

# Lummi Island Ferry

## COMPARATIVE ANALYSIS

As talk and concern turns to the age and decreasing reliability and seaworthiness of the Whatcom Chief, Islanders may soon be searching the market for a replacement Vessel. Below are specifications, and comparisons, of the Whatcom Chief to various ferries throughout the country including the “new” Ferry that was proposed for, in 2005, but rejected by, Whatcom County in 2008. The information is a compilation of ideas from a number of Lummi Island Citizens; current and past Ferry Crew members; Shipyards; County Personal; other Ferry Operators; Marine Designers; and other Industry people.

Jim Dickinson

### **THE WHATCOM CHIEF: USCG T Class (99 x 44.1ft with 7ft draft)**

When the Whatcom Chief arrived in 1962, replacing the 6-car Chief Kwina, it was considered huge. Until the millennium, the Whatcom Chief did a remarkably good job of carrying the traffic to Lummi Island. However, since then the Whatcom Chief has proven too small to handle present volume.

In 2006, the County artificially enhanced the carrying capacity for standard vehicles by charging punitive fares for larger commercial vehicles. This inhibited local commerce in building, timber and agriculture. In the last two years, the Chief’s carrying capacity has been adequate only because of the current economic downturn and reduced demand for commercial traffic. When the economy rebounds, the Ferry will again prove inadequate to the task.

The Whatcom Chief was built specifically for the protected, short-distance Lummi Island/Gooseberry Point route. Possible route relocations, with increased distances and less clement/ hospitable sea conditions will find the Chief inadequate in both capacity and seaworthiness.

The Whatcom Chief is 48 years old and a number of age-related issues are coming to light. In 2008, when the county considered purchasing a new Ferry to replace the Chief, a Marine Surveyor testified that the Vessel was in good shape and could be kept in service for at least 20 years. A new Ferry was subsequently not approved. Since then, however, significant problems have come to light.

It is now recognized that the Chief is experiencing thinning deck plating, deteriorating wiring, corrosion of its hull plating, corrosion of the deck house, and the increasing specter of metal fatigue in the hull near the propellers. Further, although not structural, the Ferry is non-compliant with Federal Americans with Disabilities (ADA) rules, with too-narrow vehicle lanes. It also has engines that cannot pass modern EPA emissions standards.

Although the Whatcom Chief was originally built with the ability to be lengthened, this option is now unfeasible due to its age. In addition, at this point, any major structure replacement or improvements to the Chief will likely trigger a requirement that the Vessel be brought up to modern safety and emissions requirements at enormous cost.

Simply put, the Whatcom Chief has reached the point of non-viability. The boat is 48 years old; it needs to be taken out of daily service, and ought to be retained as a reserve Vessel, with the minimum maintenance necessary to keep it in license.

### **PROPOSED, BUT REJECTED, “NEW” FERRY: T or K Class (175 x 50 ft with 7 ft draft)**

In 2005, Whatcom County engaged the Seattle-based Elliot Bay Design Group to design a new Ferry for Lummi Island. The criteria included:

- a. Not having to greatly expand the existing docking slips.
- b. Keeping the new boat under 100 tons with a carrying capacity of 150 passengers (to keep the crew at three).
- c. Restricting the draft to the same as the Whatcom Chief to avoid dredging.
- d. Making the boat slightly larger to accommodate a “few” more cars.

The resulting design was a ferry with capacity for 35 cars in four lanes and with the Passenger Space and elevated Pilot House on one side. To maintain the same seven foot draft as the Whatcom Chief, the designers proposed the use of Voith-Schneider Cycloidal drives instead of conventional propellers, rudders and shafts. The rationale was that these drives would require less draft, preclude dredging, and allow for far greater maneuverability in adverse conditions. While some crew and residents embraced the design, many did not.

