ferry is the only access to and from Guemes Island. There are no marinas or docks on Guemes Island, and pleasure boating is very seasonal. There is no airfield on Guemes Island, only a private emergency helicopter landing.

Over the past several years, we have been experiencing month-long or more maintenance and repair haul-outs and unexpected outages, during which our only transportation off the island is a passenger-only ferry. The current capacity of 21 vehicles is often exceeded. This requires lining up for our five-minute crossing up to two hours early in order not to arrive at work late or miss an important meeting or doctor's appointment.

As the former editor-in-chief and lead reporter of Guemes Island's community newspaper, it was my job to know the people and community of Guemes Island well.

Island demographics are currently in flux. In 2006, seventy percent of Guemes Island shoreline property was owned by people 65 years of age or older. Development pressure is increasing as people are being priced out of affordable homes in the greater Seattle metropolitan area. Those who work in the Seattle area and have greater discretionary incomes are looking for second homes and island retreats. On Guemes Island, we are about halfway through a major transfer of property, along with all the consequences such a change entails in socioeconomics and the ratio of permanent residents.

Already the island has shifted from one where many young families raised children. There are currently fewer than 25 such families on the island. There are fewer people who commute daily to work; a larger number of folks have their own businesses that operate from here or are island-based. Mostly, we are aging retirees, with a diverse mix of backgrounds and economic standing. Above all else, we value our natural resources and the beauty of our rural character and our supportive community.

For our aging population, the reliability and appropriate capacity of the Guemes Island ferry is crucial to meet our healthcare needs. There are no medical services on Guemes Island. People must travel to Anacortes, Mount Vernon, Bellingham, Everett, and Seattle—up to 80 miles away—to receive medical care. There are no grocery, drug,

hardware, or clothing stores on Guemes Island. Some islanders have been forced to move off the island because the unreliability of the ferry made it too dangerous to remain when they had serious health concerns. Only last month, someone had to be helicoptered off the island for a medical emergency because the ferry was unexpectedly out of service for several hours.

As a population ages, passenger ferry service becomes more important. The current passenger cabin is small and is often crowded, requiring people to stand outside without shelter. Passengers must enter and exit the ferry on the car deck, which delays loading and increases safety concerns. The current ferry is not ADA compliant. The lack of safe and adequate passenger space results in fewer transportation choices for older people with canes, walkers, wheelchairs, failing eyesight, or other chronic and disabling conditions or injuries. Taxi and bus service is available in Anacortes, but getting there as a passenger may be impossible. During our almost annual month-long haul-outs for our aging ferry, the passenger-only boat is extremely unsuitable for many elders in inclement weather, which is frequent during the fall or spring haul-outs. The stairs into the cabin are steep and easy to trip over and most of the deck is uncovered, with only two benches that seat six people.

These conditions are also troublesome for young families. There are no schools on Guemes Island; students must be bussed to Anacortes for school. After-school activities require alternate private transportation. An unexpected ferry breakdown is traumatic for parents and children, as happened recently.

For our business people, farmers, and ranchers, reliable ferry service is an absolute necessity. We need to receive supplies and transport products in a timely manner. We need affordable delivery and freight services and providers who service machinery, do construction, repair plumbing and electrical problems, and deliver refrigerated goods. Many service providers refuse to come to Guemes Island because the ferry waits are too long and unreliable. They can't afford to be stuck on Guemes Island.

Emergency services require reliable and safe ferry service. Guemes Island experienced an active shooter who attempted homicide and committed arson a few years ago. The entire Skagit County sheriff's department and 30 law enforcement vehicles were mobilized on the island for 12 hours. Two years later, a structure fire required more than 100 emergency responders, 23 emergency vehicles, personnel from 13 fire districts, and 28 ferry runs in a 12-hour period. Medical emergencies require immediate transport to Anacortes or Seattle. Our volunteer fire department, while adequately trained and prepared, is small. During a dry summer, a fire could easily spread across the island and require an island-wide evacuation. So could an accident at one of the two nearby oil refineries. We need adequate capacity and a reliable ferry for emergencies.

Time is valuable. The longer ferry-line waits for islanders and service providers due to inadequate capacity or unexpected delays waste time and money.

The estimated useful life of a new ferry will be at least 40 years. Because of the need to control harmful emissions and protect our planet, many modes of transportation are already moving to electric, battery-powered propulsion systems. A locally constructed

electric ferry would provide our ports and shipyards an economic opportunity to expand their expertise in a technology with a guaranteed future. Already other countries are moving rapidly to zero-emission, battery-powered ferries and marine vessels. The Skagit County Ferry Replacement Project could be the first electric car ferry in the country.

A larger, environmentally sustainable ferry with adequate and safer passenger accommodations and reliable modern technology will increase the quality of life for Guemes Island residents and visitors and could provide economic opportunities for the entire region. Replacing the diesel-powered Guemes Island ferry with an all-electric or plug-in electric hybrid makes sense economically and environmentally—*now* rather than later.

Sincerely,

Edith Walden

Cc: Rachel Rowe, Skagit County Ferry Operations Division Manager
Dan Berentson, Skagit County Public Works Director
Paul Randall-Grutter, Skagit County Engineer

From: Jessica Lynch <jessica@slowshirts.com>
Sent: Saturday, July 14, 2018 2:34 PM
To: Commissioners <commissioners@co.skagit.wa.us>
Subject: Guemes Island ferry - BUILD grant

Dear Ken,

I am a 20 year resident of Guemes Island, writing in support of Skagit County's application for a BUILD grant to help finance the replacement of the 39-year-old M/V Guemes ferry with a new electric ferry.

The estimated useful life of a new ferry will be 40 years. Because of the need to control harmful emissions and protect our planet, many modes of transportation are already moving to electric, battery-powered propulsion systems. Replacing the diesel-powered Guemes Island ferry with an all-electric or plug-in electric hybrid makes sense economically and environmentally—now rather than later, as our older Ferry has been assessed to last only another 13 years at most in good standing. This ferry would pave the way for a cleaner future for our children as well.

As a full time resident of Guemes Island, I depend on safe and reliable transportation. Not only have we been experiencing month-long maintenance-and-repair haul-outs and unexpected outages, where our only transportation off the island is a passenger-only ferry, but the
current capacity of 21 vehicles is often exceeded. This requires lining up for our five- minute crossing up to two hours early in order not to miss an important meeting or doctor's appointment or get to work late.

When I was pregnant with my daughter, I'd often have to get in line 3 hours before my scheduled Doctors appointment in Mt. Vernon just to to be sure I could arrive in time. If you do not have the means to have a second car that you keep on the Anacortes side, this is often the route you have to take. When the ferry is in haul-out we have to share a car with others, and hey- It works, but dang it can be tricky when we all have kids schedule we are also juggling! It becomes a hardship when a good portion of your day is wasted sitting in line just to make it on a scheduled trip over. This is obviously something you learn to expect and live with being an island resident, but when minute waits have now turned to hours to cross the mile wide channel, more and more often, it has become difficult to navigate successfully.

The Washington State County Road Administration Board recently recommended that up to $7.5 million be allocated to help fund this viable ferry replacement project. I am asking for your assistance and support in shepherding Skagit County's BUILD grant application through the U.S. Department of Transportation's channels to a successful conclusion so
that we will have adequate and modern
Kind regards,
Jessica Lynch
Guemes Island resident
--
jessica@slowshirts.com
cell: 360.588.0321
www.SlowLorisStudio.com

7238 Square Harbor Lane,
Guemes Island, WA. 98221

From: Phyllis Bravinder <gobravinder@gmail.com>
Sent: Saturday, July 14, 2018 7:39 PM
To: Commissioners <commissioners@co.skagit.wa.us>
Cc: Rachel Rowe <rrowe@co.skagit.wa.us>
Subject: Letter in support of BUILD

This letter is in support of Skagit County's application for a BUILD grant to help finance the replacement of our 39-year-old M/V Guemes diesel ferry with a new all-electric or plug-in electric hybrid ferry. It is time for this technology to be put to use. We would benefit economically and environmentally. Norway in particular, along with other countries, is boldly and effectively leading the way with a proven record of the benefits of electric ferries. We must join this move to the future of marine power.

In the early 1960's not long after getting married, my husband and I visited my parents on Guemes Island. They were in the process of completing their new home here in preparation for retirement. They mentioned that there was some land for sale and we took a look around. I am now living in a house I had built in 2008-2009 on the lot we bought in 1961. What a reward for all those decades paying taxes on 3+ acres of trees and other plants.

As a full time resident of Guemes Island, I rely upon safe, dependable, and timely transportation. Others who live and travel here require that as well. The many small businesses need a reliable ferry service for people and vehicles, as well as to receive and/or to send goods. This is critical to the well-being of a small business. Even one outage can cause an enormous financial loss for a business, e.g., a large wedding, a concert,... As individuals and families, the extended as well as the unexpected outages take a toll on our daily lives and our well-being. One small example of many possibilities: one's water pump goes out during an extended outage. The service trucks cannot get here to assess and repair the issue. Imagine the other possible examples such as trees down in a storm, a spreading fire, extended electricity outages, lack of heating capacity, and so on.

I do not believe there is a need to go into the importance of reliable ferry service for access to medical services, both ongoing and in emergencies. Or in a major catastrophic event such as a massive fire (we've had that here) as mentioned above, an earthquake, or a tsunami.

It is interesting to discover while living here that the community has an exceedingly high level of interest in harnessing renewable energy options such as the wind and the sun. A high proportion of Guemes Island residents have a deep commitment to the environment shown by the utilization of solar panels and wind generation of power. I recently chose to spend money having solar panels installed to use for heating. Why? Because it is the right thing to do for the environment and it will pay off economically.
We need to get away from fossil fuels, most especially diesel and its undeniable pollution of the air and water. To maintain the quality of life and economic sustainability of the island, let's move to the future, not hang on to the past. The economy of Guemes is the ambiance and environment.

