



BRITISH COLUMBIA
FERRY COMMISSION

ORDER
NUMBER: 14-01

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IN THE MATTER OF

A Major Capital Expenditure for a Cable Ferry
Proposed by British Columbia Ferry Services Inc.
Pursuant to Section 55(2) of the *Coastal Ferry Act*

BEFORE: Gordon Macatee, BC Ferries Commissioner
Sheldon Stoilen, BC Ferries Deputy Commissioner

ORDER

WHEREAS:

- A. On December 20, 2013, British Columbia Ferry Services Inc. ("BC Ferries") submitted an application and supplemental information (the "Application" and "Supplemental Information" respectively) under section 55(2) of the *Coastal Ferry Act* (the "Act") seeking the commissioner's approval of a proposed major capital expenditure for a new cable ferry and associated infrastructure to operate on Route 21 (Buckley Bay-Denman Island);
- B. The Application states that the option of implementing a cable ferry system for Route 21 has a net present value advantage of \$27.76 million over a conventional ferry option;
- C. The Application states that the new vessel would replace the existing vessel, the Quinitsa, which would be redeployed as a relief vessel and allow the retirement of another vessel without replacement;
- D. Section 55 of the Act governs the commissioner's consideration of capital deployment and expenditures of ferry operators as follows:
 - (1) Subject to subsections (2) to (5), before deploying capital assets on, or incurring capital expenditures in connection with, a designated ferry route or

terminal, the ferry operator may apply to the commissioner and the commissioner must, within one month after the application, declare whether the capital assets proposed to be deployed on, or the capital expenditures proposed to be incurred in connection with, the designated ferry route or terminal are reasonably required;

(2) A ferry operator must not incur a major capital expenditure without first obtaining the commissioner's approval of the expenditure;

(3) A ferry operator may apply to the commissioner for approval of a proposed major capital expenditure and the commissioner must respond to the application within 2 months after its receipt by the commissioner;

(4) The commissioner may approve a proposed major capital expenditure if the proposed major capital expenditure is:

(a) reasonable,

(b) prudent, and

(c) consistent with:

(i) the current Coastal Ferry Services Contract, and

(ii) any long term capital plan established by the ferry operator;

(5) For the purposes of this section, a capital expenditure of a ferry operator is a major capital expenditure if it meets the criteria:

(a) established from time to time by the commissioner, and

(b) most recently provided by the commissioner to the ferry operator;

E. Pursuant to section 55(5) of the Act, the commissioner established the criteria of a major capital expenditure by issuing Order 12-04 dated September 30, 2012 which defines a major capital expenditure as any capital expenditure which exceeds \$30 million, inclusive of component programs and interest during construction, and irrespective of the level of expenditure, any new vessel or terminal and any vessel life extension which extends the life of the vessel more than five years;

F. Upon receipt of the Application, the commissioner issued a public notice in relevant media inviting comments or submissions regarding BC Ferries' proposed major capital expenditure;

G. The Application states that BC Ferries has conducted extensive consultation with stakeholders and has made a number of changes to the proposed cable ferry

project in key areas including crew complement, home port location, operational availability and alternative service provider;

- H. The Application also states that BC Ferries has received or is expected to receive relevant approvals from other regulatory authorities governing the operation of a cable ferry on Route 21, however the final crewing levels will not be finalized until after the cable ferry has been constructed;
- I. The commissioner has reviewed and considered the Application, the Supplemental Information and the reports prepared for the commissioner by qualified independent consultants;
- J. The commissioner has considered the submissions and comments received as a result of his public notice;
- K. The commissioner has summarized his findings and determinations in the attached Review;
- L. The commissioner is satisfied that:
 - (a) A cable ferry is a technically feasible alternative to a conventional ferry on Route 21,
 - (b) BC Ferries has made reasonable efforts to consult with local ferry users on Denman Island and other relevant stakeholders,
 - (c) BC Ferries will be able to meet its contractual obligations under the Coastal Ferry Services Contract for Route 21 with the proposed cable ferry,
 - (d) An independent financial analysis has confirmed that the proposed cable ferry reduces operating costs thereby reducing pressure on future fares for all ferry users on all routes,
 - (e) BC Ferries has reasonably engaged the appropriate technical experts in the design and engineering of the cable ferry and associated infrastructure;
- M. The commissioner expects that, in the interests of ferry users and taxpayers, BC Ferries will:
 - (a) complete a procurement process that will mitigate the risks involved in a capital project involving new technologies for BC Ferries,

(b) apply best practices in the governance of the capital project;

N. The commissioner finds the major capital expenditure proposed in the Application to be:

(a) reasonable,

(b) prudent, and

(c) consistent with:

(i) the current Coastal Ferry Services Contract, and

(ii) the long term capital plan established by the ferry operator.

NOW THEREFORE pursuant to section 55 of the *Coastal Ferry Act* the commissioner orders as follows:

1. The proposed major capital expenditure for a new cable ferry and associated infrastructure as generally described in the Application is approved subject to the following conditions:

(a) The maximum amount of the major capital expenditure for the cable ferry and associated infrastructure is set at the amount stated in the Application which will be confirmed by a separate confidential order to BC Ferries. The maximum amount will remain confidential until completion of the procurement process;

(b) BC Ferries must advise the commissioner of the actual crewing levels, as finally determined, and confirm that the projected life cycle cost savings will be achieved. If the projected life cycle cost savings are less than the projected savings in the Application the commissioner may not allow the increase in operating costs in future price cap determinations;

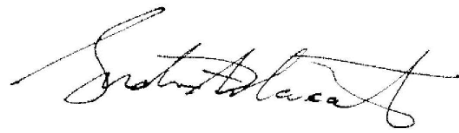
(c) BC Ferries must satisfy the commissioner that standard operating procedures will be developed and refined as operational experience is gained, to include:

(i) a rigorous inspection, testing and replacement protocol of the cable be put in place with an inspection frequency commensurate with loads experienced at site,

- (ii) operating limits and protocols based on wave conditions that avoid resonant roll by actual measurements of wind speed, wave period and height;
- (d) Prior deployment of the cable ferry, BC Ferries must satisfy the commissioner that operational reliability will be assured by:
 - (i) enabling a secondary means of recovering vessel from a propulsion system breakdown within a reasonable period of time,
 - (ii) maintaining inventory, in the province, of non-redundant parts;
- (e) At least one vessel on the minor routes will be retired so that the cable ferry does not result in a net increase in the overall size of the fleet.

DATED at Victoria in the Province of British Columbia, this 20th day of February 2014.

BY ORDER



Gordon Macatee

BC Ferries Commissioner



Sheldon Stoilen

BC Ferries Deputy Commissioner



**Review of BC Ferries' Application for
Approval of a Major Capital Expenditure for
A Cable Ferry on Route 21**

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Review of BC Ferries' Application for Approval of a Major Capital Expenditure for a Cable Ferry on Route 21

Background

On December 20, 2013, British Columbia Ferry Services Inc. ("BC Ferries") submitted an application and supplemental information (the "Application" and "Supplemental Information" respectively) to the commissioner requesting approval of a major capital expenditure for the construction of a cable ferry and associated infrastructure to operate on Route 21 (Buckley Bay on Vancouver Island to Denman Island). The Application was submitted pursuant to section 55(2) of the *Coastal Ferry Act*, SBC 2003, c. 14 (the "Act").

Statutory Framework

In accordance with the Act the commissioner regulates ferry operators by determining price caps for each performance term, approving major capital expenditures and monitoring the ferry operator's performance under the Coastal Ferry Services Contract ("CFSC"). In determining price caps, the commissioner includes those capital expenditures that are determined to be reasonable, including major capital expenditures that have been approved by the commissioner. The relevant sections of the Act in considering this Application follow:

Section 38 sets out the commissioner's role under the Act.

Role of commissioner

38 (1) Without limiting any other power of the commissioner under this Act, the commissioner must, after considering public feedback obtained under this Act, regulate each ferry operator in relation to the core ferry services that are to be provided by that ferry operator and the tariffs, including, without limitation, reservation fees, that may be

charged for those core ferry services, and must undertake that regulation in accordance with the following principles:

(a) the primary role of the commissioner is to balance, in the manner the commissioner considers appropriate:

- (i) the interests of ferry users,
- (ii) the interests of taxpayers, and
- (iii) the financial sustainability of ferry operators;

(b) ferry operators are to be encouraged to adopt a commercial approach to ferry service delivery;

(c) ferry operators are to be encouraged to seek additional or alternative service providers on designated ferry routes through fair and open competitive processes;

(d) ferry operators are to be encouraged to be innovative and to minimize expenses without adversely affecting their safe compliance with core ferry services;

(e) [Repealed 2012-28-2.]

(f) [Repealed 2012-28-2.]

(2) For the purposes of subsection (1), the commissioner is to do the following in relation to each ferry operator:

(a) review the quarterly reports and annual reports of the ferry operator provided under sections 65 and 66 respectively to determine whether:

- (i) the ferry operator is providing the core ferry services, and
- (ii) the weighted average of the tariffs charged in relation to the core ferry services applicable to each route group serviced by the ferry operator is within the price cap established for that route group;

(b) monitor the ferry operator's provision to the public of the information that is to be provided under this Act in relation to the operations and performance of the ferry operator;

(c) establish, in accordance with section 40, in advance of each performance term under the Coastal Ferry Services Contract, other than the first performance term, the price cap that is to apply to each route group to which the contract applies;

(d) review and consider applications by the ferry operator for extraordinary price cap increases in accordance with section 42;

(e) review and consider applications by the ferry operator for reductions of service in accordance with section 43;

(f) review and consider applications by the ferry operator for route discontinuance in accordance with section 44;

(g) [Repealed 2012-28-2.];

(3) The commissioner must not regulate ferry operators in relation to ancillary services;

(4) Despite subsection (1), the commissioner may remove a designated ferry route from regulation under this Act if the commissioner considers that sufficient competition is present on that designated ferry route so that regulation is no longer necessary;

(5) Without limiting any other power of the commissioner under this section, the commissioner may order a ferry operator to:

(a) prepare a plan to indicate how the ferry operator proposes to achieve an outcome, proposed by the ferry operator or the commissioner, that is consistent with the objectives of this Act or the applicable Coastal Ferry Services Contract;

(b) review any of the ferry operator's policies that the commissioner considers may not be in the interests of ferry users and taxpayers and do one or both of the following:

(i) explain the rationale for that policy,

(ii) indicate how that policy could be amended to better balance the interests of ferry users, taxpayers and the ferry operator, and

(c) undertake public consultation in relation to any services the ferry operator is providing or intends to provide or that the commissioner considers appropriate for the ferry operator to provide;

(6) If the commissioner makes an order under subsection (5) (a) or (b), the ferry operator must prepare the required plan, rationale or proposed amendment and have it approved by the commissioner;

Section 41 provides the principles that apply to the setting of price caps by the commissioner.

Principles applicable to price cap review

41 (1) [Repealed 2012-28-2.].

(2) In setting a price cap applicable to a route group, the commissioner must be guided by the following principles:

(a) the price cap must allow for a return sufficient to enable the ferry operator to recover:

(i) the portion of operating expenses, including all financing charges, that can reasonably be applied to the route group,

(ii) the portion of administrative expenses that can reasonably be applied to the route group, and

(iii) the reasonable capital costs that are to be incurred in relation to the route group, and

(iv) amortized in accordance with generally accepted accounting principles on a straight line basis;

(b) the price cap, when combined with all other price caps applicable to all route groups serviced by the ferry operator, must allow for a return sufficient to enable the ferry operator to:

(i) meet its debt obligations, and

(ii) maintain access to borrowing rates that, in the opinion of the commissioner, are reasonable in all of the circumstances;

(c) the price cap must take into account the anticipated productivity gain determined under subsection (5);

(d) the ferry operator is, on an ongoing basis, to actively seek additional or alternative service providers to provide ferry services on the designated ferry routes included in the route group in order to reduce the costs of providing those services;

(3) For the purposes of subsection (2) (a) to (c), the commissioner must, in setting a price cap for a route group:

(a) determine the portion of the following that, in the commissioner's opinion, acting reasonably, can reasonably be applied to the route group:

(i) operating expenses,

(ii) administrative expenses,

(iii) the expenses applicable to the terminals serving the designated ferry routes included in that route group;

(b) take into account, for the purposes of subsection (2) (a), only the portion of the expenses that the commissioner determines, under paragraph (a) of this subsection, can reasonably be applied to the route group;

(c) determine whether it was reasonable, in the commissioner's opinion, acting reasonably, for the ferry operator to have incurred capital expenses in relation to a designated ferry route included in the route group, and take into account only those capital expenses that:

(i) are determined under this paragraph to be reasonable, or

(ii) had been approved under section 55.

(d) attribute to capital assets deployed within or in support of the route group a value that, in the commissioner's opinion, acting reasonably, is appropriate in all of the circumstances, and

(e) include in the price cap any reservation fees applicable to the route group;

(4) [Repealed 2012-28-2.]

(5) For the purposes of this section, the commissioner must determine the productivity gain that, in the commissioner's opinion, acting reasonably, the ferry operator should achieve in the following performance term;

(6) The commissioner may, in the price cap set for a route group under this section, provide for that price cap to change annually during the applicable performance term at a specified rate equal to the British Columbia consumer price index minus a productivity factor for the route group, which productivity factor:

(a) is established by the commissioner,

(b) may be positive or negative, and

- (c) reflects the anticipated productivity gain determined by the commissioner under subsection (5);

Section 55 provides for the commissioner's review of capital deployment and capital expenditures by ferry operators.

Commissioner to consider capital deployment and expenditures

55 (1) Subject to subsections (2) to (5), before deploying capital assets on, or incurring capital expenditures in connection with, a designated ferry route or terminal, the ferry operator may apply to the commissioner and the commissioner must, within one month after the application, declare whether the capital assets proposed to be deployed on, or the capital expenditures proposed to be incurred in connection with, the designated ferry route or terminal are reasonably required;

(2) A ferry operator must not incur a major capital expenditure without first obtaining the commissioner's approval of the expenditure;

(3) A ferry operator may apply to the commissioner for approval of a proposed major capital expenditure and the commissioner must respond to the application within 2 months after its receipt by the commissioner;

(4) The commissioner may approve a proposed major capital expenditure if the proposed major capital expenditure is:

- (a) reasonable,

- (b) prudent, and

- (c) consistent with:

- (i) the current Coastal Ferry Services Contract, and

- (ii) any long term capital plan established by the ferry operator;

(5) For the purposes of this section, a capital expenditure of a ferry operator is a major capital expenditure if it meets the criteria:

- (a) established from time to time by the commissioner, and

- (b) most recently provided by the commissioner to the ferry operator.

By Order 12-04 dated September 30, 2012, the commissioner established the criteria for a major capital expenditure for the purposes of section 55(5) of the Act. That order defines a major capital expenditure "as any capital expenditure which exceeds \$30 million, inclusive of component programs and interest during construction, and irrespective of the level of expenditure, any new vessel or terminal and any vessel life extension which extends the life of the vessel more than five years."

The commissioner has also published a document titled "Guidelines for British Columbia Ferry Services Inc. Respecting Applications under Section 55 of the *Coastal Ferry Act*" which sets out the information the commissioner requires from BC Ferries when it makes an application under section 55 of the Act (the "Guidelines"). The Guidelines include definitions of "Reasonable" and "Prudent" that the commissioners will use as a guide in applying the requirements of section 55.

The Act contains a confidentiality provision. Section 54 provides:

Obligation to keep information confidential

54. Despite any obligation imposed on the commissioner under this Act to obtain, maintain or make available information or records, the commissioner, every deputy commissioner, every employee of the commissioner and every inspector must not disclose or be compelled to disclose any information or record that is obtained in, or that comes to the person's knowledge during, the course of the administration of this Act or the course of any inspection authorized under this Act, unless and only to the extent that such disclosure is consistent with the *Freedom of Information and Protection of Privacy Act*.

The sections of the *Freedom of Information and Protection of Privacy Act* ("FOIPPA") that are relevant to this Application are sections 17 and 21. Section 17 of FOIPPA states in part:

Disclosure harmful to the financial or economic interests of a public body

17(1) The head of a public body may refuse to disclose to an applicant information the disclosure of which could reasonably be expected to harm the financial or economic interests of a public body or the government of British Columbia or the ability of that government to manage the economy, including the following information:

- (a) trade secrets of a public body or the government of British Columbia;
- (b) financial, commercial, scientific or technical information that belongs to a public body or to the government of British Columbia and that has, or is reasonably likely to have, monetary value;
- (c) plans that relate to the management of personnel of or the administration of a public body and that have not yet been implemented or made public;
- (d) information the disclosure of which could reasonably be expected to result in the premature disclosure of a proposal or project or in undue financial loss or gain to a third party;
- (e) information about negotiations carried on by or for a public body or the government of British Columbia;
- (f) information the disclosure of which could reasonably be expected to harm the negotiating position of a public body or the government of British Columbia.

Section 21 of FOIPPA states in part:

Disclosure harmful to business interests of a third party

21(1) The head of a public body must refuse to disclose to an applicant information:

- (a) that would reveal:
 - (i) trade secrets of a third party, or
 - (ii) commercial, financial, labour relations, scientific or technical information of or about a third party.
- (b) that is supplied, implicitly or explicitly, in confidence, and
- (c) the disclosure of which could reasonably be expected to:
 - (i) harm significantly the competitive position or interfere significantly with the negotiating position of the third party,
 - (ii) result in similar information no longer being supplied to the public body when it is in the public interest that similar information continue to be supplied,

(iii) result in undue financial loss or gain to any person or organization, or

(iv) reveal information supplied to, or the report of, an arbitrator, mediator, labour relations officer or other person or body appointed to resolve or inquire into a labour relations dispute.

Summary of the Application

BC Ferries supplied a number of documents with the Application including a financial analysis of options, a summary of the external expertise and validation reports, a demographic and demand analysis for future traffic projections for Denman and Hornby Islands, a summary of public and stakeholder consultation as well as Statements of Technical and Operational Requirements.

The Application as submitted to the commissioner included the details of the total capital expenditure for the cable ferry project which includes the vessel and associated infrastructure, (together the “Cable Ferry Project”). Due to the commercially-sensitive nature of the financial information pertaining to the Cable Ferry Project, these amounts have been redacted from the Application as shown on BC Ferries’ website to which the commissioner’s website provides a link.

BC Ferries also filed with the commissioner certain supplemental information, financial information, and other documents (“Supplemental Information”) which BC Ferries submits is commercially sensitive and contains confidential information. In the case of each document BC Ferries has stated that “the attached document contains commercially sensitive and confidential information, the disclosure of which would harm the financial, economic and commercial interests of British Columbia Ferry Services Inc. We request that confidentiality over the document be maintained in accordance with section 54 of the Coastal Ferry Act”.

The commissioner accepts BC Ferries’ request that the commissioner maintain confidentiality of the Supplemental Information in accordance with section 54 of the Act until after the procurement process is completed as disclosure of such information could reasonably be expected to harm the financial and economic interests of BC Ferries pursuant to section 17 of the FOIPPA. Accordingly, a separate order will be released to BC Ferries with the actual amount of the major capital expenditure approved by the commissioner. This separate order shall remain confidential until completion of the procurement process.

Based on the information contained in the Supplemental Information, the commissioner acknowledges that disclosure of the information could also reasonably be expected to harm the business interests of third parties.

Scope of the Review

The commissioner reviewed the Application, as well as the Supplemental Information and the responses to follow up questions provided by BC Ferries. He further considered the reports and opinions of independent consultants engaged by the commissioner. As well, the commissioner considered the comments received from the public.

It is outside the scope of the commissioner's mandate, as defined in the Coastal Ferry Act, to review and adjudicate on the safety and environmental aspects of the cable ferry project which are the responsibility of other regulatory authorities.

In fulfilling his statutory responsibilities, the commissioner is mindful of the requirement under section 38 (1)(a) of the Act to balance the interests of ferry users, taxpayers and the financial sustainability of the ferry operator "in the manner the commissioner considers appropriate". For the reasons given later in this Review, the commissioner interprets this to mean the interests of all ferry users and all taxpayers and not just the ferry users of a single route and taxpayers of a certain community. In the context of reviewing an application for approval of a major capital expenditure the commissioner is of the view that these interests are balanced if the proposed major capital expenditure meets the criteria set out in section 55(4) of the Act.

Review Process

The commissioner engaged PricewaterhouseCoopers LLP ("PwC") to provide technical and expert advice during the review of the Application. PwC in turn engaged a subcontractor, 3GA Marine Ltd. ("3GA"), to review the naval architectural and engineering aspect of the proposed cable ferry.

3GA describes its services as follows:

"The company provides inspection, survey, design engineering and project implementation support to the marine sector worldwide through associations with subject matter experts in project management, naval architecture, marine survey, environmental stewardship and marine engineering design services. 3GA comprises an association of individuals with many years' experience in the Canadian domestic and International marine consulting, shipbuilding and repair sector, backed up by very strong design and analytical capabilities.

The company's specialists provide engineering services for projects involving all manner of vessels including research vessels, ferries, tugs, barges, general work vessels and floating structures. We offer simple, innovative solutions to complex problems in the marine industry. The company is committed to a safe, clean and secure marine space through responsible and sustainable global development.”

The firms were asked to assess whether the information provided by BC Ferries in the Application and the Supplemental Information and responses to follow up questions support the proposed major capital expenditure on the cable ferry project and that such major capital expenditure is reasonable, prudent and consistent with the current CFSC and the long-term capital plan of BC Ferries.

The consultants were also asked to confirm whether or not BC Ferries had responded adequately in the Application and the Supplemental Information to the Guidelines. The consultants examined the Application and the Supplemental Information including the index or the cross reference of BC Ferries’ responses to the Guidelines contained therein and requested further supplementary information and clarifications. The consultants have advised the commissioner that the explanations and information provided by the company are satisfactory and do support the proposed major capital expenditure.

In keeping with past practice, the commissioner placed a public notice in newspapers serving ferry dependent communities to announce a 21-day period for public comment. The Application was received on December 20, 2013. To ensure the Christmas and New Year holiday period would not interfere with a full opportunity for public comments, the public notice was delayed until the beginning of January. The consultation window remained open until January 23, 2014.

In conducting this Review, the commissioner has carefully considered the opinions expressed by his consultants, as well as comments from the public in reaching his own conclusions regarding the Application. In accordance with section 55(4), the determinations and conclusion of the commissioner are based on his assessment of whether the proposed major capital expenditure is:

- (a) reasonable as defined in the Guidelines,
- (b) prudent as defined in Guidelines,
- (c) consistent with the current Coastal Ferry Services Contract and the long-term capital plan of BC Ferries.

The Guidelines provide that for purposes of applying the requirements of section 55, the commissioners will be guided by the following definitions found at BusinessDictionary.com:

“Reasonable:”

“An intelligent approach supported or justified by reason; fair, proper, sound behavior that avoids needless error and steers clear of extremes.”

“Prudent:”

“Good judgment or wisdom gained from experience, expressed in a realistic and frugal attitude. Prudence, however, is not the same as grave caution or wariness concerned only with preserving the status quo.”

PwC Conclusions and Recommendations

As a result of its review of the Application and the Supplemental Information, PwC’s conclusions contained in its report (Appendix A) follow:

“We conclude that the major capital expenditure is reasonable, prudent and consistent with the current Coastal Ferry Services Contract by BCFS [BC Ferries] and the long-term capital plan established by the Company, and it has adequately responded to the questions posed in the Section 55 Guidelines.

The proposed deployment by BCFS of the cable ferry in terms of its capacity and operating characteristics is considered reasonable and meets the terms of the CFSC.

BCFS have conducted extensive business case analysis to support the acquisition of the cable ferry. The preferred option for the acquisition of the cable ferry to serve Route 21 is the lowest cost option. The cost analysis is based on a life-cycle analysis expressed on a net present value basis which is considered good practice for assessing infrastructure options. The net present value analysis that indicates the cable ferry option can result in \$27.8 million in cost savings is reasonable. We are satisfied that the cable ferry replaces a vessel in the fleet that needs to be retired.

The process to procure the cable ferry which has been conducted is considered appropriate. BCFS has followed a number of practices in the governance of the project and in the procurement process that it has used in the successful acquisition of a number of new vessels since 2003. This includes running a robust international competition that is based on a pre-determined design and a fixed delivery schedule.

We have no major concerns regarding the Submission. There is a risk that the crewing requirement that may be determined by Transport Canada may be higher than estimated. This is unlikely to affect the ranking of the preferred option. In order to be prudent, the Commission should consider capping the capital costs for purposes of the regulatory cost base used in setting price caps for Performance Term 4.”

3GA Conclusions and Recommendations

The following conclusions and recommendations are taken from 3GA’s report (Appendix B):

“Dynamics of the system

In our view the dynamic analysis has been conducted by experienced practitioners in dynamic analysis simulations using a generic, yet proven simulation modeling technique. The results are valid for the cases considered.

In our opinion the single amplitude roll period criterion is a reasonable goal for this service. It can be expected that the cable ferry system will exhibit a roll motion in the order of that required by the design criteria (less than 5 degrees for normal operating conditions), however that needs to be validated for the operational limiting condition. The statistical approach to establishing resonance frequencies below encounter frequency provides a probability approach that shows the criterion is met.

In our opinion the design environmental loads have been adequately addressed in the dynamic analysis however there are some additional interaction of wind waves and current that need to be reviewed to establish the final design state. None of these are considered to be critical.

In our opinion the fatigue life of the drive cable has been shown to exceed the annual replacement period.

Reliability of the system

In comparison to conventional passenger vessels, on a percentage of Canadian fleet size basis, recorded incidents of failures on cable ferries number a lesser percentage than conventional passenger vessels.

The vessel is designed to all current legislative requirements for passenger vessels and redundant operational systems.

In our opinion the redundancy of the cable ferry as a system has been maximized to all reasonable extents and the effects on operational reliability mitigated. Any issues of

mechanical reliability should not lead to operational reliability that is less than that experienced by a conventional ferry.

In our opinion the mitigation measures adopted are appropriate and reasonably applied. Our review of these items indicate that indeed all of the design related risk mitigation strategies have to varying degrees been included in the tender design.

In our opinion the cable ferry mechanical reliability has been demonstrated in design as comparable to the current technology.

Performance

In our opinion the reduced speed, in comparison to a conventional vessel, of the cable ferry will not affect the overall system operational reliability.

The application is well suited to the bathymetry of the Denman island run where the bottom profile slopes gently and the sea bed is relatively smooth.

In our opinion the additional length is not a critical factor in developing the vessel system.

In our opinion the cable ferry concept has demonstrated equal operational reliability. Reliability of service provision from a technological perspective will not change the status quo, it has the same weather window of operations as the conventional ferry.

In our opinion the vessel's design exceeds the overall engineering requirements of such a vessel. All safety systems consistent with the latest passenger ship safety requirements are designed into the vessel. It will be certificated by Lloyds Register of Shipping.

Currently the existing vessel has an operational window defined by a wind speed of 55 knots. The cable ferry has been designed to that wind load.

3GA Recommendations

We recommend that the following be consider as standard operating procedures to be developed and refined as operational experience is gained:

- a. a rigorous inspection, testing and replacement protocol of the cable be put in place with an inspection frequency commensurate with loads experienced at site,
- b. operating limits and protocols based on wave conditions that avoid resonant roll by actual measurements of wind speed, wave period and height be developed.

It is further recommended that operational reliability be assured by:

- a. enabling a secondary means of recovering vessel from a propulsion system breakdown within a reasonable period of time,
- b. maintaining inventory, in the province, of non-redundant parts.”

Commissioner Findings and Determinations

1) Is the deployment of a cable ferry on Route 21 technically feasible?

The commissioner accepts the opinions of 3GA and determines that the deployment of a cable ferry on Route 21 is technically feasible. The commissioner also concludes that 3GA’s recommendations should be implemented by BC Ferries to further ensure reliability of ferry service.

2) Is a new vessel required in BC Ferries fleet at this time and is the deployment of a cable ferry reasonable?

A number of public comments note that the current vessel, the Quinitsa, still has many years of service remaining and express the opinion that a new vessel is not required on Route 21. The commissioner must consider the needs of the ferry system as a whole. BC Ferries’ 5 year capital plan which has been approved by its board has made provision for the retirement and replacement of both the North Island Princess and the Tenaka. Neither of the routes served by these vessels is suitable for a cable ferry. However redeployment of the Quinitsa is possible and would eliminate the need to construct a new conventional ferry. So, although a new ferry is not strictly required on Route 21, it is the only route where the cost savings from a cable ferry can be achieved for the benefit of all ferry users.

BC Ferries has demonstrated to the satisfaction of the commissioner that the North Island Princess must be retired and cannot be life extended any further beyond 2016. Therefore at least one new vessel is required in the fleet. In the Application BC Ferries has stated that implementing the cable ferry service will enable them to redeploy the Quinitsa, the vessel currently serving the route, as a refit relief vessel for a number of the Minor Routes, thereby enabling the retirement of another vessel in the fleet without replacement.

Needless to say the commissioner strongly supports the optimization of operating efficiencies of the ferry system as proposed in the Application.

The commissioner finds that BC Ferries' preferred option of a cable ferry and the redeployment of the existing vessel meets the definition of being reasonable as it is “*an intelligent approach supported or justified by reason; fair, proper, sound behaviour that avoids needless error and steers clear of extremes.*” The preferred option is an intelligent approach as it is consistent with the objectives of optimization of the efficiency of the ferry system and is justified by reason given that it is supported by the best practice of a financial analysis based on total life cycle costs. A cable ferry is not considered to be an extreme alternative to a conventional ferry given that there are many examples of this technology operating successfully around the world in both fresh and salt water.

Therefore the commissioner has determined that a new vessel is required and the redeployment of the existing vessel is reasonable.

3) Is the proposed major capital expenditure prudent?

The commissioner also finds the preferred option meets the definition of being prudent as “good judgment or wisdom gained from experience, expressed in a realistic and frugal attitude. Prudence, however, is not the same as grave caution or wariness concerned only with preserving the status quo.” In considering this question the commissioner looks for evidence that a proposed vessel is not over-sized, excessively opulent, inefficient or fitted with unnecessary ancillary amenities. Furthermore prudence does not rule out consideration of innovative technology.

After reviewing the technical information and the report of his naval architect consultant, the commissioner determines that the preferred option is prudent because the proposed deployment of a cable ferry on route 21 is technically feasible, the new vessel itself is designed to be as reliable as the existing vessel, the Quinitsa, and is not over-sized, opulent or fitted with unnecessary amenities. Moreover the proposed cable ferry and redeployment of the Quinitsa enhances the operating efficiency of the ferry fleet, produces lower life cycle costs and will have a positive impact on future price caps.

4) Is the proposed major capital expenditure consistent with the Coastal Ferry Services Contract and with BC Ferries’ most recent long term capital plan?

Schedule A of the CFSC stipulates core service levels for each regulated route expressed as the number of round trips to be delivered per contract year, the minimum number of round trips per day and the minimum hours of operation that BC Ferries must operate. Another requirement is that the capacity provided on each designated ferry route will be sufficient to carry the previous year’s traffic (Appendix 1 of Schedule “A” to CFSC).

