



Falkirk Council

Food Waste Collection & Treatment

Business Case Document

26th October 2011

Release:	V 1.0
Date:	26th October 2011
Author:	Bryan Regan
Owner:	Robin Baird
Client:	Falkirk Council
Document Number:	UW11-639-03



Supported by:



Zero Waste Scotland and Scottish Futures Trust have supported the development of business cases to allow Scottish Local Authorities to assess their options for the collection and treatment of food waste. This business case document, although supported by Zero Waste Scotland and Scottish Futures Trust, will be owned by the Council.

On completion of this business case, should the Council wish to pursue one of the options arising from the study, the Council should submit the document to Zero Waste Scotland for assessment of the potential for funding.

Zero Waste Scotland, Falkirk Council, Gifford Part of Rambøll and IKM Fehily Timoney believe the content of this report to be representative and correct as at the date of writing. However, factors such as prices, levels of food waste arising and regulatory requirements are subject to change and users of the report should check to confirm the current situation. In addition, care should be taken in using any of the cost information provided as it is based upon numerous project-specific assumptions (such as scale, location, tender context, etc).

Executive Summary

This business case seeks to provide Falkirk Council (FC) with an understanding of the services that would enable the authority to maximise the diversion of food waste from landfill at an affordable cost and for each option provide a comparison in relation to the existing service in terms of cost and recycling/composting rate. It is intended that this report will be used to inform Falkirk Council decision-making with regards to service option choice.

The output of the project is a business case specifically addressing the separate collection of food waste from households within the Falkirk Council functional area. The business case examines the following options for the separate collection of food waste:

Baseline - "Do Nothing Scenario" The current collection service was modelled as a baseline comparator

Option 1 - "Fortnightly Co-Collected Food Waste" Collection of food waste on a fortnightly basis using modified Terberg Kerbsiders. The Kerbsiders will be fitted with a food pod. This will allow the collection of food waste on same day and pass as existing "Black recycling box".

Option 2 - "Weekly Co-Collected Food Waste" Collection of food waste on weekly basis using modified Terberg Kerbsiders. The Kerbsiders will be fitted with a food pod. This will allow the collection of food waste on same day and pass as existing "Black recycling box". On the week the black recycling box is not collected, additional vehicles (7.5t RCV) will be deployed to collect food waste.

Option 3 - "Weekly Food Waste" Collection of food waste on a weekly basis using a dedicated fleet of vehicles (7.5t RCV).

Option 4 – "Fortnightly Co-Collection with Existing Garden Waste Service". This option involves the fortnightly collection of food waste from householders during the same pass as the existing garden waste collection service.

Using MS Excel a model was developed to calculate the cost of the existing kerbside collection service and the four options for food waste collection. A summary of the existing service costs and environmental performance are shown below:

Collection Type	Annual Cost	% of Total Cost
Residual Service Cost	£3,835,089	57%
Co-Mingled Mixed Dry Recyclables Cost	£1,130,193	17%
Garden Costs	£1,213,425	18%
Black Box & Textile Costs	£551,702	8%
Overall Service Costs	£6,730,409	100%
MSW Recycling Rate		49.25%
Carbon Metric Recycling Rate		37.12%

The costs and environment performance associated with each food waste option was modelled and the outputs are shown below:

Item	Option 1	Option 2	Option 3	Option 4
Additional Vehicles	-	Four (4) 7.5t RCV's	Seven (7) 7.5t RCV's	-
Additional Falkirk Council Staff	-	-	-	-
Purchase of Containers	£426,592	£426,592	£426,592	£224,992
Payment to Contractor (£)/year	£88,588	£290,600	£385,831	£0
Net Cost (£) Year 1 (2011/12)	£487,336	£487,336	£443,656	£233,992
Net Cost (£) Year 2 (2012/13)	£142,494	£379,899	£519,382	£176,719
Net Cost (£) Year 3 (2013/14)	£49,420	£287,768	£430,739	£68,077
Net Cost (£) Year 4 (2014/15)	£43,824	£283,251	£429,796	£60,096
Net Cost (£) Year 5 (2015/16)	£7,473	£226,138	£376,347	£21,301
Net Cost (£) Year 10 (2020/21)	-£3,484	£235,387	£405,335	-£2,826
Net Cost (£) Year 20 (2030/31)	-£29,906	£257,692	£475,239	-£61,008
Net Cost (£) Year 25 (2035/36)	-£45,775	£271,088	£517,223	-£95,951
MSW Recycling Rate (%)	51.8%	53.7%	53.7%	51.8%
Carbon Metric Recycling Rate (%) ¹	39.3%	41%	41%	39.3%

The range of options reflect some options that are likely to be affordable but may not provide the performance that FC will eventually require and some options that are likely to be more expensive but are likely to result in higher environmental performance.

¹ Figures are estimates based on current method of calculation "Scotland's Zero Waste Plan Carbon Metric Guidance" and may be subject to change

Contents

PAGE

1. INTRODUCTION	1
1.1 REASON FOR BUSINESS CASE	1
1.2 EXPECTED OUTPUTS OF BUSINESS CASE	2
1.3 BRIEF DESCRIPTION OF WHAT WILL FOLLOW.....	2
2. BACKGROUND INFORMATION & CURRENT ARRANGEMENTS	3
2.1 FALKIRK COUNCIL KERBSIDE WASTE COLLECTION SERVICE	3
2.2 FALKIRK COUNCIL ADDITIONAL SERVICE	4
2.3 FALKIRK COUNCIL CURRENT CONTRACTUAL ARRANGEMENTS	4
3. CURRENT PERFORMANCE & RESOURCES	6
3.1 PERFORMANCE DATA	6
3.2 RESOURCES	7
3.3 WASTE COMPOSITION.....	7
3.4 CURRENT BUDGET ALLOCATION	9
4. THE DRIVERS FOR CHANGE	10
4.1 SCOTLAND'S ZERO WASTE PLAN	10
4.2 PROPOSED CHANGES TO EUROPEAN WASTE FRAMEWORK DIRECTIVE	10
4.3 PROPOSED ZERO WASTE REGULATIONS.....	11
4.4 COUNCIL'S CURRENT WASTE STRATEGY	11
5. METHODOLOGY.....	13
6. ASSUMPTIONS	14
6.1 SENSITIVITY ANALYSIS AVAILABLE QUANTITY OF FOOD WASTE	14
6.2 MODELLED HOUSEHOLD FOOD WASTE YIELD	18
7. COLLECTION OPTIONS.....	19
7.1 OPTIONS TO BE MODELLED	19
7.2 BASELINE - "DO NOTHING SCENARIO"	20
7.3 OPTION 1 - FORTNIGHTLY CO-COLLECTED FOOD WASTE – OPERATIONAL PARAMETERS.....	20
7.4 OPTION 1 - FORTNIGHTLY CO-COLLECTED FOOD WASTE – COST BREAKDOWN	21
7.5 OPTION 2 - "WEEKLY CO-COLLECTED FOOD WASTE"	23
7.6 OPTION 2 – WEEKLY COLLECTION OF FOOD WASTE (KERBSIDERS & 7.5T RCV'S– COST BREAKDOWN)	24
7.7 OPTION 3 – WEEKLY COLLECTION OF FOOD WASTE (7.5T RCV'S).....	26
7.8 OPTION 3 – WEEKLY COLLECTION OF FOOD WASTE (7.5T RCV'S) – COST BREAKDOWN	26
7.9 OPTION 4 - FORTNIGHTLY FOOD WASTE COLLECTION CO-MINGLED WITH BROWN BIN (GARDEN).....	28
7.10 OPTION 4 - FOOD WASTE COLLECTION CO-MINGLED WITH BROWN BIN (GARDEN) COST BREAKDOWN.....	28
7.11 WASTE PERFORMANCE OF OPTIONS	30
7.12 CARBON METRIC SCORE AND DIVERSION OF WASTE FROM LANDFILL.....	30
8. TREATMENT OPTIONS.....	32
8.1 IN-VESSEL COMPOSTING	32
8.2 WET ANAEROBIC DIGESTION	32
8.3 DRY ANAEROBIC DIGESTION	32
8.4 LOCAL MERCHANT FACILITIES	32
9. SUMMARY TABLES.....	33
10. TIMETABLE AND KEY MILESTONES.....	35
10.1 TIMELINE AND MILESTONES	37

List of Tables and Figures

PAGE

TABLE 2.1:	EXISTING FALKIRK COUNCIL WASTE COLLECTION SERVICE	3
TABLE 2.2:	FALKIRK COUNCIL LANDFILL GATE FEE 2011 TO 2015	4
TABLE 2.3:	SUMMARY OF EXISTING CONTRACT ARRANGEMENTS FOR FALKIRK COUNCIL KERBSIDE COLLECTIONS	5
TABLE 3.1:	QUANTITY OF MATERIAL COLLECTED VIA KERBSIDE COLLECTIONS 2010/2011	6
TABLE 3.2:	FALKIRK COUNCIL RECYCLING RATE 2006 TO 2010.....	6
TABLE 3.3:	VEHICLES AND STAFF RESOURCES KERBSIDE COLLECTIONS.....	7
TABLE 3.4:	FALKIRK COUNCIL ACRON PROFILE	7
TABLE 3.5:	FALKIRK AVERAGE RESIDUAL WASTE 2010.....	8
TABLE 3.6:	COSTS ASSOCIATED WITH EXISTING FALKIRK COUNCIL KERBSIDE COLLECTION SERVICE.....	9
TABLE 6.1:	FALKIRK COUNCIL AVAILABLE FOOD WASTE	14
TABLE 6.2:	FALKIRK COUNCIL LANDFILL GATE FEE SAVING 2011 TO 2015	16
TABLE 6.3:	COMPARISON BETWEEN WEEKLY HOUSEHOLD FOOD YIELDS OF 1.2 KG OF 1.5 KG	18
TABLE 7.1:	FALKIRK COUNCIL MODELLED FOOD WASTE COLLECTION OPTIONS.....	19
TABLE 7.2:	OPTION 1 MODIFICATIONS TO EXISTING SERVICE CONFIGURATION.....	20
TABLE 7.3:	OPTION 1 FOOD WASTE SERVICE COSTS YEAR 1 TO 5 AND YEAR 10.....	21
TABLE 7.4:	OPTION 1 NET FOOD WASTE SERVICE COSTS YEAR 1 TO 5 AND YEAR 10.....	23
TABLE 7.5:	OPTION 2 MODIFICATIONS TO EXISTING SERVICE CONFIGURATION.....	24
TABLE 7.6:	OPTION 2 FOOD WASTE SERVICE COSTS YEAR 1 TO 5 AND YEAR 10.....	24
TABLE 7.7:	OPTION 2 NET FOOD WASTE SERVICE COSTS YEAR 1 TO 5 AND YEAR 10.....	25
TABLE 7.8:	OPTION 3 MODIFICATIONS TO EXISTING SERVICE CONFIGURATION.....	26
TABLE 7.9:	OPTION 3 FOOD WASTE SERVICE COSTS YEAR 1 TO 5 AND YEAR 10.....	27
TABLE 7.10:	OPTION 3 NET FOOD WASTE SERVICE COSTS YEAR 1 TO 5 AND YEAR 10.....	27
TABLE 7.11:	OPTION 4 MODIFICATIONS TO EXISTING SERVICE CONFIGURATION.....	28
TABLE 7.12:	OPTION 4 FOOD WASTE SERVICE COSTS YEAR 1 TO 5 AND YEAR 10.....	28
TABLE 7.13:	OPTION 4 NET FOOD WASTE SERVICE COSTS YEAR 1 TO 5 AND YEAR 10.....	29
TABLE 7.14:	WASTE PERFORMANCE OF FOOD WASTE COLLECTION OPTIONS MODELLED	30
TABLE 8.1:	LOCATION OF LOCAL FOOD WASTE MERCHANT FACILITIES	32
TABLE 9.1:	SUMMARY OF COST AND ENVIRONMENTAL PERFORMANCE FOR OPTION 1 TO 4.....	33
FIGURE 3.1:	FALKIRK COUNCIL RECYCLING PERFORMANCE 2006 TO 2010	6
FIGURE 3.2:	FALKIRK COUNCIL WASTE COMPOSITION 2010.....	8
FIGURE 6-1:	IMPACT OF FOOD WASTE YIELD/HOUSEHOLD ON ANNUAL QUANTITY OF FOOD WASTE COLLECTED.....	15
FIGURE 6.2:	IMPACT OF FOOD WASTE YIELD/HOUSEHOLD ON FOOD WASTE CAPTURE RATES.....	15
FIGURE 6.3:	IMPACT OF FOOD WASTE YIELD/HOUSEHOLD ON RECYCLING RATE AND CARBON METRIC	16
FIGURE 6.4:	IMPACT OF FOOD WASTE YIELD/HOUSEHOLD ON LANDFILL GATE FEE SAVING.....	17

Appendixes

Appendix 1: Cost of Existing Collection Service

Appendix 2: Assumptions Made in Modelling Food Waste Collection Options

1. INTRODUCTION

Gifford Part of Rambøll in association with IKM Fehily Timoney (IKMFTC) was retained by ZWS (Zero Waste Scotland) to prepare a business case for the separate collection of food waste for Falkirk Council (FC). The business case comprised a financial and performance options appraisal exercise for the council. The aim of the business case is to inform FC as to the collection service configuration that will enable FC to introduce a separate kerbside food waste collection service.

The business case seeks to provide FC with an understanding of the services that would enable the authority to maximise the diversion of food waste from landfill at an affordable cost and for each option provide a comparison in relation to the existing service in terms of cost and recycling/composting rate. It is intended that this report will be used to inform Falkirk Council decision-making with regards to service option choice.