Sincerely,

Phyllis D. Bravinder

From: Sally Eagan [mailto:sallyeagan@comcast.net]
Sent: Wednesday, July 18, 2018 4:27 PM
To: Commissioners; Rachel Rowe; Kristine.Lytton@leg.wa.gov; Jeff.Morris@leg.wa.gov
Subject: Support for Skagit County BUILD Grant

July **18**, 2018

I am writing in support of Skagit County's application for a BUILD grant to help finance the replacement of the 39-year-old M/V *Guemes* ferry with a new electric ferry.
The estimated useful life of a new ferry will be 40 years. Because of the need to control harmful emissions and protect our planet, many modes of transportation are already moving to electric, battery-powered propulsion systems. Replacing the diesel-powered Guemes Island ferry with an all-electric or plug-in electric hybrid makes sense economically and environmentally—now rather than later.

As a resident of Guemes Island, I depend on safe and reliable transportation. Not only have we been experiencing month-long maintenance-and-repair haul-outs and unexpected outages, where our only transportation off the island is a passenger-only ferry, but the current capacity of 21 vehicles is often exceeded. This requires lining up for our five-minute crossing up to two hours early in order not to miss an important meeting or doctor's appointment or get to work late.

The Washington State County Road Administration Board recently recommended that up to $7.5 million be allocated to help fund this viable ferry replacement project. I am asking for your assistance and support in shepherding Skagit County's BUILD grant application through the U.S. Department of Transportation's channels to a successful conclusion so that we will have adequate and modern transportation for the next four decades.

Sincerely, Sally & Jeff Eagan

ELECTRIC FERRY PARTNERSHIP MEETING

SIGN-IN SHEET

Please sign in:	Meeting Date: Tuesday, July 10, 2018, 2:00 PM
	Place/Room: Skagit County Administration Building 1800 Continental Place Mount Vernon, WA 98273

Name – Please Print	Organization/Email Address
FRED BUCKENMEYER	CITY OF ANACORTES
Dan Berentsen	Skagit County
Hollie Anthonysz	Dakota Creek Industries, Inc.
Kevin Murphy	SCOG
Tom Wooten	Samish Indian Nation
Torey Nelson	SC Public Works
Lynn Murphy	PSE
LISA JANICKI	SKAGIT COUNTY
Ron Wesen	" "
William Moon	GLOSTEN wlmoon@glosten.com
Russell Guerry	OPALCO rguerry@opalco.com
Foster Hildreth	OPALCO fhildreth@opalco.com
Phyllis Brevinder	Guemes Island Resident gobrevinder@gmail.com
Lisa Grueter	BERK Consulting lisa@berkconsulting.com
Forrest Jones	Skagit County
Bruce Agnew	Discovery.org
Ken Dahlstedt	
John Sternlicht	EDASC
Elisabeth Klosa	WSDOT
Rachel Rowe Paul Randall-Grutter	

Appendix E Newsletters

Skagit County Ferry Replacement News

June 2018

Commissioners approve surcharge

The Skagit County Board of Commissioners voted unanimously June 18 to adopt a vessel replacement surcharge on Guemes Island Ferry fares; the surcharge takes effect Aug. 1, 2018.

"I don't think there's any perfect answer, but I think we're trying to find an answer we can all live with," said Board of Commissioners Chairman Ken Dahlstedt. "The longer we wait to build, the more expensive it'll get. Assessing a surcharge now allows us to put money in the bank so we can build a vessel that will reliably serve Guemes residents for years."

The surcharge is expected to raise approximately $235,000 annually, which represents an average per-ticket price increase of roughly 20 percent. Review all the options, and the final selection, online: skagitcounty.net/ferryreplacement.

Surcharge timeline

The Commissioners first considered a surcharge on March 26. Following the surcharge proposal, the Board opened a public comment period from March 26 through April 28. Commissioners received 60 comments, as well as in-person feedback at an April 17 public hearing and an April 28 public forum on Guemes Island.

Concerns included the impact of the surcharge on island residents, and that the timing of the surcharge felt rushed. Suggestions included a higher peak-season surcharge, and limiting the surcharge on punch cards to preserve the discounted rate.

The Ferry Division discussed the surcharge with the Commissioners on May 8, and presented three surcharge options on June 12 that took into account public suggestions. The Commissioners then requested a motion be presented on June 18.

Punch card discounts remain

Preserving the discount for punch cards was a key consideration when calculating the surcharge. When it takes effect, the punch card discount will be 10 to 15% during the non-peak season, and 30 to 40% during the peak season. That gives punch card holders between 4 and 9 free trips per punch card depending on the fare category.

We also extended the expiration date for 20-trip vehicle and motorcycle punch cards to 120 days.

Punch cards speed up our loading process, which helps keeps our ferry and our riders on time.

Buying a punch card?

- ▶ You can come to the Anacortes ticket office OR
- ▶ Purchase by mail: skagitcounty.net/PublicWorksFerry/Documents/PunchcardOrderForm.pdf
- ▶ BEST TIME: Preferably between 9 a.m. and 5 p.m. immediately after a sailing from Anacortes OR at least 15 mins before the next sailing.
- ▶ WORST TIME: Less than 5 minutes before the next sailing.

Capt. Rachel Rowe | 360-416-1400 | rrowe@co.skagit.wa.us | www.skagitcounty.net/ferryreplacement

New Guemes Ferry fare schedule

Resolution R20180123

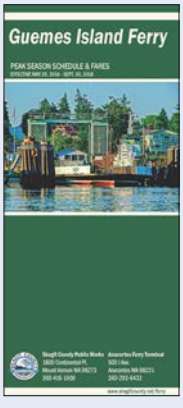
Guemes Island Ferry Fare Schedule				
	Fare schedule (includes surcharge)		Surcharge	
Fares	**Non-peak**	**Peak**	**Non-peak**	**Peak dollar**
Passenger	**Oct 1 thru May 19**	**May 20 thru Sept 30**	**dollar amt.**	**amt.**
Adult passenger	$4.00	$5.00	$1.00	$1.00
Senior (65+yrs) / disabled / youth (6-17yrs) passenger	$2.00	$3.00	$0.00	$0.50
Age 5 & under	Free	Free	Free	Free
Passenger punch cards - valid for 1 year from purchase date				
25-trip adult passenger	$77.00	$77.00	$10.00	$10.00
25-trip senior (65+yrs) / disabled / youth (6-17) passenger	$46.00	$46.00	$6.00	$6.00
Vehicle				
Motorcycle & rider	$7.00	$10.00	$1.00	$2.00
Motorcycle & senior / disabled rider	$6.00	$9.00	$1.00	$2.00
Vehicle & driver (under 20 feet including overhang)	$12.00	$15.00	$2.00	$3.00
Vehicle & senior / disabled driver (under 20 feet)	$10.00	$12.00	$2.00	$2.00
Vehicle & driver punch cards (under 20 feet including overhang) - valid for 120 days from purchase				
20-trip vehicle (under 20') & driver	$196.00	$196.00	$26.00	$26.00
20-trip vehicle (under 20') & senior / disabled driver	$156.00	$156.00	$20.00	$20.00
20-trip motorcycle & rider	$117.00	$117.00	$15.00	$15.00
20-trip motorcycle & senior / disabled rider	$98.00	$98.00	$13.00	$13.00
Vehicle convenience punch cards - valid until used				
***Non-peak 10-trip punch cards are not valid for use during the peak season**				
Peak 10-trip vehicle (under 20') & driver		$150.00		$30.00
Peak 10-trip vehicle (under 20') & senior / disabled driver		$120.00		$20.00
Non-peak 10-trip vehicle (under 20') & driver*	$120.00		$20.00	
Non-peak 10-trip vehicle (under 20') & senior / disabled driver*	$100.00		$20.00	
Oversize vehicles & vehicles w/ trailers (including driver)				
Vehicle over 20 ft to less than 25 ft	$17.00	$21.00	$4.00	$5.00
Vehicle 25 ft to less than 30 ft	$25.00	$30.00	$6.00	$7.00
Vehicle 30 ft to less than 35 ft	$33.00	$39.00	$8.00	$9.00
Vehicle 35 ft to less than 40 ft	$42.00	$51.00	$10.00	$12.00
Vehicle 40 ft to less than 45 ft	$52.00	$64.00	$12.00	$15.00
Vehicle 45 ft to less than 50 ft	$64.00	$78.00	$15.00	$18.00
Vehicle 50 ft to less than 55 ft	$77.00	$94.00	$18.00	$22.00
Vehicle 55 ft to less than 60 ft	$90.00	$109.00	$21.00	$25.00
Vehicle 60 ft to less than 65 ft	$105.00	$129.00	$24.00	$30.00
Each 5 ft increment over 65 ft	$8.00	$8.00	$2.00	$2.00
Over width charge (over 8 ft, 6 in)	Double Length Charge			
Miscellaneous				
Stacked Logging Truck	$124.00	$124.00	$29.00	$29.00
Extended Run (1 run at end of day) plus fare	$120.00	$120.00		
Guemes Special (crew call out) plus fare	$500.00	$500.00		
Charter Rate (3 hr min) plus fare	$1,200.00	$1,200.00		
$ per hour, each additional hour	$400.00	$400.00		

The surcharge and new fare schedule will take effect August 1, 2018.

The Skagit County Board of Commissioners approved two additional fare changes: Extending the expiration of vehicle/motorcycle punch cards from 90 days to 120 days, and removing the fee for bicycles.

The expiration extension on vehicle/motorcycle punch cards begins Aug. 1, 2018. Vehicle/motorcycle punch cards purchased ***prior to August 1*** will expire in 90 days. Vehicle/motorcycle punch cards purchased ***on August 1 and thereafter*** will expire in 120 days. All punch cards purchased between now and August 1 will be valid until expiration. Punch cards may not be returned, exchanged or refunded.

It's time for a change



Since we'll have to reprint a new fare & sailing schedule, we figured it was time to give it a modern, streamlined look. Expect to see a new version of the Guemes Ferry brochure later this summer.

Skagit County
Public Works Department
1800 Continental Place
Mount Vernon WA 98273-5625

Skagit County Ferry Replacement News

EMAIL UPDATES

Subscribe to our Ferry email list today and stay in the loop on new ferry news. We'll send news and important announcements:

1. skagitcounty.net/email
2. Select "Guemes Island Ferry Information"

Ferry Committee/Public Works meeting

What: Discuss the ferry replacement project & ferry ticketing

Who: Guemes Island Ferry Committee & Public Works

When: 2 to 4 p.m. Friday, May 11

Where: Anacortes Library, lobby meeting room

The public is welcome and encouraged to attend.

