
Appendix 1

WRAP Cymru Trade and Recycling Service Review

July 2020 to January 2021

Final report

Denbighshire trade waste review



A review of the trade waste service provided by Denbighshire County Council, including options for its future development

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Executive summary

This report describes the scope and findings from a desk-study commissioned by WRAP Cymru and carried out during 2020 to review Denbighshire County Council's (DCC's) trade waste and recycling service. The study assessed key areas of service design, delivery and performance (including financial standing). Included in the review was a high-level assessment of the market within which the service operates, comprising businesses (number and type) and waste streams (quantity and composition) that may be available to target. The primary focus of the work was the sequential assessment of alternative service design and delivery options, building on a baseline model depicting the service as it operates now.

Current service overview (baseline performance)

DCC provides trade waste and recycling collection services to over 600 local business premises and Council buildings through a mix of outsourced (residual waste) and inhouse (mixed dry recycling and food waste) collections. Collections are made over 5 days (Monday – Friday) through a mix of contracted bin, prepaid sack and bundled cardboard lifts. The service delivers a modelled annual turnover of approximately £420k, generating a surplus in the region of £60k, and collecting c.1,600 tonnes of material. The current trade-specific recycling rate is estimated to be around 40%.

The relatively low modelled recycling level, but strong financial standing, is due in part to the dominance of residual lifts in the current collection profile. As is the case with many Welsh local authority trade services, the pricing strategy means that residual lifts deliver a high margin, whilst recycling and food are closer to breakeven or operate at a loss.

A high-level SWOT analysis of the service identified a number of positives. These include the benefit of a relatively stable customer base, a flexible service offering attractive to small, space-constrained businesses, and logistical efficiencies that arise through the ability to co-collect domestic and trade food waste. At the same time, there exist various areas of risk. Examples include a customer contract that provides little commercial protection to the authority, a budget that lacks transparent detail and limited digital marketing.

Any decision to grow the service needs to be underpinned by a new focus on data / analysis, investment in vehicle and back-office IT systems and an appropriately resourced structure (including reinstated trade waste officer post) that is empowered to drive the service forward. It is acknowledged that space constraints at the new depot may limit the extent to which the service can handle increased tonnages, but that should not mean the service cannot perform better across a range of metrics.

The market within which the Council operates

Whilst DCC potentially has just over 20% of the available market, in terms of customer numbers, its share by waste handled is much smaller. The Council is estimated (through this study) to collect approximately 1,600 tonnes of commercial waste and recycling per annum, out of a possible 19,800 – 34,000 tonnes that might be considered accessible to it. Over three quarters of the Council's customer base are private (Trade Waste) customers, the majority of which are expected to be micro-business with fewer than 10 employees. The customer base is dominated by outlets in the Accommodation and Food Services and Retail sectors, with these groups making up 29% and 24% (by number) of all currently registered customers. Approximately 70% of the commercial waste arising in the County is considered to be recyclable or compostable. The three largest fractions (by weight) are recyclable paper (26.6%), food waste (17.3%) and card (17.2%) – all of which are currently targeted by the Council for collection / recycling.

Whilst some businesses will always be out of reach to the Council, due to their scale or structure, the market analysis indicates strong potential to grow a larger, recycling-led service. By way of example, DCC currently collects an estimated 220 tonnes of food waste via the trade service. The market analysis indicates there may be between 16 and 27 times as much commercial food waste available to collect in the accessible market. Achieving growth is dependent on being able to fill gaps in operating capacity through targeted marketing (underpinned with flexible pricing) that ensures delivery of a profitable portfolio of lifts. Future marketing should be focused on winning 'good' business. The service is currently lacking this strategic vision and a costed delivery plan.

The Council should be aware of developments in the wider commercial waste market through the progressive introduction of technology and web-based service brokerage platforms. These have the potential to disrupt the way in which waste producing businesses procure and manage trade waste and recycling services, requiring operators to report on transactional data in real time. Furthermore, the proposed introduction of a UK-wide EPR (Extended Producer Responsibility) scheme for packaging will require collectors to hold and report on improved levels of customer and material (weight / composition) data. EPR should result in greater values being passed back to collectors for clean obligated packaging material. Hence, those operators with the ability to deliver high concentrations of clean packaging material should see a financial benefit. In DCC's case, this strengthens the argument to implement a dry recycling service based on a greater level of materials separation, and to invest in IT and hardware that delivers real-time data and communication.