1.1 Reason for Business Case

The Food We Waste in Scotland Report² was published in September 2009 following work carried out on behalf of WRAP and Waste Aware Scotland. The key points to note from the Food We Waste in Scotland Report are summarised below: -

- Scottish households produce 566,000 tonnes of food waste every year. Of this, 341,000 tonnes (60.2%) is collected from people's homes by councils either in their mixed waste or in special food waste collections for recycling, where these are provided.
- the difference – 225,000 tonnes or 39.8% – is disposed of by other means including home composting, feeding to pets and tipping down the sink (sewer).
- the avoidable food waste disposed of by households amounted to £430 per household.
- the top-5 food and drinks that were disposed of by weight in Scotland were milk, bread, carbonated drinks, potatoes and pre-packed meals.
- the hospitality and catering industry in Scotland sent an estimated 68,000 tonnes of food waste to landfill in 2009 (WRAP, 2009).

In order to support the separate collection and processing of food waste, Zero Waste Scotland (ZWS) plans to deliver a £4m programme in 2011/12. The Food Waste Programme will support the following projects:-

- Development of part business case for local authorities to implement food waste collections and treatment.
- Development of full business case where procurement of treatment facilities is identified as a priority.
- Funding support of Local Authority treatment infrastructure.
- Funding support for separate food waste collection.
- Funding for mixed food & garden waste collections where the case for separate collection is not technically, environmentally or economically practical.
- De-minimus funding to private sector for start up costs for commercial food waste service.
- De-minimus funding to private sector for additional infrastructure at existing treatment facilities.

The funding will support local authorities, working in partnership with Scottish Futures Trust, and resource management businesses with projects that will enable more homes and businesses to access separate food waste collections. ZWS has set aside £3m of the £4m to support separate food waste collection and processing by local authorities.

ZWS and Scottish Futures Trust have supported the development of this business case to allow Falkirk Council to assess the options available for the collection and treatment of food waste. This business case document, although supported by Zero Waste Scotland and Scottish Futures Trust, will be owned by Falkirk Council.

² http://www.wrap.org.uk/downloads/Food_waste_in_Scotland_FINAL_report_28_August_2009.624b15b8.7550.pdf

1.2 Expected Outputs of Business Case

The Falkirk Council business cases will fit into Zero Waste Scotland's Programme Plan for 2011-2015 with the aim of increasing separation of waste into resource streams and increased economic opportunities resulting from improved processing and treatment infrastructure.

The output of the project is a business case specifically addressing the separate collection of food waste from households within the Falkirk Council functional area. The business case examines the following options for the separate collection of food waste:

Baseline - "Do Nothing Scenario" The current collection service was modelled as a baseline comparator

Option 1 - "Fortnightly Co-Collected Food Waste" Collection of food waste on a fortnightly basis using modified Terberg Kerbsiders. The Kerbsiders will be fitted with a food pod. This will allow the collection of food waste on same day and pass as existing "Black recycling box".

Option 2 - "Weekly Co-Collected Food Waste" Collection of food waste on a weekly basis using modified Terberg Kerbsiders. The Kerbsiders will be fitted with a food pod. This will allow the collection of food waste on the same day and pass as existing "Black recycling box". On the week when the black recycling box is not collected additional vehicles (7.5t RCV) will be deployed to collect food waste.

Option 3 - "Weekly Food Waste" Collection of food waste on a weekly basis using a dedicated fleet of vehicles (7.5t RCV).

Option 4 - "Fortnightly Co-Collection with Existing Garden Waste Service". This option involves the fortnightly collection of food waste from householders during the same pass as the existing garden waste collection service.

The output of the project is an examination of the options for separate food waste collection and a clear definition of the necessary steps to move the Zero Waste Plan forward in Falkirk.

1.3 Brief Description of What Will Follow

The business case involves a review of the existing collection services and the development of a model of four possible food waste collection options. This business case seeks to determine the optimal food waste collection and treatment arrangements for Falkirk Council.

The project output is a business case prepared in accordance with the Zero Waste Scotland template which details the options for collection and treatment of food waste for Falkirk Council. The business case was developed to meet the requirements and local circumstances of Falkirk Council.

2. BACKGROUND INFORMATION & CURRENT ARRANGEMENTS

The Falkirk Council area extends to some 300 sq. km. and is located in the middle of Scotland's Central Belt between Glasgow and Edinburgh. The population of approximately 149,150 is focused within a network of small to medium sized towns.

Falkirk is the principal and administrative centre of the Falkirk Council area, with a population of approximately 36,000. Falkirk is centrally located and serves as the main shopping, service and employment centre for the area. Separated from Falkirk by a narrow Green Belt are the urban areas of Larbert/Stenhousemuir, Polmont and Grangemouth. The former two are largely residential in character, whilst Grangemouth is home to the largest petrochemical complex in Scotland. In the western reaches of the area lie the settlements of Denny/Dunipace, Bonnybridge and Banknock, whilst to the east, overlooking the Forth, sits the town of Bo'ness. Some 18 smaller village communities are scattered across the rural part of the area.

2.1 Falkirk Council Kerbside Waste Collection Service

Falkirk Council offers residents a three bin kerbside collection service, a kerbside (black) box and a textile recycling sack. Falkirk currently operates a fortnightly residual waste collection service for the majority of properties, although some properties such as flats still receive a weekly collection. The number of household's receiving a residual waste collection service is 70,533.

Approximately 95% (68,000) of households are provided with a fortnightly kerbside recycle collection service. The dry recycle service incorporates the following;

- 240 litre blue co-mingled mixed dry recyclable bin
- 50 litre black box collected separately

The council provides a fortnightly kerbside collection service to approximately 60,000 households for green (garden) waste. The green waste is collected in a brown wheeled bin.

Residences in multi occupancy buildings are provided with a weekly mini blue box and bag collection service. Residual waste is disposed of in either a green bin, black bag or communal waste bin.

Material Stream	Service Coverage	Frequency of Collection	Container	Materials Collected
Residual	70,533	Fortnightly	240 litre green wheeled bin	Residual waste
Recycling Co-mingled	68,000	Fortnightly	240 litre blue wheeled bin	Mixed plastics, Tetra pak, Paper, Cardboard, Plastic bottles, Food and drinks cans
Black Box	68,000	Fortnightly	50 litre black box	colour segregated glass, small WEEE & batteries
Textiles	68,000	Fortnightly	Plastic Sack	Clothing, Shoes, Bags, Belts, Blankets, Quilt covers, Duvets, pillow cases and sheets
Garden	60,000	Fortnightly	240 litre brown wheeled bin	Flowers and plants, Grass clippings, Hedge trimmings, Weeds, Leaves, Prunings, Twigs and small branches

Table 2.1: Existing Falkirk Council Waste Collection Service

2.2 Falkirk Council Additional Service

In addition to the household kerbside collection, the following services and facilities are provided:

- Falkirk also has a network of over 90 recycling points where users can recycle food and drink cans, glass, paper and textiles.
- Falkirk operates a 'Recycling led Commercial waste collection' servicing around 800 customers who must recycle if they wish a service to be provided by the Council.
- A Recycling led Bulky uplift service is also provided by the Council. This allows for material to be diverted for recycling at the Council's recycling centres.
- WEEE waste contracted to the VALPAK Producer Compliance Scheme where this is separated and collected from recycling centres.
- Falkirk has two Household Recycling Centres (HWRC) one at Kinnell Kerse Recycling Centre, Grangemouth Road and one at Roughmote Recycling Centre, Bogton Road. These offer a variety of waste separation opportunities for householders.
- A Transfer Station, based at Roughmote.
- Waste awareness and waste prevention campaigns and activities in partnership with Zero Waste Scotland (ZWS) and community bodies. These focus upon waste prevention and niche reuse/recycling activities such as home composting and real nappies..

2.3 Falkirk Council Current Contractual Arrangements

Falkirk Council has a contract with Avondale Environmental Ltd. for the disposal of residual waste at the Kinneal landfill. The gate fee for residual waste is fixed at £82.83/tonne up to 2015. The gate fee for residual waste includes the landfill tax and Retail Prices Index (RPI). The landfill operator plans to upgrade the treatment process at the landfill. The residual waste will be processed through a "dirty MRF" and also undergo biological treatment. The contract gate fee is broken down by year as shown below;

Year	Cost/Tonne
2011/12	£70.67
2012/13	£75
2013/14	£78.90
2014/15	£82.83

Table 2.2: Falkirk Council Landfill Gate Fee 2011 to 2015

Falkirk Council has a contract with Oran Environmental Solutions (OES) for the processing of the co-mingled mixed dry recyclables. The contract runs to 2014. The current contract sees a £0/tonne processing cost for the duration of the contract with a possible rebate to the council should markets exceed a certain level.

Focsa Services (UK) Ltd is contracted by Falkirk Council to collect the material in the black recycling box and textile bags. The contract commenced on 31st May 2010 with an initial duration of 5 years (31st May 2015). The option exists to extend the contract for a further two years in one year increments. Falkirk Council provides 4 no. Terberg Kerbsiders and 1 no. stillage vehicle to FOSCA. Under the contract FOSCA provide labour, fuel, insurances and day to day vehicle maintenance. Falkirk pays for routine maintenance of the five vehicles.

Current annual payment to FOCSA is £462,000 per year with additional vehicle maintenance cost of £104,000. All the material collected through the box collection has free recycling or net income. The proposed income for the current year (2011/12) is estimated at £50,000. This year (2011/12) the councils budgeted income from textiles is £60,000.

Falkirk Council currently processes the kerbside collected garden waste at the council operated windrow composting facility at Kinneil Kerse. This facility is currently awaiting PAS100 accreditation (due

September/October 2011). Current gate fee for garden waste is £25/tonne. However, the council intend to tender this service in the fourth quarter of 2011 and anticipate a returned price in the region of £18-£20/tonne.

Material	Collection Provided by	Disposal/Treatment Location	Treatment Operator	Contract Duration	Tonnage Managed 2010
Residual	Direct Labour (FC)	Avondale Quarry, Polmont (Landfill)	Avondale Environmental Ltd	2015	35,389
Recycling Co-mingled	Direct Labour (FC)	Grangemouth MRF 1-5 Abbotsinch Road Grangemouth	Oran Environmental Solutions	2014	11,920
Black box and Textiles	Focsa Services (UK) Ltd	Greengairs Grengairs Rd Airdrie ML6 7TD	Focsa Services (UK) Ltd	31st May 2015	1,932
Garden Waste	Direct Labour (FC)	Kinneil Kerse, Grangemouth Road (Windrow Composting)	Falkirk Council	N/A	8,773

Table 2.3: Summary of Existing Contract Arrangements for Falkirk Council Kerbside Collections

3. CURRENT PERFORMANCE & RESOURCES

The total municipal waste arising in Falkirk Council in 2010/11 was 90,122 tonnes, of which 45,733 tonnes was sent to landfill and 44,389 tonnes was recovered or composted. Of the total waste arising (90,122 tonnes) managed by the council, 58,138 tonnes (64.5%) was collected at the kerbside and 31,984 tonnes via the other collection infrastructure. A breakdown of the quantities of kerbside collected material is shown below:

Waste Stream	Tonnage Collected 2010	% of Total Kerbside Collection
Refuse	35,389	60.9
Recycling Co-mingled	11,920	20.5
Black Box	Green Glass 622, Amber Glass 362, Clear Glass 777, Small WEEE 171 Total (1,932)	3.3
Textile	124	0.2
Garden	8,773	15.1
Total	58,138	100

Table 3.1: Quantity of Material Collected Via Kerbside Collections 2010/2011

3.1 Performance Data

Shown below is the Falkirk Council quantity of waste managed, recycled/composted and the recycling/composting rate from 2006/07 to 2010/11.

Year	MSW Arising	Recycled/Composted	Recycling/Composting Rate
2006/07	113,785	39,783	34.96%
2007/08	102,272	36,792	35.98%
2008/09	95,994	39,128	40.76%
2009/10	90,980	38,895	42.75%
2010/11	90,122	44,389	49.25%

Table 3.2: Falkirk Council Recycling Rate 2006 to 2010

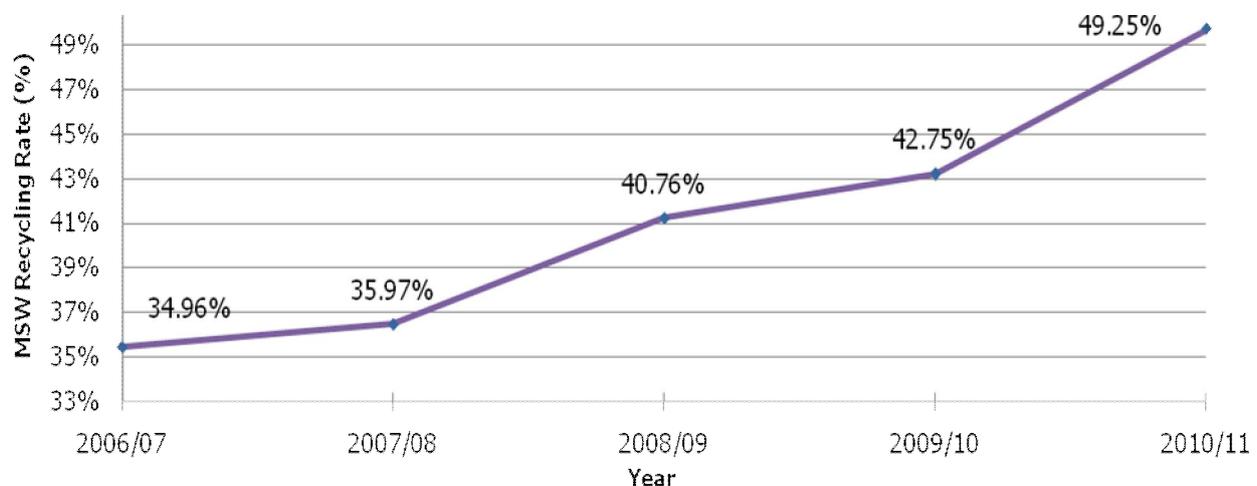


Figure 3.1: Falkirk Council Recycling Performance 2006 to 2010

3.2 Resources

Residual and co-mingled mixed dry recyclables are collected on alternative weeks. A total of 14 vehicles are used to collect residual & co-mingled recyclates. The Council has 7 spare collection vehicles of varying size which are used in the event of the unavailability of the primary collection fleet.

