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Assessing the Viability and Sustainability of Mobile Abattoirs in Scotland



AGRICULTURE, ENVIRONMENT AND MARINE



ASSESSING THE VIABILITY AND SUSTAINABILITY OF MOBILE ABATTOIRS IN SCOTLAND

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EXECUTIVE SUMMARY

This report describes the findings of a study carried out to determine whether or not mobile slaughter units (MSUs) would be viable in Scotland, by providing detailed research of all aspects of what would be required, including the impact mobile abattoirs would have on the viability of existing processing facilities and supply chains.

With the closure of abattoir facilities in rural areas in Scotland many animals are now having to travel further to be slaughtered and returned for processing in local businesses (butchers) than before.

The main objectives for this research were to:

- Review business models in other countries where mobile abattoirs exist to understand how they operate, how they are financed, when and why they were established, their processing capacity, regulatory environment in which they operate and impact they have on other existing abattoirs and supply chains in these countries.
- Investigate cases where mobile abattoirs have ceased operation (such as the case of the UK in the 90s) and the reasons for this.
- Establish whether or not mobile abattoirs would be viable in Scotland by determining exactly what would be required from a regulatory point of view to operate such an enterprise (i.e. Food Standards Scotland requirements, water supply, waste removal etc.).
- Assess various operation models of mobile abattoirs to determine what would be required to make them a viable and sustainable operation (operational costs, number of animals slaughtered, facilities and skills requirements) in Scotland.
- Assess what impact mobile abattoirs could have on the viability of existing processing facilities and supply chains.
- Engage with key stakeholders to establish their views regarding the implementation of mobile abattoirs in Scotland.
- Consider changes that might help improve the viability of existing small abattoirs in Scotland.

Findings and Conclusions

A number of operational models were identified for detailed assessment, following the review of international case studies and stakeholder engagement responses. The models considered included:

- An MSU travelling to individual farm sites.
- A “hub/ docking” approach, where local farmers would transport animals a short distance to be slaughtered. Potential sites included farms, marts, animal processors, etc.

The review identified that the most practical and preferred solution was the docking station approach and a cost benefit analysis (CBA) was then undertaken based on MSUs using a docking station approach, which could for example, involve a unit driving to the following types of location, which already have much of the required infrastructure in place (lairage, drainage, power, water): an auction mart; an industrial unit; and/or a farm.

The docking station approach modelled in this report has been discussed with a number of key stakeholders, including butchers, smallholders, crofter, farmers, auction marts, waste collectors, abattoirs, MSU designers, MSU operators and the regulators (FSS, APHA, and SEPA). Stakeholder engagement has identified significant interest and demand for an MSU service. However, this should also be interpreted as support for a local abattoir service, regardless of whether it is mobile or fixed. This support has been expressed by crofters, smallholders and farmers. More than 600 individuals responded to an online survey advertised in a number of relevant journals, with more than 90% of respondents indicating that they would support and use an MSU service. The principle reasons given were related to animal welfare (reducing the haulage distances) and the desire to create more local meat sales businesses/ opportunities.

Members of Scottish Craft Butchers also completed an online survey, with a significant majority expressing their support for MSUs. For a future service the interest and participating of butchering businesses will be instrumental to its future success.

The existing abattoir sector has expressed different views on MSUs, depending on whether these are located in the islands or on the mainland. Two island abattoirs indicated that they were concerned that support for MSUs could result in the diversion of public funding that otherwise could be channelled to their businesses. The mainland abattoirs indicated that MSUs were seen very much as a niche development/opportunity and were not considered to be a threat to their businesses.

A review of international case studies identified MSUs operating for a significant time in Norway and Sweden, however, these have stopped trading (in 2019 for the Swedish MSU) due to what has been described as financial difficulties. The context for each of these MSU services was different, with the Norwegian MSU not able to slaughter for a sufficient number of days per annum and targeting mainly sheep. The Swedish MSU also processed sheep, along with cattle (very few pigs) and never operated at a profit - its operational model may have contributed to this by targeting individual farms. The Managing Director commented that a docking station approach, with scheduled days for slaughtering at known locations would have greatly assisted the Swedish MSU in terms of how effectively it was operated.

A variety of funding and financing methods have been used internationally, with the majority of MSUs reviewed using private funding. The Canadian MSU operating in Yukon was state-funded.

The cost for authorising and maintaining a service, in terms of compliance costs associated with approving an MSU, waste management and veterinary and meat hygiene inspections has been shown to be a very small part of the overall costs of any future MSU. The most significant costs are those for staffing, waste disposal, maintenance (of the capital equipment) and debt financing.

The operational models considered in the cost benefit analysis require docking station locations to form part of a future MSU service, with auction/livestock marts, farms, and industrial units potentially viable places, with chill units installed for hanging carcasses. The operating models considered for a future MSU service included these as stand-alone businesses providing butchers, meat processors and farmers with carcasses (e.g. sides, quarters).

In terms of the types of MSUs that would be required a number of options were considered and a cost was used that allows the kill, evisceration, cutting (quarters and side) with limited, temporary chill facilities in the trailers themselves. This requires waste to be left at the docking station locations, in secure containers, with collection by a registered carrier then taking place without undue delay (likely to be in line with fallen stock timelines). The capital cost associated with this model is between £800K and £900K.

The CBA outputs indicated that there were two operational models and scenarios where payback could be achieved without grant funding, in a time period of 11 to 15 years. These models involve generating premium prices from the sale of meat and offal sales, based on demand from a local provenance and animal welfare perspective (reduced haulage distance). If grant funding at a level of 40% of the capex is considered the payback period is significantly reduced, to 7 and 9 years. However, these scenarios still need significant amounts of private investment.

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1.0 INTRODUCTION

1.1 Background

With the closure of abattoir facilities in rural areas in Scotland such as Orkney, Elgin and Dunblane, many animals are now having to travel further to be slaughtered and returned for processing in local businesses (butchers) than before. There are concerns that this is leading to increased stress to animals, greater environmental impacts and decreased profitability for farmers.

Whilst there are no perceived issues with overall slaughtering capacity in Scotland, these closures could have many impacts on local areas particularly for producer-retailers wanting to sell meat locally, from animals they have reared or that have been reared locally.

For producer-retailers in some parts of the country, the abattoir closures are already causing logistical, animal welfare (longer journeys to slaughter), environmental (e.g. air pollution in relation to longer journeys) and financial problems.

Not all abattoirs undertake “private kill” that is killing animals for individual producers and returning the carcasses to them. Some are either unable or unwilling to slaughter animals for small producer-retailers and return carcasses to them economically; while others do not have some certification e.g. organic so are not suitable for organic animals. Those that offer private kill, tend to be the smaller abattoirs. However, the lack of small-scale regional abattoirs across Scotland has led to calls from the industry to assess whether or not mobile abattoirs could potentially go some way in addressing the lack of local slaughter provision in many rural and remote areas of Scotland.

Mobile abattoirs do not currently operate in Scotland or the rest of the UK, however according to the EU regulation on the hygiene of foodstuffs (EC) No 853/2004, mobile slaughter units (MSUs) are approved for a range of animals.¹ While two mobile abattoirs were tried in the UK in the 90s, neither lasted very long as commercial operations², due to infrastructure and inspection costs. A small producer group led by Fir Farm in Gloucestershire is currently looking at the practicalities, regulations and financial viability of establishing a mobile abattoir to operate in the North Cotswolds. Twenty-four licensed red meat abattoirs operated in Scotland during 2017 (becoming 21 in 2019) and it is estimated that that total turnover of the primary processing sector in Scotland during this period was £892 million³. The five largest abattoirs in Scotland account for the majority of slaughtering capacity, processing 70% of cattle, 90% of sheep and 95% of pigs. By comparison the equivalent proportion in the five smallest abattoirs is cattle 0.6%, sheep 0.6%, and pigs 0.4%.

¹ https://www.researchgate.net/publication/242539207_Mobile_slaughter_of_cattle_and_pigs

² <http://sustainablefoodtrust.org/wp-content/uploads/2013/04/Re-localising-farm-animal-slaughter.pdf>

³ QMS, The Scottish Red Meat Industry Profile, 2018

The numbers of cattle, sheep and pigs processed in 2017 were all down from previous years which is leading to pressure across the entire sector to continue operating efficiently at full capacity. Any significant changes to current processing supply chains could have adverse effects should they not be able to fulfil orders.

However, while mobile abattoirs could potentially go some way in addressing the lack of local slaughter provision in many rural and remote areas of Scotland, consideration also needs to be given to the impact mobile abattoirs could have on the viability of existing processing facilities and supply chains, particularly more vulnerable smaller operations.

1.2 Aims and Objectives

This study aims to determine whether or not mobile abattoirs would be viable in Scotland by providing detailed research of all aspects of what would be required, including the impact mobile abattoirs would have on the viability of existing processing facilities and supply chains. By slaughtering more animals in Scotland, and therefore closer to their place of production, benefits could be gained in the form of lower transport costs and transport carbon emissions, while also maximising economic and social benefits to rural communities across Scotland and increased animal welfare.

The main objectives for this research were to:

- Review business models in other countries where mobile abattoirs exist to understand how they operate, how they are financed, when and why they were established, their processing capacity, regulatory environment in which they operate and impact they have on other existing abattoirs and supply chains in these countries.
- Investigate cases where mobile abattoirs have ceased operation (such as the case of the UK in the 90s) and the reasons for this.
- Establish whether or not mobile abattoirs would be viable in Scotland by determining exactly what would be required from a regulatory point of view to operate such an enterprise (i.e. Food Standards Scotland requirements, water supply, waste removal etc.).
- Assess various operation models of mobile abattoirs to determine what would be required to make them a viable and sustainable operation (operational costs, number of animals slaughtered, facilities and skills requirements) in Scotland.
- Assess what impact mobile abattoirs could have on the viability of existing processing facilities and supply chains.
- Engage with key stakeholders to establish their views regarding the implementation of mobile abattoirs in Scotland.
- Consider changes that might help improve the viability of existing small abattoirs in Scotland.

2.0 METHODOLOGY

The study was delivered through two main interlinked research processes:

- A literature review: this consisted of a desk-based online review to establish where mobile abattoirs currently operate and to examine what evidence and data there is regarding all aspects of their operation e.g. when and why they were established, their capacity and processing figures, the regulations they have to comply with, and the impact they have had on other abattoirs and supply chains. The reasons that mobile abattoirs have ceased operation, and the reasons for this are also reviewed.
- Interviews with key stakeholders were carried out (e.g. representatives from the beef, pig and lamb sector, abattoirs etc.) to ascertain the current availability of abattoir facilities, distances travelled to access the service, current abattoir capacity issues including sectors concerns, changes that might be required to improve the viability of existing small abattoirs and feasibility and impact that mobile abattoirs would have on the viability of existing processing facilities and the supply chain in Scotland. Key stakeholders were engaged to establish their views regards the implementation of mobile abattoirs in Scotland.

3.0 ABATTOIR INFRASTRUCTURE IN SCOTLAND

3.1 Geographical and Livestock Coverage

Box 1. Key Findings: Abattoir Infrastructure in Scotland

In 2019, there were twenty-four licensed red meat abattoirs operating in Scotland with cattle being processed at 20 sites, while 18 processed sheep and 16 processed pigs. There are many areas of mainland Scotland, including parts of Caithness, Sutherland, Ross & Cromarty, Argyll and Bute, where abattoir locations involve moving animals more than 100 miles from the farm.

Across the country abattoir infrastructure provision can be summarised as indicated in the following table and figure.

Table 1. Summary of abattoir infrastructure

Abattoir Names and Locations		Livestock Slaughtered				Other e.g. Deer	Private Kill?
		Cattle	Sheep	Pigs	Goats		
Scottish Mainland Abattoirs							
Aberdeen	Kepak McIntosh Donald	Y	Y	N	N		No
Paisley, Sandyford	John Scott (Meat) Ltd	Y	Y	N	Y		Yes
Perth	ABP Scotland	Y	N	N	N		Yes
Inverurie	Scotbeef Inverurie Ltd	Y	Y	Y	Y		No
Grantown-on Spey	Millers of Speyside	Y	Y	Y	Y		Yes
Wishaw	PR Duff	Y	Y	Y	Y		Yes
Bridge of Allan	Scotbeef Ltd (Bridge of Allan)	Y	Y	N	N		No
Brechin	Quality Pork Scotland (Brechin)	N	N	Y	N		No
Turriff	Woodhead Bros	Y	Y	Y	Y		No
Lockerbie	Border Meats	Y	Y	Y	Y		Yes
Saltcoats	Dunbia Highland Meats (Dawn Meats)	Y	N	N	N		No
Ayr	AK Stoddart Ltd	Y	Y	Y	N		No
Dingwall	John M Munro	Y	Y	Y	Y		Yes
Ardrossan	J. Robertson & Sons (Hamcurers)	N	N	Y			No
Shotts	James Chapman	Y	Y	Y	Y		Yes
Nr Glenrothes	Stagison/Downfield	N	Y	N	Y	Y	Yes
Nr Melrose	Hardiesmill (Pasture to Plate)	Y	N	N	N		No
Island Abattoirs							
North Uist	Lochmaddy abattoir	Y	Y	Y	Y		Yes
Mull	Mull abattoir	Y	Y	Y	Y		Yes
Barra	Barra abattoir	Y	Y	Y	Y		Yes
Lewis	Western Isles Council	Y	Y	Y	Y		Yes
Islay	Avonvogie abattoir	Y	Y	Y	Y		Yes
Shetland	Shetland abattoir	Y	Y	Y	Y		Yes

The abattoirs in the table above are plotted in the following figure, for reference.



Figure 1. Map⁴ showing abattoir infrastructure locations (blue dots)

3.2 Abattoir Development

The 2019 QMS report “The Scottish Red Meat Industry Profile⁵” comments that in 2018, although throughput was 3.5% below its five-year average, production volumes were higher than their 2014–18 average. The report goes on to say:

“During 2018, Scottish Government slaughter data indicates that 1.92m animals were processed by Scottish abattoirs. This was an increase of 3.5% and followed three consecutive years of declines. Red meat production also rose by 3.5%, reaching an estimated 219,000t.”

In 2014 a report was published, commissioned by the “Beef 2020 Short Life Industry Group”, established at the request of the Cabinet Secretary for Rural Affairs, Food and the Environment. It published the “Beef 2020 Report – A vision

⁴ Adapted from Google Maps: <https://www.google.com/maps>

⁵ QMS, online source: https://www.qmscotland.co.uk/sites/default/files/qm3156_rmip_2019_aw_lo_res.pdf

for the beef industry in Scotland”. In terms of abattoir provision, the report comments (the emphasis in **bold** font is ours):

*“Cattle production in Scotland is a fragmented industry, 7,400 businesses producing single suckled calves while only 22 abattoirs kill cattle. While a number of these abattoirs work as wholesalers or contract slaughterers with the Scottish retail trade, **the eight largest sites covering some 88% of the kill predominately work with the UK multiple retailers, who take the majority of the production from these sites**, with some separate non UK export sales as well. This structure of the supply chain creates challenges in respect of communication of market specifications, market signals and potential supply profiles along the supply chain. **It is estimated that less than 10% of Scottish born cattle killed in Scottish abattoirs are purchased through the auction market ring**. This leads to limited transparency over market price determination which can lead to a breakdown of trust between cattle producer and cattle buyer.”*

The report does not make any references to mobile abattoirs, nor make recommendations in terms of a greater need for more locally based abattoirs. However, the above statement does describe the commercial arrangement that exists in terms of how cattle is managed through the current supply chain and is important to understand in terms of how the retail market is changing and influencing this supply chain.

In a recent report published by the Sustainable Food Trust, it is reported that over the last decade more than a third of small abattoirs have closed across the UK for a variety of reasons. The report identifies that the number of all red meat abattoirs has fallen to 249 from 320 in 2007 and almost 1,900 in 1970 (UK statistics)⁶.

In the context of this study, the options available to individuals in terms of private kill are therefore under pressure when the abattoir sector is increasingly dominated by the multiple retailers, and abattoirs are set up to respond to this. This results in abattoir processes which are increasingly not set up for small batches or animals, including one-offs, to address the smaller-scale, niche demands of many farmers, crofters and small-holders. Both MSUs and small, fixed abattoirs, may therefore be the opportunity to provide a service to remote communities that is not currently available.

The map shown in Figure 1 highlights that there are many areas of mainland Scotland, including parts of Caithness, Sutherland, Ross & Cromarty, Argyll and Bute, where abattoir locations involve moving animals more than 100 miles from the farm. For places such as the Orkney islands and many of the inner Hebridean islands, this is compounded by requirements for ferry journeys.

⁶ <http://sustainablefoodtrust.org/wp-content/uploads/2013/04/Re-localising-farm-animal-slaughter.pdf>

4.0 MOBILE ABATTOIR CASE STUDIES

Box 2. Key Findings from Mobile Abattoir Case Studies Reviewed

There is limited information available to learn from the historic UK examples, however the key points to be considered are:

- Historically, the examples identified indicate MSU projects being taken forward through the energy of a motivated individual, rather than establishing farmer buy-in at the outset.
- Disease outbreaks are claimed to have had a significant impact on historic MSUs (and the wider meat industry) and the robustness of the operating systems for MSUs would need to take this potential into account.

Key points in terms of the international examples considered include:

- MSUs investigated have been financed through a combination of public and private investment:
- The establishment of “docking stations” and the value generated from retail cuts were viewed by many consultees as essential ingredients for the potential success of an MSU.

The capital costs of MSUs vary considerably from approximately US \$100,000 (£78,000 Pounds Sterling) for the Lopez Island MSU, up to £1 million (Pounds Sterling) for the MSU (two trailers) operated by Hälsingestintan in Sweden.

There appears to be an interest (politically and socially) around higher welfare meat with known provenance, and this appears to be generating an interest in MSUs, and notably the political context in France and Germany is suggesting some level of support in this direction.

4.1 Overview

The results of desk-based reviews and stakeholder engagement are provided in this section, with considerations made in terms of:

- Scotland and rest of the UK (rUK) case studies.
- International case studies.

It was understood that Scottish/rUK case studies may be significantly more difficult to source information on, however, where available it may allow lessons to be learned and further opportunities to be developed and considered. A review of international MSU examples was carried out to gain a thorough understanding of the business models, capacities and constraints that overseas mobile abattoirs work in, including an understanding of the impact that they may have on existing abattoirs and supply chains.

The following sections summarise the information gathered for the different case studies, with the tables in Appendix 1 providing more in depth details.

4.2 Scotland and rUK Case Studies

4.2.1 Historic Context

It had been reported that there were two MSUs historically operational within the rUK in the 1990s, however the desktop review was unable to identify any significant information online regarding these with the detailed information obtained coming from conversations with the Humane Slaughter Association (HSA)⁷. It was also believed that there may have been a MSU operating for a short time on the Isle of Skye, also in the 1990s and a brief mention of this along with the other two is provided below:

a) Brecon Beacons MSU: The MSU was designed and operated by Hugh Fullerton Smith (HFS), who then went on to set up mobile abattoirs in northern Scandinavian countries, Canada and Mongolia. The Brecon Beacons abattoir was initially set up to process deer and sheep. Although it was mobile, it was mainly based in one location. It was believed that the capital costs for the MSU were EU funded. One of the key issues associated with its demise, was thought to be due to the historic interpretation of the regulations. Whilst some farmers were potentially interested in using disused pens as lairage, at the time the interpretation of the legislation was that if the pen was used as a lairage, it then couldn't be used as a pen for a full year. This interpretation led to fewer farmers being interested. The second issue, was associated with the Foot and Mouth outbreak and is discussed in more detail below.

b) M4 Corridor MSU: The second "mobile" abattoir was planned to operate along the M4 corridor, with a base in Wiltshire. There was one key person driving the project forward, and although there was support for the mobile abattoir, this did not translate into investment. The mobile abattoir had planned to visit 4 sites/ docking points, however when planning applications were put in for the sites, there were numerous objections, for example, on one site, there was a rare orchid found, which meant that the site couldn't be used (and other similar issues). Again, similar to the Brecon Beacons example, the interpretation of being unable to use land that had been used as lairage for one year was a significant issue⁸. As a result of the above, the abattoir was fully licenced, but static. It was indicated that the Foot and Mouth Disease (FMD) outbreak ultimately led to the demise of both of the "mobile" abattoirs. The outbreak caused the government to review the slaughter capability of the UK and the construction of 3 or 4 multi-species abattoirs was funded to re-address a lack of regional capacity. These were modern buildings, that the "mobile" abattoirs could not compete against.

c) Isle of Skye MSU: The desk-top review also indicated that there was one temporary MSU operating in Skye⁹

⁷ Charlie Mason, HAS.

⁸ The "one-year standstill" interpretation was checked with RESAS and is not considered to be applicable. Standstill periods were provided and are outlined in Section 3.2.2

⁹ <https://hansard.parliament.uk/commons/1994-10-21/debates/dc64020b-38fb-41a5-9b84-4902f2941283/WrittenAnswers>

“While there was a trial operation of a mobile slaughtering facility on Skye in September 1993, no formal application for the appropriate licence under the Fresh Meat (Hygiene and Inspection) Regulations 1992 has been submitted for such a facility.”¹⁰

Whilst there is no further information available about the MSU on-line. Anecdotal information indicates that the MSU was based in England (location unknown, but likely to be one of the above MSUs) and would travel to Skye for approximately one week at a time. The slaughterhouse in Skye had just closed, and the MSU was part-funded by an EU scheme to assess its viability (operating in this context/type of location). It is understood that this continued for approximately 2 years, however demand for the MSU reduced, partly due to cost and partly because there were not many farmers finishing livestock on Skye at the time. The MSU was based at the auction mart in Portree, with farmers bringing stock to it. The waste products were either buried on-site or tipped at the adjacent landfill¹¹.

4.2.2 Current Situation

The review indicated there were plans to build an MSU in England involving the Purdis Group, who were contacted at different times across 2019 to discuss their approach and to compare this with the evolving picture in Scotland (the development of ideas generated by this study). At the time of these discussions the Purdis Group were in the process of designing an MSU to be operational by March 2020 (comment made is that the timeframe is set by the FSA). There is a team involving an architect, engineer, farmer, consultant, etc currently developing the purpose built design. With the design scheduled for completion in 2019 the timeframe for the build is then another 6 months. Discussions have indicated that the aim is to operate the MSU as a co-operative, with a couple of potential operating models currently on the table. The simplest involves the MSU providing the slaughter, but it is hoped that ultimately the MSU will slaughter 2 days per week and process 3 days per week, with the following operational features:

- Farmers will be provided with the following options i) slaughter, chill and butcher, ii) slaughter, farmer chills, MSU returns 3 weeks later to butcher, iii) MSU just slaughters. It was commented that the value was in the butchery, making the MSU economically viable.
- The MSU project is being primarily driven by one farmer, with Purdis a land agent for this farmer. There is interest amongst other farmers who have completed surveys, however, arrangements are not currently finalised. It should be noted that funding has not been secured for the MSU, although the Purdis Group are in discussions with DEFRA.
- The key issues and costs were (at the start of this MSU Feasibility Study) considered by the Purvis Group to be: i) waste management, ii) labour, iii) vet costs. To overcome with the waste management issue, the farmer will be responsible for the waste (including costs), which will be stored at the farm,

¹⁰ <https://api.parliament.uk/historic-hansard/written-answers/1994/oct/21/abattoirs>

¹¹ Contact has been made with the Skye and Lochalsh Community Feasibility Group, but the consultation is outstanding at the current time.

until a renderer collects. To overcome the additional costs of running the MSU it will target farmers that are looking to sell within a farm shop, and are therefore able to command a premium (hoped that this will offset higher slaughter charges).

4.3 International Case Studies

4.3.1 Overview

A review of international MSU examples was carried out to gain a thorough understanding of the business models, capacities and constraints that overseas mobile abattoirs work to, including an understanding of the impact that they may have on existing abattoirs and supply chains. The countries and examples considered are summarised below:

- Sweden (Hälsingestintan)
- Norway (MobilSlakt)
- France (SAS Boeuf and Hälsingestintan)
- Germany
- The Netherlands
- African Countries, Namibia (MeatCo)
- Yukon, Canada
- New South Wales, Australia (Provenir)
- New Zealand
- USA (The Island Grown Farmer Cooperative)

The above have been explored through a combination of desktop review and stakeholder engagement, with brief summaries provided for each in the following sections (more detailed information is available in Appendix 1). A final miscellaneous section provides additional information from a MSU operator and designer with significant international experience.

4.3.2 Sweden (Hälsingestintan)

The Swedish MSU is widely reported to be the first in Europe for fully grown cattle, and came into operation in 2015¹². The concept was devised by Britt Marie Stegg (engaged with during the project), in response to the horse meat exposé/“scandal” at the turn of the decade. The mobile abattoir complies with European regulations and appears to have operated within a similar context to a potential Scottish one. A key focus was the production of “ethical meat”. The company appeals to a demographic that are keen to know the provenance of their meat and are willing to pay a premium. It is also worth noting, that the founder has also been involved in setting up MSUs in France and Australia and it is understood (anecdotal

¹² <https://www.fdiforum.net/mag/featured/mobile-abattoir-improves-animal-welfare-meat-quality-france/>

information) that the Hälsingestintan MSU was being operated in a partnership with a supermarket in its latter months of operation.

Hälsingestintan were contacted in late June 2019, and they reported that the MSU had just been declared bankrupt. It was commented that many of the issues that led to its demise could have been overcome and that MSUs do have the potential to be viable. The key lessons learned are summarised below:

- Planning: The MSU did not forward plan e.g. they did not know where they were going to be from one week to the next. This was a key issue that was being worked on at the time of closure.
- Costs: There were no economies of scale; the MSU could be at 3 places in one week, moving from farm to farm, covering significant distances.
- “Incorrect products”: Young bulls were being sourced, however young bulls do not provide good marbling or pH. The MSU needed to focus on sourcing steers and heifers for a quality product – a high quality product was required in order to charge a premium price, in order to counteract the higher slaughter costs.

Hälsingestintan felt that key to the success of a unit going forward would be to have a docking station approach, with the MSU remaining at the same location for 2 or 3 months, and with farmers hauling their own livestock. Additional points to note include:

- Insufficient chill capacity.
- High operating costs (in comparison to a static abattoir).
- Insufficient waste storage capacity (leading to mixing of different waste categories).

The MSU was privately funded, with no public subsidies provided and therefore it competed alongside conventional abattoirs. The MSU had a small number of committed farmers (25) who were reported to be very happy with the system, but this was a very small number (e.g. relative to the number of farmers utilising existing abattoirs).

4.3.3 Norway (Mobil Slakt)

Mobil Slakt were operating for circa 10 years (2006 to 2015), before stopping (the owner has now retired), but it was commented during the consultation that the aim is to have the service restarted, ideally in Norway. The shareholders have given the unit to the consultee/owner, who is tasked with finding another buyer. The MSU was not built to process adult cattle, and focussed very much on sheep, authorised initially to slaughter animals corresponding to 250 tonnes of meat per year, in two specified regions. It slaughtered for 32 days per annum and it was considered that it needed a minimum of 100 slaughter days for the MSU to be financially viable - this number was not reached. It also only slaughtered in winter and autumn, with no service in summer. The objective was very much related to animal welfare concerns, minimising the distances moved prior to slaughter.

Regulatory and waste management compliance was discussed and these were considered by Mobil Slakt as having relatively small impacts. Waste was left in suitable storage containers at farms, with paperwork forwarded to Mobil Slakt for administrative purposes once the waste was processed by an authorised facility. The costs associated with this were not considered to be an issue. There are YouTube videos of the above operation, which can be accessed at: <http://www.mobilslakt.no/html/i-media.htm>.

4.3.4 France (SAS Boeuf and Hälsingestintan)

SAS Boeuf entered into a seven-year agreement with Hälsingestintan in 2017 to introduce a mobile abattoir to France.

It is understood that there was a decree published on 16 April 2019 in France, which authorises the implementation of mobile slaughterhouse projects. This is believed to be an experimental measure over a 4-year period and it was stated that the primary objective of the decree is to reduce the stress and animal suffering associated with transport conditions.¹³ The underlying political context in France may influence the development of MSUs in the country, where it is reported that they are gaining in popularity¹⁴. There is limited information available on-line regarding this initial trial period.

4.3.5 Germany

In Germany there is a pilot project, announced by the German Minister of Agriculture (Peter Hauk), where the model being supported involves the MSU being part of a licensed, fixed abattoir. The animals are stunned and bled in the MSU (the MSE-200A) with the carcasses then taken to the abattoir for post-mortem inspection and processing – the objective being to provide local meat, provenance and “artisanal meat processing”. The minister has commented (November 2018¹⁵):

“The models of mobile slaughter units, which are now being developed in Baden-Württemberg and are already being piloted, are steps in the right direction towards maximum animal welfare and transparency in meat production. Whether the mobile slaughtering process can prevail as a successful model, will also depend on the willingness of consumers to reward this when purchasing a higher price,” said Minister Hauk. In order to successfully implement the model, a functioning network of small and regional slaughterhouses is also needed.”

It should also be noted that there has been an announcement in Austria of an approach to supporting MSUs which has similarities to Germany, with the Federal Republic of Vorarlberg¹⁶ stating in May 2019:

¹³ <https://www.translatetheweb.com/?from=&to=en&ref=SERP&dl=en&rr=UC&a=https%3a%2f%2fwww.mon-abattoir.com%2f>

¹⁴ Consultation with ABA Chem

¹⁵ Online source: <https://genussimsueden.de/home-news/news-reader/hofnahe-schlachtungen.html>

¹⁶ Online source: <https://www.vol.at/vorarlberg-laesst-mobile-schlachteinrichtungen-zu/6197205>

“...initiatives have worked out specific details for the approval of "mobile slaughter facilities", which have now been adopted by the relevant Ministry of Social Affairs in a decree that is binding for all of Austria.”