Future service delivery options and modelled outputs

The domestic waste and recycling service configuration is due to change in 2023, at which point it will no longer be possible to co-collect trade food customers (with bins) on the domestic rounds, as happens now. It will also be the case that domestic flats complexes with communal bins will need to have their recycling and food waste collections integrated with trade. These drivers for change, combined with the pending requirement to deliver a greater level of dry recycling material separation in line with the Environment Act, prompted consideration of a shortlist of alternative service delivery options assessed in this study:

- Option 1 adds recycling and food lifts from 82 communal (flats) complexes to the trade service. The overall design of the enlarged service remains 'as-is', but with trade / communal food lifts now made on a dedicated vehicle. All collections are made on a weekly basis, albeit retaining any existing trade customer lift frequencies from the baseline model;
- Option 2 sees the mixed recycling collections (DMR) transformed to a service targeting separate fibres (mixed paper and card), containers (mixed cans and plastics) and glass. These are assigned in proportions that are tailored to the business type, ensuring at least the current level of recycling capacity is provided. Collections of the four dry recycling and food streams are modelled through use of pod RCVs (where food / glass are collected in the non-compacting front pod and fibres / containers in the rear compacting compartment). In model variant (a) food waste remains focused on those currently receiving this service, whereas in variant (b) food uptake increases across all relevant Hospitality (including catering departments at Education establishments) and Arts, entertainment and recreation businesses; and
- Option 3 analyses the potential scale of the opportunity to collect recycling and food presented in low quantities from micro businesses on the future RRV rounds, which would help increase collection efficiencies – especially in rural areas.

A number of variants were assessed across the modelled options to test the impact of residual waste continuing to be collected through an outsourced arrangement (currently with Veolia) versus brought inhouse, and reflecting the differential accounting of container replacement costs as either capex or opex. Option 3 was not formally modelled, the focus of the analysis instead being on identifying the population of existing customers that might be suited to having their recycling / food collected on the future RRV rounds. Detailed results are provided in the report; headline outputs are summarised below.

Modelled Option Metrics and supporting commentary	Baseline Current service with estimated / apportioned collection resources	Option 1 Current service plus Communal (flats) recycling / food	Option 2(a) Mixed recycling transformed to separate fibres, containers, glass, collected with food in pod RCVs	Option 2(b) As per option 2(a) with food waste expansion	Option 3 Microsite analysis assessing potential for small recyclers to move to a Trolleybocs service
Arisings (tpa):	1,622	1,964	2,010	2,010	< 50 (recycling & food)
No. Vehicles	2.2	3.1	3.2	3.2	Not modelled
Recycling Rate (%)	40	50	51	58	
Annual service turnover (rounded to £1k)	£423k turnover	£423k turnover	£461k turnover	£480k turnover	232 dry recycling customers, out of a baseline number of 434, may be of a scale that would support them moving onto a 'domestic' model collected on RRV rounds
Net revenue position (rounded to £1k)	£58k to £67k surplus	£2k to £14k loss	£28k to £43k surplus	£47k to £66k surplus	Existing food customers using just the 23litre caddies number 10 in total
Commentary on variants	Modelled variants include residual inhouse vs outsourced and containers capex vs opex. Outsourced residual = £3k better	Modelled variants include residual inhouse vs outsourced and containers capex vs opex. Outsourced residual = £3k better	Modelled variants include residual inhouse vs outsourced and containers capex vs opex. Outsourced residual = £7k better	Modelled variants include residual inhouse vs outsourced and containers capex vs opex. Outsourced residual = £10k worse	

Headline observations and recommendations

The results show there is potential to build a higher performing recycling service that continues to deliver a healthy financial surplus. However, this will require a period of dedicated engagement with customers, smart service pricing and lobbying of Welsh Government to ensure the separate collection requirements of the Environment Act are implemented and enforced. The greatest recycling performance gains are to be achieved by maximising uptake of glass and food, i.e. the heavy streams prevalent in the Hospitality and Arts / entertainment sector. This is likely to be challenging in the short-term whilst Covid-19 continues to have a disruptive effect on these businesses, however the opportunity exists to help these businesses 'build back better' through a recycling-led service offering. The option 3 analysis identified that approximately 50% of current dry recycling customers may be serviceable via the future RRV rounds, as a function of their small size. This may indicate the need to further explore the potential to create a 'micro-recycling' contract option that incentivises small business to recycle food and dry streams via Trolleybocs', and to protect capacity in the domestic service to enable this to happen.

Outsourcing the trade residual waste based on the terms currently applying to the Veolia contract appears to remain the most cost-effective option in all but those cases where DCC is able to significantly increase recycling of heavy streams, i.e. option 2(b) as modelled.

The current backdrop of services, applied to a customer base dominated by smaller businesses where competition levels and collection logistics vary considerably between the densely populated North and rural South, creates both opportunities and challenges for DCC. It also makes for a complex service to analyse and ultimately manage, constrained by a current lack of transparent data describing service uptake, resource demands and financial standing. In order to help the Authority overcome the challenges and realise the opportunities, the following headline recommendations emerged from the study.