Support for the new design cited:

- a. The proposed Ferry was to have one completely straight-through vehicle lane and another nearly-straight lane to facilitate large Vehicle loading.
- b. Its undivided Vehicle loading area.
- c. Its size as “not too big” thus helping to keep traffic and building on the Island to a minimum.
- d. Its increased maneuverability.
- e. Its newness.
- f. And, the fact that dredging would not be required.

Criticism focused on:

- a. The Deck House with concern that, in high wind and heavy weather conditions, the Passenger Spaces and Pilot House on one side would

“Side Cabin” style boats, such as the proposed Vessel, have been successful on protected waters like those at Anacortes/Guemes and on the Fraser River. Hales Pass, however, has more adverse weather than these locations. This format has less inherent seaworthiness than the Whatcom Chief.

- b. The proposed Ferry’s Cycloidal (Voith-Schneider) Drive which functions by means of a circulating set of adjustable vertical blades (similar to an adjustable vertical paddle wheel or a helicopter blade drive system). The system is enclosed in a fixed housing that bolts into a large hole in the propulsion ends of the boat and contains a circulating assembly that is isolated from the fixed housing by an active six foot diameter rubber seal. The rotating assembly has a number of smaller seals and bearings, set in a circle, which isolate adjustable vertical blades from the internal mechanisms and the water. Inside the circulating assembly is a series of mechanical apparatus that control the pitch of the vertical blades which subsequently controls the direction of the Vessel propulsion.

The system, with its 6-ft diameter seal, is complicated and expensive and prone to wear, vibration, and increased maintenance. On the Hales Pass run, the increased maneuverability of a Voith-Schneider drive is not needed.

In addition, the Voith-Schneider drive is estimated to use twice as much fuel as the Whatcom Chief. We could find no independent study on the fuel use of these drives; however, Marine Industry sources indicate that the V-S drives use more fuel than propellers and much more fuel than the more efficient controllable-pitch propellers.

The proposed Vessel design precluded refitting the boat with conventional drives.

- c. The carrying capacity (35 cars) would provide only a 10 car per hour increase over the Whatcom Chief. This limited increase would not be adequate for existing peak traffic and any projected traffic expansion. In summary, the proposed Ferry, like the Chief, would be too small

In any case, dredging is not an issue. The Gooseberry Point side is deep enough for a bigger Vessel; and, on the island side, the bottom is sandy and could simply be blown out of the way by the prop wash of a bigger Vessel.

After weighing the considerations listed above, Whatcom County agreed that the proposed Vessel design was questionable and would be obsolete before it appeared.

While a need for a new Ferry was recognized, it was concluded that the proposed Vessel was not the proper one.

**THE GUEMES: T Class (126.5 x 46 ft with 6 ft draft)**

The Guemes, built in 1979, is the Skagit County Ferry which runs daily between Anacortes and Guemes Island. The Ferry resembles the Canadian Translink and smaller B.C. ferries. These boats are propelled by steerable “Z” drives, similar to inboard/out-drive units which make the boats quite maneuverable in cross-current conditions. A good example of these Vessels is the former Fraser River/Albion ferries, Kulleet and Klatwa.

Originally the Guemes was about 12 feet narrower than it is presently, but it was widened in the late 1990s. Its present width allows four open auto lanes. The middle two lanes are virtually a straight drive on, and it now has a slightly larger car capacity than the Whatcom Chief.

The Guemes’ early career was marred by recurrent engine and Z drive mechanical troubles. Improvements in these systems and the addition of a full-time on-site engineer have virtually eliminated the previous problems. The weather-protected Guemes Channel has cross tides up to six-knots and the boat’s ability to “crab” across the current allows for a straight course. The Guemes also has a lower freeboard than the Chief and is inherently less seaworthy. Other than a Relief Vessel, it is not appropriate for Hales Pass or any other longer local routes.

**HIYU STATE FERRY: H Class (162 x 63 ft with 9.7 ft draft)**

The Hiyu has an official capacity of 34 cars and 200 passengers. It was built for the Point Defiance/Tahlequah route in 1967. Within ten years, the route’s traffic outgrew the Vessel and the boat was replaced by a larger one. The Hiyu then moved to Inter-Island duty in the San Juan’s.