The recycling box and garden waste services operate as a stand alone collection. There are 5 vehicles for the collection of 50 L black boxes and textile bags. The council has no spare kerbsiders. There are 6 vehicles for the collection of garden waste.

Material	Routes	Drivers	Loaders	Vehicles	Vehicle Type	Service Provider
Residual	14	14	28	14	26t RCV	Direct Labour (FC)
Co-mingled mixed dry recyclables	14					
Garden Waste	6	6	12	6	26t RCV	Direct Labour (FC)
Black box and Textiles	5	5	10	5	4 no. Terberg Kerbsiders & 1 no. Stillage vehicle	Focsa Services (UK) Ltd

Table 3.3: Vehicles and Staff Resources Kerbside Collections

3.3 Waste Composition

Falkirk Council commissioned a waste compositional study on the material collected in the residual waste bin. During March 2010, a sample of waste was collected from 144 household. The waste composition study involved the collection and manual sorting of samples of waste from selected areas within the Falkirk Council functional area. Sample areas were selected that were statically representative of the districts' population and as such a representative sample of residual waste was created.. The representative sample areas were selected using "A Classification of Residential Neighbourhoods" (ACORN) data.

ACORN is a socio-demographic tool developed by CACI Limited from data obtained from sources including the UK census and is the accepted tool for use on waste compositional analysis. The tool classifies households taking into account a range of sociological, demographic and economic indicators assigning an ACORN classification code to ranges of households. The sample selection is shown below:

ACORN Category Profile	Profile	Data as % for Area
1 Wealthy Achievers	12,755	18.6
2 Urban Prosperity	6,072	8.8
3 Comfortably Off	13,511	19.7
4 Moderate Means	7,209	10.5
5 Hard-Pressed	28,630	41.7
Unclassified	460	0.7
Total (excl. unclassified)	68,177	100.0

Table 3.4: Falkirk Council ACORN Profile

The results of the waste composition study are shown below:

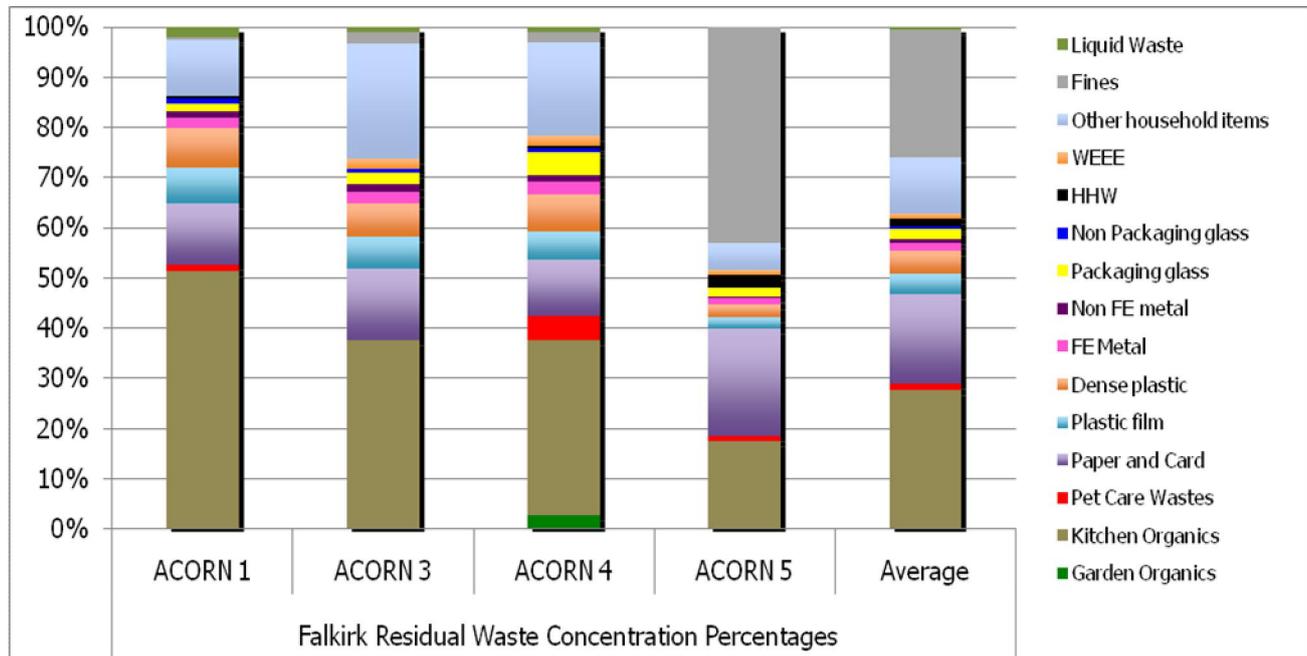


Figure 3.2: Falkirk Council Waste Composition 2010

In 2010, 35,389 tonnes of residual waste was collected by the Falkirk Council kerbside collection service. Using the concentration (%) of the primary categories results of the waste composition study the quantity of each material was calculated as shown below:

Primary categories	Concentration %	Kg/household/week	2010/11 Tonnage
Garden Organics	0.30	0.04	106.18
Kitchen Organics	27.42	3.24	9704.26
Pet Care Wastes	1.20	0.14	425.73
Paper and Card	17.74	2.10	6277.47
Plastic film	4.22	0.50	1494.98
Dense plastic	4.45	0.53	1576.10
FE Metal	1.63	0.19	576.12
Non FE metal	0.75	0.09	265.81
Packaging glass	2.14	0.25	757.06
Non Packaging glass	0.40	0.05	141.67
HHW	1.49	0.18	526.74
WEEE	1.16	0.14	411.63
Other household items	11.16	1.32	3948.26
Fines	25.40	3.00	8988.52
Liquid Waste	0.53	0.06	188.73
Total	100.00	11.81	35,389

Table 3.5: Falkirk Average Residual Waste 2010

3.4 Current Budget Allocation

The costs associated with the provision of the current Falkirk Council kerbside collection service are outlined below:

Collection Type	Cost (£)/Yr	% of Total Service Cost	£/Tonne/Yr	£/ Household/Yr
Residual Service	£3,835,089	57%	£108.37	£54.37
Co-Mingled Mixed Dry Recyclables	£1,130,193	17%	£94.81	£16.62
Garden	£1,213,425	18%	£138.31	£20.22
Black Box & Textile	£551,702	8%	£268.34	£8.11
Overall Service	£6,730,409	100%	£115.77	£95.42

Table 3.6: Costs Associated with Existing Falkirk Council Kerbside Collection Service

Appendix 1 contains a breakdown of the costs associated with the delivery of the existing kerbside collection service.

4. THE DRIVERS FOR CHANGE

4.1 *Scotland's Zero Waste Plan*

Scotland's Zero Waste Plan (ZWP) was published by the Scottish Government on 9th June 2010. The full plan can be viewed on the Scottish Government website.³ The key points of relevance from the Zero Waste Plan in relation to the collection and treatment of food waste are summarised below: -

- Action 4 – The introduction of landfill bans for materials such as food waste.
- Action 5 – The introduction of a carbon metric measurement that will encourage the recovery of materials in a way that has greater environmental benefit.
- Action 8 – The introduction of regulations to support the separate collection of materials, and specifically food waste, in order to recover the energy value from the material.
- Annex A – Only materials that have achieved PAS100 or PAS110 quality specification for composted or digested materials will be counted as recycling.
- Annex C – The intention of the Scottish Government to enact legislation to require the separate collection of food waste from households and commercial premises.

The Scottish Government has set municipal waste recycling and composting targets of 40% by 2010 increasing to 70% by 2025. European landfill diversion targets are also in place for biodegradable municipal waste for 2010, 2013, and 2020. By 2013, the biodegradable waste to landfill must be 50% of the amount in 1995. These challenging targets mean Local Authorities are looking at the potential to collect and recycle biodegradable waste streams to maximise diversion from landfill.

4.2 *Proposed changes to European Waste Framework Directive*

The revised Waste Framework Directive (WFD) (2008/98/EC)⁴ came into force in UK law on 12 December 2010 and repealed three existing directives:

- Existing Waste Framework Directive (2006/12/EC)
- Waste Oils Directive (75/439/EEC)
- Hazardous Waste Directive (91/8689/EEC)

Scottish law already contained the necessary provisions to comply with the repealed directives. However, the revised WFD introduced several provisions that required additions and amendments to existing Scottish waste legislation. Some of the amendments were met by inclusion in the revised Zero Waste Plan for Scotland (ZWP). The remaining provisions have been transposed into the Waste Management Licensing (Scotland) Regulations 2011 and the Waste (Scotland) Regulations 2011, which came into force in 27th March 2011. The main changes to waste management priorities in Scotland and the UK will be from the transposition and implementation of a new five step waste hierarchy:

1. Prevention
2. Preparing for reuse
3. Recycling
4. Other recovery, e.g., energy recovery
5. Disposal.

The new waste hierarchy is intended to act as a priority order in waste prevention legislation and policy. This means that any decisions relating to waste will need to take the new hierarchy into account. The revised Directive also sets out a range of targets, including the provision that 50% of household waste must be recycled or prepared for reuse, by 2020.

³ <http://www.scotland.gov.uk/Resource/Doc/314168/0099749.pdf>

⁴ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:312:0003:0030:EN:pdf>

In addition, there is a requirement to set up separate collection of at least paper, metal, plastic and glass from household waste by 2015. The separate collection of biowaste, such as food and garden waste, was expected to be encouraged in the transposition of the Directive and this is addressed in the ZWP.

4.3 Proposed Zero Waste Regulations

Following the publication of the Zero Waste Plan (ZWP) in June 2010, the Scottish Government is currently reviewing a consultation exercise⁵ on draft regulations aimed at implementing a number of policies set out in the ZWP.

The Draft Regulations will (if enacted as set out in the consultation) result in:

1. a requirement for source segregation and separate collection of key recyclable materials and food waste;
2. a ban on mixing separately collected wastes with other wastes;
3. a ban on landfilling of key recyclable materials and food waste;
4. a restriction on the inputs to energy from waste (EfW) facilities; and
5. a property based ban on waste disposed of to landfill based on organic content.

More specifically in relation to food waste it is proposed to introduce a number of new statutory duties on Scottish local authorities:

- a duty to provide receptacles to householders which will enable them to present food waste, glass, metals, plastics, textiles, paper and card (including cardboard) for collection separately from other waste; and
- a duty to collect and carry separately from other types of waste any food waste, glass, metals, plastics, textiles, paper and card (including cardboard) which has been presented for separate collection by householders.

4.4 Council's Current Waste Strategy

Falkirk Council, in partnership with Clackmannanshire Council and Stirling Council, prepared the Forth Valley Area Waste Plan (AWP)⁶ in 2003. The AWP describes the Forth Valley Waste Strategy Area Group (WSAG) targets and plans over the eight years from 2003 and was written in response to the National Waste Plan for Scotland. The key aim of the Area Waste Plan was:

"to contribute to the sustainable development of the Forth Valley by developing waste management systems that will control waste generation, reduce the environmental impacts of waste production, improve resource efficiency, stimulate investment and maximise the economic opportunities arising from waste".

In 2006 the WSAG also produced the Forth Valley Regional Waste Management System – Strategic Outline Case⁷ (SOC). This document describes a number of options and business cases for meeting the Landfill Allowance Scheme (LAS) targets using the Best Practicable Environmental Option (BPEO) as set out in the AWP. The main elements of the BPEO set out in the SOC are:

- Extensive Waste Prevention and Public Awareness Programme
- Enhance capacity and function of the Waste Recycling Centres
- Progressively harmonise the kerbside collection in Forth Valley
- Develop a Materials Recovery Facility (MRF)
- Enhanced Composting Facility
- Procure Residual Waste Treatment Solution

⁵<http://www.scotland.gov.uk/Resource/Doc/332934/0108419.pdf>

⁶http://www.falkirk.gov.uk/services/development/waste_strategy/Forth%20Valley%20Area%20Waste%20Plan.pdf

⁷<http://www.scotland.gov.uk/Resource/Doc/113776/0027643.pdf>

The AWP is due to be revised in 2011 but is expected to continue with the recommendations of the 2003 AWP and provide more detail as set out in the SOC.

Falkirk Council intends to review the Zero Waste Plan Regulations and as such plan to update the Forth Valley Strategic Outline Case submitted in 2006 to ensure onward compliance with statutory targets. The plan at the time focussed on avoidance and reduction of waste, maximising the reuse and recycling of waste arising using a matrix of preferable local providers, and minimising the volume of residual waste. These criteria still sit comfortably with the obligations for a Zero Waste Scotland.

5. METHODOLOGY

The first step was to model the existing “baseline” collection service. The approach firstly required that the resources and logistics involved in the existing services be captured as accurately as possible within a ‘baseline’ model. The cost data provided by FC was modelled using MS Excel. The model was used to calculate the annual costs and environmental performance associated with the delivery of the existing kerbside collection service. The baseline model attempts to describe the logistics and costs of the current services. A full description of the current service provision is given in section 3 above. The baseline model was checked and verified by Falkirk Council. Ensuring that the baseline model was representative of the local collection characteristics provided a foundation upon which alternative options were modelled and evaluated.

A number of meetings were held between IKM Fehily Timoney, Falkirk Council (FC) and Zero Waste Scotland (ZWS) to agree the food waste options to be modelled. The operational cost data required for the four food waste collection options was provided by Falkirk Council. ZWS provided data on cost items such as food waste containers, communication and awareness, etc.