Review Aspect	Suggested actions and further work
Baseline service	Review existing customer contract (E-Forms) to make it clearer what the responsibilities are on both sides. Consider introducing a 3-month notice period and/or a bin bond as mechanisms to provide greater commercial protection to the authority
	Undertake a review of back-office systems and processes, and linked customer interfaces (e.g. One Stop shops, website, customer services), in order to improve service messaging, marketing and response times. Ensure common data building blocks are used across systems, e.g. UPRN's, and create reports that enable improved service data capture. Examples include capturing SIC classifications for all customers, analysing Veolia weight data to understand trends by customer type, and recording mixed recycling weights.
	Consider making recycling compulsory for all (or all incoming) customers and undertake checks on customers to ensure they are complying with Duty of Care across all waste streams.
	Create an improved service budget and financial reporting structure to aid transparency of reporting and monitoring, ensuring the service bears all costs it should. Explore discrepancies between budgeted incomes and modelled income levels.
	Undertake a sample trade recycling weighing exercise, e.g. over a period of 1 month, to check the modelling assumptions applied in this study. Aswell as the weight this should record details of containers / streams lifted on each day / round - to ensure an accurate set of revised apportionment factors are derived from the exercise.
	Reinstate a formal trade waste officer post and revisit internal policies, including practical considerations such as use of bin locks (especially when the domestic service moves to a 4-weekly frequency) and branding of bins.
Future options	Undertake further work to assess possible uptake levels if the recycling service were to be transformed, e.g. through customer outreach. Put in place a fully resourced 'transformation plan' that recognises the risks linked to uncertain customer responses and identifies proactive steps the authority could take to ensure uptake levels align with the available resources. This requires a proactive, rather than reactive, approach to marketing the service and a refresh of the service brand.
	Consider financial incentives and/or new contract options that encourage a shift in behaviour to recycling. This is needed if the trade service is not to have the effect of pulling down the overall Authority recycling rate. Linked to the assessed transformation of the mixed recycling service (option 2(a)) and expansion of the food waste service (option 2(b)) there may be a need to cap short term cost increases to incentivise uptake, ideally coinciding with putting in resource to audit and rationalise residual waste arrangements on a customer-by-customer basis. This work should form part of a wider review of DCC's approach to pricing on the service.
	Extend the microsite analysis and model the impact of removing these sites from the trade system in order to quantify the spare capacity (and cost reduction) generated. This needs to go hand-in-hand with ensuring sufficient capacity is built into the new RRV round designs to support their future inclusion.

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1.0 Introduction

Denbighshire County Council (DCC) provides a mix of trade waste and recycling collection, treatment and disposal services to over 600 local businesses (including charities), schools (along with their onsite canteens) and municipal buildings. The service is delivered through a mix of in-house and contracted collections, based around:

- A wheeled bin and sack residual waste service, outsourced to Veolia;
- A co-mingled (mixed) dry recycling service collected via wheeled bins and sacks (plus bundled cardboard), operated in-house (albeit temporarily outsourced to CAD Recycling during the Covid-19 outbreak) on a dedicated collection round; and
- Food waste co-collected on the domestic rounds.

It is estimated (through this study) that the service handles in the region of 1,600 tonnes of trade waste and recycling each year, with potentially 40 percent of this being recycled (including food waste treatment via anaerobic digestion).

DCC has committed to change the domestic (household) service to a weekly kerbsort arrangement, alongside 4-weekly refuse in 2023. This has implications for the trade service with respect to the ongoing feasibility to co-collect, e.g. on the food, communal dry recycling collections, and linked to the future reduction in household residual waste collection frequency.

Alongside a review of recycling provision for communal bins (flats), the opportunity exists to strategically review the range of services offered to business (and internal) customers, along with the service delivery model and operational design. The focus of this review is on ensuring the service meets the future needs of the market (including consideration of alignment with the separate collection requirements of the Environment Act), whilst contributing to the delivery of the Authority's strategic objectives.

1.1 Project aim and scope

With WRAP support, a review of the trade waste and recycling collection arrangements was initiated in the Summer of 2020 as part of a wider service transformation project. The study has been executed via the following tasks:

- Inception and project scoping;
- Information and data gathering. Focus areas include the current customer base and the services they use, resource deployment and finances;
- Baseline analysis, including the development of service metrics defining customer profiles, service yield (waste quantities), resource deployment and financial standing;
- Appraisal of the market within which the service operates, including consideration of its size, composition and competing service providers. Time was also spent in the area reviewing the competitive landscape of bins and services deployed;
- Shortlisting and modelling / analysis of future service delivery options; and
- Reporting.

The work is intended to inform outline proposals for the future development of the service, including fleet procurement decisions and plans to integrate the communal (flats) recycling and food waste with trade.

Baseline service observations

Text boxes are used throughout the report to highlight observations on the service and provide comparison with the wider market and other trade waste operators.