Figure 2. IG Slaughter with Care MSU

4.3.6 Netherlands

The Netherlands are currently trialling a system of mobile killing units, in Dutch, Mobiele Dodings Units (MDUs) which are owned by existing, fixed slaughterhouses. It is reported that there is increased interest amongst slaughterhouse to purchase such units, but unlike the other examples identified in this case studies section, the Dutch system is designed to slaughter casualty animals (predominantly dairy). Amongst the conditions that have be met are:

- The animal has to be healthy, within a normal temperature range (38-39⁰C).
- FCI (VKI = Veterinary Chain Information = information about health and veterinary treatments, withdrawal periods etc), reason why the animal is not suitable for transport, Identification and Registration (I&R).
- A Vet and MDU visit the farm where the OV conducts a clinical investigation incl. rectal temperature, ID checks and FCI.
- If permission to slaughter is granted, the animal is led into the MSU (equipped with lift), shot and bled. If walking into the MSU is not possible, the animal is shot outside the unit and winched into the MSU and bled (all bleeding occurs within the unit, where the blood is collected).

The exterior of the vehicle is cleaned and disinfected after each visit. After unloading at the slaughterhouse, full cleansing and disinfection is carried out. It is stated that there will be some risk that the farmers accept (if they are not the first farm visited).

The capacity is up to 6 animals and the aim is that the unit should be at the static slaughterhouse within 2 hours of the first animal being shot. It has not been possible to obtain exact costs to utilise the service, but they are reported to be “high”, despite this, it has been stated that it is a method growing in popularity because of improved animal welfare outcomes, plus farmers re-coup some of the

costs for their slaughtered animal (indicated to be in the region of about €50-150). The costs are reported to be €300,000 (Euros) for two second hand trucks rebuilt to a MDU specification, and two new trailers (space for 2 animals) built by Böckmann, Lastrup Germany (www.boeckmann.com). It has also not been possible to determine if there are impacts on existing abattoirs. However, with slaughterhouses themselves investing in the units it is anticipated that these will support existing operations rather than compete with them.

4.3.7 African Countries

A well reported “mobile” abattoir is operated by MeatCo, and is based at the Angelina Matumbo Rebebe Quarantine camp, in Kavango. MSU operations commenced in 2016, and it is reported that prior to the siting of the MSU some farmers within the region had no access to slaughter for two/three years due to the closure of the local abattoir (therefore reportedly receiving no income and resulting in overgrazed land). However, the MSU is now permanently sited within a centralised location in the region, with farmers bringing cattle to it, rather than the MSU travelling from farm to farm. It is therefore an MSU in name only, because it appears to operate as a static small/ micro abattoir for the community. In addition, the regulations surrounding the MSU appear to be less stringent, with it reportedly able to operate during FMD moratoriums (when other abattoirs are at a stand-still). Subsequent discussions with ABA Chem (Abattoir manufacturer and supplier) have indicated that MSUs are growing in popularity in Africa, particularly for sheep and goats, due to high losses during transport in heat. However, there were a number of differences identified, in Africa, meat is generally sold “fresh” i.e not chilled, in addition the general meat hygiene and animal welfare differences were noted.

Given the differences in the geography, economics and legislation surrounding the African examples, there are no plans to gain additional information, and its relevance to Scotland appear to be limited.

4.3.8 Yukon, Canada

The MSU was established in Yukon in 2006, following on from a government commissioned feasibility study to find out what was limiting the development of the livestock industry. At the time there were no slaughter facilities at all within the state, therefore farmers were slaughtering their own livestock and selling on to friends and family (no retail permitted, because not inspected). Within the state farms were very small and geographically sparse and the feasibility report concluded that farmers needed a slaughter unit, and it was felt that a mobile one would best suit their needs because farms are spread out over significant distances, and most farmers did not have a trailer to bring their livestock to a static abattoir.

The drivers to set up the MSU were part of a movement to:

“increase the amount of commercially available, locally grown, government inspected beef, bison, pork and elk for sale in Yukon”.

The federal government was keen to grow the industry and support retail opportunities. Therefore a federal funding programme (Yukon state government) was utilised to fund the capital costs of the MSU, operated on behalf of the government by a private company, through a tender/procurement process. The original business plan saw the MSU requiring public subsidies for the initial 5 years, however, this evolved, and at one point (in 2012/ 2013), the state subsidised free slaughter for farmers for one year, in order to encourage use of the MSU¹⁷. The unit can process up to 8 bison, beef cattle or elk, 15 hogs, or 20 smaller animals such as sheep or goats. However, although demand is increasing, it is not working at full capacity, and in 2016 processed 188 animals (108 pigs)¹⁸. Discussions with the operator and government have indicated that at the time of construction there were no formal slaughter provisions available to farmers. One additional static abattoir has since opened up, however this abattoir tends to service the larger farmers, and it is reported that the two facilities complement each other rather than compete. The MSU operator provided the numbers of animals slaughtered since 2014. There is a steady increase, however this is not sufficient to meet the running costs and the MSU remains reliant upon public subsidies.

Table 2. Summary of MSU annual throughput

Year	Number of animals slaughtered
2014	87
2015	102
2016	188
2017	215
2018	253

The MSU has a minimum threshold for slaughter, this being either 4 “smalls” or 2 “bigs”. They process the majority of their pigs in September and the majority of their beef in October. The MSU can only operate above -10°C, which means that it cannot operate for roughly seven months of the year. In order to fulfil the regulatory requirements, the farm provides the toilet facilities, a flat area of ground. The farmer is required to slaughter the livestock (shoots and bleeds the animal) with the offal and waste left at the farm. In terms of managing waste, the regulations state that Specified Risk Material (Category 1) cannot be buried at the farm, however lower risk material can be. Farmers store the SRM and arrange for a collection when there is a sufficient amount. The CFIA (the environment agency) check that the amount being stored matches the number of animals slaughtered. Both the operator and state official engaged with were very positive about their MSU, with the operator stating that the system:

¹⁷ <https://www.yukon-news.com/business/consider-the-mobile-abattoir/>

¹⁸ <https://www.yukon-news.com/news/local-company-wins-yukons-mobile-abattoir-contract/>

“Works really well for the farmers/animal welfare and particularly for elk. For an MSU to be operated as a private enterprise, best to be associated with a cut and wrap facility”.

The government official stated that he believes that the MSU is a huge benefit to the industry and would want to keep it, however there would also need to be considerations about whether the government would want to keep subsidising this in the future. The MSU is fully mobile and compliant with legislation which from a snapshot review appears to be of a similar standard to Scotland. For information, a copy of the MSU operating procedures¹⁹ and application form²⁰ is available online at the time of writing.

4.3.9 The United States of America

The Niche Meat Processor Assistance Network (NMPAN) supports small meat processors, producers, buyers, regulators, and others by coordinating, distributing, and developing information and resources to improve access to processing infrastructure and the long-term stability of this sector. The website has a range of case studies, costs and regulatory guidance available on MSUs. The Director was contacted to obtain an overview of the MSU sector in the USA. The NMPAN stated that although there has been a significant number of operational MSUs in the States, the vast majority of these are now out of business (90%), with only 8 – 10 remaining. They have found that MSUs tend to be more viable when they are operated by a private company and operate on an island (limited competition). There is one particularly successful example - Lopez Islands, San Juan County, which is written up in more detail in Appendix 1.

The NMPAN believe that it is better to focus on the existing static infrastructure, they are currently looking to implement grant funding (competitive) for food processors, to help improve existing static infrastructure to better serve local farmers. The grant funding scheme will be modeled on one that is currently in place in Michigan. Specifically in relation to MSU, the key constraints were considered to be:

- Economic constraints due to limited throughput, plus additional extras such as (i) a commercial truck driver (not typically involved in the slaughter), (ii) insurance costs, (iii) overheads from running a truck, (iv) haulage to butchers.
- Practical constraints: specifically mentioned were difficulties obtaining suitable locations to site the MSU e.g. farm access in the USA is typically poor, water not tested, therefore not considered to be potable, etc.
- Regulatory constraints specifically “Pen and Shoot Design”: In the USA – if you do not shoot and kill the animal on the first shot, you are closed down for a couple of days/weeks until an approved alternative procedure is in place. An example was provided of where one MSU owner opted to make his MSU stationary, so that he could get the right pen and shoot design. In addition, it was felt that making adjustments to existing static abattoirs e.g. a new shoot

¹⁹ <http://yukonfood.com/AbattoirManual.pdf>

²⁰ <https://yukon.ca/sites/yukon.ca/files/env/env-forms/env-application-on-farm-operation-mobile-abattoir.pdf>

box to ensure that the kill was right everytime would improve animal welfare, rather than investing in MSUs which might be limited by their location.

- Throughput constraints: will not achieve the same throughputs as large, static infrastructure - an example was provided of one of the members who stated that he needed to process 10 head of cattle to break even, however it is a struggle to get through 10 cattle per day, and has never made a profit.
- Species constraints: not suitable for large, horned animals.

The concept of “docking stations” located at existing infrastructure was discussed and it was felt that this could be potentially viable and was of interest. The consultee was not able to provide an example of an MSU and docking station system in the USA. Whilst indicating that MSUs were positive from an animal welfare and local farmers’ point of view, from a business perspective the organisation considered that it was difficult to make an MSU economically viable, particularly if servicing the needs of “hobby farmers”.

4.3.10 Australia

There is reported to be a growing number of consumers interested in provenance and animal welfare in Australia, and the livestock industry has come under scrutiny recently (2018) due to the deaths of significant numbers of animals during live export of sheep from Perth (Western Australia) to the middle-east. Five mobile abattoir units are planned for production in Perth, with one expected to be based in Western Australia's south-west. There is some discussion within industry whether the strict regulations concerning animals and transport will make the units cost prohibitive²¹. Regulatory requirements are commonly cited in on-line articles as major inhibitors to mobile abattoirs within Australia, different states have different rules, with some states e.g. Northern Territory and Victoria prohibiting mobile abattoirs (there are plans to change this in Victoria). The following have been stated as important considerations, especially for mobile abattoirs in Australia: multiple layers of regulations covering food safety, water quality, environmental planning, waste disposal, workplace health and safety, zoning issues and cattle traceability (the NLIS).

Provenir, a private agri-tech company, has recently designed an MSU, operating within New South Wales, since June 20th 2019. It has been reported that Hälsingestintan have “mentored” Provenir through the process. In terms of funding, it has also been reported that the Provenir MSU has been funded by a variety of different sources, which has included private investment, crowdfunding, grants, etc. The breakdown of the different streams is commercially confidential.

4.3.11 New Zealand

Netherby Butchers based in Ashburton, New Zealand, provide farmers with an “on-location slaughter” using a Mobile Abattoir or “off-site abattoir processing”. No direct engagement resulted from efforts to contact the company and the information provided here and in the appendix is therefore based on desk-based research. The

²¹ <https://www.abc.net.au/news/rural/2019-05-03/animal-welfare-benefits-expected-from-mobile-abattoir/11066694>

Netherby Butchers MSU can be used for cattle, pork or lamb and farmers within pre-defined areas can complete an order form, indicating how many animals they have. Netherby Butchers then contact the farmers when the MSU is in their area. The MSU then slaughters on-location and transports back to the butchery chiller for further processing. Offal removal can be arranged at an extra cost, or the farmer has the option of arranging disposal.

4.3.12 Miscellaneous International Experience

This section summarises discussions with Mr Fullerton Smith, who has been heavily involved in the design and operation of MSUs internationally and who provided a number of comments regarding their build, approval and operation:

- Commented that he had MAFF-approved²² docking stations.
- Developed a system for some animals, which involved slaughtering one day, vacuum packing the next day.
- Built Swedish mobile abattoirs for the far north, freezing conditions (other desk-based work has indicated that these were 32 tonnes in weight, built into a trailer 15.5 metres long, 3.5 metres wide, expanded hydraulically on site).
- The cost of the Swedish unit was £680,000 Pounds Sterling (January 1998).
- Had a contract with the Mongolian government, for 8.5 million Euros, which the bank pulled out of (round the time of the financial crash).
- Commented that some people believe that MSUs can go around individual farms – the consultee's view is that this is a non-starter, and that it needs to the hub approach, with docking stations.
- Has developed mobile abattoirs for specific types of animals, to reflect their characteristics, build etc. For example:
 - Bison, massive, one-tonne animals which required horizontal skinning
 - High Mongolian horses - overhead rails much higher than for cattle
- Mentioned how locally transported animals, with lower levels of stress have reduced levels of pH, which increases shelf life – a good reason for MSUs.

²² The Ministry of Agriculture, Fisheries and Food (MAFF) evolved into DEFRA, with devolved responsibilities in Scotland.

5.0 STAKEHOLDER ENGAGEMENT – LIVESTOCK OWNERS/FARMING COMMUNITY

Box 3. Key Findings from the Farmer Engagement

There is significant interest and demand from a range of farmers for an MSU service, however detailed discussions with farmers indicate that the demand is for a local service (which could be provided by a MSU or small-fixed abattoir). The opportunity and challenge is to translate willingness demonstrated in the engagement to participation. However, it should also be stressed that the MSU models considered in this report are aimed at a small, niche market, involving the slaughter of circa 2,500 animals in a year (cattle and sheep), in a farming sector in Scotland which in 2018 had 1.8 million cattle and 6.6 million sheep²³.

Animal welfare, transport and limited options for private kill were often cited as reasons for considering an MSU. The most popular model identified involves the MSU docking at a central location for example a mart, in order to act as a hub site for a number of farmers. This is considered to be beneficial due to a range of factors which include: (i) decreased bio-security risks; (ii) shared infrastructure; (iii) ease of setting up waste disposal infrastructure; and (iv) the potential for significant levels of throughput and therefore enhanced economic viability.

5.1 Overview

Livestock owners, consisting of smallholders, crofters and farmers were engaged with to understand if there is a need and demand for an MSU service (for simplicity these stakeholders will be referred to as “farmers” in the rest of this section). The aim was to establish:

- How farmers currently manage animals for slaughter.
- How far animals travel and details of their closest private kill service.
- Thoughts and opinions on an MSU service (if one was to be provided).
- Practical considerations of using an MSU service.

The engagement with farmers took place using a number of different methodologies, as summarised below:

- Structured surveys:
 - Telephone interviews with 18 farmers, using a detailed questionnaire.
 - Online, attitudinal survey, engaging 618 farmers.
- Ad hoc discussions, in response to the above surveys, word of mouth and articles written about the project, published in various farming journals.

²³ Scottish Government data for 2018.

- Meetings arranged as a result of the above discussions. These were held with farmers through the following:
- National Farmers Union Scotland (NFUS) Orkney
- Smallholding Scotland
- NFUS Less Favoured Areas Group

Appendix 2 provides detailed information on the interviews and survey results, with the following sections providing a summary of the key findings.

5.2 Key Findings from the Telephone Interviews

An overview of the farmers interviewed in terms of livestock species, location, land area etc is provided in Appendix 2. It is important to note that 11 of the 18 questioned felt that MSUs could in theory be of benefit, whereas 7 felt that MSUs would not add value or were unsure about the value. There was particular interest from poultry farmers who felt that an MSU could be beneficial for poultry retail (poultry was outwith the scope of this project). Whilst generally positive in their outlook of MSUs, there were a range of considerations that were felt to be important to their viability. These are summarised below:

- Several farmers commented on local abattoirs closing and how this has increased costs for those who now have to travel longer distances.
- 9 farmers stated that there would be a need for good, reliable local butchers, with sufficient capacity including hanging space and chillers in all locations where the MSU stops, with good links between the butcher and the MSU.
- The 5 pig farmers contacted all highlighted the requirement to de-hair pigs (boiling water dip tank (singer) and a scraping machine post-slaughter) and were concerned that an MSU may not offer this service.
- 7 farmers raised concerns about waste disposal.
- 6 farmers raised bio-security risks (particularly if travelling between farms).
- 7 famers mentioned the economic viability of a potential MSU service (no economy of scale making it difficult to compete with larger, static enterprises).
- 6 farmers indicated that farmers in more remote areas are less likely to finish stock due to the quality of the land and would be unlikely to change their business model.
- A number of farmers raised similar issues regarding availability and capacity of the service and local retail outlets.

Four of the farmers expressed a preference for a local fixed abattoir, rather than a mobile unit for rural locations, the latter including the west coast, Orkney and the Isle of Skye.

5.3 Key Findings from the Online Survey

There were significant levels of support given for an MSU service from the respondents to the on-line survey. However, it was clear from the comments

provided that respondents were supportive of a “local” abattoir service, regardless of whether this was mobile or a static service (see also Appendix 2 for details):

- 552 (91%) of the 604 respondents said there would be customer demand for locally sourced, traceable meat arising from a mobile abattoir.
- 538 respondents said that mobile abattoirs have the potential to provide their smallholding/croft/farm with a value-added service, by providing private kill and traceable meat products.
- The most popular model for using an MSU involved it docking at a third-party location - 488 respondents indicating their interest in such a service (83%).

5.4 Engagement with Farming Organisations and Farmers

5.4.1 Scottish Crofting Federation (SCF)

The SCF was aware that members and the wider crofting community were interested in the research and therefore assisted in communicating that there was a survey available for smaller-scale farmers/crofters to give views on MSUs.

5.4.2 Smallholding Scotland

Smallholding Scotland believe that a local kill service is fundamental to smallholders being able to develop premium, high quality meat sales and farm shops. It was commented that “hosting MSUs at marts seem like the most sensible option”, with marts operated as docking stations, where waste disposal options are likely to be put in place. In addition there is the potential to incorporate chill stores, butchery units, penning, bedding, lairage and trailer cleaning infrastructure.

5.4.3 National Farmers Union Scotland - Less Favoured Area Working Group

At a meeting of the above group in Stirling (October 2019) the objectives of the mobile abattoir study were communicated to the attendees and feedback sought. In general the views given were cautious, with a number of issues raised, concerning: waste management, veterinary costs and the financials being made to stack up. There were also a number of concerns raised about the potential for biosecurity risks.

5.4.4 National Farmers Union Scotland, Orkney- Meeting in Kirkwall (four attendees)

The farmers felt that an MSU could provide a useful service for Orkney and could be organised to tie in reasonably effectively with the local Mart. A number of points were made, including:

- A service to meet private kill demand for Orkney could be around 15 cattle per week (plus a number of sheep).
- There are 5 butchers, 2 with good-sized storage facilities.
- There are 3 prime sales per month, and this could perhaps be organised fortnightly, these being the best point in time for the MSU to be on-site at the mart, perhaps staying for 2 – 3 days.

- The auction mart was discussed as the most viable docking station location. This would need chill facilities, and there was likely to be interest in discussing this.
- It was mentioned that the local butchers were asked to participate in new abattoir infrastructure, but there was little interest.
- Rare breed sheep is being sent from North Ronaldsay to Shetland at the moment for private kill.

5.5 Auction Marts

5.5.1 Overview

Three auction marts were contacted:

- United Auctions (UA)
- Aberdeen and Northern Marts (ANM)
- Orkney Auction Mart

It is understood that ANM's mart in Wick, Caithness, has auction sales on a Monday from August to November, with another three sales in the springtime (April). In addition to this there are weekly collections of animals throughout the year, for transport to the ANM Thainstone facility (near Aberdeen) for sale. This may be potentially significant in terms of an MSU operating model – there may be an opportunity to locate at sites where animals are gathered and sold. However, no responses from the above marts were provided with regards to questions asked about this.

5.5.2 Orkney Auction Mart

- The Mart is extremely supportive of the MSU idea for Orkney, operating with the mart as a docking station with chill facilities – “definitely a very good idea.”
- The butchers do not want to provide/manage abattoir infrastructure themselves, so it needs someone to run with this.
- The Orkney abattoir, just before closing, was being charged £56,000 per annum for the disposal of waste to Dundas in Dumfries and Galloway. Need to think about costs such as this. Having a local facility to take such waste would be a great development.
- Although only operating part-time, for rates, the former abattoir was being charged the full rate of £60,000 per annum. This, plus the waste cost were major impacts on its viability.
- 14,000 store cattle being sold from Orkney per annum.
- There are around 12 to 15 farmers who finish on the island, and the local kill requirement may be circa 750 cattle per annum and the same for lambs²⁴. At the moment there are significant costs in getting meat from Dingwall back to

²⁴ It is also understood (discussion with Orkney butcher) that around September to November there would be demand for the slaughter of circa 250 rare breed sheep (North Ronaldsay).

Orkney for it to be sold under the Orkney brand (£200 per head, for the carcase to return).

- Farmers are happy with the Dingwall service, but the Orkney Meat brand is important to those mentioned above.
- Chill space is considered to be a challenge for most of the Orkney butchers and therefore having this at the mart, along with its lairage facilities would be considered a significant benefit.

5.6 Ad Hoc Farmer Engagement

A number of farmers wanted to follow up on news and information read/received about the mobile abattoir feasibility study, and a summary of their thoughts and views is provided in Appendix 2. In general, the farmers were supportive of a MSU service.

6.0 ENGAGEMENT WITH BUTCHERS, ABATTOIRS AND MEAT WHOLESALERS

Box 4. Key Findings from engagement with butchers, abattoirs and meat wholesalers

The majority of butchers engaged with felt that MSUs would be able to provide value added services to them and the farming community, and that there would be significant demand from the latter.

The larger mainland abattoirs did not feel that MSUs would be a threat to their business models.

The smaller island abattoirs have a number of concerns and issues about support being given by government to any future MSU operators and the potential of these to damage business.

6.1 Overview

Stakeholder engagement took place with abattoirs/meat wholesalers and butchers, supported by the Scottish Association of Meat Wholesales (SAMW) and the Scottish Federation of Meat Traders Association (SFMTA), the latter operating as Scottish Craft Butchers. The following sections provide the key outcomes from this, with Appendix 3 providing the detailed response data.

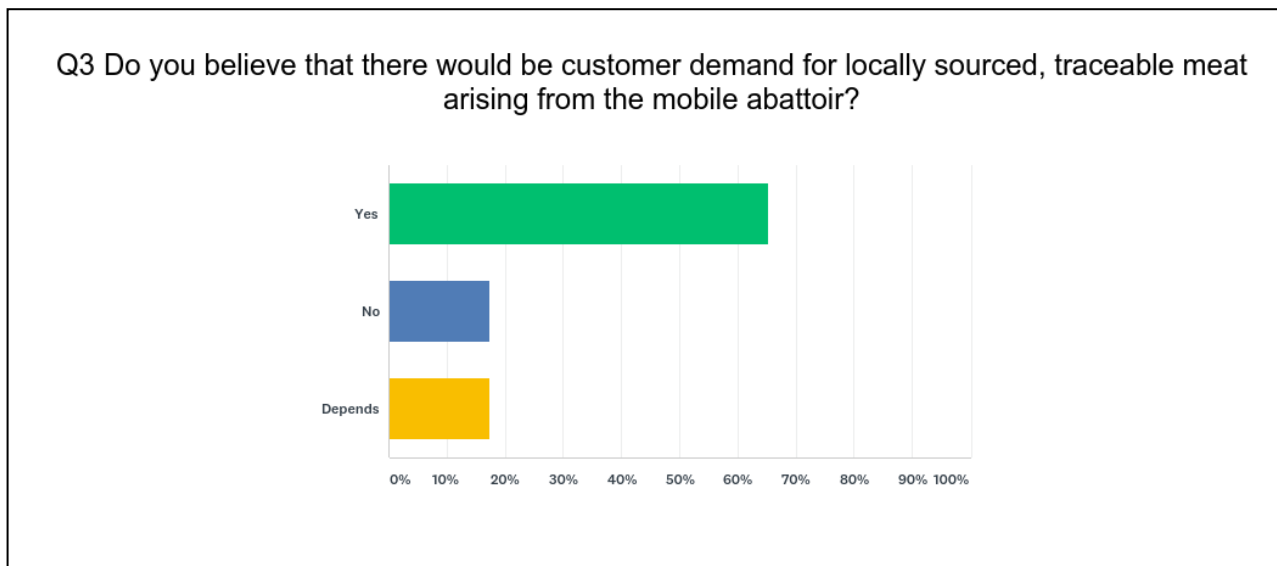
6.2 Butchers and Scottish Craft Butchers

Scottish Craft Butchers represents butchers (including those associated with abattoirs) in Scotland and has approximately 400 members. Following a meeting with the organisation in Perth a news article on this feasibility study was written and sent to members in July 2019, to raise awareness of the project. This was emailed to members, published on the website and issued as a hard copy. Following this,

an online survey was later emailed to all members. There were also phone discussions with butchers (and as discussed in the farming engagement section of this report, there were a number of conversations with farmers that also providing butchering services as part of their farm shops).

There were 23 responses to the survey, with detailed anonymised results shown in Appendix 3. The majority of respondents were positive about the introduction of an MSU in Scotland, with an indication of the outcomes shown below.

Figure 3. Questionnaire response on demand.



The above (Figure 3) indicates that, in terms of whether there would be customer demand for locally sourced traceable meat:

- 15 of the 23 respondents (65%) answered “yes”;
- 4 (17%) stated “depends”; and
- 4 stated “no”.

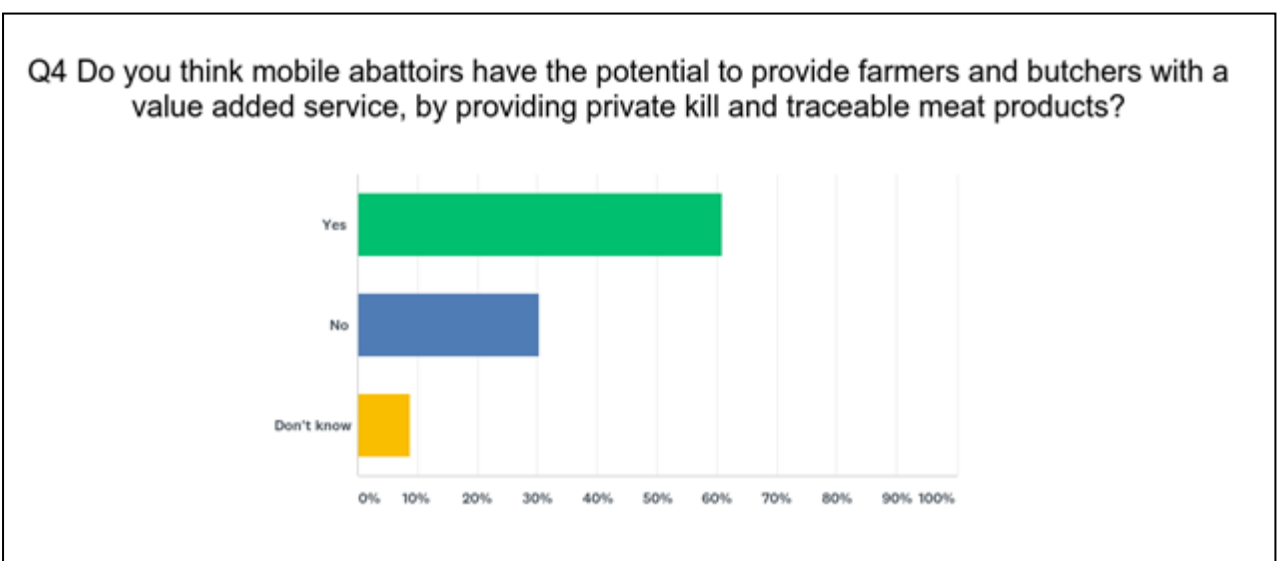


Figure 4. Questionnaire response on the potential to provide a value-added service

The above indicates that, in terms of whether mobile abattoirs have the potential to provide farmers and butchers with a value added service, by providing private kill and traceable meat products:

- 14 (61%) answered “yes”;
- (7) 30% answered “no”²⁵; and
- 2 (9%) answered “Don’t know.”

In addition to the above nearly 80% (18 respondents) did not have any concerns that an MSU would have an impact on the viability of their current businesses. Collaborative opportunities were commented on in the survey, with the following identified as being of interest through responses from 14 companies:

- Providing a retail outlet for local meat products originating from animals slaughtered at a mobile abattoir (6 respondents)
- Providing staff at agreed times, who will provide a butchering service for the mobile abattoir (7 respondents)
- Butchering and retail of carcasses provided from a mobile abattoir (6 respondents)
- Providing chill facilities for carcasses from the mobile abattoir (4 respondents)
- Providing a site/location for chill facilities - for carcasses from the mobile abattoir (4 respondents)
- Providing a docking station, where a mobile abattoir could hook into existing infrastructure (details discussed and agreed e.g. this could be for electricity and, water connections, access to drains, chill facilities) (4 respondents).

6.3 Abattoirs and SAMW

SAMW facilitated engagement with its 20 members (abattoirs and wholesalers – note that its membership does not include the island abattoirs, or Downfield and Hardiesmill). A meeting with SAMW Council members took place in September 2019 and feedback from a number of abattoir operators was provided at this. In addition, SAMW emailed the link to an on-line survey asking for views about the potential of MSUs.

Individual, direct engagement (meeting/calls) also took place with the following:

- Hardiesmill Abattoir
- Mull Abattoir
- Munro’s, Dingwall
- ABP Perth

²⁵ One of the respondents answering “no” operates an island abattoir and has concerns about the impacts of MSUs on business.

- Scottish Island Abattoirs Association (SIAA)
- Mull Abattoir

Contact was also made with Downfield Abattoir, however no response was obtained.

The view from the SAMW Council meeting was that the niche market and approach in terms of scale and geographical targets meant that the development of a mobile abattoir service was not viewed as a threat to the SAMW members. Interest was expressed by one of the members in terms of potentially being involved in a future MSU service.

The island abattoirs had a number of reservations about an MSU and the potential impacts on their viability, with key feedback in this respect being:

- There are concerns that MSUs could attract public subsidies which could otherwise be earmarked for the island abattoirs.
- The island abattoirs are fragile in terms of income generation and profitability, and there are concerns that MSUs could divert animals and income streams from them.

7.0 REGULATORY REVIEW

Box 5. Key Findings from the Regulatory Review

There are no restrictions stated within the regulations that would prohibit the establishment of an MSU in Scotland. In terms of regulatory compliance and associated fees for OV's and MHI small throughput MSUs would be able to claim discounts in the same way as other abattoirs currently operating in the country.