Under each food waste collection option, the model subsequently calculates the staffing, vehicle requirements and associated collection and disposal costs. The model calculates the expected performance of each option in terms of recycling / composting rates and also calculates the estimated costs of each option based on numbers of vehicles, containers, and crew required and multiplies these by their unit costs. The cost of treating/disposing of the various waste streams is calculated and included. Finally the model adds overheads for management and administration.

6. ASSUMPTIONS

In order to model the options for the collection of food waste a number of assumptions were made. A number of cost headings are constant across all four options e.g. cost of food waste containers and communication and awareness. A full list of the assumptions made in modelling the food waste collection services are provided in Appendix 2.

ZWS and Falkirk Council requested that a sensitivity analysis be carried out on the amount of food waste presented per week by householders. The aim of carrying out the sensitivity analysis was to examine the impact of householders presenting varying amounts of food waste and the associated impacts on landfill diversion rates and landfill gate fee savings.

6.1 Sensitivity Analysis Available Quantity of Food Waste

The most significant assumption made in the MS Excel model relates to the yield of food waste that could be expected from each household covered by a food waste collection service. The calculation of the maximum quantity of food waste available from kerbside households is calculated based on the quantity of residual waste requiring management, composition of the residual waste stream and number of households that are provided with a food waste collection service.

Parameter	Value	Unit
Number of Kerbside Households	70,533	Households
Total Household Waste to Landfill (2010)	35,389	Tonnes
% Kitchen Organics	27.42	%
Total Quantity of Food Waste Available	9,704	Tonnes
Quantity\Household\Year	137.58	Kg\HH\Yr
Number of Households with Food Waste Service	64,000	Households
Available Food Waste from Household Provided with Food Waste Service	8,805	Tonnes

Table 6.1: Falkirk Council Available Food Waste

If the 64,000 households provided with the food waste collection service diverted 100% of the food waste a total of 8,805 tonnes of food waste would be collected. This assumes that every household avails of the food waste collection service and that 100% of the food waste is captured (100% capture rate). The behaviour of households in previous studies suggests that less than 100% capture rate can be expected as every household will not avail of the food waste collection services. The Scottish Food Waste Collection trials⁸ reported that:

- measured participation rates⁹ during the trials varied more significantly between 53% - 78%.
- three of the trials provided separate food waste collection to main door properties; the average yield from these trials was 1.5 kg/hh/wk¹⁰ of food waste for all households.
- for main door collections the WRAP trials found an average between 1.04 kg/hh/wk and 2.10 kg/hh/wk.
- average yields for food waste only households setting out in Scotland was 3.52 kg/hh/wk
- average yield of food from the combined food and garden waste collection was 0.8 kg/hh/wk¹¹.

⁸ http://www.wrap.org.uk/downloads/Scottish_Food_Waste_Collection_Trials.cdeba53c.10243.pdf

⁹ Participation - the number of households who set out their container(s) at least once in three consecutive collections as a percentage of the total number of households provided with the service.

¹⁰ Three of the trials provided separate food waste collection to main door properties; the average yield from these trials was 1.5 kg/hh/wk of food waste for all households. Source of data Scottish Food Waste Collection Trial, page i.

¹¹ The average yield of food from the combined food and garden was 0.8kg/hh/wk. Source of data Scottish Food Waste Collection Trial, page ii.

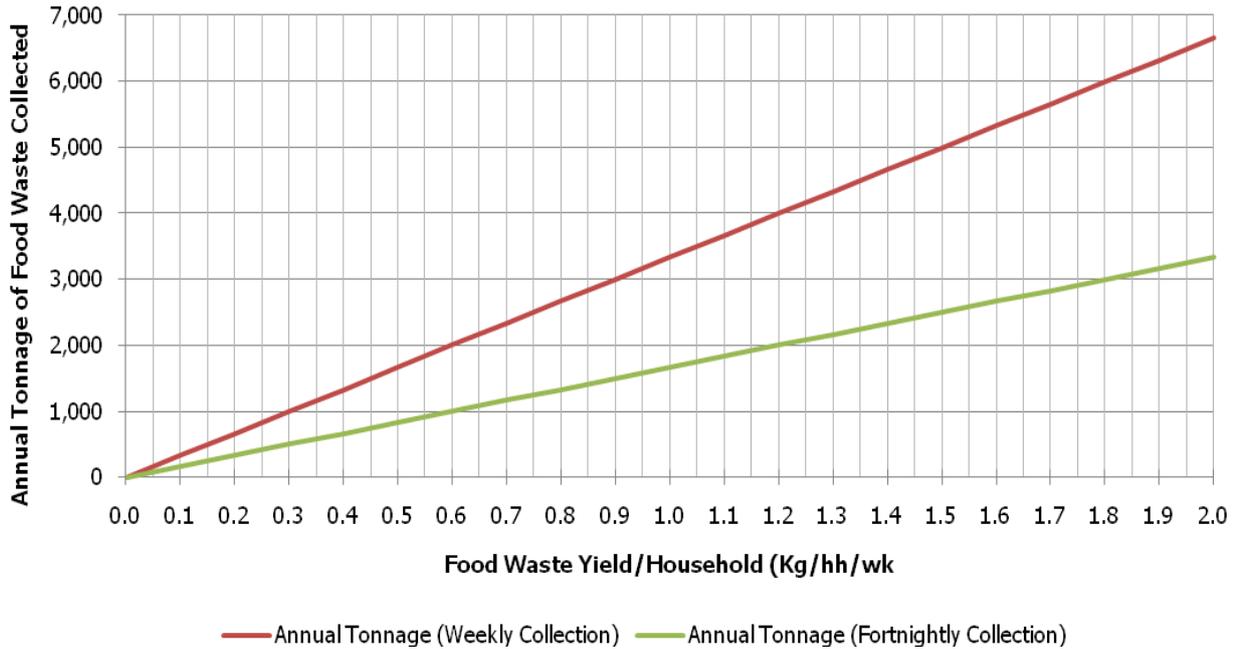


Figure 6-1: Impact of Food Waste Yield/Household on Annual Quantity of Food Waste Collected

When modelling, an assumption is made as to the yield of food waste that could be expected from every household covered by the service. The amount of food waste that each household presents for collection has a direct impact on the annual quantity of food waste diverted from landfill. Figure 6.1 shows that 4,992 tonnes (56.7%) of total available food waste (8,805 tonnes) would be diverted with a weekly collection service and household yield of 1.5 kgs/hh/wk whereas 3,994 tonnes (45.4%) would be diverted with a yield per household of 1.2 kgs/hh/wk.

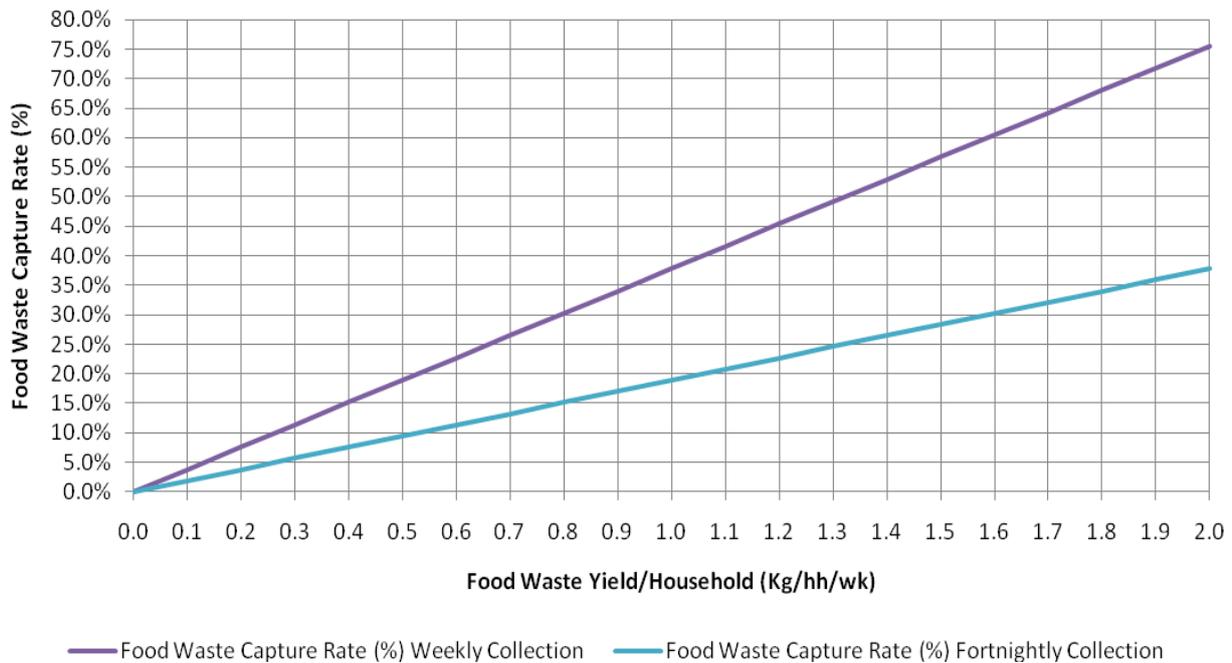


Figure 6.2: Impact of Food Waste Yield/Household on Food Waste Capture Rates

Figure 6.2 shows the capture rate (%) associated with household food waste yields ranging from 0 kgs to 2 kg/household/week. The graph also shows the variation between weekly and fortnightly collections. If a figure

of 1.5 kg/hh/wk was employed as the average yield of food waste from all households in Falkirk. it would translate to a capture rate of 56.7% for weekly food collection service. This implies that 100% of the food waste is captured from 56.7% of the households, whereas a capture rate of 45.4% would result if household yield was 1.2 kgs/hh/wk.

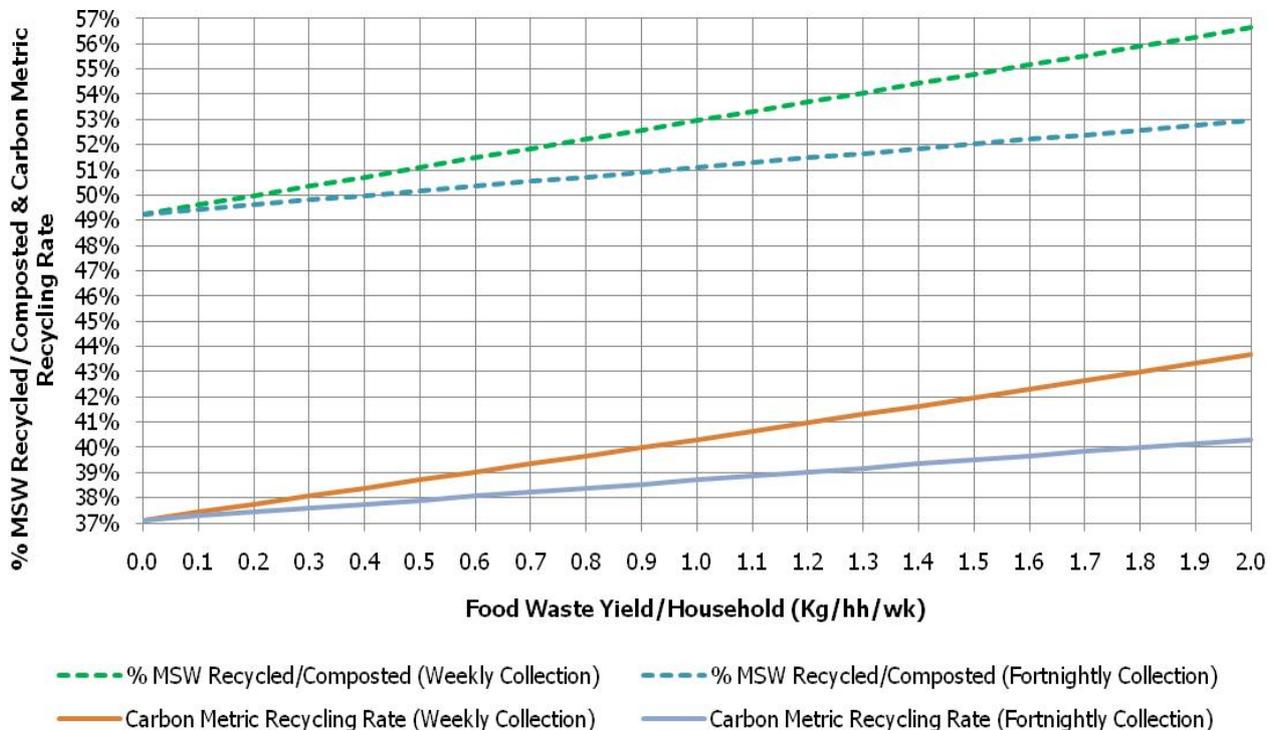


Figure 6.3: Impact of Food Waste Yield/Household on Recycling Rate and Carbon Metric

Falkirk currently has a MSW Recycling\Composting rate of 49.25% and a carbon metric recycling rate of 37.12%. Figure 6.3 shows the impact that the quantity of food waste presented per household has on the MSW Recycling\Composting rate and carbon metric recycling rate.

