Technical Note

Project Title:	Gourock Dunoon Ferry Study
MVA Project Number:	101988
Subject:	Choice Modelling
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Author(s):	
Reviewer(s):	
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1 Introduction

1.1 This note contains a description of the choice modelling undertaken to represent the choices made between different groups of travellers on the Firth of Clyde. :

2 Market Segments

- Cowal Residents
- Others
- Car based passengers
- Foot Passengers
- Concessions?

3 Key Calibration Parameters

3.1 2010 is the last full year where both Cowal and Western Ferries were running. This is therefore the most appropriate basis for calibrating a choice model. Aggregate figures for 2010 as follows:

2010	Passengers	Cars	CVs / Buses
Cowal Ferries	499,200	61,400	3,500
Western Ferries	1,313,800	546,200	33,000
TOTAL	**1,813,000**	**625,600**	**36,500**

	Foot Passengers	Vehicle Based Passengers	Scheduled Bus Passengers	Total Passengers
Cowal Ferries	373,690	125,538	0	499,200
Western Ferries	137,225	1,176,575		1,313,800
TOTAL	**510,915**	**1,302,113**		**1,813,000**

Foot Passengers

3.1.1 The key issue here is that we do not know the number of foot, car and bus-based passengers carried on Western Ferries. We also do not know how many vehicle based passengers travel in a CV or a bus. So:

- from the McGill's timetable we can estimate that there are 6,760 crossings per year;
- national statistics suggest that the average bus loading is nine passengers, CVs can be assumes as single person occupancy;
- STS road traffic statistics suggest that on rural roads there is an 85% / 15% split in terms of total CVs / buses;
- we can therefore estimate the number of buses and CVs carried by each operator and thus the number of passengers carried by each vehicle type;
- we can then deduce the passengers carried by car on Cowal ferries and apply this to Western Ferries car volumes to obtain estimates of Western car passengers;
- we can then estimate foot passenger volumes on Western by deducting all vehicle based passengers from the total;
- the end result of this process is that Western held a 36% share of bus / foot passengers and Western held a 64% share; and
- these foot / bus proportions are likely to have shifted further towards Western since 2010

See D:\gourock Dunoon\ 20130219 calibration stats v1.0

Published Data 2010	Cowal	Western
a. Total Passengers	499,228	1,313,800
b. Foot Passengers	373,690	-
c. Total Cars	61,400	564,200
d. Total CVs / Buses	3,462	33,000
Estimated Data		
e. McGills Buses veh		*6,760*
*f. McGills Buses pass (e * 9)*		*61,192*
g. Other buses veh (15% of total cv / bus)	*534*	*4,044*
*h. Other buses pass (e * 9)*	*4,909*	*37,207*
i. CVs (85% of total cv / bus)	*2,928*	*22,196*
*j. CV passengers (i * 1)*	*2,928*	*22,196*
k. Car Passengers (a-b-h-j)	*117,701*	
l. Passengers / car (k/c)	*1.92*	
*m. Car Passengers (l * c)*		*1,081,543*
n. Foot Passengers (a-f-h-j-k)		*110,663*
Summary of estimates		
Foot Passengers	*373,690 (77%)*	*110,663 (23%)*
Bus based passengers	*4,909 (5%)*	*99,399 (95%)*
Car / CV based passengers	*120,629 (10%)*	*1,103,738 (90%)*
Foot / Bus total	*378,599 (64%)*	*210,062 (36%)*

3.1.2 We know that

3.2

- Dunoon / Cowal based foot passengers
- 'Mainland' based foot passengers

3.3 A two-step process to demand forecasting is being undertaken:

- Step 1: Define scenarios in relation to the total volume of travel across the Firth of Clyde; and

- Step 2: Estimate the market share accruing to Western and Gourock-Dunoon under a number of service scenarios.

Step 1: Define Market Volume Scenarios

3.4 Having analysed the trend data on the Firth of Clyde in Section 2, the key issues in any projection are:

- when will growth resume with the anticipated economic recovery?
- at what rate will growth resume in relation to recent trends?; and
- in the longer term, is there a 'saturation' point for volumes on these crossings, ie growth cannot continue indefinitely without significant population growth?

3.5 The relationship between Scottish **economic growth** and Gourock Dunoon volumes is complex. Total car and passenger volumes have drifted steadily and consistently down between 2007 and 2011, despite the economy suffering a sharp fall in 2009, rebounding in 2010 and contracting again in 2011. Car ferry volumes have dropped much faster than national traffic volumes since 2007 and were growing at a faster rate than national traffic between 2000 and 2007. This suggests volumes here are more volatile than national traffic. It is therefore not obvious that volumes on the route will immediately increase with economic growth. For example the economy grew between 2009 and 2010, yet passenger and car volumes dropped. As such, economic forecasts are probably not the most reliable basis for forecasting here, and a trend based approach may be more appropriate.

