

**Calculating Investment Needed to  
Reduce BC Minor Routes Fares by  
25%**

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**Prepared for  
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### Introduction

The Islands Trust proposes that the BC Ministry of Transportation and Infrastructure should increase funding to BC Ferries allowing fare reductions and resultant ridership recovery. The Islands Trust is concerned about the the negative impact that ferry fare increases have had on coastal communities. The Islands Trust contracted us to provide calculations and a range of estimates of the amount of funding required to reduce BC Ferries minor routes fares by 25%, beginning April 1, 2016.

### Estimated Additional Government Funding Requirements for FY 2016/17

Exhibit 1 provides estimates of the additional funding required from government for 25% fare reductions on BC Ferries Minor Routes for the fiscal year beginning April 1, 2016. The estimates assume no increase in population in the service area and are in 2015 dollars.

#### Exhibit 1 – Minor Routes

| Fare Reduction | Price Elasticity of Demand | 2016/17 Additional Funding |
|----------------|----------------------------|----------------------------|
| 25%            | -0.15                      | \$15,819,000               |
| 25%            | -0.20                      | \$14,888,000               |
| 25%            | -0.25                      | \$13,958,000               |
| 25%            | -0.30                      | \$13,027,000               |

Exhibit 2 provides estimates of additional funding required from government for a 25% fare reduction on BC Ferries Route 3 (Horseshoe Bay – Langdale) for the fiscal year beginning April 1, 2016. The estimates assume no increase in population in the service area and are in 2015 dollars.

#### Exhibit 2 – Horseshoe Bay – Langdale

| Fare Reduction | Price Elasticity of Demand | 2016/17 Additional Funding |
|----------------|----------------------------|----------------------------|
| 25%            | -0.15                      | \$8,571,000                |
| 25%            | -0.20                      | \$8,067,000                |
| 25%            | -0.25                      | \$7,563,000                |
| 25%            | -0.30                      | \$7,058,000                |

The government funding requirement is the output or dependent variable in the spreadsheet model developed for this exercise. The independent variables include annual fare increases ( $\Delta$ Fare), changes in population ( $\Delta$ POP), percentage fare reduction (Discount), price elasticity of demand ( $E_d$ ) and inflation rate ( $\Delta$ CPI). Different inputs or assumptions for the independent variables determine the output or government funding requirement.

### Assumptions

Two key assumptions include an inflation rate of 2% from 2016-2020 and annual fare increases of 1.9% April 1, 2017 to April 1, 2019. If fares increase at general inflation, ferry travel is not becoming more expensive relative to other possible expenditures. Thus there is no expectation of shifting expenditures away from travel, with attendant impact on the funding requirement calculations for 2017-2020. We have provided calculations and a range of estimates of the amount of funding required annually to reduce BC Ferries minor routes fares by 25%, beginning April 1, 2016, until April 1, 2020.

Another key assumption is rate of change of population. Traffic growth results from population growth, all things being equal. This increases the funding estimate slightly as more travellers benefit from fare reduction compared to the base case with no fare reduction. We have input a 0% increase in population ( $\Delta$ POP) based on a Statistics Canada Report which showed the 2006 population of 25,365 in the Island Trust Area increased to only 25,570 in 2011.

The discount applied to fares is 25% as specified by Island Trust. A smaller discount rate reduces the government funding requirement.

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### Price Elasticity

The range of estimates provided reflects the different assumptions made concerning price elasticity of vehicular and passenger traffic on the routes. Price elasticity of demand is a measure used in economics to show the responsiveness, or elasticity, of the quantity demanded of a good or service to a change in its price.

The differing funding requirements reflect different input price elasticities ranging from -0.15 through -0.30, with a mid-range estimate using an elasticity of -0.25.

Price elasticity is market-specific (meaning origin-destination, sailing time and type of travel). Ideally we would have a comprehensive travel demand study to derive elasticities for each route and the spreadsheet model could be altered to accommodate this if this information becomes available. The spreadsheet model uses identical elasticity estimates for vehicular and passenger traffic.

We checked the spreadsheet model results against another Perrin, Thorau & Associates model for BC Ferries routes. The other methodology produced a funding requirement of \$12.0 million for a 25% cut in fares in 2016/17. That compares closely to the spreadsheet model estimate of \$13.5 million for a 25% cut in fares, using an elasticity of -0.30. (The Perrin, Thorau & Associates model indicated elasticities of -0.22 for passengers and -0.27 for vehicles; it included all Minor routes, except for Route 12 (Brentwood-Mill Bay).)