Within the model it has been assumed that the gate fee for treatment of food waste will be £37.50¹²/tonne. There is a landfill gate fee saving associated with the diversion of food waste away from landfill. As outlined in section 2.3 above Falkirk Council has a contract with Avondale Environmental Ltd for the disposal of residual waste at the Kinneal landfill. The landfill gate fee savings per year are shown below:

Year	Landfill Gate Fee/Tonne (£)	Food Waste Gate Fee/Tonne (£)	Net Gate Fee Saving/Tonne (£)
2011/12	70.67	37.5	33.2
2012/13	75	37.5	37.5
2013/14	78.9	37.5	41.4
2014/15	82.83	37.5	45.3
Post 2015	100	37.5	62.5

Table 6.2: Falkirk Council Landfill Gate Fee Saving 2011 to 2015

¹² Figure supplied by Falkirk Council

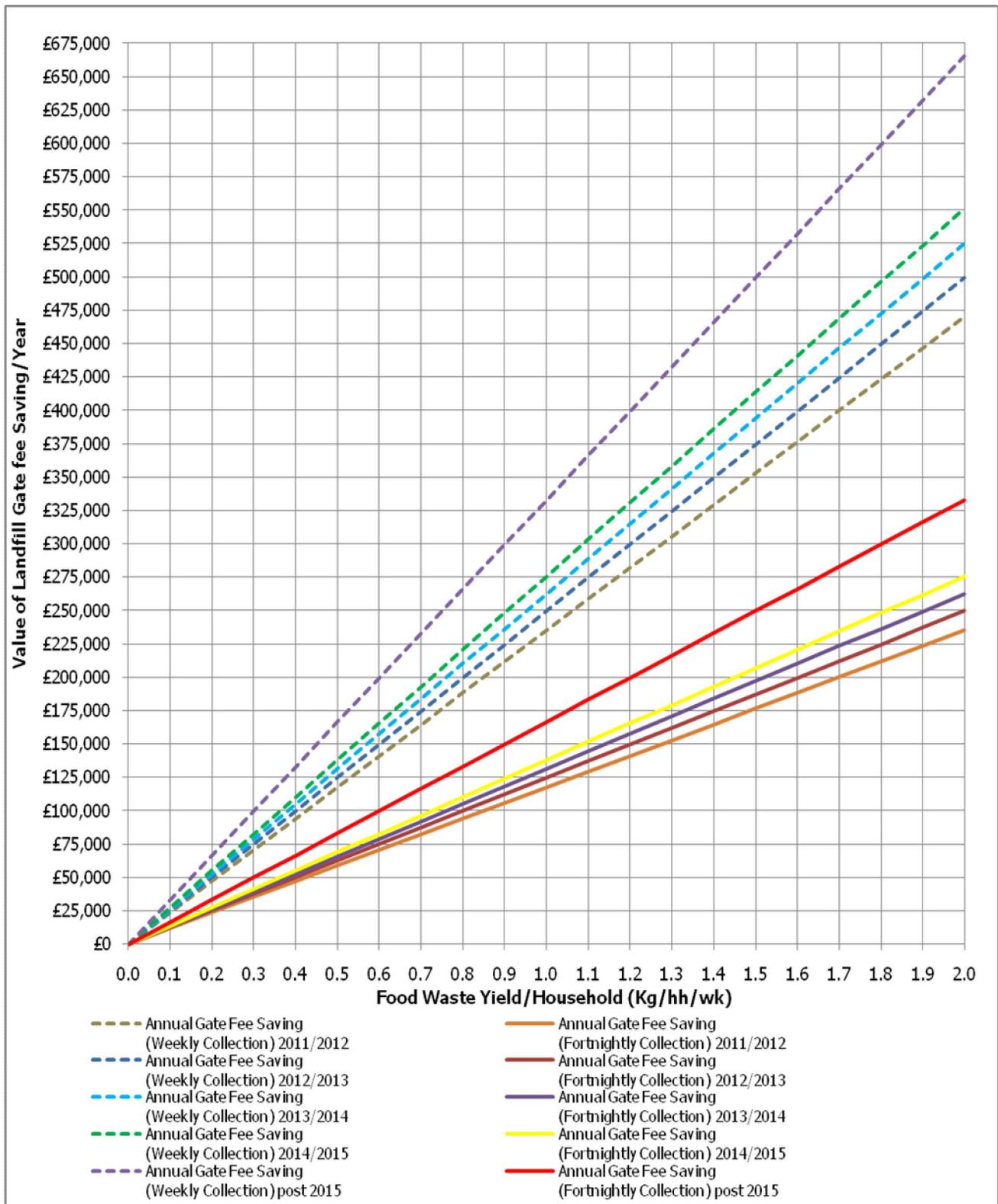


Figure 6.4: Impact of Food Waste Yield/Household on Landfill Gate Fee Saving

Figure 6.4 shows the impact of householders diverting food waste away from landfill in terms of landfill gate fee saving. The largest gate fee saving is achieved with weekly collection of food waste as more waste is diverted from landfill. Post 2015 a landfill gate fee of £100/tonne was assumed this was based on soft market sounding carried out by Falkirk Council.

6.2 Modelled Household Food Waste Yield

In discussions with FC and ZWS it was agreed to model a figure of 1.2 (kg/hh/wk) as the food waste yield/household under a weekly collection frequency and 0.7 (kg/hh/wk) for fortnightly collection. These figures were selected based on the operational experience of Falkirk Council. A comparison between the weekly food waste yields used in the Falkirk model compared to the Scottish Food Waste Collection Trial Report is shown below:

Parameter	Falkirk Council Model (1.2 kg/hh/wk)	Scottish Food Waste Report (1.5 kg/hh/wk)	Difference
Annual Quantity of Food Waste Collected (tonnes)	3,994	4,992	998
Capture Rate (%)	45.4	56.7	11.3
MSW Recycled/Composted (%)	53.7	54.8	1.1
Carbon Metric Recycling Rate (%)	41	42	1
Annual Gate Fee Saving 2012/2013 (£)	149,760	187,200	37,440

Table 6.3: Comparison between Weekly Household Food Yields of 1.2 kg of 1.5 kg

7. COLLECTION OPTIONS

The food waste options modelled were selected to reflect a range of collection techniques that could be employed by Falkirk Council (FC) to collect food waste. The range of options reflect some options that are likely to be affordable but may not provide the performance that FC will eventually require and some options that are likely to be more expensive but are likely to result in higher environmental performance. Options were selected that provide a practical strategy to:

- Capture a significant amount of food waste and
- Provide a cost effective and sustainable food waste collection service

7.1 Options to be modelled

A summary of the four options modelled is shown in table 7.1. In each food waste collection option there will be a revenue cost savings achieved by diverting food waste away from landfill to anaerobic treatment. There is no landfill tax saving as the increase in landfill tax up to 2015 is included in the existing contract gate fee for landfill disposal.

Option Name	Option Title	Food Collection Frequency	Waste	Description of Option
Baseline	Do Nothing Scenario	No Food Collection	Waste	Existing collection service with no food waste collection.
Option 1	Fortnightly Co-Collected Food Waste	Fortnightly		Co-collection of food waste on fortnightly basis using modified Terberg Kerbsiders. Existing Terberg Kerbsiders modified to include a food waste pod. Food waste collected from householders during same pass as "Black Box Recycling"
Option 2	Weekly Co-Collected Food Waste	Weekly		Week 1, co-collection of food waste on fortnightly basis using modified Terberg Kerbsiders. Existing Terberg Kerbsiders modified to include a food waste pod. Week 2, collection of food waste using fleet of new 7.5t RCV's.
Option 3	Collection of food waste on weekly basis using modified small RCV (7.5t).	Weekly		Weekly collection of food waste using fleet of new 7.5t RCV's.
Option 4	Fortnightly Food Waste Collection Co-mingled with brown bin (Garden)	Fortnightly		Co-collection of food waste on fortnightly basis using existing garden waste fleet.

Table 7.1: Falkirk Council Modelled Food Waste Collection Options

7.2 Baseline - "Do Nothing Scenario"

In this option the existing service remains unchanged. This option is the baseline against which the other options are compared. A summary of the existing service costs and environmental performance are shown below:

Collection Type	Annual Cost	% of Total Cost
Residual Service Cost	£3,835,089	57%
Co-Mingled Mixed Dry Recyclables Cost	£1,130,193	17%
Garden Costs	£1,213,425	18%
Black Box & Textile Costs	£551,702	8%
Overall Service Costs	£6,730,409	100%
MSW Recycling Rate		43.25%
Carbon Metric Recycling Rate		37.12%

7.3 Option 1 - Fortnightly Co-Collected Food Waste – Operational Parameters

In option 1, food waste is collected fortnightly using modified Terberg Kerbsiders. The Terberg Kerbsiders are modified to include a pod for the collection of food waste. This option provides for the collection of food waste on same day and pass as "Black recycling box".

Shown below are the modifications to the baseline collection service to account for the roll out of a food waste collection service under option 1.

Parameter	Option 1
Collection Frequency	Fortnightly
Mode of Collection	"Terberg Kerbsiders" vehicles modified to include food collection pod. Kerbsider used to collect waste at the same time as recycling black box.
Vehicles	No additional vehicles purchased by FC
Collection Staff	The collection of food waste is carried out by contractor who currently collects black box recycling. Additional annual payment of £88,588 made to contractor for collection of food waste. No additional FC staff employed to collect food waste.
Containers	Each householder receives a 10 litre kitchen caddy for internal storage and a 25 litre bin for external storage of food waste. Biodegradable bin liners for initial start up. Assuming 6 months of bags which is 78 bags per household (3 per week)
Annual Quantity of Food Waste	$(0.7\text{kg}/\text{hh}/\text{wk} * 52 \text{ weeks}) = 36.4 \text{ kgs}/\text{hh}/\text{year}$. Service coverage = 64,000 households. Annual food waste arising = 2,330 tonnes
Disposal/Treatment:	Food waste is treated in local merchant anaerobic digestion facility

Table 7.2: Option 1 Modifications to Existing Service Configuration

7.4 Option 1 - Fortnightly Co-Collected Food Waste – Cost Breakdown

The 2011/2012 financial year runs from 1st April 2011 to 31st March 2012. Falkirk Council envisages that it will incur capital costs in 2011/2012 related to the purchase of containers and modifications to collection vehicles. No revenue costs will be incurred in the 2011/2012 financial year.

Falkirk Council envisages that in April 2012 they will commence rollout and collection to the first 20,000 properties. In May the service will be rolled out to a further 30,000 properties. The remaining 14,000 properties will be provided with the food waste collection service in June 2012.

Falkirk Council envisages starting the food waste in April 2012 therefore incurring 12 months of revenue costs although all the capital costs will be incurred in 2011/2012.

No retail price index (RPI) is applied in year one (2011/2012). The treatment of food waste is estimated to cost £37.5/tonne and no RPI has been applied to this cost item as soft market soundings indicate that food waste treatment will decrease in coming years. A RPI at 2.5% has been applied to all other cost items.

Year	Containers Capital	Containers Revenue	Comms Revenue	Vehicles Capital	Vehicles Revenue	Collection Logistics Revenue	Food Waste Treatment Revenue	Total Cost Including Administration at 4%
Year 1 (2011-2012)	£426,592	£0	£0	£42,000	£0	£0	£0	£487,336
Year 2 (2012-2013)	£0	£53,000	£51,250	£0	£5,290	£108,114	£87,360	£317,214
Year 3 (2013/2014)	£0	£20,657	£0	£0	£5,422	£110,817	£87,360	£233,226
Year 4 (2014/2015)	£0	£21,173	£0	£0	£5,558	£113,587	£87,360	£236,785
Year 5 (2015/2016)	£0	£21,702	£0	£0	£5,697	£116,427	£87,360	£240,433
Year 10 (2020/2021)	£0	£24,554	£0	£0	£6,445	£131,726	£87,360	£260,089

Table 7.3: Option 1 Food Waste Service Costs Year 1 to 5 and Year 10

7.4.1 Option 1 – Containers

A 10 litre internal kitchen caddy (£1.39/container), a 25 litre external caddy (£3.15/container) and an initial 6 months "starter pack" supply of biodegradable liners (£2.13 for 78 liners) are supplied to the 64,000 households covered by the food waste collection service. The capital cost associated with the purchase of the containers in year one is £426,592.

Providing a 'starter pack' of liners to residents during initial roll out of the food waste collection service can help maximise participation after the launch of collections. However there is potential for significant wastage if liners are supplied to households that do not subsequently participate in the collections. Therefore local authorities should carefully consider how many liners should be provided during trial roll out and the associated cost implications.

The provision of free liners has resource implications for Falkirk Council – approximately £4.25 per participating household per year (based on current prices) and assuming on average 3 liners per week.

In view of this, it is important to note that if free liners are provided at the outset of a scheme, the introduction of charges is likely to have an adverse effect on the performance of a scheme. Surveys carried out by WRAP¹³ in two of the trial areas which provided liners free of charge asked residents whether they would continue to use the service if they had to purchase liners and 38% of respondents stated that they would discontinue using the food waste collection service.

On the other hand, if residents are required to purchase their own liners from the inception of a scheme, it is also likely that some households will not use the scheme for this reason. Anecdotal evidence from some of the trials suggests a mixed approach is sensible – for example, supplying a certain number of liners free of charge during the launch of a scheme and requiring residents to purchase their own liners thereafter. However, it is important that residents use the correct liners so clear advice needs to be provided. There are examples of authorities working with liner suppliers to establish local supply networks to make it easier for residents to purchase the right liners¹¹.

There is a cost associated with the delivery of the containers to each household, estimated by Falkirk Council (FC) at £53,000, which will be incurred in 2012/2013. After the initial roll out there will be a requirement to replace containers due to damage by householders/collection crews, containers lost/stolen and general wear and tear. The recurring annual revenue costs of container replacements after year one is £19,662. It has been assumed that no containers will require replacement in the first year (2012/2013) of service roll out.

7.4.2 Communications

Communications are an integral part of any local authority recycling service. WRAP's (Waste & Resources Action Programmes) guidance in The Waste Collection Commitment (www.wrap.org.uk/lacommitment) sets communications firmly at the heart of any good recycling and waste service. This is based on consumer feedback on what is considered to be the most important aspects of a waste collection service. In order to participate fully, residents need to know clearly what their services are, what their service rules are and what happens to their recycling after it is collected.

The ultimate aim of any recycling communications campaign is to improve recycling performance. WRAP's research shows that key to the success of a recycling scheme is a well designed service with good communications to overcome peoples barriers to participation.¹⁴

The communication and awareness expenditure associated with the initial roll out the FC food waste collection service is £96,000 (£1.5\household). Communications after initial service roll out will be funded from the existing council communication and awareness budget.