In the late 1990s, Inter-Island traffic outgrew the Hiyu’s capacity and it was relocated to the Ferry Homeport at Eagle Harbor where it was used as a spare and training boat. In 2007, when the four Steel Electric Ferries were abruptly retired, the Hiyu was refurbished and put into service. Again, although it is extremely reliable, it does not have the required capacity. Nonetheless, moving 34 cars across the water is better than moving no cars. It is, however, the stepchild of the State’s fleet.

About ten years ago, Whatcom County looked at purchasing the Hiyu as a replacement for the Whatcom Chief; however, there were some issues, mainly age and local opposition to a larger Ferry, and it was not acquired.

The Hiyu’s car deck is semi-enclosed with four height-restricted lanes and a fifth straight-on center lane which has full 16 foot height clearance. As the State auto-length

standard is 18 feet per car, the Hiyu could carry more than the listed 34 cars with the way the Whatcom Chief stacks them on. It has two separate 100 passenger cabins which are on each side of the center lane.

The Hiyu is now 43 years old and has many of the same age-related issues as the Chief but, does not have comparable wear. The Hiyu engines are original Cat 399s, which are not pollution compliant. In addition, the engines are inefficient by today's fuel standards. The Hiyu is not ADA compliant, having no protected space on the main deck for wheel chairs and no elevator to the passenger spaces. The separated passenger cabins require an individual cabin crew person per house.

The Hiyu, as an H class Vessel, operates with a minimum crew of six and would have to be reclassified to a K class to be used on the Lummi Island route. Even if possible, reclassification would likely be very expensive and entail a complete rebuilding of the Vessel including re-powering with pollution compliant engines. At least one elevator would have to be added, which could take up several car spaces. Like the Chief, the Hiyu is likely too old to lengthen.

Also, with only the first of the State's three new Ferries coming on line this year and with two other larger Vessels failing, it is unlikely that the State will declare the Vessel surplus for quite some time. Considering everything, including its capacity, the Hiyu is not a good candidate, unless it's free.

### **LAKE CHAMPLAIN FERRIES (175 to 219 ft x 44 ft with 8 ft draft)**

Lake Champlain ferries ([www.ferries.com](http://www.ferries.com)) are limited by a transport canal to about a 44 foot width, about the same beam as the Whatcom Chief. Because of this limitation, a modified passenger cabin format has been developed for the fleet, which is operated by the Lake Champlain Transportation Company.

Lake Champlain Vessels have three uncovered lanes on one side of a very narrow deck house. The third lane closest to the deck house is straight on and a fourth covered lane is on the other side of the deck house. The deck house is just wide enough for wheel chairs, the boat's exhaust stacks and an elevator in some of the later boats.

The Passenger space is directly above the lower-height-clearance fourth lane and is accessible by stairs on both its ends. The Pilot House is above the Passenger Space and offset so it is as close to the center of the boat as possible. By this configuration, the Lake Champlain ferries are narrow four-lane Vessels that are ADA compliant. The format also provides a more centered, wind neutral cabin.

A few years ago, the Lake Champlain Transportation Company had the Plattsburg, a 40+ car Ferry, for sale because it was too small for its route. Since then, a large bridge across the lake has been demolished and all the Company's Vessels -- plus a new one -- are working full time.

Should a Lake Champlain Ferry come up for sale in the future and the Lummi Island passage is limited to the existing beam, such a boat might be considered suitable for us. However, careful thought would have to be given to the Vessel's long narrow shape and possible seaworthiness questions. In the marine vernacular, this type of vessel is called a "canoe".

**THE CHETZEMOKA: H Class, WSF Kwa di Tabil Type (270 x 64 ft with 10.5 draft)**

This is the new heavy-weather class Vessel currently being built for the State Ferry System's Keystone run. It has a fully enclosed 64 car capacity deck, individual bicycle lounges and storage, 700 passenger capacity, and open upper observation deck.