3.6 In terms of **population**, the GROS projections for the Argyll and Bute Council area suggest a **7% drop** in population between 2010 and 2035. There are no sub-local authority projections available. GROS estimates of the population of the settlement of Dunoon (which includes Sandbank) suggest that the population grew from 8,950 in 2003 to 9,410 in 2010, a growth of around 5% which will account for some of the growth seen in this period.

3.7 A prospective starting year for the analysis any new service has yet to be agreed and the current Argyll Ferries contract runs to June 2017. Presumably, this contract could be terminated early on the agreement of both parties if a passenger and vehicle service was to be introduced. The TOR stated an assessment period of 15 years, so the assessment period could be 2017-2032 (or perhaps eg 2015-2030?).

3.8 As suggested above, although volumes are currently dropping, it would seem reasonable to assume that travel volumes across the Clyde will begin to increase again when the economy recovers and in particular when real incomes start increasing, and we can develop a number of different growth scenarios to explore the sensitivities of the outcomes reached here to this.

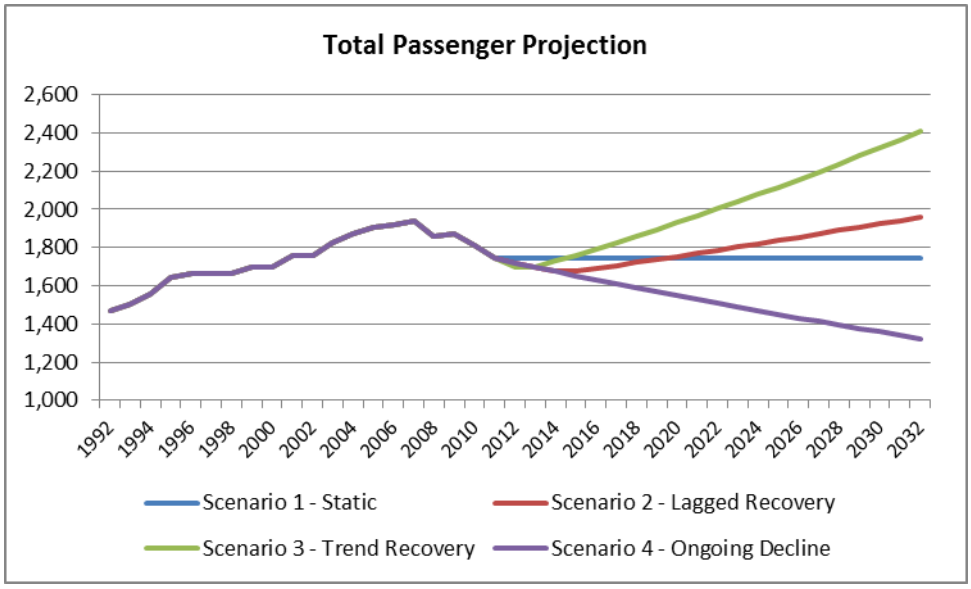
3.9 The total volume will of course also be determined to some extent by the nature of the ferry services in operation (ie service frequency and price) and this will be accounted for, in terms of changes from today's level of service. In the decade or so up until July 2011 there had been a very stable supply side, with no major changes to frequencies, fares, operating day etc.

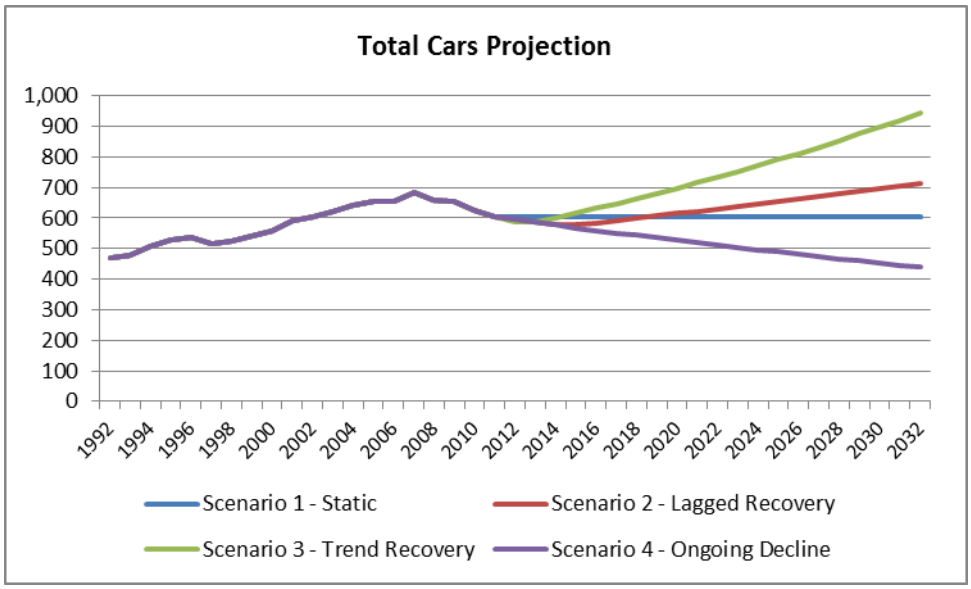
3.10 The commencement of a half hourly foot passenger only service, together with a much longer operating day, has not led to any increase in foot passengers. However the issues surrounding the vessels currently in use makes it difficult to draw any conclusions from this.