Although the Islands Trust has only asked us to consider elasticities of -0.15 to -0.30, we are aware that BC Ferries has commissioned studies which include the estimation of price elasticities for various routes and for the system. One such estimate is -0.40, which we believe is used by BC Ferries internally. Assuming a price elasticity of -0.40, with consistent assumptions for other independent variables, the spreadsheet model estimates a minor routes funding requirement of \$11.2 million for Fiscal Year 2016-2017.

### Prepaid Fare Increases on Selected Routes 2003-2015

Exhibit 3 provides data and calculations for Route 4 (Swartz Bay to Fulford Harbour, Salt Spring Island); Route 8 (Horseshoe Bay, West Vancouver to Snug Cove, Bowen Island); Route 19 (Nanaimo Harbour to Gabriola Island); and Route 22 (Hornby Island to Denman Island).

Exhibit 3 illustrates the actual and percentage increases in prepaid fares for car and driver from 2003 to 2015 for selected routes. The 2003 base fares were derived from the prepaid adult (book of 10) and prepaid car (book of 10) published rates for the subject routes. The 2015 fares were based on the published cost of a fare for car and driver using the Experience Card on the subject routes. Some interpolation was required and rounding for consistency.

All fares are for an under-height passenger vehicle and adult driver using prepaid fares which are the least expensive fares in the tariff. This would have required a ticket in 2003 and using the Experience Card in 2015. The second column of Exhibit 3 shows April 1, 2003 prepaid fares. The third column shows April 1, 2015 prepaid fares. The fourth column calculates % increase of April 1, 2015 prepaid fares over April 1, 2003 prepaid fares. The fifth column calculates what the prepaid fare would be if prepaid fares had only increased at the rate of the CPI since 2003 (2003-2015 CPI increase = 24.4%). The last column shows what the 2016 prepaid fare would be after a 25% reduction on selected routes.

### Exhibit 3: Prepaid (Discount) Fare Increases since 2003 for car and driver

| Route | 2003 Prepaid Fare | 2015 Prepaid Fare | % Increase since 2003 | 2015 Prepaid Fare at CPI % increase | 2016 Fare with 25% cut |
|-------|-------------------|-------------------|-----------------------|-------------------------------------|------------------------|
| 4     | \$15.40           | \$33.10           | 115%                  | \$19.10                             | \$25.30                |
| 8     | \$13.05           | \$29.45           | 125%                  | \$16.25                             | \$22.55                |
| 19    | \$10.60           | \$23.45           | 121%                  | \$13.20                             | \$17.95                |
| 22    | \$8.55            | \$20.35           | 138%                  | \$10.60                             | \$15.55                |

Part of the differential percentage increase in fares is a result of the practice of BC Ferries rounding up individual and ticket book fare increases to the nearest 5 cents or 25 cents rather than as a straight percentage increase. This is a practical administrative matter for BC Ferries but over the years has resulted in greater percentage increases for some routes that started with a lower base fare.

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The CPI used was for Canada from Statistics Canada, CANSIM, table 326-0021 modified 2015-01-23. The base year is 2002 and the CPI in 2003 was 102.8. The estimated CPI in 2015 is 127.2. The increase from 2003 to 2015 is 24.4%.

The fares reflect the historical circumstances under which BC Ferries acquired each route. The routes in the southern Gulf Islands were acquired in the early 1960s from a private company. The northern Gulf island routes were transferred from the BC Department of Transportation in the early 1980s.

The original fares subsequently increased, often annually, on approval by the BC Cabinet. The tariff (the collected fare structure) contains obvious inconsistencies. Although attempts have been made, it has never been rationalized.

There is variation in transportation needs and in economic and social circumstances between the island communities. Increases in ferry fares of over 100% in a period when the consumer price index rose by only 24% have adversely affected both the Vancouver Island and the coastal economies. Many of the highest percentage fare increases have impacted the most disadvantaged and poorly-served communities.

### Conclusions

We note that, while fares have increased steadily, revenues from vehicle traffic have seemingly plateaued in Fiscal 2013/14. The market elasticity may be such that further fare increases will not translate into added revenue, and presents the possibility that a well-designed fare structure (including discounts) could well mean better financial results. Of course, this requires sophisticated coordination of fares with service plans, as implied by BC Ferries in its document *Fare Flexibility and Revenue Management Strategy*.

### Recommendation:

Additional government funding to reduce ferry fares by 25% on the Minor routes and on Route 3 would begin to reverse some of the negative consequences of the accelerated fare increases experienced in coastal communities since 2003. Δ