Cost of the Chetzemoka, the first of its class, is \$76.5 million. Its speed is 14 knots. It has two EMD 3000HP Diesels with a projected fuel use of 1200 gallons a day. It will require a minimum of eight, more likely nine, crew. The two similar ferries, now being constructed for the State, will be \$57+ million each.

The Chetzemoka is included in this discussion as a minimum example of the type of Ferry that would have the required seaworthiness to run to Fairhaven and other Bellingham locations. With its 64-car carrying capacity, the Chetzemoka is too small for either location. In order to keep up with the peak demand now experienced by the Whatcom Chief, a Vessel the size of the 120-car WSF Issaquah class would be needed for Fairhaven; one the size of the 180-car Jumbo class would be required for Bellingham.

**PIERCE COUNTY'S CHRISTINE ANDERSON: K CLASS. (213 x 66 ft with 9.7 ft draft)**

Built in 1994, in Portland, Oregon at the old Nicholls Brothers Yard, the hull of the Christine is similar to the Hiyu since both Vessels had the same designers. The Christine is in daily service to Anderson Island from Steilacoom, just south of Tacoma. Demand regularly exceeds its intended 54 car capacity.

The Vessel has a semi-enclosed deck with a maximum 14.5' height clearance. The 225 passenger capacity cabin is elevated above the car deck and has an exterior walkway around the pilot house, which is centered above the passenger spaces with excellent sight lines. Access to the passenger space is by stairway at both ends. The Christine is ADA compliant with elevators and restrooms; however, it has no longitudinal wheelchair lane.

Propulsion (12 knot speed) is via Standard fixed pitch propellers driven by non-pollution-compliant Cat 3508 engines. The Vessel has a great design, is visually elegant, and has held up beautifully. Its design, however, has been supplanted by the Steilacoom II described below. In 1994, then-Captain Bill Hawley wanted Whatcom County to go in

with Pierce and have Nicholls Brothers build two Christine Andersons; too bad it didn't happen. It is doubtful another will be built exactly like it.

### **STEILACOOM II: K Class (216 x 68 ft with 9.7 draft)**

The Steilacoom II, built for Pierce County in the Nicholls Brothers Yard at Freeland, WA, is the lineal descendent of the Christine Anderson. The Steilacoom II's hull is similar, but three feet longer and two feet wider, to the Christine's. It also has a longer semi-enclosed deck than the Christine and its maximum height clearance is 16 feet.

The Steilacoom II's maximum 325 Passenger capacity cabin and its Pilot house are larger than the Christine's but the two Vessels both have elevated above-car deck with similar walkways and stairs. The Steilacoom II is completely ADA compliant with elevator, restrooms, and a dedicated longitudinal wheelchair lane.

Propulsion is via Controllable Pitch Propellers, but with now non-pollution-compliant Cat 3508B engines.

Pierce County had the Steilacoom II for only several months when the State of Washington leased it for use on the Keystone/Port Townsend Route, which had no Ferry due to the loss of the State's four Steel Electrics. Although it was made for more protected waters and is very short on vehicle-capacity (54 cars/run), the Steilacoom II has done well replacing two 60-car- plus Vessels. No other boat in the State Fleet, other than the Hiyu has the shallow draft needed for Keystone Harbor and, once again, the State's philosophy is that 54 cars to Port Townsend every hour and a half is better than none.

This Fall, the Steilacoom II is due to be replaced by the new State Ferry Chetzemoka. When this happens, the Steilacoom II, which has held up very well, will return to Pierce County after it is refurbished by the State.