3.11 Some potential whole route scenarios are outlined below:

- Scenario 1 'Static' – base all cost and revenue estimates on 2011 total route volumes;
- Scenario 2: 'Lagged Recovery' – volumes pick up at say 50% of the 2000-07 trend rates following economic recovery. Say 50% of trend reductions to 2014, then gradual recovery;
- Scenario 3: fast recovery – say volumes stabilise in 2013 the resume 2000-07 trend growth from 2014 onwards; and
- Scenario 4: ongoing decline – assume volumes continue to drop at say 50% of current rates.

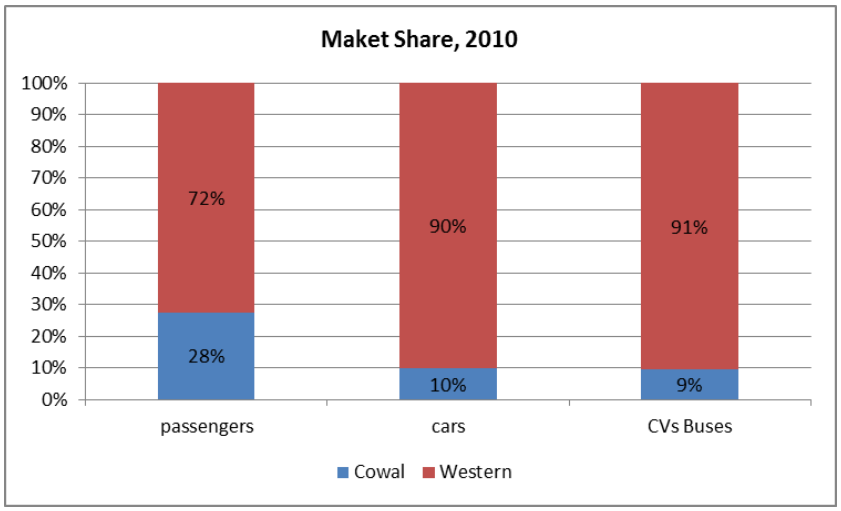
3.12 These four scenarios would give rise to the following projections.





Step 2: Estimate Market Share

3.13 2010 was the last full calendar year when both passenger and vehicle ferries were operating. The market share between Cowal and Western is shown below.



3.14 What determines these choices? The choice between the two ferry services will have been influenced by:

- Quantifiable elements: Fares, frequency, length of operating day, location of terminals etc; and
- Less quantifiable elements: ticketing practices, presence of train link at Gourock, getting a lift to terminal etc;

3.15 The Ferries Review Stated Preference Study undertaken for Transport Scotland produced a series of parameter values which can be used to inform the modelling of ferry services.

3.16 The process we are currently developing involves:

- Code up generalised cost functions for each ferry service based on SP work noted above;
- Synthesise a broad Origin-Destination matrix for foot passengers and cars / car based passengers, for Cowal residents and Others – based in part on the 2007 survey data;
- Calibrate a choice model for the split of foot passengers and cars / car based passengers to the 2010 carryings data
  - this will require route specific constant to account for unquantifiable elements;
  - summed across the matrices this will recreate the annual figures
- develop a number of trend based forecasts for demand across the Firth (foot passengers, cars / passenger, CVs / buses) as described above;
- Adjust these using a route elasticity for the total number of crossings relative to the 2010/11 situation if, ie the final year of Cowal's operations;
- Growth up our base year demand matrices in line with route projections;
- Apply calibrated choice model; and therefore
- Determine new market shares based on service characteristics together with the resulting boardings and revenues.

3.17 This approach allows us to use an evidence-based and systematic approach to forecasting the use of a Gourock – Dunoon town centre ferry service.