BC Ferries submits that with the proposed new cable ferry it complies with the current CFSC by being able to operate the core service levels as required under the CFSC. The passenger volume modelling report by Urban Futures reports a decrease in actual population between 2006 and 2011 for Denman Island of 7% and Hornby Island of 9% and that while population growth may be seen on Denman and Hornby Islands, it also projects an aging demographic. The Application indicates that the cable ferry capacity will be sufficient to meet the most optimistic range of the traffic projection. If traffic growth proves to be higher than the most optimistic projections BC Ferries has stated that it could add capacity with more sailings, increase the licensed capacity of the vessel to accommodate more passengers, consider lengthening of the cable ferry and/or supplement cable ferry service with a passenger only ferry.

The commissioner determines that the proposed major capital expenditure is consistent with the current CFSC because the cable ferry will be able to deliver the core service levels currently required and carry the previous years' traffic volume.

On the issue of the proposed major capital expenditure being consistent with BC Ferries' most recent long term capital plan BC Ferries has submitted to the commissioner the details of its most recent Five Year Capital Plan. Upon analysis and explanation of minor variances, the commissioner is satisfied that the proposed major capital expenditure is consistent with BC Ferries' most recent long term capital plan.

5) Does the proposed cable ferry balance the interests of ferry users, taxpayers and the financial sustainability of the ferry operator?

The commissioner is required to consider the interests of ferry users, taxpayers and financial sustainability of ferry operators. The commissioner interprets that to be as broad as opposed to a narrow consideration, taking into account the interests of ferry users on all routes and taxpayers throughout the entire province. A decision not to approve the proposed major capital expenditure for the Cable Ferry Project has negative implications for ferry users on all routes. Foregoing the \$2 million annual savings which are available would negatively impact fares on all routes by 10 basis points each year for the 40-year asset life of the cable ferry. In 2011 the commissioner conducted a review of the Act, which involved public meetings in all ferry dependent communities. Over 2000 people attended the public meetings and over 200 written submissions were received. The very clear consensus from virtually all communities visited was that ferry fares must be constrained to the greatest degree possible. The commissioner can therefore be reasonably sure that ferry users on routes other than route 21 would not welcome higher fares so that a cable ferry could be avoided.

Ferry users on both Denman and Hornby Islands have not addressed the question of fare impacts in any of the submissions the commissioner has received. To be more clear, none of the submissions of any opponent of the cable ferry express a willingness to pay higher fares if the commissioner were not to approve the proposed capital expenditure for the cable ferry. Noting that ferry users on other routes are unlikely to be willing to support higher fares, it follows that the full cost of not approving the capital expenditure for the cable ferry would potentially have to be borne by those who oppose the expenditure.

The interests of taxpayers are considered when efforts are made to reduce pressure for additional transportation fees. Foregoing an opportunity to save \$2 million per year, in an environment where there is significant resistance to further fare increases could put such pressure on the taxpayer.

The financial sustainability of the ferry operator is best served by allowing it to keep costs down, as an alternative to higher fares which might meet customer resistance.

For these reasons, the commissioner considers a cable ferry to represent a balancing of the three interests he is required to consider.

Consideration of other issues raised in public comments

6) Is there an undue risk to reliability of ferry service?

A risk assessment conducted by Lloyd's Registry, an independent accreditation agency, has determined that with the implementation of certain risk mitigation measures all identified ship and marine operational hazards could be kept at a low or tolerable level. 3GA has confirmed this assessment. Details of the risks and mitigation measures are deemed by BC Ferries as being commercially sensitive and have not been publicly disclosed.

7) Has appropriate consultation taken place and has BC Ferries reasonably incorporated concerns into the proposed design and operation of a cable ferry?

The Application states that BC Ferries has conducted extensive public and stakeholder consultation and engagement with respect to the proposed Cable Ferry Project. Appendix 6 of the Application lists 26 public meetings and presentations between June 2009 and October 2013. As a result of public input gathered from these meetings and presentations, BC Ferries made four notable changes to the project including changes to the design and engineering of the vessel, crew levels, home-porting and insourcing.

The commissioner considers the level of consultation and engagement conducted for this project to have exceeded what normally would be expected. In the commissioner's view the changes BC Ferries has made are a reasonable response to public input on the project.

8) Is a cable ferry unproven technology?

Numerous public comments have made reference to the idea that a cable ferry is unproven technology, and that they will be the subjects of an experiment that might fail.

As noted above, section 38(1) of the Act enumerates the principles to be applied by the commissioner in regulating a ferry operator in relation to the core ferry services the operator provides and the tariffs. One of those principles is found in s. 38(1)(d):

(d) ferry operators are to be encouraged to be innovative and to minimize expenses without adversely affecting their safe compliance with core ferry services.

A cable ferry is in fact an innovative technology in the context of BC Ferries, which offers potential to minimize costs. As such, it clearly falls within the intent of this section of the Act, and the commissioner is required to "encourage" such innovation.

Cable ferries are an innovation for BC Ferries, but they are not unproven or experimental technology. The commissioner is advised by 3GA that there are many cable ferries operating successfully around the world. The fact that the Denman Island route will be the longest in the world is not compelling in and of itself either. No evidence has been put forward which ties the length of a cable ferry with its likelihood of successful operation. The notion that BC Ferries cannot introduce any innovation into the ferry system until it has been fully proven somewhere else in the world implies that BC cannot in fact innovate or demonstrate leadership in ferry operations which have potential to reduce pressure on fares. Such a notion is also inconsistent with the wording of s.38(1)(d).

9) Safety

The Act does not give the commissioner authority to regulate safety of vessel operations. The regulator of vessel safety in Canada is Transport Canada which may delegate certain regulatory authority to Lloyds Registry. The commissioner expects BC Ferries to meet or exceed all applicable safety legislation, regulations and standards.

In its response to the submission from the BC Ferry and Marine Workers' Union (both attached as appendices), BC Ferries states that, "Lloyds Registry has been designated by Transport Canada for overall regulation, and the ferry will be built and operated to current applicable Transport Canada regulations and standards". Further, BC Ferries states "While not required by regulation, BC Ferries intends to apply to Transport Canada to determine crew size" and "that the design of the terminals, cables and the cable ferry have all been conducted and signed off by Professional Engineers whose Association "has a code of conduct ... in regard to protecting the public ... by setting and maintaining high standards of professional practice and ethical conduct for its members."

10) Impact on local jobs and economy

There are numerous references in the public submissions to the negative impact of ferry worker job losses on the economic well-being of the two islands. The commissioner has considerable sympathy for this view, and understands the degree to which ferry employees contribute to the communities in which they reside. On the other hand, ferry users have been very clear that the commissioner must do everything possible to constrain future increases in ferry fares. Labour is the largest cost driver in the ferry system, representing some 60% of total operating cost. If labour savings are not to be permitted, the ability to bring down costs would be unreasonably constrained.

11) Interoperability

A common argument in opposition to the cable ferry is that it does not fit with the objective of an interoperable ferry system. The commissioner's own report, "Review of the Coastal Ferry Act", dated January 2012 made reference to the desirability of fleet interoperability. The matter was discussed in Chapter 9 under the topic of "Affordability". Page 70 of the report contains the following statement:

"The commissioner believes there needs to be a set of policy directives flowing from the vision setting out clear objectives covering fuel efficiency, and greater standardization and interoperability of vessels to optimize efficiency of the fleet. If other types of vessels are added to the fleet in future, (cable ferries, passenger ferries, barges, etc.), those too should be standardized to the greatest extent possible."

The commissioner's comments about interoperability were in the context of affordability and efficiency, with a view to constraining pressure on fares. The fact that a cable ferry will not be interoperable with other vessels currently in the fleet does not justify passing over an opportunity to reduce costs and take pressure off fares. That would actually be the opposite outcome of what the commissioner's report was seeking. If additional cable ferries are added to the system in future, the commissioner would expect the interoperability principle to be applied to all cable ferries.

12) Bridge alternative

Several public submissions raised the possibility that a bridge might be a cost effective alternative to a new vessel on route 21.

This idea has not been fully developed nor presented to the residents of Denman Island or the Islands Trust. Regardless, it is beyond the commissioner's jurisdiction to consider such an option. The commissioner would not, however, discourage the development of alternatives to ferry services which prove to be more cost effective and viable in future.

13) Alternative Service Provider ("ASP") option

Another principle which the commissioner is required to consider in his regulation of ferry operators is found in section 38(1)(c) of the Act: "ferry operators are to be encouraged to seek additional or alternative service providers on designated ferry routes through fair and open competitive processes".

BC Ferries did undertake a process to source an alternate service provider for a cable ferry on Route 21. The idea met with significant opposition from local residents. In the end, the ASP option was withdrawn.

Summary of Commissioner Determinations under section 55(4)

Based on his findings, as well as the conclusions of PwC and 3GA, the commissioner determines the proposed major capital expenditure as described in the Application to be:

- (a) reasonable,
- (b) prudent, and
- (c) consistent with:

- (i) the current Coastal Ferry Services Contract, and
- (ii) any long term capital plan established by the ferry operator.

Accordingly, the commissioner determines that the proposed major capital expenditure is approved subject to the following conditions:

(a) The maximum amount of the major capital expenditure for the cable ferry and associated infrastructure is set at the amount stated in the Application which will be confirmed by a separate confidential order to BC Ferries. The maximum amount will remain confidential until completion of the procurement process;

(b) BC Ferries must advise the commissioner of the actual crewing levels, as finally determined, and confirm that the projected life cycle cost savings will be achieved. If the projected life cycle cost savings are less than the projected savings in the Application the commissioner may not allow the increase in operating costs in future price cap determinations;

(c) BC Ferries must satisfy the commissioner that standard operating procedures will be developed and refined as operational experience is gained, to include:

- (i) a rigorous inspection, testing and replacement protocol of the cable be put in place with an inspection frequency commensurate with loads experienced at site,
- (ii) operating limits and protocols based on wave conditions that avoid resonant roll by actual measurements of wind speed, wave period and height be developed;

(d) Prior to deployment of the cable ferry, BC Ferries must satisfy the commissioner that operational reliability will be assured by:

- (i) enabling a secondary means of recovering vessel from a propulsion system breakdown within a reasonable period of time,
- (ii) maintaining inventory, in the province, of non-redundant parts; and

(e) At least one vessel on the minor routes will be retired so that the cable ferry does not result in a net increase in the overall size of the fleet.

Appendix A

PwC Report

BC Ferries' Application under Section 55 of the Coastal Ferry Act

BC Ferry Commission

February 20, 2014

Buckley Bay to Denman
Island (Route 21) Cable
Ferry

Note: This report has been redacted such that information of a confidential and commercially sensitive nature is not included.



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Removed as it includes information of a confidential and commercially sensitive nature

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Removed as it includes information of a confidential and commercially sensitive nature

Appendix F: BCFS Rationale for the Retirement of the Tenaka and North Island Princess

1.0 Executive Summary

PricewaterhouseCoopers LLP (“PwC”) was engaged in by the British Columbia Ferry Commission (the “Commission”) to assess British Columbia Ferry Services Inc.’s (“BCFS” or the “Company”) Application (the “Application”) for the acquisition of a new vessel submitted on December 20, 2013 in accordance with Section 55 of the *Coastal Ferry Act* (the “Act”).

We conclude that the major capital expenditure is reasonable, prudent and consistent with the current Coastal Ferry Services Contract (“CFSC”) by BCFS and the long-term capital plan established by the Company, and it has adequately responded to the questions posed in the Section 55 Guidelines.

The proposed deployment by BCFS of the cable ferry in terms of its capacity and operating characteristics is considered reasonable and meets the terms of the CFSC.

BCFS have conducted extensive business case analysis to support the acquisition of the cable ferry. The preferred option for the acquisition of the cable ferry to serve Route 21 is the lowest cost option. The cost analysis is based on a life-cycle analysis expressed on a net present value basis which is considered good practice for assessing infrastructure options. The net present value analysis that indicates the cable ferry option can result in \$27.8 million in cost savings is reasonable. We are satisfied that the cable ferry replaces a vessel in the fleet that needs to be retired.

The process to procure the cable ferry that has been conducted is considered appropriate. BCFS have followed a number of practices in the governance of the project and in the procurement process that it has used in the successful acquisition of a number of new vessels since 2003. This includes running a robust international competition that is based on a pre-determined design and a fixed delivery schedule.

We have no major concerns regarding the Application. There is a risk that the crewing requirement once it is finally determined may be higher than estimated. This is unlikely to affect the ranking of the preferred option. In order to be prudent, the Commission should consider capping the capital costs for purposes of the regulatory cost base used in setting price caps for Performance Term 4.

A summary analysis of BCFS’s responses to the Section 55 Guideline Questions is shown below.

Section 55 Category	# Section 55 questions	# Major concerns	# Minor concerns
Project Description	21	-	-
Timing and In-service Date	3	-	-
Does the Proposed Capital Expenditure Demonstrate Good Judgement, based on Wisdom, Experience and Good Sense?	8	-	-
Wise Use of Resources	6	-	-
Showing Due Consideration for the Future	7	-	-
Not Excessive	8	-	-
Demonstrating Good Value at a Fair, Moderate Price	8	-	-
Coastal Ferry Services Contract	1	-	-
Long Term Vision for Coastal Ferry Services in British Columbia	1	-	-

A life-cycle cost analysis comparing the cable ferry solution could also examine the relative environmental impacts of these options. While the cable ferry will have benefits in terms of its carbon footprint and associated health impact benefits, these considerations are outside of the scope of our work.

2.0 Background

In April 2003, the Province of British Columbia established the British Columbia Ferry Authority (the “Authority”), an independent corporation that holds the single issued voting share of BCFS.

BCFS as the operating subsidiary of the Authority provides coastal ferry services on the west coast of British Columbia. With 35 vessels travelling between 47 terminals, on 25 routes, BCFS is one of the largest ferry operators in the world, both in terms of fleet size and passengers carried. Its fleet includes a number of older vessels and the Authority has undertaken a process to upgrade its fleet.

A Coastal Ferry Services Contract existing between the Province and BCFS defines service levels on each regulated route and the Commission sets price caps across the route groups every four years. Within its operating framework, BCFS can decide on fares and routes, and can access capital markets directly.

The Commission is a provincial regulatory agency operating under the Coastal Ferry Act with responsibilities for making regulatory decisions affecting ferry operators in the Province.

The *2012 Coastal Ferry Amendment Act* amended Section 55 of the Act to require BCFS to first obtain the Commissioner’s approval before incurring a major capital expenditure (Section 55 (2)). By Order 12-04, dated September 30, 2012, the Commissioner determined that for the purposes of Section 55 (2), a major capital expenditure includes:

“any capital expenditure which exceeds \$30 million, inclusive of component programs and interest during construction, and irrespective of the level of expenditure, any new vessel or terminal, and any vessel life-extension which extends the life of the vessel by more than five years.”

On December 20, 2013 BCFS made its Application to the Commission under Section 55 of the *Coastal Ferry Act*. The Application for “Buckley Bay to Denman Island (Route 21) Cable Ferry Project” requests the following determination:

1. Notwithstanding anything in Order 12-02 establishing the definition of “major capital expenditure”, with regard to this Project it is only expenditures incurred from the date of this filing that constitute a “major capital expenditure”.

and

2. Approval, pursuant to 55(2) of the CFA, for Project capital expenditures of up to \$ < > million, including interest during construction (“IDC”).

According to the *Coastal Ferry Act*, the Commission has 2 months to respond to the Application.

The Application is in four parts:

- Section 1. Introduction
- Section 2. Project Description
- Section 3. Analysis of Options
- Section 4. Procurement and Risk

The Application is also supported by a number of appendices and supplementary information and technical reports.

3.0 *Mandate*

PwC was engaged in December 2013 by the Commission to assess the Application by BCFS for the acquisition of the new vessel. Our assessment was conducted in accordance with Section 55 of the *Coastal Ferry Act*.

Section 55 of the Act requires that BCFS demonstrates to the Commission that major capital projects be:

- a. Reasonable;
- b. Prudent; and
- c. Consistent with:
 - i. The current Coastal Ferry Services Contract,
 - ii. Any long term capital plan established by the ferry operator.

PwC was asked to review the information provided by BCFS, and, using the Section 55 Guidelines (Appendix A) and their professional expertise, provide an assessment of the Application.

Scope

The focus of PwC's assessment was on the financial aspects of the Application. The scope of our work included:

- review of the *Coastal Ferry Act* and the Section 55 Guidelines (amended in 2012 by Bill 47);
- review of the Coastal Ferry Services Contract and the Fiscal 2014 Five Year Capital Plan;
- attendance at a meeting with BCFS management and representatives of the cable ferry project team to discuss the Application;
- detailed assessment of the Application, supporting appendices and supplementary information;
- development of written questions for BCFS;
- reviewing responses to additional questions from BCFS received;
- review of additional documents provided by BCFS, including:
 - Long Range Maintenance Plan for the Tenaka and the Buckley Bay and Denman Island West terminals
 - price cap impact analysis
 - financial costs estimates for Buckley Bay and Denman Island West terminal upgrades
 - summary of Shipyard Responses to the Request for Proposals – Cable Ferry
- discussions with representatives of the Commission; and
- debrief of a draft version of this report with the Commissioner.

Subcontractors

PwC sub-contracted 3GA Marine, a technical advisor with expertise in marine architecture who reviewed the Application and had access to all the supplemental information and appropriate BCFS staff. The company's specialists provide consulting and engineering services for projects involving all manner of vessels including ferries and passenger ships, research vessels, general work vessels and floating structures. The company has in-depth knowledge of the domestic and international regulatory regimen in which passenger ship operators work. It has conducted several assignments involving cable ferry systems in Canada.

3GA Marine's assessment focussed on the naval architecture and vessel performance related issues including:

- the suitability of the cable ferry with relevance to the prevailing environmental conditions; and
- the principal particulars of the proposed vessel for size, performance and reliability.

3GA Marine's assessment is provided in a separate report to the Commission.

Notice to Readers

This Report is issued by PwC for the exclusive use of the Commission in connection with its assessment of the Section 55 Application by BCFS for the acquisition of a cable ferry.

Our work did not constitute an audit conducted in accordance with generally accepted auditing standards, an examination of internal controls nor attestation nor review services in accordance with the standards established by the Canadian Institute of Chartered Accountants. Accordingly, we do not express an opinion nor any other form of assurance on the financial or other information, or operating internal controls, of the Project.

PwC did not examine, compile or apply agreed upon procedures to satisfy the requirements of Canadian Institute of Chartered Accountants to the financial information used in this Report and we therefore are unable to express assurances on such information except where expressly stated in the Report to form part of the scope of our work.

Further this Report does not constitute an opinion as to legal matters, including the interpretation of the Coastal Ferry Act or any other similar matters. The economic impact of the various procurement options is also outside the scope of PwC's work.

Our work is based primarily on the information and assumptions listed in the body of this Report. While we read information from various sources we did not perform checking or verification procedures except where expressly stated in the Report to form part of the scope of our work. Our work and commentary is subject to assumptions, which may change with the benefit of further detailed information. We make no representation regarding the sufficiency of our work and had we been asked to perform additional work, additional matters may have come to our attention that would have been reported to the BC Ferry Commission.

Some of the documents and figures we reviewed were produced by third parties. We did not corroborate or verify these documents and figures with these parties. It is outside the scope of our review to evaluate the methodology used to conduct independent studies; therefore, we have accepted the information as presented, including conclusions. We did review the credentials of external consultants that BCFS management relied upon and that we were unfamiliar with.

The outputs of the Report are intended to provide the BC Ferry Commission with information to assist in informing their decision making process pertaining to the Project. PwC accepts no liability in respect of any loss, damage or expense of whatsoever nature is caused by any use the reader may choose to make of this Report, or which is otherwise consequent upon the gaining of access to the Report by the reader.

Our Report, including schedules and appendices, must be considered in its entirety by the reader. Selecting and relying on specific portions of the analyses, or factors considered by us in isolation may be misleading.

4.0 Approach

Our comments and conclusions are based on the formal written Application and the responses to our supplemental information requests provided by BCFS management and staff.

In reaching our conclusion about the Section 55 Application, our approach to the assessment has been to:

- provide commentary on:
 - the rationale and scope of the project;
 - the options analysed; and
 - the procurement process and its associated risks
- pose a number of clarification questions based on the Application (Appendix B)
- request additional analysis of BCFS
- provide summary comments on:
 - each of the main categories under which Section 55 Guideline questions are grouped; and
 - any major and minor concerns with the responses to each question

Concerns could stem from issues ranging from analytical approaches and procurement processes to issues of lack of clarity and adequate documentation.

Major concerns are defined as significant issues that have direct bearing on the overall conclusion about the Section 55 Application. They can relate to inadequate responses to the Section 55 Guideline questions or to the overall conclusion about the reasonableness of the request. Minor concerns are less significant in terms of their impact on the overall conclusion but still warrant comment. Each concern could be considered as an area for further review or clarification with BCFS.

5.0 Project Description

Project Overview

The project involves the implementation of a cable ferry service on Route 21 between Buckley Bay on Vancouver Island and Denman Island. Implementing the cable ferry service will enable the Company to redeploy the Quinitsa, the vessel currently serving the route, as a relief vessel for a number of the Minor Routes.

The cable ferry will be the first of its kind in the BCFS fleet. The project includes the procurement of a new open vehicle deck vessel equipped with a drive wheel system to propel the ferry along submarine cables deployed between the two berth locations. Equivalent in size to the Quinitsa, the vessel will have a vehicle capacity of 50 automobile equivalents (AEQs). It will also be equipped to carry a complement of 150 passengers and crew.

The project includes the construction of two new berths – one at the Buckley Bay terminal and the other at the Denman Island West terminal. The Denman Island West terminal is also to be expanded to incorporate a vehicle holding compound and will involve general reconfiguration of the shore side terminal.

The project is part of a fleet revitalization that includes the replacement of 10 minor vessels over the next seven years. This involves a fleet deployment strategy affecting a number of Minor Routes.

Vessel Replacement Strategy

In the Application, a conventional ferry service is compared to the cable ferry service. The introduction of the cable ferry needs to be understood in the context of vessel deployment amongst a group of Minor Routes (18, 21, 24 and 25) that share the same refit and relief vessel. In the options analysis, the Tenaka, currently serving Route 24, is retired under both options. In the Long Range Management Plan (LRMP) for the asset, this vessel is scheduled to be retired in 2016.

Under the conventional service option, a new minor vessel replaces the Tenaka on Route 24. Under the cable ferry service option, the cable ferry is introduced on Route 21 and the Quinitisa becomes a relief vessel for the Minor Routes currently served by the Tachek, so that the Tachek can replace the Tenaka on Route 24. These options are summarized in the table below.

The net impact of the preferred cable ferry option relates to the different capital costs and operating expenses related to a new minor vessel on Route 24 and the cable ferry service on Route 21. The main differences between the two options are:

- the difference in capital costs between the 50 AEQ cable ferry and a 30 AEQ conventional ferry; and
- the difference in crewing, fuel and maintenance costs between the cable ferry and a conventional ferry.

PwC has reviewed the financial models to support the options analysis and discussed the approach taken with BCFS management. We are satisfied that the financial modelling captures the main cost differences between the two options.

Section 55 Application for Cable Ferry – Vessel Options

Route	Status Quo	Option 1 Conventional	Option 2 Cable Ferry
21	Quinitisa	Quinitisa	Cable Ferry
24	Tenaka	new minor vessel	Tachek
Refit Relief *	Tachek	Tachek	Quinitisa
Retired	-	Tenaka	Tenaka

*for Routes 18, 21, 24 and 25

Comparison to Long Term Capital Plan

The timing and introduction of the cable ferry on Route 21 and the corresponding retirement of the Tenaka are consistent with BCFS's 5-Year Capital Plan. We reviewed the capital cost estimates and compared these to BCFS's 5-Year Capital Plan. The capital cost estimates are 39% higher than those indicated in the 2014 5-Year Capital Plan (updated January 9, 2014), as shown in the following table:

Option	Total Project Cost (\$m)
In 5-Year Capital Plan	
In Section 55 Application	
Difference	+39%

A detailed reconciliation has been provided by BCFS and is contained in Appendix C. The main reasons why the current estimates are higher include:

- the 5-Year Capital Plan totals have not been updated based on recent estimates;
- the 5-Year Capital Plan totals do not include interest during construction and training and deployment costs;
- engineering estimates are higher than those estimated in the earlier plan;
- the vessel is being designed to include more redundancy and more safety features than in the earlier plan; and
- an additional contingency of \$2.5 million has been added to allow for the impact of unforeseen scheduling delays and other potential factors leading to cost increases

Based on the analysis and the supporting reasons provided and our discussions with BCFS management, the differences between the capital costs in the most recent 5-Year Capital Plan and those used in the Application have been satisfactorily explained.

Consistency with Coastal Ferry Services Contract

The Commission is required to consider whether the proposed major capital expenditure is consistent with the Coastal Ferry Services Contract. Schedule A of the CFSC stipulates core service levels for each regulated route expressed as the number of round trips to be delivered per contract year, the minimum number of round trips per day and the minimum hours of operation that BCFS must operate. Another requirement is that the capacity provided on each designated ferry route will be sufficient to carry the previous year's traffic (Appendix 1 of Schedule "A" to CFSC).

BCFS submits that with the proposed cable ferry BCFS complies with the current CFSC by being able to operate the core service levels as required under the CFSC. BCFS states that due to the excellent service reliability of the Quinitsa currently operating on Route 21, a less rigorous service standard would meet the requirements of the CFSC. However, in response to concerns raised during the public consultation process, BCFS have engineered the vessel to a higher standard to enable ensure it can provide the same level of service reliability as the Quinitsa currently provides.

The current vessel size is adequate to satisfy the requirements of the CFSC. The highest and lowest actual utilizations for 2012 as a percentage of capacity are shown in the table below. BCFS currently manage certain peak loads by adding additional sailings.

Route 21 capacity reached in 2012	Vehicle capacity	Passenger capacity
Peak		
<i>Buckley Bay - Denman Island</i>		
High	100.6%	44.0%
Low	4.0%	1.0%
<i>Denman Island - Buckley Bay</i>		
High	98.0%	33.7%
Low	1.5%	0.7%
Off - Peak		
<i>Buckley Bay - Denman Island</i>		
High	85.9%	34.4%
Low	3.2%	1.2%
<i>Denman Island - Buckley Bay</i>		
High	89.7%	35.2%
Low	1.9%	0.6%

Based on the analysis in the Application and responses to questions from PwC, the new cable ferry with the same vehicle capacity should be sufficient to carry the previous year's traffic, as required under the current CFSC.

6.0 Analysis of Options

BCFS conducted a net present value (NPV) analysis on two options. The analysis included all capital costs, interest during construction, operating and maintenance costs, and periodic refit costs.

The options included are described in the following table.

NPV Analysis of Options

Option	Capital Assumptions	Operating Assumptions
Option 1: Conventional Ferry	Replacement of a 30 AEQ vessel Terminal upgrade at Denman West	Crew of 6
Option 2: Cable Ferry	Replacement of a 50 AEQ vessel Terminal upgrades at Buckley Bay and Denman West	Crew of 3

Common Assumptions

The NPV analysis used the following common assumptions:

- a discount rate of 7%;
- inflation of 2% for all capital and operating costs;
- capital cost estimates based on the purchase of new vessels;
- incremental berth and terminal upgrades required;
- assumes no tariff revenue differences in any of the options – the base NPV values are based on costs only; and
- the NPV is calculated over 40 years.

Based on the above assumptions, BCFS have calculated the NPV for the options as shown in the following table. The NPV of the cable ferry option is \$27.8 million, or 29% lower than the conventional ferry option.

NPV Summary from Options Analysis (\$m)

Option	Project Cost (incl. IDC)	40-year NPV	
		Application	NPV Ranking
Option 1: Conventional Ferry		-96	2
Option 2: Cable Ferry		-68	1

BCFS's Application is supported by an option analysis that includes replacement with a vessel size that meets the objectives of the corporate vessel replacement strategy and independent demand forecasts. The preferred option is based on the lowest net present value cost over the life of the assets.

Our assessment has included the following:

- reviewed the validity of a number of assumptions in the options analysis with a focus on the costing and other factors relevant to the Section 55 Application Guidelines;
- reviewed the logic of the model and discussed it with BCFS management;
- conducted a number of sensitivities on the base case;
- assessed the impact of alternative vessel deployment;
- assessed the demand analysis;
- assessed price cap impacts; and
- assessed the appropriateness of the discount rate applied.

In general terms, the model is consistent with standard discounted cash flow analysis and is consistent with the approaches the Company has taken with previous Section 55 applications.

Our specific comments on the cable ferry options analysis are focussed on financial aspects. Technical issues including reliability have been addressed in a separate report by 3GA Marine.

Option 1 – Conventional Ferry

Capital Costs - Vessel

BCFS have developed a capital cost for the concept design of the conventional vessel using values in a commissioned report written by STX Canada. This work uses proprietary software which manipulates a database of known similar ship construction costs. It uses a series of correction factors describing the difference in the principal characteristics of the candidate ship and the database ships and interpolates within the known data to derive an expected cost of the intended construction.

The accuracy of the estimate is dependent on the amount and relevance of the “parent” ship data. It must consider global variances in the very volatile shipbuilding market as well as the maturity of the technology.

The Application takes the STX derived build cost estimate and adds taxes and logistics costs (Project Management, delivery etc.). The assumption is that the vessel would be built domestically with no added costs for duty and exchange rates. On this basis the capital cost estimates derived in the BCFS Application for the conventional ferry option are considered reasonable.

Capital Costs - Terminal

Capital costs for the Terminal upgrade at Denman West have been developed by BCFS as Class C estimates. The cost estimates are scheduled to be completed in 2023 and include enhancements to the vehicle holding compound. We reviewed these estimates including the contingencies applied. The Class C estimates are supported by independent engineering estimates developed by KPFF Consulting Engineers (“KPFF”).

Operating Expenses

The starting point for the analysis was direct operating costs for Route 21 based on 2013 financial results for crewing, fuel and maintenance expenses. We were able to agree these numbers with the financial models used in the NPV analysis. The route statement from the financial results for 2013 is contained in Appendix D. In the analysis the crewing costs are based on a crew of 6 and the operating expenses, including crewing, fuel and maintenance, are indexed at the rate of inflation.

BCFS have estimated the life-cycle cost of the vessels over a 40-year period based on refits every four years, starting at \$2.2 million and escalating from there. This approach is consistent with refit schedules for minor vessels.

Option 2 – Cable Ferry

Capital Costs – Vessel

Capital cost estimates were developed based on design input from qualified professional firms. These include:

- engineering and environmental studies supporting the design that considered load factors from wind, wave and current (amongst others); and
- a risk registry and assessment conducted by Lloyd's Register that identified risk mitigation prior to the design (Appendix E).

On this basis the capital cost estimates derived in the BCFS Application for the cable ferry vessel are considered reasonable.

Capital Costs – Terminal

Capital costs for the terminal upgrades at Buckley Bay and Denman West have been developed by BCFS as Class C estimates. The terminal upgrades are scheduled to be completed in 2015 and are part of the integrated cable ferry system. We reviewed these estimates including the contingencies applied. The Class C estimates are supported by independent engineering estimates developed by KPFF.