2.0 Existing service – baseline review

To inform the assessment of future options for the design and delivery of the trade waste service, it is first necessary to define the current service and its performance. This constitutes a baseline review. The baseline review is based on Authority-supplied information and data primarily covering the 2019/20 financial year, supported by external data where gaps exist. This has been used to create a 'master customer spreadsheet' containing details of service transactions, and an overarching model that incorporates finance and resource information.

This section of the report summarises the key inputs and outputs from the baseline review, as applied to each element of the service.

2.1 Service overview

The range of services available to Denbighshire business customers, charities and municipal buildings (e.g. schools) is based on collection of the following streams:

- Residual waste collection (general waste) in either (brown) bags or bins (240/360/660/1100/1280¹ litres). The vast majority of customers receive a weekly collection but a small number receive fortnightly or monthly lifts;
- Dry mixed recycling (DMR) collection, in (clear) recycling bags or bins (240/360/660/1100/1280 litres). The main target materials are paper, card (including cartons), glass, plastic and cans. As with residual waste, whilst most collections are made weekly a number of customers receive fortnightly or monthly lifts;
 - Integrated with the DMR lifts, bundled cardboard is collected on a Pay As You Throw (PAYT) basis, through the advance purchase of labels. Popular with high street customers who do not have space for bins, most customers flatten their boxes and place them inside the largest box they have;
- Food waste collection via 23 litre caddies or 120 litre bins. Collections are made weekly, fortnightly and in some cases, monthly.

Most customers are formally contracted and receive regular scheduled collections. For those smaller businesses using sacks and cardboard recycling labels, these can be purchased at the 'One Stop Shops' located in towns across the County.

Observation: service design as perceived by customers

The current service design allows for collection of a comprehensive range of materials, with close alignment between what can be recycled at home and at work. A flexible range of containment options and collection frequencies are available to customers.

In order to achieve alignment with the Welsh Government's preferred level of business waste separation requirements proposed via the Environment (Wales) Act 2016, DCC would need to split the co-mingled dry recycling stream into separate paper/card, metal/plastic and glass streams. It is also proposed that WEEE and textiles be separately collected from non-domestic premises.

For smaller businesses producing less waste overall, the ability to use sacks for both general waste and recycling, enhanced by a flexible cardboard recycling service, is likely to be attractive. With Pay As You Throw (PAYT) options across all streams the service provides a high level of flexibility for small / seasonal customers.

¹ 1280 litre bins were predominantly issued to internal customers in the past. All new large 4-wheeled bins are 1100 litres.

2.1.1 Peripheral services

A number of peripheral service areas impact upon the trade waste and recycling collections. Examples include:

- Servicing communal bins at flats complexes following the introduction of the new collection service (and Resource Recovery Vehicles (RRVs)) in 2023;
- A chargeable bulky trade refuse collection service²; and
- A chargeable trade garden waste collection service³.

Trade waste is not accepted at any of the authority's Recycling Parks (Household Waste and recycling Centres).

The above elements do not form part of the formal baseline review and model development. However, the integration of flats is considered in the future options modelling (section 5).

2.2 Charging

Wheeled bin collections are charged on a volume basis using the industry-standard approach 'per lift', against a pre-agreed schedule. The amount payable depends on the number and size of bins on site and the collection frequency. Residual bins are weighed (by Veolia) but no variable charging applies, with the same charge applied irrespective of whether a bin is full or half-empty at the time of collection. Recycling and food bins are not weighed by either DCC or CAD Recycling. Charges for most collection options, excluding residual bins, are published on the Authority website⁴.

General waste and DMR sacks (assumed to be 80 litres) are pre-purchased (in minimum quantities of 10) and set out by customers on an 'as needed' (PAYT) basis on the designated collection day. Food waste liners for the 23 litre caddies (where used) are supplied at no extra cost, in quantities (assumed) aligned with the level of containment used / paid for.

No additional charges are levied covering Duty of Care administration or bin rental/bonds, which is widespread across the private sector, and increasingly common amongst local authorities. Whilst this has the key benefit of meaning DCC's charging structures are kept simple, there may be commercial drawbacks linked to debt recovery and customer retention. By way of comparison:

- Monmouthshire County Council charge their wheeled bin customers a security bond based on one full quarter of collections (13 lifts where weekly), multiplied by the number of bins on site. Amounting to what is in effect a security deposit, this upfront charge provides some financial protection against issues of bin damage / loss and non-payment of bills; and
- Pembrokeshire County Council charge trade customers for the hire of residual waste bins, whilst also giving them the option of purchasing their own (through the Authority). Bin hire charges represent a not insignificant 20% of the total residual waste annual service income.

In common with other local authorities, no VAT is charged on top of the quoted prices.

² Recorded with income code 9607 this service is budgeted to generate a modest £200 (£1,061 in 2019/20)

³ No formal budget exists for this and at the time of reporting just 2 external customers were contracted to receive this service

⁴ <https://www.denbighshire.gov.uk/en/business/environmental-health/Trade-waste.aspx>. At the time of the review (summer 2020) it was noted that the pricing information relates to the 2017/18 financial year – so is somewhat outdated.

