Part 1 Appraisal Summary Tables

<table>
<tr><th colspan="4">Proposal Details</th></tr>
<tr><td colspan="2">Name and address of authority or organisation promoting the proposal:

(Also provide name of any subsidiary organisations also involved in promoting the proposal)</td><td colspan="2">Mr Michael Craigie, 01595 744 160, michael.craigie@shetland.gov.uk

Shetland Islands Council, Development Service, Transport Planning Service, 6 North Ness, Lerwick, Shetland, ZE1 0LZ</td></tr>
<tr><td>Proposal Name:</td><td>Option CO4 – Fixed link (tunnel) between Yell and Shetland mainland</td><td>Name of Planner:</td><td>Stephen Canning, Peter Brett Associates</td></tr>
<tr><td rowspan="3">Proposal Description:</td><td rowspan="3">There is at present uncertainty over the precise design and alignment of a fixed link to Yell. The most recent tunnel feasibility work was carried out in 2008 established the potential for a 3.5km dual lane tunnel, although very limited ground investigation has been undertaken. Options for a bridge were considered in 1999 at a conceptual level only. Our assumption is therefore that a fixed link would take the form of a tunnel.

This option would permit the redeployment of the MV Dagalien and MV Daggri (and potentially the linkspans to another route.</td><td rowspan="3">Estimated Total Public Sector Funding Requirement:</td><td>Capital costs/grant:
A range of capital costs have been provided for a fixed link, as set out in the main report:
Unlined UK: £95.6m (£177.9m including optimism bias & contingency)
Unlined Norwegian: £76.3m (£141.9m including optimism bias & contingency)
1/3 Lined UK: £101.8m (£189.4m including optimism bias & contingency)
1/3 Lined Norwegian: £80.5m (£149.8m including optimism bias & contingency)</td></tr>
<tr><td>Current revenue support: £0</td></tr>
<tr><td>Annual revenue support:
It is likely that a fixed link of this nature would require revenue support for ongoing maintenance. However, as this option is rejected from further consideration, an estimation of these costs and a determination of who would meet the costs has not been undertaken</td></tr>
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Funding Sought From: (if applicable)	Transport Scotland	Amount of Application:	*Present Value of Cost to Govt.* Costs in this study are all reported in 2016 prices only. The costs would reflect those set out above.
Background Information			
Geographic Context:	The island of Yell is situated between the north of Shetland mainland and the islands of Unst and Fetlar. The island is separated from Shetland Mainland by a narrow strait of water known as Yell Sound. The majority of the settlements on Yell are in the north and east the island. The ferry from the island to Shetland mainland operates from Ulsta (to Toft), a very small settlement on the south-west coast of the island. The larger settlements on Yell, such as Mid Yell and Cullivoe tend to be located in the east and north of the island, meaning that an onward car or public transport connection is typically required from Ulsta.		
Social Context:	Yell is the second most populous of the isles, with a population of around 1,000. The island has a relatively stable population, supported by good access to job opportunities and local services. However, forecasts suggest that the population will decline in the years ahead. In addition, whilst Yell has a stable population, it is also an ageing one, which is reflected in the proportionally lower economic activity rate and higher number of retirees relative to the Shetland Islands generally. Health provision on the island is of a high quality, whilst there are stable rolls at the island nursery, the two primary schools and the Junior High. The island also has a high level of community cohesion, with a very active third sector on the island.		
Economic Context:	The Yell economy is relatively healthy, with a number of indigenous businesses in the valuable aquaculture sector, good commuting opportunities and a strong public sector presence (in terms of both direct jobs and as a facilitator of other opportunities). Yell has very high levels of household car ownership and a significant proportion of its residents travel in a car to work. This reflects the importance of commuting to the island, particularly to Sullom Voe and Lerwick. The amount of people working from home has increased in recent years. The availability of housing on Yell and the North Isles generally is seen to constrain the growth of the community. Overall, Yell is in a relatively favourable position overall, with a stable population, reasonable industrial mix and good connectivity. Maintaining and potentially improving this level of connectivity in years to come will be of importance to the island.		
Planning Objectives			

Objective:	Performance against planning objective:
TPO1: The capacity of the services should not act as a constraint to regular and essential personal, vehicular and freight travel between the island(s) and Shetland Mainland	***Performance against Transport Planning Objective: Major Positive*** The provision of a fixed link to Yell would remove all capacity related constraints associated with the current ferry service. There would also be integration benefits for Unst and Fetlar.
TPO2a: Where an island has a 'commutable' combined ferry or drive / public transport / walk time to a main employment centre (e.g. 80 minutes), the connections provided should reliably facilitate commuting	***Performance against Transport Planning Objective: Moderate Positive*** The current Yell Sound service supports commuting to Sullom Voe and Lerwick. However, the provision of a fixed link would reduce commuter journey times, allow for 24 hour travel-to-work and offer a high-degree of reliability (i.e. a tunnel would not be negatively impacted by weather).
TPO2b: Where an island does not have a 'commutable' combined ferry or air / drive / public transport / walk time to a main employment centre (e.g. 80 minutes), the connections provided should reliably permit at least a half day (e.g. 4 hours) in Lerwick 7 days a week, all year round.	***Performance against Transport Planning Objective: Neutral*** This objective is not considered relevant for Yell.
TPO3: The scheduled time between connections should be minimised to increase flexibility for passengers and freight by maximising the number of island connections across the operating day.	***Performance against Transport Planning Objective: Major Positive*** The provision of a fixed link would remove any frequency related considerations associated with the ferry. There would also be integration benefits for Unst and Fetlar.
TPO4: The level of connectivity provided should minimise the variation within and between weekdays, evenings, Saturdays and Sundays.	***Performance against Transport Planning Objective: Major Positive*** The provision of a fixed link would remove any timetable related variations associated with the current Yell Sound ferry service.
TPO5: Where practicable, islanders should be provided with links to strategic onward	***Performance against Transport Planning Objective: Major Positive***