Operating Expenses

Crewing expenses are based on the assumption of a crew of 3 which BCFS have stated should meet or surpass mandated crew levels.

Fuel expenses have been estimated based on fuel consumption estimates associated with the cable system. The fuel consumption estimates were developed by an independent engineer based on model resistance testing. The fuel unit costs are the same as with Option 1 which we have confirmed are reasonable. The forecasted fuel consumption is significantly less than with a propulsion system in a conventional ferry.

Maintenance expenses include refits every 10 years at significantly lower amounts than with a conventional ferry. These appear reasonable based on the different propulsion systems.

Sensitivity Tests

We conducted sensitivity tests on the following:

- capital costs of vessels
- capital cost of terminal upgrades
- crewing
- maintenance
- life-extension of the Tenaka
- discount rate

In the case of crewing, we requested BCFS conduct sensitivity tests assessing the financial impact of a higher crewing level of 4.

Summary results for the first four sensitivities are shown in the following table. The sensitivity test with maintenance costs assumes cost increases with the cable ferry only.

With the sensitivities, in all cases the NPV values of the cable ferry option are favourable in relation to the alternatives.

NPV Sensitivity on Capital Costs of Vessels (\$m)

Option	Total Project Cost (incl. IDC)	40-Year NPV		
		-25%	Base case	+25%
Option 1: Conventional Ferry		-89	-96	-103
Option 2: Cable Ferry		-63	-68	-73

NPV Sensitivity on Capital Costs of Terminal Upgrades (\$m)

Option	Total Project Cost (incl. IDC)	40-Year NPV		
		-25%	Base case	+25%
Option 1: Conventional Ferry		-93	-96	-99
Option 2: Cable Ferry		-62	-68	-74

NPV Sensitivity on Cable Ferry Crew Level (\$m)

Option	Total Project Cost (incl. IDC)	40-Year NPV	
		Crew of 3 (Base case)	Crew of 4
Option 1: Conventional Ferry		-96	-96
Option 2: Cable Ferry		-68	-72

NPV Sensitivity on Maintenance Costs (\$m)

Option	Total Project Cost (incl. IDC)	40-Year NPV		
		Base case	+50%	+100%
Option 1: Conventional Ferry		-96	N/A	N/A
Option 2: Cable Ferry		-68	-70	-72

Alternative Vessel Replacement Options – Life Extension of the Tenaka

BCFS were requested to conduct a sensitivity test on the assumption that the Tenaka were life-extended on Route 24 as a variation under Option 1 - Conventional, therefore eliminating the need to retire a vessel. The following table summarizes this analysis. Life-extending the Tenaka is described as Option 1A.

Section 55 Application for Cable Ferry – Vessel Options

Route	Status Quo	Option 1 Conventional	Option 1A Conventional	Option 2 Cable Ferry
21	Quinitsa	Quinitsa	Quinitsa	Cable Ferry
24	Tenaka	new minor vessel	Tenaka (life-extended)	Tachek
Refit Relief *	Tachek	Tachek	Tachek	Quinitsa
Retired	-	Tenaka	-	Tenaka

**for routes 18, 21, 24 and 25*

The sensitivity analysis conducted by BCFS suggests that life-extension of the Tenaka is the least preferable of the three options.

NPV Sensitivity Based on Life-Extending the Tenaka (\$m)

Option	Total Project Cost (incl. IDC)	40-Year NPV
Option 1: Conventional Ferry		-96
Option 2: Cable Ferry		-68
Option 3: Tenaka Life-Extension then Replace with New Conventional Vessel		-99

In the Application, BCFS also explain that the Company is considering life-extension of the Tenaka to eliminate the need for replacing the North Island Princess on Route 18 that is scheduled to be replaced in 2016. This option has yet to be fully assessed and would be the subject of a separate Section 55 application. This deployment does not affect the introduction of the cable ferry service on Route 21. It is, however, a departure from the current 5-Year Capital Plan. BCFS management have explained that it would only be introduced if the benefits outweigh any other deployment strategy.

BCFS were asked to provide rationale for the retirement of the Tenaka and the North Island Princess (“NIP”). The Company’s response is included in separate letters contained in Appendix F.

The NIP is 55 years old and the longest serving vessel in the fleet. The NIP was last life-extended in 2003. Recent vessel inspections suggest it is not a candidate for further life-extension and will reach the end of its service life by the spring of 2017.

The Tenaka has had 50 years of service and will reach the end of its useful life in 2015 unless it is modernized. In contrast to the NIP, the Tenaka has some possibility for life-extension but is subject to further analysis and regulatory approval.

Under all of the options shown in the table below, the NIP is retired. As a result, the addition of the cable ferry does not unnecessarily increase the size of the fleet.

Vessel Deployment Options – Routes 18, 21, 24 and 25

Route	Status Quo	Conventional Option 1		Cable Ferry Option 2	
		Option 1	Option 1A	Option 2	Option 2A
18	North Island Princess (NIP)	replaced by a new minor vessel	replaced by a new minor vessel	replaced by a new minor vessel	replaced by Tachek
21	Quinitsa	Quinitsa	Quinitsa	Cable Ferry	Cable Ferry
24	Tenaka	new minor vessel	Tenaka (life-extended)	Tachek	Tenaka (life-extended)
25	Quadra Queen II	Quadra Queen II	Quadra Queen II	Quadra Queen II	Quadra Queen II
Refit Relief	Tachek	Tachek	Tachek	Quinitsa	Quinitsa
Retired	-	NIP, Tenaka	NIP	NIP, Tenaka	NIP

	Deployment in 5-Year Capital Plan
	Comparative Option in Section 55 Application
	Other options being considered (subject to separate Section 55 application)

Discount Rate

Prior to the BC Ferry Commission Regulatory Review and the subsequent amendments to the *Coastal Ferry Act* which eliminated the regulated rate of return on equity, BCFS have regulated Return on Equity (ROE) of approximately 13% for PT2 and PT3. Its weighted senior debt costs were approximately 5.72%. Based on its capital structure, the company's weighted average cost of capital (WACC) can be estimated as follows:

Target equity of 17.5% x 13.0% ROE =	2.28%
Debt of 82.5% of total x 5.72% =	<u>4.71%</u>
WACC	6.99%
Rounded	7.0 %

The Company's WACC can be used as an appropriate discount rate. The 7% used by BCFS appears reasonable. Sensitivity was performed on the discount rate by reducing it to 6% on the basis that interest rates have fallen. This comparison is shown below. The cable ferry option is still favourable in the comparison.

We performed sensitivity analysis on the discount rate with the two main options and the life-extension of the Tenaka. The results do not change in terms of preference.

NPV Sensitivity on Discount Rate (\$m)

Option	Total Project Cost (incl. IDC)	40-Year NPV	
		7% (Base case)	6%
Option 1: Conventional Ferry		-96	-105
Option 2: Cable Ferry		-68	-76
Option 3: Tenaka Life Extension then Replace with New Conventional Vessel		-99	-111

Demand Analysis

BCFS commissioned Urban Futures, an experienced demographic forecasting firm, to examine future demand for Routes 21 and 22.

Urban Futures forecasted rates of change based on projected demographic changes and those forecasted rates of change were applied equally to passenger, passenger vehicle and commercial vehicle traffic. This appears appropriate as only 2% of total traffic was commercial.

The forecasted demand does not appear unreasonable based on historical traffic patterns and forecasted population, and the modelling examined future changes in total and specific age cohorts.

BCFS considered the Urban Futures demand growth rates in their vessel capacity analysis. Based on the forecasts the capacity of the vessel appears to be adequate under the high and low growth scenarios for the route.

The proposed cable ferry will have capacity for 150 passengers, which we consider reasonable. For the 9 sailings (0.1%) in fiscal 2013 when the passenger count exceeded 145 passengers there was sufficient capacity in the following sailing or a round trip could be provided. The options for the new cable ferry in a similar situation would be:

- operating in shuttle mode when heavy traffic conditions exist (increasing frequency of sailings and reducing wait times between sailings); and
- BCFS will be able to add additional crew, thereby increasing the passenger capacity, since the maximum passenger complement is predicated on operating with 3 crew. The vessel will be equipped with 2 life rafts each with the capacity to carry 150 passengers. Should there be the necessity to carry over 150 passengers BCFS will be able to add additional crew, thereby increasing the passenger capacity.

Price Cap Impacts

The calculations for the price cap impacts for PT3 and PT4 and for 2020 described in Section 3.5 of the Application were produced by BCFS. The PT3 price cap impact (on all routes) was calculated using the Long Term Forecast (LTF) model as it stood in 2010-11 (the model version that formed the basis for the preliminary PT3 price caps). That LTF version used the cable ferry as the base case scenario, including all capital costs and 50% of the overall operating savings contemplated in the original business case. To calculate the price cap that would have been set had the conventional ferry alternative been used, the following steps were taken:

- removed all capital expenditure related to the cable ferry;
- added all capital expenditure contemplated in the conventional ferry alternative (numbers from the original business case);
- removed model adjustments used to reduce operating expenditures by 50% of the operating savings contemplated in the business case; and
- found the annual price cap growth rate needed to produce the equivalent equity at the end of PT3 as the cable ferry case produced – the difference in price cap growth is the incremental impact that the cable ferry had on PT3 price caps.

The PT4 price cap impact (on all routes) was also calculated using the LTF, but the calculations were made using the current 2013-14 model version. The latest model version also used the cable ferry as a base case. To calculate the potential PT4 price cap impact under a conventional ferry alternative, the following steps were taken:

- removed all capital expenditure related to the cable ferry;
- added all capital expenditure contemplated in the conventional ferry alternative (numbers from the updated business case);
- removed model adjustments used to reduce operating expenditures by 100% of the operating savings contemplated in the business case; and
- found the annual price cap growth rate needed to produce the equivalent equity at the end of PT4 as the cable ferry case produced – the difference in price cap growth is the incremental impact that the cable ferry could have on PT4 price caps.

In a separate request from the Commissioner, BCFS calculated the one-time impact (a 66% fare increase) in the event the marginal impact of the foregone savings were to be borne entirely by users of Route 21. This was calculated as follows:

- estimated annual expense savings by adding: (1) the uninflated average annual operating cost savings contemplated in the revised business case and (2) an estimate of annual amortization savings from the cable ferry versus the alternative capital plan. This totalled \$2.2 million
- Route 21 had total tariff revenue (including social program fees) of \$3.3 million for FY2013

To generate a positive annual impact to net earnings equivalent to that generated by the annual savings of a cable ferry (the \$2.2 million), Route 21 would need to produce \$5.5 million in tariff revenue, which is an increase of 66.4%. All of these calculations have been independently verified by PwC as being accurate.

7.0 Issues Raised in Public Comments

BCFS Consultations

BCFS have conducted public information sessions and stakeholder consultations regarding the proposed cable ferry since June 2009.

During the feasibility stage this included:

- Meetings with Denman-Hornby Ferry Advisory Committee during the Summer and Fall of 2009 and 2011
- Information sessions hosted by BCFS on Denman Island and Hornby island during the Summer and Fall of 2009 and 2011

Meetings and Presentations with Users of Baynes Sound and other stakeholders including:

- Council of Marine Carriers (representing tow boat operators in Baynes Sound)
- Shellfish Growers of BC
- Pacific Region Recreational Boating Advisory Council
- Council of BC Yacht Clubs
- Extensive communications and consultations with 11 First Nations groups as part of the regulatory approvals process
- CRVD – Advisory Planning Commission for Baynes Sound
- Nanaimo Power & Sail Squadron
- Herring Industry Advisory Board

Consultations with Regulatory Authorities:

- Canadian Environmental Assessment Agency
- Fisheries & Oceans Canada
- Transport Canada Marine Safety – Navigable Waters Protection Program
- Provincial Integrated Land Management Bureau

After receiving regulatory approvals BCFS began with the project development phase, during which time they conducted meetings and presentations with:

- Denman-Hornby Ferry Advisory Committee during Spring 2012 and Fall 2013

- Information sessions hosted by BCFS on Denman Island and Hornby island during 2011 to 2013
- Other stakeholders in September 2013

BCFS states that as a result of feedback from stakeholders received during consultations they made the following changes to the plans for the cable ferry project:

- Commitment to a minimum crew of 3 people
- Continuation of home port on Denman island
- Replicating same level of service reliability as is provided by the current vessel now deployed on Route 21 (Quinitsa)
- Foregoing investigations for the potential opportunity to realize savings through issuance of an “operate only” RFP and commitment by BCFS to continue operating the service itself

Based on the above, BCFS appear to have undertaken extensive consultation regarding the introduction of the new cable ferry.

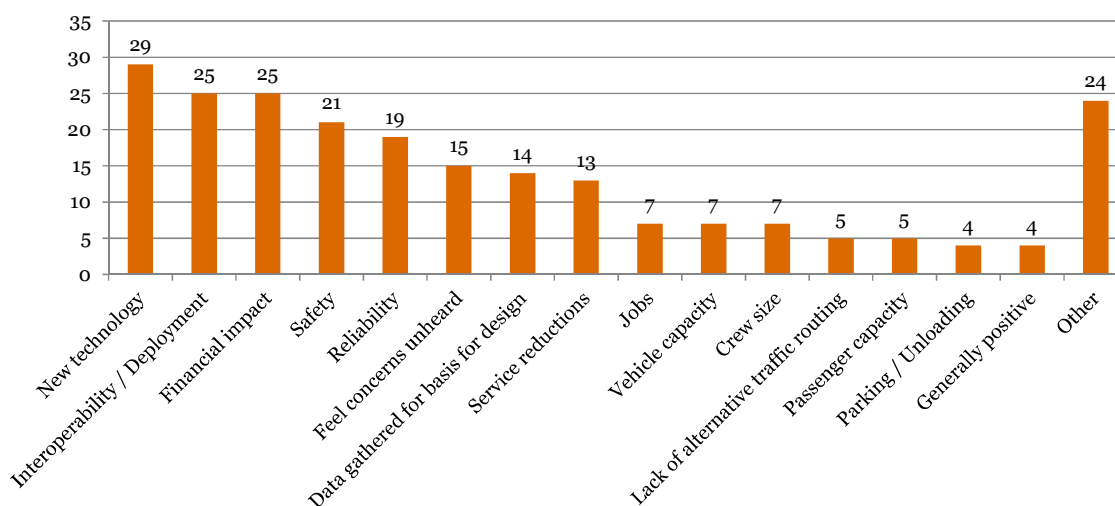
Public Input Received by the BC Ferry Commission

Upon receipt of the Application, the Commission sought public feedback by way of announcement on 23 December, 2013 on its website and by issuing a public notice in relevant media inviting comments. The Commission’s website provided a link to BCFS’s Section 55 Application and to the Section 55 Application Guidelines. Parties were provided the opportunity to write to the Commission until 23 January 2014.

A total of 67 responses were received from the public including from the Buckley Bay - Denman Island Ferry Advisory Committee. Many responses raised more than one issue and each issue raised has been included in the table below, such that there are a total of 224 comments.

The email responses have been categorised based on frequency of similar themes. Below is a summary of the number of responses by category and a general description of the nature of the comments.

Number of public comments by category



Summary of Public Comments

Description	#	Main concerns
New technology	29	Believe technology is risky given distance of Route 21 and size of proposed cable ferry
Interoperability / Deployment	25	- Inconsistent with the stated philosophy of creating a fleet of vessels which are interoperable - Confusion about which vessel is being replaced in fleet deployment strategy
Financial impact	25	- Fears that costs have been escalating over time - Confusion about what has been included in financials which have been presented to public
Safety	21	Concerns about emergency response procedures
Reliability	19	- Believe that more sailings will be cancelled than BCFS forecast - Happy with current performance of Quinitsa
Feel concerns unheard	15	Feel BCFS management have informed communities rather than consulted with them
Data gathered for basis for design	14	- Believe that environmental parameters used as basis for cable ferry design are flawed - Particular emphasis on wind data parameters
Service reductions	13	Concerns that service reductions will affect access to employment, healthcare and education for islanders
Jobs	7	Loss of employment for some BCFS workers
Vehicle capacity	7	Expectation that population on Denman and Hornby islands will change over the 40-year lifetime of the cable ferry, yet capacity cannot change
Crew size	7	Believe crew of 3 is too small to deal with operations including efficient loading and emergency response
Lack of alternative traffic routing	5	Concerned that there is no alternative for ferry users
Passenger capacity	5	Expectation that population on Denman and Hornby islands will change over the 40-year lifetime of the cable ferry, yet capacity cannot change
Parking / Unloading	4	- Unnecessary to expand parking 2 lane offloading will not help as the traffic will need to merge into one lane anyway - More BCFS staff are needed to supervise loading to make it efficient
Generally positive	4	Generally supportive of the Application
Other	24	Various other broad ranging comments

8.0 Procurement Options

Procurement Process for the Cable Ferry System

A Vessel Replacement Program (VRP) Steering Committee comprised of senior management was formed to oversee the procurement of new vessels. We believe this to be a suitable governance structure for the procurement process.

The committee considered a variety of alternatives for procurement but settled on the best practice procurement processes in the industry. Alternative service delivery was ruled out as the initial phase of the process did not support the case to move forward with an alternative service provider to design, build, acquire and operate the service. Used vessels were also ruled out as they were not considered cost effective given the simplicity of a new build, isolation of existing cable ferry routes and the relatively large vehicle capacity required of this vessel. Conversion was also discarded as being cost ineffective.

BCFS followed separate design and build processes which we consider appropriate given the integrated system required for the terminals and the Company's many needs to be considered. A single contract was awarded to design the integrated system to KPFF who in turn selected sub-contractors to design the cable ferry and the berths and terminal upgrades.

Post design, separate procurement processes were to be run for each of the cable ferry vessel, berth construction and terminal upgrades.

The cable ferry procurement process is outlined below and was a three- stage process, which we deem appropriate and good practice for vessel procurement.

Procurement Process Timeline for Cable Ferry

Time	Action	Issued	Responses received
February 2013	Request for Expressions of Interest issued	22	16
May 2013	Request for Pre-Qualifications issued	10	5
September 2013	RFP issued	3	3
Early 2014	Execution of Shipyard contract subject to Section 55 Application approval	1	-

BCFS applied a number of criteria to the evaluation of the bids. These criteria were weighted as below.

The proponent who was selected scored the highest total with respect to the criteria. This proponent also had submitted the proposal with the lowest bid. The weightings and the process for selecting the preferred proponent appear reasonable.

Cable Ferry RFP Shipyard Score Comparison Criteria and Weightings

Criteria Description	Weighting
Technical content, including compliance with the Design Package	25%
Schedule and Build Strategy	25%
Total overall Cost of the Vessel; also financing and payment terms	30%
Provision of the Bid Bond	5%
Adherence to the form of the Specimen Shipbuilding Contract, including financial & refund guarantee	15%

The proposals were received and evaluated and the final contract with the selected proponent has been approved by the Board of Directors of BCFS. Execution of the contract is subject to the Commissioner's approval of the Section 55 Application.

The construction of the two berths and the upgrading of the terminals are also being run as build-only procurement processes via Request for Proposals posted on BCFS's website with possible proponents notified through a tender notification system. We consider this process to be appropriate.

Procurement Process Timeline for Concrete Pontoons and Terminal Upgrades and Berth Infrastructure

Time	Action	Interested	Responses received
November 2013	RFP issued for concrete pontoons	-	-
December 2013	RFP issued for terminal upgrades and berth infrastructure	19	-
January 2014	RFP deadline for concrete pontoons	-	7
February 2014	RFP deadline for terminal upgrades and berth infrastructure		
Post bid closing	Review of packages by BCFS team and KPFF		
	Approval of award of contracts by BCFS President and CEO		
Early 2014	Execution of Shipyard contract subject to Application approval		

9.0 Conclusions

We conclude that the major capital expenditure is reasonable, prudent and consistent with the current Coastal Ferry Services Contract by BCFS and the long-term capital plan established by the Company, and it has adequately responded to the questions posed in the Section 55 Guidelines.

The proposed deployment by BCFS of the cable ferry in terms of its capacity and operating characteristics is considered reasonable and meets the terms of the CFSC.

BCFS have conducted extensive business case analysis to support the acquisition of the cable ferry. The preferred option for the acquisition of the cable ferry to serve Route 21 is the lowest cost option. The cost analysis is based on a life-cycle analysis expressed on a net present value basis which is considered good practice for assessing infrastructure options. The net present value analysis that indicates the cable ferry option can result in \$27.8 million in cost savings is reasonable. We are satisfied that the cable ferry replaces a vessel in the fleet that needs to be retired.

The process to procure the cable ferry that has been conducted is considered appropriate. BCFS have followed a number of practices in the governance of the project and in the procurement process that it has used in the successful acquisition of a number of new vessels since 2003. This includes running a robust international competition that is based on a pre-determined design and a fixed delivery schedule.

We have no major concerns regarding the Application. There is a risk that the crewing requirement once it is finally determined may be higher than estimated. This is unlikely to affect the ranking of the preferred option. In order to be prudent, the Commission should consider capping the capital costs for purposes of the regulatory cost base used in setting price caps for Performance Term 4.

Appendix B

3GA Report



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Review of the Section 55 Application Cable Ferry

20 February
2014

REPORT 13-10 C

REPORT 13-10 C

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1 INTRODUCTION

1.1 Objectives

The BC Ferry Commission has retained PricewaterhouseCoopers LLP (PwC) to review and provide advice regarding the approval process for BC Ferry Services Inc. (BCFS) application under Section 55 of the Coastal Ferry Act for capital expenditure respecting the procurement of a cable ferry for service to Denman Island (the “Cable Ferry”). 3GA Marine Limited (3GA) has been retained as part of that review process to provide advice specifically on the technical aspects of the application.

The charge to 3GA is to review the application and supporting technical data provided by BCFS and provide opinion on;

- a) Suitability of the cable ferry concept with relevance to the prevailing environmental conditions
- b) Principal particulars of the proposed vessel for size, reliability and technical performance
- c) Other technical assumptions used in the business case for the Cable Ferry.

In setting the objectives of this review process cognizance was taken of the feedback from public consultation. The work was focused towards answering two questions regarding the technological feasibility of the Cable Ferry in its deployment on the Denman Island crossing:

- i. Does the technical presentation demonstrate that the reliability of the Cable Ferry service will match the reliability of a conventional vessel on route 21?, and
- ii. Is the mitigation plan in the event of failure adequate?

In the first question the report deals with the design information, the input parameters defining the environment in which the vessel will operate, the simulation of the vessels response to that environment and the demonstration of the engineering design of the vessel.

The second question reviews the answers developed above and compares the performance objectives of the current vessel with the normal operational response of ferry vessels and contains a review of some other applications of cable ferries.

A subject matter expert (BMT ARGOSSE b.v.) was subcontracted to perform a review of the dynamic analysis of the cable ferry system with the same focus as described above.

1.2 Disclaimer

It should be noted that the work conducted in this review cannot be considered a “design check”. It makes opinion on the reasonability of the technical solution and how that solution was derived in design.

This report provides the 3GA review of the data as presented by BCFS to the Commissioner as supporting data to the Section 55 application. No additional analysis or numerical checking has been performed. All opinions are those of the author. This report is for the client’s information purposes only and should not be relied upon for any other purposes. 3GA have taken all reasonable efforts to ensure that the contents of the report are accurate are not in any way liable for the accuracy, suitability, completeness, currency or otherwise of the information within the report. 3GA shall have no liability whatsoever to the Customer for any claim, loss, damage, costs or expense suffered by the Client arising out of or connected with or related to use of our services.

2 ABOUT THE AUTHORS

2.1 3GA Marine Limited

3GA Marine (3GA) is an international association of marine sector professionals providing services to owners, operators and regulators of floating assets.

3GA was established in January 2012 in Victoria BC. It is a limited company incorporated in the Province of British Columbia, Canada; however, its associates are located across Canada and internationally. It has 3 principal practicing partners and directors (Shareholders) all residing in British Columbia.

The company provides inspection, survey, design engineering and project implementation support to the marine sector worldwide through associations with subject matter experts in project management, environmental stewardship, naval architecture, marine engineering, and marine operations consulting.

3GA comprises an association of individuals with many years' experience in the Canadian domestic and International marine consulting, shipbuilding and repair sector, backed up by very strong design and analytical capabilities. The company's specialists provide consulting and engineering services for projects involving all manner of vessels including ferries and passenger ships, research vessels, general work vessels and floating structures. There is an in-depth knowledge in the company of the domestic and international regulatory regimen in which ship operators and in particular, passenger ship operators' work.

3GA staff members are intimately familiar with the Canadian ferry sector and have worked on design, operations and maintenance management for ferry fleets from coast to coast. We have worked with Transport Canada (TC) as consultants on regulatory development issues and in submitting plans on behalf of owners. We have an in-depth knowledge of the regulatory regimen and are known to TC Headquarters and field inspection staff.

3GA has retained engineering support contracts with both the Ministry of Transportation and Infrastructure in British Columbia and the Ministry of Highways and Infrastructure in Saskatchewan, both of whom operate cable ferries on inland water of Canada. Under these contracts 3GA provide as and when required engineering services to the design operation and maintenance of their fleets of ferry vessels, for example 3GA is currently designing and implementing a re-engine project for the Harrop Cable Ferry in BC and overseeing the structural refurbishment of the Estuary cable ferry in Saskatchewan.

3GA considers it important to be seen as a leader in technology implementation and regulatory awareness in the marine sector and believe that our customers can rely on the knowledge base of the company to be at the forefront of industry development. The company is committed to a safe, clean and secure marine space though responsible and sustainable global development.

3GA is a member of the Canadian Ferry Operators Association.

For more information see www.3gamarine.com

2.1.1 Principal Author of the Report

The principal 3GA author for this report is **David Stocks**. He is founder and president of 3GA, an experienced Naval Architect and Engineer with over 39 years in the marine sector. He founded 3GA Marine in response to a need from the commercial marine sector in Canada and across the Pacific Rim for high quality responsive consulting services.

David immigrated to Canada in 1982 after training in a UK Shipyard and graduating from Newcastle University in Naval Architecture and Shipbuilding. His background in the Canadian marine industry started in the Beaufort oil and gas development projects of the early 80's and has since included various positions of responsibility in both the public (Transport Canada, Steam ship inspector and Coast Guard Naval Architect major crown projects) and private sectors on all three of Canada's sea coasts and also in the Great Lakes. He joined BMT Fleet Technology in 1999 in Ottawa as a Senior Project and Business Development Manager and in 2004 he won a contract with BC Ferries to support the early phases of the project that became the Super C Ferry build program and at that time he established the BMT Office in Victoria. Over the period to 2011 he oversaw BMT's growth and development as Vice President (Pacific) into a full engineering and consulting services company with offices in both Victoria and Vancouver. During this period he led several projects with BC Ferries including major refits and engineering studies, and he also led the engineering team that developed the preliminary design and oversaw the build of the first new Seabus at Victoria Shipyards. Throughout his career David has led engineers and researchers in developing solutions to complex issues by assembling teams of varied disciplines in areas of the marine sector as diverse as ice breaker design in the arctic, squat measurement in Great lakes, corrosion control, Ballast water treatment systems, bespoke ferry design and search and rescue radar systems.

David's professional affiliations include;

- Association of Professional Engineering of Ontario
- Canadian Institute of Marine Engineers
- Project Management Institute

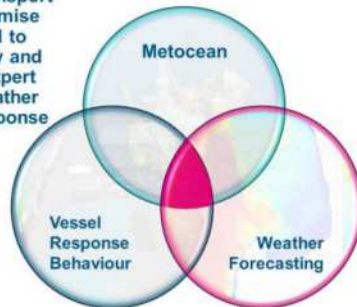
David is the immediate past chairman of Ocean Initiative BC, a volunteer group advocating for a safe and secure marine space on the British Columbia coast (www.oceanmarinespace.com).

2.2 BMT Argoss b.v.

BMT ARGOSS is a BMT Group Ltd operating company providing metocean and nautical consultancy, systems and services. Through combining expertise in the field of numerical (metocean) modelling, meteorology and weather forecasting, remote sensing data, vessel response behaviour of operating and moored ships and seabed dynamics BMT ARGOSS is able to provide a wide range of

services aimed at reducing the risks involved with design and operations.

Our mission is to assist our offshore energy, marine transport and coastal clients to optimise (engineering) design and to improve operational safety and efficiency by providing expert services in metocean, weather forecasting and vessel response behaviour.



Primary markets encompass offshore energy, marine transport and ports and terminals. In addition BMT ARGOSS also caters on shore and offshore emergency response organisations with valuable tools that make insightful the effect of the environment on object or within an area during an emergency response situation.

A Mission statement

Our clients are served by a team of specialists that include: oceanographers, meteorologists, naval architects, and mathematicians. BMT ARGOSS maintains offices in:

- ☐ Australia (Perth)
- ☐ Indonesia (Jakarta)
- ☐ Kazakhstan (Atyrau)
- ☐ Malaysia (Kuala Lumpur)
- ☐ The Netherlands (Amersfoort and Marknesse)
- ☐ United Kingdom (Aberdeen and Fareham)

The below services, consultancies are a selection the solutions that BMT ARGOSS can provide to help authorities, operators and contractors to optimise their operational efficiency and/or design.

BMT ARGOSS maintains a **24/7/365 weather and operations support centre** from where meteorological and oceanographic support is provided to support on-going operations taking place offshore and near shore. Forecasts are produced by experienced marine meteorologist that use dedicated metocean models that are operated in-house.

Consultancy projects routinely carried out by BMT Argoss staff include:

- ☐ Metocean information to support operations planning
- ☐ Metocean information to support (engineering) design
- ☐ Port, mooring and (inland) waterway layout design (feasibility) studies
- ☐ Seabed dynamics studies for subsea infrastructure
- ☐ Casualty / delay investigations and disputes

For more information: www.bmtargoss.com

3 ENVIRONMENTAL CONDITIONS AND VESSEL RESONANCE

The following describes the review of the technical information provided by BCFS to the review team in answering the two questions regarding the technological feasibility of the Cable Ferry in its deployment on the Denman Island crossing

It was conducted with the following considerations in mind:

- Whether the methods applied are appropriate for the issue/system under consideration;
- The assumptions that have been made and whether they likely to be conservative;
- Whether the input data used is consistent with expectations;
- Where this is not the case, whether the external sources of data have been correctly interpreted, based on an inspection of the references;
- Whether the results of simulations / analysis seem logical and whether they accord with past experience; and
- Whether the interpretation of the results and the conclusions drawn from them are reliable considering the assumptions and approximations in the analysis method.

3.1 Design Process

The design of the Cable Ferry has progressed through many stages including feasibility study, concept development and contract design phases. The supporting feasibility studies and data analysis has been derived by a number of subject matter experts and contributes to the overall design development. The developed design has then been issued for build tender to shipbuilding organization not involved in the design process.