2.2.1 Scale of charges

Table 2.1 summarises the charges applying to the primary collection options available.

Table 2.1 Service options and charges (2019/20 figures⁵).

Collection	Containment options	Lift charges	Additional information
General (residual) waste	80 litre brown sack (10-99)	£2.16/sack (min. 10 sacks)	Discounted lift charges applicable to charities (estimated)
	80 litre brown sack (100+)	£2.06/sack	
	240 litre wheeled bin	£5.75	
	360 litre wheeled bin	£8.14	
	660 litre wheeled bin	£14.26	
	1,100 litre wheeled bin ⁶	£24.56	
Dry recycling	80 litre clear sack (per roll)	£1.06/sack (min. 10 sacks)	
	240 litre wheeled bin	£3.15	
	360 litre wheeled bin	£4.64	
	660 litre wheeled bin	£8.24	
	1,100 litre wheeled bin	£10.30	
	Cardboard labels	£2.14/label (sheets of 14)	
Food	23 litre lidded caddy	£1.60	
	120 litre bin	£3.18	

Observations: charging levels and cost recovery

DCC operates a hybrid charging system that blends scheduled (bin lift) and variable PAYT (sack/label purchase) elements. This provides flexibility to customers, supported by quarterly billing (for wheeled bin customers) meaning charges are adjusted regularly to reflect service usage. The authority has made progress harmonising charging arrangements across all customers in recent years, removing disparities such as previously provided free recycling to schools and internal customers. Whilst the principles by which DCC sets its prices for the service each year are understood, it is unclear to what extent these take account of evolving market conditions, and the ongoing outsourcing arrangement with Veolia (for residual). Whilst the pricing strategy is broadly in line with other Welsh local authorities, where recycling is offered at a considerable discount to residual waste, this has not on its own delivered a shift in business behaviour to 'recycle first'. Making recycling mandatory could help DCC achieve recycling rates that are closer to 'best in class', i.e. closer to 70% than the current 40%.

Whilst debt recovery is not considered (by Officers) to be a major issue for the service, given the limited protection offered by the customer contract (covered later) it may be worth considering the option of applying a bin bond (to new or unreliable businesses) in order to provide some commercial protection against 'absconding' customers. The lack of an integrated IT/in-cab system to ensure 'additional' waste is charged for, and unclear boundaries between domestic and trade lifts (including unclear branding of trade bins), may also mean that due income is not being fully recovered.

2.3 Operational delivery

DCC's trade waste and recycling collection arrangements are managed through a mixed operational delivery strategy. Whilst the core streams of residual waste and mixed recycling are collected on dedicated trade rounds, food waste is currently co-collected on the domestic food rounds.

⁵ Unit charges have been standardised across customer groups in recent years, e.g. requiring internal customers to pay the same rates as those applying to (external) businesses. Certain service elements have seen greater price adjustments than others, e.g. the cardboard collection cost has doubled over the course of 2-3 years so that it now better reflects the true costs of providing the service, which incorporates printing, posting and administering label orders.

⁶ The majority of legacy 4-wheeled bins in use are 1280 litres. These are charged at the same rate as 1100 litre bins.

The core elements of the service, in terms of round structures and fleet profile, can be summarised as:

- Trade refuse (residual waste) collected by Veolia using its own resources. The resource deployed to service DCC's customers is unknown, with Veolia lifting waste alongside its own customers in the region to create logistically sensible round structures that maximise customer route density. It is suggested by Officers that Veolia took on a single vehicle when the contract with DCC was won. The site visit undertaken in support of this review observed Veolia undertaking lifts (from DCC customers) on St Asaph business Park – using what appeared to be 26t single-compartment RCV;
- Trade recycling (dry mixed) collected 4 days per week based on a driver only using a single-compartment 15t RCV, owned outright by the authority. Whilst this service is nominally operated inhouse, and has been modelled as such, during the Covid-19 pandemic CAD Recycling have temporarily undertaken recycling collections on the authority's behalf⁷; and
- Food waste is co-collected on domestic rounds using 7.5t dedicated food waste vehicles. It is understood there are currently 6.4 of these undertaking weekly collections. The proportion of time spent collecting trade food waste is not known.

The existing customer base is serviced over a standard working week with collections taking place Monday - Friday. Crewing levels are based on a driver only across the dedicated residual (Veolia) and recycling (DCC / CAD) rounds. Where food is co-collected on the domestic rounds crewing levels vary, but is assumed to average as a driver plus one loader.