7.1 Overview

Recent abattoir closures in Scotland have been considered in the context of the extent to which regulations impacted on these. Through conversations with many different stakeholders there are varying degrees of influence in terms of how regulations do, and could impact on viability of MSUs. This section of the report considers the impacts, opportunities and areas of uncertainty in terms of how existing regulations may impact on the viability of mobile abattoir infrastructure operating in Scotland in the future.

The regulatory review is split into two steps:

- Desk-based research to identify questions/matters to be subsequently covered with the key stakeholders.
- Engagement with the key stakeholders responsible for implementing regulations, policy and developing this in the future.

The outcomes of the Regulatory Review are shown in detail in Appendix 4, and are summarised here.

7.2 Desk-based Review

The FSS website provides a full list of the pertinent legislation with respect to relevant regulations²⁶ which do not need to be repeated here, but for indicative purposes the following represents a significant body of these regulations with respect to MSU operations:

- Welfare of Animals (Slaughter or Killing) Regulations 1995.
- EU Regulation (EC) No 853/2004 laying down specific hygiene rules for food of animal origin.
- Animal Health and Welfare (Scotland) Act 2006.
- Food Hygiene (Scotland) Regulations 2006.
- Cattle Identification (Scotland) Regulations 2007.

²⁶ FSS, webpage: <https://www.foodstandards.gov.scot/business-and-industry/safety-and-regulation>

- EU Regulation (EC) No 1069/2009 laying down health rules as regards animal by-products and derived products not intended for human consumption (Animal by-products Regulation).
- EU Regulation (EC) No 1099/2009 on the protection of animals at the time of killing.
- Transmissible Spongiform Encephalopathies (Scotland) Regulations 2010.
- Welfare of Animals at the Time of Killing (Scotland) Regulations 2012.
- Animal By-Products (Enforcement) (Scotland) Regulations 2013.

It should be noted that Regulation (EC) 1099/2009 on the protection of animals at the time of killing which came into force across Europe on 1 January 2013 involved some measures in relation to layout, construction and equipment in existing slaughterhouses which did not come into effect until December 2019. Although written for England, the DEFRA Information Note “Welfare of Animals at the Time of Killing in England” has a summary of the implications. For illustrative purposes, some of the areas impacted by this include stunning methods, lairage facilities, restraining equipment, slaughterhouse approvals, etc.

The British Veterinary Association (BVA) and Veterinary Public Health Association (VPHA) made a joint response to the UK All-Party Parliamentary Group for Animal Welfare (APGAW) abattoir provision enquiry (in March 2019). In this it mentions that the role of mobile abattoirs should be further explored to create more opportunities for on-farm slaughter. The compliance requirements referred to in this response are very much related to the operational aspects of a future MSU service, and the desk-based review therefore considers these in detail, structured in terms of the following:

- Animal health and welfare at slaughter
- Biosecurity
- Food safety
- Safe lairage
- Potable supply of water
- Facilities for the disposal of animal by-products
- Suitable facilities for the dressing and movement of carcasses

The findings from researching the above are summarised in the appendix and where applicable, discussed with the key stakeholders identified in the next section. Where available the requirements from schemes operated by QMS, the Soil Association and the Scottish Organic Producers Association (SOPA) are also considered with respect to the above.

7.3 Engagement with Stakeholders

Through the desk-based research and discussions with the Scottish Government (SG) Rural and Environment Science and Analytical Services (RESAS), the wider Animal Health and Welfare teams, and FSS, a number of key stakeholders were discussed and confirmed as targets for engagement.

Meetings and telephone discussions with individuals within the following organisations were held to gain an insight into the regulatory landscape that influences the potential operation of future MSUs, covering the potential issues, opportunities and any areas of uncertainty identified from the desk-based work:

- SG RESAS
- SG Animal Health and Welfare
- Food Standards Scotland (FSS)
- Animal & Plant Health Agency (APHA)
- Local Authority Planning Department
- Local Authority Animal Welfare
- Environmental Health
- Building Standards
- Council Roads Department
- SEPA
- QMS

At a meeting with SG RESAS it was commented that with regards to the regulation of any future MSU the key regulatory bodies are national and therefore there would be no local variations or issues associated with its operations.

As mentioned previously the detailed consultation responses for the other stakeholders mentioned above are provided in the appendix, with a number of extracts from this shown in the following table for indicative purposes. A number of the comments selected for the table are those with particular relevance to the feasibility of MSUs, considered in the cost benefit analysis later.

Table 3. Extracts of key stakeholder feedback

Stakeholder	Comments
FSS	<p>For a small throughput MSU operation the OV and MHI charges would be discounted, in the same way as currently applies to operational, small throughput, fixed abattoirs:</p> <p><i>“The discount is applied accumulatively to LSU levels: an FBO producing 6,000 LSU would receive 85% discount for the first 1,000, 70% discount for the next 4,000 and 21% discount for the remaining 1,000.”</i></p> <p>The application assessment process, in terms of authorising an MSU service, could be made on the basis of both the tractor/trailer unit and the docking station locations being considered together, with this accompanied by the appropriate methodologies, risk assessments etc.</p>
LA Planning	An MSU will not require full planning permission unless it is to be located at a site for more than 28 days within a year.
LA Animal Welfare & Env. Health	FSS are the main regulators, however the local authority may be the competent authority for small-scale poultry facilities. The officer felt that an MSU would be relatively low-risk.
LA Building Standards	An MSU would not be covered by Building Standards. If the MSU was to utilise the existing drainage network for example, at a docking station, then they may have some input, however it would be in relation to the fixed infrastructure.
LA Roads	There may be some restrictions on movements dependent upon the size and weight of the MSU, and this may influence potential routes that can be taken. All local authorities have details of the various restrictions and permits/exemption maps and procedures for information.
SEPA	SEPA would not have a role in the regulation of an MSU from a waste management perspective. There may be other requirements, site specific, if there are emissions, nuisance etc.
APHA	The APHA is responsible for regulating the control of ABPs. There were no obstacles or barriers identified in terms of establishing an MSU and a view that indicated the fees and compliance requirements would be considered in the same way that any other process, service etc generated ABPs.
Scottish Water	Effluent from a mobile slaughter unit would be deemed to be trade effluent and as such each site at which the unit would be operated would need to apply for consent, the granting of which will be dependent on the local capacity.
QMS	The development of docking stations was believed to be the most practical and economic method of operating an MSU. There were some concerns raised about the availability of slaughtermen and vets, but QMS believe that there should be no issues that are insurmountable.

8.0 MSU DESIGN REVIEWS AND ENGAGEMENT

Box 6. Key Findings from engagement with MSU Designers

There are a range of options on the market ranging in cost from £310,000 up to almost £1million dependent upon the species processed. Typically, the throughput of the MSU is constrained by chill capacity.

8.1 Overview

Four MSU suppliers were engaged with to determine costs, throughputs, technical capacity, etc and to feed into the market viability and cost benefit analysis work. The table below summarises the technology providers engaged with.

Table 4. Summary of work done, engagement on MSU design and costs

Company and Location	Comments
Kometos Finnmodules, Finland	Kometos have indicated that they have sold a number of MSUs in Sweden, Latvia, Estonia and Kazakhstan. This company provided the MSU used in the Swedish case study referred to earlier in this document and have provided detailed information on multi-species MSUs, with a range of configurations.
Abachem Engineering, England	Cost information plus drawings and specification have been provided for the following three options: (i) cattle; (ii) sheep and pigs; (iii) cattle, sheep and pigs.
AES, England.	Drawings and design data (schedules of items) provided for different scales of modular* and mobile slaughter units, for different animal species. Cost data has been provided.
Fisher UK, England	Have provided information on chilling units, for use at the docking station sites.
Dawson Group - Scotland office, manufactured in England.	Cost estimates (capex and rental) provided for modular* units rather than mobile units which can easily move to different locations.

The following sections provide an overview of in terms of the designs and costs associated with the companies mentioned above. The detailed information provided has not been included in this report for commercially sensitive reasons and the cost data has been anonymised for the same reasons.

8.2 Summary of Design Options

8.2.1 Mobile Slaughter Units

Kometos commented that their basic rule of thumb is that if there is capacity to have a throughput of 15 cattle, the MSU can then process 30 pigs or 40-50 sheep in a same space, in one slaughter day – processing the same animal species only over the course of one day. Chilling space is what determines the throughput and capacity limits.

It was commented that the pig dehairing machine is a challenge. Creating the required quantity of warm water requires a significant amount of energy and finding the space for the plant is challenging. In effect they have said that in practice this does not work.



Figure 5. View of the two Kometos semitrailer units from above, and a cow carcass hanging inside the MSU

The Kometos trailer width would need consideration, at 3.1 metres, which is 0.2 metres wider than the maximum for normal loads (2.9 metres). See the figure above for reference. The cattle carcasses are chilled as quarters and the sheep as whole carcasses.

ABA Chem provide MSU designs and manufacturing for sheep, pigs and cattle and have reported to have sold over 10 MSUs (all sheep and pigs, no cattle). The african market was commented to be growing. It was stated that it is much easier and cheaper to process sheep and pigs, if looking at cattle need to be aware of height and width restrictions which mean that the systems need to be hydraulic, which significantly increases costs. Both of the options (cattle and sheep/pigs) have one storage container for waste, therefore all categories would need to be mixed. There is a separate container for blood, however this is not collected hygienically and therefore the separate collection is for ease.

8.2.2 Chilling Units

Fisher UK provided information on a chill unit design for location at a docking station (figure below). This is able to store 30 cattle and 30 lambs (similar to 10 cattle for space) per location. The rail is at 550mm centres which may be tight for beef quarters (depends on the species) e.g. if they are large continental breeds this may have to reduce down to 4 rails (from 5) at wider centres. The unit requires a 3-phase power supply to run the refrigeration system.

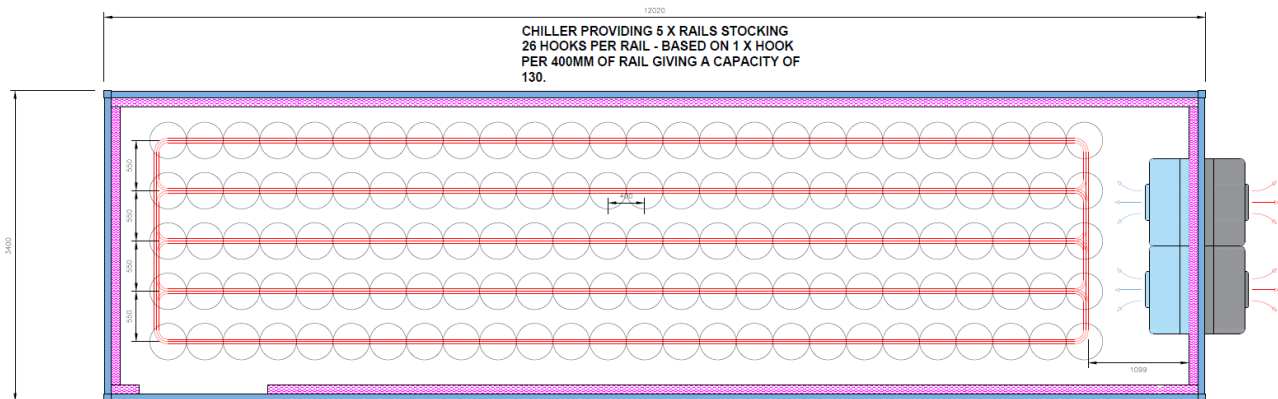


Figure 6. Outline of Fisher UK chill unit for docking stations

8.3 Summary of Costs

Table 5 provides anonymised capital cost information from two MSU design companies, for the following:

- MSU (tractor trailer), all species + chill trailer
- MSU (tractor + trailer), all species + chill incorporated (no separate chill trailer)
- MSU (Tractor + trailer), sheep and pig + chill incorporated

Table 6 provides the same anonymised capital cost information from one company, but for two small, modular fixed slaughterhouses (for comparison purposes with MSU costs) and for an MSU option, for the following:

- Modular smalls (e.g. sheep, pigs) slaughterhouse
- Modular, low throughput cattle, sheep and pig slaughterhouse
- MSU (tractor + trailer), all species + chill incorporated

Table 5. Companies A & B – Modular and MSU design criteria and indicative capital cost estimates

Criteria	Company A		Company B	
	MSU, all species + Chill Trailer	MSU, all species + Chill incorporated ²⁷	MSU, Sheep and Pig + Chill Incorporated	MSU, All species + Chill Incorporated
Cost²⁸	£922,727	£618,227	£310,000	£750,000
Throughput Per Day (8 hours)*	15 cattle, or 30 pigs, or 40-50 sheep (throughput constrained by chill capacity)	>15 cattle, or 30 pigs, or 40-50 sheep	15	3
Number of operatives	6	3	3	2 - 3

*Limited by chilling infrastructure

Table 6. Company C – Modular and MSU design criteria and indicative capital cost estimates

Criteria	Modular Smalls (e.g. sheep, pigs) Slaughterhouse	Modular, Low Throughput Cattle, Sheep and Pig Slaughterhouse	MSU, All Species
Cost	To be confirmed	To be confirmed	To be confirmed
Throughput Per Day (8 hours)*	Capacity: circa 20-50 smalls per day Storage capacity of the cold store: circa 8 – 10 carcasses Average Weight of the live animals: 100 – 150 Kg	160 head beef per annum approx. 3/ per week 1200 head lambs per annum approx. 20/week 300 pigs per annum approx. 5/week	Slaughtering capacity: 3 - 4 cattle per hour. However, the cold store capacity only holds 4 - 6 carcasses.
Number of operatives	3 workers	3 workers	3 workers

²⁷ Assumed that the cost of the MSU without chill capacity (one tractor + trailer) is 67% of the £922,727 (one tractor plus the MSU trailer and chill trailer).

²⁸ Costs based on exchange rate of 1.1 Euros to 1.0 Pounds Sterling.

9.0 ASSESSMENT OF THE MARKET

Box 7. Key Findings from an Assessment of the Market

A survey undertaken with interested small-scale farmers/crofters indicated that there was a demand for a local slaughter service, on the basis of the sample considered.

Consultations with existing abattoir operators revealed scepticism surrounding the economic viability of a MSU, however the majority of operators indicated that an MSU is unlikely to have a significant impact on their viability. The exception to this being small island abattoirs, who felt that supporting existing infrastructure should be a priority.

9.1 Overview

Smallholders, crofters and larger-scale farmers have different motivations in terms of abattoir provision, with many happy with current arrangements, but many others, in particular in areas remote from slaughter infrastructure and/or with niche market positions e.g. organics, low carbon businesses etc that are not content with current arrangements. A more local service is required for this niche market grouping, and the important attitude in terms of this need is whether it would be converted to use of an MSU if this service was made available.

The section considers the views of these key stakeholders, and also the following:

- The impact of regulations on markets and costs/income potential.
- The views of existing abattoir operators and how future mobile abattoirs could impact on their businesses.
- Changes that could make mobile abattoirs more viable – considering feedback from the stakeholder engagement.

9.2 The Demand for a Local Kill Service

The future market for mobile abattoirs in Scotland is likely to be underpinned by the demand for a local kill service. A survey of interested industry stakeholders was undertaken, however it should be noted that the general public & people buying meat may have different views. The following summarises results from engagement with more than 600 respondents, including 209 smallholders, 190 crofters, and 113 larger-scale farmers:

- 552 (91%) of the 604 respondents said “yes” to question 4, asking if there would be customer demand for locally sourced, traceable meat arising from a mobile abattoir.
- 538 respondents said that mobile abattoirs have the potential to provide their smallholding/croft/farm with a value-added service, by providing private kill and traceable meat products.

- In terms of the most popular model for using an abattoir, this involved one coming to a third-party location, with 488 respondents indicating their interest in using such a service (83%).

Figure 3 indicates that the following were the drivers stated by respondents (in an open part of the survey where any further comments on MSUs could be left), in terms of why people would want to use an MSU service:

- Animal welfare: to minimise the distances involved in moving livestock from where it has been reared and/or finished to where it is then slaughtered. In the process this will provide higher quality meat from animals which are stressed less than they may be if moved over much longer distances.
- Provenance and local sales: a local kill service is considered by many stakeholders to provide small-holders, crofters, farmers and butchers with the potential to generate meat sales with local provenance.
- Essential service: there are views that the rural way of life in Scotland is under pressure from many different sources, and the loss of abattoirs in many parts of the country compounds this – with the potential for cultural, economic and environmental impacts.

In terms of the final point above there are significant bodies of research now undertaken which consider the challenges, threats and opportunities associated with crofting, smallholding and farming – these are widely covered in many other programmes and areas of research and do not therefore form a part of the market assessment work described in this section.

9.3 Market Implications of Regulations

The Regulatory Review section of this report provides a description of the key controls that have to be incorporated in the design and operation of a potential future service. In terms of the costs associated with regulations and the impacts specifically on MSUs, these are comparable to small-scale abattoirs currently operating (e.g. the island abattoirs). An important example of how costs are applied concerns the OV and MHI requirements, where there are significant differences in the fee structure when comparing small-scale abattoirs and larger facilities. Significant discounts in OV and MHI costs are available for an MSU operating below the throughput thresholds described, starting with 85% of the inspection costs, for the lowest throughput operation, covered by FSS.

This means that for facilities operating at this scale, one of the key issues often reported about the potential of MSUs, the regulatory costs, may be overstated. However, this is not to diminish the complexity of operating an MSU such that it is compliant with regulatory requirements. This does not mean that there could be any reduction in the standard of regulation or governance regimes.

The significance of the costs associated with OV and MHI inspections is considered in the cost benefit analysis work carried out and described in the Operational Model section of this report.

9.4 Market Implications Considering Existing Abattoir Infrastructure

This report describes how engagement with existing abattoir infrastructure in Scotland has provided different views on the potential impacts of MSUs. A total of 12 abattoirs have been engaged with through discussions and meetings, with a small number (three) responding to the online survey. The views expressed can effectively be split into two:

- Existing, Scottish mainland abattoirs: Feedback from the online questionnaire, private discussions, and a Council meeting of SAMW indicated that MSUs would not be considered a threat to existing abattoir business. Though sceptical of the potential of MSUs, it was commented that they recognise that if they do move forward they are likely to be targeting niche markets.
- Island abattoirs: Two individual abattoirs responded to the Scottish survey, via personal discussions, and the Scottish Craft Butchers survey. These responses indicated that they would not be supportive of government support to any future mobile abattoir service, and that they had concerns about the potential impacts of such a service on their business models. Their view is that a local service is best provided through the establishment of small, fixed abattoir infrastructure.

One of the 12 abattoirs above is a micro-abattoir, operating on the mainland whose business model would be unlikely to be affected by an MSU.

9.5 Demand Driven by Local Meat Provenance

No market research has been identified, carried out specifically in Scotland, to understand what customers may be likely to pay for local food such as beef, mutton, lamb and pork products within the desk-top review, however there may be internal research held by QMS/Scotland Food and Drink (for example) that quantifies this. However, there are farm shops in Scotland selling meat sourced from their own livestock which are thriving and therefore are also demonstration of how provenance and well-marketed products can foster business success.

A desk-based review of provenance and the market potential associated with this was carried out more widely than the Scottish context. The key words “meat provenance market value” and “meat traceability market value” were used in an online search and this limited review provides data extracts from the following sources, which provide indications and information on the importance of local kill, at the very least to niche markets:

- “The Grocer”: A 2018 survey, “How much do shoppers care about traceability of meat”²⁹

²⁹ Online source: <https://www.thegrocer.co.uk/buying-and-supplying/sourcing/how-much-do-shoppers-care-about-traceability-of-meat/568758.article>

- AHDB Beef and Lamb, 2016, “The role and value of independent butchers in England”
- QMS Red Meat Industry profile (2018)
- IGD Shopper behaviour red meat category (February 2019)

The findings of the above are presented for indicative purposes only, with much more significant work required in this area to understand the scale of the opportunities, and regional/local differences and opportunities in Scotland.

The “Grocer” research was described as being based on the polling of more than two thousand people in Britain (number in Scotland not stated, nor other socio-economic characteristics of the population), to explore shopper attitudes. Figure 7 below is an extract from this survey indicating the top considerations of people polled.

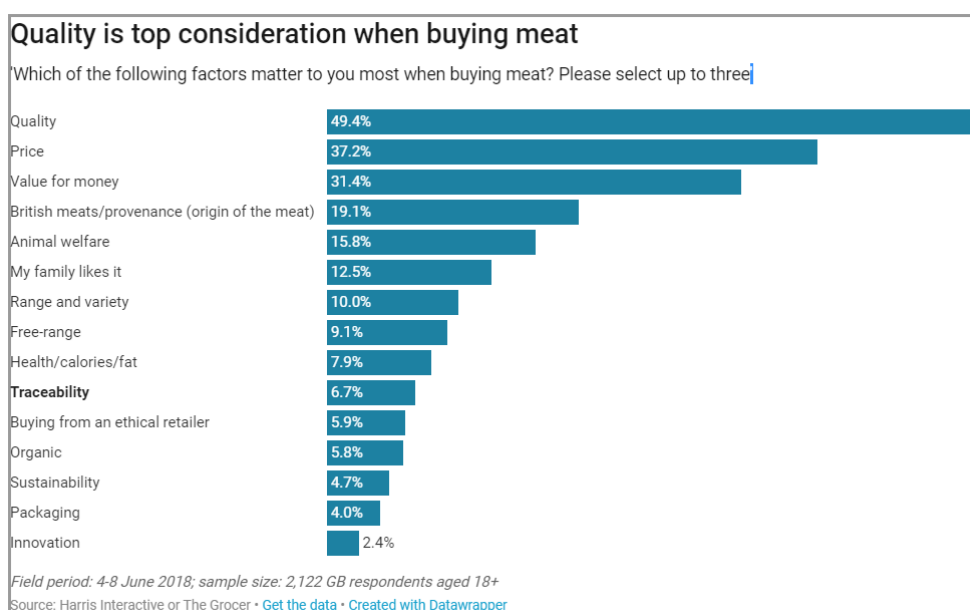


Figure 7. Extract from Grocer Poll giving views on shopper attitudes.

The AHDB report looking at England made 22 references to “provenance” and “traceable”, with none to “welfare”. In terms of the former a number of significant statements were made, for example:

“...butchers are united in the view that a continued focus on quality, provenance and customer service will be essential to successful trading.

Most of the butchers we spoke to agreed that food scares such as the horse meat scandal have positive implications for butchers, as consumers become more interested in the provenance and quality of the meat they buy.

Having a local, traceable supply chain ensures that customers can trust the products. In addition, some butchers felt that their supply of local products is part of their ability to offer consumers something different (and, in their opinion, superior) to the products offered by the supermarkets.

Satisfying and retaining regular customers is therefore essential to the continued viability of many independent butchers. These regular customers prioritise quality, provenance, and customer service ahead of other considerations, such as price.

...there is a future for independent butchers, provided they continue to focus on the quality and provenance of their product and ensure that the standards of customer service exceed those available at larger retailers.”

It is understood from discussions with Scottish Craft Butchers that local meat provenance has the potential to generate added value and new sales for its members. Although there are a number of niche, high value farm shops in the country, selling premium products to high value outlets, it could also be argued that this is under pressure with the loss of local abattoir provision, as well as reduced levels of opportunity and/or increased costs associated with arranging private kill, for local sales.

The category benchmark research indicated that shoppers are more willing than the average category to pay extra to get better quality fresh red meat. Fresh red meat shoppers value the origin, animal welfare standards, taste and texture of the products³⁰. The same research indicated that “ethical” product concerns are strongest in fresh red meat. 70% of shoppers in fresh meat say that ethical production is an important driver of product choice – up from 58% last year. Product origin is also highly important to fresh red meat shoppers.

9.6 Market Demand Driven by Animal Welfare Concerns

As indicated and discussed previously animal welfare has been brought up consistently in stakeholder engagement work, through surveys and direct engagement, as a reason for why people want to have an MSU service available to them locally.

IGD³¹ research indicated that 41% of shoppers, and 51% of 18 - 24-year olds, cite ethical concerns as a motivator for not eating meat. While only a small percentage have stopped consuming meat entirely, this number is likely to rise with 68% of 18 - 24-year olds either reducing or considering reducing their meat intake. There is therefore a potentially increasing market for producers of ethical/ known provenance meat.

In addition, important and influential organisations such QMS and the SPCA can be considered in this context. QMS has stated that it endorses the Scottish SPCA’s desire to see healthy and well cared for animals and has made a commitment through its Animal Welfare and Wellbeing Charter that it is working to have these principles being driven through all stages of its whole chain assurance on a ‘whole of life’ basis. The organisation has stated that it is committed to ensuring that all farmed cattle, sheep and pigs in its Quality Assurance Schemes have the best

³⁰ Jun-Sep’18. Base: 3,633 British supermarket shoppers / 107 fresh red meat shoppers

³¹ IGD ShopperVista, 31st Aug – 2nd Sep’18. Base: 2,055 British grocery shoppers

possible quality of life and that handling of these animals in the live supply chain is based on the principles of “the Five Freedoms” at all times:

- Freedom from hunger and malnutrition
- Freedom from discomfort
- Freedom from pain, injury or disease
- Freedom to express normal behaviour
- Freedom from fear and distress

Another important organisation which has the potential to influence behaviour with respect to animal welfare is the AHDB. In its 2018 publication, “Marketing prime beef cattle for better returns” it provides guidance to beef producers:

“In order to maximise their financial returns, beef producers need to produce and sell the type of finished cattle markets really want and are willing to pay the most money for.”

In this document there are no references to distances travelled by animals, and two references to animal welfare:

“...stock that passes through an assured supply chain can carry the Red Tractor logo and Quality Standard Mark on pack. These schemes give consumers confidence in the provenance, traceability and welfare of the animal. Sensitive handling is vital for animal welfare and to minimise damage that shows up after slaughter.”

9.7 Learning from Best Practice Marketing Initiatives Around the World

Although in its early days, the Provenir mobile abattoir in Australia provides what could be an interesting example of innovative marketing of an MSU service, coupled with engaging, online marketing of the resulting products, for purchase directly off their website. This is a model which is likely to resonate with many of the stakeholders responding to the survey described previously in this report.

9.8 Changes that might help to improve the viability of existing small abattoirs in Scotland

Consultations with stakeholders consistently listed i) regulation, ii) waste, iii) staffing issues and iv) costs (of competing with larger abattoirs with high throughputs) as significant barriers to small abattoirs.

The cost benefit analysis carried out in the following section considers the final point, and quantifies some of the key issues/barriers that have been raised in various form about MSUs, in terms of costs, often associated with waste management, veterinary costs and the cost of compliance (with regulations). Discussions with the regulators have informed the position with respect to veterinary and waste compliance costs, and for a well-managed MSU operation

may not be considered too onerous. The cost of waste collection is more challenging, and this is covered in the CBA in the following section.

The UK Government All Party Parliamentary Group on Animal Welfare (APPGAW) is currently conducting an enquiry into the loss of small abattoirs and its effect on animal welfare and the rural economy, the findings of the enquiry are yet to be published, however may provide some insights into changes that might help improve the viability of existing small abattoirs in Scotland.

In terms of how the business models developed in the following section important aspects for consideration of a viable MSU service include:

- Transportation and in particular, ferry charges are a significant cost in terms of the viability of services on the islands. Discussions (e.g. with NorthLink Ferries) have not identified any discounting potential associated with an MSU service to Orkney (e.g. road equivalent tariff or others).
- Development of docking bay location and waste storage infrastructure. This approach has been incorporated within the operational models described later and are important in terms of providing staff with animal handling skills, utilities (drains, lairage, water, electricity) and an organised management and logistics model which allows scheduled events to take place and be planned for.

10.0 POTENTIAL OPERATIONAL MODELS AND COST BENEFIT ANALYSIS (CBA)

Box 7. Key Findings from the Cost Benefit Analysis

The CBA and sensitivity analysis has indicated that the options for an MSU service which are most viable are those where the avoided costs associated with haulage of animals are the highest, and where there is the potential to add value through sales of meat which have a premium associated with local provenance and animal welfare.

10.1 Overview

An important part of developing potential operational models for consideration in cost benefit analyses (CBA) involves unpicking in detail what the challenges are and providing cost estimates where there are a range of issues/practicalities to be considered which may not be defined based on evidence and formal quotes. A number of factors are considered in the CBAs of the models:

- Discussions with industry have indicated that MSUs can vary significantly in price range, with indicative prices of up to £1 million. A consideration of how this could be financed is considered in the CBA.

- The practical and cost considerations of ensuring regulatory compliance and the need for veterinary supervision is costed for.
- Lairage, disposal and refrigeration issues, in addition to potential biosecurity issues.
- The potential to generate value with all of the products/by-products and waste (including offal, gut content, 5th Quarter etc.). This could also be viewed as a positive from the perspective of decreasing waste and contributing to the Scottish Government's commitment to the Circular Economy.
- The potential premiums that can be generated through sales of niche meat products (e.g. as organic, local, improved animal welfare).

A number of operational models have been identified for detailed assessment, following the review of international case studies and stakeholder engagement responses. The costs are based on MSUs using a docking station approach, which could for example, involve a unit driving to the following types of location, which already have much of the required infrastructure in place (lairage, drainage, power, water):

- An auction mart
- An industrial unit
- A farm

The cost benefit analysis is based on waste streams being owned by the MSU operator, but left in secure containers for subsequent collection, without undue delay (e.g. using similar timescales as those in place for fallen stock³²). In terms of the MSU authorisation, the docking stations are costed on the basis of being part of the MSU operation and would therefore be regulated by FSS as such (discussed with the FSS as a reasonable way forward). The APHA would therefore view this as being one site for authorisation from an ABP/waste management perspective. The CBA is costed on the basis of this approach.

There are challenges associated with providing a service for pigs (principally dehairing and, potentially, the need for trichinella testing in many cases), and therefore the scenarios below only focus on cattle and sheep/lambs. It should be noted that cattle also provide a challenge because of the high capital costs involved in designing and building the MSUs.