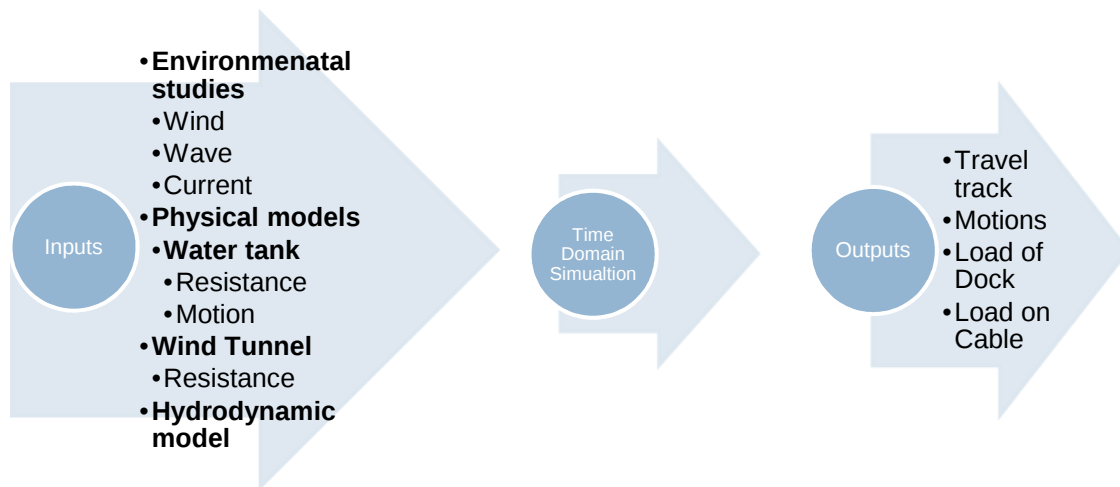
The process followed by BCFS in this acquisition is what can be considered to be the more traditional Design *then* Build process as against the more modern Design *and* Build process. The former requires multiple contracts and contractors whereas the latter puts the entire process into the single contract allowing the owner to pass performance responsibility onto the prime build contractor. In this case the performance guarantee for the end product is ultimately held by the owner (BCFS).

This process is a valid ship acquisition process. It is most often used in procurements where the owner has specific design engineering requirements that he cannot relax or where there is some uncertainty in the outcome which he has to mitigate before entering a build contract.

3.2 Dynamics of the Cable Ferry

This section is a discussion prepared by 3GA based on the findings of the BMT ARGOSS review of the dynamic response analysis presented in the BCFS material.

The following diagram shows the outline of the dynamic analysis performed by BCFS and its consultants.



The environmental conditions used in the dynamic analysis are consistent with the environmental studies that were developed separately and statistically interrogated to develop the maximum individual condition which is expected to occur once in every 100 years. There are significant interactions in the wind and waves and current. The data analysis shows for instance that (a) there is a surface current that is largely wind generated and (b) the relationship between wave height and period is relatively constant indicating the wave are locally generated wind driven waves.

The dynamic analysis is:

- a. performed in the simulated conditions of a 100 year wave and wind (17 m/s)¹ and also in 100 year wave and 55 knot (28.29 m/s) wind (which corresponds to the operational matrix maximum wind condition); and
- b. in all cases a current speed of .97 m/s (1.8 knots) is also added to the analysis. Although in the derivation reports, which set this value as the 100 year extreme, there is discussion of the stochastic nature of the current that it is not quantified. BCFS has stated that the sustained wind of 55 knots in the analysis is randomly varied to gust of 88.

Overall an analysis which uses the maximum constant operational wind speed and 100 year waves simultaneously should result in the most extreme cable loads and is thus likely conservative, however the 100 year wave conditions do not necessarily give rise to the most severe motions on the Cable Ferry. This is because wave period is a very important parameter in determining response resonance. The effect of lower wave conditions and the motion response is addressed in a separate methodology as discussed later. It is noted in a design report that the wave height is fetch limited (to a value significantly less than the predicted 100 year maximum) consequently the analysis is for an extreme condition that is unlikely to occur and therefore very conservative.

The model schematization used to compute the loads on the fender/pontoon during berthing of the Cable Ferry seem to be simplified. This does not indicate that there is a problem but it is not immediately obvious to the reviewers why the representation of the force between the ferry and the pontoon that uses a linear stiffness and some damping is conservative. In our view the analysis of the berthing energy and the fender capacity next to the results of the dynamic simulation should be reviewed.

In our view the dynamic analysis has been conducted by very experienced practitioners in dynamic analysis simulations using a generic, yet proven simulation modeling technique. The results are valid for the cases considered.

3.3 Fatigue Assessment of the Cable

The methodology used to demonstrate an adequate fatigue life of the cable itself is an industry standard for mooring systems in an offshore environment. It uses a technique that accumulates the varying stress cycles experienced by a mooring system such as the cable system in this application over the life of the material.

¹ (1 m/s = 1.9 knots)

The assumptions that have been made in developing the life summation are extremely conservative and are based on a near constant operation in extreme wave and wind conditions.

The analysis uses as its stress generation simulation calculator, the same dynamic analysis used in the overall system dynamic analysis described earlier.

A very simplified analysis of vortex induced vibration by current on the cable was also established. These were shown to be of very small significance in the overall fatigue life and are not included in the accumulated of stress cycles.

The accumulation of stress cycles does not however include any account of cycling over the drive gear and whilst the design report suggests this action is “gentle” and it is fairly low frequency (once a trip), it is not accounted for in the fatigue assessment.

The assumption throughout the process is that the cable is new (no wear), is not affected by abrasion on the ocean bottom surface, shore facilities or docks nor is there significant wear from the ferry drive system.

The results of this analysis show the expected fatigue life of the cable when invoking a standard that implies a factor of safety of 3, is in the order of 89 years.

The performance criterion for fatigue is not set in the design specification explicitly. The overall desired safety factor in cable strength is set by BCFS at an extreme of 2, consequently the review of the fatigue assessment is considered to be reasonable in its approach even though a component of the fatigue life is ignored (cycling over drive gear), the results are sufficiently conservative.

A complete and extensive cable inspection regimen is proposed that will identify any pending issues with the cable life.

In our opinion the fatigue life of the drive cable has been shown to exceed the annual replacement period.

4 PERFORMANCE, RELIABILITY AND REDUNDANCY

4.1 Performance

The following describes the review of the performance characteristics of the cable ferry system as described in the BCFS specifications.

4.1.1 Speed

The speed of the Cable Ferry vessel will be slower than the current conventional vessel in terms of its maximum transit speed. However the frequency of crossing will not be affected due to the reduction in berthing time and streamlining of loading. A maximum operating speed of 8.5 knots is high but still within the technology bounds of cable ferry systems.

In our opinion the reduced speed, in comparison to a conventional vessel, of the Cable Ferry will not affect the overall system operational reliability.

4.1.2 Motions

Motions are addressed by the designer in the early reports and then subsequently again in the model testing and the dynamic analysis.

The SOR set the limits of motion as follows:

- (3) “Transit- Normal” equates to unrestricted operation, as defined by the limiting roll condition of 5° (single amplitude)
- (4) “Transit- Limited” equates to restricted operations where the roll condition is relaxed and the vessel adopts special operational procedures

It also sets the environmental conditions for these states as:

	Sustained (knots) [mid-channel]	Wave Height/ Period [Hs/Tm] (m; s)	Current [Tidal] (m/s)
Transit - Normal	0- 35	0.5m; 2.5s	0.2
Transit - Limited	36- 54	0.6m; 3.0s	0.9

A series of analyses are set out in the data provide:

The early motion analysis is performed using relatively simple ship motion theory which calculates statistically, motion responses in a frequency domain for a floating body in a seaway. The theory relies on empirical data to validate the damping coefficients used and is restricted in its applicability when applied to large flat, low draft structures. It is unclear in the work how the designer has accommodated the damping coefficients due to a cable suspended barge system.

This analysis essentially shows that the response of the Cable Ferry to the extreme wave conditions will exceed the defined motion criteria in respect to roll amplitude. However the results were computed in conditions equating to a wave height of 1.2 meters, and period of 5 seconds. It shows a statistically significant roll of 9.5° (note; significant is usually defined as the average of the 1/3 highest rolls encountered, that value's relationship to the maximum depends on the overall distribution shape).

In the model testing tank performed, physical models of the Cable Ferry were subjected to a single set of unidirectional but irregular waves simulating the extreme condition (wave height 1.2 meters, wave period 5 seconds) at zero forward speed of the ferry in a number of wave encounter headings. It is not clear in these tests how the damping effects of the cable are incorporated into the overall response but the results of this limited test set show extreme roll values (circa 10° roll) which exceed the set criteria, however they too are in wave conditions that exceed any of the SOR set design conditions.

In the dynamic analysis the environmental conditions used are those attributable to the statistically derived 100 year occurrence wave and 2 different wind speeds. This analysis is run in a time domain i.e. a real time simulation and forward speeds are also included.

The maximum roll angle developed in this analysis notably was not in the highest wind speed but was at the lower wind with a 1.9 meters/ second (4 knot) speed of advance and was 11.6° . When considering the population of roll events recorded, the significant roll amplitude is circa 7.6° .

These analyses are all performed in the 100 year extreme conditions and are simulations of the response of the vessel. In terms of design philosophy they represent the most possible extreme loading events and are conservative estimates that are used in the strength analysis of the cable system. It is not reasonable to use such extreme values in examination of the motions to be experienced as the vessel will not be operating in such conditions (nor is the current vessel).

The designer has therefore turned from the time domain simulation to an examination of the frequency of response. In this approach rather than develop a set of response motions values the designer has examined the frequency of occurrence of various waves systems. This enables the setting of operational limits on the actual wave conditions rather than the apparent wind condition. In developing the input data for the dynamic simulation the designer has established the response spectrum of vessel, i.e. he has calculated the angle of roll that the vessel develop in response to a wave. These responses are resonant at the natural frequency of the vessel. By establishing the probability of encountering the resonant wave frequency and by association the wave height he has established the probability of the vessel motion exceeding the criteria for motions.

It is our opinion that the designer has demonstrated a set of operational limiting wave characteristics that are within a reasonable probability of occurrence, consistent with the design criteria and has demonstrated that the ship will have operational reliability levels similar to or even greater than the current vessel.

4.2 Reliability and Redundancy

The following describes the review and analysis of the overall performance of the Cable Ferry in terms of its reliability. Reliability in this review is taken to mean both consistency in delivery of service (service reliability) and consistency in component function (mechanical reliability). In considering the need for service reliability, system redundancies are often designed into an asset to mitigate the effect of break down in the mechanical reliability of individual component. Redundancy is however often expensive and if the frequency or consequence of a breakdown in mechanical reliability is acceptably low then redundancy can be deemed unnecessary.

In order to assess the service reliability of the proposed ferry system and assess the adequacy of the redundancy provided it is necessary to review the critical failure modes of the system and establish the likelihood (probable frequency) of an event.

4.2.1 Review of Cable Ferry Failures

A review of worldwide cable ferry applications was developed and presented as part of the concept development (appended list from Glosten report). These cable ferry systems represent a small sample of the total number of cable ferries in existence but does capture those which are larger in size and distance of travel. It demonstrates that the technology of cable ferries is proven in both salt water and fresh water environments and in applications close to the length of the Denman island application.

In terms of distance the closest application in seawater is the Keistio in Finland (1600 meter travel) however it is a small carrying only 10 cars. <http://www.finferries.fi/en/ferry-traffic/ferries.html?id=87#lautta-tiedotteet> .

In terms of carrying capacity the largest is the 73 car ferry at Torpoint in the UK traveling 1000 meters. <http://www.tamarcrossings.org.uk/index.aspx?articleid=35680>

The proponent does not develop any review of failures in these ferry vessels.

3GA have performed a limited review of failures and this is presented below.

For the 2 large examples from BCFS demonstrating size of service we were unable to find any failure or service reliability data for Finland (function of language probably). On the UK application the ferry vessel operates in a relatively sheltered brackish water (partially seawater) environment but it has been weather delayed in high winds and there are records of mechanical failure suspending service, however no record of failure causing the vessel to be stranded away from one of the docks. (Note there are 3 vessels running parallel to each other on this service).

More specific data is available for Canadian applications of cable ferry failures through the Transportation Safety Board (TSB) records;

There are at least 65 operating cable ferries in Canada. Every province and territory except Nunavut, PEI, and Newfoundland and Labrador has cable ferry operations. Canadian cable ferries carry between 1 and 30 cars. While some cable ferries are seasonally operated, there are many cable ferries that operate year-round, even in ice covered waters. Many Canadian cable ferries are owned and operated or contracted by provincial transportation agencies. Others, such as *Ecolos*, in the Ottawa River are wholly private enterprises.

According to the TSB there have been 30 reported occurrences of incidents involving cable ferries in Canada since 1975, but no associated fatalities. There have been 13 occurrences involving cable and drive assembly failures, of which 10 resulted in the ferry being adrift.

(source: <http://www.tsb.gc.ca/eng/rapports-reports/marine/2010/m10c0092/m10c0092.asp>)

Typical causes of these accidents have been cable overloads from ice conditions (example LeHave Nova Scotia January 2014 and *Ecolos* in Ontario) and / or overloads coupled with excessive wear and deterioration of the cable (example Westfield 1996 New Brunswick).

In comparison to conventional passenger vessel, on a percentage of fleet size basis (Canadian Registered), recorded incidents on cable ferries number a fewer percentage than conventional passenger vessels.

4.2.2 Risk Assessment

A risk assessment of the Cable Ferry and its operations at the Denman Island crossing was conducted in 2011 by Lloyds Register of Shipping. This identified a number of risk items and presented some mitigating actions to reduce those risks. Many of these were design orientated risk mitigation strategies and were subsequently dealt with during the pre-tender design phase.

At the request of the review team, BCFS revisited the risk register to update those items which were identified as being mitigated by technical design and re-analysed the risk post-tender design activities.

Our review of these items indicate that indeed all of the design related risk mitigation strategies have to varying degrees been included in the tender design.

The risk assessment developed from a technological perspective displays a low level of risk.

Mitigating activities relating to the identified failure modes include:

- a schedule of regular cable inspection and replacement regimen (cable deterioration); and
- the practice of limiting operations to a weather window defined by wind speed (overload avoidance (ice not an issue)).

In our opinion the mitigation measures adopted are appropriate and reasonably applied.

Review of the Section 55 Application Cable Ferry

4.2.3 Redundancy

The cable ferry system proposed has levels of redundancy designed into the vessel aimed at maximizing the mechanical reliability and mitigating the operational reliability. These include a propulsion system that comprises a dual diesel engine system that will enable one engine to be out of service completely and the vessel will still maintain operations and speed.

The system also has a level of redundancy in the 2 guide cables providing a redundant level of safety. The vessel is designed to all current legislative requirements for passenger vessels and redundant operational systems.

Inevitably though, with a system that only has one drive cable there is a single point of failure that can affect the vessel operational reliability, i.e. the drive train culminates in a single drive wheel system. Failure of this component, either in the cable itself or the drive wheel cannot be mitigated from a redundancy perspective. Mitigation of this failure mode is provided in the system by:

- Having spare parts readily available; for example the pre tender design specifications requires that one set of bull wheel bearings and one spare hydraulic motor be provided in the build. These items could reasonably be refitted into the vessel overnight in the event of a failure. (No provision is provided for holding an actual bull wheel assembly in spares).
- Having alternative systems to provide external back up to enable operational reliability; for example the pre build tender specification calls for the rescue boat to be capable of being launched and pushing the ferry to shore (It is unclear if this is actually incorporated in the final design or to what weather conditions it would be capable).
- Instituting inspection and maintenance routines that avoid failure due to wear or prevent issues being over looked that might lead to failure; for example a rigorous cable inspection regimen is incorporated along with an annual change out of the drive cable.

Overall the effect of any lack of mechanical reliability should not lead to operational reliability that is less than that experienced by a conventional ferry.

In some cases of critical failure the operational reliability exceeds that of the current vessel. For example the Cable Ferry is designed to operate on one engine of two engines while the second is being replaced on the run or overnight, an operation which could not be performed on the current vessel.

In our opinion the redundancy of the Cable Ferry as a system has been maximized to all reasonable extents and the effects on operational reliability mitigated. A review of critical spare parts needs to be undertaken to ensure that replacement of components is not delayed by acquiring bespoke parts such as the bull wheel assembly.

To mitigate the consequences of a mid-voyage failure of the propulsion system, the methodology that will be used to get the vessel to shore needs to be clearly defined and shown to be capable of achieving its goal in all the operational conditions. This could be an available tug large enough to push/pull the vessel or a secondary system of winching the vessel to the nearest terminal.

5 TECHNOLOGY BASED COMMENTS RECEIVED

A number of comments have been submitted, these are not addressed individually here, but the following uses a general categorization of these comments to discuss the technological feasibility of the Cable Ferry and what has been done to demonstrate that.

Innovation and prototypical application

The concept of cable ferries is well established; there are larger cable ferries in existence and application that are approaching the length of this deployment, however none are quite as long as this run. Canada has a large number of these vessels operating on both coasts and in the interior lakes, including what is currently the longest application in existence. Cable Ferries operate in saltwater environments and in conditions more exposed than Denman Island. The application is well suited to the bathymetry of the Denman island run where the bottom profile slopes gently and the sea bed is relatively smooth.

The only innovation here is the length of the run which is a small progression in the technology and in our opinion the additional length is not a critical factor in developing the vessel system.

Operational Reliability

The work undertaken in the design of this vessel and the ferry system as a whole demonstrates that the reliability of service provision from a technological perspective will not change the status quo, it has the same weather window of operations as the conventional ferry.

In our opinion the Cable Ferry concept has demonstrated equal operational reliability.

Mechanical Reliability/Redundancy

The Cable Ferry functions on diesel engine technology and as such has the same (if not greater due to newer model) mechanical reliability as the current conventional vessel. The system has been designed for complete diesel engine redundancy to the point where engine change out can be completed without disruption to the operational reliability. There is however a single point of failure that can affect the capacity of the vessel to operate. The design information presented demonstrates that this will be mitigated to a point where the effect on operational reliability will be minor primarily by having critical spare parts on hand.

The cables themselves have been designed to withstand the dynamics of the environment and follow the world's most stringent code for offshore mooring system design. They will undergo a rigorous inspection routine and the drive cable will be changed annually.

In our opinion the Cable Ferry mechanical reliability has been demonstrated in design as comparable to the current technology.

Review of the Section 55 Application Cable Ferry

Dynamic modeling of cable system

A state of the art dynamic simulation of the cable ferry system has been conducted. This takes into account many of the issues identified in the comments (earth quakes are not reviewed from a vessel perspective but seismic design of the shore facilities is).

In our opinion the dynamic analysis of the cable ferry system shows that it can withstand the environmental loads that can be expected to occur in the area of deployment, however there are some further refinements of the analysis that are recommended to be conducted.

Peak Design loads / wind

The Cable Ferry will be subjected to environmental loads from the wind, waves and current during its operations. Currently the existing vessel has an operational window defined by a wind speed of 55 knots. The Cable Ferry has been designed to that wind load. Hurricane winds have been seen however as with the current vessel the Cable Ferry will be secured to the shore when these occur.

In our opinion the design environmental loads have been adequately addressed in the dynamic analysis however there are some additional interaction of wind waves and current that need to be reviewed to establish the final design state. None of which are considered to be critical.

Under designed

The vessel is designed to the international classification society rules for passenger vessels. The vessel form has been optimized to account for the environment it will operate in. The lack of necessary propellers reduces the need for draft. All safety systems consistent with the latest passenger ship safety requirements are designed into the vessel. It will be certificated by Lloyds Register of Shipping.

In our opinion the vessel's design exceeds the overall engineering requirements of such a vessel.

Capacity and comfort

The vessel has been designed with the same car carrying capacity as the current vessel, passenger capacity has been reduced. Passenger comfort in terms of amenities will be consistent with the BCFS fleet. The vessel motions will be different than the current vessel

In our opinion the motion characteristics of the vessel have been shown not to be dangerously large in extreme conditions, however those conditions are such that the vessel would not sail, therefore some additional refinement of the analysis is recommended.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 3GA Summary Findings:

6.1.1 Dynamics of the System

In our view the dynamic analysis has been conducted by experienced practitioners in dynamic analysis simulations using a generic, yet proven simulation modeling technique. The results are valid for the cases considered.

In our opinion the single amplitude roll period criterion is a reasonable goal for this service. It can be expected that the cable ferry system will exhibit a roll motion in the order of that required by the design criteria (less than 5 degrees for normal operating conditions), however that needs to be validated for the operational limiting condition. The statistical approach to establishing resonance frequencies below encounter frequency provides a probability approach that shows the criterion is met.

In our opinion the design environmental loads have been adequately addressed in the dynamic analysis however there are some additional interaction of wind waves and current that need to be reviewed to establish the final design state. None of these are considered to be critical.

In our opinion the fatigue life of the drive cable has been shown to exceed the annual replacement period.

6.1.2 Reliability of the System

In comparison to conventional passenger vessels, on a percentage of Canadian fleet size basis, recorded incidents of failures on cable ferries number a lesser percentage than conventional passenger vessels.

The vessel is designed to all current legislative requirements for passenger vessels and redundant operational systems.

In our opinion the redundancy of the Cable Ferry as a system has been maximized to all reasonable extents and the effects on operational reliability mitigated. Any issues of mechanical reliability should not lead to operational reliability that is less than that experienced by a conventional ferry.

In our opinion the mitigation measures adopted are appropriate and reasonably applied. Our review of these items indicate that indeed all of the design related risk mitigation strategies have to varying degrees been included in the tender design.

In our opinion the Cable Ferry mechanical reliability has been demonstrated in design as comparable to the current technology.

Review of the Section 55 Application Cable Ferry

6.1.3 Performance

In our opinion the reduced speed, in comparison to a conventional vessel, of the Cable Ferry will not affect the overall system operational reliability.

The application is well suited to the bathymetry of the Denman Island run where the bottom profile slopes gently and the sea bed is relatively smooth.

In our opinion the additional length is not a critical factor in developing the vessel system.

In our opinion the cable ferry concept has demonstrated equal operational reliability. Reliability of service provision from a technological perspective will not change the status quo; it has the same weather window of operations as the conventional ferry.

In our opinion the vessel's design exceeds the overall engineering requirements of such a vessel. All safety systems consistent with the latest passenger ship safety requirements are designed into the vessel. It will be certificated by Lloyds Register of Shipping.

Currently the existing vessel has an operational window defined by a wind speed of 55 knots. The Cable Ferry has been designed to that wind load.

6.2 Recommendations

We recommend that the following be considered as standard operating procedures to be developed and refined as operational experience is gained:

- a. a rigorous inspection, testing and replacement protocol of the cable be put in place with an inspection frequency commensurate with loads experienced at site; and
- b. operating limits and protocols based on wave conditions that avoid resonant roll by actual measurements of wind speed, wave period and height be developed.

It is further recommended that operational reliability be assured by:

- a. enabling a secondary means of recovering vessel from a propulsion system breakdown or within a reasonable period of time; and
- b. maintaining inventory, in the province, of non-redundant parts.

Appendix C

Summary of Public Comments

	Concern / comment / suggestion
1	Concerned that schedule adjustments mean service reductions which threaten flexibility with respect to health care & recreation. Reduction to seniors discounts angers people.
2	Any one-off prototype venture is risky with few, if any, rewards. This is incredibly expensive "innovative" technology that cannot be used anywhere else within BCFS routes.
3	Potential cost savings are significant and BCFS should be congratulated for considering alternative modes of transport.
4	+ Satisfied with diligence of design and engineering reports. Cable ferry offers economic & environmental benefits. -BCF has handled this poorly - failing to give any concession to Denman islanders who see it as "unproven technology, safety concerns & lost jobs" - with nothing in return. Expects BCFS intends to build a vessel that needs to suspend service during bad weather and still meet service level target under the CFSA, whereas the current vessel has never had to stop sailing due to weather. Cutting first and two last runs will have a huge negative impact. If cuts must be made taking sailings out in mid-day during crew change is much more palatable. Restructuring of BCFS to make a quasi-commercial organization has not worked out well - could be time to scrap it. Seems unfair that high costs of ongoing maintenance and capital replacement must be borne by service users when it comes to ferries, but apparently not roads. Government and BCFS ignore economic principles: increase fares -> decrease ridership, decrease utility (service cuts) -> decrease demand. While in short term there is a core requirement that is less affected by price increases, discretionary travel has been significantly affected by the huge price increases over the past decade. If the government wanted to eliminate economic activity on the islands, reduce the population, and shift the demographics to retirement communities, these ferry cost and service changes would have been the top of their action plan. I do NOT have confidence in BCFS and the governance of this essential service. I spent an evening doing some research, resulting in a spreadsheet that indicates that we would be better off with a bridge.
5	One cable ferry with no replacement capability in terms of accident or malfunction makes no sense. 3 crew could not protect passengers' safety in dangerous weather situation. Deck hands are required to facilitate passenger loading.
6	Questions whether dynamic modelling of mechanical stress has been undertaken with respect to: a) expansion and contraction; a1) wind, wave, electronic testing model, a2) Caesar II pipe stress modeling of cable; b) corrosion; c) erosion; d) biological fouling; e) earthquake seismic loads; f) wind hurricane 110mph dynamic loading; g) fire hazard from ignition of hydrocarbon fuel of vessel.
7	Project is dangerous. Cable ferry broke loose in LaHave River and drifted towards sea. Wants confirmation that CBC news story link has been viewed, and that Commission fully understands public danger. Commission will be responsible in lawsuit when someone is injured or killed in an accident. Concerns with inadequate staffing, underbuilt hill and cable strength/shore tethering and

	unknown safety in a sudden wind gust. BCF have used inadequate wind data and geological information. Why is money being gambled with a unique, never tried and tested ferry when a 3 design ferry system has been put in place? Experiment is life-endangering for users who depend on safe and affordable transportation. Overpaid BCFS staff are disregarding public safety. Want confirmation of receipt of email and understanding of its contents.
8	In peak summer months existing 50AEQ service is burdened with chronic overloads. A ferry at the same capacity for 40 years does not allow for any growth on the islands.
9	Not consistent with stated objective to rationalise fleet. Standalone vessel which is unlike any vessel used by BCFS before and exceeds known parameters globally will likely engender unexpected events upon deployment.
10	Salt water corrosion on cable ferry is an issue. Better to leave as is and refit (all vessels) with new environmentally friendly 4 cycle diesel engines to reduce operating costs and lower fares.
11	Fare vs demand analysis conducted? Provide more parking spaces to avoid high fares for cars. Why was money spent on new docks that did not fit existing or future vessels?
12	Untested over such a long stretch of water, local job loss, not enough crew to deal with emergencies, cancellation increase due to rough water stranding high school students and workers far from home, and the necessary new dock would not accommodate other vessels if needed. Major concern is compromise of safety in an experiment aimed at saving a few dollars in fuel and wages.
13	Concern with lack of interoperability and adaptability with cable ferry. Residents of Denman and Hornby denied benefits of sensible standardization strategy, but made guinea pigs in half baked, unproven cable ferry experiment. Concerned with being stuck with inflexible, un-upgradeable system for 40 years. BCFS management made a profit last year allowing them to pay generous bonuses and allowing free travel for employees and their families - believes financial approach is not robust. Residents were told all along that NPV difference was \$19m and in the application the advantage is \$27.76m. BCFS should include higher capital/financing costs in their projections and determination of NPV savings. "I bet there will be some new mid-level (general overhead) management positions to take care of the cable ferry. Who will do all that, who will supervise and which account will be debited with the associated salaries and wages? Can you assure the public that the projected savings are real and not the result of creative accounting by moving costs associated with Route 21 into general overheads and administration?" "BCF determined, "that it would be an acceptable risk to operate a cable ferry at Route 21 without dolphins on a trial basis. If the conditions for the vessel during storm events are found to be unacceptable, BCFS would install dolphins following the trial period." Is that reasonable and prudent, would that need to be addressed in the business plan?

	"There was a statement by BCFS at a public meeting that if the government wants more capacity on Route 21, the government will say so and BCFS will comply. When asked how that could be accomplished with a cable ferry, there was a huge silence."
14	Not supported for many negative reasons presented already by very learned people. Listen to them!
15	Reliable all-weather transportation?
16	Concerned that oyster business will be adversely affected with respect to time to market for oysters.
17	System unproven on west coast, introduces unique operating & maintenance system. Should stand ferries & docks. "If it does not prove reliable or economic, we, the users will bear the brunt of the risk of service loss and ultimately the cost of this experiment."
18	Service reductions and fare hikes damaging to coastal communities. BCFS should divest responsibilities of servicing communities that would be better served by fixed link (e.g. Denman, Gabriola). Largest cable ferry in the world has 40 car capacity. None of the large ones operate in tidal waters. How can a fixed link to Denman Island not be much less expensive than the proposed cable ferry?
19	Price increases have had a negative impact on economy. Technical feasibility concerns: long distance of cable, salt water and high winds in winter. Are there other ways to save money instead - Denman could have a schedule similar to Hornby (with only one crew shift to save on costs). Loss of jobs to Denman is another nail in the coffin.
20	Infrastructure investment already made for current terminals is not compatible with cable ferry. No alternative travel route available. 50AEQ vessel not appropriate for future demand (obviously already anticipated by BCFS given recent infrastructure upgrades on Hornby). Drive cable and traction wheel represent single point of failure with no back-up. No alternative route. Both Denman and Hornby residents virtually unanimously opposed to cable ferry.
21	No such cable ferry exists over distance proposed. Current ferry runs well.
22	Not reasonable: Longest in world, open salt water, extreme weather at times, wind data measurement errors, crew size too small, "hi-fog water mist system" to enable smaller crew is to be deployed in passenger lounge -> passenger reactions to unexpected cold spray & inability to see will lead to panic & confusion in case of fire. Logs a navigation hazard in high tides in spring & fall. Double offloading, even if possible, would lead to traffic jams (no time gained). Not prudent: simulations not reality. Whole system "working together in the actual environment is an enormous & potentially very costly experiment." BCFS has not listened to islanders main concerns. "According to mariners with actual experience with cables, these cables are both undersized (by almost two-thirds) and unlikely to have a service life nearly as long as claimed in the proposal. Frugality and innovation are of course always desirable, but valuing them over reliability and safety is a recipe for unforeseen, totally avoidable and extremely costly disasters."