2.3.1 Veolia contract

DCC's contract for the collection and treatment of trade residual waste commenced in August 2018. The contract is based on a schedule of 'all-in' (collection / treatment) lift charges, indexed annually. A weight threshold applies to the pricing formula, but this has never been triggered. Whilst the original contract term has expired, it is being extended on a rolling basis.

⁷ On the basis of a hastily agreed subcontracting arrangement, whereby CAD are charging c.50% of their standard lift rate.

Observation: operational design and delivery

The Authority's trade waste and recycling service supports weekly, fortnightly and monthly collections of each of the primary streams, providing flexibility for large and small waste producers alike. Term-time only collections (42 lifts per annum) will also be appealing to schools. The 5-day working pattern (Monday – Friday) is in common with the majority of local authority trade waste services, albeit a limited number (such as Gwynedd) also undertake Saturday collections.

The service as a whole is viewed (by Officers) as being reliable, with many longstanding (and returning) customers. Veolia deliver a consistent quality of outsourced residual waste service; this may be due as much to the diligent driver that works on this service, who is an ex- Authority employee, as to anything else. The temporary outsourcing arrangement with CAD Recycling has perhaps been less successful, e.g. due to the rapid handover. Whilst outsourcing elements of the service have increased administration within the Authority, e.g. by dealing with invoices and managing intermediate communications, they are also viewed (by Officers) as having driven some systems-based improvements.

The operational strategy of co-collecting domestic and trade food waste via the domestic fleet enables the Authority to offer service flexibility in a cost-effective manner, especially given that uptake of this service is limited (equating to what is estimated to be <2 days work in the week). As an aside it is noted that such approaches by local authorities have been challenged by private sector operators in certain parts of the UK on the grounds that they breach State Aid rules - by using publicly funded assets to deliver a commercial service. When the domestic kerbside waste and recycling collection service changes to a weekly kerbsort arrangement and four-weekly residual collection, requiring bin-based trade food collections to be separately operated, the previous efficiency gains will be removed. As such, the long-term cost effectiveness of maintaining certain aspects of the current service design are uncertain. Those businesses that sit in rural locations or that are spread out from one another result in a much lower collection route density being achieved – meaning rounds become dominated by driving (which is costly) as opposed to lifting (generating income). This represents a challenge to be aware of when potential alternative future service delivery options are being assessed. As the 'minority' service, specific timings for the trade food collections are not known. Whilst a 'buffer' of time will be built into the current rounds to allow for trade lifts, these collections are not specifically monitored / quantified. The same is true for the residual collections undertaken by Veolia, which represents an operational risk should DCC choose to bring this service back inhouse.

2.4 Service administration

Administration and management of the trade waste service is split across a number of Officers. A formal trade waste officer post was made redundant 4-5 years ago, resulting in the loss of a single point of service contact, and associated ownership. Tasks fall on various staff and functions, including those fulfilled by the 'One Stop Shops' dealing with sack / label customers. Within the baseline budget 1 x FTE technical waste officer at the top of grade 5 has been costed to account for service delivery support & administration, indicating that the bulk of the service administration falls on one staff member. Other supporting resource⁸ may comprise:

- 0.2 x Grade 5 finance support;
- 0.15 x senior technical waste officer;
- 0.05 x service manager; and
- 0.1 x assistant operations supervisor.

⁸ Contributing to service delivery but not representing cashable savings were the trade service to be removed. As such, these costs do not feature in the trade service budget and have not been modelled in this study.

2.4.1 Customer contract (trade waste agreement)

DCC's trade waste agreement with customers comprises a number of 'E-Forms' covering each service (residual, recycling, food, garden). The agreement captures details of the service required (container and collection frequency), the customer (name, address etc. but not SIC - **which it should**) and sets out payment dates, and the schedule of charges. Other than stipulating that 'extra collections/side waste will be charged for' and that 'wheeled bin(s) supplied will remain at all times the property of Denbighshire County Council but the hirer will be responsible for all damage or loss caused to the bin(s) whilst under his/their control, fair wear and tear excepted', there are no formal clauses setting out responsibilities on both sides. This is unusual and is considered to provide a lack of protection to both the authority and the customer, e.g. in the case of a lack of payment or service failure. For those customers purchasing sacks through the One Stop shops it is understood the receipt book doubles as the Controlled Waste Transfer Note (CWTN).

Trade waste service contracts would normally be expected to include information and clauses covering such issues as:

- Details of waste transfer and reception points;
- Notice periods for termination of the agreement;
- Dispute resolution processes and communication protocols linked to changes in service;
- Reference to legislative controls including legal duties on customers to recycle, which some authorities have taken to the extent of making this a mandatory service requirement;
- Detail on waste types accepted; and
- Containment and presentation, including collection weight limits.