The operational models/scenarios considered in this cost benefit analysis describe the added value benefits offered by an MSU service. It should be noted that for all of these scenarios the carcasses are hung in local chill facilities, at the docking stations, with a percentage of the MSU kill income paid to the host site (e.g. an auction mart).

³² This was discussed with the APHA as a potential way of defining timescales for collection of ABP waste.

Scenarios 1a, 1b & 2 - MSU service provided to butchers/farmers

This scenario has the MSU operating as a stand-alone business. The income streams are based on:

- (i) The charge for slaughter – based on current kill prices being charged.
- (ii) Sale of carcasses (e.g. quarters or sides for cattle), based on being able to charge a price which is comparable with what butchers/farmers are currently paying i.e. in the CBA this includes avoided haulage costs to and from the abattoir.

Scenarios 1 and 2 are different only with respect to the geographical areas covered. The very special case of Orkney, with a high density of cattle and no abattoir is considered in Scenario 1a) describing a weekly service which will provide the local demand for meat. Scenario 1b) for Orkney only meets half of the local demand, with more slaughtering days on the mainland (e.g. Caithness and Sutherland). The purpose in considering both is to identify whether the ferry costs associated with a weekly service make this unviable.

Scenario 2 is a service provided exclusively on the mainland. Again, Caithness & Sutherland is used, but this is only for indicative purposes and there is the potential for many other parts of the country to also be considered for the service on the same basis e.g. Argyll and Bute, the Borders, Angus, etc.

Scenario 3 - MSU owned by a butchers/meat processor, with premium meat sales

Having purchased an animal for slaughter, the avoided costs shown are those that would be derived from an MSU service, with this effectively part of the butcher's/meat processor's business now. The full list of benefits covered by the CBA are provided below:

- (i) Avoided charge for slaughter
- (ii) Avoided purchase cost of carcasses from an abattoir
- (iii) Avoided haulage costs of animal to abattoir
- (iv) Avoided haulage cost of carcase coming from the abattoir
- (v) A premium for the sale of high quality, high animal welfare and local provenance meat.

In terms of the final benefit above, this value is based on the sales of different cuts from a carcase, with the additional value being the premium that a butcher/meat processor may be able to sell the products for, on the basis of marketing this as having local provenance, high welfare standards etc- 5% of the sales value of the is included as an additional benefit of owning and running an MSU.

Scenario 4 - MSU owned by a butchers/meat processor, with premium meat and offal sales

The scenario and financial benefits are the same as Scenario 3, but with an additional income stream associated with the sale of offal. This results in a corresponding (small, circa 2.5%) reduction in the quantity of waste being disposed of.

10.2 Operational Model Used for the CBA of MSUs for Cattle and Sheep

The following table provides an overview of the logistics and geographical coverage considered in the operational model and scenarios for MSU providing slaughtering services for cattle and sheep.

Table 7. Summary of operating models & scenarios for CBA – slaughtering cattle & sheep

Scenario/Location	Animals	Description
<u>MSU Service to Butchers/Farmers– income to MSU from butchers/farmers for kill, chill at mart/industrial unit and sale of carcase which includes avoided haulage costs</u>		
1a) Island, weekly + mainland scenario	Cattle and sheep/lambs	Weekly service in Orkney and northern mainland – Caithness & Sutherland is example used. Orkney demand has been described as circa 15 cattle and 15 sheep per week
1b) Island, fortnightly + mainland scenario	Cattle and sheep/lambs	Fortnightly service to Orkney, meeting only half of demand. More time spent slaughtering in Caithness & Sutherland
<u>MSU Service to Butchers/Farmers– income to MSU from butchers/farmers for kill, chill at mart/industrial unit and sale of carcase which includes avoided haulage costs</u>		
2) Mainland only	Cattle and sheep/lamb	All of slaughtering service provided in the north of Scotland (mainland) e.g. Caithness & Sutherland.
<u>Butcher-owned MSU with Premium Sales - buys the animals - avoided costs of kill, haulage and carcase purchase, chill at mart/industrial unit</u>		
3) Mainland only	Cattle and sheep/lamb	All based in the north of Scotland (mainland) e.g. Caithness & Sutherland.
<u>Butcher-owned MSU with Premium Sales plus <u>Offal</u> Sales</u>		
4) Mainland only	Cattle and sheep/lambs	

A further model that could be considered is the “Buy-a-Cow” approach being run by “Crowdbutching Ltd” which markets ethically sourced meat for a niche market, with meat boxes sold online using innovative marketing and communications approaches. More information is available at: <https://www.buyacow.uk/large-meat-box/>.

In terms of the number of slaughter days used for the operational models, and how these vary, depending on location, the following table provides a description of the values used in the CBA. For emphasis, the mainland service is being described as Caithness & Sutherland, one of the reasons for which is its proximity to Orkney, which is described as being in Scenario 1 for the reasons described previously.

10.4 Debt Financing and Funding of an MSU

The CBAs assess the costs and benefits associated with the different scenarios, on the basis of the following:

- 70% debt financing of the capex.
- 40% grant support for capex and 70% debt finance for the remaining capex.

The debt is assumed to be paid off after 5 years, with an interest rate of 5% used. Scottish Enterprise (the Scottish Investment Bank) were asked if they could provide information on the rates used for loans, and this was confirmed to be in the range of 4 - 11% . Lower end rates would typically be applied to companies with a strong historic performance and track record.

40% grant funding is used because this is a level of support currently provided through a number of schemes (e.g. the Scottish Rural Development Programme).

10.5 Results

The following tables are provided to summarise the results of the CBA carried out on the operational models and scenarios described in Section 10.1. It should be noted that the Excel spreadsheet used for this data accompanies this report separately.

Table 8. Summary of income and operational costs in Year 1 of trading (£000's)

Description	Scenarios for MSU Service Provided to Butchers/Farmers			Scenarios for Butcher-owned MSU	
	1a Orkney (weekly) + Mainland	1b Orkney (fortnightly) + Mainland	2 Mainland	3 Mainland + Premium Sales	4 Mainland + Premium + Offal Sales
Operating Income					
Kill and Cutting	120	120	126	126	126
Avoided Haulage Costs to Abattoir	89	61	39	39	52
Avoided Haulage from Abattoir	104	65	52	52	52
Skins & Hides	5	5	5	5	5
Retail Cuts	0	0	0	118	118
Offal	0	0	0	0	7
TOTAL INCOME / AVOIDED COSTS £000's	317	250	221	339	360
Operating Costs					
Staffing	-110	-110	-110	-110	-110
Accommodation	-20	-20	-20	-20	-20
Waste Costs	-99	-77	-54	-54	-51
Compliance Fees	-10	-10	-10	-10	-10
Energy/Fuel/Mileage	-64	-43	-22	-22	-22
Maintenance and Spare Parts	-37	-37	-37	-37	-37
Admin Costs	-14	-14	-14	-14	-14
Consumables, water	-1	-1	-1	-1	-1
Marts - charge for docking bay	-3	-3	-3	-3	-3
Marts - charge for Chill Facility	-4	-4	-4	-4	-4
Miscellaneous					
TOTAL OPERATING COSTS EXCL. DEBT FINANCE £000's	-363	-319	-276	-276	-273
Debt Finance costs - annually, up to Yr 5	-133	-133	-133	-133	-133
TOTAL OPERATING COSTS INCL. DEBT FINANCE £000's	-495	-452	-408	-408	-406

Table 9. Overview of income and costs at Year 5 of the service

CBA Income & Cost Summary	Scenarios for MSU Service Provided to Butchers/Farmers			Scenarios for Butcher-owned MSU	
	1a Orkney (weekly) + Mainland	1b Orkney (fortnightly) + Mainland	2 Mainland (C&S)	3 Mainland (C&S) + Premium Sales	4 Mainland (C&S) + Offal Sales
Annual Operating Income	317	250	221	339	360
Cumulative Operating Income	1,583	1,251	1,104	1,696	1,798
Annual Operating Costs	-361	-318	-274	-274	-272
Cumulative Operating Costs	-1,807	-1,589	-1,372	-1,372	-1,359
Annual Cash flow	-44	-67	-53	65	88
Cumulative Cash flow	-223	-338	-268	324	439
Capex	-838	-838	-838	-838	-838

Table 10. CBA summary showing NPVs, IRRs and payback period

Financial Performance	Scenarios for MSU Service Provided to Butchers/Farmers						Scenarios for Butcher-owned MSU			
	1a Orkney (weekly) + Mainland		1b Orkney (fortnightly) + C&S		2 Mainland (C&S)		3 Mainland (C&S) + Premium Sales		4 Mainland (C&S) + Offal Sales	
	70% Debt Finance	70% Debt Finance + Grant	70% Debt Finance	70% Debt Finance + Grant	70% Debt Finance	70% Debt Finance + Grant	70% Debt Finance	70% Debt Finance + Grant	70% Debt Finance	70% Debt Finance + Grant
NPV (Net Present Value) - 3 years (000's)*	-903	-480	-987	-564	-936	-640	-501	-205	-417	-121
NPV (Net Present Value) - 5 years (000's)	-1,053	-555	-1,156	-658	-1,092	-752	-558	-218	-454	-114
NPV (Net Present Value) - 10 years (000's)	-1,221	-724	-1,412	-914	-1,295	-955	-310	30	-120	221
3 yr IRR (Internal Rate of Return)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-55.2%
5 yr IRR (Internal Rate of Return)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-31.8%
10 yr IRR (Internal Rate of Return)	N/A	N/A	N/A	N/A	N/A	N/A	-9.1%	5.4%	-1.2%	17.4%
Payback Years	N/A	N/A	N/A	N/A	N/A	N/A	15	9	11	7

10.4 Cost Benefit Analysis – Sensitivity Analyses

The following table summarises impacts to the CBA on the basis of changing:

- Avoided costs associated with the transport of animals.
- Capital costs.
- The approach to waste management, in particular removing stomach/gut³³ content (circa 25% of waste) and applying this to land.
- Debt financing interest rates.

The key for the colours used in the table below is as follows:

(G)	Positive impact on payback period (improved by one year or more)
(Y)	Marginal, negative impact on payback period (1 year)
(R)	Significant negative impact on payback period (more than one year)

Table 11. Sensitivity analysis summary for Scenarios 3 and 4

Parameter modified	Change to Payback Period	
	Scenario 3	Scenario 4
Avoided haul costs reduced by 25%	Option without grant support increases from 15 to 16 years. With grant, increased from 9 to 10 years (Y)	Option without grant support increases from 11 to 12 years. Unchanged with grant support (Y)
Capex increased by 25%	Option without grant support increases from 15 to 18 years. With grant, increases from 9 to 11 years (R)	Without grant support increases from 11 to 14 years. Grant support option from 7 to 8 years. (R)
25% reduction of waste hauled – applying stomach/gut content to land	Without grant payback reduces from 15 to 12 years. With grant, reduces from 9 to 7 years (G)	Without grant payback reduced from 11 to 10 years. With grant, from 7 to 6 years. (G)
Hide prices for cattle increase from £4.50 to £10.00 per hide.	Without grant, payback reduced from 15 to 13 years. With grant, reduced from 9 to 8 years (G)	Without grant payback reduced from 11 to 10 years. With grant, from 7 to 6 years. (G)
Interest rate increased from 5% to 10%	Marginal impact – payback increases by one year, without and with grant. (Y)	Marginal impact – option without grant support increases from 11 to 12 years. With grant, no change. (Y)

³³ Guidance on how gut content can be spread to land is available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/290130/LIT_5492_40c081.pdf

10.5 Cost Benefit Analysis and MSU Viability

The CBA and sensitivity analysis has indicated that the options for an MSU service which are most viable are those where there is the potential to add value through sales of meat which have a premium associated with local provenance and animal welfare. Payback periods of 9 and 15 years are shown to be the case, with and without 40% grant funding respectively. This reduces to 7 and 11 years when the scenario including sales of offal are considered.

The potential to reduce costs by managing waste streams at the source of their generation is also highlighted in the sensitivity analysis, for example by applying stomach contents to land rather than hauling these with the other waste streams. Depending on the scenario, reduced payback periods of 1 to 3 years are possible on the basis of waste being reduced by 25%.

In the case of an Orkney service, a regular, weekly and fortnightly service was considered, to understand the benefits realised by avoiding the costs of animals to a mainland abattoir and the return cost of hauling carcasses. No viable outcomes were demonstrated in the CBA on the basis of avoiding such costs alone.

11.0 CONCLUSIONS

Stakeholder engagement has identified significant interest and demand for an MSU service. However, this should also be interpreted as a local abattoir service, regardless of whether it is mobile or fixed. This support has been expressed by crofters, smallholders and farmers. More than 600 individuals responded to an online survey advertised in a number of relevant journals, with more than 90% of respondents indicating that they would support and use an MSU service. The principle reasons given were related to animal welfare (reducing the haulage distances) and the desire to create more local meat sales businesses.

Members of Scottish Craft Butchers also completed an online survey, with a significant majority expressing their support for MSUs. For a future service the interest and participating of butchering businesses will be instrumental to its future success.

The existing abattoir sector has expressed different views on MSUs, depending on whether these are located in the islands or on the mainland. Two island abattoirs indicated that they were concerned that support for MSUs could result in the diversion of public funding that otherwise could be channelled to their businesses. The mainland abattoirs indicated that MSUs were seen very much as a niche development/opportunity and were not considered to be a threat to their businesses.

A review of international case studies identified MSUs operating for a significant time in Norway and Sweden, however, these have stopped trading (in 2019 for the Swedish MSU) due to what has been described as financial difficulties. The context for each of these MSU services was different, with the Norwegian MSU not able to slaughter for a sufficient number of days per annum and targeting mainly sheep.

The Swedish MSU also processed sheep, along with cattle and never operated at a profit - its operational model may have contributed to this by targeting individual farms. The Managing Director commented that a docking station approach, with scheduled days for slaughtering at known locations would have greatly assisted the Swedish MSU in how effectively it was operated.

In terms of funding the MSUs, the Swedish business was financed through bank loans, and with significant levels of funding by individual investors. The Norwegian MSU was financed by a group of private shareholders. The Australian MSU considered only started operating in the summer of 2019 and therefore more time is needed to understand how well this works. It is understood (though not confirmed) that this was funded from individual investors and also used crowdfunding approaches. The Canadian model investigated is 100% funded by the state government, to provide a service which assists in promoting and developing rural and remote business growth in the area (Yukon).

The cost for authorising and maintaining a service, in terms of compliance costs associated with approving an MSU, waste management and veterinary and meat hygiene inspections has been shown to be a very small part of the overall costs of any future operation. The most significant costs are those for staffing, waste disposal, maintenance (of the capital equipment) and debt financing.

The operational models considered in the cost benefit analysis would require docking station locations to form part of a future MSU service, with auction/livestock marts, farms, and industrial units potentially viable places. Livestock marts present a particularly interesting opportunity in this respect, and one of those contacted, in Orkney, expressed its interest in being a location. Butchers in Orkney, although expressing their satisfaction with their current abattoir service in the mainland would be interested in using an MSU service. The operating models considered for a future MSU service included these as stand-alone businesses providing butchers, meat processors and farmers with carcasses (e.g. sides, quarters).

In terms of the types of MSUs that would be required a number of options were considered and a cost was used that allows the kill, evisceration, cutting (quarters and side) with limited, temporary chill facilities. This requires waste to be left at the docking station locations, in secure containers, with collection by a registered carrier then taking place without undue delay (likely to be in line with fallen stock timelines). The capital cost associated with this model is circa £838K.

The CBA outputs indicated that there were two operational models and scenarios where payback could be achieved without grant funding, in a time period of 15 years or less. These models involve generating premium prices from the sale of meat and offal sales, based on demand from a local provenance and animal welfare perspective (reduced haulage distance). If grant funding at a level of 40% of the capex is considered the payback period is significantly reduced, to 7 and 9 years. However, these scenarios still need significant amounts of private investment.

GLOSSARY OF TERMS

Animal and Plant Health Agency (APHA)	The aim of the organisation is to safeguard animal and plant health for the benefit of people, the environment and the economy. It is an executive agency sponsored by the Department for Environment, Food & Rural Affairs, and also works on behalf of the Welsh Government and the Scottish Government. It is responsible for inspecting Animal By-Product processing facilities in Scotland.
Animal by-products (ABPs)	Animal by-products are materials of animal origin that people do not consume. They are controlled by the Animal By-Products Regulations (EC) 2009 (142/2011), transposed into Scottish law through The Animal By-products (Enforcement) (Scotland) Regulations 2013. This controls the collection, transport, storage, handling, processing and use or disposal of animal by-products in Scotland, including catering wastes.
Food Standards Scotland (FSS)	This is a non-ministerial government department of the Scottish Government. It is responsible for food safety, food standards, nutrition, food labelling and meat inspection in Scotland
Meat Hygiene Inspector (MHI)	The Food Standards Scotland Meat Hygiene Inspectors undertake controls to support Scotland's important meat, game and poultry industries.
Mobile Slaughter Unit (MSU)	A self-contained slaughter facility that can travel from site to site.
Official Veterinarian (OV)	The Food Standards Scotland Official Veterinarian provides a technical and leadership role, in approved premises providing technical advice and direction to the plant inspection team to ensure the efficient and consistent delivery of Official Controls and associated tasks.
Renderer	A company which takes ABPs, processes them and produces usable materials such as lard, tallow, etc.
Scottish Association of Meat Wholesalers (SAMW)	Represents the red meat industry views and interests of its member companies, working with partner organisations, Government Ministers and officials in Edinburgh, London and Brussels.

Scottish Federation of Meat Traders Association (SFMTA)	The SFMTA offers services specifically to support craft butchers - representing and promoting the interests of Scottish butchers. "Scottish Craft Butchers" is the consumer facing branding for members of the SFMTA
Scottish Environment Protection Agency (SEPA)	SEPA is Scotland's principal environmental regulator. It has a wide range of responsibilities including regulating waste management activities such as landfills, incinerators and the export of waste, administering the producer responsibility schemes for packaging, WEEE and batteries, collecting and interpreting waste data and tackling environmental crime.
Specified Risk Materials (SRMs)	Those parts of cattle, sheep and goats that are most likely to pose a risk of infectivity if the animal from which it comes from was infected with a transmissible spongiform encephalopathy (TSE) disease. It has to be removed from both the human and animal food chains and destroyed.

APPENDIX 1: Mobile Abattoir Case Studies Data

INTERNATIONAL MOBILE ABATTOIR CASE STUDIES

Overview

A review of international MSU examples was carried out to gain a thorough understanding of the business models, capacities and constraints that overseas mobile abattoirs work in, including an understanding of the impact that they may have on existing abattoirs and supply chains. The case studies are summarised in the tables below, with a brief review of the relevance of the case study to the Scottish situation.

The following case studies have been explored through a combination of desk-top and stakeholder engagement:

- Sweden (Hälsingestintan)
- Norway (MobilSlakt)
- France (SAS Boeuf and Halsingestintan)
- African Countries, Namibia (MeatCo):
- Yukon, Canada:
- New South Wales, Australia (Provenir)
- USA (The Island Grown Farmer Cooperative)

Sweden (Hälsingestintan)

Table 12. Hälsingestintan engagement data

Criteria	Comments
Capacity per day	<p>Throughput: 80 head per week (cattle), daily capacity average 30 head per day (actual capacity could be 150, but need to take into account chilling capacity). More than 4,000 cattle processed per annum.</p> <p>A key issue was limited chilling capacity. Could only kill for 3 days because didn't have enough chill trucks (one chill truck had a significant problem with condensation).</p> <p>It was commented that the service was provided over one-shift - an alternative model, which could have increased throughput, being to operate over two shifts. It was indicated that one issue with the service over time was the stress (on staff and animals) associated with trying to increase throughput significantly in one shift.</p>
Staff requirement	The MSU typically operated with five to six people (absolute minimum of four), however this didn't include people operating "behind the scenes".
Annual sales income	Not indicated. It was commented that the service had a planned growth trajectory, moving from a net cost to income over a defined period. It was never profitable in the period of operation, although the gap was closing, but not fast enough.

Services provided and costs	<p>The MSU provided the following services:</p> <ul style="list-style-type: none"> • The MSU slaughters the cattle for “free”, the MSU then owns the animal. The farmer was paid 10 euros per hour for assistance e.g. leading the cows to antemortem checks, etc. However, very few farmers opted for this service (<2%). • The farmer is charged a fee, which varies depending on the service required: • Fee 1.20 euro carcass weight per kg for slaughter, • €2.50/kg for slaughter and deboning and packing, and transport. • Additional €1.20 if retail packaged. • Note: The farmer’s name was printed on the packaging.
Operational costs	<p>Approximately 14 months ago, operating costs were €1.40 per kilo, however at the time of closure, these had decreased to €1 per kilo. It was commented that a large-scale abattoir would be operating at approximately €0.50 per kilo.</p> <p>The CEO indicated that the next generation of mobile abattoirs could get down €0.70 per kilo.</p>
Waste	<p>Waste was always owned by the MSU, but left on the farms in storage containers, mixed. The Swedish MSU operated under the European Regulations, it was stated that waste was a big challenge.</p> <p>Hides did not typically present a problem – the hides were placed into plastic containers, chilled in ice water and transported.</p> <p>Intestines posed more of a problem – the capacity of the storage container didn’t correlate with the number of carcasses being processed. This sometimes resulted in the mixing of waste streams.</p> <p>Tils, skulls, livers, lungs, etc presented significant issues - overall, the waste storage capacity of the MSU was too small for the throughput. The various categories of waste streams were often mixed, leading to higher disposal costs and less value from items.</p> <p>The mixing of waste is an aspect of the service which should be addressed in the future, to minimise cost and potentially generate income instead, in some cases.</p> <p>There was no space for a detain rail, if an animal was deemed unsuitable for human consumption after the post-mortem, slaughtering would need to stop for the day. It should be noted that this would be very rare, and had never happened to his knowledge. It was reported that there had been occasional problems with liver worms, however it was only the liver that needed to be disposed of separately.</p>
Regulatory requirements and constraints	<p>Complies with Sweden Animal Health legislation and Swedac Accredited according to Food Safety System Certification FSSC 22000 v4.1 (downloadable from website)</p> <p>It was mentioned that it had been straightforward to meet the regulations. Over the years there has been some requirements for</p>

	consultations e.g. “height pulling”, was a problem, emphasised the importance of co-operative working with regulators.
Type of unit	<p>There were two vehicles - one truck for slaughtering and another with chilling infrastructure. Cutting was done at a fixed, dedicated facility.</p> <p>Unit details: 28.5m long vehicle, plus truck, required 40 x 70m of space, stunning box at rear end, 1.4m high, but when stunning 6.5m high.</p> <p>Required 2 hours to set up on farm.</p> <p>Basic process: Animal checked by vet, animal goes into the stunning unit, hatch on the side, open gate, stick and bleed, raise it to the roof (rails in the roof), de-hide, etc, classification, scaling, etc. Out of slaughter unit, into chill trailer to 7 degrees. Height regulations were an issue – need to do suspension. Chiller for 2 days, take carcass to maturation chiller for another 7 to 10 days, deboning and packaging.</p>
Cost information	<p>The cost of the MSU was €1million, a chill truck is approximately €200,000. The MSU being used was a prototype and it was identified that there were a number of issues that could be overcome (and had been overcome) in subsequent models.</p> <p>It is reported that the MSU was primarily financed via bank loans and subsequently private investment. There were no public subsidies.</p>
Context and Background	<p>The ethos/USP of the service was to provide “zero transport kilometres” which meant going to individual farms – livestock was not brought to the MSU from other farms.</p> <p>The “ethical meat” service was specifically aimed at smaller farmers, who generate quality produce and consumers that want to know the origins of their meat (big focus on qr codes, which allow consumers to trace each cut of meat to an individual farm). Overall aim to increase the standard of animal welfare.</p> <p>Prior to closure, Halsingestintan processed animals from 25 producers.</p>
Reflections on the service	<p>A key issue with the service was described as being the sales strategy.</p> <p>The potential operating models being considered for Scottish MSUs were thought to be positive (involving docking stations at farms, marts etc) and would have made their model more viable e.g. locating at a farm with 15 to 20 cattle to be slaughtered, and then staying there for a number of days as other farmers brought their livestock to the MSU.</p> <p>There were no retail outlets involved in the model, but when asked, considered that this could have been an important “win”. They were very focussed on having a “safety net” (baseline) client base, to ensure a minimum demand was available, and a retailer could have assisted with this.</p>

Norway (Mobil Slakt)

Table 13. Mobil Slakt, Norway, engagement data

Criteria	Comments
Capacity per day/annum	<p>100 sheep per day, or 35 pigs per day. Up to 100Kg cattle could be managed (height restrictions meant that adult cattle were not possible), but rarely processed.</p> <p>They had 32 slaughter days per annum, all in the autumn/winter (but not when it was too cold e.g. never below -5° Celsius). No slaughter in summer. So, 3,200 capacity/throughput for sheep or 1,120 pigs.</p> <p>The maximum daily throughput was 1,340 Kg, typically made up of small sheep (circa 10Kg or larger sheep, typically in the range 10 to 23 Kg).</p>
Staff requirement	5 people worked in the unit, one cleaning and slaughtering the animal; two eviscerating/pre-cutting and two in the clean side.
Services	In the first 5 years they only took sheep, then in 2011 started taking pigs, but vast majority was still sheep.
Annual sales income	The service did not break even. It was calculated that it would have needed to operate for 100 days to do so or for it to have the whole value chain embodied in the project (to maximise sales from retail cuts).
Price of services	For animals under 13Kg they did not charge. Above 13Kg they charged 25 Norwegian Kroner (£2.30 Sterling) per Kg.
Operational costs	<p>Some waste could be separated and used for dog food, however, most was rendered because of logistics and cost. The waste was left at the farms, with the farmers then providing Mobil Slakt with the certificate confirming the end fate. The cost of this was sent from the renderer direct to Mobil Slakt.</p> <p>Waste costs were 5 Norwegian Krone per Kg (circa £0.50 Sterling per Kg). Waste water went to local drains. The waste costs were not considered a significant issue.</p> <p>Sheep produced 50% meat and 50% waste.</p>
Retail	No retail cuts provided from the unit and no retail partners involved in the ownership and running of it.
Inspection and certification	<p>The unit was authorised to slaughter animals corresponding to 250 tonnes of meat per year in the regions of Hordaland and Sogn og Fjordane.</p> <p>There were no compliance issues in terms of regulations.</p> <p>It was commented that in 2014 the European Commission discussed abattoir inspection in Norway and identified Mobil Slakt as the best example in terms of meat quality and animal welfare.</p>
Type of unit	Single vehicle, articulated in the middle, separating clean (pre-chilling) from dirty (pre-cutting) side of vehicle.
Capital cost information	The unit cost 2.3 million Krone to set up (circa £200,000 pounds sterling, at 0.092 pounds per krone exchange rate). The unit is in storage, with

	the aim being to sell it in Norway if possible, and if not, a sale outwith the country may be considered.
Context and Background	<p>The service provided was slaughtering and then pre-chilling, with a maximum of 2 hours transport to the next/final chill then processing. It is important that the carcass does not get too cold in the first 10 hours. The chill/hanging capacity is 50 carcasses (sheep).</p> <p>The distances travelled were great, sometimes 500km (more than 300 miles).</p> <p>Mobil Slakt was managed by Torill Malmstrøm, who has provided this consultation response, with the company including around 120 shareholders, before handing the ownership to Torill, to sell the unit.</p>
Contact Details	<p>Torill Malmstrøm</p> <p>post@mobilspekt.no</p>

Germany

Table 14. IG Schlachtung mit Achtung, Germany (translated as “Slaughter with Care”)

Criteria	Comments
Date of establishment	Operating for one-year (since 2018).
Capacity per day	One cow can be slaughtered and transported to the static abattoir at any one time (up to max. 1,300kg).
Staff requirement	One member of staff (CCTV installed as standard to ensure high standards of care)
Services Provided	Slaughter and transport of cattle to abattoir.
Annual sales income or similar	It is reported that the sales price of meat is up to 3 times higher than meat from conventional slaughter and that farmers get twice as much in comparison to standard market prices.
Products	This is a slaughter only service, provided in association with the slaughterhouses.
Regulatory requirements and certification	<p>There have been some changes to enable the development of semi-mobile slaughter facilities. Some of the key requirements are summarised below:</p> <ul style="list-style-type: none"> • The MSE-200A must be approved as part of an EU-certified slaughterhouse by the veterinary office responsible at the site. • A certificate of expertise (according to the Animal Welfare Slaughter Ordinance) is required to carry out the actual slaughter. • The MSE-200A fully complies with the requirements of AFFL circulation decision 2017-VI³⁴ on mobile slaughter and can

³⁴ German government sub-group on “Meat and poultry meat hygiene and technical issues concerning food of animal origin” (AFFL)

	<p>therefore be authorised as part of a slaughterhouse under Article 4(2) of Regulation (EC) No 853/2004 in accordance with Article 31 of Regulation (EC) No 882/2004. (Decree v. February 2018).</p> <ul style="list-style-type: none"> • The process of anaesthetisation and bleeding must take place within a maximum period of 60 seconds. • The process from stunning to evisceration, etc. in a correspondingly EU-certified slaughterhouse must take place within a maximum period of 60 minutes.
Type of unit	<p>There is no processing of livestock at the MSU, photos of the unit are provided below, but the basic specification is provided here:</p> <ul style="list-style-type: none"> • It consists of a 19 m³ closed work area with bleeding tilting table and hygiene devices as well as an extendable and retractable fixation module with feeding point. • High work safety through automatic head fixation when stunning in anesthesia unit (if necessary re-shooting is possible without danger). • High work safety through automatic head fixation / carcass fixation during stinging (chest stitch) / bleeding in the closed stun unit. • High work safety through deadman operation, including locked door during the pulling process, entering only after the • Hygiene safety, no physical contact (floor / walls, etc.) of the carcass in the slaughter room. • Integrated hygiene unit (washable sink, etc.) • Safe transport (automatic fixation / load securing) of the carcass in the mobile slaughter unit • Performance data vehicle: Kerb weight approx. 1,900 kg, Payload 1300kg, Total permissible weight 3500kg, Support load 100 kg (ball head coupling)
Cost information (set-up costs)	<p>MSU costs: €68,000 + VAT</p> <p>In order to introduce the innovative slaughtering method with the MSE-200A, the relevant federal state ministries offer comprehensive support programmes for small and medium-sized enterprises such as butchers, slaughterhouses or farms. The level is variable, but is reported to be up to 30% within Bavaria.</p> <p>The system tends to remain on the farm, however it can be rented.</p>
Background, political context and impacts on existing infrastructure	<p>Given the recent operation of the MSU and that it is connected to the existing abattoir infrastructure, it is too early to conclude whether there will be any impacts on existing infrastructure.</p>

Yukon, Canada

Table 15. Yukon State, Canada

Criteria	Comments
Date of establishment	Autumn 2006
Capacity per day	<p>“In normal daily operations, the mobile abattoir is able to process 5 beef or elk and up to 10 pigs, sheep or goats. This allows for setup and timely delivery to a cut & wrap facility”</p> <p>Minimum callout for beef or elk is 2 animals, for pigs, sheep or goats are 4 animals and for rabbits are 25.</p>
Staff requirement	A minimum of two (one a government inspector) is reported on-line.
Services Provided	<p>The abattoir operators are equipped to skin, eviscerate, dress and cool animal carcasses. The mobile abattoir is also equipped with a scalding dehairing machine for pigs. Other functions of slaughter must be provided by the farm. Note: the farmer is responsible for the slaughter of the animals, and slaughter does not take place within the MSU).</p> <p>Mobile Slaughter Service for red meat livestock is available late April through early November - dependent on weather. The mobile abattoir cannot operate when night-time temperatures drop below -10°C.</p>
Annual sales income or similar	The government cover the operating expenses and wages which amount to approximately Canadian \$60,000 per year. The contractor also gets a monthly retainer and collects the slaughter fees from the farmer.
Cost to farmer of using service	<p>Cost per animal:</p> <ul style="list-style-type: none"> • Beef or Yak: \$110 • Elk: 100 • Pigs: 55 • Sheep or goats: 35 • Rabbits: 7.50 <p>Other costs: travel at \$2/km measured one-way from the Whitehorse city limits</p> <p>* Standby fees: the livestock owner may be charged up to \$75/hour for unnecessary delays for which they are responsible.</p> <p>Costs obtained on-line 24/07/19</p>
Products	The farmer has responsibility for the products (note: meat can be sold “farm gate”, which means that it does not need to be inspected).
Regulatory requirements	The operating procedures (Appendix A) provide details on the mobile abattoir, and the regulatory requirements for individual farms.

and certification	The Yukon government meat inspector provides inspection services during the slaughter process and ensures all federal and territorial regulations and health guidelines are met or exceeded.
Type of unit	<p>The mobile abattoir is housed in a fifth wheel trailer custom designed with features for Yukon conditions and provides slaughter, inspection and refrigerated transportation services for red meats such as beef, bison, pork, elk, sheep and goats.</p> <p>The MSU is 33ft long, 14ft high, 8 ft wide and weighs 21,000lbs</p> <p>The front of the unit houses a mechanical room and a cooler with refrigeration capacity for up to 8 bison, beef cattle or elk, 15 hogs, or 20 smaller animals such as sheep or goats. The back half of the unit contains overhead winches for lifting the animal into the dressing bed as well as the equipment needed for skinning and evisceration.</p>
Cost information (set-up costs)	The unit cost Canadian \$150,000 to build 13 years ago. A recent quote for a MSU had been obtained, which was in the region of Canadian \$250,000.
Background, political context and impacts on existing infrastructure	<p>As indicated above the government was keen to “increase the amount of commercially available, locally grown, government inspected beef, bison, pork and elk for sale in Yukon.</p> <p>In addition, it is reported that farmers were looking for a way to bring government inspected meat to market.</p> <p>The MSU was developed based on research carried out by the Yukon Agricultural Association (non-profit). In 2014, the Yukon Agricultural Association published a report which discusses some issues and thoughts for the future³⁵. This report helps to provide some context for the MSU and is summarised below.</p>

The Yukon Agricultural Association (YAA) is a non-profit society with a mandate to support and promote agriculture in Yukon. In 2012, YAA secured a 30-year lease on a 65-hectare parcel of land. One of the projects, that the YAA would like to see developed on the land, is effectively the construction of a “docking station” to address some issues and to support the MSU going forward. The following represents some of the key findings arising from the report.