	Alleged personal ties exist between members of BCFS board and cable suppliers.... BCF has a poor track record in using unusual designs in their attempts to save money. The cable ferry proposal has all the earmarks of yet another disastrous and ultimately very costly fiasco. Not consistent with any long term plan: violates BCFS's own stated goal of flexibility and interoperability. No ferry will be able to replace it even temporarily due to non-standard terminals. What if there is a forest fire or other emergency requiring total evacuation? Maintaining a viable conventional terminal at Denman West, or building a new one, is an undeniable necessity well within 40 years. Cable ferry training costs do not appear to have been included for when other staff fill in for cable ferry workers. Suggests cost/benefit comparison for deploying one of the new slightly smaller ICFs on route 21 from mid-fall to mid-spring, with the Quinitsa deployed on route 21 from May-Oct and as a relief vessel on other minor routes the rest of the year. Given the ageing population on both islands, no one really knows which way population will trend in short or long term.
23	17 FOI requests were filed to get the information required to evaluate the project - yet BCFS state they have conducted extensive public & stakeholder consultations and listened carefully. Wind analysis in roddan engineering report is flawed - report mentions the famous storm of 4 to 6pm on Dec 11, 2006, saying "wind peaked at 26 knots. This invalidates the whole report! There is undeniable photographic evidence of hurricane force winds, water spouts reported by Comox & Chrome Island, the bottom of Denman Island was deforested. Hydro was out for 8 days. Highway signs were bent over. A light standard on the Denman dock was blown over and the wind was 26 knots! Chrome Island reports gusts over 83 knots."The vessel is under designed. "A barge with a draft of 23 inches and a freeboard of 11.8 inches held crosswise to 80 knots is in serious danger, yet it is in the submission.... There is one page of tests, all done at 32 knots, that describes 48 separate tests - everyone above allowable limited for hull; motion. Some motions are 6 and 1.2 times allowable limited. This makes one wonder if the reports get read by Ferries decision makers. The MOT has just proudly launched a new ferry for upper Arrow Lake at 5.5 meter hull depth. This cable ferry for a saltwater storm zone has only 2.1 meter depth. "Ferries now faces a unanimously agreed upon negative letter from both ratepayer groups, a negative letter from the FAC, a 1,000 name petition plus a 1,800 name petition. Some SOR statements are ridiculous (e.g. cable replacement without interrupting ferry service). The LaHave ferry in Nova Scotia broke loose about 2 weeks ago and will not be back in service for at least another week. This is the same bull wheel design in use here. p91 says the designer will confirm cable size and specification - not even pinned down with certainty yet! "It dictates the business case, because the wire issue is such a significant building block. I am not against a cable ferry, just the current iteration of this one. It needs wires of 2 and 5/8ths not 1 and 5/8ths. It needs a moulded depth of 3.5 meters not 2.1 meters. It needs transit simulations at 55 knots not 32 knots/ I have been telling Ferries this for 3 years now, but I am just a simple island Captain. The fact that I have 30 years of Command experience is not relevant to them."Why are the 2 islands excluded from the benefits of interoperability?" 'The current ferry has 4 engines, 4 drives and has a great reliability record. The proposed ferry has one drive cable and one set of bull wheels. This is a step backward, not forward."Every cable ferry in Canada has a way to drive around if it breaks down and is either free or reasonably priced. This projects shows a promise to continuously cost more per year and reduce the

	reliability to a level that is unacceptable. This is under designed and experimental."
24	Not reasonable: What happens when the current docking facilities are removed - how will breakdowns be dealt with? Engineers on Hornby have raised serious concerns about wind speed tests used by BCFS. Their questions were never adequately answered. How will a cable break be dealt with during a crossing when there are cars and passengers on board? How long does it take to replace a broken cable and at what cost? - no satisfactory answers obtained. BCF mentions the number of consultation meetings held with Denman Islanders - but these were not "consultative" but rather consisted of BCFS "telling" the community what they planned to do. There was never any attempt to "ask" the community what they felt should be done or to gather opinions. Not prudent: Any major wind in Baynes Sound will exert tremendous stress on cables. How long can cables withstand stress? Community attempts so get clear answers on total expenditures to date have been unsuccessful. Too many unknowns exist with cable ferry system. One off technology unable to be supported by other vessels in system.
25	CF does not steer clear of extremes or fall within BCFS's long term vision for vessel standardization. Significant bugs still exist with 2 systems (battery power charged from 600 V shore power overnight, LNG system for future use). - Not "prudent or reasonable for BCFS to demand our 2 communities assume the risk of both a new cable ferry and new to BCFC technology with all the associated risks." Several shipyards had specifically rejected taking part in the project. What were their reasons? Route 21 is the best location for Quinitisa. "She has been tried on other routes (Gabriola and Quadra) and was not suitable mainly because she does not handle current well and is somewhat underpowered for her size." Suggests BCFS undertake replacement trial to prove her suitability for other routes she would be used on - especially important for winter use on Northern Gulf Island routes. "After asking many questions regarding technical concerns, costs, and viewing extensive presentations, I was left less assured than I had been before the meeting." Project should be "subjected to a new, thorough independent financial review, taking into consideration the Tenaka's refit cost and the potential cost of rebuilding NIP, not to mention the doubling of the original cost estimate." Project shows no consideration for future. Zero adaptability, unless along with the LNG retrofit four leg wells with engine rooms are also installed so that the cable ferry can be converted to a Q class at a later date. Loading / unloading with only 2 deckhands will mean cars park with large gaps so will not actually be 50AEQ. Loading / unloading 2 lanes concurrently will not improve efficiency due to configuration of local roads. "What local input from employees and residents BCFC have received, has been disregarded." "The 1800 signatories of the latest petition from Denman and Hornby have spoken as clearly as they can and expressed concerns that BCFC has not answered to public satisfaction. Islanders want the excellent service provided by the Quinitisa and her crew to continue."

	"Our communities do not want to be the subject of BCFC's cable ferry experiment. We are counting on you to relate to our need for reliable, adaptable, efficient, reasonable priced transportation." "The consultant, Roddan Engineering, dismisses decades of gathered wind and wave data specific to this location, reported for every crossing by the ferry captains and contained in the Wheelhouse Log Books which are archived by BCF...Severe concerns about the validity of the gathered wind data are raised." "While the Commissioner generally emphasises the need for the application to be reasonable and prudent, on pages 15/16 of Order 13-01, he links those characterisations to standardisation and the need to 'use vessels and terminals to service multiple routes (referred to as interoperability) as opposed to their being constrained in use to a single... route.' The Commissioner will not be able to approve the cable ferry without contradicting himself."
26	No confidence that matters dealt with adequately or at all, as technical queries only vaguely answered by BCFS. Properly designed cable ferry can operate on the route successfully but concern that no tempting money pinching decisions are made to cut corners and result in unexpected consequences. Unanswered technical queries: securing ferry to dock in storm conditions, salt water corrosion of running cables, replacement of cable in short time of overnight especially in heavy weather conditions, model testing conducted to determine if 3 cables could be engineered to take equal tension in 55kt wind, provisions for evacuating passengers in event of single engine breaking down or drive cable breaking in 55 knot winds and relevant tidal current. Unless a suitable tug was kept readily available continuously (expensive), passengers would have to wait several hours on board, possibly in winter conditions. Request for business plan also unanswered. Suspects savings do not consider the repayment and debt servicing.
27	Despite BCFS's persistent comments on the non-mandatory nature of the review process, which could create a very real danger of compromising the review process as a whole, the writer requests that the Commission treat this review process exactly as required by the high standards of the applicable legislation and the Order, in recognition of the significance of the Project and the necessity of determining any flaws or deficiencies before major capital expenditures are incurred.
28	"Is it prudent and reasonable to replace a reliable and effective service with one that a) involves pushing the envelope of cable ferry systems and b) will orphan Route 21 from the rest of the coastal ferry service at a time when interoperability is becoming the guiding principle in BCFS's capital planning?" "The present service on Route 21 is excellent. It is being provided by a recently refitted vessel whose capacity and capabilities ideally match the needs of the route. Part of the proposed expenditure involves replacing the Denman West terminal which was already scheduled for replacing. But it will also involve rebuilding the recently replaced Buckley Bay terminal." "We hope this review will identify the level of savings that may realistically be achieved and

	assess whether these support a reasonable and prudent decision in the light of any potential reduction in the level and quality of service established on Route 21." "We hope this review will evaluate actual capital costs and potential savings using full information now available and in the light of current plans for fleet composition." "BCF has stated that with the proposed crew component, deckhands will not be available to ensure that vehicles are packed in tight. This is a current practice that is crucial to keeping traffic moving and limiting overloads. In assessing potential labour savings, it would be prudent to incorporate a scenario involving a larger crew component than is being proposed." "The actual fuel consumption will not be known until the vessel is in operation. It is prudent to be very conservative in projecting savings." "BCF anticipates that cables will only need to be replaced every three years, but actual operations may generate a different (and more expensive) replacement regime, given that a cable ferry with this combination of distance and size is untested in service. Again, prudence suggests a conservative approach to estimating savings. We hope this review will evaluate potential operational cost-savings in a way that takes into account potential variations from what is proposed that could come into play during actual deployment." "We hope this review will consider, with respect to the prudence and reasonableness of this proposal, whether this significant step-up in the scale of a cable ferry operation poses undue risk to the reliability of the required service and to the projected savings should the cable ferry experience problems or failures after it is deployed." "BCF is proceeding with the cable ferry, in spite of its inconsistency with the plan for standardization and interoperability, because it anticipates that significant savings will compensate for the incompatibility. We hope this review will evaluate potential savings in the light of an absence of interoperability."
29	Necessity: Dock in Buckley Bay was recently replaced, Quinita has many years left in her life, just the Denman-West terminal needs to be upgraded. Quinita is a very reliable ship, and perfectly suited for her location. Most cancellations happen due to concerns about excessive motions, brought on by orientation and frequency of the encountered waves. "It does not make sense at this time to replace a perfectly matched ferry with an unproven, highly experimental and questionable design." Evaluation of a new concept: behaviour and performance of cables ferries is not well understood in the presence of wind, wave and current environments and remains unproven - from consultant reports to BCFS for this project. "The quality of the input determines the quality of the result. Without going into details, the environmental data collection (wind and waves) and processing was marred by equipment failure, was short term, did not collect data during a prolonged "Alaska high pressure system: in the summer and generally dismissed local reports, including lighthouse bulletins and wheelhouse log book entries by the Denman ferry captains reporting wind speed and wave height among other information. Consequently, the wind and wave data used to engineer the integrated system

are not of a quality and integrity that should be used for a public transportation system, a highly experimental one in this case."

"An overall seismic assessment of the integrated cable ferry system in Baynes Sound was not done.... An overall seismic assessment including the modelling of the effects of possible tsunamis (to a minimum of 4.5m in height) on the ferry, the cables and the beach installations would be a reasonable and prudent step to assure the feasibility and long term operational availability of a cable ferry in Baynes Sound. A free floating, self-propelled ferry has a much better chance of surviving a large wave without major damage."

Business case and budget: Amounts have changed through various iterations of BCFS's presentations on the costs of the cable ferry. Advises a detailed audit.

"NPV savings from a tax payer's view are different again. A good portion of the eliminated officer's and crew member's salaries are returned to public coffers through income and consumption taxes."

Interoperability and adaptability: "BCF has embraced fleet standardization as a new corporate concept, because of the associated interoperability, adaptability to changing demand and major cost savings. They have said that they do not want ferries restricted to only one route in their corporate vessel replacement strategy. You have not only endorsed that concept yourself, you reported that a majority of British Columbians also support that idea. The majority of residents of Denman and Hornby demand, that we will be beneficiaries of that sensible concept as well."

"The ferry cannot be adapted to changing realities for at least 40 years without major additional expenditure, thereby invalidating the business case."

Ships motions in response to wind and waves: "Because of the hull design of the proposed cable ferry, roll response and associated ship's motions may restrict and limit operations at rather low significant wave heights (0.5 to 0.8m). E.Y.E. warns of sliding vehicles on the deck. A preliminary operational matrix by BCFS indicates restricted/emergency operations only beyond a wave height of 0.6m.

BCF's operational matrix: "BCF claims, that only 5 sailings a year fall into the 'cautionary' operations window with wave heights of 0.5 to 0.6m and none into the restricted/emergency operations window above 0.6m wave heights. A look at graphs of the E.Y.E Report, Appendix B, tells a completely different story."

Looking at Captain Behrens wheelhouse log book for Nov 12, 2007, the wind speed at Buckley Bay was 50kts and wave height was 4ft. "While the cable ferry would be past restricted/emergency operations, not even transporting an ambulance, the Quinitsa conducted normal operations, taking 2 vehicles to Denman Island. Something does not add up!"

Redundancies: "According to the Ministry of Transportation in Nova Scotia, the LaHave River cable ferry was a new ferry, put in service in 2010, was designed by E.Y.E. Marine Consultants and fitted with their proprietary cable drive system, just like the proposed Route 21 cable ferry. The LaHave ferry has no guide cables and drifted towards the open ocean, but that is irrelevant

	when considering redundancy of the propulsion system, as is the question why the cable broke." "The ferry will not have 'get home ability' if anything goes wrong with the bull wheels or the drive cable, nor can she limp along like the Kahloke and keep providing service until repairs can be completed. Conclusion: "The lack of redundancies and reasonable relief service during breakdowns and refits, as well as reduced service availability during adverse weather periods will have a negative effect on the economies of two islands and will change the demographics of those islands. It is highly questionable, whether a cable ferry on Route 21 will provide a financial net-benefit for the BC tax payer over the lifetime of the ferry..... The reasonable, prudent and intelligent decision is to do nothing at the moment." LNG supply and logistics will be sorted in the near future. Attached was a link to a presentation by Corvus Energy explaining benefits of hybrid technology, especially for short-run ferries. Why did BCFS not consider this or the flywheel technology being lobbied last March. It would be helpful if the Commissioner were aware of the following article regarding new research shaking up the entire notion of what could happen to the Vancouver area during an earthquake: http://www.cbc.ca/news/canada/british-columbia/earthquakes-amplified-in-silty-vancouver-basin-study-1.2504243. "I want to point out a possibly very serious mistake in the Application. The lack of redundancy in the propulsion train of the cable ferry is of grave concern. On page 96 of the Application... "In addition, the ferry will be fitted with emergency brakes for clamping the guide cables, comprising a hydraulic tensioning brake that responds to a loss in cable tension. This system will allow a damaged cable to be secured, allowing the vessel to winch back on the line. To my knowledge there will be no longer brakes on the guide cable, just one hydraulic brake on the drive cable. When cable tension is lost, that brake presumably locks onto the guide cable. However, that does not allow the ferry to winch back on the line, because without pretension the traction drive will not work. This scenario was today confirmed to me via email, by the designer of the Buckley Bay - Denman as well as the LaHave River cable ferry, E.Y.E Marine Consultants. At LaHave the cable tension was lost, and the ferry could not get traction on the cable and ran aground 2 weeks ago." Attached documentation of water spout at Denman Island from earthquake of 23 June 1946. Attached newspaper article about water spout between Denman Island and Deep Bay which caused man to drown.
30	Safety concerns after reading about LaHave cable ferry event caused by sideways wind.
31	If late night service is cancelled AA members on Hornby will be cut off from this essential health support.
32	Has there been a determination of safe passing distances for other ocean craft to pass?
33	"If the capacity of the Denman ferry is static for the next 50 years, Hornby will be stagnant, or the Ferry Corp will be faced with agitation for a direct Hornby to Vancouver Island ferry. The

	potential savings of the cable ferry....which is a theoretical reduction in crew.... could be all lost if a Hornby direct ferry has to be put into service."
34	"We believe it to be an unproven, potentially dangerous, expensive and unnecessary experiment that is clearly not wanted by those communities it will serve."
35	How do we get regular service during refits as none of the other ferries will be able to dock at Denman West? The cable ferry will run slower than our present system making it difficult to move traffic efficiently during peak periods." Given the reduced service levels, how do we get to work on Vancouver Island in a consistent manner? "Proposal is for new ferry terminals with 2 lanes offloading to speed up process but those 2 lanes will need to merge into one. I don't see the benefit of that expense and we rarely need a fifty car loading area on Denman West so why that expense." "Rumours indicate the costs of the cable ferry have doubled since the initial proposal." Alternative or servicing route with a smaller vessel (due to cost advantage) has not been considered. "Smaller vessels could double trip during peak periods moving traffic efficiently."
36	Informing about CBC interview between Pete Kimmerly and Mark Wilson. "I have nothing but praise for this section 55 process. Ferries thinks differently I believe."
37	"A large number of Denman Islanders feel they have not seen convincing evidence that the cable ferry has the technical ability to provide the same level of service, reliability and safety as the current vessel, especially in adverse weather conditions." "There is concern that the lack of interoperability within the BCF fleet will be a source of ongoing problems for this route... How will service be provided during refits or in the case of a breakdown? How can sufficiently trained and experienced relief crew and maintenance personnel be made available?... When people posed these questions at public consultation sessions about the cable ferry, they heard a variety of answers that were different at each meeting. However these are legitimate issues and need definitive answers if this review of the cable ferry is to be based on solid evidence." "Were told Tenaka would be retired and is now slated for a major upgrade.... so many unanswered questions exist about economic rationale for the project. "The move away from interoperability runs counter to the current BCF business plan and thus undermines the business case for the cable ferry. Any evaluation of the economic argument for the cable ferry needs to take into account the foreseeable and unforeseeable challenges (not just for the Hornby and Denman routes, but generally as well) that will be created over the upcoming decades due to the one-off nature of the vessel and terminals." "Our island communities and economies, like communities and economies throughout BC, need transportation and infrastructure that provides a reasonable level of consistency. This consistency is being eroded on a number of fronts. Replacing our ferry with a technology that is new, untried, and entirely disconnected to the rest of the fleet at this time fuels a growing sense of uncertainty that is harming our business climate and our social resilience." "Unless there is certainty that a cable ferry can indeed safely, reliably and consistently continue the same level of service as the Quinitsa, and produce significant savings, we urge you to pull

	the plug on the cable ferry project."
38	"We believe that we (and BCF and the Province) cannot afford to take the financial and safety risks we believe are associated with the new cable ferry experiment." The BCFS "proposal, rapidly becoming a fact, appears to be fraught with potential mechanical safety, size, adaptability, financial and other problems, all of which has been well documented and submitted repeatedly to the Ferry Corporation during the "public consultation" process. Most of it has ostensibly fallen on deaf ears..." Contrary to stated goal to create maximum flexibility.... "the cable ferry will not be able to replace any other ferry in the system, nor will any other ferry be able to replace it if it fails." It will still be the same size 40 years from now and may be incapable of serving the by then expanded two communities." "Not until all the above frequently-emphasized shortfalls and risks of the cable ferry project can be and are adequately addressed and the cable ferry design is ready to receive "final" approval, and the exact number of crew members required to operate it can be finally known, no accurate cost calculations can possibly be made, nor any real "savings" estimated. "We have never before heard such a strong and unified voice coming simultaneously from the residents of the two island communities, all of whom will potentially be deeply affected."
39	"Attended meeting after meeting wherein government proponents consulted the community by ignoring our concerns and wasting our time." "1- The cable ferry would be an oddity in the fleet and down time could be damaging to the community's access to medical services and to work; 2 - while BCF's engineers feel that the design is <i>perfect</i>, others with background and experience question the design, the ability to repair problems, use of weather data in the design (weather stats which defy island experience); 3 - cost savings have been calculated without reference to recent upgrades to Buckley Bay dock and money spent to create similar upgrade at Denman West for use by a conventional ferry is in place) and without admitting to the cost over-run which is inevitable." "We were told..." Present salt water cable ferries are excellent models of engineering success. Two such systems exist in Finland. These sites do not apply to the Baynes Sound situation because each site is unique. (No comment necessary?). A safety factor of 2.06 has been calculated based on historical wave, wind and tide information. (This minimal safety factor fails to include climate change: subsequent increased storm activity, seismic activity and rising ocean levels.) Any glitches would be addressed without disruption to services. (Replacement cable storage is distant - possible Comox storage and no guaranteed transportation/installations. Replacement ferry service depends on questionable docking upgrades and available vessels). The existing service is effective and offers a coastal service mix and match. Why reduce the possibilities following an engineer's dream?"
40	To go to a cable system type ferry is putting people's lives at risk and deflating the local economy. The price of the ferries have now put a strangle hold on the economics of the region.
41	Not interchangeable, costs of terminals and ferry have doubled. "Quinitsa is THE most efficient ship in the fleet - why replace the best with an untested, not well

	planned and costly experiment?"
42	"Research gathered is not accurate because it takes averages of waves heights and wind levels. Both quite periodically are way more severe than it states in the reports." "Loss of reliable safe marine highway, residents are in a majority of non-support and lack of confidence, negative effects of unreliable service on employment and economy, loss of jobs, property prices, risk is that the project may not work." "Cable ferries are generally used as a secondary route of transport not as a sole because they are notoriously not reliable." "the overpaid CEO's and overly managed company is sinking...."
43	Seems inefficient to have entirely different system of service and maintenance due to being only cable ferry in entire BCFS system.
44	lack of interoperability, no alternative route, flaws in safety, crewing levels and licences, weather data is very questionable, social economic concerns, and cost and cost overrun concerns, 40 years is a long time.... "At a crew meeting a few months ago with BCF managers they were unable to answer ANY of our "what if" scenarios. ... It was actually quite frightening that they got angry at us for asking these simple, realistic questions and were unable to answer them. Does it sound like they know what they're doing? Not to us it didn't.... big concerns." "We all know that the Quinitsa is really only capable of running on route 21 and she is almost new." killing communities with rising fares, BCF should concentrate on getting their financial problems in order before experimenting on us.
45	Concerns remain unsatisfactorily addressed. Concerned with safety.
46	"1. There has not been genuine public consultation on the issue... Residents have useful knowledge that would contribute to making the best decision, yet BCF has excluded consideration of their input in the fundamental decision of whether to replace the current ferry, and if so, with what. 2. There was insufficient consideration given to the environmental impact of the cable digging up the ocean bed. 3. I understand that the time for a return trip leaves no extra time for scheduled sailings, which means that the ferry can't shuttle to create extra sailings during busy times... Aside from the sheer inconvenience to residents, the potential for such lengthy waits at popular times will have a very significant chilling effect on visitors who already have to overcome steep fees to use the ferry. This in turn will have a distinct adverse effect on the islands' economy which is increasingly based on tourism. 4....A number of residents who do have technical expertise combined... with an intimate and personal knowledge of the geography of and around the islands.....have repeatedly expressed concerns on a technical level with the safety and other aspects of the feasibility of the cable ferry proposed. While such concerns should always be taken seriously, that is even more important here, where the proposal involves something unique and unprecedented."
47	Lack of due diligence regarding feasibility and safety, excluded "major expenses required for emergency contingencies (a realistic plan for emergency response to a broken cable including

	manufacture and delivery interval and/or storage facility for a backup). Response times for a tug or Coast Guard ship large enough to aid the vessel are considerable." Spending not responsible - nearly new Buckley Bay terminal facility not required, the ship which was to be retired is now being refitted.
48	"The reasons [for the cable ferry] that have been given by BCF executives have been shown over and over to be misinformed, unrealistic or just plain lies. We have brought thoughtful and fact filled feedback to the table over and over again and been disregarded or treated like fools.... We need your help to prevent this wrongheaded proposal from becoming a dysfunctional fiasco."
49	"Public endorsement of, and strong support for BC Ferries' proposed project to build and operate a cable ferry on the route" "opportunities for the involvement of BC industries" "endorsing the construction of vessels for BC Ferries" "Will benefit British Columbia and urge our affiliated unions and other unions and labour organizations to do the same"
50	"Writing to express our strong support for BC Ferries' proposed project to build and operate a cable ferry" "will create numerous direct and indirect family supporting jobs for British Columbians, while raising much needed tax revenues and providing an economic infusion to our local communities"
51	<i>Requested not to be published.</i>
52	"It will do nothing to improve or even maintain service quality currently provided.... This application is an experiment... I truly believe, from forty three years local knowledge, that the wind and wave data being used an accepted for the design purposes is absolutely wrong. I believe that to represent this data as fact could actually constitute an offence under "the Act" (article 70.1b). I have worked on this route for twelve years and have regularly experienced deals well beyond 0.6 meters. If this is the point the service is discontinued then interruptions will be far in excess of the five runs per year alleged by the corporation. It is appalling to think we should accept that level of disruption because we are currently operating over some average for the fleet."
53	Anxious about performance of ropes for cable ferry. Rope anchorage system having the ability to pay out rope, in the event that conditions of maximum rope load are experienced might be more appropriate, or larger ropes. Interoperability - will BCFS commit to maintaining the trestle and ramp at Denman West in a usable state throughout the life of the cable ferry system? Maximum operating wind speed should be set at 55kts, as stated in the application. Freeboard of the ferry hull seems small.
54	BCF should investigate alternate fuels to save money. Global warming and sea levels have not been addressed in issue of a cable ferry which in addition would not conform to the universality of the fleet.

55	"Volume of public concerns expressed in relation to the Project together with the technical and practical difficulties inherent to the Project suggest that it is neither reasonable nor prudent." "provide information regarding whether there has been complaints from the public, or other stakeholders about the existing capital asset" "concern not with the existing ferry structure but with the proposed Project itself" "The unprecedented nature of the Project as potentially the longest cable ferry operation in the world, together with the extremity of public comment it has provoked, appears to be in direct conflict with the Guidelines' definition of 'reasonable'"
56	Empty lots on the two islands will get built on, increasing population and traffic will increase. BCFS anticipated this and built new docks for the Hornby to Denman run. Why propose a 50 AEQ vessel with a life span of 40 years?
57	"We would be robbed of interoperability and orphaned from the rest of the fleet. All flexibility to adapt to changing ferry traffic and historical seasonal differences in utilization will be lost."
58	In the case of vessel failure where would the tug boat come from and where would it deliver the passengers? Too many questions, too few answers.
59	Repeat of submission #46 from a concerned family member.
60	"Insofar as sensitivity analysis has not been applied to safety issues regarding the cable ferry, then the financial implications of these various safety issues have not been fully assessed." "Such analysis, when done these days, must allow for the possibility of climate change over the next 40-50 years."; "It would appear that taking 'one-in-a-hundred years' weather data is not the most risk-averse option in the current world climate context" "the cable ferry is thus an experiment, admitted to be unique and outside the range of the firm's current area of expertise. Given the experimental nature of the project, I would have anticipated a degree of additional sensitivity analysis beyond that which might be normally expected for the calculation of ordinary capital project Net Present Values." "Given that the firm's 'general policy objectives of standardization and interoperability of its vessels' must have some major positive financial rationale, then I would have expected there to be some negative financial consequence from deviating from this policy in this case, perhaps to do with spreading maintenance and spares overheads across fewer vessels. To the contrary, the BC Ferries Application appears to positively value a reduction in the interoperable fleet, contradicting the espoused general policy. It is counter-intuitive." "I would argue that deviating from this general policy is not 'consistent with any long term capital plan established by the ferry operator" "no analysis whatsoever as to the risk associated with the rigidity of this invariable capacity constraint" "making a large capital commitment that ties this ferry route to a rigid size of vessel that cannot

	be changed for the next 40 years is neither reasonable nor prudent." "At this point I wish to give advance warning that, if the Urban Futures report had been handed in to me as a student project, it would have been returned with an F grade." "It is an interesting philosophical question for an accountant as to how to handle the balance sheet value of these dockside capital investments if they are not to be part of day-to-day ferry operations" "I know of no business in the world that can accurately predict what the demand for its services will be in 25 years' time, let alone in 35 to 40 years' time. To specify now, in 2014, that the Denman cable ferry fixed capacity will match demand in 30 years' time is nothing more or less than an extraordinary gamble." "For this reason alone I would argue that this proposed cable ferry capital investment is neither reasonable nor prudent." "All of the current anecdotal evidence points to the fact that increased ferry fares are having a large negative effect on ferry traffic demand, and upon demand for island residences. If these current trends continue, then the proposed cable ferry will be much too big in 20 to 30 years' time. The islands will be in a continuous period of decline." "Given that BC Ferries has based its capital cost estimates for the cable ferry project depending on the predications made in the Urban Futures report, I urge the BC Ferry Commission to reject the proposed capital project on the grounds that it is neither reasonable nor prudent." "Does the cable ferry capital cost analysis include the write-off of this large soon-to-be-unused capital investment? I suspect not."
61	"Experimenting with a community's vital transportation link demonstrates disrespect for a community that expressly doesn't want to be subject of the experiment." "Facts and figures show no benefit to that community and marginal if any benefit to the system at large." "It is prudent to forgo the experiment and invest in improving or bolstering the existing effective system."
62	Ferry docks were recently renovated at a significant cost. "during unstable winter weather which could leave many island children returning from school stranded on Vancouver Island", "question how safe the cable ferry will be for school aged children with only three crew on board." "We like our ferry service as is." "Same level of service?" "need to downsize on the top end and reduce their spending on executive salaries instead of trying to save money, over many. Many years, with an experimental system that may not be as efficient or safe." "How can we trust BC Ferries budget when they have proven to be fiscally irresponsible in the past?"

63	"They have already submitted a petition to the Minister of Transportation Todd Stone via the office of Comox Valley MLA Don McRae late last year. Charlie Tate, who helped gather signatures, said, "this petition shows that virtually one hundred per cent of Denman and Hornby residents oppose this project. For five years, and nine public 'consultation' meetings, Denman Islanders have consistently opposed the cable ferry. BC Ferries executives say they will go ahead no matter what we do." 1800 Denman, Hornby and other local users signed the petition and have exhausted every avenue to stop BCFC from proceeding with this project." "How does it may sense to leave Denman Hornby out of your own interoperability plan?"
64	Concerns about safety with respect to being in an earthquake zone, and being unheard.
65	"Cost of the whole project...is rising and is agreed by the proponents and opponents that the cost has doubled so far and likely will tripe as the months wear on" "As Commissioner, you and up to two deputy commissioners are appointed by the Province as Independent statutory offices. The operative word in this statement is Independent. You have the wherewithal and power and duty to adjudicate BC Ferries plans for a Cable Ferry." "I believe you are obligated to stress your independence and I also believe you are obligated to cancel the project, or at least postpone the project until a satisfactory reckoning of budget and technical details have passed scrutiny." "We have precedent of service expectations. Those expectations cannot, will not be offered by a Cable Ferry. It cannot, will not offer the residents equivalent service. It will be tied up for days in the winter months as the wind matrix will not allow it to operate." "We were taking a storm course. We had to. At that very moment, winds were clocked at 95.5 knots, or 177 km/hr at Chrome Island. We endured 20 foot swells in following seas, wave top blown into a blinding spray ahead of us. We took green water over the bow for at least 7 minutes, including while we docked at Denman West." Concerns that the Cable Ferry project structure is particular susceptible to service cancellations and delaysComments lack of customer benefit as it does not offer lower fare "Laying off of 12 fulltime mariners and several part time people will have on the communities must be addressed"; "ferries salaries alone have a sizable impact on our Islands." "BC Ferries are imposing their will upon the Islands based upon flawed science and flawed economics." "It is far better to err on the side of caution in this case, that not support a project that has no clear benefit in the next several years, let alone across a forty year span." Comments about interoperability and lawsuits that could occur when hardship and danger to life result.

66	Comments about standardization, over budget, reliability in stormy weather. "Quinitsa has many years of service left."
67	We respectfully request that the Commissioner dismiss the Application of BC Ferries dated December 20, 2013. The Commissioner must also consider whether a proposed capital expenditure such as the Cable Ferry Project is technologically feasible and presents no reasonable prospect of danger. Role of the Commissioner: "Ferry operators are to be encouraged to be innovative and to minimize expenses without adversely affecting their safe compliance with core ferry services." An intelligent approach supported or justified by reason; fair, proper, sound behaviour that avoids needless error and steers clear of extremes. We submit that it would not be reasonable of the Commissioner to approve a major capital expenditure whose object is not technologically feasible, or, has a reasonable prospect of danger. The failure of the Fast Cat Ferries was largely owing to the fact that they were not technologically feasible in that they were not suited to the marine environment they would be operating in. Surely the legislature intended the Commissioner to use s. 55 in part as a safeguard to protect against the reoccurrence of a major capital expenditure on a vessel that is not technologically feasible or safe. The Commissioner must determine that a proposed vessel is technologically feasible and presents no reasonable prospect of danger prior to approving it under s. 55. We note the warning given by Glostten Associates who were retained by BC Ferries to conduct an independent review of the overall feasibility of the Cable Ferry Project. At 1.9 km, our research indicates that the proposed ferry service would be the longest cable ferry operation in the world by about 300 meters. It is important to review the technical and financial elements at every stage of the project prior to embarking on the next stage, to ensure that the underlying fundamentals still support the project moving ahead. Consequently, there is no immediate need to replace the Quinitsa, like there was for vessels in Order 13-01. BC Ferries has not presented any evidence that the Quinitsa will be adequate to meet current service levels at its redeployment or that it will be technological feasible to operate at that route. BC Ferries has also not presented evidence or comparative cost analyses of upgrading an aged vessel, or replacing an aged vessel with a new regular vessel, rather than replacing one with the Quinitsa.