The agreement does not appear to include any 'tie-in' period, meaning customers can leave at short notice⁹. This is at odds with the private sector, whose customer contracts commonly have 12 - 24 month terms, with restrictive tie-ins. These commercial practices are not advocated in DCC's case, as there is little benefit in holding a customer to a service they do not want (or are unhappy with) for such long periods. However, in the absence of any financial mechanisms that protect the authority, e.g. a bin bond, it may be appropriate for the Authority to consider introducing a notice period of say 3 months as a way of providing greater protection against aggressive sales tactics from competitors.

⁹ The current contract sets out 30 days' notice of cancellation.

Observations: customer contract and administration

DCC's customer agreement (E-Form) captures a basic level of service information for those customers taking up a bin-based service. For bag customers there is no formal agreement, just a receipt that is taken to represent the CWTN. The lack of compulsory recycling means customers can choose a residual waste only service, which is likely to have contributed to the relatively modest estimated service recycling rate of 40%. The absence of a formal termination period in the customer agreement offers little defence to customers that are potentially lured away by promotional offers from competitors. As an example, when the residual trade contract was first awarded to Veolia, competing bidders (e.g. Gaskells) were known to target existing customers – on the premise that the Authority were ceasing to provide a service. Should the authority not wish to introduce a restrictive 'tie-in' period then other mechanisms, such as bin bond, may provide additional commercial protection. That said, many of the authority's customers are long standing and may be happy to commit to longer contract terms. Other commercial controls DDC may wish to consider, as adopted by other local authorities, include:

- Applying an administration or Duty of Care charge;
- Stipulating a minimum advance invoice value; and
- For departing customers, require evidence of a CWTN being in place with a new service provider. The same may apply to customers taking up just part of the service, e.g. recycling; DDC may want assurance that a legal outlet exists for any general waste that is produced.

Despite the lack of a robust set of Terms and Conditions governing the customer contract, it is understood that the service runs with low levels of (bad) debt. This most likely reflects the stable customer base the authority has. However, should more customers start to go out of business, the position could worsen. Issues may also emerge should the authority decide to grow the service and win new customers, which introduces new commercial risks. As such, it is a recommendation of this study that additional clauses be added to the agreement, covering issues such as change management, communication protocols and termination periods.

Owing to the organisational setup the authority can be slow to respond to customer contacts and complaints, something that has been highlighted during the disruption and service delivery changes brought about by Covid-19. Without very good in-cab and integrated back office systems, it is difficult to access 'real time' data and information. When combined with the lack of a dedicated officer with responsibility for the service, it is likely that enquiries and responses may not be dealt with as quickly as the authority would like. A clearer communications and dispute resolution protocol, embedded or cross-referenced in the customer service agreement, would help to alleviate any customer service issues that arise.

Subject to decisions made on the future delivery of the service, it is recommended that a single (technical) waste officer be made responsible for its management / administration, supported by independent street-scene resources undertaking local enforcement activities 'on the ground'.

2.5 Customer data

DCC provided a copy of its customer database in MS Excel format. The file, received 6th August 2020, has been configured by the Authority to enable Officers to update service information and generate mail merge reports for external customers. The data is structured by customer (in rows) against which service uptake information is defined (in adjacent columns). Within each worksheet recorded data fields include customer type, payment method, business classification and SIC code (partially complete), customer name, address, and for each service received: container type/quantity, collection day/frequency, total annual collections, cost per lift¹⁰ and total annual charge. This common data structure is replicated across multiple worksheets, each containing information for a different customer group or type of service received, as follows:

¹⁰ In most cases, cost per lift data is 'looked up' from a separate worksheet containing this information that can be updated whenever price changes apply.

- Bags: listing customers who purchase brown (residual) or clear (recycling) trade sacks and pay via Customer Services or Libraries. For some customers the date on which bags were last purchased, and the quantity, is included;
- Cardboard: lists those customers using cardboard (labels). As per the bag customers some entries include a date on which labels were last purchased, but without quantity information;
- External (Wheelie Bins): contains the bulk of the entries. Where a customer has multiple bins on site or repeat visits in the week, e.g. food lifts from the general hospital, additional rows are included containing this detail. The worksheet includes a limited number of church customers (5) that receive free collections;
- Internals: lists all internal (non-school) customers and the service they receive;
- Schedule 1: contains a short list (5 entries) of charities to which reduced collection charges apply. None of these customers receive recycling collections; and
- Schools: Split by catering dept (food lifts) and schools (residual and recycling). A mix of total annual lifts apply with some establishments receiving collections all year round (52 weekly lifts), and others just at term times (42 weekly lifts).

2.5.1 Data cleansing and formatting pre-analysis

A process of data cleansing and formatting was required to enable the customer data to be analysed and used to generate input metrics to the baseline model. Steps involved collating all customer and service information within a single worksheet (removing duplicate customer entries where appropriate), removing merged cells and identifying/renaming repeat customer entries with additional bins/lifts.