- Difficult to move large animals from inside rails to outside rails. Need to ensure that carcasses can be moved and still meet all inspection codes. Bison has been too big to process in the mobile abattoir.
- Currently elk farmers use mobile abattoir and then send meat to local butchers for processing. Mobile abattoir would be more useful if accompanied with processing space.
- Do not want to see public funding for facilities that would compete with local business

³⁵ Yukon Agricultural Association Conceptual Site Plan, October 8, 2014

- Space needed to expand abattoir operation from mobile to freestanding. Mobile abattoir has a limited life span and eventually more capacity will be needed to meet the needs of the growing businesses.
- Need space for more pens near abattoir in the future.
- Farmers want to take cattle to abattoir and then have meat go directly to market. This will require pens to hold cattle before slaughter.
- Animal handling facilities need to be designed so that animals are stress-free before slaughtering.
- Consider contacting stores to find out what kind of meat they will take and when in order to be able to plan storage and freezer space accordingly.
- Need to put together a good plan for the waste and start educating people about the project.
- Plan should include cooling and freezing space to increase the efficiency of the mobile abattoir.

The Yukon State Case study appears to be relevant to the Scottish context (with one significant difference – it would appear that many farmers were previously slaughtering cattle and selling the meat “farm gate”, therefore the difficulty has been trying to convince farmers to pay for slaughter, rather than competing with any significant existing infrastructure).

The United States of America

Table 16. The Island Grown Farmer Cooperative (IGFC) mobile processing unit (MPU), USA.

Criteria	Comments
Capacity per day	9-10 head beef (or 35 lamb or 15 pigs). Processes approximately 2500lbs per day.
Staff requirement	2 butchers work for 8 hours, per day, under inspection. Extra for drive-time, set-up and clean up. The MPU is in operation 4 days/week, (requirement to take meat back to the processing plant and do truck/trailer cleaning/maintenance). Employs 6 people over-all (includes management and p/t cleaning staff)
Services	slaughter & process; raw sausage; case-ready, retail packaging
Annual sales income	\$500,000 (all services, not including the value of meat processed)
Price of services	Slaughter: \$40 lamb or goat, \$55 pig, \$105 steer. In order to have the unit come to their farm, producers have to have a minimum slaughter amount of \$450. Cutting (to case ready) = \$1.05/lb lamb, \$0.82/lb steer, \$0.6071 pig (plus 10% price increase, spring '08). Sausage = \$1.25/lb for links. (For farmers not in the co-op, prices are slightly higher.)
Operational costs	~\$294,500/yr. Fee structure is designed to break even or be slightly profitable. The trailer gets ~10 miles/gallon.
Retail	On-site sales: Open 2 days/wk, earns \$9000/mo.

	Other outlets for members: off-farm, farmers markets, restaurants, grocery stores, farm stands). Only a few sell wholesale.
Inspection and certification	USDA inspected and certified organic. No other requirements - rinse water and offal are composted on-farm.
Type of unit	Standard 36 foot unit
Cost information	<p>The total cost for the project was \$150,000 in 2000. Trailer \$60,000 Equipment & Installation \$27,000 Truck \$18,000 Design/ Project Mgmt. \$25,000 Testing \$15,000 Outreach \$ 5,000</p> <p>The MPU was paid for with grants, and private donations from the farmers and other individuals in the community.</p> <p>Once the MPU was built, the co-operative didn't need additional outside funding. Members pay a service fee and an initial capital charge of \$600 from each of the 30 starting members (now 60 members). Rates were set to break even in the first year. Co-op member farms are all within 100 miles of each other (1-2 hours drive), which is stated to be the largest area the MPU can serve efficiently.</p>
Context and Background	<p>The farmers in San Juan County (Washington State) lacked access to USDA slaughter and processing, and were unable to transport their animals to facilities on the mainland. Quote:</p> <p><i>"Central to their success is this fact: none of these farmers has any other options for slaughter/processing, so they have to make this one work and keep it afloat."</i></p> <p>From an initial desktop review, this case study appears to represent an applicable example for Scotland, although to date there has been no contact with farmers to establish demand. It is also worth noting that there are numerous outlets for the end-products, with a large demand for locally grown food.</p>
Contact Details	<p>Information obtained from https://articles.extension.org/pages/15739/island-grown-farmers-cooperative-updated-32018 (accessed 30/01/19)</p> <p>Attempted contact made with Bruce Dunlop (manufacturer) on four occasions.</p>

Australia

Table 17. Chris Belazs, Provenir, Australia

Criteria	Comments
Capacity per day	Designed to process 10 beef or 75 lambs per day.
Staff requirement	Four staff
Services	<p>Purchase livestock from the farmers (10-12% uplift on what the farmer would receive from a sale yard). The MSU then slaughters and processes the meat.</p> <p>Provenir own the butchery plant. The meat is processed into 49 different products – key aspect of an MSU is the ability to gain value from the whole carcass.</p>
Annual sales income	The MSU became operational in June 2019.
Price of services	See above.
Operational costs	<p>Commercially confidential, however there was a discussion surrounding operational models.</p> <p>Provenir had looked at providing a service model e.g. providing contract kills for farmers, however had concluded that the economics didn't work (could not charge the farmers enough, for it to be self-sustaining). Considered a co-operative, which was felt to be a better option than a service model, but Provenir ultimately went for an acquisition service because it enabled them to maximise value from each carcass and brand and sell the meat.</p>
Retail	<p>A key aspect is that the meat is sold as a premium product. Although not discussed within the consultation, the meat can be home delivered, purchased at retail outlets and is sold within some restaurants. It should be noted that at the time of the consultation (8th August 2019), 65 animals had been processed through the MSU.</p> <p>The company had recently won the Australian Food Awards best in class for branded meat.</p>
Type of unit	The unit was designed by Provenir and is custom built. It requires a special licence due to its size. It is approximately 3m x 12m, with a pop-top for large cattle. The MSU is completely self-sufficient, with amenities, toilet, power, etc.
Capex cost information	This is commercially confidential, but was stated to be seven-figures (AUS\$). The capex costs were supported through a mix of grants, support; however it is a private company.
Regulatory Context	A key difference between Australian and Scottish regulations is that the EPA regulations do not apply to small-scale operations (which the MSU

	falls under), therefore farmers can bury or compost “waste” at the farm, which removes some of the cost and storage issues.
Context and Background	<p>In Australia, there is a strong ethical awareness of animal welfare, with many consumers choosing to switch from meat consumption to vegan/vegetarian. It is estimated that for most people, the switch back to meat consumption is between 6 weeks – 6 months, however this group of people were much more likely to pay extra for their ethics. Provenir carried out a survey of 4000 people, 79% of people indicated that they would pay between 20-25% more for ethical meat (this premium is required to cover the costs of farm slaughter).</p> <p>Provenir are yet to determine whether the results from their survey are aspirational/ behavioural. Provenir meat is strongly branded (see website: www.provenir.com.au, with consumers able to trace their meat. Provenir are part of a research programme, they will be carrying out analysis that looks at the chemical composition of their and how this influences taste and meat quality (within 4 – 6 months).</p> <p>It was stressed that the MSU needs to be based on the “pain point of the consumer and not the farmer”. In Australia, there is a gap in the market for ethically produced meat that static abattoirs and farmers struggle to tap into.</p>

New Zealand

Prices for the MSU (and conventional abattoir kill) are taken directly from the butcher website are provided here for comparison

Table 18. MSU Slaughter Prices for Netherby Butchers, New Zealand (New Zealand dollar prices shown)

Beef		Lamb		Pork	
On-farm MSU	\$130.00/beast	on farm MSU	\$40.00+pelt	On farm MSU under 75kg	\$80.00 each
				On farm MSU over 75kg	\$100.00 each
Offal removal (if required)	\$20.00/beast	Offal removal (if required)	\$5.00 /sheep	Not indicated	
Abattoir killing and processing	\$1.50kg + killing fee	Abattoir killing and cartage	\$40.00 each	Abattoir killing under 75kg	\$80.00 each
				Abattoir killing over 75kg	\$95.00 each
Beef processing charges	\$1.50 per kg (bone in weight)	Lamb processing charges	\$40.00 each	Pork processing charges (> 75kg)	\$100.00 each
Basic Processing includes:		Basic processing Includes:		Basic processing includes:	
				<ul style="list-style-type: none"> • Roasts 	

<ul style="list-style-type: none"> • Fillet, Ribeye, Porterhouse, Rump Steak • Roast Beef • Corned Silverside • Blade, Crosscut and Stewing Steak • Mince • Weiner Schnitzel • All Vacuum packed 	<ul style="list-style-type: none"> • Leg Roasts • Chops • Rolled, Seasoned, Forequarters 	<ul style="list-style-type: none"> • Chops • Strips • Diced Pork • Steaks/Schnitzel
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APPENDIX 2: Stakeholder Engagement Data – Farmers, Crofters, and Smallholders

ENGAGEMENT RESULTS

Overview

Livestock owners, consisting of smallholders, crofters and farmers were engaged with to understand if there is a need and demand for an MSU service. The engagement with farmers took place using a number of different methodologies and the results of the structured surveys and additional notes from the qualitative interviews are provided below.

Results of Engagement with Farmers Through Structured Telephone Interviews

Overview and Profile of Farmers

18 farmers participated in the telephone interviews, farming across a range of livestock species, including beef cattle, dairy cattle, sheep, poultry (not included in the MSU scope of work) and pigs, including 2 registered organic farmers. The profile is shown in Table 19. The participants ranged in both holding size and location, covering a wide range of the country, including the central belt, the islands and highlands (see Table 20).

Table 19. Details of the number of farms out of the 18 interviewed, with different livestock types.

Land use	Number of farms (out of 18)
QMS member	15
Organic	2
Farms with arable/temporary grass	8
Permanent grass (Grade 1)	13
Permanent grass (Grades 2 and 3)	11
Beef, sheep	8
Beef, dairy, sheep	1
Beef, dairy, sheep, pigs	1
Beef, sheep, pigs	1
Beef, sheep, poultry, pigs	1
Sheep	2
Sheep, pigs	1
Pigs	1
Poultry, pigs	1
Other	1

The farms with arable and temporary grass all grew food for the livestock and/or grazed the land. Beef and dairy cattle were generally inside during the winter and

outside on temporary and permanent grassland during the spring, summer and autumn. Sheep were generally outside all year except for lambing time.

Table 20. Details of farm size and location for the 18 participants

Total land area (ha)	Number of farms	Location
<5	1	North Lanarkshire (Motherwell)
5-10	1	Angus
11-25	1	Inverness
26-50	1	Inverness
50-100	1	Orkney
101-150	4	Isle of Skye, Paisley, Argyll, Aberdeen
150-250	1	Glasgow
251-500	1	Dumfries and Galloway (Castle Douglas)
>500	7	Sutherland, Caithness, Dumfries & Galloway, East Ayrshire, Perth

The following summarises how the 18 participating farmers finish their animals:

- 12 finished all or the majority of their livestock on the farm.
- 2 farmers based in Sutherland and Argyll finish up to 25% of their livestock with the rest sold as store at livestock markets.
- 4 farmers never use an abattoir for their livestock - based in Caithness, Inverness, Perth and Skye. They sell all livestock as store at livestock markets (see Figure 8 below).

Of the 12 farms finishing livestock, there were three farmers who sell some or all of their finished livestock to one or more slaughter sales or a dealer - 1 in Ayrshire and 2 in Dumfries & Galloway.

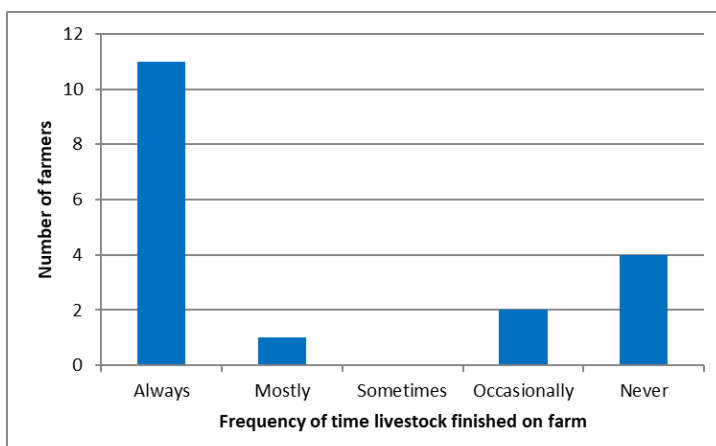


Figure 8. The proportion of livestock finished on each farm for the 18 Scottish farms

In terms of abattoir usage and distances involved:

- 11 farmers in total send livestock to abattoirs. Eight of these farmers use 2-4 abattoirs depending on a range of factors including:
 - Livestock type (not all abattoirs will process all livestock types)
 - Number of individuals, the limiting processing capacity of the closest abattoir,
 - Availability of private kill, and
 - Whether the abattoir is certified to process organic livestock.
- Livestock from the farms surveyed were transported up to 245 miles to an abattoir.

For some farmers a >200-mile journey to an abattoir may take over four hours due to road conditions, or the requirement to travel by road and ferry making the journey at least eight hours. The number of runs per year per farm ranged from 1-100, and number of animals transported 1-400, with this variation both according to livestock type, production system and herd size.

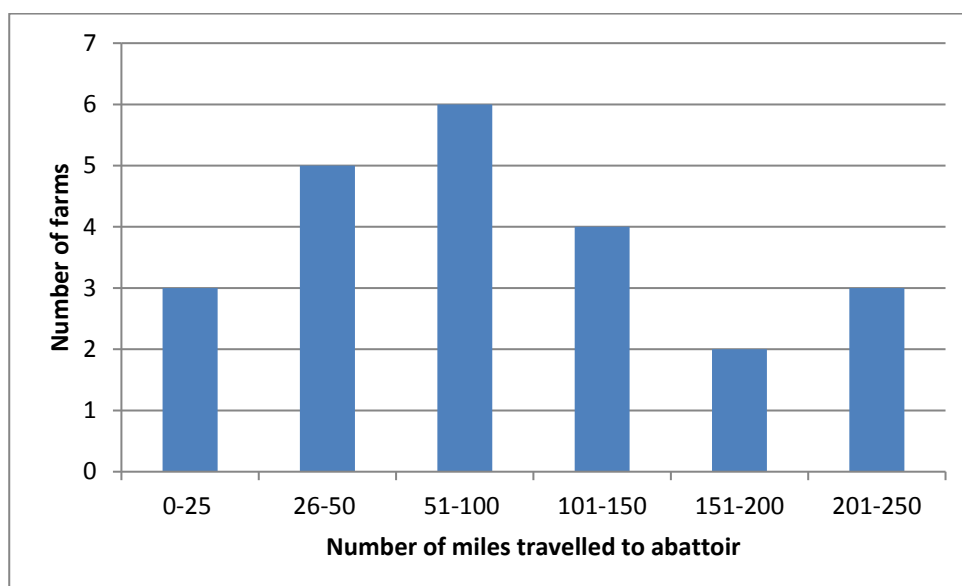


Figure 9. Number of miles travelled to an abattoir

The abattoirs offering private kill used by the farmers interviewed were: Munro's (Dingwall), Downfield (Fife), Border Meats (Lockerbie), Millers of Speyside (Grantown-on Spey), John Scott/Sandyford (Paisley), PR Duff (Wishaw), Mull Abattoir (Isle of Mull) and James Chapman (Shotts).

Other abattoirs used were: AK Stoddart's (Ayr), Woodhead Bros (Turriff), Tulip/Quality Pork Scotland (Breachin), Scotbeef (Bridge of Allan), Highland Meat (Saltcoats), Kepak McIntosh Donald (Aberdeen) and Pickstock Telford (north-west of Birmingham).

The following section provides the detailed responses from farmers engaged with.

Detailed Interview Responses

Q1. Do you think mobile abattoirs have the potential to provide farmers with a value-added service, by providing private kill and traceable meat products?

Figure 10 provides the overview of responses. When asked whether MSUs could offer added value by providing private kill, 11 farmers felt that MSUs could in theory be of benefit, offered a range of considerations including:

- Beneficial for areas where the nearest abattoir is currently far away
- Facility to slaughter all livestock including pigs and poultry (more smallholders would consider poultry if there was somewhere to slaughter them)
- Organic certification required
- Beneficial for the production of local, traceable food
- Potential to access new market
- Reduction in livestock miles

7 farmers responded that they felt MSUs would not add value or were unsure about the value.

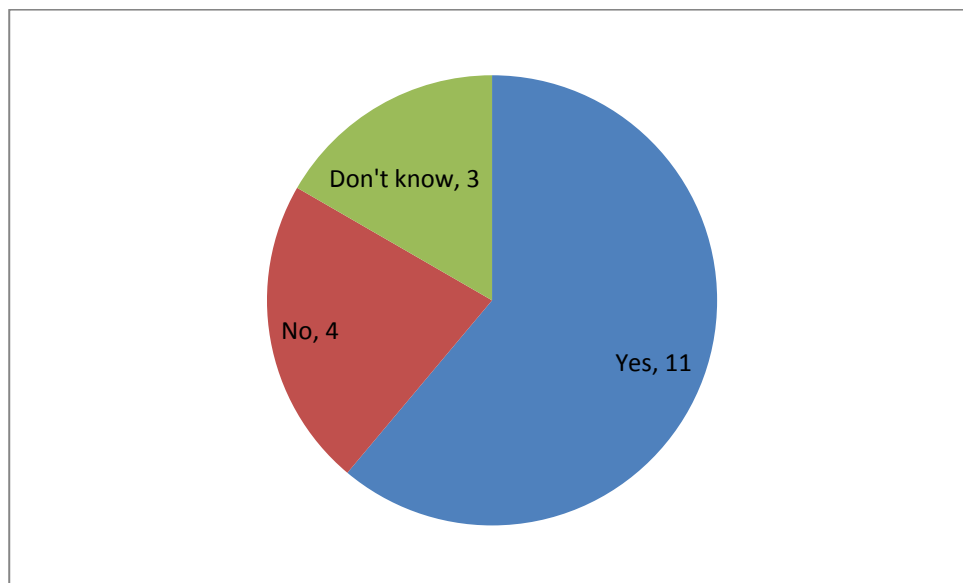


Figure 10. Answer to question: do you think mobile abattoirs have the potential to provide farmers with a value-added service, by providing private kill and traceable meat products?

Q2. Would you be interested in using a mobile abattoir facility if it was coming to your farm, for your own sole use?

Questions 2-4 relate to potential MSU models, with the results summarised in Figure 11. Of the 18 farmers surveyed, 3 may do so, 7 were potentially interested (said yes) and 8 would not use an MSU coming to their farm.

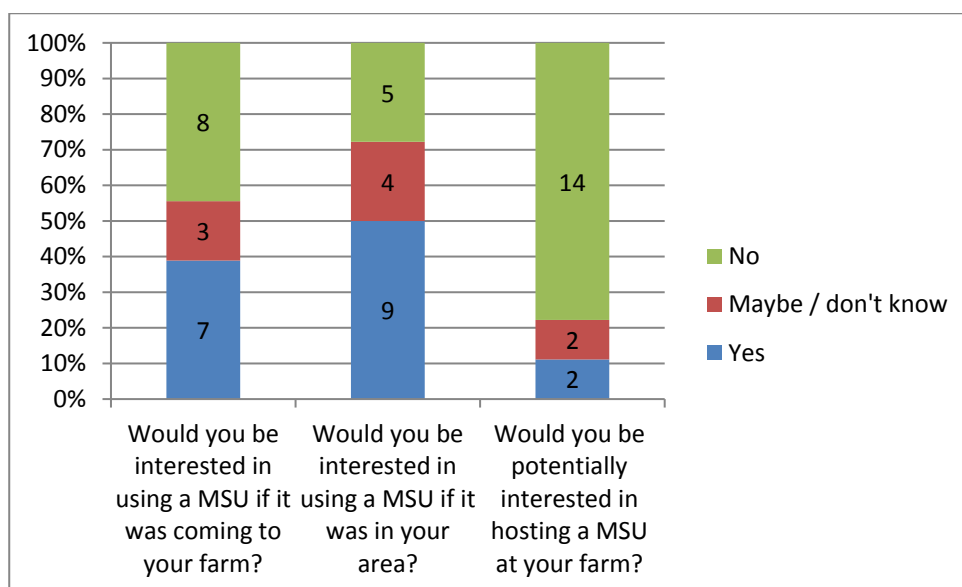


Figure 11. Opinions of farmers regarding theoretical MSU location and use

Q3. Would you be interested in using a mobile abattoir facility if it was in your area e.g. at a local host farm?

Of the 18 responses, 9 farmers were interested in using an MSU in the local area (answered yes) and 5 farmers would not use an MSU (e.g. at a local host farm, using a docking station approach. This was a lower number than those who would not want an MSU on their own farm.

Of the other 4 responses, 1 of those does not currently finish cattle, but would be interested from a private kill perspective. The other 3 farmers, who do not finish cattle, were unlikely to change their production system as they felt conditions in their location were not well suited to finishing cattle, as compared to milder more arable areas where finishing food can be produced locally. Several farmers suggested a local market or industrial estate as a docking station whereas others felt there was no obvious location near them.

Q4. Would you be potentially interested in “hosting” a mobile abattoir at your farm, for others to also use?

Only 2 of the farmers said they would consider hosting an MSU on their holding, with 14 saying no and 2 were unsure. The main reason for the lack of interest was biosecurity risk of other animals being on their holding, with the greatest concern from the pig farmers, followed by cattle.

Q5. If the minimum threshold for an MSU was 10 cattle, or 25 sheep or 25 pigs, would that present an issue?

Five of the farmers would have sufficient livestock to satisfy the minimum threshold scenario (Figure 12). The other farmers were either unsure (3 farmers) or certain that they would have insufficient livestock (6 farmers) or would not use an MSU in any case.

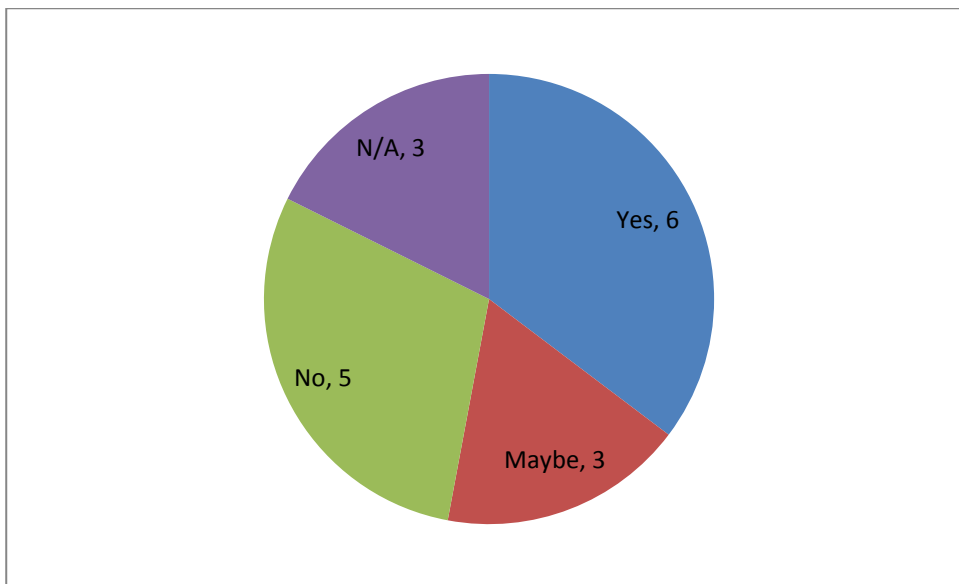


Figure 12. Answer to question: If the minimum threshold for an MSU was 10 Cattle, or 25 sheep or 25 pigs, would that present an issue?

Results of Engagement Through the On-Line Survey

A survey monkey questionnaire was developed and advertised through a range of individual contacts, including: the Scottish Crofting Association, Smallholdings Scotland, and Scotland the Brand. The project then subsequently featured in a number of online publications and was available for a 4-week period from August to September 2019. Examples of these articles are provided below:

- The Scottish Farmer, <https://www.thescottishfarmer.co.uk/news/17881329.say-mobile-abattoirs/>
- The Orkney News, <https://theorkneynews.scot/2019/08/30/do-you-want-a-local-abattoir-service/>
- Global Meat News, <https://www.globalmeatnews.com/Article/2019/09/07/Scottish-mobile-abattoir-viability-investigated>
- Scottish Rural Action, <https://www.sra.scot/viability-and-sustainability-of-mobile-abattoirs-in-scotland/>

618 responses were received, an anonymised overview of the responses is shown below.

Q1. Can you state if you consider yourself to be?:

Answer Choices	Responses	
Smallholder	33.82%	209
Crofter	30.74%	190
larger-scale farmer	18.28%	113
Other	16.34%	101
If other (please specify)		106
	Answered	618

Skipped

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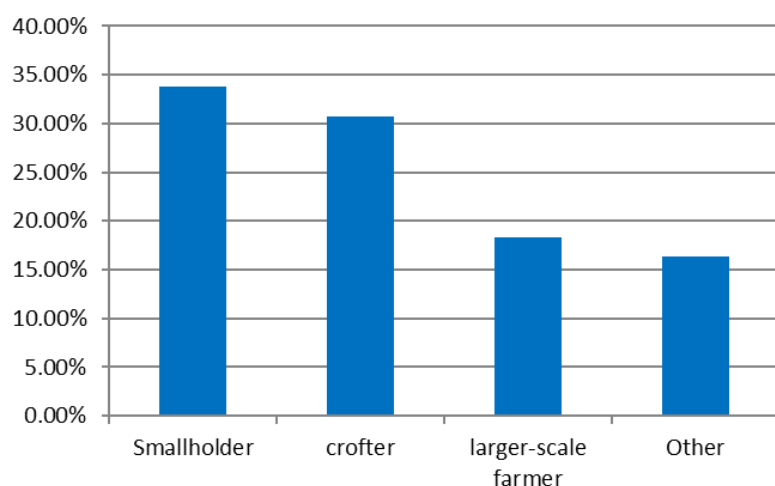


Figure 13. Answers to question 1

Q2. Do you think mobile abattoirs have the potential to provide your smallholding/croft/farm with a value-added service, by providing private kill and traceable meat products?

traceable meat products?