7.4.3 Vehicles

The four existing Terberg Kerbsiders vehicles will be modified to include a dedicated food pod. The modification cost per vehicle is £8,000. In addition four spare fork lift stillage container are purchased at a cost of £2,500\container. There is an annual revenue cost of £5,161 associated with the replacement of fork lift stillage.

7.4.4 Collection Logistics

In option 1, food waste is collected during the same pass as the black box recycling. The addition of food waste to the existing contract arrangement will result in an additional payment to the private contractor of £88,588/year. In addition FC will have to supervise the food waste service at an estimated cost of £16,889/year.

¹³ Case study, Food Waste Collection Trials – use of liners for kerbside containers and kitchen caddies

¹⁴ WRAP, Improving recycling through effective communications - Final Report (November 2009)

7.4.5 Carbon Metric and Recycling Rate

The fortnightly collection of food waste will divert an estimated 2,330 tonnes of food waste away from landfill. The diversion of food waste will increase the MSW recycling rate by 2.6% from the current figure of 49.3% to 51.8%. The Carbon Metric Recycling Rate¹⁵ increases by 2.2% from 37.1% to 39.3%.

7.4.6 Summary of Option 1 Costs

The diversion of waste from landfill results in a cost saving due to reduced gate fee for food waste treatment. Table 7.4 shows the nets cost of the option 1 food waste collection service.

Year	Option 1 - Total Food Waste Cost (£/Year)	Landfill Gate Fee Saving (£/Year)	Net Cost Option 1 (£/Year)
Year 1 (2011-2012)	£487,336	£0	£487,336
Year 2 (2012-2013)	£317,214	£174,720	£142,494
Year 3 (2013/2014)	£233,226	£183,805	£49,420
Year 4 (2014/2015)	£236,785	£192,961	£43,824
Year 5 (2015/2016)	£240,433	£232,960	£7,473
Year 10 (2020/2021)	£260,089	£263,573	-£3,484

Table 7.4: Option 1 Net Food Waste Service Costs Year 1 to 5 and Year 10

7.5 Option 2 - "Weekly Co-Collected Food Waste"

In option 2, householders are provided with a weekly food waste collection service. In this option, week 1 will involve collection of food waste on same day and pass as "Black recycling box". On week 2, when the black box is not collected additional vehicles (7.5t RCV Linktip) will be deployed to collect food waste. Shown below are the modifications to the baseline collection service to account for the roll out of a food waste collection service under option 2.

Parameter	Option 2
Collection Frequency	Weekly
Mode of Collection	Week 1 – "Terberg "Kerbsiders" vehicles modified to include food collection pod. Kerbsider used to collect waste is at same time as recycling black box. Week 2 – New fleet of 7.5t (Linktip) collection vehicles are purchased to collect food waste on week when black box recycling is not collected.
Vehicles	Existing "Kerbsider" collection vehicles modified to include food collection pod. Four (4) new 7.5t (Linktip) collection vehicles are purchased.

¹⁵ Figures are estimates based on current method of calculation "Scotland's Zero Waste Plan Carbon Metric Guidance" and may be subject to change

Parameter	Option 2
Collection Staff	On week of black box, food waste is collected at same time as recycling black box, therefore no additional staff employed. Additional payment of £290,600/year to contractor to provide staff to collect food waste.
Containers	Each householder receives a 10 litre kitchen caddy for internal storage and a 25 litre bin for external storage of food waste. Biodegradable bin liners for initial start up. Assuming 6 months of bags which is 78 bags per household (3 per week)
Annual Quantity of Food Waste	(1.2 kg\hh\wk*52 weeks) = 62.4 kgs/hh/year. Service coverage = 64,000 households. Annual food waste arising = 3,994 tonnes
Disposal/Treatment:	Food waste is treated in local merchant anaerobic digestion facility

Table 7.5: Option 2 Modifications to Existing Service Configuration

7.6 Option 2 – Weekly Collection of Food Waste (Kerbsiders & 7.5t RCV's– Cost Breakdown)

The timeline for the roll out of the option 2 food waste collection service is the same as option 1. Shown below are the capital and revenue costs associated with option 2. All the capital costs are incurred in this financial year 2011/12 with revenue cost incurred in 2012/2013.

Year	Containers Capital	Containers Revenue	Comms Revenue	Vehicles Capital	Vehicles Revenue	Collection Logistics Revenue	Food Waste Treatment Revenue	Total Cost Including Administration at 4%
Year 1 (2011-2012)	£426,592	£0.	£0.	£42,000	£0	£0	£0.	£487,336
Year 2 (2012-2013)	£0	£53,000	£51,250	£0	£66,790	£332,487	£149,760	£679,419
Year 3 (2013/2014)	£0	£20,657	£0	£0	£68,460	£340,799	£149,760	£602,863
Year 4 (2014/2015)	£0	£21,173	£0	£0	£70,171	£349,319	£149,760	£614,041
Year 5 (2015/2016)	£0	£21,702	£0	£0	£71,925	£358,052	£149,760	£625,498
Year 10 (2020/2021)	£0	£24,554	£0	£0	£81,377	£405,103	£149,760	£687,226

Table 7.6: Option 2 Food Waste Service Costs Year 1 to 5 and Year 10

7.6.1 Option 2 – Containers & Communications

The number, type and cost of containers provided to householders are identical to those described in option 1 as is the cost of communications.

7.6.2 Option 2 – Vehicles

The four existing Terberg Kerbsiders vehicles will be modified to include a dedicated food pod. The modification cost per vehicle is £8,000. In addition four spare fork lift stillage container are purchases at a cost of £2,500\container. There is an annual revenue cost of £5,161 associated with the replacement of fork lift stillage.

Four additional 7.5t (Linktip) are purchased to collect food waste on the week with the black recycling box is not collected. The 3.5t Linktip vehicles have an indicative capital cost of £41,000 each. A cost of £15,000 was used to model the annual cost associated with the purchase and running of each 7.5t vehicle.

7.6.3 Option 2 – Collection Logistics

Falkirk Council envisages that the collection of food waste will be carried out under contract by a private sector service provider. The modelled annual cost of the private contractor collecting the food waste £290,600/year. In addition, FC will have to supervise the food waste service at an estimated cost of £33,778/year.

7.6.4 Option 2 – Carbon Metric and Recycling Rate

The fortnightly collection of food waste will divert an estimated 3,994 tonnes of food waste away from landfill. The diversion of food waste increased the MSW recycling rate by 4.4% from the current figure of 49.3% to 53.7%. The Carbon Metric Recycling Rate increases by 3.9% from 37.1% to 41%.

7.6.5 Option 2 – Summary of Costs

The diversion of waste from landfill results in a cost saving due to reduced gate fee for food waste treatment. Table 7.7 shows the nets cost of the option 2 food waste collection service.

Year	Option 2 - Total Food Waste Cost (£/Year)	Landfill Gate Fee Saving (£/Year)	Net Cost Option 2 (£/Year)
Year 1 (2011-2012)	£487,336	£0	£487,336
Year 2 (2012-2013)	£679,419	£299,520	£379,899
Year 3 (2013/2014)	£602,863	£315,095	£287,768
Year 4 (2014/2015)	£614,040	£330,790	£283,251
Year 5 (2015/2016)	£625,498	£399,360	£226,138
Year 10 (2020/2021)	£687,226	£451,839	£235,387

Table 7.7: Option 2 Net Food Waste Service Costs Year 1 to 5 and Year 10

7.7 Option 3 – Weekly Collection of Food Waste (7.5t RCV's)

In option 3, householders are provided with a weekly food waste collection service. In this option, food waste will be collected by a fleet of new 7.5t (Linktip) collection vehicles. The model assumes that the 64,000 households will be serviced by 7 RCV's (daily route size of 2,000 households). Shown below are the modifications to the baseline collection service to account for the roll out of a food waste collection service under option 3.

Parameter	Option 3
Collection Frequency	Weekly
Mode of Collection	New fleet of 7.5t (Linktip) collection vehicles are purchased to collect food waste on weekly basis
Vehicles	Seven (7) new 7.5t (Linktip) collection vehicles are purchased.
Collection Staff	Collection carried out under contract by private service provider Additional payment of £385,831/year to contractor to provide staff to collect food waste.
Containers	Each householder receives a 10 litre kitchen caddy for internal storage and a 25 litre bin for external storage of food waste. Biodegradable bin liners for initial start up. Assuming 6 months of bags which is 78 bags per household (3 per week).
Annual Quantity of Food Waste	(1.2kg\hh\wk*52 weeks) =62.4 kgs/hh/year. Service coverage = 64,000 households. Annual food waste arising = 3,994 tonnes
Disposal/Treatment:	Food waste is treated in local merchant anaerobic digestion facility

Table 7.8: Option 3 Modifications to Existing Service Configuration**7.8 Option 3 – Weekly Collection of Food Waste (7.5t RCV's) – Cost Breakdown**

The timeline for the roll out of the option 3 food waste collection service is the same as option 1 and 2. Shown below are the capital and revenue costs associated with option 3. All the capital costs are incurred in this financial year 2011/12 with revenue cost incurred in 2012/2013.

Year	Containers Capital	Containers Revenue	Comms Revenue	Vehicles Capital	Vehicles Revenue	Collection Logistics Revenue	Food Waste Treatment Revenue	Total Cost Including Administration at 4%
Year 1 (2011-2012)	£426,592	£0	£0	£0	£0	£0	£0	£443,656
Year 2 (2012-2013)	£0	£53,000	£51,250	£0	£107,625	£425,771	£149,760	£818,902
Year 3 (2013/2014)	£0	£20,657	£0	£0	£110,316	£436,415	£149,760	£745,834
Year 4 (2014/2015)	£0	£21,173	£0	£0	£113,074	£447,326	£149,760	£760,586
Year 5 (2015/2016)	£0	£21,702	£0	£0	£115,900	£458,509	£149,760	£775,707
Year 10 (2020/2021)	£0	£24,554	£0	£0	£131,131	£518,761	£149,760	£857,174

Table 7.9: Option 3 Food Waste Service Costs Year 1 to 5 and Year 10**7.8.1 Option 3 – Containers & Communications**

The number, type and cost of containers provided to householders are identical to those described in option 1 and 2 as is the cost of communications.

7.8.2 Option 3 – Vehicles

Seven (7) additional 7.5t (Linktip) are purchased to collect food waste. The 3.5t Linktip vehicles have an indicative capital cost of £41,000 each. A cost of £15,000 was used to model the annual cost associated with the purchase and running of each 7.5t vehicle.

7.8.3 Option 3 – Collection Logistics

Falkirk Council envisages that the collection of food waste will be carried out under contract by a private sector service provider. The modelled annual cost of the private contractor collecting the food waste £385,831/year. In addition, FC will have to supervise the food waste service at an estimated cost of £29,556/year.

7.8.4 Option 3 – Carbon Metric and Recycling Rate

The fortnightly collection of food waste will divert an estimated 3,994 tonnes of food waste away from landfill. The diversion of food waste increases the MSW recycling rate by 4.4% from the current figure of 49.3% to 53.7%. The Carbon Metric Recycling Rate increases by 3.9% from 37.1% to 41%.

7.8.5 Option 3 – Summary of Costs

The diversion of waste from landfill results in a cost saving due to reduced gate fee for food waste treatment. Table 7.10 shows the nets cost of the option 3 food waste collection service.

Year	Option 3 - Total Food Waste Cost (£/Year)	Landfill Gate Fee Saving (£/Year)	Net Cost Option 3 (£/Year)
Year 1 (2011-2012)	£443,656	£0	£443,656
Year 2 (2012-2013)	£818,902	£299,520	£519,382
Year 3 (2013/2014)	£745,834	£315,095	£430,739
Year 4 (2014/2015)	£760,586	£330,790	£429,796
Year 5 (2015/2016)	£775,707	£399,360	£376,347
Year 10 (2020/2021)	£857,174	£451,839	£405,335

Table 7.10: Option 3 Net Food Waste Service Costs Year 1 to 5 and Year 10

7.9 Option 4 - Fortnightly Food Waste Collection Co-mingled with Brown Bin (Garden)

In option 4, householders are provided with a fortnightly food waste collection service. In this option, food waste will be collected at the same time and pass as the existing garden waste service by the existing fleet of RCV's used to provide the garden waste service. The existing garden waste bin will be used for the external storage of food waste.

Shown below are the modifications to the baseline collection service to account for the roll out of a food waste collection service under option 4.

Parameter	Option 4
Collection Frequency	Fortnightly
Mode of Collection	Food waste collected at same pass as garden waste
Vehicles	Existing fleet of RCV's used for garden waste service. No additional vehicles purchased
Collection Staff	Existing crews collecting garden waste collect food waste in garden "brown" bin
Containers	Each householder receives a 10 litre kitchen caddy for internal storage of food waste. Existing "brown" garden bin used for external storage of food waste. Biodegradable bin liners for initial start up. Assuming 6 months of bags which is 78 bags per household (3 per week)
Annual Quantity of Food Waste	(0.7kg\hh\wk *52 weeks) = 36.4 kgs/hh/year. Service coverage = 64,000 households. Annual food waste arising = 2,330 tonnes
Disposal/Treatment:	Food waste is treated in local merchant anaerobic digestion facility

Table 7.11: Option 4 Modifications to Existing Service Configuration

7.10 Option 4 - Food Waste Collection Co-mingled with Brown Bin (Garden) Cost Breakdown

The timeline for the roll out of the option 4 food waste collection service is the same as option 1, 2 and 3. Shown below are the capital and revenue costs associated with option 4. All the capital costs are incurred in this financial year 2011/12 with revenue cost incurred in 2012/2013.