Skagit County Ferry Replacement News

April 2018

Vessel replacement project update

Skagit County has applied for $10 million through the County Ferry Capital Improvement Program administered by the County Road Administration Board (CRAB). A technical review committee was created to review our project application.

The review process has concluded, and the work from the committee revealed that we have met the technical requirements for the program. Their current recommendation for funding is based on whether or not the county forms a ferry district.

If we form a ferry district, the technical review committee recommends that we be eligible for 50% of the project cost, currently estimated at $10 million (the maximum amount available).

Without a ferry district the committee recommends that we receive 30% of the project cost, currently estimated at $7.5 million. The technical review committee's recommendations have been submitted to the CRAB board; we meet with the CRAB board at their spring meeting on April 19.

The CRAB board could decide on April 19 whether to award Skagit County the funds, or they could wait until their summer meeting in July to make a decision. Either way, funding would not officially be approved by the state legislature, or available to Skagit County, until summer of 2019.

Voice thoughts on proposed surcharge

The Board of Skagit County Commissioners has determined that the M/V Guemes has reached the end of its useful and economic life and needs to be replaced. The Board is considering implementing a ferry vessel replacement surcharge (per RCW 36.54.200). Revenues generated from the surcharge could ***only*** be used for vessel replacement.

The Board is considering a surcharge of $1 per adult passenger fare sold, $0.50 per senior/youth/disabled passenger fare sold, $1 per motorcycle fare sold, $2 per vehicle fare sold and $5 per oversize vehicle fare sold. Frequent-user punch card prices would be adjusted and discounted accordingly.

PUBLIC HEARING

- 9 a.m. Tuesday, April 17
  Commissioners Hearing Room
  1800 Continental Place, Mount Vernon
- Documents: skagitcounty.net/ferry
- Comments: ferrycomments@co.skagit.wa.us

Other proposed changes to the fare schedule include extending the expiration of vehicle punch cards from 90 days to 120 days and eliminating the fee for bicycles.

Capt. Rachel Rowe | 360-416-1400 | rrowe@co.skagit.wa.us | www.skagitcounty.net/ferryreplacement

Preliminary cost estimate for smaller 28-car vessel

At their March 2 meeting with Skagit County Public Works, the Guemes Island Ferry Committee submitted a request to estimate the cost for a 28-car vessel with fewer emergency response design requirements.

Glosten completed this task and presented Skagit County with a preliminary cost estimate. Reducing vessel size by 4 cars represents a 15% reduction in overall capital cost; a 32-car vessel would cost roughly $26 million and a 28-car vessel roughly $22 million.

While the report does not discuss impacts to operational costs, a reduction in vessel size will generally reduce operating costs.

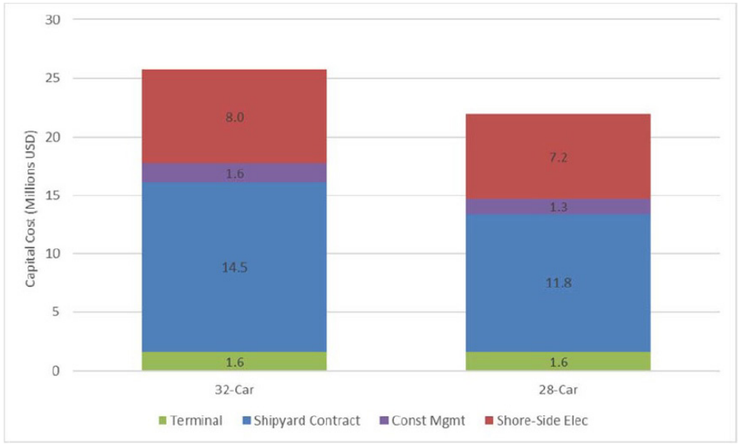


Figure 1 Program capital cost estimate by vessel option

The estimate only evaluates the all-electric propulsion system, anticipating that other propulsion options will scale similarly in terms of cost.

The analysis notes that terminal and dolphin upgrade costs remain the same for a 28-car vessel; costs for shoreside electrical decrease slightly, from $8 million to $7.2 million. The emergency services costs (e.g. a shoreside backup generator) for the vessel remain the same, at $329,000, regardless of vessel size. That amounts to roughly 1% of the overall cost.

While documents we delivered to the CRAB board discuss plans for a 32-car vessel, those are merely concept design documents (30% design) and prove that we have a viable concept, that we need to replace our ferry, and that we have a reasonable plan to fund it. If we get CRAB funding, we can still modify the vessel design. We're only locked into a design when we get to 90% design, which won't be for another year at least.

Vessel Surcharge FAQs

We've tried to answer all your questions in one place online. Visit skagitcounty.net/ferry, scroll down, and click "Skagit County vessel replacement surcharge Q&A."

Here's a sample of your questions & our answers:

Why begin collecting funds for a new ferry when it is far from clear yet that you will find or raise the money to construct a new vessel?

We know that the current vessel will not last forever, and that one day we will need to replace the M/V Guemes. The same goes for all of the equipment Skagit County owns. For example, when we buy a dump truck, we know one day we will need to replace it. It is financially prudent to establish a replacement fund for all County equipment before it needs to be replaced – the ferry is no exception.

Are the funds being collected specifically to be applied to a new vessel?

Yes, funds collected would **only** be used for a new vessel. By law, Public Works cannot use these funds for any other purpose.

How long will the surcharge be in effect?

That's up to the Skagit County Board of Commissioners. We should have instituted a replacement surcharge in 1979, when the current vessel went into service. Because that didn't happen, we bear the full cost of replacement today.

Ferry operating costs reduced by 80 percent on Norway's Ampere

by Edith Walden

In May, the world's first all-electric vehicle ferry, Norway's MS Ampere, will mark the end of its third year of service. The 260-foot vessel carries 360 passengers and 120 cars on its 3.5-mile crossing.

Operator Norled recently announced that the Ampere has reduced operating costs by 80 percent and CO2 emissions by 95 percent, compared to fuel-powered alternatives. In addition to energy costs that are lower than diesel, maintenance costs are also lower because an electric motor is simpler and lasts three times longer than a typical internal combustion engine.

Norway currently has two all-electric car ferries in service and will add 10 more to its fleet this year. Another 60 are planned to be launched by 2021, and by 2023, the country expects its entire ferry fleet to be all-electric or equipped with hybrid technology for longer routes.

Norway's Ampere launched in 2015.
Photo courtesy of Siemens AG

In addition to ferries, all-electric cargo and container ships, canal barges, and supply vessels are in design or ready to launch soon for short routes in Finland, Denmark, Sweden, the Netherlands, and China.

For more information about the Ampere and the world's conversion to electric marine vessels, see:
http://bit.ly/ElectrekArticle
http://bit.ly/YaleEnviroArticle

Ferry public forum set for April 28

We've set our spring ferry public forum for ***1:30 p.m. Saturday, April 28***, at the Guemes Island Community Center, 7549 Guemes Island Road.

Please join Skagit County Commissioners Ken Dahlstedt and Ron Wesen, along with representatives from Skagit County Public Works, for a discussion about the following agenda items:

Ferry replacement project
- SEPA review update
- 28-car ferry preliminary cost estimate

Vessel replacement surcharge
- Proposal details
- Public comment received

Fare Revenue Target Report
- No general fare increase recommended
- Report is available online at skagitcounty.net/ferry.

Longing for the five-cent ferry of 1912?

by Edith Walden

In 1912, the 40-foot Elk went into service between Anacortes and Guemes Island. The Elk could carry 35 passengers and the fare was five cents per one-way passage. The schedule was six trips per day. Five cents in 1912 is equivalent to $12.23 in 2018 for a one-way passenger trip.

In 1916, Charley Gant, editor of the Guemes newspaper, the Beachcomber, wrote this:

"There may come a time when the county will give us a free ferry to Guemes, but that time is not now. And there may come a time when the county will give us no ferry at all. The slogan of the settlers of Guemes and the merchants of Anacortes has been: A five cent ferry making five trips daily. We have secured a five-cent ferry making six trips daily, and it is the best service Guemes has ever had."

Harry Rickaby's Elk was a popular transport for groups out for a picnic on local islands. Here Ben March of Sinclair (Cottonwood) Island is rowing ashore to help ferry passengers to the Elk.

Photo from the March 2012 Guemes Tide courtesy of Mary March Leach, Cottonwood Collection

Skagit County
Public Works Department
1800 Continental Place
Mount Vernon WA 98273-5625

Skagit County Ferry Replacement News

WHAT CAN WE IMPROVE?

► Let's get detailed: What specific changes can we make now and in the future to improve your ferry service?

► Share your thoughts:

publicinput.com/1972

In our first survey, you gave us baseline information about who uses the ferry, when, and why. This new survey asks you more detailed questions that will allow us to better understand the input we have received so we can prioritize specific improvements to the system.

The new ferry will be larger than the current vessel. With that in mind, do you think it's important for the new ferry to still make two round-trips per hour?

- ○ Yes
- ○ Not sure
- ○ No

Vote to view results

FERRY EMAIL UPDATES: ► visit skagitcounty.net/email ► click "Guemes Island Ferry Information"

Skagit County Ferry Replacement News

December 2017

Glosten

First look at new Guemes Ferry design

The Guemes Island Ferry Replacement Concept Design Report is out — which means the new vessel is officially at 30 percent design completion. Probably the most notable part of the 100-plus-page report, however, is the general arrangement drawing. In layman's terms: The first sketches of how the new vessel will look.

Much like the existing vessel, the proposed new ferry will be double ended, with a three-tiered deckhouse on one side, and four vehicle lanes sized for trucks and emergency vehicles.

Overall, the new vessel will be longer and slightly wider than the current ferry, with estimated capacity of 32 vehicles and 150 passengers. Storage areas on either side of the deckhouse are intended for bicycles, handcarts or other items.