	BC Ferries has failed to demonstrate that the Cable Ferry Project is reasonably required, either to replace the Quinitsa itself, or for the purpose of redeploying the Quinitsa to replace another aging vessel. The Cable Ferry Project does not meet the criteria of this definition in that this project is extreme in its entirety. The Cable Ferry Project has not been proven to be technologically feasible. The manning of the Cable Ferry will be unsafe. BC Ferries has not presented adequate contingency plans. The proposed Cable Ferry will be the largest salt water cable ferry in the world; it will also be the longest span in the world by about 300 meters. Meanwhile, it will have a capacity of 150 passengers and 50 cars. There is no other cable ferry in the world of this size with this voyage duration. This is a high-risk project. Common practice, experience, and standard analysis methods provide little assistance in determining the technological feasibility of this unique and adventurous project. An independent review of the technological feasibility of using this cable in is required. The fact that BC Ferries has presented no evidence regarding the substantive technical features of other cable ferries, or their regulation by other jurisdictions despite recorded accidents is unreasonable. Although the Cable Ferry will be connected by its cables to terminals on shore, BC Ferries has presented no seismic analysis of the terminals ability to withstand earthquakes, nor whether the Cable Ferry will be able to withstand a tsunami. We submit that it would be unreasonable to approve the Cable Ferry Project without reviewing a seismic analysis of the integrity of the proposed Cable Ferry, and an analysis as to whether the Cable Ferry will be able to withstand a tsunami. BC Ferries has not provided a thorough underwater survey of the entire cable corridor. The cable will be subject to any obstructions and abrasions which could either interfere with the operation of the ferry, or, contribute to wear and tear of the cables. These obstructions may even include heritage ship wrecks. An independent review should also be completed of the wind and wave analyses done by BC Ferries. Members of the Community and the Union have observed that many of the wind and waves for the area are understated. The proposed Cable Ferry will have the same, albeit smaller, equipment as any vessel in BC
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	Ferries fleet and yet have no qualified individual with a Technical Certificate of Competency on board. We submit it is very dangerous not to have some level of Certificate of Competency on board. In the event of an emergency, the size and qualifications of the crew determines the size of the firefighting party, their roles during evacuation, and the crew's ability to maintain crowd control and access to muster stations. This is not at all an example of steering clear of extremes. BC Ferries has presented no evidence regarding whether it is feasible to safely and efficiently load and unload the proposed Cable Ferry with only three crew members. Such manning will compromise safety, and will fail to either maximize occupancy on board, or fail to minimize time spent loading as anticipated. After the Demand Island West berth is retired in as little as 7 years, there will not be readily available alternative to the Cable Ferry within the BC Ferry fleet. Strangely, BC Ferries has presented no evidence on how cable rotation and replacement or routine maintenance is to occur. BC Ferries has not submitted any evidence that it will ensure the availability of a tugboat within the proximity of the Route 21 to respond to an emergency. It is not reasonable for the Cable Ferry Project to have no alternative service plans for even routine maintenance, and that the lack of redundancies presents a reasonable prospect of danger. There is a significant risk that the small amount of projected savings over the lifespan of the Cable Ferry Project is likely to be eliminated. The assumptions are that: (1) the Quinitsa will be able to replace another vessel; and (2) Transport Canada will approve a manning requirement of three. We respectfully submit that it would be imprudent for the Commissioner to approve of the project without having reviewed a comparative cost analysis of these options, and without evidence that the Quinitsa is able to replace another vessel. We respectfully request that the Commissioner notify Transport Canada of the Union's safety concerns relating to manning. Cable ferry vessel replacement parts will not be interchangeable, and alternate ferries will not be able to utilize the Cable Ferry's unique terminals. It is doubtful that the Cable Ferry Project will be able to meet the needs of the islands' increasing population and rising demand. BC Ferries has failed to present evidence with respect to the amount of cancellations the Cable
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	Ferry will undergo as routine maintenance such as rotation and replacement of cables is conducted. These reductions in service are all the more concerning the reliance of Denman and Hornby Island's aging and increasing population on Route 21 for ambulance service. The absence of budgeting for the terminals that are required to accommodate the Cable Ferry docking at either end of Route 21. We note that it is not clear which vessel the Quinitsa is intended to replace. The Cable Ferry Project is therefore inconsistent with the face of the Long Term Capital Plan. The Community and the Union have raised serious concerns regarding the Cable Ferry Project's finances, technological feasibility, and safety. An independent review of the Cable Ferry Project is required. The proposed Cable Ferry will be unique in the world and therefore it departs from past experience. However, B Ferries has also failed to make reference to comparative cable and cable ferry manning specifications and regulations. The Cable Ferry Project will realize only a small annual net profit over the course of its lifetime while it presents considerable risk. The Cable Ferry Project projects savings by presuming it will be able to eliminate the need of replacing another vessel, and by presuming Transport Canada will approve a crew of 3. The Cable Ferry Project also fails to take advantage of BC Ferries fleet standardization program. The Cable Ferry Project does not show due consideration for the future. It will reduce passenger capacity at Route 21 for the next 40 years. Meanwhile, ridership and the population of Denman and Hornby Islands which rely on Route 21 are projected to increase. The Cable Ferry Project will not be able to support increased demand. BC Ferries has not demonstrated that the Cable Ferry Project is reasonably required. The Quinitsa will not retire until 2024/2025. Nor has BC Ferries presented evidence that the Cable Ferry Project will be less expensive than either upgrading an old vessel, or replacing an old vessel with a regular vessel. Is the total cost different in any respect from what was approved in the capital plan? This is unclear to the Union due to redactions. The Cable Ferry Project will result in a permanent service reduction. The Cable Ferry will not be standardized with the rest of the fleet.
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Appendix D

Denman-Hornby Island Ferry Advisory Committee Submission

Denman-Hornby Ferry Advisory Committee

Comments on Section 55 Application with respect to BC Ferries' Cable Ferry Proposal for Route 21

15 January 2014

Introduction

The Denman-Hornby Ferry Advisory Committee has not taken a position for or against the cable ferry project. What we have done is to make sure that BC Ferries is aware of questions and concerns arising from our communities, encouraged opportunities for direct communication between BC Ferries and residents of Denman and Hornby Islands and provided advice on particular aspects of the project.

BC Ferries has acted upon some of the key issues raised by:

- Changing the proposed home port from Buckley Bay to Denman West
- Deciding to not pursue an alternative service provider
- Commissioning an independent engineering review
- Agreeing to explore solutions that would maintain a public boat ramp on Denman Island
- Voluntarily applying for this Section 55 review.

We are glad this review is happening because ferry users in our communities continue to have significant concerns. We understand that some specific concerns, such as crewing levels and operational safety, are outside the scope of the review. But we believe the review could address a fundamental question we hear voiced by many:

Is it prudent and reasonable to replace a reliable and effective service with one that a) involves pushing the envelope of cable ferry systems and b) will orphan Route 21 from the rest of the coastal ferry service at a time when interoperability is becoming a guiding principle in BC Ferries' capital planning?

Rationale for the proposed capital expenditure

This Section 55 application is unusual in that the capital expenditure is not necessary with respect to addressing service on the route to which it is being applied. The present service on Route 21 is excellent. It is being provided by a recently refitted vessel whose capacity and capabilities ideally match the needs of the route. Part of the proposed expenditure involves replacing the Denman West terminal which was already scheduled for replacing. But it will also involve rebuilding the recently replaced Buckley Bay terminal.

There is no rationale for the capital expenditure with respect to the Route on which it is being applied.

The rationale is that the capital and operational savings generated from the expenditure will be applied system wide to reduce the upward pressure on fares. Capital savings are expected to accrue from the difference between the cost of building a conventional vessel and the cost of building a cable ferry plus the cost of terminal reconstruction. Operational savings are expected to accrue from reduced labour, fuel and maintenance costs.

We hope this review will identify the level of savings that may realistically be achieved and assess whether these support a reasonable and prudent decision in the light of any potential reduction in the level and quality of service established on Route 21.

Proposed capital asset

The original proposal was that the deployment of a cable ferry would coincide with the planned retirement of the *Tenaka*, which is a relief vessel for mostly northern Gulf Island routes. Building the cable ferry (plus the terminal work) was estimated by BCF to be far cheaper than building a conventional ship to replace the *Tenaka*. The *Quinitsa*, which is now a perfect fit for Route 21, would then become a relief vessel. However, the *Quinitsa* does not have the capability to serve on some of the more exposed routes where the *Tenaka* is often deployed.

BCF is now suggesting that, instead of being replaced, the *Tenaka* will have a life extension. This changes the context of capital planning that contributed to the original business case for the cable ferry. Also, now that BCF is ready to tender contracts for construction of the cable ferry and terminals, there is a better sense of actual costs (including feasibility and development costs as well as time expended by BC Ferries salaried staff expended so far) than when estimates were used in the business case.

We hope this review will evaluate actual capital costs and potential savings using full information now available and in the light of current plans for fleet composition.

Deployment and operation of the asset

The anticipated operational savings for the cable ferry are projected by BC Ferries to come from reduced labour, fuel and maintenance costs.

Labour is a significant cost component. BC Ferries anticipates savings will come from reducing the current crew of six for the *Quinitsa* to a crew of three for the cable ferry. However, Transport Canada's crewing requirements are being conjectured at this stage and will not be known for sure until the vessel has actually been constructed. While BCF has stated that a crew of one or two is usual for a cable ferry, the vessel proposed for Route 21 will have by far the largest capacity of any cable ferry in Canada (and the second largest capacity of any in the world).

In addition, it may well be that BCF finds that a crew larger than three could be needed for operational effectiveness (as current crew members of the *Quinitsa* assert), particularly during the peak season when there are frequent overloads and traffic backed up along the roads. BCF has stated that with the proposed crew component, deckhands will not be available to ensure that vehicles are packed in tight. This is a current practice that is crucial to keeping traffic moving and limiting overloads.

In assessing potential labour savings, it would be prudent to incorporate a scenario involving a larger crew component than is being proposed.

BCF initially suggested that the cable ferry could reduce fuel consumption on Route 21 by about a half. BCF is now suggesting the reduction would be by about a third. The actual fuel consumption will not be known until the vessel is in operation. It is prudent to be very conservative in projecting savings.

BCF cites reduced maintenance costs as a major anticipated saving. However, there are two factors (perhaps among others) that may change this. BCF anticipates that the cable ferry will only need to be refitted once every ten years rather than once every four, as is required for the *Quinitsa*. If it turns out that more frequent refits are required this could add significantly to the cost. BCF anticipates that cables will only need to be replaced every three years, but actual operations may generate a different (and more expensive) replacement regime, given that a cable ferry with this combination of distance and size is untested in service. Again, prudence suggests a conservative approach to estimating savings.

We hope this review will evaluate potential operational cost-savings in a way that takes into account potential variations from what is proposed that could come into play during actual deployment.

Consistency with Coastal Ferry Services Contract

The Coastal Ferry Services Contract specifies the minimum level of service required on Route 21. BCF is proposing that the cable ferry deliver a comparable level of service to that being provided by the *Quinitsa* which exceeds contractual requirements. This is prudent because there are times when, even with the vessel operating in shuttle mode, traffic backs up on the roads creating a safety hazard.

BCF's confidence that such service can be provided is based on modeling rather than on available evidence of a comparable cable ferry operating reliably and safely to move this volume of traffic. This is because there is no comparable ferry in operation. According to our understanding, the Route 21 cable ferry will be the longest in the world and the second largest in the world. While cable ferries are indeed operating successfully around the world, this cable ferry will be significantly pushing the envelope of cable technology with respect to a unique combination of size and distance.

We hope this review will consider, with respect to the prudence and reasonableness of this proposal, whether this significant step-up in the scale of a cable ferry operation poses undue risk to the reliability of the required service and to the projected savings should the cable ferry experience problems or failures after it is deployed.

Consistency with long term capital planning

BCF's current Business Plan includes the following statements: *"To support safe and efficient operations and minimize the impact on fares, we plan to build standardized vessels to provide interoperability and design optimization."*

The proposed cable ferry project is counter to this plan. It will essentially orphan Route 21 from the rest of the coastal ferry system with respect to interoperability. Crew – including potential relief crew – will have to be specifically trained to operate this unique vessel. The same applies to maintenance personnel. Replacement vessels will not be able to operate on Route 21 when the aging existing Denman West dock is no longer usable (likely within five to ten years). There will not be the flexibility to use a smaller or larger vessel should traffic levels change or to address seasonal fluctuations more efficiently (lower utilization in the off-peak season is being characterized as an inefficiency). BCF is proceeding with the cable ferry, in spite of its inconsistency with the plan for standardization and interoperability, because it anticipates that significant savings will compensate for the incompatibility.

We hope this review will evaluate potential savings in the light of an absence of interoperability.

Appendix E

Extract from BC Ferry and Marine Workers' Union Submission



BC FERRY & MARINE WORKERS' UNION

1511 Stewart Avenue
Nanaimo, BC V9S 4E3
250.716.3454 or 1.800.663.7009
250.716.3455 Facsimile

Via Email

January 23, 2014

B.C. Ferry Commission
P.O. Box 9279
Stn Prov Govt
Victoria, BC V8W 9J7

Attention: Mr. Gordon Macatee

Re: Section 55(2) Review of BC Ferry Service's Application for Major Capital Expenditure on Cable Ferry Project on Denman Island Route

Dear Sir,

British Columbia Ferry and Marine Workers Union (the "Union") would like to thank the Commissioner for the opportunity to comment on the proposed cable ferry project between Buckley Bay on Vancouver Island and Denman Island (the "Cable Ferry Project" and "Route 21").

We understand that BC Ferries has agreed to be bound by the Commissioner's decision in submitting an application under s. 55 of the *Coastal Ferries Act*, SCB 2003, c 14, (the "Act") and that it cannot incur further capital expenditures on the Cable Ferry Project without first obtaining the Commissioner's approval.

The Union respectfully submits that the proposed Cable Ferry Project is not reasonably required under s. 55(1) of the Act, nor does it meet any of the criteria under s. 55(4). We also submit that the Cable Ferry Project if implemented will result in a permanent reduction of service. Consequently, we respectfully request that the Commissioner dismiss the Application of BC Ferries dated December 20, 2013 (the "Application").

We will address the criteria under s. 55(4) specifically and by following the Commissioner's Order Number 12-04 and the *Guidelines for British Columbia Ferry Services Inc. Respecting Applications under Section 55 of the Coast Ferry Act* (the "Guidelines"). However, prior to discussing the submissions we will first review the scope of s. 55 regarding the issues that the Commissioner must consider. We respectfully submit that the Commission's review of a proposed capital expenditure is broad and must include a review of whether a new vessel, and in this case its terminals, are technologically feasible and present no reasonable prospect of danger.

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AFFILIATED WITH:

BC Federation of Labour

BC Government & Service Employees' Union

Canadian Labour Congress

National Union of Public & General Employees

International Transport Workers' Federation



We ask that you carbon copy our legal counsel, Anthony Glavin and Daniel Bertrand of Koskie Glavin Gordon on all responses to this submission.

THE SCOPE OF SECTION 55 REVIEW

The Commissioner's review of proposed capital expenditures under s. 55 is not limited merely to financial considerations. The Commissioner must also consider whether a proposed capital expenditure such as the Cable Ferry Project is technologically feasible and presents no reasonable prospect of danger. The role of the Commissioner is set out in the Act:

Role of Commissioner

- 38** (1) Without limiting any other power of the commissioner under this Act, the commissioner must, after considering public feedback obtained under this Act, regulate each ferry operator in relation to the core ferry services that are to be provided by that ferry operator and the tariffs, including, without limitation, reservation fees, that may be charged for those core ferry services, and must undertake that regulation in accordance with the following principles:
- (a) the primary role of the commissioner is to balance, in the manner the commissioner considers appropriate,
 - (i) the interests of ferry users,
 - (ii) the interests of taxpayers, and
 - (iii) the financial sustainability of ferry operators;
 - (b) ferry operators are to be encouraged to adopt a commercial approach to ferry service delivery;
 - (c) ferry operators are to be encouraged to seek additional or alternative service providers on designated ferry routes through fair and open competitive processes;
 - (d) ferry operators are to be encouraged to be innovative and to minimize expenses without adversely affecting their safe compliance with core ferry services;

Much of the Act concerns financial oversight of BC Ferries. However, Section 55 is contained within Division 5 of the Act -- "Other Rights and Obligations of the Commissioner", it states:

Commissioner to Consider Capital Deployment and Expenditures:

55 (1) Subject to subsections (2) to (5), before deploying capital assets on, or incurring capital expenditures in connection with, a designated ferry route or terminal, the ferry operator may apply to the commissioner and the commissioner must, within one month after the application, declare whether the capital assets proposed to be deployed on, or the capital expenditures proposed to be incurred in connection with, the designated ferry route or terminal are reasonably required.

(2) A ferry operator must not incur a major capital expenditure without first obtaining the commissioner's approval of the expenditure.

(3) A ferry operator may apply to the commissioner for approval of a proposed major capital expenditure and the commissioner must respond to the application within 2 months after its receipt by the commissioner.

(4) The commissioner may approve a proposed major capital expenditure if the proposed major capital expenditure is

(a) reasonable,

(b) prudent, and

(c) consistent with

(i) the current Coastal Ferry Services Contract,
and

(ii) any long term capital plan established by the
ferry operator.

(5) For the purposes of this section, a capital expenditure of a ferry operator is a major capital expenditure if it meets the criteria

(a) established from time to time by the commissioner, and

(b) most recently provided by the commissioner to the ferry operator.

Whether a proposed major capital expenditure is “prudent” under s. 55(4)(b) is principally a question of whether it is financially sound. In the Guidelines, The Commissioner has referred to the definition of prudent in BusinessDictionary.com as:

Good judgement or wisdom gained from experience, expressed in a realistic and frugal attitude. Prudence, however, is not the same as grave caution or wariness concerned only with preserving the status quo.

However, the use and implications of the term “reasonable” in British Columbia Columbian legislation is significantly broader than mere financial considerations. In the Guidelines, the Commissioner used a definition from BusinessDictionary.com:

An intelligent approach supported or justified by reason; fair, proper, sound behavior that avoids needless error and steers clear of extremes.

The requirement that a major capital expenditure be reasonable under s. 55(4)(a) is separate from the requirement that it be prudent under s. 55(4)(b). The term “reasonable” is not superfluous when read against prudent. Instead, it imports the common law’s “reasonable person test” into the scope the Commissioner’s s. 55 review. We submit that it would not be reasonable of the Commissioner to approve a major capital expenditure whose object is not technologically feasible, or, has a reasonable prospect of danger.

The term reasonable under the Act must also be interpreted with reference to the circumstances under which it was passed and amended. The Act was passed upon the election of the current Liberal government in response to the “Fast Cat Ferries” scandal of the previous government. The failure of the Fast Cat Ferries was largely owing to the fact that they were not technologically feasible in that they were not suited to the marine environment they would be operating in. The current language of s. 55 must also be interpreted with regard to the sinking of the MV Queen of the North on March 22, 2006, which resulted in two deaths. This tragic event occurred prior to the passage of the *Coastal Ferry Amendment Act, 2012*, Bill 47, which received Royal Assent on May 31, 2012. Surely the legislature intended the Commissioner to use s. 55 in part as a safeguard to protect against the reoccurrence of a major capital expenditure on a vessel that is not technologically feasible or safe.

In any event, as demonstrated by the financial consequences of the Fast Cat Ferries scandal, and the sinking of the MV Queen of the North, the technological feasibility and safety of a proposed vessel is linked to the question of whether acquiring it is a prudent expenditure. In other words, the reasonableness and prudence tests under ss. 55(4)(a) and (b) engage both the technological feasibility and safety of a proposed vessel.

Therefore, the Commissioner must determine that a proposed vessel is technologically feasible and presents no reasonable prospect of danger prior to approving it under s. 55.

We also note that the Commissioner has the authority to appoint or retain consultants, inspectors and other Employees necessary to assist the Commissioner in performing the duties of his office:

Employees and Consultants:

- 36** (1) The commissioner may appoint, in accordance with the *Public Service Act*, employees necessary to enable the commissioner to perform the duties of the office.
- (2) For the purpose of the application of the *Public Service Act* to subsection (1) of this section, the commissioner is deemed to be a deputy minister.
- (3) The commissioner may retain consultants, inspectors or other persons as may be necessary for the commissioner to perform the duties of the office and may establish their remuneration and other terms and conditions of their retainers.
- (4) The *Public Service Act* does not apply in respect of a person retained under subsection (3) of this section.

In Order Number: 13-01, which concerned a s. 55 application for the approval of constructing three new intermediate class vessels, the Commissioner noted that:

The commissioner engaged PricewaterhouseCoopers LLP ("PwC") to provide technical and expert advice during the review of the Application. PwC in turn engaged as subcontractors 3GA Marine and Opus International Consulting Inc. to respectively review the naval architectural and demand analysis aspects contained in the Application. The firms were asked to give their opinions as to whether the information provided by BC Ferries in the Application and responses to follow up questions reasonably support the proposed major capital expenditure on the three new intermediate class vessels and that such major capital expenditure is reasonable, prudent and consistent with the current Coastal Ferry Services Contract ("CFSC") and the long-term capital plan of BC Ferries. (page 12)

We respectfully submit that this same process should be utilized in the present case. Furthermore, if the Commissioner believes that a review of the technological and safety aspects of the Application is outside of his personal expertise, then he must retain the necessary consultants, inspectors and other persons necessary to assist him in evaluating the Application.

In the context of the Application before the Commissioner, we note the warning given by Glosten Associates who were retained by BC Ferries to conduct an independent review of the overall feasibility of the Cable Ferry Project:

At 1.9 km, our research indicates that the proposed ferry service would be **the longest cable ferry operation in the world by about 300 meters...**

It is important to review the **technical** and financial elements at every stage of the project prior to embarking on the next stage, to ensure that the underlying fundamentals still support the project moving ahead. This feasibility review was an important step prior to embarking on the detailed engineering and design phase of the project.

The Glosten Associates, February 8, 2012, *Cable Ferry Service – Buckley Bay and Denman Island West: Feasibility Review* pg. 2 (attached as Appendix A)

(emphasis added)

Nonetheless, as will be elaborated below, the Application has serious financial, technological feasibility and safety flaws, and we respectfully request that the Commissioner dismiss the Application.

THE CABLE FERRY PROJECT IS NOT REASONABLY REQUIRED

The matter before the Commissioner is easily distinguishable from Order 13-01, the only Order to date where the Commissioner has given s. 55 approval to new vessels. In that case, the three vessels to be acquired would replace two existing vessels – the Queen of Nanaimo and the Queen of Burnaby – which were to reach the end of their economic lives and were due to be retired in 2017 (pg. 1). The Cable Ferry Project in this case is to replace the Quinitsa which currently serves Route 21. According to April 1, 2003, version of the Coast Ferry Services Contract at page 92, the Quinitsa's anticipated retirement date is 2024/2025 (attached as Appendix B). Consequently, there is no immediate need to replace the Quinitsa, like there was for vessels in Order 13-01.

BC Ferries claims that by replacing the Quinitsa with the Cable Ferry Project, it will then be able to redeploy the Quinitsa to another route. BC Ferries claims that this will save money in that BC Ferries will not have to replace another small vessel. However, BC Ferries has not cited which route the Quinitsa may be redeployed to. BC Ferries has not presented any evidence that the Quinitsa will be adequate to meet current service levels at its redeployment or that it will be technological feasible to operate at that route. BC Ferries has also not presented evidence or comparative cost analyses of upgrading an aged vessel, or replacing an aged vessel with a new regular vessel, rather than replacing one with the Quinitsa.

The Union has been given the impression by BC Ferries that the Quinitsa will be redeployed to the route connecting Denman Island and Hornby Island which is currently being serviced by the Kahloke. The Union has also been given the impression that the Kahloke will in turn be redeployed to the service the route between Powell River and Texada Island which is currently being serviced by the North Island Princess. However, no studies have been presented to the Commissioner that such a plan is feasible from an economic, technological, or safety perspective.

Consequently, BC Ferries' projected savings insofar as they are based on the intention to redeploy the Quinitsa are purely hypothetical.

BC Ferries has failed to demonstrate that the Cable Ferry Project is reasonably required, either to replace the Quinitsa itself, or for the purpose of redeploying the Quinitsa to replace another aging vessel. Therefore, we respectfully submit that the application should be dismissed.

THE CABLE FERRY PROJECT IS UNREASONABLE

The Guidelines define reasonable as:

An intelligent approach supported or justified by reason; fair, proper, sound behavior that avoids needless error and steers clear of extremes.

In our opinion the Cable Ferry Project does not meet the criteria of this definition in that this project is extreme in its entirety. Our objections are principally:

1. the Cable Ferry Project has not been proven to be technologically feasible,
2. the manning of the Cable Ferry will be unsafe, and
3. BC Ferries has not presented adequate contingency plans.

We address these in turn.

1. Technological Feasibility

The proposed Cable Ferry will be the largest salt water cable ferry in the world; it will also be the longest span in the world by about 300 metres. Meanwhile, it will have a capacity of 150 passengers and 50 cars. There is no other cable ferry in the world of this size with this voyage duration.

As stated in a draft report for the Cable Ferry Project in part authored by BC Ferries:

Most cable ferries operate on shorter routes in protected coastal areas or on rivers or lakes and therefore can be designed by marine engineers and naval architects based on common practice, experience, and standard analysis methods. However, longer crossings require additional consideration. The longer the crossing, the more severe the potential environmental loads due to increased exposure and fetch, which in turn results in higher wind speeds and wave conditions. As a result, the motion of the ferry and resulting stresses on the cable system must be considered to ensure safety and reliability, and to achieve an acceptable level of service specified by the operator throughout the lifetime of the ferry.

Design Methodology and Numerical Analysis of a Cable Ferry by Dean M. Steinke (Dynamic Systems Analysis), Ryan S. Nicoll (Dynamic Systems Analysis), Tony Thompson (EYE Marine), & Bruce Patterson (BC Ferries), pg 1 (attached as Appendix C)

We submit that this is a high-risk project. Common practice, experience, and standard analysis methods provide little assistance in determining the technological feasibility of this unique and adventurous project.

For example, B.C. Ferries has continually compared this vessel to the Needles cable ferry in southern British Columbia. The distance traveled by the Needles ferry is less than 1000 metres, is not subject to tidal forces, opposing vessel traffic and is not subjected to the extreme weather conditions of Baynes Sound. The Needles ferry cable is suspended from the lake bottom and therefore not subject to the constant abrasion that the Route 21 cable will be exposed to.

There are a number of variables affecting the Cable Ferry's performance where not enough allowance for error has been made. The diameter and type of cable is one of them. BC Ferries has decided to use 1 5/8", 6X19, IWRC, plastic valley filled, Seale construction cable. The proposed cable will be completely covered by a plastic coating. There will be no ability to visually inspect the cable and will require the purchase of specialty equipment to magnetically inspect the cable. While providing examples of other cable ferries in the world, BC Ferries has presented no comparative evidence to the commissioner of the types of cables used by other cable ferries. Questions of the reliability of this kind of cable have been raised by members of the community and the Union. An independent review of the technological feasibility of using this cable is required.

There have been documented failures of cables. In New Brunswick in October of 1996 after the failure of a similar size and type cable that resulted in a vessel being adrift with passengers on board, the Transportation Safety Board made recommendations and the New Brunswick Ministry of Transportation initiated a change to the frequency of cable changes and ordered that no cable should be in service for more than 303 days. However, BC Ferries plans to utilize each cable for the Ferry Cable Project 1088 days. The fact that BC Ferries has presented no evidence regarding the substantive technical features of other cable ferries, or their regulation by other jurisdictions despite recorded accidents is unreasonable.

We also note that although the Cable Ferry will be connected by its cables to terminals on shore, BC Ferries has presented no seismic analysis of the terminals ability to withstand earthquakes. Nor has BC Ferries done an analysis into whether the Cable Ferry will be able to withstand a tsunami. Unlike other regions in which cable ferries may operate, both of these kinds of natural disasters are anticipated for the BC Coast. We submit that it would be unreasonable to approve the Cable Ferry Project without reviewing a seismic analysis of the integrity of the proposed Cable Ferry, and an analysis as to whether the Cable Ferry will be able to withstand a tsunami.

We also observe that BC Ferries has not provided a thorough underwater survey of the entire cable corridor. This is unreasonable as the cable will be sitting on the bottom of the seafloor, and consequently will be subject to any obstructions and abrasions which could either interfere with the operation of the ferry, or, contribute to wear and tear of the cables. These obstructions may even include heritage ship wrecks protected under the *Heritage Conservation Act*, RSBC 1996, c 187, of which at least one is known to be in the vicinity of Buckley Bay. See Golder Associates, October 7, 2010, British Columbia Ferry Services, Mr. Kelly Wheller (attached as Appendix D) and Golder Associates, Environmental Assessment, pg. 34 (attached as Appendix E).

In addition to an independent review of the cable proposed, we submit that an independent review should also be completed of the wind and wave analyses done by BC Ferries. Members of the Community and the Union have observed that many of the wind and wave estimates for the area are understated. An independent review of the capacity of the Cable Ferry to withstand the elements in its proposed route must occur in order to confirm that there is no reasonable prospect of danger.

The proposed Cable Ferry will carry 150 people, and due to its unique, adventurous, and potentially dangerous nature, an independent review is justified to ensure that it is technologically feasible and that it presents no reasonable prospect of danger.

2. Safe Manning

Alarming, a review of the law as it relates to the purchase, inspection, and use of a new cable ferry raises serious safety concerns. In particular, the *Canada Shipping Act*, exempts cable ferries from many safety requirements. BC Ferries anticipated reduction in manning levels appears to be directly tied to a reduction of on-board safety measures. Ironically, the longest proposed cable ferry in the world will in fact be subject to less safety regulation measures than any other ship in the BC Ferries fleet.

Cable ferries are exempted from the following safety regulations:

1. *Fire and Boat Drills Regulations* SOR/2010-83, see s. 2(2)(b);
2. *Marine Personnel Regulations*, SOR/2007-115, Division 2, see s. 200;
3. *Collision Regulations*, CRC, c 1416, Rule 46; and
4. *The Navigation Safety Regulations*, SOR/2005-134, see s. 24(2)(b).