Year	Containers Capital	Containers Revenue	Comms Revenue	Vehicles Capital	Vehicles Revenue	Collection Logistics Revenue	Net Food & Garden Waste Treatment Revenue	Total Cost Including Administration at 4%
Year 1 (2011-2012)	£224,992	£0	£0	£0	£0	£0	£0	£233,992
Year 2 (2012-2013)	£0	£53,000	£50,000	£0	£24,917	£12,983	£197,023	£351,439
Year 3 (2013/2014)	£0	£6,324	£0	£0	£25,540	£13,308	£197,023	£251,882
Year 4 (2014/2015)	£0	£6,482	£0	£0	£26,178	£13,641	£197,023	£253,057
Year 5 (2015/2016)	£0	£6,645	£0	£0	£26,833	£13,982	£197,023	£254,261
Year 10 (2020/2021)	£0	£7,518	£0	£0	£30,359	£15,819	£197,023	£260,746

Table 7.12: Option 4 Food Waste Service Costs Year 1 to 5 and Year 10

7.10.1 Option 4 – Containers

In option 4, householders are only provided with one food waste container, a 10 litre internal kitchen caddy (£1.39/container), as the existing “brown” garden bin is used for the external storage of food waste. Each household is also provided with an initial 6 months “starter pack” supply of biodegradable liners (£2.13 for 78 liners). The capital cost associated with the purchase of the containers in year one is £224,992. The use of the existing garden bin for the external storage of food waste results in a year one capital cost saving of £201,600 compared to options 1, 2 and 3.

As the number of containers provided in option 4 is half that of option 1, 2 and 3, the annual revenue cost of container replacements is also reduced.

7.10.2 Option 4 – Communications

The option 4 cost of communications is identical to option 1, 2 and 3.

7.10.3 Option 4 – Vehicles

No additional vehicles are required in option 4 as the existing fleet of garden waste collection vehicles are employed to collect food waste. When modelling this option an additional cost of £24,309 was include for the additional haulage and running costs of the collection fleet.

7.10.4 Option 4 – Carbon Metric and Recycling Rate

The fortnightly collection of food waste will divert an estimated 2,330 tonnes of food waste away from landfill. The diversion of food waste increases the MSW recycling rate by 2.6% from the current figure of 49.3% to 51.8%. The Carbon Metric Recycling Rate increases by 2.2% from 37.1% to 39.3%.

7.10.5 Option 4 – Disposal & Treatment Costs

The addition of food waste (2,230 tonnes/yr) to the existing fortnightly garden waste (8,773 tonnes) collection service will result in the co-mingled material (11,103 tonnes) being treated via AD. With an AD gate fee of 37.5/tonne the annual cost of treating the comingled food and garden waste will be £416,348. The existing windrow composting gate fee is £25/tonne resulting in an annual treatment cost of £219,325.

The net cost of treating the comingled food and garden waste is (£416,348-£219,325) £197,023/year.

7.10.6 Option 4 – Summary of Costs

The diversion of waste from landfill results in a cost saving due to reduced gate fee for food waste treatment. However, the co-collected food and garden waste is treated by anaerobic digestion (AD) resulting in increased treatment costs as gate fee for AD is higher than windrow composting. Table 7.13 shows the nets cost of the option 4 food waste collection service.

Year	Option 4 - Total Food Waste Cost (£/Year)	Landfill Gate Fee Saving (£/Year)	Net Cost Option 4 (£/Year)
Year 1 (2011-2012)	£233,992	£0	£233,992
Year 2 (2012-2013)	£351,439	£174,720	£176,719
Year 3 (2013/2014)	£251,882	£183,805	£68,077
Year 4 (2014/2015)	£253,057	£192,961	£60,096
Year 5 (2015/2016)	£254,261	£232,960	£21,301
Year 10 (2020/2021)	£260,746	£263,573	-£2,826

Table 7.13: Option 4 Net Food Waste Service Costs Year 1 to 5 and Year 10

7.11 Waste performance of options

In all options examined it is assumed that total number of households provided with a separate food waste collection service is 64,000. The projection of waste arising is modelled based on waste arising data provided by Falkirk Council for 2010. It was assumed that impact of waste reduction initiatives will offset population growth and associated increase in waste arising.

Parameter	Baseline	Option 1	Option 2	Option 3	Option 4
Total Household Waste (t)	58,138	58,138	58,138	58,138	58,138
Total Household to Landfill (t)	35,389	33,059	31,395	31,395	33,059
Total Household Recycled(t)	22,749	25,079	26,743	26,743	27,408
Total Kerbside Food(t)	0	2,330	3,994	3,994	2,330
kg/hh/wk Kerbside food	0.0	0.7	1.2	1.2	0.7
% MSW Recycled/Composted (%)	49.3%	51.8%	53.7%	53.7%	51.8%
Carbon Metric Recycling Rate %	37.1%	39.3%	41.0%	41.0%	39.3%

Table 7.14: Waste Performance of Food Waste Collection Options Modelled

7.12 Carbon Metric Score and Diversion of Waste from Landfill

The primary aim of implementing a food waste collection service is to divert organic material from landfill in order to reduce green house gas emissions, meet biodegradable waste diversion targets and move towards the recycling/recovery targets set in the Scotland's Zero Waste Plan.

The weekly collection options (option 2 and 3) divert 3,994 tonnes of food waste from landfill with the fortnightly options (option 1 and 4) diverting 2,330 tonnes. The weekly food waste collection option diverts 41.7% more waste than the fortnightly option. The percentage MSW Recycled/Composted is 53.7% under option 2 and 3 (weekly collection) and 51.8% under option 1 and 4 (fortnightly collection).

The Zero Waste Plan contains the following action: *"The Scottish Government will introduce a carbon metric for waste, to identify and prioritise the materials with the highest environmental benefit for recycling, leading to better environmental outcomes, and a more efficient economy. This metric will complement the existing tonnage metric."*¹⁶

Fortnightly food waste collections increase the Falkirk Carbon Metric Recycling Rate (%) from 37.1% to 39.3% and from 37.1% to 41% with weekly food waste collection.

¹⁶ Source: Zero Waste Plan for Scotland

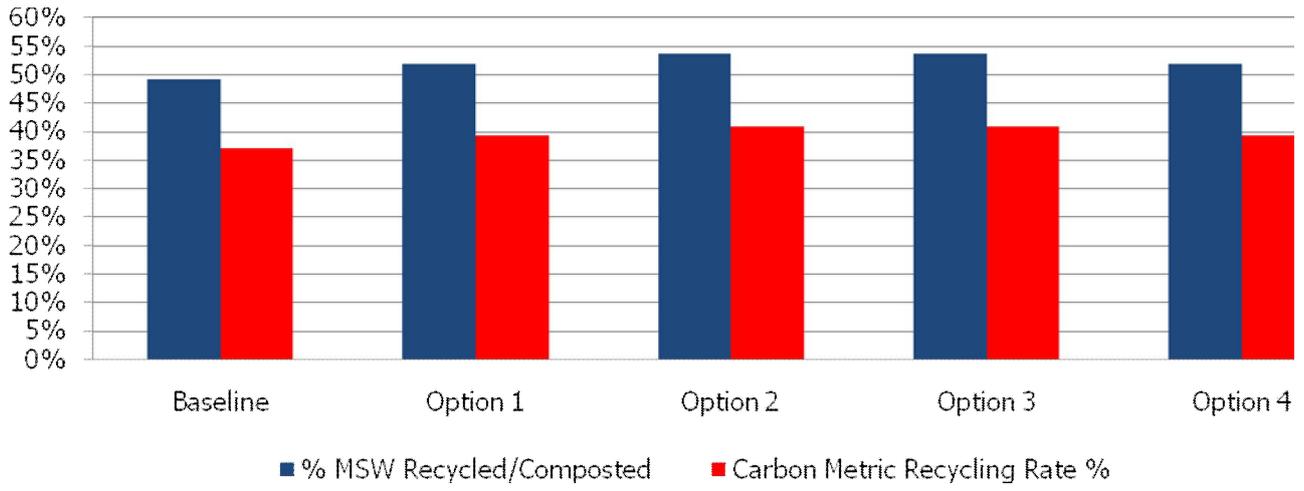


Table 7.15: Recycling Rate and Carbon Metric Contributions of Food Waste Options

8. TREATMENT OPTIONS

This section describes the various treatment options for food waste and provides a summary of local merchant facilities. It should be noted that food waste is considered an animal by-product material and, as such, must be treated in an approved facility in accordance with the requirements of relevant animal by-product legislation.

8.1 In-vessel composting

This is a form of composting where the food waste is treated in a close container or reactor. The reactors can be either horizontal or vertical and work by allowing a flow of air through the material ensuring material biodegradation at temperatures of 55 to 70°C. The temperatures achieved can eliminate pathogens and weed seeds in accordance with the requirements of animal by-products regulation.

8.2 Wet Anaerobic Digestion

In contrast to composting, anaerobic digestion takes place in the absence of air i.e. in an anaerobic environment with a material moisture content of approximately >85%. The process takes place in enclosed vessels and results in the production of bio-gas (60% methane, 40% carbon dioxide). The bio-gas can either be burnt to produce heat and electricity or alternatively can be cleaned up and injected into the mains gas grid or used to fuel motor vehicles. Wet digestion systems generally include a sensitisation step to ensure adherence with the requirement of animal by-product legislation. The remaining material, known as digestate, can be used as fertiliser and soil conditioner.

8.3 Dry Anaerobic Digestion

This process differs from wet anaerobic digestion in terms of the moisture content of the material being processed with a moisture content of approximately >70% observed. This process is better suited to high dry matter feed stocks such as energy crops, garden waste and mechanically recovered municipal waste (e.g. from mechanical biological treatment plant). Dry digestion systems generally include a sensitisation step to ensure adherence with the requirement of animal by-product legislation.

8.4 Local Merchant Facilities

There are a number of merchant food waste facilities in relatively close proximity to Falkirk Council. Falkirk Council intends to establish a "Framework Contract" of service providers for treatment of food waste.

Facility Type	Within 10 miles from main depot (or other relevant location)	Within 50 miles of main depot (or other relevant location)
IVC	Not Currently Available	GP Green Recycling, Blantyre, Glasgow. Approx 26 miles
IVC	Not Currently Available	Horizons Environment, Deerdykes Composting Facility, Mollins Road. Approx 15 miles.
Wet AD	Not Currently Available	Horizons Environment, Deerdykes Composting Facility, Mollins Road. Approx 15 miles.
Dry AD	Not Currently Available	Not Currently Available

Table 8.1: Location of Local Food Waste Merchant Facilities

9. SUMMARY TABLES

A summary of the year 1 to 5 and year 10 cost associated with the four food waste collection options modelled for Falkirk Council are shown below:

Item	Option 1	Option 2	Option 3	Option 4
Additional Vehicles	-	Four (4) 7.5t RCV's	Seven (7) 7.5t RCV's	-
Additional Falkirk Council Staff	-	-	-	-
Purchase of Containers	£426,592	£426,592	£426,592	£224,992
Payment to Contractor (£)/year	£88,588	£290,600	£385,831	£0
Net Cost (£) Year 1 (2011/12)	£487,336	£487,336	£443,656	£233,992
Net Cost (£) Year 2 (2012/13)	£142,494	£379,899	£519,382	£176,719
Net Cost (£) Year 3 (2013/14)	£49,420	£287,768	£430,739	£68,077
Net Cost (£) Year 4 (2014/15)	£43,824	£283,251	£429,796	£60,096
Net Cost (£) Year 5 (2015/16)	£7,473	£226,138	£376,347	£21,301
Net Cost (£) Year 10 (2020/21)	-£3,484	£235,387	£405,335	-£2,826
Net Cost (£) Year 20 (2030/31)	-£29,906	£257,692	£475,239	-£61,008
Net Cost (£) Year 25 (2035/36)	-£45,775	£271,088	£517,223	-£95,951
MSW Recycling Rate (%)	51.8%	53.7%	53.7%	51.8%
Carbon Metric Recycling Rate (%)	39.3%	41%	41%	39.3%

Table 9.1: Summary of Cost and Environmental Performance for Option 1 to 4

A detailed cost breakdown of each option is provided overleaf.