transport connections without the need for an overnight stay on Shetland mainland.	The provision of a fixed link would allow twenty-four hour access to Lerwick and Sumburgh Airport. There would also be integration benefits for Unst and Fetlar.
Rationale for Selection or Rejection of Proposal:	This option is rejected from further consideration given the very high up-front capital costs. In addition, there are very high levels of technical and funding uncertainty, whilst the elapsed time before this option could be realised means that it will not be considered further in the appraisal. This elapsed time would also mean that if taken forward, this option would not be in place until the tail end of the strategy period, meaning that an interim ferry-based solution would be required, adding further to the cost. Should a nationally funded programme of fixed links emerge in future, the proposal could be revisited at this stage.
Implementability Appraisal	
Technical:	The ground investigation information is very limited and consists of the Caledonia Geotech report of 2002,which, inter alia, recommended as a pre-requisite for final route selection: • a more detailed geological mapping programme including stereo-oblique air photography, due to faulting within the tunnel corridor; • terrestrial geotechnical rotary drilling investigations to assess rock properties; • marine ground investigation of the central channels (though likely expensive due to sea current / weather etc.) or directional drilling from land to assess rock properties; The report also opined that 60m below CD may be suitable for tunnel construction from Shetland to Bigga, but a deeper profile is advisable between Bigga and Yell due to a prominent fault and potential for weak, brecciated rocks. The current lack of information (especially ground investigation) precludes robust optioneering.
Operational:	A proposal of this nature could not be funded independently by Shetland Islands Council and a bid for funding support would therefore have to be made to Transport Scotland. A scheme of this nature would be considered a nationally significant infrastructure project, similar in scale to e.g. the Airdrie – Bathgate Rail Link (£300 million) and Borders Rail (£353 million). To this end, the project would need to go through several steps to secure funding and it should be noted that it is not included as one of Transport Scotland's 29 strategic transport priorities through to 2032 (identified by the Strategic Transport Projects Review). The project is also not cited in the Infrastructure Investment Plan 2011.

	The lead time for a fixed link of this nature would also be considerable, with an elapsed time of several years from initial planning through to scheme opening. The combination of a lack of funding certainty, the absence of a supporting policy commitment and the long lead-times for such a scheme give rise to significant operational risks associated with an Unst – Yell fixed link. A basic ferry infrastructure would also need to be maintained to ensure continuity during times of tunnel closure / maintenance or where there is a catastrophic failure of the asset (akin to that experienced on the Forth Road Bridge in December 2015). The current ferries and linkspans on the Yell Sound route could be redeployed elsewhere on the network, offsetting capital expenditure (at least in the short-term) on other routes.
Financial:	A range of capital costs have been provided for a fixed link, as set out in the main report: • Unlined UK: £95.6m (£177.9m including optimism bias & contingency) • Unlined Norwegian: £76.3m (£141.9m including optimism bias & contingency) • 1/3 Lined UK: £101.8m (£189.4m including optimism bias & contingency) • 1/3 Lined Norwegian: £80.5m (£149.8m including optimism bias & contingency) Ongoing maintenance costs would be in addition to the up-front capital costs.
Public:	The consultation identified a fixed link as the only acceptable solution to the Yell community.

STAG Criteria		
Criterion	**Assessment Summary**	**Supporting Information**
Environment:	×××	The provision of a fixed link is likely to have a minor negative impact through increasing vehicle kilometres, whilst there will also be potentially major environmental impacts associated with construction (further work on the alignment and design would be required to more accurately assess these impacts).
Safety:	×	The provision of a fixed link would lead to an increase in car trips to and from Yell, which would lead to a marginally higher accident rate. The removal of the ferry service would remove any potential for marine accidents.
Economy:	✓✓✓	The provision of a fixed link would be of a significant benefit to Yell. Firstly, there would be

		substantial TEE benefits, associated with the journey time savings associated with not having to wait for or travel on a ferry. In addition, Shetland mainland would be accessible 24 hours per day and there would be no frequency related issues associated with waiting for a ferry. The wider benefits to Yell would also be considerable. First and foremost, Yell would effectively become an 'extension' of Shetland mainland, more fully integrating the island's economy with the wider Shetland economy. This could create additional job opportunities for Yell and would encourage both inward investment and in-migration / population retention. A fixed link would also lead to cost reductions / productivity enhancements for Yell businesses, particularly the strategically important aquaculture sector. Other sectors which would benefit include tourism and locally traded services. The provision of a fixed link for Yell would also be of benefit to the neighbouring communities of Unst and Fetlar.
Integration:	✓✓	A fixed link would significantly enhance transport integration with the Shetland and indeed Scottish mainland. A fixed link could also promote land-use development in Yell (in the 'Area of Best Fit' in Mid-Yell), alleviating the current housing pressures on the island. There would also be integration benefits for Unst and Fetlar.
Accessibility and Social Inclusion:	✓✓✓	The provision of a fixed link would fundamentally transform the community accessibility of Yell, effectively making the island an extension of Shetland mainland. The impacts are likely to be similar in nature to that experienced by Skye when the bridge was opened, albeit the magnitude of those benefits are likely to be smaller given that a Yell fixed link would connect an island with an island rather than with the Scottish mainland. There would also be integration benefits for Unst and Fetlar.