The Concept Design Report also takes an in-depth look at the benefits and tradeoffs of five different propulsion types — starting with the current geared diesel system, and expanding to consider diesel-electric, series hybrid, plug-in hybrid and all-electric propulsion.

To give context to each of the propulsion systems, Glosten implemented a scoring system (taking into consideration weight, complexity, reliability and other factors) to weigh the strengths and drawbacks of each type of propulsion.

Glosten also prepared a Transportation System Assessment and a Vessel Capacity Study, both of which lay the foundation for the concept design report.

All three reports are available online at skagitcounty.net/ferry. Click "Ferry Replacement Project" and scroll down below the concept design image to read the PDF reports.

Capt. Rachel Rowe | 360-416-1400 | rrowe@co.skagit.wa.us | skagitcounty.net/ferryreplacement

Presentations, audio from Nov. 2 meeting now online

Approximately 106 people joined the Skagit County Board of Commissioners, Public Works and representatives from ferry consultant Glosten at a public meeting Nov. 2 at the Guemes Island Community Center. The Board discussed funding considerations, while Glosten addressed specific questions relating to ferry design and capacity. Find links to presentations and audio from the Nov. 2 meeting online: skagitcounty.net/ferry and click "Ferry Replacement Project."

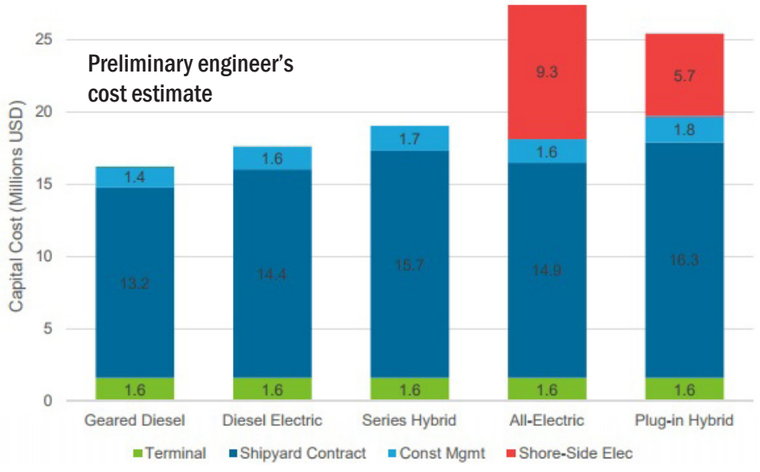
Glosten delivers ferry specifics to Board

The Board of Commissioners heard updates on the process to design a new Guemes Ferry from design consultant Glosten at a special presentation Nov. 21.

Glosten discussed in detail the concept design report and preliminary cost estimates for five separate propulsion system options. At the Dec. 1 Ferry Committee/Public Works meeting, Glosten presented this information to interested committee members and roughly 30 attendees from the public.

Glosten calculated the propulsion system capital costs (including shoreside infrastructure) for all five propulsion options, and applied a preliminary weighted scoring system to each to assist the County in selecting the most viable option. Weighting factors included air emissions, design/build complexity, reliability and more.

The study also found vessel capital costs to be similar regardless of propulsion type; additional costs come into play for shoreside infrastructure, fuel and/or electric costs, and mid-life repowering, whether to an engine or for battery replacement.



Applying a weighted scoring system to the cost of each propulsion system shows that all-electric has a higher initial capital cost but significantly lower operating cost. A plug-in hybrid has similar operating costs but lower capital costs. And a geared diesel system has higher maintenance and operational costs.

Watch the entire presentation at http://bit.ly/GlostenPresentNov21 or review presentation materials online at http://bit.ly/GlostenNov21.

Phase 2: Estimated Project Schedule

Project Tasks	Jan.	Feb.	March	April
Preliminary design				
Public outreach				
Add'l CRAB reporting				
Vessel funding research				

Now what? Next steps after CRAB application

We're applying for up to $10 million in funding from the County Ferry Capital Improvement Program, administered by the County Road Administration Board (CRAB). The application will be submitted by the December 31 deadline.

During the first three months of 2018, Glosten and Skagit County will present the Guemes Ferry Replacement Project to a technical advisory committee that will conduct our application review.

Once the review has been conducted, the committee will issue a written report to CRAB. At their spring meeting in April, CRAB may decide to act on our funding request; however, they could wait as late as the summer meeting, in July.

Submitting application materials to CRAB for the new Guemes Ferry simply means that Skagit County believes it has a viable project that could be eligible for funding; it doesn't mean that any final decisions have been made. The concept design report, which represents 30 percent design completion, provides specifics to decision-makers at the state level.

No decisions have been made on a propulsion system; all five options are included in the application packet.

Once we submit the application, we will continue our search for other funding sources, begin work on preliminary design (once a propulsion system has been selected), and continue our public outreach efforts.

Public meeting

Join the Skagit County Board of Commissioners, Public Works and Glosten for a public meeting to discuss next steps AND learn about the ferry operations survey:

- January 25, 2018
- 5:30 p.m.
- Guemes Island Community Center

Will there be a ferry taxing district?

It's still unknown whether we will, if we legally can, or if we need to form a ferry taxing district to meet county contributions to receive the maximum amount of CRAB funding. This will continue to be a discussion as we move forward with our funding request to CRAB.

We are asking for the CRAB board's discretion in how we generate these funds. We are also waiting for the Legislature to provide possible action on bills that define taxing districts and how they are formed.

We will keep this dialogue open with residents and ferry riders.

Skagit County
Public Works Department
1800 Continental Place
Mount Vernon WA 98273-5625

Skagit County Ferry Replacement News

GIVE US YOUR FERRY INPUT

► We have a NEW way for you to share feedback.

► Please take our survey about your current ferry use AND share ideas for the new ferry:

publicinput.com/1970

What is the most important thing Skagit County should consider in a new ferry?

64%	Reliability	81
17%	Cost/affordability	21
12%	Environmentally friendly	15
6%	More capacity for vehicles & motorcycles	8
1%	Quietness	1
0%	More capacity for walk-ons & bicycles	0

FERRY EMAIL UPDATES: ► visit skagitcounty.net/email ► click "Guemes Island Ferry Information"

Skagit County Ferry Replacement News

October 2017

Join the Skagit County Commissioners, Public Works Department and naval architect Glosten for a public forum on ferry operations.

The meeting is set for 5:30 p.m. Thursday, Nov. 2, at the Guemes Island Community Center, 7549 Guemes Island Road.

Agenda items include an operations update (ridership and revenue statistics, as well as revenue target report), conceptual design and cost estimate for the Guemes parking lot project, and an update on the ferry replacement project from Glosten's Will Moon.

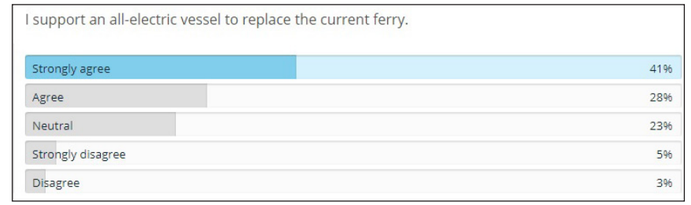
For more on the replacement project, see our project schedule update on page 3.

Share your input on ferry replacement

At the Aug. 29 public meeting on Guemes, folks told us that they'd like to see an online system for public input.

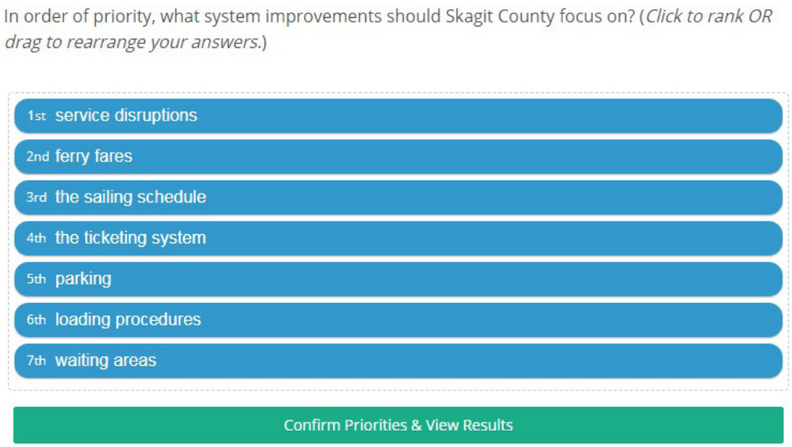
Last month, we partnered with publicinput.com to launch a site where we can share information and gather input for the ferry replacement project. It's important that we can effectively engage with you and get your feedback.

Cont. on page 2



A question from the current survey is shown above. When you pick an answer to any of the survey questions, you instantly get to see the results. As more of your friends and neighbors take the survey, we'll get better data. To take the survey right now, simply scan the QR code shown to the right or visit publicinput.com/1970.

Capt. Rachel Rowe | 360-416-1400 | rrowe@co.skagit.wa.us | www.skagitcounty.net/ferryreplacement



Haven't taken the survey? Got 5 minutes? Go to publicinput.com/1970. This initial survey has 10 questions. Your responses are anonymous.

Some questions that have multiple answers require you to click "View Results" in order to see the tally of responses.

If you have already taken the survey, you can reopen it, and your results will appear. This allows you to track new comments and respond.

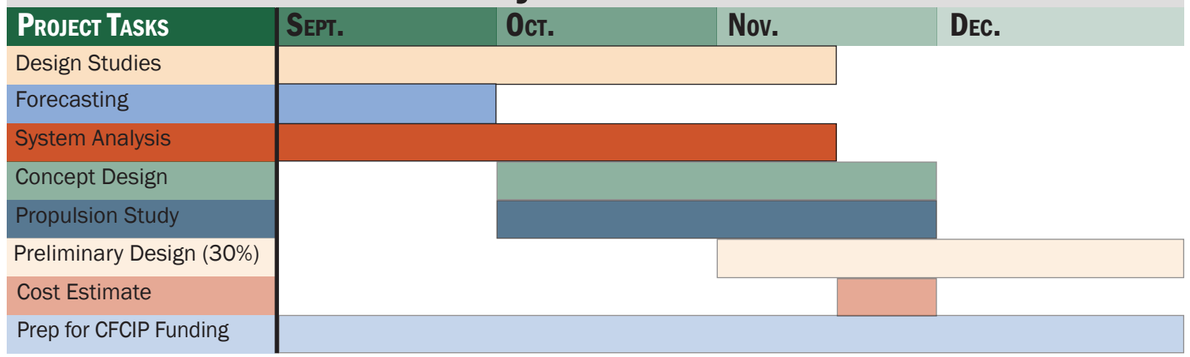
We need your input: Survey is fast, simple

From page 1

In the coming months, we'll post project updates, and you can take surveys and see feedback submitted by your neighbors. Skagit County and Glosten will answer technical questions and follow the discussion.