Answer Choices	Responses	
Yes	89.37%	538
No	2.33%	14
Depends	5.65%	34
	Answered	602

Skipped

16

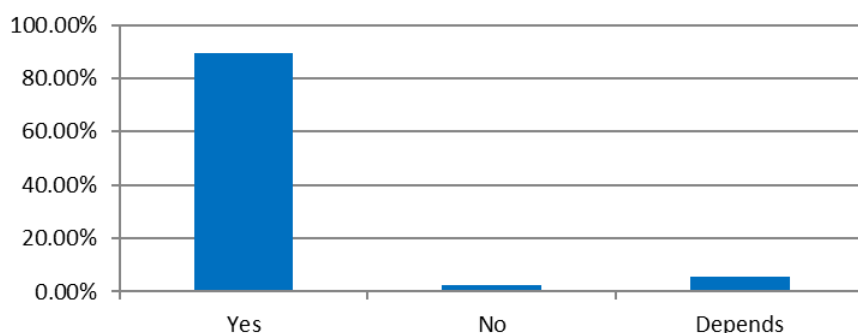


Figure 14. Answers to question 2

Q3. Do you believe that there would be customer demand for locally sourced, traceable meat arising from the mobile abattoir?

Answer Choices	Responses	
Yes	91.39%	552
No	1.66%	10
Depends	5.13%	31
Please comment on your response		263
	Answered	604
	Skipped	14

Q4. Would you be interested in any of the following?

Answer Choices	Responses	
Using a mobile abattoir facility if it was coming to you.	76.92%	450
“Hosting” a mobile abattoir at your croft/ smallholding/farm (for other farmers to bring livestock to).	38.12%	223
Using a mobile abattoir facility if it was in your area e.g. at a local host farm or meat processing facility.	83.42%	488
Please comment on your response		206
	Answered	585
	Skipped	33

Summary of Further Information Responses Provided

The following graphs take the additional feedback provided at the end questionnaire, by 235 respondents. The questionnaire asked for any other information which they felt would be useful for consideration, in terms of the viability of MSUs.

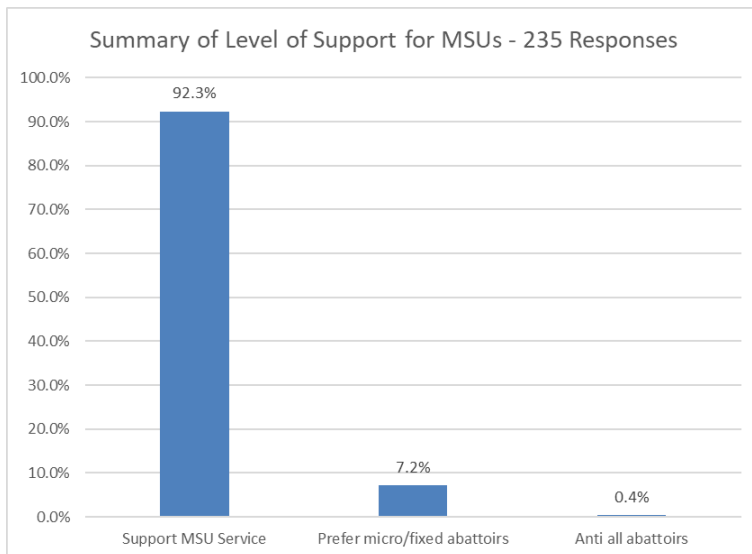


Figure 15. Summary of preferences given as additional information

In terms of Figure 15, it should be emphasised that the questionnaire was not set up as to be MSU versus Micro-abattoir. It is, however, pertinent for individuals who believe that fixed, micro-abattoirs should be considered over the MSU option (17 individuals). The vast majority of respondents providing additional information were extremely supportive of MSUs (217). However, this should also be read with caution since in reality it seems reasonable to assume that what respondents are really supportive of is a local kill service, which addresses the concerns, costs and lost business opportunities, which the current abattoir arrangement in Scotland is giving them. This is very much borne out by the views given by those expressing their support for MSUs, summarised in the following figure.

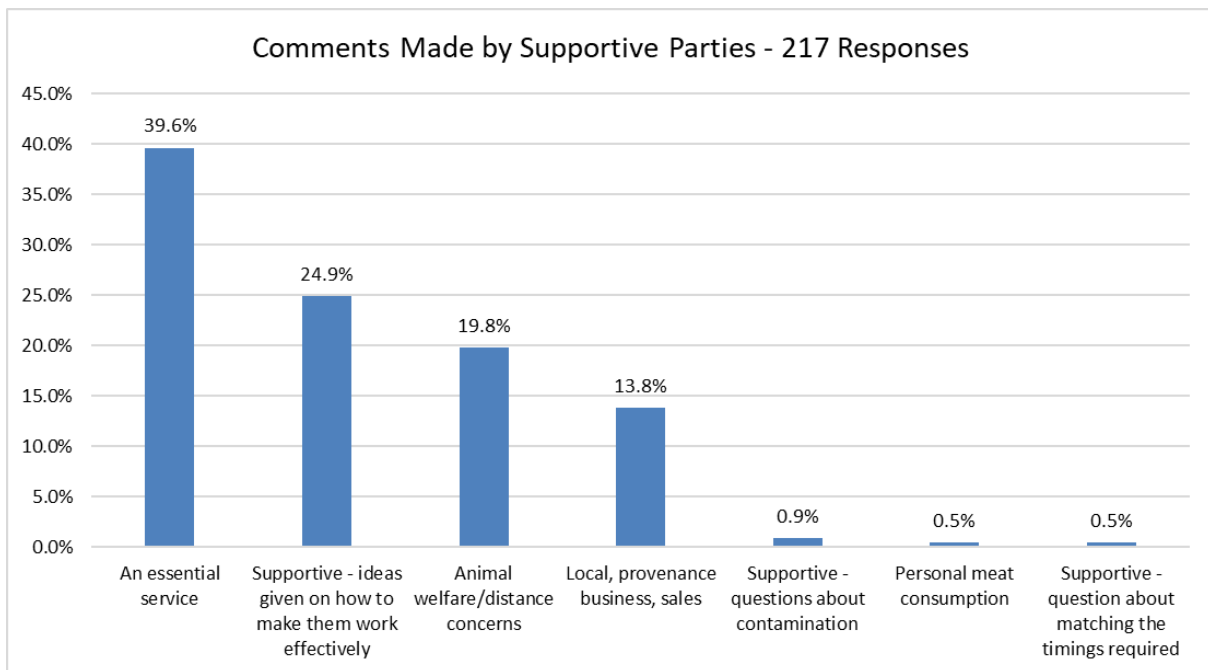


Figure 16. Summary of views given by those supportive of MSUs.

The full range of reasons is given in the figure below for the 17 respondents providing further information and views on their preferences, for micro/fixed abattoirs.

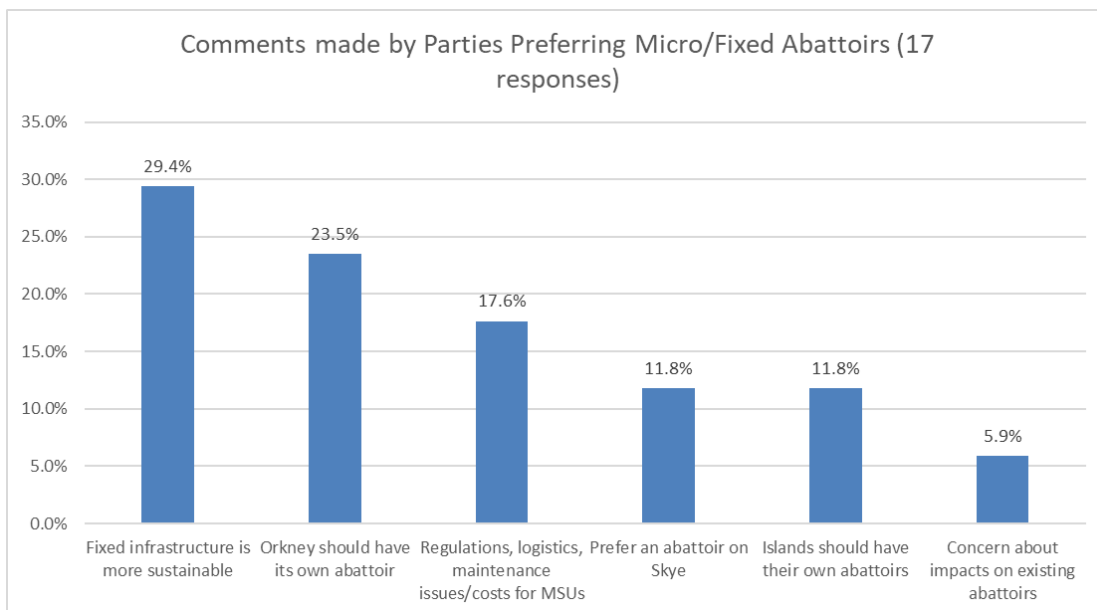


Figure 17. Summary of additional information given for parties preferring micro-fixed abattoirs to MSUs.

Further points of consideration that arose during a Meeting with the NFUS (Less Favoured Areas)

The focus of the meeting was around the potential viability and demand for MSUs, however some miscellaneous points of interest were also made, which are summarised below:

- An EU-funded trial using an English MSU was carried out in Skye in the 1990s, near Portree, further details provided earlier in this report.
- It was commented that Orkney was an interesting case in point, having the highest density of cattle in Europe and would require an MSU to visit weekly. It was considered that whilst there was a demand for slaughter provision on Orkney, there was limited interest on Orkney to re-vist a static abattoir. The representative was aware that there there was some limited demand for an MSU on Orkney, but he believed that the vast majority of farmers would choose to continue to transport cattle down to Dingwall. A meeting was also held in Orkney (see section 5.4.4 of the main report)
- In Shetland it was mentioned that a vet flies out to the islands every two days – this was given as an example of the costs that are incurred, however, it should be noted that this is addressed to a great extent later in the report, following discussions with FSS, where it was commented that abattoirs with low throughputs receive 85% discounts of OV and MHI fees.
- Regulatory burden stated consistently as a barrier (including incoming CCTV requirement).
- In addition concerns were raised about the ability to get licenced slaughterman/ OV willing to travel.
- It was commented that the Forestry Commission used cold stores, and there was a question about whether this infrastructure could be used collaboratively with future MSU operations.
- There was concern regarding the potential impacts on small and island abattoirs (mull and Shetland specifically mentioned), there was a preference for any money that might be available to be spent on the existing infrastructure, rather than for an MSU, which might impact on the viability.
- It was stated that the Mull abattoir services the mainland as well as several other islands. However, it was reported that there were significant waits for the service, therefore indicating that there is sufficient demand for extra provisions.
- Would prefer to see more local, rather than mobile abattoirs, it was mentioned that there was more demand for local meat e.g. through the co-op, etc. However, there were approximately 5 or 6 farmers that would consider using an MSU.

Summary of ad hoc discussions with farmers

Table 21. Summary of ad hoc discussions with farmers about MSUs

Farmer Description	Comments about MSUs
Cattle, sheep and pig farmer, Kincardineshire.	<p>150 head of cattle, 100 breeding ewes and a small number of pigs. Very supportive of the MSU concept, and would use one, if it offered its service in the locality.</p> <p>Wants a private kill and cannot get this service from the local abattoir, which is located in close proximity to the farm – instead is currently sending animals to Grantown-on-Spey (90 miles).</p> <p>Animal welfare is of huge importance and does not want to send animals over this kind of distance.</p> <p>This farmer runs a high health scheme farm and although would be happy for an MSU to come to his farm, would not want to act as a hub for others unless they were also of a comparable high health status.</p> <p>Charged £75 to kill a pig recently, plus a £60 haulage charge to Grantown, plus £50 for the carcase (sides) to come back. i.e. £185 in total.</p>
Goat Farm, Moray	<p>Farm goats, sheep and alpacas.</p> <p>Send animals to Scotbeef in Inverurie (40 miles) and Dingwall (67 miles).</p> <p>Their breed of goats (a premium brand) do not travel well and are easily stressed. The quality of meat from stressed animals is reduced. They had 350 to 400 animals slaughtered last year.</p> <p>Although supportive of micro abattoirs and MSUs, is not sure how the latter would work for them – they have a continuous, weekly kill requirement, which may mean that a micro abattoir would make more sense. In total are looking at 12 animals being killed per week. If a docking station-MSU system could service this then there would be interest.</p> <p>Commented that once the new Scotbeef abattoir opens and the old one closes, they will no longer be taking goats. At the moment they are acting as a conduit for many farmers' private kill, because of the frequency of animals being sent for slaughter.</p> <p>Commented that Miller's at Grantown are stopping private kills. Also mentioned that there are 26,000 farms in Scotland less than 10 hectares (not sure how many with animals), but that the country is a nation of smallholders, with many benefits that result from this, but the closure of abattoirs is having a huge impact.</p>
Sheep farmer, Moray	<p>Sheep farmer with 200 head. Nearest slaughterhouse is in Grantown-on Spey (Miller's), which do not do lamb. Sends animals to Scotbeef in Inverurie (40 miles) and Dingwall (67 miles).</p> <p>It costs circa £160 per animal for haulage and kill. Lambs are around 50% of this cost.</p>

	Local farmers are supportive of the MSU model (the farmer has investigated this as a potential operator in the future).
Sheep farmer, Caithness	<p>A sheep farmer who has investigated the potential for establishing an MSU and who currently sends animals to Dingwall for private kill (50 miles journey).</p> <p>Has engaged with many farmers in the surrounding area and there is significant interest in using an MSU.</p>
Cattle and pig farmer, Gigha	<p>This farmer is currently sending cattle and pigs to an abattoir in Carlisle, which although it is further than those in the central belt offers a lower cost service, because of a relationship (friends/family) which means that carcasses are returned at no/little cost. The abattoir charges a total of £500 per carcass returned, broken down as £40 transport, £70 kill, £350 for carcass plus the levy. The cost would be more or less the same to Paisley, plus the cost of getting the carcass returned. Pigs cost £250 each for the kill and carcass, excluding transport costs (to/from Carlisle). The farmer believes that he and other farmers could finish their animals on grass in the west, rather than in the east coast, to tie in with an MSU service.</p> <p>The farmer would be very much interested in using the services of an MSU, and has suggested that a docking station located in the Kintyre peninsula, not far from where the ferry arrives (Tayinloan) would be one which he and many of his neighbouring farmers would be very interested in using. Such a location would also mean that it is well suited for farmers further to the south (e.g. Campbeltown area) to use.</p>
Cattle and sheep farmer, Borders	<p>This farmer runs a 600-acre mixed organic, animal/arable farm, with on-farm butchers. They are highly motivated to support local services where possible. They have 140 sucklers, 30 free-range sows and are using store lamb and mutton ewes 450 lambs per year). Their weekly need, for an MSU to service, would be 8 pigs, 8 lambs and two cows. The abattoir they use currently charges £300/week for the kill of these animals, and the delivery back to the farm of the carcasses in a refrigerated vehicle. Their delivery company charges them a total of £100 per week, the costs shared with other neighbouring farms.</p> <p>They are currently sending cattle to Jewitts Abattoir (near Middlesbrough), which although it is further than others in Scotland, provides a dedicated organic line and a good service. However, it also takes around 3 hours to travel to the abattoir, and a more local option would be welcomed. They currently receive carcasses back from this abattoir which are in turn butchered at the farm for sale to high-end restaurants across the UK. They are sending between 80,000 to 100,000 Kg of meat to their butchery for processing every year. They have their own hanging room and chill facilities, but would need to build a separate chill for an MSU service.</p> <p>They believe that meat quality is greatly enhanced by reducing the miles travelled, and therefore stress and would welcome an MSU</p>

	to their farm. They would be less interested in being a docking station for other farmers to use, because of biosecurity concerns, but would be happy to take their animals to well-known, trusted, neighbouring farms for slaughter, or to the nearest mart at St Boswalds (for example), 45 miles away.
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**APPENDIX 3: Stakeholder Engagement Data -
Butchers, Abattoirs and Wholesalers**

ENGAGEMENT WITH BUTCHERS AND THE SFMTA

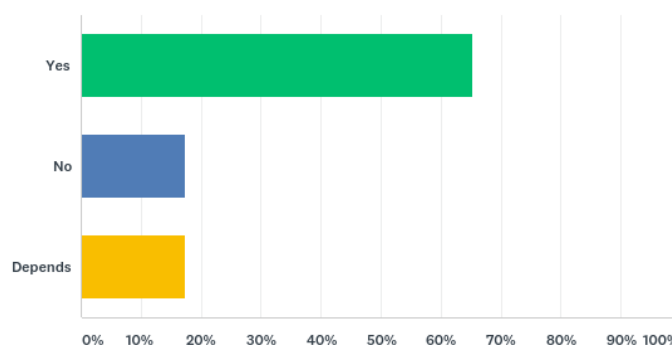
Overview

The Scottish Federation of Meat Traders Association (SFMTA), otherwise known as “Scottish Craft Butchers” represents butchers (including those associated with abattoirs) in Scotland and has approximately 400 members. Following a meeting with the organisation in Perth a news article on this feasibility study was written and sent to members in July 2019, to raise awareness of the project. This was emailed to members, published on the website and issues as a hard copy. Following this, an online survey was later emailed to all members.

There were 23 responses to the survey, with the anonymised results provided a summary of the key questions is provided below. It should be noted that the majority of respondents were positive about the introduction of an MSU in Scotland.

Survey Responses

Q3 Do you believe that there would be customer demand for locally sourced, traceable meat arising from the mobile abattoir?

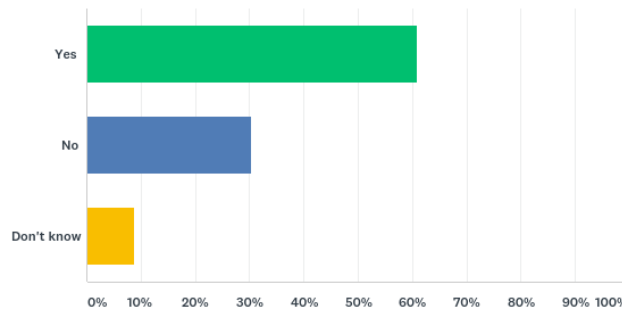


In addition to the above answers, respondents were able to comment on this question, with a total of 17 of the 23 doing so. The viewpoints, positive and negative, are provided below verbatim:

- *We are constantly looking to be more transparent in the traceability of our products. A mobile abattoir would provide this.*
- *Less food miles. Much less stress for the animals. Cost implications. Satisfying a great local need.*
- *All my customers are concerned about animal welfare and the current situation is terrible.*
- *There are only a few small abattoirs in Scotland that can cater for butchers contract kill, with the larger processor abattoirs NOT interested in supplying a slaughter service to the butchers trade.*
- *Nice idea but impractical, re chilling and physically handling carcass.*

- *The most simple and cost effective solution is to provide dispensations to the absurd level of regulation applied to abattoirs, whether they're killing a beast a month or a minute.*
- *Yes ... but it is a only a possible solution for more outlying remote areas. More new small regional abattoirs are crucially needed.*
- *Facilities already in place that need support from Scottish Gov*

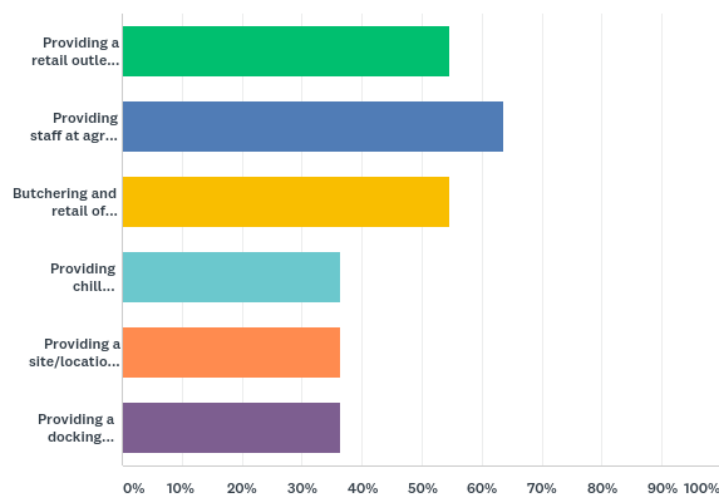
Q4 Do you think mobile abattoirs have the potential to provide farmers and butchers with a value added service, by providing private kill and traceable meat products?



Summary of feedback, from 7 respondents, shown below:

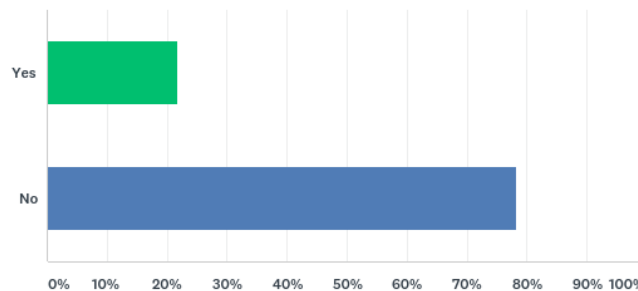
- *From feedback, farmers would rather dispatch of their beef cattle on their own farms rather than using abattoirs or selling at market. Both of which are stressful for the animals and upsetting for the owners to watch.*
- *My stock travel 120 miles to the nearest slaughterhouse.*
- *Do normal abattoirs not do that already?*
- *But it is very hard to achieve any level of efficiency with mobile abattoirs - i.e. kill costs will always be prohibitively high*

Q5 Please indicate below if you would be interested in finding out more about any of the joint-working/collaborations below for a future mobile abattoir service:



It should be noted that only 11 of the 23 respondents answered this question, which would appear to indicate that the remaining 12 respondents would not be interested in further information. Three respondents opted to leave a comment – the three comments were very positive.

Q6 Would you have any concerns that a mobile abattoir may have a potential impact on the viability of your current business?



Respondents were given the option of providing additional comments regarding the viability and sustainability of a mobile abattoir operating within Scotland. 15 of the respondents provided a comment, these are provided below:

- *I think it should be self financing and not be subsidies or be given 'grace' on inspection charges. It must be given the same charging system as rural abattoirs*
- *As stated above. located in areas further away form existing Abattoirs.*
- *Any mobile abattoir would need to have capacity to hang beef and deliver to shops*
- *The decline in the offering of a 'private kill' service in Scotland is on an alarming downward trend. This needs reversed. Money would be better spent supporting micro static systems rather than the significant additional costs of a mobile unit and its docking stations etc.*
- *My impression of a mobile abattoir is what we see online from the States where a beast is shot with a rifle then the carcass is prepared outdoors on a hoist at the back of a vehicle. Rarely does it give a good impression.*
- *I think the abattoirs that are left do a great job but find it hard enough to keep going without cutting there throughput with introducing mobile “pop up” ones*
- *Having looked into this and spoken to Canadian operators I cannot see how mobile abattoirs are the solution to the drastic shortage of kill options in Scotland. They are not easy to work in - too many compromises resulting from the mobile aspect, no chill facilities and slow throughput. I feel (Government) support for established small regional abattoirs is essential and seriously lacking at present.*
- *Like all businesses I would be concerned if there's enough footfall for this service*

- *As long as mobile abattoirs are keeping high welfare standards for our livestock, and less stress for the animals in their final moments, I think it's a fantastic idea and one I can see being very favourable. I would much rather my beef cattle were dispatched quickly at home, than being transported to a stressful environment. Better welfare, happier animals, better beef!*
- *My business is on the border and my nearest abattoir is at Durham, a mobile unit has to be better than the current situation*
- *I would very much appreciate discussing this further as we would be the type of business that would suffer because of this.*
- *Current abattoirs are either getting more and more industrial or closing altogether leaving a big gap for smaller businesses and farmers.*
- *whats the prices of killing*
- *Mobile abattoirs could be good for northern out reaches, but down in the southern lands it would not be a good idea and could have a detrimental effect on our current abattoir*
- *Would be very desirable from a carbon footprint angle*

It should be noted when reviewing the results and comments that some of the butchers responding to the survey also had links to abattoirs.

Direct Engagement Results

In addition to the previous survey of butchers a summary of a meeting and telephone discussions is provided in the table below.

Table 22. Summary of Butcher Engagements

Abattoir	Comments
Scott Brothers, Dundee	<p>Provenance is important and for butcher shops this is a growing business opportunity, with increasing numbers of customers looking for this.</p> <p>The bigger abattoirs are increasingly tied in to the supermarkets making local/private kill increasingly difficult.</p> <p>Supportive of MSUs – the more it is considered, the more it makes sense.</p>
S.A. Mackie Butchers, Aberlour	<p>Has looked at the potential for setting up an MSU, with a site visit to Finland to inform this. Considered/considering AN MSU with a small chill, taking the carcasses to the main chiller – considering this at the farm.</p> <p>Also a sheep farmer, as well as a butcher. Would be interested in private kill for wholesale plus own retail sales.</p> <p>Local farmers are described as being supportive.</p> <p>Conversation with SEPA was negative with waste indicated as being very difficult to control.</p>

ENGAGEMENT WITH ABATTOIRS AND TRADE BODIES

Overview

The Scottish Association of Meat Wholesalers (SAMW) facilitated engagement with its 20 members (abattoirs and wholesalers – membership does not include the island abattoirs, Downfield and Hardiesmill). A meeting with SAMW Council members took place in September 2019 and feedback from a number of abattoir operators was provided at this. In addition, SAMW emailed the link to an on-line survey asking for views about the potential of MSUs.

Individual, direct engagement (meeting/calls) took place with the following operators:

- Hardiesmill Abattoir
- Mull Abattoir
- Munro's, Dingwall
- ABP Perth
- Scottish Island Abattoirs Association

Contact was also made with Downfield Abattoir, however no response was obtained at the time of compiling the draft report.

A summary of the survey results and discussions is provided in the following sections.

Survey Responses

Only three out of twenty SAMW members completed the online survey, with another abattoir contributing in a telephone conversation (i.e. feedback provided by four in total). Because of the small numbers the results for the responses from these abattoirs are shown most easily in a summary table.

Table 23. Summary of online survey responses from SAMW members (abattoir operators)

ID	Questions	Answers	
		Yes	No
A	Is your facility operating at or near full capacity?	0	3
B	Does your abattoir offer private kill?	3	0
C	If you do not offer private kill would you be interested in doing so in the future? (ignore if not applicable)	N/A	N/A
D	Does your abattoir hold organic certification?	1	2
E	If you do not offer an organic service would you be interested in doing so in the future? (ignore if not applicable)*	3	0

F	What is your overall view on the potential value of a mobile abattoir service targeting specific parts of Scotland in the future?*	Neutral - 2	Negative - 1
G	Do you believe that a mobile abattoir service would significantly impact on your business?	0	3
H	Would you be interested in exploring potential opportunities concerning collaboration or co-location of a mobile abattoir, at your abattoir (to support private kill as an example)?	1	2

The following comments were made by the abattoir operators as a follow-up to their responses provided above.

- Question E: It should be noted that the two abattoirs that do not currently hold organic certification, indicated that they would be interested in doing so in the future if there was a demand.
- Question F: Two comments provided by the operators:
 - *As such a service is available in other countries it appears possible to do so in Scotland however as the regulatory cost burden that all meat processors are obliged to pay is significant and unique to the meat sector, in my view is not financially viable with a large element of public subsidy.*
 - *I believe it would need to be heavily subsidized*
- Question G: Two operators provided comments on this question:
 - *Every animal killed in a mobile abattoir is one less killed in a static facility, seriously undermining the viability of the few remaining plants. Our location (name removed) is a prime example. HOWEVER, if WE operated a mobile abattoir one day a week/fortnight, using our staff and by-products disposal facility, then there would be positive benefits.*
 - *Number of stock "lost" would be minimal.*

Direct Engagement Results

The table below provides a summary of the direct engagement with SAMW members and other abattoir operators.

Table 24. Summary of direct engagement with abattoir operators

Abattoir	Comments
SAMW	SAMW commented that there was felt to be limited interest amongst members in setting up a mobile abattoir due to concerns about economic viability and farmer loyalty. It was mentioned that the majority of members were investing in current sites, rather than setting up satellite operations. Private kill was identified as a significant issue for SAMW members, however the organisation does not feel that MSUs are the solution. SAMW

	<p>would prefer to see an organisation (possibly a mart or organisation with a passion for local food) established. The organisation would co-ordinate local farmers to enable animals to be bulked up for on-ward processing at the abattoir. The meat could then be re-distributed back to farmers. It was also stated at the meeting that abattoirs could offer a private kill service if it was required.</p> <p>In addition, SAMW would like to see research on consumer demand, is there a sufficient demand for premium meat, and if there is, how much more are customers willing to pay? Would this premium cover the additional costs of the mobile abattoir or would it be reliant upon state subsidies³⁶.</p> <p>At the September Council meeting it was confirmed by those attending (7 operators) that MSUs were not considered to represent a threat to their businesses.</p>
Scottish Islands Abattoirs Association	<p>Supportive of MSUs, but not to the detriment of small abattoirs, for example, as operating on islands, not so much concerned about MSUs taking away business, but more concerned about subsidies going to MSUs.</p> <p>Would like to see the Scottish Government view both small abattoirs and MSUs in terms of the local services they can provide.</p> <p>Getting the right operating model is key e.g. private, co-operative, etc.</p> <p>Believe that farmers need an “affordable service”; the challenge will be how to make the MSU affordable with its lower throughput.</p> <p>A potential issue of de-boning meat was raised, plus the value of meat (due to imported vacuum packed meat).</p>
Hardiesmill Micro-Abattoir	<p>Providers of top-end beef (institute of masters of beef) and can charge a premium price for their product, which helps to cover the costs of running a micro-abattoir. Very aware of quality and consistency, and welfare was a top concern.</p> <p>Considered an MSU approximately 5 years ago, but ruled it out due to the following reasons:</p> <p>Significant costs (they were quoted 6million Euros). Political landscape was not supportive.</p> <p>Roads/access to farm.</p> <p>Previously had to consult with 11 statutory bodies - decided to simplify things and look at a micro-abattoir approximately 4.5 years ago - became fully licensed in December 2018. First on-farm micro abattoir for cattle in 25 years.</p> <p>Gravity and height are big issues that need to be overcome for MSUs</p> <p>Regulatory bodies very helpful, however very time-consuming.</p>
Munro's of Dingwall	<p>Any business that takes animals away from their business could be considered a threat. They provide service covering a 100 mile radius, and</p>

³⁶ Enscape have not been able to source UK based customer demand research to date. However the Australian research referenced by Provenir will be requested (if not commercially confidential).