***A Vessel (12 knot speed), similar to the Steilacoom II, could be obtained from Nicholls, on a design/build basis for somewhere around 12 million dollars. It would include pollution-compliant Cat 3508C engines. It could run with a crew of three, possibly four at busy times. It would be far more fuel efficient per car load than the Whatcom Chief, and would not have to make as many runs to maintain adequate capacity.***

Besides having good reserve capacity, an added bonus would be greatly enhanced emergency transport ability during periodic flood events. Although it is far bigger than the Chief, and much more seaworthy, it has inadequate capacity and questionable seaworthiness during extreme weather for a Fairhaven run. A boat patterned on the Steilacoom II is presented in the "Five Ferries" writing and drawings as the Lummi Islander.

## **LENGTHENED PIERCE COUNTY TYPE FERRIES**

Lengthening a Ferry is a relatively inexpensive way to get larger capacity, although it does not necessarily completely increase extreme weather ability. (See the Chetzemoka below for a heavy-weather class Vessel.)

A lengthened Pierce County type Ferry is currently being designed for somewhere in the southeast. This extended Vessel is simply a Steilacoom II design (described immediately above) lengthened by addition of a longer center hull section. The first extension, up to about 36 feet (66 cars) would cost about 2 million dollars more than the Steilacoom II's \$12 million base cost; every additional 18 feet car length would cost approximately another million dollars.

The limit of this design as a K class Vessel is about 270 feet or 72 cars; further length moves a Ferry into the H class, meaning more requirements and a larger crew.

The Cat 3508C engines used in Pierce County's Steilacoom II are good for ferries up to about 252 feet or 66 cars. At that length or longer, larger cat 3512HD engines or their equivalents would likely do better with better power to weight ratio.

Cruising speed for a lengthened Steilacoom II Ferry would be 14-15 knots, perhaps faster, depending on the longer overall length. Fuel use would be slightly more than the 54 car base version.

A drawing of the 66-car version is presented in the "Five Ferries" writing and drawings as the Lummi Chief. This drawing shows the Vessel with separate Pilot Houses and Crew Quarters similar to those on a State Ferry. For our purposes, a single centered Pilot House would be more appropriate.

## **COMPARISON AND RECOMMENDATIONS**

The Whatcom Chief, no matter how we regard it, is near the end of its useful life as a daily transporter. The County's current maintenance program calls for replacing the existing deck house with a narrower one to make the car lanes ADA-compliant and new pollution-compliant engines are soon to be required. The expense required to adequately refurbish the Chief could be better used to help obtain a new Vessel.

The Chief, however, should be retained through an Inter-County Agreement as a reserve boat. As such, it could be used as a car or passenger Ferry in emergencies for Whatcom, Skagit, Kitsap and Pierce Counties. San Juan County has also expressed interest in the Chief for: moving their Public Works Equipment between their main Islands; for non-scheduled service to smaller Islands; and as an EMS and Fire Support Vessel since the State Ferries are too large and rigidly controlled to perform these functions.

***Which Vessel, then, do we select as a replacement for the Lummi Island Ferry route?***

The Vessel required, of course, depends on where the Lummi Island Ferry will dock on the mainland side. Seaworthiness and carrying capacity are determinants.

If we stay at Gooseberry Point, a 54-car capacity Ferry like Pierce County's Christine Anderson or the Steilacoom would be appropriate. If the run is moved to Neptune Beach, a 66-car version would be adequate. For Fairhaven, the absolute minimum (still with only marginal safety and far below current car capacity) would be a 72-car model.

Of the Ferry types analyzed above, the Pierce County designs rise to the top. For cost and utility, they are without equal. Further, these Vessels do not carry the costs of a new design: they are proven, excellent Vessels and could be built with little or no delay.

At Gooseberry Point, either the Christine Anderson or the Steilacoom II Ferry type would work well. Both would use less fuel than the Whatcom Chief and both can now carry all legally-allowable vehicle traffic (which the Chief cannot). This would help boost the Island economy by allowing, for example, full loads of agricultural and forestry products. In addition, either the Christine Anderson or the Steilacoom Ferry types can be lengthened in the future to expand capacity. This would also be economically advantageous, especially during peak seasons when a larger ferry could handle increased traffic much more quickly and efficiently thereby avoiding additional runs while increasing fare box revenue.