We have a survey open right now at publicinput.com/1970. So far, we have had 142 participants. In order to have a valid response group, we need to hear from more of you. Preliminary decisions that will shape the next 40 years are happening now. Your voice is needed.

Phase 1: Estimated Project Schedule



Ferry Committee Meeting

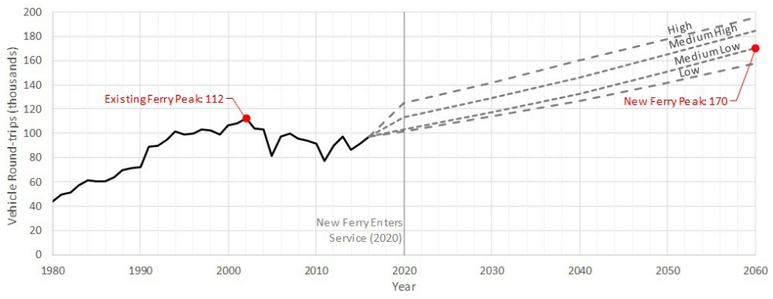
The next Ferry Committee meeting with Public Works is **2-3:50 p.m. Friday, Nov. 3,** at the Anacortes Library. The meeting is located in the meeting room inside the lobby and is open to the public. Feel free to join us; the focus is the ferry replacement project.

Ferry concept design work currently underway

Concept design is currently underway. During this process, Glosten is determining all the things the new vessel will need to do and be. Concept sketches will define how the vessel will look and feel. The initial design studies will look at vehicle and passenger capacity, level of service, terminal interface, propulsion options, life-cycle costs, basic arrangements, weights, stability, etc.

The vessel capacity study is available for review online at bit.ly/GuemesFerryReplacement.

The purpose of this report is to calculate capacity for a new ferry, based on past ridership and estimates for future ridership. This report might change as we proceed with further design studies.



Based on historic and current data, Glosten projects annual vehicle ridership to be approximately 170,000 by the year 2060, an increase of 74% over current levels.

The new ferry is proposed to carry 32 vehicles and is intended to be in service from 2020 to 2060. Vehicle ridership has increased 158% from 1980 to its peak in 2002. Passenger ridership increased 101% from 1980 to its peak in 2007. Today, 0.001% of all ferry trips are likely to contain a full load of passengers, and 22% of all ferry trips are likely to contain a full load of vehicles. Based on these percentages, the new ferry's capacity is dominated by vehicle demand.

Glosten developed a ridership forecasting model that accounts for local population, fares and parking at the terminals. Increasing population increases ridership; increasing fares reduces ridership; and increasing parking reduces vehicle ridership. Glosten found that these three factors have statistically significant impacts on ridership.

Forecasting rider, vehicle use through 2060

Based on historic and current data, Glosten projects a vessel that carries 32 vehicles will serve most effectively until the year 2060.

Glosten's ridership forecast used low-, medium- and high-population projections that were prepared by Skagit County's Planning Department. The most likely outcome is the medium-population projection. Skagit County has chosen to pursue the medium-low outcome for planning purposes. As shown, annual vehicle ridership is forecasted to be approximately 170,000 in 2060, an increase of 74% over 2016 levels.

Glosten scaled the capacity of the new vessel by using the ratio of the existing vessel's ridership in its busiest year to the forecasted ridership in 2060. A capacity of 32 vehicles matches Skagit County's medium-low forecast target. Glosten is calculating the maximum number of vehicles that could be carried while maintaining a schedule of two round-trips per hour.

Skagit County has an opportunity to apply for up to $10 million in grant funding through the County Ferry Capital Improvement Program. The application is due December 31. This is an aggressive schedule, but we are confident we will be ready.

Skagit County Ferry Replacement News

September 2017

Public meeting recap

The Skagit County Commissioners and Glosten thank the approximately 180 people who attended the Aug. 29 community meeting on Guemes Island to discuss the Ferry Replacement Project.

An explanation as to why the M/V Guemes needs to be replaced kicked off the meeting. Due to its advanced age, and the high cost of operating and maintaining the vessel beyond its useful life, Skagit County has determined an immediate need to replace the vessel.

The Commissioners' vision is to replace the M/V Guemes with an all-electric, battery-powered vessel. They approved a one-year, $513,742 contract with Seattle-based naval architecture firm Glosten on Aug. 7 to begin design and analysis of a new vessel. Preliminary design, including propulsion system options, structure, mechanical and electrical systems, and 3D modeling, is expected to be complete by Dec. 31, 2017. A new vessel could be in service as early as 2020.

Completing the preliminary design before the end of the year allows the County to apply for up to $10 million in reimbursable funding for the project from the state's County Ferry Capital Improvement Program. Funding through the CFCIP program is only available once every four years.

Staff from Skagit County Public Works and naval architect Glosten explained the process of studying and beginning design of a new vessel.

Audio and video recordings of the meeting and PowerPoint presentations, including notes about the project, can be found online at http://bit.ly/GuemesFerryReplacement. You can also can find frequently asked questions and peruse comments submitted after the meeting.

Ferry Committee meetings set

The Guemes Island Ferry Committee and staff from Skagit County Public Works met Friday, Sept. 1, at the Anacortes Library to discuss the Guemes Ferry Replacement Project, among other topics.

The Ferry Committee and Public Works representatives will meet monthly to focus on progress with the Ferry Replacement Project. Future meetings at the Anacortes Library are scheduled from 2 to 3:50 p.m. on the following dates:

- ► Friday, Oct. 6
- ► Friday. Nov. 3
- ► Friday, Dec. 1

The listed Ferry Committee meetings with Public Works are open to the public.

GIVE US YOUR FERRY INPUT

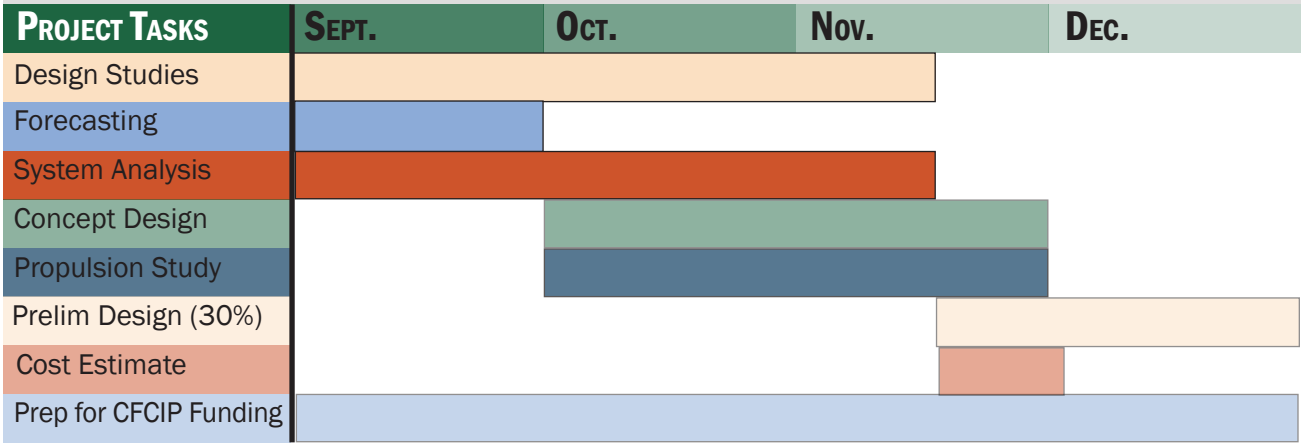
► We have a NEW way for you to share feedback.

► Please take our survey about your current ferry use AND share ideas for the new ferry:

publicinput.com/1970

Capt. Rachel Rowe | 360-416-1400 | rrowe@co.skagit.wa.us | www.skagitcounty.net/ferryreplacement

Phase 1: Estimated Project Schedule



Brush up on electric ferries

Electric vessel technology isn't new, but it's making a comeback. The links below give you an inside look into electric propulsion and how it's being used:

► **All-electric: The Future of Ferry Propulsion** (Pacific Maritime Magazine, March 2017; bit.ly/2vPG1sz)

► **Two massive ferries are about to become the biggest all-electric ships in the world** (Electrek, August 2017; bit.ly/2y0glen)

► **Setting a Course for Carbon-Free Shipping** (Siemens; http://sie.ag/2y3kcYd)

Electric boats: An old idea?

Electric boats have been around since the 19th century. The first recorded launch of an electric boat was September 1838 on the Neva River in Russia. The 28-foot paddleboat carried 14 passengers and used zinc batteries that weighed almost 400 pounds.

The invention and later improvement of rechargeable batteries in the 1860s led to commercial production of electric boats. Electric vessels flourished from the 1880s to the 1920s when the internal combustion engine began its ascendance as a popular marine propulsion choice.

The Buena Vista ferry began service across the Willamette River in Oregon in 1852 and converted to overhead electric wires in 1937. Its current all-electric vessel went into service in 2011, powered by an electric cable from shore. The Wheatland and Canby ferries, in operation since 1844 and 1914, respectively, currently use all-electric cables to carry up to nine cars and 49 passengers across the Willamette River.

The Ampere, the world's first all-electric, battery-operated car and passenger ferry, was launched in Norway in May, 2015. Two 780-foot, 8,414-ton car and passenger ferries will launch soon to service a 2.5-mile route from Sweden to Denmark.