Option 1 Fortnightly Collection with Black Box												
Year	Containers Capital Cost	Containers Revenue Cost	Communications Revenue	Vehicles Capital Cost	Vehicles Revenue Cost	Collection Logistics Revenue Costs	Food Waste Treatment Revenue Cost	Total Cost Including Administration	Landfill Gate Fee Saving	Net Cost Option 1	Capital Cost	Revenue Cost
Year 1 (2011-2012)	£426,592	£0	£0	£42,000	£0	£0	£0	£487,336	£0	£487,336	£487,336	£0
Year 2 (2012-2013)	£0	£53,000	£51,250	£0	£5,290	£108,114	£87,360	£317,214	£174,720	£142,494	£0	£317,214
Year 3 (2013/2014)	£0	£20,657	£0	£0	£5,422	£110,817	£87,360	£233,226	£183,805	£49,420	£0	£233,226
Year 4 (2014/2015)	£0	£21,173	£0	£0	£5,558	£113,587	£87,360	£236,785	£192,961	£43,824	£0	£236,785
Year 5 (2015/2016)	£0	£21,702	£0	£0	£5,697	£116,427	£87,360	£240,433	£232,960	£7,473	£0	£240,433
Year 10 (2020/2021)	£0	£24,554	£0	£0	£6,445	£131,726	£87,360	£260,089	£263,573	-£3,484	£0	£260,089
Year 20 (2030/2031)	£0	£31,431	£0	£0	£8,250	£168,621	£87,360	£307,489	£337,396	-£29,906	£0	£307,489
Year 25 (2035/2036)	£0	£35,562	£0	£0	£9,335	£190,779	£87,360	£335,957	£381,732	-£45,775	£0	£335,957
Option 2 -Option 2-Vehicles- Food Waste Weekly Week 1 - Modification to Kerbsiders Co-Collection with Black Recycling Box Week 2 - Used New Fleet of 7.5t Linktip (new for this service)												
Year	Containers Capital Cost	Containers Revenue Cost	Communications Revenue	Vehicles Capital Cost	Vehicles Revenue Cost	Collection Logistics Revenue Costs	Food Waste Treatment Revenue Cost	Total Cost Including Administration	Landfill Gate Fee Saving	Net Cost Option 2	Capital Cost	Revenue Cost
Year 1 (2011-2012)	£426,592	£0	£0	£42,000	£0	£0	£0	£487,336	£0	£487,336	£487,336	£0
Year 2 (2012-2013)	£0	£53,000	£51,250	£0	£66,790	£332,487	£149,760	£679,419	£299,520	£379,899	£0	£679,419
Year 3 (2013/2014)	£0	£20,657	£0	£0	£68,460	£340,799	£149,760	£602,863	£315,095	£287,768	£0	£602,863
Year 4 (2014/2015)	£0	£21,173	£0	£0	£70,171	£349,319	£149,760	£614,040	£330,790	£283,251	£0	£614,040
Year 5 (2015/2016)	£0	£21,702	£0	£0	£71,925	£358,052	£149,760	£625,498	£399,360	£226,138	£0	£625,498
Year 10 (2020/2021)	£0	£24,554	£0	£0	£81,377	£405,103	£149,760	£687,226	£451,839	£235,387	£0	£687,226
Year 20 (2030/2031)	£0	£31,431	£0	£0	£104,169	£518,567	£149,760	£836,085	£578,392	£257,692	£0	£836,085
Year 25 (2035/2036)	£0	£35,562	£0	£0	£117,858	£586,711	£149,760	£925,486	£654,398	£271,088	£0	£925,486
Option 3 -Vehicles- Food Waste Weekly New Fleet of 7.5t Linktip (new for this service)												
Year	Containers Capital Cost	Containers Revenue Cost	Communications Revenue	Vehicles Capital Cost	Vehicles Revenue Cost	Collection Logistics Revenue Costs	Food Waste Treatment Revenue Cost	Total Cost Including Administration	Landfill Gate Fee Saving	Net Cost Option 3	Capital Cost	Revenue Cost
Year 1 (2011-2012)	£426,592	£0	£0	£0	£0	£0	£0	£443,656	£0	£443,656	£443,656	£0
Year 2 (2012-2013)	£0	£53,000	£51,250	£0	£107,625	£425,771	£149,760	£818,902	£299,520	£519,382	£0	£818,902
Year 3 (2013/2014)	£0	£20,657	£0	£0	£110,316	£436,415	£149,760	£745,834	£315,095	£430,739	£0	£745,834
Year 4 (2014/2015)	£0	£21,173	£0	£0	£113,074	£447,326	£149,760	£760,586	£330,790	£429,796	£0	£760,586
Year 5 (2015/2016)	£0	£21,702	£0	£0	£115,900	£458,509	£149,760	£775,707	£399,360	£376,347	£0	£775,707
Year 10 (2020/2021)	£0	£24,554	£0	£0	£131,131	£518,761	£149,760	£857,174	£451,839	£405,335	£0	£857,174
Year 20 (2030/2031)	£0	£31,431	£0	£0	£167,858	£664,058	£149,760	£1,053,632	£578,392	£475,239	£0	£1,053,632
Year 25 (2035/2036)	£0	£35,562	£0	£0	£189,916	£751,320	£149,760	£1,171,621	£654,398	£517,223	£0	£1,171,621
Option 4 - Fortnightly Co Collection of Food and Garden Waste												
Year	Containers Capital Cost	Containers Revenue Cost	Communications Revenue	Vehicles Capital Cost	Vehicles Revenue Cost	Collection Logistics Revenue Costs	Net Food & Garden Waste Treatment Revenue Cost	Total Cost Including Administration	Landfill Gate Fee Saving	Net Cost Option 4	Capital Cost	Revenue Cost
Year 1 (2011-2012)	£224,992	£0	£0	£0	£0	£0	£0	£233,992	£0	£233,992	£233,992	£0
Year 2 (2012-2013)	£0	£53,000	£50,000	£0	£24,917	£12,983	£197,023	£351,439	£174,720	£176,719	£0	£351,439
Year 3 (2013/2014)	£0	£6,324	£0	£0	£25,540	£13,308	£197,023	£251,882	£183,805	£68,077	£0	£251,882
Year 4 (2014/2015)	£0	£6,482	£0	£0	£26,178	£13,641	£197,023	£253,057	£192,961	£60,096	£0	£253,057
Year 5 (2015/2016)	£0	£6,645	£0	£0	£26,833	£13,982	£197,023	£254,261	£232,960	£21,301	£0	£254,261
Year 10 (2020/2021)	£0	£7,518	£0	£0	£30,359	£15,819	£197,023	£260,746	£263,573	-£2,826	£0	£260,746
Year 20 (2030/2031)	£0	£9,623	£0	£0	£38,862	£20,250	£197,023	£276,387	£337,396	-£61,008	£0	£276,387
Year 25 (2035/2036)	£0	£10,888	£0	£0	£43,968	£22,911	£197,023	£285,781	£381,732	-£95,951	£0	£285,781

10. TIMETABLE AND KEY MILESTONES

There are a number of tasks that Falkirk Council will need to consider in providing a food waste collection service to householders. Shown below is a checklist of items to be considered.

Communications

1	Collect current scheme promotions
2	Review current scheme designs
3	Develop design brief for generic leaflet
4	Decide on concepts
5	Develop Guidelines and templates
6	Concept finalisation and sign off
7	Determine print time
8	Tailor promotions specific to L.A.
9	Approval process for artwork
10	Agree text and logos
11	Agree introductory flyer
12	Agree instruction leaflet
13	Arrange photo opportunities
14	Write and issue press release

Containers

1	Procure boxes / liners
2	Check order numbers and procure bins
3	Sort out storage space for bins and liners
4	Agree re-distribution method for liners
5	Devise distribution method for bins, caddies and liners
6	Distribution of bins and initial liners

Vehicle

1	Review vehicle options
2	Agree vehicle style
3	Procure/ modify vehicle
4	Add vehicle to O license
5	Arrange for storage of vehicle
6	Arrange insurance & tax
7	Agree maintenance schedule
8	Arrange breakdown cover
9	Agree ABPR with trading standards
10	Devise method to prevent overloading
11	Arrange PPE and spill kit on vehicle
12	Identify space for additional promotional material and liners on vehicle
13	Agree design and logos for vehicle
14	Arrange for decals

Training

1	Identify training needs for crew
2	Identify training needs for call-centre staff
3	Prepare training plan
4	Identify and prepare FAQs
5	Training of crews
6	Training of call-centre staff
7	Prepare outline and send letter to Councillors

End market

1	Establish Framework Contract For Treatment
2	Agree gate fee and secure supply agreement
3	Determine specification for material and contamination level accepted
4	Arrange invoice system

Project Review

1	Define invoicing system, reporting system, communication channels
2	Quarterly progress reports (quarterly)
3	Distribution of additional literature e.g. newsletter
4	Survey to residents
5	Survey to staff
6	Analyse data

10.1 Timeline and Milestones

The envisaged timeline for the roll out of the Falkirk Council food waste collection service is shown below:

October

- Complete Business Case

November

- Reviewed by ZWS steering group
- Offer of funding in principle to Falkirk Council

December

- Report to Council Environment & Community Safety committee

January

- Referred to Policy & Resources committee to sanction decision
- Agree full funding with ZWS
- Agree contract variation with FOCSA re new collection
- Place order for caddies & liners for delivery in April 2012
- Order new vehicles if required
- Procure treatment capacity

February/March

- Agree comms campaign strategy and agreed literature
- Set up project delivery team for completion of rollouts

April

- Commence rollout and collection to first 20,000 properties.

May

- Complete rollout and collection to next 30,000 properties

June

- Complete rollout to remaining properties

July

- Assess performance of collection and report to ZWS findings/concerns

Appendix 1

Cost of Existing Collection Service

Residual Collection Service

Each fortnight residual waste is collected from 70,533 households across 14 collection routes using 26 tonne (Gross Vehicle Weight) Refuse Collection Vehicles (RCV's).

Table A-1: Existing Cost Base - Residual Collection Service

Cost Heading/Route	Unit Cost/Year	Comment
Annual Cost Vehicles	£368,789	7 no. 26t RCVs with 2 no. Spare Vehicles
Annual Cost Staff and Supervision	£581,239	Cost of 7 drivers, 14 loaders, (1 relief driver and 2 relief loaders to account for absenteeism and holidays)
Annual Cost Containers	£100,039	All bins are assumed to be purchased upfront by FC and not financed over a number of years. However, the costs are annualised within the model by dividing the capital costs by the lifespan of the container. Additionally, an annual replacement rate is associated with the containers where households request replacements for lost or broken bins leading to additional cost.
Annual Cost Disposal/Treatment	£2,500,941	Disposal at £70.67/t
Annual Operating Cost Residual Service	£3,551,009	Sum of Vehicle, Staff & Disposal Costs
Overheads cost as % of operating costs	8%	Overhead Cost %
Overheads cost\Year	£284,081	Overhead cost
Total Annual Operating Cost Residual Service	£3,835,089	Total cost vehicles, staff, containers, disposal/treatment and overheads

Co-Mingled Collection Mixed Dry Recyclables Service

Each fortnight co-mingled mixed dry recyclables are collected from 68,000 households across 14 collection routes using 26 tonne (Gross Vehicle Weight) Refuse Collection Vehicles (RCV's). The costs associated with the provision of the co-mingled mixed dry recyclables waste collection service are shown below:

Table A-2: Existing Cost Base – Co-Mingled Recyclables Collection Service

Cost Heading/Route	Unit Cost/Year	Comment
Annual Cost Vehicles	£368,789	7 no. 26t RCVs with 2 no. Spare Vehicles
Annual Cost Staff and Supervision	£581,239	Cost of 7 drivers, 14 loaders, (1 relief driver and 2 relief loaders to account for absenteeism and holidays)
Annual Cost Containers	£96,447	All bins are assumed to be purchased upfront by FC and not financed over a number of years. However, the costs are annualised within the model by dividing the capital costs by the lifespan of the container. Additionally, an annual replacement rate is associated with the containers where households request replacements for lost or broken bins leading to additional cost.
Annual Cost Disposal/Treatment	£0	11,920t at £0/t
Annual Operating Cost Co-mingled Service	£1,046,475	Sum of Vehicle, Staff & Disposal Costs
Overheads cost as % of operating costs	8%	Overhead Cost %
Overheads cost\Year	£83,718	Overhead cost
Total Annual Operating Cost Co-mingled Service	£1,130,193	Total cost vehicles, staff, containers, disposal/treatment and overheads

Garden Waste Service

Each fortnight garden waste is collected from 60,000 households across 12 collection routes using 26 tonne (Gross Vehicle Weight) Refuse Collection Vehicles (RCV's). The costs associated with the provision of the garden waste collection service are shown below:

Table A-3: Existing Cost Base – Garden Collection Service

Cost Heading/Route	Unit Cost/Year	Comment
Annual Cost Vehicles	£311,588	6 no. 26t RCVs with 1 no. Spare Vehicles
Annual Cost Staff and Supervision	£507,529	Cost of 7 drivers, 14 loaders, (1 relief driver and 2 relief loaders to account for absenteeism and holidays)
Annual Cost Containers	£85,100	All bins are assumed to be purchased upfront by FC and not financed over a number of years. However, the costs are annualised within the model by dividing the capital costs by the lifespan of the container. Additionally, an annual replacement rate is associated with the containers where households request replacements for lost or broken bins leading to additional cost.
Annual Cost Disposal/Treatment	£219,325	Treatment of 8,773t at £25/t
Annual Operating Cost Garden Service	£1,123,542	Sum of Vehicle, Staff & Disposal Costs
Overheads cost as % of operating costs	8%	Overhead Cost %
Overheads cost\Year	£89,883	Overhead cost
Total Annual Operating Cost Garden Service	£1,213,425	Total cost vehicles, staff, containers, disposal/treatment and overheads

Black Box Recycling and Textile Service

Each fortnight the kerbside black box and textile service is provided to 68,000 households across 10 collection routes using Kerbersiders & 1 no. Stillage vehicle. The costs associated with the provision of black box recycling service are shown below:

Table A4: Existing Cost Base – Black Box and Textile Collection Service

Cost Heading/Route	Unit Cost/Year	Comment
Annual Cost Vehicles	£141,543	4 no. Kerbersiders and 1 no. stillage
Annual Cost Staff and Supervision	£483,111	Figure supplied by FC "Current annual payment to FOCSA is £462,000 pa. Supervision cost of £4,222 per contract route.
Annual Cost Containers	£15,829	All bins are assumed to be purchased upfront by FC and not financed over a number of years. However, the costs are annualised within the model by dividing the capital costs by the lifespan of the container. Additionally, an annual replacement rate is associated with the containers where households request replacements for lost or broken bins leading to additional cost.
Annual Cost Disposal/Treatment	-£110,000	Revenue Positive
Annual Operating Cost Black Box Service	£530,483	Sum of Vehicle, Staff & Disposal Costs
Overheads cost as % of operating costs	4%	Overhead Cost %
Overheads cost\Year	£21,219	Overhead cost
Total Annual Operating Cost Garden Service	£551,702	Total cost vehicles, staff, containers, disposal/treatment and overheads

Summary Cost Kerbside Collection Service

A summary of the costs associated with the existing collection service is shown below:

Table A5: Existing Cost Base – Kerbside Collection Service

Collection Type	Annual Cost	% of Total Cost
Residual Service Cost	£3,835,089	57%
Co-Mingled Mixed Dry Recyclables Cost	£1,130,193	17%
Garden Costs	£1,213,425	18%
Black Box & Textile Costs	£551,702	8%
Overall Service Costs	£6,730,409	100%

Appendix 2

Assumptions Made in Modelling Food Waste Collection Options