	<p>centralised facilities, with the infrastructure already in place are an efficient set up.</p> <p>Cutting services in an MSU won't be possible because of the hanging requirements</p> <p>Although a centralised facility can provide the required service, it is understood that animal welfare (haulage distance) concerns can be better met by MSUs. They would be interested in operating such units, if this was to prove to be the way forward for more rural communities.</p> <p>Private kill is offered, with meat going back to butchers in Fort William, Inverness etc.</p> <p>The docking station idea is a good one., and using marts in particular makes sense – lairage and animal handling skills in place.</p> <p>Chill facilities at their site are usually full, and chill capacity/requirements would need to be understood.</p> <p>Waste is expensive to manage – believe that the unit would need to bring this back to the abattoir, where it would be consolidated with other waste for an effective cost per tonne (cost information provided).</p> <p>Estate deer larders – could providing collaborative opportunities? (with cutting plant and chill facilities).</p>
ABP Perth	<p>MSUs not viewed as a threat to the business.</p> <p>Fish processing facilities, located in many rural locations – could these provide a collaborative opportunity?</p> <p>May be value in considering how mobile units could work in collaboration with existing abattoirs, e.g. rather than the mobile unit doing the kill, they could be small, refrigerated vehicles providing a haulage service for carcasses or primary/retail cuts. This could address some of the OV requirements and associated costs.</p> <p>Is there potential for MSUs to have synergies with island abattoirs?</p> <p>The company does provide private kill, but it is not advertised and poses logistical challenges.</p> <p>Manning an MSU could be a challenge, asking people to be away from home for a number of days at a time.</p>
Mull Abattoir	<p>Not supportive of MSUs, principally because of the potential they have to take business away from island abattoirs, such as Mull's</p> <p>There are also concerns about any future public subsidies being paid to support the development of MSU infrastructure, rather than small/micro abattoirs, which are in great need of support.</p>
Shetland Abattoir	<p>The Shetland abattoir is run as a co-operative. Shetland charge £12 to slaughter a sheep, however private facilities are significantly more expensive. Provided a link to a benchmarking report for the Island abattoirs, which has been reviewed and will be referenced in the final report.</p>

	A key market for is a niche French restaurant in Edinburgh who was looking for their rare breed in a recipe. Great selling point for both the restaurant and farmer.
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ENGAGEMENT WITH OTHER STAKEHOLDERS

The following table summarises the results of engagement with a range of other organisations, operating with relevant, but different objectives and aspirations in terms of the scope of work of this project.

Table 25. Stakeholder engagement summary

Organisation	Comments
TRADE AND SECTOR ORGANISATIONS	
British Meat Products Association	<p>Considered an interesting idea, however, would be difficult to compete commercially with the large companies that are processing 7,500 cattle per week, 60,000 sheep per week etc. The large abattoirs are looking for big production runs, however they are not set up for private kill and this could be a niche for the MSU.</p> <p>Due to the low volumes, more waste may actually be generated – if there are only 3 or 4 hides, they would be uneconomical to transport, and therefore an MSU may have fewer opportunities for generating additional income.</p> <p>Managing the 5th quarter economically will be tricky.</p> <p>“Docking stations” seen as a positive, because of the shared infrastructure/ vets - plus higher throughput if farmers coming to the MSU. Believe it will be more economical if only looking at cattle and sheep. Pigs could present an issue, would require hot water for scalding at a constant 60 degrees. Could hand-scrape pigs, if there was someone with the skills. The “average” farmer would not be able to cope with a quarter of beef (as an example); likewise, removing the shoulders from sheep is not easy. Would need to have butchers involved in some form.</p> <p>Raised the potential of having a butcher shop at the MSU to provide farmers with the option to brand their meat as a co-operative, rather than individually.</p> <p>Thought that there would be a demand in Scotland for high premium meat.</p> <p>Not aware of any members exploring the option of an MSU.</p>
Humane Slaughter Association	<p>Recently presented to the “St George’s house consultation” which looked at on-farm and local slaughter provision. Presented “against” mobile abattoirs not because unsupportive of them, but due to the economics³⁷. Loyalty and commitment are key to establishing a viable MSU.</p> <p>Food provenance is a key issue, difficult to achieve with large abattoirs.</p> <p>There is an assumption that smaller is better for animal welfare, however this is not necessarily the case.</p>

³⁷ Reports are available.

	<p>Approximately 130 abattoirs in the UK, technically, capacity exceeds demand. However, aware of the impacts of seasonality impacting on capacity, which may support an MSU.</p> <p>Based on professional experience, “four docking units within 100 miles, with a group of farmers that are loyal and committed”, with meat transported to a central facility for processing, could be the most viable option.</p>
Scottish Agricultural Organisation Society (SAOS)	Supportive of the project and interested in sharing data.
Institute of Auctioneers and Appraisers in Scotland	Several attempts at contacting this organisation were made – no response.
The Princes Countryside Trust	The Trust was contacted with the aim of understanding the findings of their work looking into island abattoirs. A July meeting presenting the findings of their work, attended by Scottish Government, with feedback provided afterwards. Report published, with reference to MSUs in one paragraph, expressing concern about their potential impact on island abattoirs.
Nourish Scotland	<p>Discussion about animals being sent to England – there is a significant economic case to be addressed.</p> <p>Co-location sound good.</p> <p>There is a demand for local (provenance known) meat sales, but this is not quantified other than individual company sales.</p> <p>A co-ordinated marketing approach is needed to encourage local meat sales, hence private kill to deliver this.</p> <p>Pointed to the report: “The Future Demand for Smallholdings in Scotland – An Assessment).</p>
Department of Animal Environment and Health, Swedish University of Agricultural Science	<p>The department had recently conducted research into animal welfare and meat quality based on the slaughter of over 300 animals at the Halsingestintan MSU and a static abattoir within Sweden (the formal research papers are currently being written up, however there is a summary paper available)³⁸. The researcher outlined that the key findings were:</p> <p>The use of “permanent installations” e.g. docking stations are useful for ensuring calm animals. Several farms visited by the MSU were being visited by the MSU for the first time and the infrastructure was temporary and not necessarily appropriate. Layout, driveways, etc are essential in keeping animal stress levels low.</p>

³⁸ Swedish University of Agricultural Sciences, “Is Mobile Abattoir Beneficial for Meat Quality?”, Katarina Arvidsson Segerkvist, Jan Hultgren, Karin Wallin, Anne Larsen and Anders H. Karlsson*, SE-531 32 Skara, Sweden http://icomst-proceedings.helsinki.fi/papers/2018_11_26.pdf

	<p>The animal handling/ movement was better by trained abattoir staff, rather than farmers (who were typically responsible for getting their animals to the MSU). It was noted that the farmers had received no training in how to move an animal and that this is possibly better done by trained personnel. However, transport to the static abattoir was not covered by the research, and this is likely to have had a significant impact on cattle slaughtered at the static abattoir that has not been measured.</p> <p>Overall, the time from stunning to sticking was longer at the MSU than at the static abattoir, which may be explained by inappropriate stun box design and difficulties to shackle stunned animals rapidly enough.</p> <p>Ten percent of the animals were reshot at the MSU, which was higher than the static abattoir. Again, changes to the layout of the MSU may have helped to lower this.</p> <p>In terms of meat quality, the research looked at colour, pH, tenderness and water-loss. Overall the meat was more tender from the MSU, however this is believed to have been due to the MSU utilising an alternative form of hanging (animals hung from pelvic bones). The MSU adopted this form of hanging because it is known to produce very tender meat. Therefore, difficult to identify whether the changes to the slaughter process had an impact on meat quality.</p> <p>Based on the research to date, it cannot be concluded that animal welfare or meat quality is generally better with one or other way of slaughtering.</p> <p>The researcher indicated that the MSU operator had been very interested in exploring novel, high value outlets for their 5th quarter products e.g. medicines, pharmaceuticals, etc.</p>
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APPENDIX 4: Regulatory Review Data

REGULATORY REVIEW

Overview

Recent abattoir closures in Scotland have been considered in the context of the extent to which regulations impacted on these (discussion with Scottish Government) and there are varying degrees of influence in terms of how these could be viewed to having been impacted with no specific common thread. This section of the report considers the impacts, opportunities and areas of uncertainty in terms of how existing regulations may impact on the viability of mobile abattoir infrastructure operating in Scotland in the future.

The regulatory review is split into two steps:

- Desk-based research to identify questions/matters to be subsequently covered with the key stakeholders.
- Engagement with the key stakeholders responsible for implementing regulations, policy and developing this in the future.

The FSS website provides a full list of the pertinent legislation with respect to relevant regulations³⁹ which do not need to be repeated here, but for indicative purposes the following represents a significant body of these regulations with respect to MSU operations:

- Welfare of Animals (Slaughter or Killing) Regulations 1995
- EU Regulation (EC) No 853/2004 laying down specific hygiene rules for food of animal origin
- Animal Health and Welfare (Scotland) Act 2006
- Food Hygiene (Scotland) Regulations 2006
- Cattle Identification (Scotland) Regulations 2007
- EU Regulation (EC) No 1069/2009 laying down health rules as regards animal by-products and derived products not intended for human consumption (Animal by-products Regulation)
- EU Regulation (EC) No 1099/2009 on the protection of animals at the time of killing
- Transmissible Spongiform Encephalopathies (Scotland) Regulations 2010
- Welfare of Animals at the Time of Killing (Scotland) Regulations 2012
- Animal By-Products (Enforcement) (Scotland) Regulations 2013

It should be noted that Regulation (EC) 1099/2009 on the protection of animals at the time of killing which came into force across Europe on 1 January 2013 involved some measures in relation to layout, construction and equipment in existing slaughterhouses which do not come into effect until December 2019. Although written for England, the DEFRA Information Note “Welfare of Animals at the Time of Killing in England” has a

³⁹ FSS, webpage:

summary of the implications. For illustrative purposes, some of the areas impacted by this include stunning methods, lairage facilities, restraining equipment, slaughterhouse approvals, etc.

There have not been discussions with the British Veterinary Association (BVA) and Veterinary Public Health Association (VPHA) as part of this project. However, reference is made here to a joint response to the UK All-Party Parliamentary Group for Animal Welfare (APGAW) abattoir provision enquiry (in March 2019) which stated the following, in terms of its position on mobile abattoirs (emphasis added is ours):

- “We are aware that stakeholders are currently exploring the feasibility of mobile abattoirs as a means to increase local abattoir provision.
- BVA is supportive of exploring options to provide more opportunities for farm animal slaughter as close to the point of production as possible, in turn reducing the need for animals to be transported over longer distances.
- The role of mobile abattoirs should be further explored to create more opportunities for on-farm slaughter of animals destined for human consumption.
- Mobile abattoirs would need to comply with current legislative requirements for animal health and welfare at slaughter, biosecurity, food safety and hygiene checks, including ante- and post-mortem inspections performed by Official Veterinarians. In addition, there would be a need for safe lairage facilities, a potable supply of water, facilities for the disposal of animal by-products, as well as suitable facilities for the dressing and movement of carcasses.
- As emphasised in the above section, any growth in mobile abattoirs should not represent a downgrading of animal health and welfare or public health standards and we could only support the use of mobile abattoirs where appropriate supervision from Official Veterinarians was in place.”

The aspects underlined above, very much related to the operational aspects of any future mobile abattoir service, are used as the headings in the next section, to focus this review of regulations.

The views of other potential key stakeholders, such as QMS, Soil Association and the Scottish Organic Producers Association (SOPA) are also provided for further information, to offer a range of views in terms of requirements, not only in terms of regulations, but to meet the standards of these organisations. The Soil Association and SOPA are included because they have the potential to reflect niche supply chain drivers that could support future mobile abattoir development.

Desk-based Assessment of Regulations and Standards

Animal health and welfare at slaughter

Two key regulations in this context are:

- The Welfare of Animals at the Time of Killing (Scotland) Regulations 2012
- The Welfare of Animals (Transport) (Scotland) Regulations, 2006

There are arguments, and a range of online publications, from a number of parties, that mobile abattoirs are more likely to facilitate higher animal welfare, in particular related to the transportation distances. The “Soil Association Standards - Abattoir and Slaughtering, Version 18”, in terms of “arrival and unloading” describes a key statutory welfare requirement:

“Slaughterhouses must have suitable equipment and facilities for unloading animals. Animals must be carefully unloaded from vehicles as soon as possible after they arrive. The welfare and health of animals must be assessed upon arrival in order to prioritise those animals with specific welfare needs. If an animal has been injured during transportation and cannot be unloaded without causing it pain, it must be humanely killed or slaughtered on the vehicle, using an appropriate emergency method.”

The standard mentioned above, in terms of “stunning and killing equipment” summarises a key statutory welfare requirement below:

“Any method of stunning used must cause an animal to lose consciousness immediately without distress and remain unconscious until the animal has died from blood loss. The WATOK and EC Regulation 1099/2009 stipulate the permitted methods of stunning or killing animals and lays down specific requirements for their operation. The Soil Association standards require that all animals are pre-stunned before slaughter and also set higher requirements for the gas killing of pigs.”

The guidance “Red meat slaughterhouses: unloading, handling and holding animals⁴⁰” describes the methods to be used, relating to the above. An understanding of the procedures to be followed comes from having trained/qualified personnel in place, however, there are design and logistical aspects that are emphasised here, because locations which are intermittently involved in animal slaughter have different challenges. Areas for consideration in this respect include:

- Responsibility – the slaughter site will be managed by a local party (farmer, abattoir, butcher etc) who must co-ordinate with the veterinarian, producer and MSUs, with systems in place which manage situations such as severe weather, break-downs (of the MSU vehicle), sickness (e.g. of the OV), etc.
- Set-up – an additional consideration which will require familiarity, developed over time, which fixed facilities are potentially less challenged by. For

⁴⁰Source: <https://www.gov.uk/guidance/red-meat-slaughterhouses-unloading-handling-and-holding-animals>

example, to have additional bedding if animals remain in lairage for 12 hours or more).

- Timing – procedures need to be in place to manage issues that develop, for example:
 - If animals arrive before the MSU does, and/or the OV.
 - Emergency slaughter requirements, with timing issues complicating this.

Many of this issues referred to above can be mitigated against by employing a docking station approach, where the locations visited by MSUs are familiar, and in effect are part of the operational and management framework for the MSU business – with scheduled, repeat business and visits on an ongoing basis.

Biosecurity

The following are highlighted as examples of where there could be particular impacts in terms of MSUs compared to fixed facilities:

- Disease outbreak
- Dirty livestock

The guidance “Controlling disease in farm animals⁴¹” states:

“Meat from establishments where a disease outbreak is suspected or confirmed may not enter the human food chain. Instead, it must be disposed of by slaughterhouses as a Category 2 animal by-product, i.e. high-risk material containing potential contamination.”

Observations/questions related to the above are indicated below:

- The potential to have MSUs at farms may be considered a risk, in terms of the impact on the rest of the animals - measures to mitigate against potential impacts, perceived or significant, would need to be developed.
- There is some published data indicating that the slaughter of animals locally, rather than moving them over larger distances to fixed abattoirs, may be a positive development in terms of traceability, identifying the source of diseases, and speeding up the process of addressing the issues and mitigating against their spread and severity. The Swedish and Australian case studies both discuss how they use the mobile abattoir to provide the consumer with information on what farm the meat has originated from. This is a key selling point (QR codes): “Utilising the latest traceability technology, our digital provenance platform connects you with the origin of your food. A simple scan of the QR code reveals insights into the true provenance of your beef; the breed of cattle, the land on which it was raised, how it was farmed and by whom.”⁴²

⁴¹Source: <https://www.gov.uk/guidance/controlling-disease-in-farm-animals#biosecurity-and-disease-control>

⁴² <https://provenir.com.au/about/#sixstar>, Same procedure used (developed by Halsingestintan)

With regards to traceability, and managing the cleanliness of animals presented to abattoirs, the QMS “2018 Cattle & Sheep Standards Quality Meat Scotland Assurance Scheme” provides an example of action with implications for brand eligibility, stating:

“Traceability of product is key and checker systems are available to farmers, auction markets and abattoirs, for determining the brand eligibility of Scotch assured livestock. For members’ information, abattoirs receiving dirty livestock may report this to Trading Standards or Animal and Plant Health Agency (APHA) and according to industry feedback, improvements are needed in the presentation of clean animals for slaughter.”

Observations/questions related to the above are:

- Because of their much smaller size and confined spaces, the importance of animals being presented “clean” to MSUs may be even greater than to fixed infrastructure and therefore awareness-raising, pre-haul procedures may need to be considered.
- In addition to the above, it should be noted that in terms of the Scottish Organic Producers Association (SOPA) publication, “SOPA Standards for Processors, Importers & Animal Feed Compounders Section 12 – Abattoir Standards” there would appear to be no further information (in addition to the regulations) provided, with respect to additional biosecurity requirements.
- The Soil Association Standard (Abattoir and slaughtering Version 18) appears to make no additional, specific mention of biosecurity requirements.
- Should an animal/ meat be considered by the OV as being unsuitable for human consumption during the ante/ post hygiene check, there are considerations that would need to be addressed on how to keep the animal/ meat separate.

Food safety

There is now a body of research that describes improved meat quality associated with animals that have been slaughtered locally, where stress associated with haulage over significant distances is avoided, however it is difficult to describe, at this point in the project, aspects of MSU operations that are likely to improve food safety standards. However, this is an aspect of the work which will receive some focus.

In terms of effective operational measures, the 2008 FAO report on Abattoir Development describes how:

“Effective process control in abattoir operations on the basis of Good Hygiene Practices (GHP) and Hazard Analysis and Critical Control Point Schemes must be the ultimate target to be achieved.”⁴³

Hygiene checks, ante and post-mortem inspections by OV's are requirements of the industry.

This review has identified that recruiting and retaining suitably qualified staff has been an issue for the operation of MSUs. Discussions with two stakeholders (Purdis and Abattoir Equipment Supplies) have indicated that they are hoping to operate MSUs with two members of staff (Purdis have stated that one member of staff would be an animal health inspector). Several consultees have indicated that the requirement to have a vet on site was an economic restriction, however, as described elsewhere in this document, low throughput facilities have significant discounts applied to OV and MHI costs, and their contribution to the overall operational costs is minimal (see the cost benefit analysis later in this report).

Key to delivering the required food safety standards is therefore the competence of the members of staff and in 2013 new EU legislation came into force, introducing Certificates of Competence (CoC), replacing slaughterman licences issued under the “Welfare of Animals (Slaughter or killing) Regulations 1995 (WASK). The implementing regulations in Scotland were “The Welfare of Animals at the Time of Killing (Scotland) Regulations 2012.”

In terms of food safety, a review of SOPA and the Soil Association standards indicated the following:

- SOPA Standards for Processors, Importers & Animal Feed Compounders Section 12 – Abattoir Standards” - no specific mention of food safety.
- Soil Association Standards Abattoir and slaughtering Version 18 - Only references to safety are with respect to lairage, cleaning chemicals, bleeding, sticking and monitoring.

Safe Lairage

There are many, key statutory welfare requirements in terms of lairage, including⁴⁴:

- Animals not taken directly to the place of slaughter must be kept in lairage, for as short a time as possible and slaughtered without undue delay. Every animal should be protected from adverse weather conditions and provided with adequate ventilation. Every animal kept in the lairage must have enough space to stand up, lie down and turn around without difficulty.
- Water must always be available to all animals in the lairage. Any animal that has been on the site for 12 hours or more must be provided with food, for organic animals this must be organic feed. If animals are kept in the lairage for more than 12 hours, they must be given bedding (such as straw), or

⁴³ FAO, 2008, Abattoir Development – Options and Designs for Hygienic Basic and Medium-Sized Abattoirs. Source: <http://www.fao.org/3/ai410e/AI410E08.htm>

⁴⁴ Extract from Soil Association Standard

equivalent material (such as rubber slats), suitable to the species of animals, their number and what they are accustomed to.

- The condition and state of health of every animal must be inspected at least every morning and evening by a competent person. Any animal judged to be experiencing pain for any reason must be slaughtered immediately. Animals that are unable to walk must not be moved or made to move, but must be killed where they are.

Scottish Regulations will be introduced in 2019 in terms of mandatory use of CCTV. The Mandatory Use of Closed-Circuit Television in Slaughterhouses (England) Regulations 2018 requires slaughterhouse operators to install and operate a CCTV system that can cover the areas where live animals are present. These areas include unloading, lairage, handling, restraint, stunning and killing areas. MSUs will also need to provide the same functionality, and as such it is anticipated that there should be little/no difference between them and fixed abattoirs.

A review of SOPA and the Soil Association standards indicated the following:

- SOPA Standards for Processors, Importers & Animal Feed Compounders Section 12 – Abattoir Standards: sections 12.4.1 to 12.4.8 provide the requirements for lairage. Other references made in terms of lairage are the statutory welfare requirements.
- Soil Association Standards Abattoir and slaughtering Version 18 - references to lairage are with respect to CCTV, Certificate of Competence (CoC) for workers, labelling with respect to organics animals, organic feed for animals held more than 12 hours.

Potable Supply of Water

In addition to the requirements set out in the animal welfare regulations, SOPA and the Soil Association standards state:

- SOPA, Standards for Processors, Importers & Animal Feed Compounders Section 12 – Abattoir Standards”: references to drinking water at lairage and water sprays for pigs.
- Soil Association Standards Abattoir and slaughtering Version 18 – references to water for animals in the lairage, rinsing to remove residues (cold water may not be sufficient) and for disinfection (water and steam).

Facilities for the disposal of animal by-products

Key European and Scottish animal by-products regulations (ABPRs) related to waste/mortalities are as summarised below⁴⁵:

- EC No 1069/2009 – laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal by-products Regulation).

⁴⁵ List from 2016 Enscape report on Fish Mortalities in Scotland, for Scottish Government and Zero Waste Scotland.

- EU No. 142/2011 - The EU ABP Implementing Regulation (implementing EC No. 1069/2009).
- EU Reg No 2015/9 –amending Regulation (EU) No 142/2011 implementing Regulation (EC) No 1069/2009.
- Animal By-Products (Enforcement) (Scotland) Regulations 2013 – referred to below as the ABP (E) (S).

In terms of SOPA and Soil Association standards, the following is pertinent in terms of how the management of ABP waste is considered:

- SOPA Standards for Processors, Importers & Animal Feed Compounders Section 12 – Abattoir Standards: no specific mention of animal by-products.
- Soil Association Standards Abattoir and slaughtering Version 18 – reference to the EC No. 1069/2009 above, only.

The FSS Manual for Official Controls (Amendment 13) states that:

- Premises, machinery and implements used in SRM removal are clean before operations begin and during processing to prevent cross contamination
- Storage and transport bins are clean, leak free and impervious, indelibly marked/ labelled with well-fitting lids which are used when the bin is used to store or transport SRM
- Bins are washed and disinfected when required and not used for any other purpose
- Bin liners, if used to line SRM bins, are used once only and disposed of entirely as SRM

In terms of the above, and the management of ABPs generally, a number of key considerations and questions for regulators (e.g. FSS and SEPA) are identified and summarised below:

- For a mobile abattoir docking system/approach, ABPs from slaughter would most likely have to remain at the docking station location, categorised under Cat 1, 2 and 3, and stored until an authorised collector arrives. Acceptable, secure conditions would be required to facilitate this.
- Does the regulator have a view on storage infrastructure requirements (other than what has been commented on above), the timeliness of subsequent uplifts etc for different types of docking station? For example, these could be co-located at farms, butchers' premises, auction marts, etc.

Both FSS and the APHA have been engaged on these questions, with their responses shown in the stakeholder engagement section later.

Suitable facilities for the dressing and movement of carcasses

Observations in terms of dressing and the movement of carcasses are summarised below:

- In addition to ABP storage, docking station locations could be set up to have chilling infrastructure located on site e.g. at auction marts, butchers' premises, farms.
- The FSS Manual for Official Controls (Amendment 13) describes verification and inspection requirements for food chain information and the collection and communication of inspection results.

In addition to the above, the SOPA and Soil Association have the following standards which will need to be taken into consideration by any future MSU operator:

- SOPA Standards for Processors, Importers & Animal Feed Compounders
Section 12 – Abattoir Standards: sections 12.6, 12.7 and 12.8 refer to requirements Processing, Storage and Labelling respectively.
- Soil Association Standards Abattoir and slaughtering Version 18: Processing organic and non-organic:
 - *If you process organic and non-organic products, either using the same equipment or at the same site, you must: a) assess the risk of contamination and mixtures or exchanges, and put in place controls to avoid those risks*
 - *Process and store organic products separately, in time or space, from non-organic products*
 - *Ensure that the cleaning of your facilities and equipment is sufficient to remove residues of non-organic product before you start processing*
 - *Finish the whole run of organic products before you start to process non-organic products*
 - *Keep a record of all organic and non-organic operations and the quantities processed.*

Engagement with Stakeholders

Scottish Government: Rural & Environment Science & Analytical Services (RESAS)

Steering group meetings, hosted by RESAS, were attended by a range of interested Scottish Government teams. It is important to emphasise up-front that there were no regulatory issues raised at the RESAS hosted meetings that would prevent the potential operation of a mobile abattoir in Scotland.

An initial desk-top review and stakeholder engagement work, prior to the first meeting, had identified that there may be a number of issues that make an MSU less economically viable (than a conventional static abattoir) - common issues raised were associated with waste disposal, chilling, processing capacity and throughput. To overcome some of these issues, some overseas examples have developed “docking stations”, which are areas that have some level of static infrastructure in place and typically enable a number of farmers within a local area to bring stock to in order to increase throughput at the MSU.

Overseas examples are typically based at larger farms or at purpose built locations, however the question was whether it would be possible to site an MSU at a range of docking stations by utilising the existing supply chain (e.g. farms, marts, abattoirs, butchers, etc), to reduce capital and operational costs and encourage buy-in throughout the supply chain. The key comments regarding this approach are summarised below:

1. There should be no significant issues co-locating a mobile abattoir beside a mart, however time or physical separation would be essential. Disease control would need to be managed. For a low-throughput mart it could work and would make sense for an MSU to be co-located. It was noted that a potential business risk would be restricted movements during disease outbreaks (this would be an issue for an MSU regardless of whether marts were used as potential docking stations).
2. The mobile abattoir could potentially be located at an existing abattoir site, provided each operator specified responsibilities (the thinking behind existing at a local abattoir was that the MSU could process private/ organic kill). If the mobile abattoir was to be located at a butchers, this would need to be discussed with FSS.
3. No significant issues associated with an MSU locating on a farm, however it was noted that the farm would need to have QMS membership/supervision in order to retain “Scotch Beef” label (further discussion with QMS was recommended).
4. With regards to the subsequent use of land that had been used as lairage the Scottish Government confirmed that the following would apply:
 - a. Standstill period – 13 days (cows and sheep), 20 days for pigs. For disease control.
 - b. Maximum in Scotland would be 28 days (lands that could not be cleaned and disinfected).
5. Other potential docking stations were identified as game and deer handling facilities – common throughout Scotland.
6. The issue of waste generation and storage was raised, whilst this is not the specific remit of this team (FSS are the appropriate body). For a mobile abattoir docking system/approach, ABPs from slaughter would most likely have to remain at the docking station location, categorised under Cat 1, 2 and 3, and stored until an authorised collector arrives. Acceptable, secure conditions would be required to facilitate this. **Note:** Subsequent discussions with mobile abattoir manufacturers have indicated that ALL waste is typically bulked at the MSU and would either need to all be treated as Cat 1 or separated by operatives. Later in this report the benefits associated with leaving stomach/intestine content at a location, for spreading to land, rather than hauling as waste, is considered.

7. It had been noted that MSU's rarely contained a detain rail for carcasses that are deemed unfit for human consumption after slaughter. Clarification of the procedures was sought, should this occur. This is very rare, however it is anticipated that slaughter would need to stop, this was later checked with MSU manufacturer's, that confirmed this would be the case, due to a lack of space.
8. Hygiene requirements are specified within the regulations - whilst these would be made more difficult with the limited space, they should be do-able e.g. using disposable overalls. It would be easier if these types of facilities could be shared e.g. if a docking station approach is adopted. Other key points that would need to be considered include drivers hours, hygiene facilities, secure facility for OV, getting appropriate staff.
9. No restrictions on the MSU being used for multi-species. Important to maximise value and ensure that there are markets for all products. It was noted that landfill would not be a favoured option.
10. There is a requirement to transport casualty animals to an abattoir within 2 hours if not using active refrigeration, therefore this may only work if the MSU is already scheduled to be in the area, and the animal has a minor injury.
11. There was some discussion around seasonal/ modular abattoirs and whether these should be considered. Modular abattoirs are typically a number of porta-cabins that can be moved from site-to-site, but on a less frequent basis than a traditional MSU.
12. With regards to regulation of a potential MSU, all of the key bodies are national and therefore an MSU should not present any significant issues. The reporting requirements would be the same as a conventional abattoir, however there would need to be a separate County Parish Holding (CPH) number movement that would be recorded to the CPH, which would need to know where the MSU was at that time. However could potentially use a Scottie ID. There is no specific reporting mechanism set up at the moment, and therefore a new one would need to be created, whilst this would take time, it was not perceived to be a significant factor. Sheep movements require abattoirs to report to a central database, however a hand-held scanner can be purchased. Connectivity to internet may be an issue, but have 24 hours to report.