Ferry replacement funding

The potential sources of funding that the County is actively pursuing include the following:

• Department of Ecology - Volkswagen Settlement Funds

• County Ferry Capital Improvement Program (CFCIP)

In April 2017, Public Works presented the Guemes Ferry Replacement Project to the County Road Administration Board (CRAB) for the purpose of asking them to issue a call for projects for the CFCIP.

At the meeting, CRAB issued a call for projects.

Project applications are due Dec. 31.

CFCIP funding

► Maximum award funding is $10 million, provided the County contribute a cost share.

► $10 million would be paid out at no more than $500,000/year for a 20-year period.

FERRY EMAIL UPDATES: ► visit skagitcounty.net/email ► click "Guemes Island Ferry Information"

Appendix F Quality of Life Data

U.S. Census Bureau, OnTheMap Application and LEHD Origin-Destination Employment Statistics
BG 1 (Tract 9501, Skagit, WA) from Census Block Groups

Job Counts in Work Blocks by Distance Only

	2015	
	Count	Share
Total All Jobs	351	100.0%
Less than 10 miles	85	24.2%
10 to 24 miles	83	23.6%
25 to 50 miles	29	8.3%
Greater than 50 miles	154	43.9%

Jobs by NAICS Industry Sector

	2015	
	Count	Share
Agriculture, Forestry, Fishing and Hunting	10	2.8%
Mining, Quarrying, and Oil and Gas Extraction	0	0.0%
Utilities	1	0.3%
Construction	30	8.5%
Manufacturing	36	10.3%
Wholesale Trade	7	2.0%
Retail Trade	42	12.0%
Transportation and Warehousing	13	3.7%
Information	8	2.3%
Finance and Insurance	9	2.6%
Real Estate and Rental and Leasing	6	1.7%
Professional, Scientific, and Technical Services	15	4.3%
Management of Companies and Enterprises	1	0.3%
Administration & Support, Waste Management and R	12	3.4%
Educational Services	28	8.0%
Health Care and Social Assistance	45	12.8%
Arts, Entertainment, and Recreation	14	4.0%
Accommodation and Food Services	33	9.4%
Other Services (excluding Public Administration)	13	3.7%
Public Administration	28	8.0%
Total All Jobs	351	100.0%

Job Counts in Work Blocks by Distance Only

	2015	
	Count	Share
Total All Jobs	351	100.0%
Less than 10 miles	85	24.2%
10 to 24 miles	83	23.6%
25 to 50 miles	29	8.3%
Greater than 50 miles	154	43.9%

Jobs Counts by Places (Cities, CDPs, etc.)

Where Workers are Employed - All Jobs	2015 Count	2015 Share
Anacortes city, WA	54	15.4%
Seattle city, WA	51	14.5%
Bellingham city, WA	24	6.8%
Mount Vernon city, WA	18	5.1%
Bellevue city, WA	13	3.7%
La Conner town, WA	7	2.0%
Redmond city, WA	6	1.7%
Arlington city, WA	5	1.4%
Marysville city, WA	5	1.4%
Bremerton city, WA	4	1.1%
All Other Locations	164	46.7%
Total All Jobs	351	100.0%

Analysis Type	Distance/Direction
Selection area as	Home
Year(s)	2015
Job Type	All Jobs
Selection Area	1 (Tract 9501, Skagit, WA) from Census Block Groups
Selected Census Blocks	51
Analysis Generation Date	07/03/2018 02:02 - OnTheMap 6.5
Code Revision	d6ec994dcb416ba9b4b1b8cb2b4d690f01609fc9
LODES Data Version	20160219

Source: U.S. Census Bureau, OnTheMap Application and LEHD Origin-Destination Employment Statistics
(Beginning of Quarter Employment, 2nd Quarter of 2002-2015).

Taxable Retail Sales

Year: 2013AN
Location: Unincorporated Skagit County
Tax Type: Sales
NAICS Code: All
Sum By: All

D = Records not disclosable due to confidentiality requirements

Year	Tax Type	NAICS	Total Taxable	Units	Uninc TRS/ Business
Unincorporated Skagit County					
2013 Annual	Sales	All NAICS	$294,190,084	6,394	$46,010

Source: http://apps.dor.wa.gov/ResearchStats/Content/TaxableRetailSalesLocal/Report.aspx

Guemes 2013 TAXABLE_AL	Guemes Records	Guemes Percent of Uninc Sales	Guemes Percent Unic Businesses	Guemes TRS/ Business
$ 2,881,698.00	50	0.98%	0.78%	$57,634

Source: Washington Department of Revenue 2014, point data summarized to address privacy

Appendix G Guemes Island Ferry Replacement Project (Electric) Inclusion in State and Local Planning Documents

Appendix G. Ferry Replacement Project inclusion in State and Local Planning Documents

Row #	Agency	Document	Description	Minor Amendment Status
1.	Skagit County	2016 Comprehensive Plan Chapter 8: Transportation Goals and Policies: Ferry Service – 8A-5 / Appendix C https://www.skagitcounty.net/CompPlan	The 2016 Plan Appendix C indicates the project includes $12,500,000 in federal and state funds to replace or modify the current Guemes Island ferry.	Amend Plan 2019 with County Plan docket.
2.	Skagit County	2018–2023 Capital Facilities Plan https://www.skagitcounty.net/CapFacilitiesPan	Page 36 lists several Ferry proposals including the Ferry Replacement with $10M in cost in 2018.	Amend Plan Fall 2018 with County Plan docket.
3.	Skagit County	2018-2023 Transportation Improvement Program https://www.skagitcounty.net/2018-2023SixYearTIP	Guemes Ferry Boat Replacement or Overhaul/Modifications $20,000,000	Administrative Modification Completed on June 26, 2018 to update the project description and cost: Guemes Ferry Boat Replacement (Electric) $21,704,000
4.	Skagit County	Fourteen Year Ferry Capital Improvement Plan 2018-2031 https://www.skagitcounty.net/FYFCIP	Vessel Replacement Value $20,000,000.	Amend Fall 2018 Guemes Ferry Boat Replacement (Electric) $21,704,000

Row #	Agency	Document	Description	Minor Amendment Status
5.	Skagit Council of Governments, Metropolitan Planning Organization	Skagit 2040 Regional Transportation Plan http://www.scog.net/MTP-RTP/RegionalTransportationPlan_Approved.pdf	Section 7: Financial Constraints Financial Strategy: "This priority includes securing near-term revenue to maintain local transit operations, replace aging ferry …"	Update the project description and cost: Guemes Ferry Boat Replacement (Electric) $21,704,000 Amendment completion date in 2019.
6.	Skagit Council of Governments, Metropolitan Planning Organization	Regional Transportation Improvement Program 2018-2023 http://www.scog.net/RegionalTIP2018-2023.pdf	Guemes Ferry Boat Replacement or Overhaul/Modifications $20,000,000	Administrative Modification Requested on June 26, 2018 to update the project description and cost: Guemes Ferry Boat Replacement (Electric) $21,704,000 Likely amendment completion date in August 2018.
7.	Washington State Department of Transportation	Washington State Statewide Transportation Improvement Program 2018 to 2021 Page 1215 http://www.wsdot.wa.gov/LocalPrograms/ProgramMgmt/STIP.htm	Guemes Ferry Boat Replacement or Overhaul/Modifications $20,000,000	Guemes Ferry Boat Replacement (Electric) $21,704,000 completion date in August 2018.

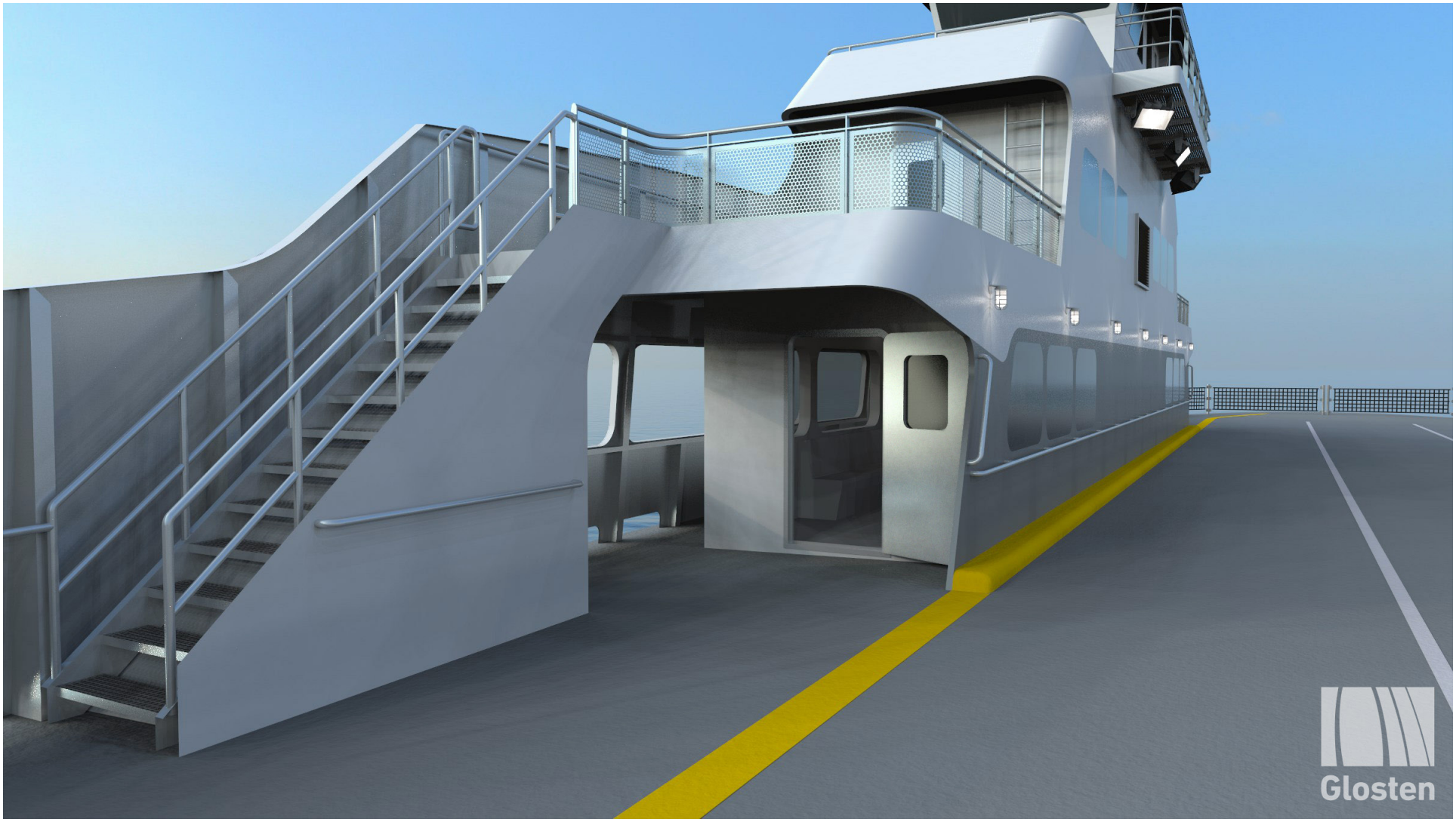
Appendix H 32-Car Electric Ferry Renderings