The exemptions are likely based on the belief that Cable Ferries are generally safer than non-cable ferries. Traditional cable ferries are small, usually one or two crew and have limited equipment and small passenger loads. They are usually across rivers or small lakes and not subject to tidal conditions or weather. Transport Canada would never have envisioned that an organization would attempt to build and operate such a large vessel on such a long span as the Cable Ferry. The fact that this proposed vessel will transport in excess of 140 passengers puts it in a class by itself. The Cable Ferry will be unique in that it will be the longest and one of the largest in the world, and will be the only one operating on the Pacific West Coast of British Columbia.

The *Marine Personnel Regulations* in particular concern training, certifications, and minimum crew complements as they relate to safe manning requirements and deck watches. BC Ferries intends to staff this vessel with three crew members, none of whom are Transport Canada Certified Seafarers, see *The Examination and Certification of Seafarers*, Transport Canada (attached as Appendix F). BC Ferries intends to reduce manning down from a Captain, a Mate and a Chief Engineer assisted by two Deckhands and one ERA, to having one Lead Operator and two Operators, none of whom will be required to have certain professional licences and competencies relating to safety and navigation which are required of Certified Seafarers. See the job descriptions (attached as Appendix G).

However, the proposed Cable Ferry will have the same, albeit smaller, equipment as any vessel in BC Ferries fleet and yet have no qualified individual with a Technical Certificate of Competency on board. We submit it is very dangerous not to have some level of Certificate of Competency on board.

BC Ferries has failed to give the Commissioner any evidence of another form of mass transportation of this size, distance and subject to these similar conditions without some kind of professional certification. Nor have they submitted any comparative evidence with respect to how many crew members work on cable ferries that are close to the size of the proposed Cable Ferry.

In the event of an emergency, the size and qualifications of the crew determines the size of the firefighting party, their roles during evacuation, and the crew's ability to maintain crowd control and access to muster stations.

This is not at all an example of steering clear of extremes.

Moreover, BC Ferries has presented no evidence regarding whether it is feasible to safely and efficiently load and unload the proposed Cable Ferry with only three crew members. Currently, one loading officer directs the overall loading of the Quinitsa from the terminal. One crew member is stationed on the loading ramp ensuring safe loading by each individual vehicle. And two Deckhands are located down-deck direct parking on the vessel in order to maximize space.

BC Ferries proposes to reduce crew, yet shorten loading time by introducing an additional loading lane. Of the three crew members, one will have to be stationed in the control centre. That leaves two crew members. A crew member is required for each lane in order to ensure safe loading. Therefore, BC Ferries would be forced to either leave one lane unattended during loading, or to have no Deckhands ensuring that all available parking space between vehicles is utilized. One Deckhand will have great difficulty in ensuring that parking space is utilized as a structure is planned to occupy the middle of the Cable Ferry's deck splitting it in two halves and obstructing the Deckhand's field of vision. Such manning will compromise safety, and will fail to either maximize occupancy on board, or fail to minimize time spent loading as anticipated.

BC Ferries proposed manning of the Cable Ferry presents a reasonable prospect of danger.

3. Absence of Contingency Plans

BC Ferries has not proposed safe or practical contingency plans in the event of a prolonged service disruption.

BC Ferries states that the current berths used by the Quinitsa will remain operational during construction and the remainder of their useful lives (approximately 20 years for Buckley Bay and seven to 10 years for Denman Island West) (pg. 17). Meanwhile, BC Ferries recognizes that the Cable Ferry's berths will not be inter-operable with other vessels in the BC Ferries fleet. Therefore, after the Denman Island West berth is retired in as little as 7 years, there will be no readily available alternative to the Cable Ferry within the BC Ferry fleet.

This lack of alternative service is concerning given BC Ferries has stated that the cables will occasionally need rotation and replacement. The Cable Ferry will also require routine maintenance and service. However, strangely, BC Ferries has presented no evidence on how cable rotation and replacement or routine maintenance is to occur.

With regard to safety, in the event that the cable system fails, there is no system of backup propulsion or other "redundancy", which could leave the Cable Ferry in a dangerous state of drift. BC Ferries has not submitted any evidence that it will ensure the availability of a tugboat within the proximity of the Route 21 to respond to an emergency.

We respectfully submit that it is not reasonable for the Cable Ferry Project to have no alternative service plans for even routine maintenance, and that the lack of redundancies presents a reasonable prospect of danger.

THE CABLE FERRY PROJECT IS NOT PRUDENT

The Guidelines define prudent as:

Good judgment or wisdom gained from experience, expressed in a realistic and frugal attitude.

Due to redactions in the Application, it is difficult for the Union to address costs associated with this project and the moneys already spent. We have heard cost estimates ranging from 30 to 45 million for vessel and infrastructure construction. However, currently the Cable Ferry Project is expected to generate a net present value of \$27.8 million assuming no inflation over the 40 year lifespan of the Cable Ferry. (See the Application, pg. 11) That is a net present value of merely \$460,000 for each year of the project.

Three factors are cited for reducing operating costs in BC Ferries' Community presentation of November 29, 2012 (attached as Appendix H). These are:

- Assumes crew reduction of 3
- Assumes 45% of current fuel consumption
- A simpler vessel will require less repair and maintenance

Projected savings from fuel are projected to only be about \$100,000 per year. See the Glosten Associates, February 8, 2012, *Cable Ferry Service – Buckley Bay and Denman Island West: Feasibility Review* pg. 2, 4 (attached as Appendix I). Consequently, it appears that much of the Cable Ferry Project's savings are projected to arise from the Quinitsa being able to replace another vessel, reduced manning requirements, and less repair and maintenance.

We submit that BC Ferries is over reliant on several assumptions in their calculation of these savings. Consequently, there is a significant risk that the small amount of projected savings over the lifespan of the Cable Ferry Project is likely to be eliminated. These assumptions are that:

1. the Quinitsa will be able to replace another vessel; and
2. Transport Canada will approve a manning requirement of three.

BC Ferries will likely also lose opportunities to save money in failing to achieve vessel interoperability at Route 21. Finally, the Cable Ferry Project will not be able to accommodate projected increases in island population and Route 21 ridership demand.

We will address these in turn.

1. The Assumption that the Quinitsa will be able to Replace Another Vessel

BC Ferries argues that the Cable Ferry Project would allow them to avoid the construction of another minor vessel. However, as noted above, BC Ferries has not presented evidence or a comparative cost analysis of upgrading an aged vessel, or replacing one with a new small vessel rather than replacing one with the Quinitsa. We anticipate that the Cable Ferry Project would cost more than either the upgrading of an existing vessel, or the construction of new regular vessel.

We respectfully submit that it would be imprudent for the Commissioner to approve of the project without having reviewed a comparative cost analysis of these options, and without evidence that the Quinitsa is able to replace another vessel.

2. The Assumption that Transport Canada will approve a Manning Requirement of Three.

BC Ferries states that it will seek apply to Transport Canada to determine the manning level *after* the Cable Ferry has been built and inspected. Transport Canada determines manning requirements in order to ensure safety. Our concerns relating to safely manning the Cable Ferry are presented above, and we doubt that Transport Canada will approve BC Ferries planned manning levels.

We respectfully submit that it would be imprudent for the Commissioner to approve of the project without having required BC Ferries to first apply to Transport Canada to determine the safe manning levels required for the Cable Ferry. However, we note that this issue directly engages the Act's s. 38(1)(d) which requires that the Commissioner to regulate BC Ferries in accordance with the principle that:

(d) ferry operators are to be encouraged to be innovative and to minimize expenses without adversely affecting their safe compliance with core ferry services;

Consequently, we respectfully request that the Commissioner notify Transport Canada of the Union's safety concerns relating to manning.

3. Failing to Achieve Vessel Interoperability at the Buckley Route 21.

In Order 13-01, the Commissioner noted repeatedly that standardizing the proposed vessels would maximize service flexibility, service interoperability, and vessel relief strategies. (pg. 3, 15) In that case, BC Ferries submitted that "through standardization, opportunities exist to use vessels and terminals to service multiple routes". With respect to vessels, BC Ferries refers to standardization as "interoperability" and claims that it will result in "operational cost benefits" due to "lower crew training, maintenance and inventory costs due to standardization of parts and critical spares." Due to standardization in training, interoperability is also supposed to result in increased safety.

The Commissioner summarized BC Ferries' inoperability plan regarding fleet replacement in Order 13-01:

All [future] vessels will be designed and built in accordance with their standardization objective that is the foundation of the Company's replacement strategy.

In Order 13-01, the Commissioner also observed:

While a long term vision has yet to be developed, in 2012 the Province conducted a community consultation process on coastal ferry service and found through a poll that 83 per cent of respondents either strongly or somewhat agreed with the concept of standardizing vessels. (pg 16)

Order 13-01 was released on July 19, 2013, just four months prior to BC Ferries Application for the Cable Ferry Project. However, now BC Ferries wants to construct a unique cable ferry system for a single route. Cable Ferry vessel replacement parts will not be interchangeable, and alternate ferries will not be able to utilize the Cable Ferry's unique terminals.

BC Ferries also expressed its intent to pursue interoperability as a cost savings measure in its Annual Report 2012-2013 at pp. 10 and 40 (attached as Appendix J), and its Business Plan for 2014 at pp 9, 13, 18 (attached as Appendix K). Even the Ministry of Transportation has lauded the new corporate philosophy of standardization. See News Release 2013TRAN0073-001731, Nov. 18, 2013 (attached as Appendix L)

BC Ferries will not be able to realize the cost benefits arising from fleet standardization and interoperability with respect to the Cable Ferry, and this is imprudent.

4. Failing to Accommodate Increases in Island Population and Route 21 Ridership Demand.

The population of Denman Island is projected to grow from 1,030 in 2011 to 1,469 by 2036. See the BC Ferries Passenger Volume Modelling report by Urban Futures, attached to the Application as Appendix 4. Hornby Island's population is projected to grow from 1,000 in 2011 to 1,418 by 2036. Such increases could increase total trips per year from 389,762 to 621,297. However, at present 51% of sailings during peak season already experience 80-100% vehicle occupancy during peak season. See BC Ferries Capacity Utilization Chart at pg. 37 of the Application. Consequently, it is doubtful that the Cable Ferry Project will be able to meet the needs of the islands' increasing population and rising demand.

THE CABLE FERRY PROJECT IS NOT CONSISTENT WITH THE CURRENT COASTAL FERRY SERVICES CONTRACT

The Coastal Ferry Services Contract stipulates certain "Core Service Levels" for each route. Currently, Route 21 requires 16 round trips a day with 15 on Sunday. The Quinitsa has a maximum capacity of 294 passengers. However, the proposed Cable Ferry will have a capacity of only 150 passengers including crew.

Moreover, the proposed Cable Ferry is anticipated to result in more cancellations due to weather. According to the Application, 5 sailings are expected to be cancelled a year due to weather. (pg 10) Remarkably, the Quinitsa only suffered one cancellation due to weather between the years 2010 and 2013. (pg 39) Even including controllable core cancellations which occur due to maintenance, the Quinitsa only suffered 4 round trip cancellations in a 4 year period. While cancellations due to weather alone with the Cable Ferry will be higher in one year than what the Quinitsa experienced over 4 years for all causes, BC Ferries has failed to present evidence with respect to the amount of cancellations the Cable Ferry will undergo as routine maintenance such as the rotation and replacement of cables is conducted.

Such a reductions in service will not only be contrary to service levels required in the current Coastal Ferry Services Contract, but will also constitute permanent reductions in service under the Act. Approval for these reductions in service can only be granted by the Commissioner under either Article 42 or 43.1 of the Act.

These reductions in service are all the more concerning the reliance of Denman and Hornby Island's aging and increasing population on Route 21 for ambulance service.

THE CABLE FERRY PROJECT IS NOT CONSISTENT WITH THE LONG TERM CAPITAL PLAN

Due to redactions, it is difficult for the Union to verify whether the Cable Ferry Project is consistent with the current Long Term Capital Plan (attached as Appendix M). However, two pieces of information appear to be missing or contradict earlier positions adopted by BC Ferries.

First, is the absence of budgeting for the terminals that are required to accommodate the Cable Ferry docking at either end of Route 21. We would expect that these would be itemized under "Terminals" in Schedule 1, Page 3. However, we acknowledge that perhaps they fall under the cost of "New Minor Vessel – Cable Ferry" under Schedule 1, Page 1.

Second, we note that it is not clear which vessel the Quinitsa is intended to replace. The Union had been given the impression that the Quinitsa would be redeployed along the Kahloke's route which would in turn be redeployed to service the route between Powell River and Texada Island and replace the North Island Princess. However, the North Island Princess is cited as being replaced. (pg 8)

The Cable Ferry Project is therefore inconsistent with the face of the Long Term Capital Plan.

CONCLUSION

The Commissioner has been tasked with reviewing the Cable Ferry Project to determine whether it constitutes a reasonable and prudent capital expenditure that is consistent with the current Coastal Ferry Services Contract, and the 5 Year Capital Plan. We submit that this review must follow the independent process done for the acquisition of the vessels in Order Number 12-04. In addition to hiring financial consultants to review the Application, the Commissioner must review the technological feasibility and safety of the proposed Cable Ferry Project. We respectfully submit that the Cable Ferry Project must be determined as presenting no reasonable prospect of danger.

The Guidelines state that the Commissioners will base their decision on the following tests, a summary of our submissions are below each point:

- a) Does the proposed capital expenditure demonstrate good judgment, based on wisdom, experience and good sense?

No. The community and the Union have raised serious concerns regarding the Cable Ferry Project's finances, technological feasibility, and safety. An independent review of the Cable Ferry Project is required. The proposed Cable Ferry will be unique in the world and therefore it departs from past experience. However, BC Ferries has also failed to make reference to comparative cable and cable ferry manning specifications and regulations.

- b) Does the proposed capital expenditure indicate a wise use of resources?

No. The Cable Ferry Project will realize only a small annual net profit over the course of its lifetime while it presents considerable risk. The Cable Ferry Project projects savings by presuming it will be able to eliminate the need of replacing another vessel, and by presuming Transport Canada will approve a crew of 3. The Cable Ferry Project also fails to take advantage of BC Ferries fleet standardization program.

- c) Does the proposed capital expenditure show due consideration for the future?

No. The Cable Ferry Project does not show due consideration for the future. It will reduce passenger capacity at Route 21 for the next 40 years. Meanwhile, ridership and the population of Denman and Hornby Islands which rely on Route 21 are projected to increase. The Cable Ferry Project will not be able to support increased demand.

- d) Has it been demonstrated that the proposed capital expenditure would not reasonably be considered excessive?

No. BC Ferries has not demonstrated that the Cable Ferry Project is reasonably required. The Quinitsa will not retire until 2024/2025. Nor has BC Ferries presented evidence that the Cable Ferry Project will be less expensive than either upgrading an old vessel, or replacing an old vessel with a regular vessel.

- e) Does the proposed capital expenditure provide good value, at a moderate and fair price? Is it affordable?

No. BC Ferries' projections regarding expenditures and savings are presumptive and involve significant risk. See question b) above.

- f) Is the proposed capital expenditure provided for in a board approved capital plan?

i) Is the total cost different in any respect from what was approved in the capital plan?

This is unclear to the Union due to redactions. It is not clear whether the cost of the Cable Ferry terminals are included, and it is not clear if replacing a vessel with the Quinitsa was properly costed.

ii) Is the total cost different in any respect from what was indicated in the BC Ferries' last submission to the Commissioner for price cap setting purposes?

This is unclear to the Union due to redactions.

- g) Is the proposed capital expenditure consistent with the requirements of the Coastal Ferry Services Contract?

It is not. The Cable Ferry Project will result in a permanent service reduction.

- h) How does the proposed capital expenditure support the government approved long term vision for the future of coastal ferry services?

It does not. The Cable Ferry will not be standardized with the rest of the fleet.

For all the foregoing reasons, it is our submission that the Application does not meet any of the tests under s. 55. Consequently, we respectfully request that the Commissioner dismiss the Application.

Moreover, the Cable Ferry Project will result in a permanent reduction of service within the meaning of s. 43.1. Therefore, if BC Ferries wishes to proceed with the Cable Ferry Project, further action will be required to seek approval with the Commissioner than what is within the scope of the Application.

We also respectfully request that the Commissioner notify Transport Canada of the Union's safety concerns relating to manning so that he may ensure that any innovation in the Cable Ferry Project does not adversely affect the safety of BC Ferries employees and passengers.

Yours truly,

BC FERRY & MARINE WORKERS' UNION



Michael McNevin
Ships' Officers' Component President

Enclosures

cc: Chris Abbott, BCFMWU Provincial President
Anthony Glavin, Koskie Glavin Gordon
Daniel Bertrand, Koskie Glavin Gordon

Appendix F

BC Ferries' Response to Appendix D and E submissions



EXECUTIVE VICE PRESIDENT & CHIEF FINANCIAL OFFICER

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February 14, 2014

Mr. Gordon Macatee
British Columbia Ferries Commissioner
BC Ferry Commission
RPO Hillside P.O. Box 35119
Victoria, BC V8T 5G2

Dear Mr. Macatee:

Re: Application to the British Columbia Ferries Commissioner Pursuant to Section 55(2) of the Coastal Ferry Act ("CFA") For Buckley Bay to Denman Island ("Route 21") Cable Ferry Project (the "Application")

Thank you for providing us with a copy of the submission of the BC Ferry & Marine Workers' Union (the "Union") dated January 23, 2014, concerning the Application, and for inviting us to provide our comments in response.¹

British Columbia Ferry Services Inc. ("BC Ferries" or the "Company") has carefully reviewed and considered the Union's submission. In response, BC Ferries provides complete and compelling answers to each point raised by the Union. The evidence provided in this submission further supports the prudence and reasonableness of the expenditure applied for, and BC Ferries submits that the Application should be approved.

I. The Scope of a Section 55 Review

The Union's submission begins with a legal analysis of the scope of section 55.² It submits that in addition to a consideration of the items specifically enumerated under section 55(4), the Commissioner must also consider whether the proposed expenditure is "technologically feasible" and whether it presents "no reasonable prospect of danger".

BC Ferries agrees that the Commissioner can consider technological feasibility to the extent that it has an impact on the prudence of a project.³ It would be imprudent to undertake a project that is not technologically feasible. The Commissioner's section 55 guidelines identify the need for certain technical information because of the potential financial impacts. For example, the guidelines require BC Ferries to provide the following information:

Does the proposal include significant features that are innovative or untried?

¹ BC Ferries received the Union's submission on January 29, 2014.

² See pp. 2 to 5 of the Union's submission.

³ To be clear, however, BC Ferries does not agree with the Union's reasoning in support of this interpretation.

What new technologies or innovations will be incorporated, and why are they considered necessary?

Will there be provision for a conversion to an alternative to marine diesel engines, such as LNG?

The information provided in the Application meets these, and all other requirements in the Commissioner's section 55 guidelines, and demonstrates that the Project is technically sound. BC Ferries' specific responses to the technological issues raised by the Union are provided below. There is no merit to the technological concerns raised by the Union.

With respect to the Union's concern with a "reasonable prospect of danger", a review of the submission reveals that this is really a concern with safety. BC Ferries submits that with respect to the issue of safety, the Commissioner's role is similarly focussed on, and limited to, ensuring that funds are being spent on a project that is capable of meeting the applicable safety codes and requirements (i.e. prudent). The Commissioner is not charged with the responsibility of assessing what the safety codes and requirements should be as a matter of public policy. This not only reflects the language and purpose of section 55, but more generally the Commissioner's role as an economic regulator of ferry operators. As noted on the Commissioner's website:

Further, the commissioner is not responsible for regulating safety or environmental aspects of ferry operations.

Safety regulations are set and enforced by legislation, other tribunals and government agencies. BC Ferries will comply with all applicable legislation, and has been dealing with the appropriate regulatory bodies throughout the development of the Project. The Commissioner would exceed his jurisdiction by:

- imposing new safety requirements on the Project that are not required by Canadian or Provincial legislation, or
- questioning whether the government is regulating cable ferries appropriately,

which is the essence of what the Union appears to be advocating, since the Union has not identified any safety code provision that cannot or will not be met by BC Ferries, but rather questions the appropriateness of certain federal exemptions to safety regulations.

The information in the Application, and included in this response, demonstrates that BC Ferries will meet or exceed all applicable safety requirements and, as such, that there is no merit to the safety concerns raised by the Union.

The Union's concerns about consistency with the current Coastal Ferry Services Contract ("CFSC") and BC Ferries' long term capital plan are within the scope of a section 55(2) review, and BC Ferries addresses the concerns identified under these headings below. There is no merit to the concerns raised by the Union with respect to these matters.

II. Consultant Review

At pp. 5 and 6 of its submission, the Union submits that if the Commissioner believes that a review of the technological and safety aspects of the Application are outside his personal experience, then he must retain the necessary consultants to assist him in evaluating the Application. In support of this, the Union relies on section 36 of the CFA and the fact that

the Commissioner engaged technical consultants to assist in the review of the application that led to Order 13-01 being made.

BC Ferries notes that this concern has already been addressed by the Commissioner. Consistent with the process undertaken in response to BC Ferries' section 55(2) application of May 22, 2013 for the approval to construct three new intermediate class vessels, the Commissioner has engaged PricewaterhouseCoopers LLP ("PwC") to provide financial, technical and other expert advice in the review of the Application. As with the prior application, PwC in turn has engaged, as subcontractors, 3GA Marine Ltd. On its website, 3GA Marine Ltd. describes its services as follows:

The company provides inspection, survey, design engineering and project implementation support to the marine sector worldwide through associations with subject matter experts in project management, naval architecture, marine survey, environmental stewardship and marine engineering design services.

3GA comprises an association of individuals with many years experience in the Canadian domestic and International marine consulting, shipbuilding and repair sector, backed up by very strong design and analytical capabilities. The company's specialists provide engineering services for projects involving all manner of vessels including research vessels, ferries, tugs, barges, general work vessels and floating structures. We offer simple, innovative solutions to complex problems in the marine industry. The company is committed to a safe, clean and secure marine space through responsible and sustainable global development.⁴

Elsewhere in its submission, the Union submits that there is a need for "independent review" of a number of the technical aspects of the Project, such as the choice of cable and the wind and wave analysis (discussed further below). BC Ferries trusts that the engagement of 3GA Marine Ltd. addresses the Union's concerns about the need for the assistance of technical consultants to review the Application, to the extent that such issues are within the scope of the Application.

III. "Reasonably Required"

At pp. 6 and 7 of its submission, the Union argues that the Project is not reasonably required because BC Ferries has not demonstrated that there is a need to replace the *Quinitsa*, or a need to redeploy the *Quinitsa* to replace another aging vessel. With respect, the argument made under this heading is premised on a mischaracterization of the rationale for the Project. BC Ferries is putting this Project forward because it will generate significant cost savings to offset pressure on future fare increases for all ferry users through more efficient delivery of Route 21 service and the ability to retire an existing vessel without replacement.

As a point of clarification, the statutory test of "reasonably required" is found in section 55(1) of the CFA, and the current application is made under section 55(2), where no such test is specified. Regardless, however, the Project meets the test of being "reasonably required".

⁴ <http://www.3gamarine.com/index.html>

IV. The Proposed Major Capital Expenditure is Reasonable

1. Technological Feasibility

At pp. 8 through 10 of its submission, the Union raises a number of technical issues and concerns, and concludes by submitting that an independent review of the Project is needed to ensure that it does not present a reasonable prospect of danger.

As stated in the Application⁵, while a cable ferry system is new to BC Ferries, the technology is established and proven. Cable ferries operate nationally and internationally in both salt and freshwater applications, and in much more severe environmental conditions than those experienced in the sheltered configuration of Baynes Sound, where the proposed cable ferry will operate. Cognizant that the Route 21 cable ferry will likely be one of the longest cable ferry operations in the world by 300 metres and that the ferry itself will be large by cable ferry standards, the Company has undertaken extensive research and analysis⁶ to confirm the technical feasibility of the Project and to ensure that the cable ferry will deliver safe and reliable service. The analysis performed demonstrates that the Project is technologically feasible.

BC Ferries has been studying the Project since 2008 and has employed subject matter experts in every aspect of the cable ferry system design (which incorporates the ferry, cable system, and berth arrangements as an integrated system). Fourteen different professionally accredited consulting organizations have worked with BC Ferries to obtain the cable ferry permits and on the various design stages for the Project, from concept and feasibility to the detailed design. In designing the cable ferry system, simulation and modeling techniques were imported from the offshore oil industry, which designs much larger moored structures for much more severe conditions than are experienced in Baynes Sound. The environmental conditions were characterized from two extensive field measurement programs, and developed into design criteria using statistical methods widely accepted in the professional ocean engineering field. As an added measure of caution, the extreme conditions were augmented by anecdotal wind conditions to ensure an equivalent level of reliability with the current service. An overview of the extensive research and analysis undertaken by the Company in respect of the Project is found in section 4.2 of the Application.⁷ The technical rigor adopted in the design of the cable ferry system fully addresses any technical risk associated with operating one of the longest cable ferry span in the world.

In addition to the above, it must be noted that the design of the terminals, cables and the cable ferry have all been conducted and signed off by Professional Engineers. The Association of Professional Engineers and Geoscientists of BC ("APEGBC") has a code of conduct in regard to "protecting the public" in which it clearly states "*APEGBC protects public safety by setting and maintaining high standards of professional practice and ethical conduct for its members and licensees.*" The fact that the designs have been signed off by Professional Engineers demonstrates that the Project is technologically feasible.

⁵ See p. 24 of the Application.

⁶ See pp. 24 – 28 of the Application.

⁷ This analysis was presented at the 2013 Annual General Meeting ("AGM") of the Society of Naval Architects and Marine Engineers in Bellevue, Washington this past fall as a refereed paper, and the *Design Methodology and Numerical Analysis of a Cable Ferry* was cited as an *Archival Paper*. It will be archived in the near future by SNAME and incorporated into the proceedings of the 2013 AGM.

In response to the specific areas of concern identified by the Union, BC Ferries' offers the follow comments.

Reliability of Cables

At p. 9 of its submission, the Union raises concerns about the diameter and type of cable selected for the project. There is no merit to these concerns.

As stated in the Application⁸, the cable diameter size of 1 5/8 inches has been determined to be appropriate based on modeling using an advanced time-domain simulation that simulated the transit of the ferry across Baynes Sound in various weather conditions, including the 100 year storm and 55 knot sustained winds, with a gust spectrum. The motion of the ferry was simulated, as was the geometry of the cable as it lifted off the bottom during each transit. A scenario with a failed cable (two cables operating) was also modeled. This modeling was done to ensure that in the unlikely event a cable breaks, the vessel can safely return to dock so the cable can be changed. The loads from the cables were safety factored using criteria scaled from (and exceeding) the American Petroleum Institute ("API") offshore mooring design standard to identify the required breaking strength of the cables. These standards are used worldwide in the design of large offshore oil and gas platforms.

Most cable failures, including the New Brunswick incident referenced by the Union in its submission⁹, have been on ferries with a single cable system and, in almost all cases, have involved extreme loads inflicted on the system by drifting ice in freshwater or brackish water conditions. The Route 21 cable ferry will operate with three cables in open water conditions in Baynes Sound. As described, the cables have been specified using design criteria from the offshore oil and gas industry (API 2SK), which is a degree of rigour not known to have been employed in the design of other cable ferry systems, where it is understood that the cable sizing tends to be based on empirical experience.

The cables will be PFV (plastic filled valley) where an inert plastic is used in the cable construction to fill the voids between the external strands and encapsulate the independent wire rope center (core). This helps lubricate and protect the cable from internal corrosion and abrasive particulates while increasing durability and longevity. It reduces wire contact stress and provides a greater wear area while affording visual inspection of the outer strands most in contact with the equipment or seabed and is not the same as being completely encased in plastic. This is of similar design and quality to other cable ferries operating throughout Canada. In most cases, cable ferry operators follow an annual drive cable change out procedure. BC Ferries plans to adopt this approach, and will change out the drive cable each year by rotating it into one of the guide cable positions. This is the same procedure that is used on the Needles cable ferry in British Columbia. BC Ferries will have a robust planned and preventative maintenance program in place to further maximize the reliability of the cables and their useful lives. This includes plans to procure specialty testing equipment to measure cable quality, wear, and stretch, which will be employed as part of the rigorous inspection schedule the Company will put into place for the cable ferry system.

⁸ See p. 27 of the Application.

⁹ See p. 9 of the Union's submission.

Ability to Withstand Earthquakes and Tsunamis

At p. 9 of its submission, the Union raises concerns about the terminals' ability to withstand earthquake, and the cable ferry's ability to withstand a tsunami. Like all new terminals constructed by BC Ferries, the upgrades planned for the Buckley Bay and Denman West terminals will be built to CSA 826 Ferry Boarding Facilities Regulations and the Canadian Highway Bridge Code which include specific seismic design requirements for each specific location and application. Tsunamis are not specifically covered in building codes. However, the relatively sheltered location of Baynes Sound suggests that a tsunami from within the area would have a localized effect which would have equal dynamic effect on a conventional ferry as a cable ferry, as well as the conventional or cable ferry terminals and marine infrastructure.

Underwater Survey of Cable Corridor

At p. 9 of its submission, the Union suggests that BC Ferries has not provided an underwater survey of the cable corridor. This is not the case at all. This issue, and other environmental issues, have already been addressed by a separate government body, and are not properly within the scope of a section 55 review in any event. As part of the environmental assessment of the Project under the *Canadian Environmental Assessment Act*, BC Ferries contracted for a thorough underwater survey and inventory of the entire corridor on the cable ferry route using a remote operated vehicle. No shipwrecks or obstructions were observed. Although not within the scope of the review, BC Ferries would be pleased to provide a copy of the survey to the Commissioner upon request.

Wind and Wave Analysis

At p. 10 of its submission, the Union suggests that an independent review of BC Ferries' wind and wave analysis should be performed.

The data in the wind and wave analysis for the Project was generated using recognized statistical methods employed by Environment Canada and by the professional ocean engineering community. The data was prepared by independent consultants and then subsequently employed in the numerical modeling to determine probabilities of occurrence by another independent consultant. Any anomalies would have been identified at that time. The extreme wind values used as the design condition were overlaid with anecdotal 55 knot sustained winds which exceeded the statistical record, and a gust spectrum to 80 knots, to represent a short term wind event.

It is important to understand the distinction between statistical environmental data for engineering purposes, versus observed or anecdotal extreme values. The analysis is based on the former, as it is essential that the data set be consistent with the design methods and standards, in this case generally adopted from the offshore design codes. The wind and wave analysis reports have been made available to the Commissioner, and it is assumed will be reviewed by 3GA Marine in its role of providing independent assessment of the technical aspects of the Application. Accordingly, the Company sees no further requirement for independent technical assessment of this matter.

Independent Review

In its concluding remarks on this topic at p. 10 of its submission, the Union comments that there should be an "independent review" of the Project in its entirety "to ensure that it is technologically feasible and that it presents no reasonable prospect of danger". The

Commissioner is independent of BC Ferries and, as described above, has engaged independent consultants to assist with technical aspects of the review of the Application. Further, as noted, licensed and practicing Professional Engineers have signed off on the design of the terminals, cables and the cable ferry. For these and the other reasons described above, BC Ferries submits that the concerns raised by the Union are already addressed through the extensive engineering and technological assessments that BC Ferries has conducted for this Project.