Food Standards Scotland (FSS)

The FSS guidance manual, the Manual for Official Controls (MOC), contains details of the tasks, responsibilities and duties FSS staff and veterinary contractors undertake in approved meat establishments. The Food Standards Agency (FSA) "Meat Industry Guide" (MIG) was discussed and confirmed as a key document in terms of the considerations required in abattoir design.

Overall, in terms of MSU design and operation, the key aspects to be considered are:

- Separation between activities – clean and dirty.
- Separation in space and time.
- Advise the Official Veterinarian (OV) of the steps

All OVs in the future will be managed through FSS and the OV on small plants will be able to do both ante and post mortem inspections

It was commented that a 2017 amendment (EC No. 853/2004, Annex III, Section 1, Chapter VII paragraphs 1 to 3) allows FSS to authorise slaughterhouses to transport warm meat from domestic ungulates. This does not provide any operational advantages or exemptions, however, in terms of MSUs, as explained in the FSS guidance/policy document – see Box 1.

Box 1. FSS, Policy on Transportation of Warm (above temperature) Red Meat from Slaughterhouses in Scotland

The following is a key extract from the above policy document with reference to “warm meat”:

“...meat of domestic ungulates is to be immediately chilled after post-mortem inspection to a core temperature of not more than 7°C

the meat must leave the slaughterhouse, or a cutting room on the same site as the slaughterhouse, immediately (i.e. a guideline 3 hour period from the completion of the post-mortem inspection of the first animal slaughtered to be transported warm, to the departure of the vehicle) and the transport takes no more than two hours; and (iii) is justified for technological reasons.

This derogation must not be used for operational reasons unless there is an associated technological reason – i.e. where chilling is not recommended as it may not contribute to the hygienic and technically most appropriate processing of the product, for example: foie gras. The specific product also needs to undergo a step (further processing) for which it is better that the product is not chilled before starting or carrying out the transport.”

In a general discussion about the operational challenges and opportunities, the following was covered:

- Chill space⁴⁶ is a key challenge. Refrigerated containers – approvals are straightforward. The use of temporary covers/curtains are possible, between adjoining process locations. A central belt abattoir is using 2 such containers and configurations.
- Lairage sharing could be a potential opportunity – depends on the site.

⁴⁶ Post meeting note: useful guidance document on chilling. From the AHDB: “Chilling, Meat and Quality Shelf-life”

- The slaughter box will be one of the the costliest aspects of an MSU’s design and build. The question was asked about the potential for using the slaughtering facility of existing facilities where appropriate, with the MSUs providing other services.
- Saturday and Sunday working is a possibility in terms of collaboration with existing abattoirs.

It was commented that in terms of animal welfare officers, there is the threshold, below which no animal welfare officer is required, the threshold defined as⁴⁷:

“The animal welfare officer is not required for slaughterhouses slaughtering less than 1,000 livestock units of mammals or 150,000 birds or rabbits per year. However, obligations related to their tasks as previously described remain and have to be implemented by the slaughterhouse operator.”

Council Regulation No. 1099/20098 provides additional context on the animal welfare position – see Box 2.

Box 2. Council Regulation (EC) No 1099/2009 “on the protection of animals at the time of killing” states:

(47) Small slaughterhouses predominantly involved in the direct sale of food to the final consumer do not require a complex system of management to implement the general principles of this Regulation. The requirement to have an animal welfare officer in place would therefore be disproportionate to the objectives pursued in those cases and this Regulation should provide for a derogation from that requirement for such slaughterhouses.

In terms of the costs associated with regulations and the impacts specifically on MSUs, these are comparable to small-scale abattoirs currently operating (e.g. the island abattoirs). An important example of how costs are applied concerns the OV and MHI requirements, where there are significant differences in the fee

A key guidance document in terms of understanding how costs would be applied for veterinary and meat inspection controls with MSUs is the 2018 FSS “Guidance Charges for Official Controls in Approved Meat Establishments in Scotland”. This guidance describes the need for charges, and where the regulatory requirements set this out. A fundamentally important aspect of this, with respect to a small throughput MSU operation is how the OV and MHI charges would be discounted, as explained in paragraph 46 of the guidance:

⁴⁷EC publication extract, from “The animal welfare officer”, online source, accessed August 2019: https://ec.europa.eu/food/sites/food/files/animals/docs/aw_prac_slaughter_owo-brochure_24102012_en.pdf

“The discount is applied accumulatively to LSU levels: an FBO producing 6,000 LSU would receive 85% discount for the first 1000, 70% discount for the next 4000 and 21% discount for the remaining 1000.”

In addition to the above, the contracting model for OV and (MHI) has changed September 2019, with FSS now directly employing all OVs and contracting the MHIs. The rates applied at the moment (October 2019) are set out in this guidance and are £40.55/hr for OVs and £30.05/hr for MHIs.

In effect, when calculating the OV and MHI costs where discounts apply, expenses (flights, accommodation etc) are covered within the hourly rate above i.e. for an OV flying to a remote location, and staying overnight at a hotel, the cost for an MSU operating below 1,000 LSU per annum would be 15% of the hourly rate (no additional costs for expenses). This is the same charging situation with the island abattoirs at the moment.

A worked example is shown on the basis of the above, where an OV does the ante mortem inspection, taking, for illustrative purposes 1.0 hour and then also does the MHI's work for the remainder of the day, say 6.0 hours (cheaper for the FSS to do this rather than send one OV plus and MHI to a site). In other words, the OV does the work required for an MHI, but at the lower rate (£30/hour) for the remainder of the time. i.e. the cost to the abattoir would be:

$$15\% \times [(1 \times £40) + (6 \times £30)] = £33 \text{ per day (7.0-hour day).}$$

If an MSU is considered to have issues in terms of how it is operating (performance/standards) then the subsidy cannot be used to maintain and support FBOs in this situation and so the FSS is at liberty to then charge the full fee.

Trichinella testing was discussed for pigs not in controlled housing, for which no FBOs are charged (the cost is borne by the FSS) - only applies to boars and sows. It was commented that it was reasonable to assume that setting up a British Standard-certified laboratory for this would be very expensive (there are significantly equipped laboratories, in place at larger abattoirs). Where there are such laboratories in place the FSS pays the FBOs £0.60 for every sample tested - it is much cheaper for the FSS to do this than pay the £48.50 cost for the samples that an MSU may be required to have tested. In terms of the logistics and timescales for testing it is understood that an OV would be able to arrange for a courier to collect samples on the day of the slaughter, with the results coming back a day or two later. The chilled carcasses would need to be stored until the results come back at which point they could be released.

In terms of the percentage of pigs that are considered to not be in controlled housing, it is believed that this applies to a minority of livestock, but the FSS are surveying farmers for this data, and if the results are available during the timescale of this study they will be shared. In general, the process of testing for trichinella did not cause any particular concerns as long as the requirements are followed.

The EU Official Controls Regulation (OCR) was mentioned, and its implications in terms of future process. The implementation of this has the potential to be impacted on, depending on the outcomes of BREXIT negotiations. At this stage, therefore, only a brief summary of this is provided in the box below, until a clearer picture is available.

Box 3. Summary of the New EU Official Controls Regulation (OCR)

[Regulation \(EU\) 2017/625](#) on official controls and other official activities performed to ensure the application of food and feed law, rules on animal health and welfare, plant health and plant protection products – referred to as the Official Controls Regulation (OCR) – is a directly applicable EU regulation that sets operational standards for the performance of official controls and other official activities by competent authorities (CAs) across the EU. Although the OCR entered into force on 27 April 2017, the main date of application is 14 December 2019.

As of that date, the OCR will repeal and replace existing legislation which is integral to the activities of FSS, as the national CA responsible for the delivery of official food and feed controls in Scotland, and enforcement bodies. This includes [Regulation \(EC\) No 882/2004](#) and [Regulation \(EC\) No 854/2004](#). Rules in the [Delegated Regulation \(EU\) 2019/624](#) and [Implementing Regulation \(EU\) 2019/627](#) made under Article 18 of the OCR repeal and replace Regulation 854/2004.

Local Authority Planning Team

General planning requirements were discussed for a mobile abattoir potentially operating in Scotland. The key points are summarised below:

- If the mobile abattoir is to be located at a site for more than 28 days within a year, then each of the sites that the MSU visits will require full planning permission. If the mobile abattoir will be present on a site for less than 28 days, then it will be classed as a permitted development, and will not require planning permission (however Environmental Health will have an input).
- If planning permission is required, the following are typical timeframes:
 - Pre-application process: 4 – 8 weeks
 - Full planning process: 2 months
- The planners would assess the standard issues e.g. i) parking, ii) Access, iii) Hard standing, iv) drainage v) vehicle access, etc.
- The fee can be calculated on-line and is based on floor space of the MSU.

An assessment of the potential impacts of the planning requirements will be carried out for the final report, because the requirements are likely to be impacted by the operational model e.g. it is anticipated that docking stations would require full

planning permission, however if the MSU is travelling between host farms, then it is possible that it could be exempt from planning requirements.

Local Authority Animal Welfare & Environmental Health Officer

It was assumed that an MSU would be similar to having a mini-market/mini-abattoir within the area and would anticipate occasional inspections. Would need to attend if there was an issue with farmers potentially using the MSU for casualty slaughter (when livestock should have been shot in the field for animal health) or if either the wrong animal or documentation was provided to the MSU.

A second enquiry was made with the Environmental Health team, who believed that local authorities would be the main regulators if a very small number of animals are slaughtered per month, and above a threshold, FSS are the main regulator. If the local authority are the main regulator they would do an initial inspection to determine the number of inspections required per year. The officer felt that an MSU would be relatively low-risk, because all of the products are raw. In terms of potential issues, the local authority team would have some involvement in waste and odour complaints, however from a regulatory point of view, it was considered suitable.

Local Authority Building Standards Officer

The officer believed that because an MSU is not technically a “building” it would not be covered by Building Standards. If the MSU was to utilise the existing drainage network for example, at a docking station, then they may have some input, however it would be in relation to the fixed infrastructure.

Local Authority Roads Manager

The roads manager indicated that there may be some restrictions on movements dependent upon the size and weight of the MSU, and this may influence potential routes that can be taken. An example was provided in Mull, where, for example empty vehicles are permitted down certain roads, but once full (and exceeding the weight requirements), an alternative route must be taken. All local authorities have details of the various restrictions and permits/ exemption maps and procedures for information.

Scottish Environment Protection Agency (SEPA) - Waste

The waste team believed that SEPA would not have a role in the regulation of an MSU from a waste management perspective. There may be other requirements, site specific, if there are emissions, nuisance etc.

The Animal and Plant Health Agency (APHA)

The regulation of ABP waste is controlled by the APHA and it is understood that an MSU would need approval by the APHA as would locations identified for the storage of ABP waste (docking stations holding waste). Initial feedback is that there

will be several variables to consider, for example Auction Marts already have biosecurity protocols in place whilst industrial units would need a new licence.

The 2018 Animal By-products and Pet Passport Fees (Scotland) Regulations 2018 describe how the APHA charges for the assessment of applications concerning the processing, storage and other treatment of ABPs. In terms of the appropriate fee, on the basis of Table 1 in the regulations, this is currently considered to be:

- MSU Fee: £485 for consideration of “an application, for approval of an establishment or plant carrying out the handling of animal by-products after their collection, by way of operations such as sorting, cutting, chilling, freezing, salting, removal of hides and skins, or removal of specified risk material, that includes a site visit of up to 60 minutes.”
- Docking station (unlicensed) Fee: £485 - Consideration of “an application for approval of an establishment or plant carrying out the storage of animal by-products and or derived products that includes a site visit of up to 60 minutes.”

If a mobile abattoir unit and the storage locations are approved, there would be inspections costs as defined in Table 2 of the regulations. It is understood that that a cost of £157 per visit would apply for annual/biennial visits, £561 for quarterly visits etc. MSU and the storage sites (frequency of site visits will be informed by a risk assessment process).

Scottish Water

Scottish Water commented that trade effluent is defined by The Sewerage (Scotland) Act 1968 as "any wastewater discharged during the operation of a business or industrial process". Examples of trade effluent are process waters, cooling waters, contaminated surface water runoff, and wash water from vehicles, machinery and floors. Therefore effluent from a mobile slaughter unit would be deemed to be trade effluent and as such each site at which the unit would be operated would need to apply for consent, the granting of which will be dependent on the local capacity in the network and local treatment works. The Consent will stipulate limits which needs to be adhered to and will include a maximum volume, suspended solids, biological material etc. Other key points are:

- Consent is only granted for discharges to the foul or combined sewer at a designated point and it would not be possible to collect the waste and discharge for example down a road gully.
- It is not permissible to discard whole blood to sewer and Scottish Water only accepts blood which arises from washing floors, utensils or similar activities
- Pre-treatment of the effluent would be required prior to discharge and as a minimum this is screening (through a 4 mm mesh sieve).
- Some large sites have full biological treatment to meet the Consent conditions.
- There must be nothing in the effluent which contravenes the Animal By-Products (Enforcement) (Scotland) Regulations 2011.

Quality Meat Scotland (QMS)

The development of docking stations was believed to be the most practical and economic method of operating an MSU. There were some concerns raised about the availability of slaughtermen and vets, but QMS believe that there should be no issues that are insurmountable.

In relation to the quality assurance scheme, in principle there should be no issues, but in practice, this has never been tested.

Critical to consider market demand for products - not all butchers have outlets for the whole carcase, some prefer to order just the products/cuts that they know they can sell. There is also the added cost of employing an extra butcher to break down the carcase, but this depends on the operational model employed by the MSU.

When selecting from a wholesaler, the butcher is able to stipulate the quality of the meat required - it will be important for the MSU to offer a similar service. However, it was believed that an MSU could offer a range of opportunities for butchers looking for contract kill to serve local markets etc.

Further discussion highlighted the importance of the QMS Scottish brands (Scotch Beef PGI, Scotch Lamb PGI and Specially Selected Pork) and the preference for meat to go through the QMS quality assurance channels these channels wherever possible. The quality assurance scheme, ensures that must have been born, reared and slaughtered in Scotland and spent their entire life on QMS Assured holdings.

This whole of life brand eligibility is delivered by a suite of assurance schemes: two livestock for (i) Cattle & Sheep; and (ii) Pigs, as well as four non-livestock schemes: (i) Feeds; (ii) Haulage; (iii) Auction Market; and (iv) Processor.

QMS were specifically asked about anything that may limit or restrict the viability of an MSU. The following points were raised as being particular aspects that require consideration up-front:

- Livestock movement records: static abattoirs/markets are critical points in registering deaths with the BCMS or equivalent and have this functionality built-in, and the MSU would also need to perform this function.
- Detainment of carcasses not-fit-for human consumption e.g. where would these be stored? What would the procedures be, and more widely how would waste, specifically SRM, be handled/stored?
- Hygiene requirements.
- Lairage requirements, including separation of stock.
- Ability to recruit/obtain suitably qualified staff.
- Would need to ensure that the layout was suitable to ensure compliance with all regulations e.g. the maximum stunning to stick time must be 60 seconds for cattle, etc.

More generally, the wider issues of what farmers actually want was raised e.g. what are the benefits of a mobile abattoir versus a local abattoir.

There was a short discussion around island/ seasonal abattoirs and their demand. It was noted that it is important to consider where livestock is finished to ensure that there is a demand for the MSU.

A further discussion was held with the marketing development manager regarding the potential demand for higher welfare/ known provenance meat. QMS stated that they have conducted a survey which indicated that 7 out of 10 respondents would be willing to pay more for a premium product/ higher welfare product, however how much extra is unknown, and QMS are not aware of any research that has been carried out to try to quantify this (further information on consumer demand is outlined later in this report).

QMS does not hold any information on the size of the market with respect to “farm shops” or “direct sales”. There is some interest in the “Pasture for Life” scheme⁴⁸, however it is still very early in terms of understanding and take-up.

With regards to potential interest from large retailers on this type of product, it was felt that the price of the product may be a barrier, and that it may be better to look at alternative outlets. In particular, having discussions with secondary processors may help to ensure that there are markets for all products and provide access to markets.

⁴⁸ Information available at: <https://www.pastureforlife.org/certification/the-pasture-for-life-standards/>

APPENDIX 5: Cost Benefit Analysis Data

- **Scenario Data and Descriptions**
- **Cost and value/price data**

Table 26. Overview of the livestock slaughter data used in the CBA

Description of Logistics and Model		Slaughter Days		Orkney				Caithness & Sutherland				Ross & Cromarty			
		Days / Week	Weeks pa	Cattle	Sheep	Lambs	Pigs	Cattle	Sheep	Lambs	Pigs	Cattle	Sheep	Lambs	Pigs
Ork + Caithness: <u>Weekly</u>	Orkney Mart on Monday, MSU arrives later afternoon. Slaughter on Tuesday, leave on Wed morning (6.30) ferry to Scrabster. Drive to C&S Location Wednesday. Slaughter Wed pm and/or Thursday. Friday, drive to base, clean-up and reconciliation work	2.0	48	7		10									
	Caithness & Sutherland Area close to Wick A&NM (Mart) and/or Lairg Mart (latter only three days per year)	1.0	48					7		10					
Ork + Caithness: <u>Fortnightly</u> on Orkney	Orkney Mart on Monday, MSU arrives later afternoon. Slaughter on Tuesday, leave on	2.0	24	7		10									

Description of Logistics and Model		Slaughter Days		Orkney				Caithness & Sutherland				Ross & Cromarty			
		Days / Week	Weeks pa	Cattle	Sheep	Lambs	Pigs	Cattle	Sheep	Lambs	Pigs	Cattle	Sheep	Lambs	Pigs
	Wed morning (6.30) ferry to Scrabster. Drive to C&S Location Wednesday. Slaughter Wed pm and/or Thursday. Friday, drive to base, clean-up and reconciliation work														
	Caithness & Sutherland Area close to Wick A&NM (Mart) and/or Lairg Mart (latter only three days per year) When in Orkney, 1.0 day of slaughter in C&S, next week, no time in Orkney, 3 days when all in C&S	1.0	24					7		10					
		3.0	24					7		10					
Ross & Cromarty + Caithness: Weekly	Ross & Cromarty 1.0 day slaughter per week Caithness and Sutherland 2.0 days slaughter per week	1.0	48									7		10	
		2.0	48					7		10					

Calculations and Estimates used in the CBA

Compliance Costs

The results from the CBA are provided at the end of this section. Informing these costs is data and calculations, provided in the Excel spreadsheet accompanying this report. A number of the tables associated with this are provided in this section, to give additional clarity. The table headings indicate which element of the CBA that the data pertains to.

The following costs for veterinarian inspections for a function MSU, and to approve an MSU and its docking stations are determined from conversations with FSS and the APHA, and with reference to the charges specified in regulations and guidance:

- FSS fees - “Guidance Charges for Official Controls Version 4.1 June 2018”
- APHA fees – “The Animal By-Products and Pet Passport Fees (Scotland) 2018

Table 27. Summary of OV and MHI rates and the cost, after discounting, for the MSU.

Description	Hourly Rate	No. of Hours	£ Day Rate
OV Cost - one hour	40.55	1	40.55
MHI - 6 hours	30.05	6	180.30
		Day rate	220.85
Charge to MSU for first 1,000 animals is 15% of cost	15%		£33.12
Charge to MSU for subsequent 4,000 animals is 30% of cost	30%		£66.26
For CBA use mid-point of above	22.5%		£49.69

Table 28. FSS – Indicative MSU and Docking Station Approval Process Cost - Based on Hourly Fee Rate

Task	Hours	£ Fee, inc expenses	£ Totals
Desk-based work	4.00	64.51	258.04
Site visit - MSU	4.00	64.51	258.04
Site visit - docking station	3.50	65.51	229.29
Site visit - docking station	3.50	66.51	232.79
Site visit - docking station	3.50	67.51	236.29
Report	4.00	64.51	258.04
TOTAL			1,472.48

Ongoing, annual veterinary audit

321.65

Table 29. APHA Approval Process Costs – for managing ABP waste

Task	£ Fee, inc expenses	£ Cost
Approval of MSU and docking stations	485	485
Annual/biennial visits	157	157

Data on Animal Liveweights, Carcasses and Residual Items

The following data is used to assist calculations with respect to the following:

- Waste management – the storage capacity required at docking stations plus the removal costs. It also allows consideration for the local management of Cat 3 stomache/intestine contents, which can be applied to land.
- The quantity and value of premium meat sales can be calculated from the skeletal meat weight
- Potential offal sales

Table 30. Split by weight of animals into carcase and residual items (including offal and gut content)

Species	Liveweight	Skeletal meat weight	Total Residual	Residual Split			
				Edible offal	Hide/Skin	Stomache / intestine contents	SRM & other Cat 1 waste
Cattle	600	318	282	13	43	74	152
Sheep	42	20	22	1.2	4.5	5	11
Lambs	42	20	22	1.2	4.5	5	11
Pigs	101	76	25	2	0	0	23

Table 31. Split by weight of animals into carcase and residual items (including offal and gut content)

Animal	Liveweight	Skeletal meat weight	Total Residual	Residual Split (%s of Liveweight Animal)			
				Edible offal	Hide/Skin	Stomache / intestine contents	SRM & other Cat 1 waste
Cattle	600	53%	47%	2%	7%	12%	25%
Sheep	42	48%	52%	3%	11%	12%	26%
Lambs	42	48%	52%	3%	11%	12%	26%
Pigs	101	75%	25%	2%	0%	0%	23%

The offal value shown in the following table is an estimate and is produced for one of the operating models and scenarios in the CBA.

Table 32. Split by weight of animals

Animal	Offal Value for CBA, £/Kg	Offal Value/Carcase
Cattle	0.50	6.50
Sheep	0.50	0.60
Lambs	0.50	0.60
Pigs	0.50	1.00

Added Value to Beef Sales on the Basis of Local Provenance – Facilitated by Having Local Kill Through an MSU

The following tables take Scottish Craft Butchers data (published in the Autumn 2019 Newsletter) and make estimates in terms of the value of beef and lamb products (such as fillet, sirloin steaks etc for beef). The CBA considers the additional sales premium that could be associated with such items, if sourced from local animals, and sold as such – this additional value is expressed as 5% and 10%, with the former used for this scenario in the CBA.

Table 33. Table showing value of Scotch beef cuts & potential for added value to carcasses from selling product slaughtered and provided locally (premium, provenance, high value sales)

SCOTCH BEEF	01/07/2019 Scottish Craft Butchers Data		Estimate of Split in a carcase		£ Value
	p /Kg	£ / Kg	Kg	%	
Fillet steak	4316	43.16	6	2.0%	259
Sirloin steak	2953	29.53	13	4.3%	384
Rolled Rib Roast	2325	23.25	7.5	2.5%	174
Popeseye Steak	1855	18.55	7.5	2.5%	139
Topside	1544	15.44	25	8.3%	386
Round / Rump Steak	1485	14.85	7.5	2.5%	111
Shoulder Steak	1236	12.36	25	8.3%	309
Rolled Brisket	1165	11.65	8.5	2.8%	99
Boiling Beef Bone In	718	7.18	7.5	2.5%	54
Sub-total			107.5	36%	1,916

The same analysis of lamb products indicates that the average value of the cuts is £15.17. On the basis that the carcase weighs 20 Kg, this translates to £303.47 of lamb products for sale.

The table below summarises the added value that local/provenance sourced meat products could provide to a butcher's business, through an MSU providing local kill services. The 5% premium is considered in two of the CBA scenarios/models.

Table 34. Potential added value for premium sales of beef & lamb products based on local provenance

Meat Product	Mark-up % for local origin/provenance	£ Added Value onto £1,916 Scotch Beef Products
Beef	5%	95.78
	10%	191.56
Lamb	5%	15.17
	10%	30.35

Generating Value for an MSU Service Through Avoided Haulage and Kill Costs

The models and scenarios used in the CBAs were described in Section 10.1. The avoided costs associated with these and used in the CBA are summarised in the following table.

Table 35. Avoided haul and kill costs used in CBA model/scenarios

Animals	Avoided haul to Abattoir	Avoided carcase haul from abattoir	Avoided Kill Cost		Avoided haul to Abattoir	Avoided carcase haul from abattoir	Avoided Kill Cost		Avoided haul to Abattoir	Avoided carcase haul from abattoir	Avoided Kill Cost
	Orkney (weekly) and Caithness				Orkney (fortnightly) and Caithness				Mainland/Caithness and Sutherland		
Cattle	£45.00	£45.00	£87.50		£33.75	£33.75	£87.50		£30.00	£30.00	£87.50
Sheep	£30.00	£30.00	£22.00		£18.75	£18.75	£22.00		£15.00	£15.00	£26.00
Lambs	£30.00	£30.00	£22.00		£18.75	£18.75	£22.00		£15.00	£15.00	£26.00
Pigs	£37.50	£37.50	£40.00		£26.25	£26.25	£40.00		£22.50	£22.50	£50.00

Waste Management Costs

Discussions with ABP collectors have resulted in a range of costs for the collection of the MSU's waste streams. A summary of the key data from these discussions is shown in the table below.

Table 36. Summary of potential prices for MSU waste stream collections.

Description	Collectors' Costs	Comments
Cat 1, 2 and 3 ABP cost in remote areas	£90.00/T	Charged for mixed Cat 1, 2 and 3 ABP waste, in a 11-tonne load/vehicle - therefore costing circa £1,000 for a full load.
Butchers' Cat 2 waste	£120/T	Tonnage cost based on £30/240L bin
Mixed Cat 1, 2 % 3 - circa 5 tonne uplift – north mainland	£170.90/T/Wk	Cost for an 18-tonne vehicle to Wick, one day round trip, scheduled ~£750
Mixed Cat 1, 2 & 3 - circa 5 tonne uplift - Orkney	£455.80/T/Wk	Cost for an 18-tonne vehicle to Orkney, two-day round trip, scheduled £2,000

A collector currently charges £30/uplift for butchers' waste, in 240-litre bins (this is Cat 2). They could collect Euro containers (1,100 litre) from docking station sites, winched onto a 18-tonne wagon If traveling to somewhere like Wick to collect 4 to 5 tonnes – using 10 x 1,100 litre Euro-containers. The cost could be based on the trip, rather than a charge per bin or tonne. The cost, for indicative purposes is likely to not exceed £1,000 per day (would be a maximum, worst case), and likely to be more than £500 – a mid-range of £750 per haul therefore used in the table. The cost for Orkney would be double, and more, including ferry costs. They take the hides off fallen stock, then mix all the categories of ABPs collected - no discount for separated wastes therefore no value in separated Cat 1, 2 and 3 collections. All of such waste is mixed before being shipped south. The most effective way to reduce waste costs will be to do so at source. The costs used for managing waste streams at the docking stations is summarised in the table below.

Table 37. ABP waste stream costs used in the CBA scenarios

Scenarios	Tonnes/week Per Site	£ Cost for Orkney collection Per Tonne	£ Cost for Caithness collection Per Tonne	£ Average or Value to Use
Orkney (weekly) and Caithness waste	4.40	455.80	170.90	313.40
Orkney (fortnightly) and Caithness waste	4.40	455.80	170.90	242.10
Caithness and Sutherland	4.40	455.80	170.90	170.90

Hides and skins

The Sustainable Food Trust, in an October 2018 briefing paper⁴⁹ to the UK parliament indicated the following position, in terms of hides and skins value:

“The price of hides and skins has plummeted in recent years. More research is needed to establish all the reasons for this. Small abattoirs are currently being paid only 20p per sheep skin (c/w £6 a few years ago) and sometimes charged to have them taken away. Cattle hide prices have fallen to £14 each, with some as low as £4.50. In the 1980s abattoirs received £20 per hide and in 2014 they were paid over £30.”

The above information has been discussed with an ABP and fallen stock collector and confirmed to still be the case. The following values are therefore used in the CBA:

- Cattle hides: £4.50 each
- Sheep skins: £0.00 each (may be sold for as low as £0.20, assumed to work out at £0.00)

MSU and Chill Capital Costs

Earlier in the report a number of MSU designs were provided for slaughtering different species, using a range of configurations. The capital equipment cost for one tractor and trailer provided by Kometos Finnmodules is used in the CBA, with 67% of the budget price provided being used. This estimate is based on a price being provided for a two-trailer configuration, one of which provided chill facilities for carcasses, which is not required in the docking station model. A cost for two chilling units, one at each of the docking stations, is used in the CBA. The capital costs used in the CBA are as summarised in the table below.

Table 38. Description of the capital costs used in the CBA

Capex Description	£ Cost
WASTE CONTAINERS	-13,160
Docking station 1 - 20 containers (10 on site, 10 off site)	
Docking station 2 - 20 containers (10 on site, 10 off site)	
TRACTOR AND TRAILER COST (Kometos)	-618,227
CHILL COSTS	-130,000
Docking station 1	
Docking station 2	
CONTINGENCY – 10% OF CAPEX	-76,139
TOTAL	-837,526

⁴⁹ Online source: <https://sustainablefoodtrust.org/wp-content/uploads/2013/04/SFT-Small-Abattoirs-Briefing-Oct-18.pdf>



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This document is also available from our website at www.gov.scot.
ISBN: 978-1-83960-607-6

The Scottish Government
St Andrew's House
Edinburgh
EH1 3DG

Produced for
the Scottish Government
by APS Group Scotland
PPDAS706006 (03/20)
Published by
the Scottish Government,
March 2020

Social Research series
ISSN 2045-6964
ISBN 978-1-83960-607-6

Web Publication
www.gov.scot/socialresearch

PPDAS706006 (03/20)