Glosten


Glosten


Glosten


Glosten


Glosten

Appendix I BCA Worksheets

Capital Costs

UPDATED: July 18, 2018

Description	Category	2018	2019	2020	2021	Total Cost
Total Replacement Cost		**$372**	**$750**	**$13,080**	**$7,503**	**$21,704**
Vessel Total		**$221**	**$445**	**$9,540**	**$5,478**	**$15,685**
Vessel Consti County Oversight	*Vessel Construction*	$0	$0	$179	$104	$283
Design and F Vessel Design	*Design and Preliminary Work*	$221	$445	$41	$0	$707
Vessel Consti Construction Management	*Vessel Construction*	$0	$0	$358	$207	$565
Shipyard Contract		$0	$0	$8,962	$5,168	$14,130
Vessel Consti Bonding and Risk Insurance	*Vessel Construction*	$0	$0	$177	$102	$279
Vessel Consti Material Markup	*Vessel Construction*	$0	$0	$424	$244	$668
Vessel Consti Estimating Allowance	*Vessel Construction*	$0	$0	$1,404	$810	$2,214
Vessel Consti Shipyard Engineering and Services	*Vessel Construction*	$0	$0	$1,185	$684	$1,869
Vessel Consti Structure	*Vessel Construction*	$0	$0	$1,728	$997	$2,725
Vessel Consti Propulsion	*Vessel Construction*	$0	$0	$799	$460	$1,259
Vessel Consti Electric Plant	*Vessel Construction*	$0	$0	$1,291	$744	$2,035
Vessel Consti Command and Surveillance	*Vessel Construction*	$0	$0	$490	$282	$772
Vessel Consti Auxiliary Systems	*Vessel Construction*	$0	$0	$511	$295	$806
Vessel Consti Outfit and Furnishings	*Vessel Construction*	$0	$0	$953	$550	$1,503
Shoreside Electrical Total		**$106**	**$214**	**$2,595**	**$1,485**	**$4,398**
Shore-side El Utility Connection	*Shoreside Electrical Improvements*	$0	$0	$62	$36	$98
Shore-side El County Oversight	*Shoreside Electrical Improvements*	$0	$0	$49	$29	$78
Design and F Permitting	*Design and Preliminary Work*	$12	$25	$2	$0	$39
Design and F Shoreside Design	*Design and Preliminary Work*	$94	$189	$17	$0	$300
Shoreside Electrical Subtotal		$0	$0	$2,463	$1,421	$3,884
Shore-side El Infrastructure	*Shoreside Electrical Improvements*	$0	$0	$1,650	$952	$2,602
Shore-side El Charging Apparatus	*Shoreside Electrical Improvements*	$0	$0	$667	$384	$1,051
Shore-side El Emergency Services Generator	*Shoreside Electrical Improvements*	$0	$0	$147	$84	$231
Terminal Improvements Total		**$45**	**$91**	**$945**	**$540**	**$1,621**
Terminal Imp County Oversight	*Terminal Improvements*	$0	$0	$18	$11	$29
Design and F Terminal Design	*Design and Preliminary Work*	$45	$91	$8	$0	$145
Terminal Improvements Subtotal		$0	$0	$918	$529	$1,447
Terminal Imp Apron Modifications	*Terminal Improvements*	$0	$0	$219	$126	$345
Terminal Imp Dolphin Upgrades	*Terminal Improvements*	$0	$0	$699	$403	$0

	0	*1*	*2*	*3*	
	2018	**2019**	**2020**	**2021**	**Total**
Project Costs	$ 371,929	$ 750,294	$ 13,079,602	$ 7,503,175	$ 21,705,000
Discounted 7%	$ 371,929	$ 701,209	$ 11,424,231	$ 6,124,826	$ 18,622,195
Discounted 3%	$ 371,929	$ 728,440	$ 12,328,779	$ 6,866,468	$ 20,295,617

Baseline (M/V Guemes continued operations) Maintenance Costs
UPDATED: July 18, 2018

	2013$	2018$
Vessel Refurbishment	$ 929,000	$ 984,740
Vessel Overhaul	$ 4,794,000	$ 5,081,640
Vessel Lease (for overhaul period)	$ 1,095,000	$ 1,215,450
TOTAL	$ 6,818,000	$ 7,281,830

Inflation Factor (2013$ to 2018$)
https://www.bls.gov/ppi/#data
1.06 Producer Price Index for industry Shipbuilding and repairing, product Ship repair, non-military
1.11 Producer Price Index for industry Marine cargo handling, product marine cargo handling

Operating Cost Savings
UPDATED: July 18, 2018

Item	**M/V *Guemes*** [1]		**32-Car Electric Ferry**		**Savings**	
	Cost	% of Total	Cost	% of Total		
Fuel/Lube/Supplies[2]	$295,685	23.70%	$175,000	24.50%	$120,685	40.80%
Maintenance/Repair	$649,792	52.10%	$306,210	42.90%	$343,582	52.90%
Rentals[3]	$77,262	6.20%	$21,000	2.90%	$56,262	72.80%
Other Items[4]	$118,509	9.50%	$106,658	14.90%	$11,851	10.00%
Interfund Transfers	$105,207	8.40%	$105,207	14.70%	-	-
Total Costs	$1,246,455	100%	$714,075	100%	$532,380	42.70%

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	2021	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
M/V Guemes	$1,246,455	$8,528,285	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455
Required Additional Maintenance		$7,281,830												
32-Car Electric Ferry	$714,075	$714,075	$714,075	$714,075	$714,075	$714,075	$714,075	$1,409,580	$714,075	$714,075	$714,075	$714,075	$714,075	$714,075
Required Additional Maintenance								$695,505						
Annual Operating Cost Savings	$532,380	$7,814,210	$532,380	$532,380	$532,380	$532,380	$532,380	($163,125)	$532,380	$532,380	$532,380	$532,380	$532,380	$532,380
Discounted Annual Operating Cost Savings (7% Discount Rate)	$497,551	$6,825,234	$434,581	$406,150	$379,580	$354,747	$331,540	($94,940)	$289,579	$270,635	$252,930	$236,383	$220,919	$206,466
Discounted Annual Operating Cost Savings (3% Discount Rate)	$516,874	$7,365,642	$487,203	$473,013	$459,236	$445,860	$432,874	($128,772)	$408,025	$396,141	$384,603	$373,401	$362,525	$351,966

	15	16	17	18	19	20	21	22	23	24	25	26	27
	2035	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**
M/V Guemes	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455
Required Additional Maintenance													
32-Car Electric Ferry	$714,075	$714,075	$1,409,580	$714,075	$714,075	$714,075	$714,075	$714,075	$714,075	$1,409,580	$714,075	$1,409,580	$714,075
Required Additional Maintenance			$695,505							$695,505			
Annual Operating Cost Savings	$532,380	$532,380	($163,125)	$532,380	$532,380	$532,380	$532,380	$532,380	$532,380	($163,125)	$532,380	($163,125)	$532,380
Discounted Annual Operating Cost Savings (7% Discount Rate)	$192,959	$180,336	($51,641)	$157,512	$147,208	$137,577	$128,577	$120,165	$112,304	($32,160)	$98,091	($28,089)	$85,676
Discounted Annual Operating Cost Savings (3% Discount Rate)	$341,714	$331,762	($98,693)	$312,717	$303,609	$294,766	$286,180	$277,845	$269,753	($80,247)	$254,268	($75,640)	$239,672

	28	29	30	31	32	33	34	35	36	37	38	39	40	41
	2048	**2049**	**2050**	**2051**	**2052**	**2053**	**2054**	**2055**	**2056**	**2057**	**2058**	**2059**	**2060**	**2061**
M/V Guemes	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455
Required Additional Maintenance														
32-Car Electric Ferry	$714,075	$714,075	$714,075	$714,075	$1,409,580	$714,075	$714,075	$714,075	$714,075	$714,075	$714,075	$714,075	$714,075	$714,075
Required Additional Maintenance					$695,505									
Annual Operating Cost Savings	$532,380	$532,380	$532,380	$532,380	($163,125)	$532,380	$532,380	$532,380	$532,380	$532,380	$532,380	$532,380	$532,380	$532,380
Discounted Annual Operating Cost Savings (7% Discount Rate)	$80,071	$74,833	$69,937	$65,362	($18,717)	$57,090	$53,355	$49,864	$46,602	$43,553	$40,704	$38,041	$35,553	$33,227
Discounted Annual Operating Cost Savings (3% Discount Rate)	$232,691	$225,914	$219,334	$212,945	($63,347)	$200,721	$194,875	$189,199	$183,688	$178,338	$173,144	$168,101	$163,205	$158,451