2. *Safe Manning*

At pp. 10-11 of its submission, the Union makes a number of comments regarding safety concerns that it has with the Project.¹⁰

The Union points out that cable ferries are exempted from certain federal safety regulations, and then appears to infer from this that the Project will be unsafe. BC Ferries has two responses to this concern. First, the appropriateness of the federal government's approach to regulating the safety of cable ferries is not a matter within the Commissioner's purview. Second, the Union's suggestion that cable ferries are not safe because of the exemptions that they reference is not supported by the facts.

The Project will meet all applicable legislation, regulations and standards. With respect to the cable ferry, Lloyds Register has been designated by Transport Canada for overall regulation, and the ferry will be built and operated to current applicable Transport Canada regulations and standards.

Transport Canada's Marine Personnel Regulations define the training requirements for cable ferry personnel, but exempt cable ferries from the requirements of the minimum safe manning document for defining the crew complement. Presumably Transport Canada's decision to not regulate crew levels of cable ferries reflects its view of the inherent safety characteristics of these vessels.

While not required by regulation, BC Ferries intends to apply to Transport Canada to determine crew size for the proposed cable ferry. To address local concerns about safety, and potential job loss in the communities, BC Ferries has committed to crew the vessel with a minimum complement of three, regardless of whether Transport Canada authorizes a lower crew complement. In comparison, most cable ferries operate with a crew of one or two. To derive a proposed crew complement, BC Ferries has carefully assessed the design, systems, and layout using the Transport Canada minimum safe manning requirements. The proposed crew level is supported by a Hazard Identification ("HazID") that was independently conducted by Lloyd's Register, a copy of which has been provided to the Commissioner. The resulting task analysis and risk assessment will be used to support the application to Transport Canada, which does not typically issue a Manning Certificate until a vessel has been constructed and delivered, and a boat and fire drill has been successfully executed.

As stated in the Application¹¹, since the cable ferry will be crewed with less crew than the *Quinitsa*, the Company has addressed potential safety concerns regarding the requirement

¹⁰ As noted above, BC Ferries does not agree that the applicability and merit of federal safety regulations is within the scope of this Application. Notwithstanding that these matters are not within the scope of this Application, BC Ferries provides responses to these matters in the interest of providing assurance the vessels will be operated safely and will meet applicable safety regulations.

¹¹ See p. 29 of the Application.

to fight a fire by fitting modern fire suppression technology such as a hi-fog water mist system and remote fire monitors through-out the cable ferry. Both of these systems can be deployed instantaneously from the operating station on the car deck. The ferry will be fitted with two inflatable slide/platform systems that, in the unlikely event of an evacuation, can be deployed by one crew member, each with the capacity to carry the full complement (100 percent per slide). The Company will also equip the cable ferry with a rescue craft for any potential person overboard incidents or to respond to a marine rescue. In all cases of emergency response, the short duration of the transit must be considered, and the fact that the cable ferry is held in place by three cables, unlike a conventional vessel.

The crew complement is envisaged to include a Lead Operator, Operator and Deckhand. The proposed crew complement is considered sufficient to ensure safe, reliable and efficient vessel operations, including safe management of passenger and vehicle traffic. In response to the specific concerns expressed by the Union with respect to the latter, it should be noted that there will be one crew member at each end of the vessel to maximize occupancy on board. In addition, both the vessel and the terminal compound will have CCTV that can be monitored by the Lead Operator, and all staff will be in communication via VHF radio. Further, BC Ferries has introduced additional unloading lanes at each terminal with contingency in high traffic times to bring on a terminal crew member to facilitate two lane loading should that be required.

BC Ferries has the following additional comments regarding the specific exemptions mentioned at p. 10 of the Union's submission (which are indicated in bold/italics). It is important to note that the regulatory framework within which the cable ferry will operate is comprehensive and complex. The four specific exemptions referenced by the Union should not be considered in isolation of the full spectrum of regulatory requirements that are in place to ensure that the vessel operates safely. Having said that, BC Ferries responds to the specific issues raised by the Union below.

- ***Fire and Boat Drills Regulations SOR/2010-83, sees. 2(2)(b)***: Cable ferries are exempt pursuant to section 2 of this federal regulation. However, pursuant to BC Ferries Corporate Safety Policy, fire and boat drills will be performed on the cable ferry as they are on all vessels throughout the BC Ferries fleet.
- ***Marine Personnel Regulations, SOR/2007-115, Division 2, see s. 200***: As noted by the Union, Division 2 of the *Marine Personnel Regulation* does not apply to cable ferries, with the exception of section 205, which does apply. The crew on board the cable ferry, as a standard, will have the following qualifications: on-board familiarisation and safety training, as required by Transport Canada Regulation TP4957; MED (Marine Emergency Duties) with respect to basic safety; crew assigned to a survival craft shall have PSC/RPSC (Passenger Safety), MES (Marine Evacuation System) training and first aid training.
- ***Collision Regulations, CRC, c 1416, Rule 46***: Schedule 1 of the *Collision Regulations* sets out a number of "rules" that apply to the vessels subject to the regulation. Rule 46 of Schedule 1 deals with "Alternate System of Navigation Lights", which means a "backup system that includes masterhead lights, sidelights, a strentlight and the lights prescribed in Rule 30 for vessels at anchor". While Rule 46 does not apply to cable ferries, it is actually replaced with Ferry Cable Regulations SOR/86-1026, section 5, under the *Navigable Waters Protection Act*. The cable ferry will comply with this rule and will have more lighting and traffic indication than a similar sized vessel under the *Collision Regulations*.

- ***The Navigation Safety Regulations, SOR/2005-134, sees. 24(2)(b)***: Section 24(2)(b) excludes cable ferries from the requirement to be fitted with a steering magnetic compass. Regardless of this exemption, BC Ferries will be installing one in addition to other navigational equipment not required on cable ferries such as two radars, AIS (Automatic Identification System), and GPS (Global Positioning System). The Company will ensure that operating personnel have the appropriate training and certifications to enable them to properly operate this equipment.

While safety regulation of cable ferries is not within the scope of the Application¹², BC Ferries has provided the above information to assure the Commissioner, the public and the Union that the cable ferry will be operated in a safe manner and in compliance with applicable safety regulations.

BC Ferries submits that there is no merit to any of the Union's "safe manning" concerns.

3. *Contingency Plans*

At p. 12, the Union raises concerns about contingency plans to deal with service disruptions, maintenance and breakdown. BC Ferries has developed appropriate plans to address these matters as summarized below.

As stated in the Application¹³, the *Quinitsa* will be available as the relief vessel for Route 21 until approximately April 2016 and intermittently thereafter, subject to its service commitments, in the unlikely event of a disruption in service following introduction of the cable ferry system. To provide a long term backup scenario, the Company will leave the existing marine infrastructure that currently supports the conventional service at both Buckley Bay and Denman Island West in place for the remainder of its useful life (approximately 20 years for Buckley Bay and seven to 10 years for Denman Island West) after the cable ferry enters service. As the ramps are located at the cable ferry berths (rather than on the ferry), there will be various options to provide long term refit relief, including barge and water taxi service, a system currently used for one of the Company's small Northern vessels, or with another suitable conventional ferry in BC Ferries' fleet.

With regard to cable renewals and exchanges, these are designed to occur during the layover period through the night with no expected impact to service. The engines, generators, and hydraulic powerpacks are modular and skid mounted to be exchanged during a night shift with a complete spare unit located shore side with no anticipated impact to the service schedule.

In the event of a drive or drive cable failure, a tug will be deployed to attend and provide propulsion to the cable ferry if a relief ferry is not able to provide alternate service. For an extreme situation (all cables fail) the cable ferry is equipped with an anchor. It needs to be emphasized that considerable attention and conservatism has been incorporated into the design and maintenance of the cable ferry to prevent this from occurring.

BC Ferries submits that there is no merit to the Union's concerns with contingency planning.

¹² Except to the limited extent described in section I, namely that the Commissioner can consider whether funds are being spent on a project that is capable of meeting the applicable safety codes and requirements (i.e. prudent).

¹³ See p. 29 of the Application.

V. The Proposed Major Capital Expenditure is Prudent

At pp. 12 to 15, the Union raises a number of concerns regarding certain aspects of the business case in support of the Project. The concerns are without merit. BC Ferries addresses each of these matters below.

1. The Quinitsa will be able to replace another vessel

The Union submits that further analysis is required to determine whether upgrading an aged vessel or constructing a new regular vessel would be a more cost effective option than the cable ferry option recommended in the Application. The Union also suggests that evidence that the *Quinitsa* will be able to replace another vessel is required.

The two options set out in the Application – conventional ferry service (Option 1) and cable ferry service (Option 2)¹⁴ - reflect the planned retirement of the *Tenaka* in fiscal 2016. The option of replacing the *Tenaka* on the route connecting Quadra Island to Cortes Island (“Route 24”) with a new (conventional) minor vessel (Option 1) is less favourable on a net present value (“NPV”) basis to that of the cable ferry option (Option 2) which, through the redeployment of the *Quinitsa* as a refit relief vessel and its replacement on Route 21 with a cable ferry, allows for the redeployment of the recently life extended *Tachek* to replace the *Tenaka* on Route 24.

The Company has determined that life extending the *Tenaka* would not provide a more favourable option on a NPV basis to either of the options presented in the Application. The summary results, which have been previously provided to the Commissioner, are as follows:

Options	40-Year NPV	NPV Ranking	NPV Disadvantage (versus Cable Ferry)
Option 1: Conventional Ferry Service – Status Quo (New Minor Vessel)	-\$95.82 M	2	-\$27.76 M
Option 2: Cable Ferry Service	-\$68.05 M	1	\$0.00 M
Alternative Option: Tenaka Life Extension to 2029 and Replace with New Conventional Vessel	-\$99.29 M	3	-\$31.24 M

Proceeding with the Project will enable the *Quinitsa* to be redeployed as a relief vessel, to provide direct service on some “Sheltered Waters” routes, and, in some cases to relieve the *Quadra Queen II* from her regular service to allow that vessel to provide refit relief on “Near Coastal, Class 2” (“NC2”) routes prevalent in the Northern Islands.¹⁵ This deployment plan precludes the need to replace an NC2 Minor vessel to relieve the *Tenaka*, which is currently scheduled for either (1) replacement or (2) life extension to facilitate replacement of the *North Island Princess* with the *Tachek* on the route connecting Westview with Texada Island (“Route 18”). With either option, the need to replace a Minor NC2 vessel is deferred.

The replacement of the *North Island Princess*, either through the life extension of the *Tenaka* or with a new-built vessel, will be the subject of a separate section 55(2) application

¹⁴ See pp. 14 – 17 of the Application.

¹⁵ The *Quinitsa* cannot be certified for NC2 service due to its hull subdivision (lack of double bottom). The Union’s reference to the *Kahloke* moving to Route 18 is not feasible for this reason, as a vessel must be NC2 to operate on that route.

by the Company. Were a life extension of the *Tenaka* determined to be feasible, the net benefits would be additive to the benefits of deploying the proposed cable ferry on Route 21. For further certainty, in no way would the life extension of the *Tenaka* in this connection detract from the net benefits of the cable ferry project.

2. *Crew Levels*

In its submission, the Union suggests that the Project should not be approved by the Commissioner without having required the Company to apply to Transport Canada to determine the safe manning levels for the cable ferry. This approach suggested by the Union is without merit.

As described above, the proposed crew complement of three has been determined by carefully assessing the design, systems, and layout using the Transport Canada minimum safe manning requirements. The proposed crew level is supported by an independent HazID report. While a final crewing level will not be determined until after the required inspections and drills have been completed, the business case remains valid even with a crew augmentation to four or five members due to the other operational and maintenance savings associated with the Project.

There is a further difficulty with the Union's suggestion. As described previously, Transport Canada typically will not commit to a crewing level until a vessel is constructed and delivered (and a boat and fire drill is completed). In contrast, section 55 requires approval of the Commissioner before undertaking a major capital expenditure, such as that required to construct a new vessel. The Union's suggested approach, even if it was warranted (which for the reasons stated above it is not) is unworkable because BC Ferries will not be able to obtain Transport Canada's approval until after the vessel is constructed.

3. *Vessel Interoperability*

The Union submits that because the cable ferry will be unique within BC Ferries' fleet, it will not result in cost benefits arising from fleet standardization and interoperability, and therefore the Project is imprudent.

As the Union observes, BC Ferries is pursuing fleet standardization and interoperability in order to achieve cost benefits. However, this does not mean that BC Ferries will ignore opportunities to achieve cost savings in certain cases such as this. Where an opportunity exists to achieve savings, even at the expense of interoperability, BC Ferries will consider those opportunities and weigh their benefits against the benefits of fleet standardization. Where, as here, those benefits are significant, BC Ferries will pursue the project, subject to the required approvals. BC Ferries does not believe that there is anything imprudent about approaching fleet standardization in this way. On the contrary, to ignore significant benefits in order to maintain standardization would, in BC Ferries' view, be imprudent.

4. *Accommodating Increase in Denman Island Population*

The Union asserts that there is a risk that the Project will not be able to meet the demands of Denman Island's increasing population.

The Passenger Volume Modelling report by Urban Futures, attached as Appendix 4 of the Application, reports a decrease in actual population between 2006 and 2011 for Denman of 7 percent and Hornby of 9 percent. While the report goes on to suggest that population growth may be seen on Denman and Hornby Islands, it also projects an aging demographic.

The annual traffic growth forecasts in the report for Denman Island range from a low of - 0.4 percent to an average 1.2 percent per annum, and for Hornby Island range from a low of -0.4 percent to an average of 1.5 percent per annum.

In view of the aging demographic and no evident significant increase in economic development, the Company believes that sizing the vessel for the “status quo” is prudent. The demographics show that the under age 20 population is expected to decline, as is the working age group, for which the majority of the travel on these islands is presently based. In contrast, an age group with more of an ability to change their travel patterns (over age 55) is expected to increase – this group may not travel everyday commuting to/from work which can be rigid in terms of time of travel, instead their travel may be more discretionary in nature. If the optimistic level of traffic growth in the report did occur, the Company has the ability to add additional crew to enable the vessel to carry more passengers, as well as to add sailings as it does now in peak periods. (These opportunities are discussed further in section VI (1), below). Over the longer term, were significant increases in traffic levels to be sustained, other options could be explored, including the possible extension of the vessel to increase vehicle and passenger capacity. The feasibility of this option would need extensive review, which would encompass a review of the cable ferry infrastructure.

VI. The Proposed Major Capital Expenditure is Consistent with the Current CFSC

Contrary to the assertions at p. 15 of the Union's submission, the Project will meet and likely exceed the core service level requirements for Route 21 in the current CFSC. As noted in the Application¹⁶, the Project will also meet the service requirements contemplated by the provincial government in its recent public engagement process, and since announced by government to take effect in April 2014, and the business case remains solid even with these reductions in service for Route 21.

1. Passenger Capacity

In its submission, the Union expresses concern that the reduction in passenger capacity from 294 on the *Quinitsa* to 150 on the cable ferry will compromise the Company's ability to satisfy the service level requirements of the CFSC. This concern is without merit. The analysis of passenger traffic on Route 21 over the last decade indicates that a licence of 150 passengers was only exceeded on a very limited number of trips (< 0.1%). As passenger complement is a driver of crew size, the additional capacity is not justifiable. As the CFSC only commits BC Ferries to carry the previous year's traffic, the reduction in licence is permitted, while not representing any likely reduction in service.

In the event that demand were to exceed the ‘per sailing’ capacity constraint of 150 passengers, there are options available to add passenger capacity. For the anticipated limited occurrences, the options include:

- As the crossing time is only ten minutes, when heavy vehicle traffic conditions exist the *Quinitsa* currently operates in shuttle mode. This not only increases the frequency of sailings, but also reduces the wait time between sailings. This option will continue to be available with the cable ferry operation.
- The maximum passenger complement is predicated on operating the cable ferry with three crew members. As the cable ferry will be equipped with two life raft systems, each with the capacity to carry 150 passengers, should there be a need to carry over

¹⁶ See pp. 9 – 10 of the Application.

the 150 limit, BC Ferries has the opportunity to add additional crew, thereby increasing the passenger capacity.

2. *Weather and Mechanical Cancellations*

The Union expresses concerns about potential sailing cancellations due to weather and routine maintenance and cable replacement, and suggests that the Commissioner's approval for the latter would be required under section 42 or 43.1 of the CFA. These concerns are without merit.

The comprehensive modeling performed by BC Ferries' consultants indicates that approximately five sailings per year are at risk of cancellation due to motion-induced weather restrictions, representing less than 0.01% of the current 12,296 sailings per year required to be delivered under the CFSC. This is far below the fleet average for BC Ferries. Regarding mechanical reliability, the ferry has been fitted with fully redundant powering and auxiliary systems, such that it is expected that only a fault with the drive cable could result in a cancellation. As noted above, the drive cable will be monitored and maintained to ensure the highest level of reliability.

The CFSC contains provisions that permit temporary service disruptions of up to 20 consecutive days and a maximum of 30 days per year for weather, mechanical and other specified reasons. These provisions are expected to be more than sufficient to address any cancellations in cable ferry sailings that may be required. For this reason, the Union's assertion that an application under section 42 or 43.1 is required at this time has no merit.

VII. The Proposed Major Capital Expenditure is Consistent with BC Ferries' Long Term Capital Plan

Contrary to the concerns raised at p.16 of the Union's submission, the Project is consistent with the long term capital plan of the Company.

The Union questions whether the capital costs for the berth and terminal upgrades have been budgeted. The answer is yes, and while these costs fall under a master planning process that was ongoing prior to the cable ferry proposal, they have now been incorporated into the Project to ensure effective integration and project management. As such, the cable ferry project, including new terminals and cable anchoring and tensioning system will be managed as a single integrated and complete system.

The Union further questions the vessel redeployment plans arising from the introduction of the cable ferry. As previously described, the Project enables the redeployment of the *Quinitsa* as relief vessel on minor and intermediate routes due to its flexible configuration, and the ultimate replacement of one NC2 Minor vessel is deferred until the late 2020s when the other vessels in that class are scheduled for replacement. This permits cost efficiencies to be achieved from a multiple ship order, which is designated as the "T-Class", comprising the *Tachek*, *Tenaka* and *Quadra Queen II*, rather than individual ship replacements. Thus the introduction of the cable ferry, despite being unique in the BC Ferries fleet, together with the redeployment of the *Quinitsa*, facilitates the goals of BC Ferries' long term capital plan, which include replacement of vessels by class type (thereby enabling the achievement of economies of scale by block ordering).

VIII. The Section 55 Guideline Decision Criteria Are Met

In its conclusion, the Union applies its submissions against the decision criteria that are set out in the Commissioner's section 55 guidelines. This aspect of the Union's submission repeats the submissions that precede it, which BC Ferries has already addressed above. For that reason, BC Ferries will not repeat the submissions it has already made regarding the Union's "conclusion" section, other than to say that there is no merit to the Union's submissions that the Application does not meet the "test" under section 55. BC Ferries submits that the Project meets the requirements of section 55 and should be approved.

IX. Conclusion

BC Ferries appreciates the opportunity provided by the Commissioner to respond to the issues raised by the Union. Many of the issues raised relate to safety concerns and are outside the scope of the Application. Notwithstanding this fact, BC Ferries has taken the opportunity to respond to these concerns so that the public, the Commissioner and the Union are assured that the vessel will be safely manned and operated according to the applicable safety standards. The remaining issues raised by the Union relating to technological feasibility and compliance with core service levels are also without merit. The cable ferry project has been extensively and robustly engineered, and it is a technologically sound project. The Project will meet the core service levels, and no section 42 or 43.1 applications are required. Finally, for the reasons explained above, the Project is consistent BC Ferries' long term capital plan.

BC Ferries submits that the Application should be approved.

Sincerely,



Robert P. Clarke, CGA
Executive Vice President & Chief Financial Officer

cc: Sheldon Stoilen, Deputy Commissioner



EXECUTIVE VICE PRESIDENT & CHIEF FINANCIAL OFFICER

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February 14, 2014

Mr. Gordon Macatee
British Columbia Ferries Commissioner
BC Ferry Commission
RPO Hillside P.O. Box 35119
Victoria, BC V8T 5G2

Dear Mr. Macatee:

Re: Application to the British Columbia Ferries Commissioner Pursuant to Section 55(2) of the Coastal Ferry Act ("CFA") For Buckley Bay to Denman Island ("Route 21") Cable Ferry Project (the "Application")

Thank you for providing us with a copy of the comments of the Denman-Hornby Ferry Advisory Committee (the "FAC") dated January 15, 2014, concerning the Application, and for inviting us to provide our comments in response.¹

The FAC states that it takes no position for or against the project. Rather, it provides a summary of questions and concerns arising from its communities. British Columbia Ferry Services Inc. ("BC Ferries" or the "Company") has carefully reviewed and considered the FAC's comments. Most of the concerns and questions raised by the FAC were also raised by the BC Ferry & Marine Workers Union (the "Union") in its submissions dated January 23, 2014. Rather than repeat BC Ferries' response to those issues here, BC Ferries relies on its response to the Union's submission dated February 14, 2014 (with the relevant references provided below where applicable).² Other concerns raised (not dealt with in the Union's submissions) have otherwise been addressed in the Application.

The evidence provided in this submission (and in response to the Union's submission) further supports the prudence and reasonableness of the expenditure applied for, and BC Ferries submits that the Application should be approved.

I. Overarching Question Posted by the FAC

The FAC comment that the review of the Application should address the following fundamental question:

¹ BC Ferries received the FAC's submission on January 29, 2014.

² BC Ferries' response to the Union's submissions dated February 14, 2014 is being provided to the Commissioner at the same time as these submissions in a separate document.

Is it prudent and reasonable to replace a reliable and effective service with one that a) involves pushing the envelope of cable ferry systems and b) will orphan Route 21 from the rest of the coastal ferry service at a time when interoperability is becoming a guiding principle in BC Ferries' capital planning?

BC Ferries agrees that the Commissioner should consider the prudence and reasonableness of the Project, as required under section 55(4) of the *Coastal Ferry Act*, and submits that the Project meets both requirements.

BC Ferries has acknowledged that the Project will likely be one of the longest cable ferry operations in the world and has always approached the Project with this fact in mind. As stated in BC Ferries' response to the Union's submissions:

Cognizant that the Route 21 cable ferry will likely be one of the longest cable ferry operations in the world by 300 metres and that the ferry itself will be large by cable ferry standards, the Company has undertaken extensive research and analysis to confirm the technical feasibility of the Project and to ensure that the cable ferry will deliver safe and reliable service. The analysis performed demonstrates that the project is technologically feasible.

BC Ferries has been studying the Project since 2008 and has employed subject matter experts in every aspect of the cable ferry system design (which incorporates the ferry, cable system, and berth arrangements as an integrated system). Fourteen different professionally accredited consulting organizations have worked with BC Ferries to obtain the cable ferry permits and on the various design stages for the project, from concept and feasibility to the detail design. In designing the cable ferry system, simulation and modeling techniques were imported from the offshore oil industry, which designs much larger moored structures for much more severe conditions than are experienced in Baynes Sound. The environmental conditions were characterized from two extensive field measurement programs, and developed into design criteria using statistical methods widely accepted in the professional ocean engineering field. As an added measure of caution, the extreme conditions were augmented by anecdotal wind conditions to ensure an equivalent level of reliability with the current service. An overview of the extensive research and analysis undertaken by the Company in respect of the Project is found in section 4.2 of the Application. The technical rigor adopted in the design of the cable ferry system fully addresses any technical risk associated with operating one of the longest cable ferry span in the world. [Emphasis added.]

BC Ferries also acknowledges that the vessel will be unique to its fleet and that, in this particular case, interoperability will not be achieved. BC Ferries repeats and relies on the submissions found at p. 11 of its response to the Union's submission dated February 14, 2014, regarding the issue of interoperability.

With respect to the concern that BC Ferries will "orphan" Route 21 from the rest of its fleet, BC Ferries repeats and relies on its submissions regarding contingency planning found at p. 9 of its response to the Union's submission dated February 14, 2014. As BC Ferries' submissions make clear, while the cable ferry will be different from other BC Ferries vessels, it will not in any sense be orphaned. Adequate contingency planning is in place to ensure continued service in the event of mechanical failure of the vessel.

II. Rationale for the Proposed Capital Expenditure

Under the heading “rationale for the proposed capital expenditure”, the FAC comment that the review of the Application should address the following fundamental question:

We hope this review will identify the level of savings that may realistically be achieved and assess whether these support a reasonable and prudent decision in the light of any potential reduction in the level and quality of service established on Route 21.

BC Ferries addressed the savings that will be achieved through the Project in section 3.4 of the Application (p. 17). As described in that section, the Project will achieve a net present value (“NPV”) advantage of \$27.76 million over the status quo option and is preferred by BC Ferries.

In its submissions, the Union raised concerns regarding certain “assumptions” and premises of the calculated savings.³ BC Ferries repeats and relies on its submissions to the Union’s concerns regarding the savings that will be achieved through the Project at pp. 10 to 12 of its response dated February 14, 2014.

III. Proposed Capital Asset

Under the heading “proposed capital asset”, the FAC comment that the review of the Application should address the following fundamental question:

We hope this review will evaluate actual capital costs and potential savings using full information now available and in the light of current plans for fleet composition.

With respect to the FAC comment that the capital costs and potential savings be reviewed based on current information available through the tendering processes for the cable ferry and terminals, BC Ferries confirms that it has considered such information, where appropriate, and the business case for the Project remains solid.

With respect to the FAC suggestion that the possibility of life extending the *Tenaka* be addressed in the review, BC Ferries repeats and relies on its submissions regarding the financial analysis respecting this matter found at p. 10 of its response to the Union’s submission dated February 14, 2014. As made clear in BC Ferries response, a life extension of the *Tenaka* has not yet been determined by the Company to be feasible and, even if it were to be so determined, it would not provide a more favourable option on a NPV basis to either of the two options presented in the Application. Further, as the Company states in response to the Union:

The replacement of the *North Island Princess*, either through the life extension of the *Tenaka* or with a new-built vessel, will be the subject of a separate section 55(2) application by the Company. Were a life extension of the *Tenaka* determined to be feasible, the net benefits would be additive to the benefits of deploying the proposed cable ferry on Route 21. For further certainty, in no way would the life extension of the *Tenaka* in this connection detract from the net benefits of the cable ferry project.

³ See pp. 12 to 15 of the Union’s submissions. BC Ferries does not agree with the characterization of the issues raised by the Union in this section of its submissions as “assumptions”.

IV. Deployment and Operation of the Asset

Under the heading “deployment and operation of the asset”, the FAC raise the following concerns:

- they raise a concern with the assumption that the cable ferry will be manned by a crew of three (they are concerned it could be higher);
- they contend that BC Ferries initially suggested that the cable ferry could reduce fuel consumption by half, but now says the reduction would only be by a third;
- they express concern that the maintenance cost saving are premised on assumptions about when refit (every 10 years) and cable replacement (every 3 years) will need to occur, and that things may prove to be different.

The FAC comment that the review of the Application should address the following fundamental question:

We hope this review will evaluate potential operational cost-savings in a way that takes into account potential variations from what is proposed that could come into play during actual deployment.

With respect to the assumption that the cable ferry will be manned by a crew of three, the Union raised a similar concern in its submissions at p. 14. BC Ferries repeats and relies on its submissions found at p. 11 of its February 14, 2014 response. As BC Ferries states in response to the Union, the proposed crew complement of three is based on careful analysis, and the business case remains valid even with a crew augmentation of four or five members due to other operational and maintenance savings associated with the Project.

BC Ferries addressed the savings in fuel consumption that will be achieved through the introduction of the cable ferry in section 3.3 of the Application (p. 16). As described in that section, a reduction in fuel burn from the current rate of over 27,000 litres per month to 14,000 litres per month - a reduction of approximately 50 percent - is expected.

In terms of the comments made about the dry docking cycle, BC Ferries has a reasonable expectation to be able to dry dock the cable ferry on a ten year cycle based on discussions with the Classification Society, Lloyds Register, which has indicated that it will support a submission to Transport Canada for the extended docking cycle. This is based on the cable ferry's effective design for minimal maintenance requirements, with few hull penetrations, long lasting cathodic protection, low maintenance coatings, and modular systems that are easily exchangeable with locally stored spares. Were a four year docking cycle to be required, the Project would continue to have a NPV advantage to the status quo.

With respect to the replacement of the cables, as described in section 4.2 of the Application (p. 28) the drive cable will be changed out each year and will then be rotated into one of the less exercised guide cables for another two years. Thus a new cable is in fact fitted every year in the drive cable position. This is the pattern that is employed by other cable ferry operators which operate in more extreme environmental conditions and operate a greater number of hours per year. This cable rotation cycle is reflected in the business case for the Project.

V. Consistency with the Coastal Ferry Services Contract ("CFSC")

Under the heading "consistency with the Coastal Ferry Services Contract", the FAC comment that the review of the Application should address the following fundamental question:

We hope this review will consider, with respect to the prudence and reasonableness of this proposal, whether this significant step-up in the scale of a cable ferry operation poses undue risk to the reliability of the required service and to the projected savings should the cable ferry experience problems or failures after it is deployed.

BC Ferries repeats and relies on its submissions in response to the Union regarding the extensive engineering that has gone into the project. For example, at p. 4 of its February 14, 2014 response, BC Ferries states:

As stated in the Application, while a cable ferry system is new to BC Ferries, the technology is established and proven. Cable ferries operate nationally and internationally in both salt and freshwater applications, and in much more severe environmental conditions than those experienced in the sheltered configuration of Baynes Sound, where the proposed cable ferry will operate. Cognizant that the Route 21 cable ferry will likely be one of the longest cable ferry operations in the world by 300 metres and that the ferry itself will be large by cable ferry standards, the Company has undertaken extensive research and analysis to confirm the technical feasibility of the Project and to ensure that the cable ferry will deliver safe and reliable service. The analysis performed demonstrates that the Project is technologically feasible.

BC Ferries addressed further concerns regarding consistency with the current CFSC, including issues relating to passenger capacity, and weather and mechanical cancellations, at pp. 12 to 13 of its February 14, 2014 response to the Union's submission.

BC Ferries submits that the Application, and its response to the Union's submission, demonstrates that it will be able to meet the core service requirements in the current CFSC.

VI. Consistency with Long Term Capital Planning

Under the heading "consistency with long term capital planning", the FAC comment that the review of the Application should address the following fundamental question:

We hope this review will evaluate potential savings in the light of an absence of interoperability.

The Union raised the same concern with interoperability in its submissions at p. 14, and a concern with consistency with longer term capital planning at p. 16 of its submissions. BC Ferries repeats and replies on its response to these submissions, found at pp. 11 and 13 of its February 14, 2014 response.

VII. Conclusion

BC Ferries appreciates the opportunity provided by the Commissioner to respond to the comments of the FAC. The matters raised by the FAC have been considered and addressed in this submission, the Company's response of February 14, 2014 to the Union's submission and in the Application.

BC Ferries submits that the Application should be approved.

Sincerely,

A handwritten signature in black ink, appearing to be 'R. Clarke', with a stylized flourish at the end.

Robert P. Clarke, CGA
Executive Vice President & Chief Financial Officer

cc: Sheldon Stoilen, Deputy Commissioner