If a new boat has to be built, a 60-car version of the Steilacoom II would be best for the existing route as it could handle the current maximum hourly traffic in one load. In addition, ***the larger car capacity would allow the Ferry deck to be used as a de-facto loading lane as cars could be driven onto the deck as they arrive. This would eliminate the long queue of cars up to the street, thereby greatly reducing the traffic impact on Gooseberry Point.***

When the Steilacoom II returns to Pierce County, the Christine Anderson may become available. Lease, purchase or some kind of Inter-County Agreement may be options for Whatcom County's obtaining this Vessel.

Some Islanders believe a larger boat will invite more growth on Lummi Island. However, it should be recognized that, before the current economic downturn, growth was occurring at an accelerated pace with the Whatcom Chief. As the economy rebounds, traffic again will increase independent of the size of our Ferry. A Ferry is by all codes and definitions a road; as such, it must handle traffic. It should not be treated as a social engineering tool in a futile gesture to maintain a fictional status quo.

When the 20-car Whatcom Chief appeared in 1962 to replace a 33 year old 6-car ferry, it was considered huge. The Chief's 330% increase of capacity has proven to be a very wise decision as the boat – although now worn out and undersized -- is still functioning after 48 years on the job. If the boat is now replaced with a 54-car Ferry, the resulting

capacity increase will be less than the increase realized when the Chief replaced its predecessor in 1962; moreover, the Chief's term of use will have been 150% longer than that of the previous boat.

Without doubt, Lummi needs a new Ferry. I personally hope the Whatcom Chief is able to hold on a little longer so we can obtain an appropriate Ferry in a rational fashion instead of in a crisis situation.

## **OTHER CONSIDERATIONS**

In addition to a replacement ferry, there are several other important topics that we should consider in an attempt to improve the management, safety and operations of our Ferry and to avoid the ordeal we have been experiencing since last February. I list some of these below.

### **An Inter-County Ferry Association (IFCA)**

Through an Inter-Local Agreement, the Counties in Washington State that operate Ferries could band together to share assets to: (a) operate in a more cost-effective manner; (b) partner for State and Federal transportation grants; (c) share relevant trainings; and (d) establish emergency and reserve capacity which is not currently available.

The recent unplanned failure of the Whatcom Chief demonstrates this latter need. When the Whatcom Chief sprung its leak, there were no car Ferries in reserve anywhere on the U.S. West Coast which were available for temporary use. Prudence and good management dictate that a back-up Ferry be available for emergencies, dry dock periods and other occasional uses. Having a Vessel available to all Washington State Counties for dry dock alone would help retain the cash flow from automobiles, helping to keep local economic disruption to a minimum.

I have proposed that the State County Road Advisory Board (CRAB) establish an Inter-County Ferry Association. Before it can move forward, this proposal must be backed up by a request from a County.

### **Whatcom County Ferry Advisory Board**

While Public Works does a good job of running our Ferry operation, the Department simply does not have the time to do required in-depth investigations and planning. An Advisory Board, made up of about nine County-appointed volunteers, could fill this gap. Volunteers would need an overall interest in Ferry transportation and an ability to comprehend complex mechanical problems and solutions. They would have to have time available to investigate options. It would be desirable for some to have specialties relevant to Ferry operations.

A Ferry Advisory Board would allow the Islanders a voice regarding their Ferry and would add a huge base of knowledge and ideas to Lummi Island Ferry operations.

### **Emergency Planning**

A Comprehensive Emergency Plan for the Lummi Island Ferry is not available, as was apparent in the June Whatcom Chief failure. While the County did an excellent job of quickly getting the Passenger Ferry up and in place, there was a lack of communication with Islanders in regard to movement of trapped vehicles off the Island. Rumors, unanswered questions and frustration were rampant.