	2021	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
M/V Guemes	$1,246,455	$8,528,285	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455
32-Car Electric Ferry	$714,075	$714,075	$714,075	$714,075	$714,075	$714,075	$714,075	$1,409,580	$714,075	$714,075	$714,075	$714,075	$714,075	$714,075
Annual Operating Cost Savings	$532,380	$7,814,210	$532,380	$532,380	$532,380	$532,380	$532,380	-$163,125	$532,380	$532,380	$532,380	$532,380	$532,380	$532,380
Discounted Annual Operating Cost Savings (7% Discount Rate)	$497,551	$6,825,234	$434,581	$406,150	$379,580	$354,747	$331,540	-$94,940	$289,579	$270,635	$252,930	$236,383	$220,919	$206,466
Discounted Annual Operating Cost Savings (3% Discount Rate)	$516,874	$7,365,642	$487,203	$473,013	$459,236	$445,860	$432,874	-$128,772	$408,025	$396,141	$384,603	$373,401	$362,525	$351,966

	2035	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**
M/V Guemes	$1,246,455	$1,246,455	$1,246,455	$1,246,455	$1,246,455	1246455	1246455	1246455	1246455	1246455	1246455	1246455	1246455
32-Car Electric Ferry	$714,075	$714,075	$1,409,580	$714,075	$714,075	714075	714075	714075	714075	1409580	714075	1409580	714075
Annual Operating Cost Savings	$532,380	$532,380	-$163,125	$532,380	$532,380	532380	532380	532380	532380	-163125	532380	-163125	532380
Discounted Annual Operating Cost Savings (7% Discount Rate)	$192,959	$180,336	-$51,641	$157,512	$147,208	137577.1087	128576.7371	120165.1749	112303.9018	-32159.5424	98090.57713	-28089.3898	85676.10894
Discounted Annual Operating Cost Savings (3% Discount Rate)	$341,714	$331,762	-$98,693	$312,717	$303,609	294765.898	286180.4835	277845.1296	269752.553	-80246.6907	254267.653	-75640.2024	239671.6495

	2048	**2049**	**2050**	**2051**	**2052**	**2053**	**2054**	**2055**	**2056**	**2057**	**2058**	**2059**	**2060**	**2061**
M/V Guemes	1246455	1246455	1246455	1246455	1246455	1246455	1246455	1246455	1246455	1246455	1246455	1246455	1246455	1246455
32-Car Electric Ferry	714075	714075	714075	714075	1409580	714075	714075	714075	714075	714075	714075	714075	714075	714075
Annual Operating Cost Savings	532380	532380	532380	532380	-163125	532380	532380	532380	532380	532380	532380	532380	532380	532380
Discounted Annual Operating Cost Savings (7% Discount Rate)	80071.12985	74832.83164	69937.22583	65361.8933	-18717.1465	57089.60896	53354.77473	49864.27545	46602.12659	43553.38933	40704.10218	38041.21699	35552.53924	33226.67219
Discounted Annual Operating Cost Savings (3% Discount Rate)	232690.9219	225913.5164	219333.511	212945.1563	-63347.4787	200721.2332	194874.9837	189199.0133	183688.3625	178338.216	173143.899	168100.8728	163204.7309	158451.195

	M/V Guemes	**32-Car Electric Ferry**	**Annual Operating Cost Savings**	**Discounted Annual Operating Cost Savings** ***7% Discount***	**Discounted Annual Operating Cost Savings** ***3% Discount***
2022	$8,528,285	$714,075	$7,814,210	$6,825,234	$7,365,642
2023	$1,246,455	$714,075	$532,380	$434,581	$487,203
2024	$1,246,455	$714,075	$532,380	$406,150	$473,013
2025	$1,246,455	$714,075	$532,380	$379,580	$459,236
2026	$1,246,455	$714,075	$532,380	$354,747	$445,860
2027	$1,246,455	$714,075	$532,380	$331,540	$432,874
2028	$1,246,455	$1,409,580	-$163,125	-$94,940	-$128,772
2029	$1,246,455	$714,075	$532,380	$289,579	$408,025
2030	$1,246,455	$714,075	$532,380	$270,635	$396,141
2031	$1,246,455	$714,075	$532,380	$252,930	$384,603
2032	$1,246,455	$714,075	$532,380	$236,383	$373,401
2033	$1,246,455	$714,075	$532,380	$220,919	$362,525
2034	$1,246,455	$714,075	$532,380	$206,466	$351,966
2035	$1,246,455	$714,075	$532,380	$192,959	$341,714
2036	$1,246,455	$714,075	$532,380	$180,336	$331,762
2037	$1,246,455	$1,409,580	-$163,125	-$51,641	-$98,693
2038	$1,246,455	$714,075	$532,380	$157,512	$312,717
2039	$1,246,455	$714,075	$532,380	$147,208	$303,609
TOTAL	**$29,718,020**	**$14,244,360**	**$15,473,660**	**$10,740,176**	**$13,002,824**

Emissions Reductions Monetization Calculation

UPDATED: July 18, 2018

Recommended Monetized Values (2016$)

Emmission Type	Dollars per Short Ton (2016$)	Dollars per Short Ton (2018$)
Carbon Dioxide (CO_2)	N/A	N/A
Volatile Organic Compounds (VO	$1,917.05	$1,872
Nitrogen Oxides (NOx)	$7,554.52	$7,377
Particulate Matter (PM)	$345,579.74	$337,459
Sulfur Dioxide (SO_2)	$44,649.21	$43,600

	NOx	CO	CO_2	HC	PM	Diesel Fuel	SO_2	CH_4	N_2O
Baseline w/ Diesel Engines	8.44	4.38	1352	0.84	0.62	387	0.013	0	0
Battery Electric Ferry	0	0	898	0	0	0	0	0.049	0.012
Annual Reduction	8.44	4.38	453	0.84	0.62	387	0.013	-0.049	-0.012

		Emissions Reduction			Monetized Value of Emmissions Reduction				Discounted Monetized Value of Emmissions Reduction	
		Nitrogen Oxides (NOx)	Particulate Matter (PM)	Sulfur Dioxide (SO2)	Nitrogen Oxides (NOx)	Particulate Matter (PM)	Sulfur Dioxide (SO2)	Total	*7% Discount*	*3% Discount*
1	**2022**	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$260,374	$270,485
2	**2023**	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$243,340	$262,607
3	**2024**	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$227,421	$254,959
4	**2025**	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$212,543	$247,533
5	**2026**	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$198,638	$240,323
6	**2027**	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$185,643	$233,323
7	**2028**	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$173,498	$226,527
8	**2029**	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$162,148	$219,929
9	**2030**	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$151,540	$213,524
10	**2031**	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$141,626	$207,305
11	**2032**	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$132,361	$201,267
12	**2033**	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$123,702	$195,404
13	**2034**	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$115,609	$189,713
14	**2035**	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$108,046	$184,187
15	**2036**	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$100,977	$178,823
16	**2037**	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$94,371	$173,614
17	**2038**	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$88,198	$168,558
18	**2039**	8.44	0.62	0.013	$63,760	$214,259	$580	$278,600	$82,428	$163,648
	TOTAL	$151.92	$11.16	$0.23	$1,147,683.13	$3,856,669.94	$10,447.91	$5,014,801	**$2,802,462**	**$3,831,729**

Residual Value Calculation

UPDATED: July 18, 2018

		$15,685,000 40	$4,398,000 20	$1,621,000 40	
		32-Vehicle Replacement Ferry *40-year Life*	**Shoreside Electrical Improvements** *20-year Life*	**Terminal Improvements** *40-year Life*	**Total Residual Value of Improvements**
0	**2022**	$15,685,000	$4,398,000	$1,621,000	$21,704,000
1	**2023**	$15,292,875	$4,178,100	$1,580,475	$21,051,450
2	**2024**	$14,900,750	$3,958,200	$1,539,950	$20,398,900
3	**2025**	$14,508,625	$3,738,300	$1,499,425	$19,746,350
4	**2026**	$14,116,500	$3,518,400	$1,458,900	$19,093,800
5	**2027**	$13,724,375	$3,298,500	$1,418,375	$18,441,250
6	**2028**	$13,332,250	$3,078,600	$1,377,850	$17,788,700
7	**2029**	$12,940,125	$2,858,700	$1,337,325	$17,136,150
8	**2030**	$12,548,000	$2,638,800	$1,296,800	$16,483,600
9	**2031**	$12,155,875	$2,418,900	$1,256,275	$15,831,050
10	**2032**	$11,763,750	$2,199,000	$1,215,750	$15,178,500
11	**2033**	$11,371,625	$1,979,100	$1,175,225	$14,525,950
12	**2034**	$10,979,500	$1,759,200	$1,134,700	$13,873,400
13	**2035**	$10,587,375	$1,539,300	$1,094,175	$13,220,850
14	**2036**	$10,195,250	$1,319,400	$1,053,650	$12,568,300
15	**2037**	$9,803,125	$1,099,500	$1,013,125	$11,915,750
16	**2038**	$9,411,000	$879,600	$972,600	$11,263,200
17	**2039**	$9,018,875	$659,700	$932,075	$10,610,650
18	**2040**	$8,626,750	$439,800	$891,550	$9,958,100
	Maintenance Needed in Residual Life	$1,391,010			$1,391,010
	Residual Value	$7,235,740	$439,800	$891,550	$8,567,090
				Discounted 7%	$2,534,693
				Discounted 3%	$5,032,262

Net Present Value and Benefit-Cost Analysis Summary

UPDATED: July 18, 2018

Benefit Category	Social Benefit	Value	Monetized Value *(7% discount rate)*	Monetized Value *(3% discount rate)*
Vehicle Operating Cost Savings	Cost savings to taxpayers related to ongoing operations of Guemes Ferry route	$15,473,660 in vehicle operating cost savings	**$10,740,176**	**$13,002,824**
Emissions Reductions	Improved air quality and reduced environmental impacts through reduction in emissions, including nitrogen oxides, particulate matter, and sulfur dioxide	151.92 short ton reduction in nitrogen oxides, 11.16 short ton reduction in particulate matter, and 0.23 short ton reduction in sulfur dioxide	**$2,802,462**	**$3,831,729**
Residual Value	Additional operating life of vessel, shoreside electrical, and terminal	$8,576,090 in undiscounted residual value	**$2,534,693**	**$5,032,262**
Capital Costs			**$18,622,195**	**$20,295,617**
Net Present Value			**($2,544,864)**	**$1,571,198**
Benefit to Cost Ratio			**0.86**	**1.08**