A pre-determined plan must be developed. It should define what will happen when any type of Ferry emergency occurs. In cases where the Lummi Island Car Ferry cannot be used, the possibility of obtaining the Skagit Ferry Guemes for a few emergency runs on late weekday evenings might be pre-arranged.

A number of Lummi Islanders will be glad to help formulate this plan.

### **Dock Compatibility**

To facilitate compatibility in emergencies, Lummi Island Ferry docking slips ought to be reconfigured to allow landing the largest County Ferries. Such reconfiguration would not impede docking the existing Ferry and could be done while the docks are in the course of ordinary maintenance and refurbishment.

The largest of the County Ferries in Washington State is the Steilacoom II at 68 feet wide. The Island dock could currently take a Vessel up to about 60 feet in width. The Gooseberry dock can currently handle a Vessel up to about 50 feet wide. The Island dock is in need of southern breakwater replacement; the Gooseberry dock is in need of near total dolphin rebuild. At the time of these renovations, the docks could be widened.

In emergency situations such as flooding, reconfiguration of the Lummi Island and Gooseberry Point docks would allow the use of the Pierce County Ferries, the Whatcom Chief, the Guemes and the State Ferries Hiyu, Rhododendron, Chetzemoka, and the Salish and Kennewick, now under construction.

### **Relocate Ferry Operations Management to Lummi Island**

In the “old” days, Ferry operation was controlled by the Ferry Captain. Today, operations are controlled from the Public Works Office with duties distributed among several employees who have other primary responsibilities. In Skagit and Pierce Counties, Ferry service is controlled from the Ferry Dock.

I propose that management of the Lummi Island Ferry likewise be moved closer to the environs to be housed at the Island ferry landing, by transferring the duties now performed in town.

. A small office could be built onto the inland side of the current Island Terminal to house a Bookkeeper and Ferry Director with office hours that coincide with peak Ferry traffic.. The office would be responsible for accounting, crew and special trip scheduling, maintenance scheduling, community relations and other day-to-day operations.

The Bookkeeper as well as the Ferry Director – with proper certification -- would be available to substitute on the Ferry when extra personnel are required. They could also cover Crew breaks, sickness and emergencies. It would be expedient, but not necessary, if the Director had a Captain’s License. Personnel for these positions could be drawn from current employees or could be newly hired.

The Bookkeeper and Director would be considered “Management” and work directly for the County, being responsible to the Public Works Department. Contact with the Public Works Office would be via Land and Cellular Telephone, Fax Machine and Internet.

An alternative might be to put an Office on the Ferry, especially if a larger boat is acquired. When over 150 passengers were projected to be on the Vessel, the Bookkeeper or Director could operate out of the on-Ferry Office. This would meet the requirements for increased Vessel staffing. If the on-Ferry Office were linked to the Shore Office, the Bookkeeper or Director could continue to perform their usual duties.

Relocating management of Ferry operations to the Island dock would go a long way to getting better service to the riders at reduced, or certainly no additional, cost.

## **RECOMMENDATIONS RECAP**

1. . Replace the Whatcom Chief but keep it licensed in reserve status.
2. Do not build the previously proposed and designed “New Ferry;” sell the design to Skagit County, where it would be more appropriate.
3. Replace the Whatcom Chief with a Ferry of the Pierce County pattern. If the replacement is a used boat, it should carry a minimum of 54 cars; if new, it should carry 60.
4. Use conventional propeller/rudder setup for propulsion, favoring controllable-pitch propellers for fuel conservation.
5. Stay at Gooseberry Point for lower costs and flexibility.
6. Establish Inter-County Ferry Association.
7. Establish County Ferry Advisory Board.
8. Compile and distribute Emergency Ferry Plan.

9. Reconfigure the Lummi Island and Gooseberry Docks to accept largest Ferry in Western County operation.
10. Relocate Ferry Operation management to Lummi Island.

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