Figure 2.1 presents a sample map generated from the cleansed data supplied by the Authority, combined with Ordnance Survey CodePoint data¹¹ loaded into QGIS¹². The map shows the overall distribution of customers, including the subset of 'Bag' customers shown in green, supporting depot / materials reception infrastructure and a Postcode District overlay.

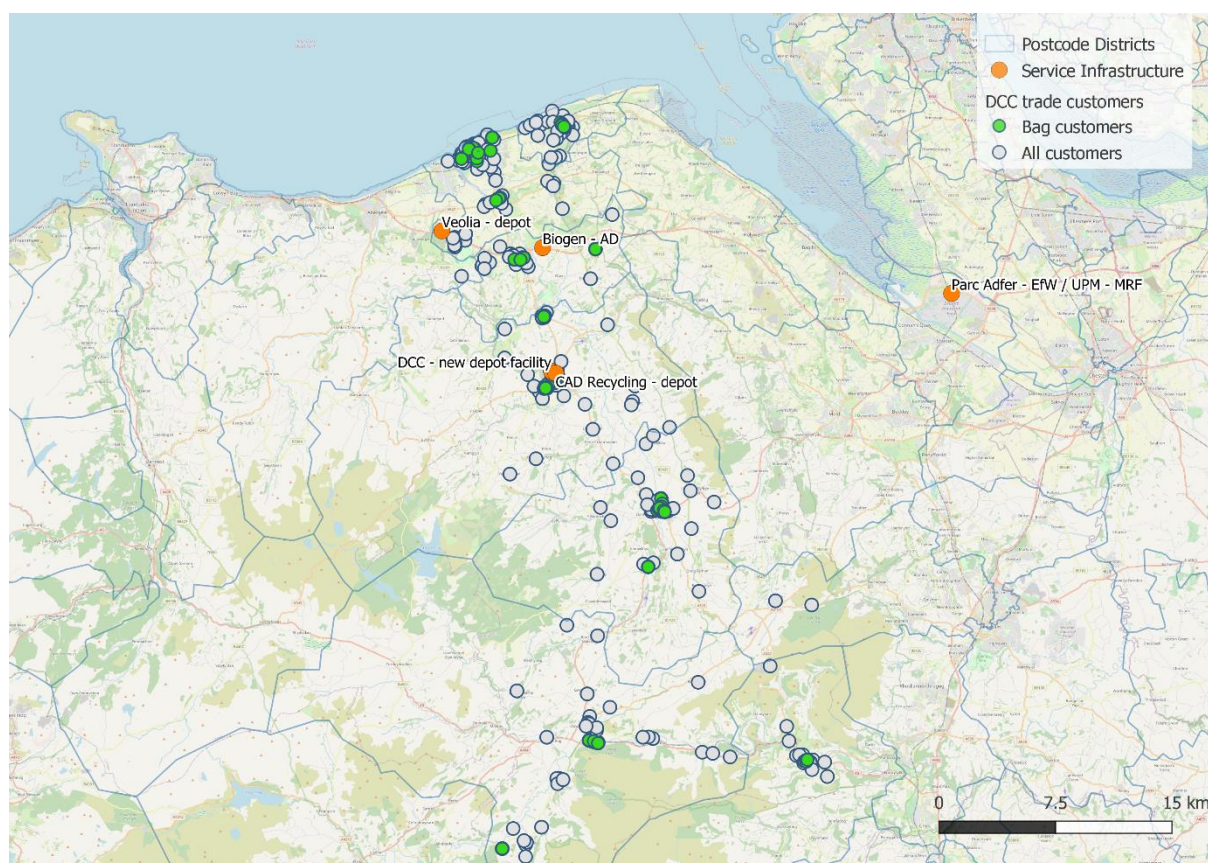
It is possible to run various spatial analyses on the data from within the GIS. By way of example, the proportional split of customers by region (and underlying Postcode District) can be summarised as follows:

- North: 69% LL16 (Denbigh), LL17 (St. Asaph), LL18 (Rhyl), LL19 (Prestatyn)
- Mid: 15% LL15 (Ruthin)
- South: 16% LL11 (Wrexham), LL20 (Llangollen), LI21 (Corwen)

¹¹ Used to assign grid references to supplied postcodes

¹² A free and open source Geographic Information System. <https://www.qgis.org/en/site/>

Figure 2.1 Customer distribution map: including 'Bag' sites.



Observation: customer data management

DCC's approach to managing administrative and operational data on its trade waste service is similar to many local authorities. Most have independently developed their own customer databases over time, holding information deemed important to fulfil invoicing transactions and keep track of contracted services. In common with its local authority peers, DCC has not fully integrated this customer data with that used to manage the operational deployment of resources on rounds. This reflects the fact that there has historically been limited demand for real-time reporting. Should DCC need to re-route the trade rounds, introduce a significant service change, or find itself in a market with much higher levels of customer turnover, it would be a recommendation to move to a position where the combination of UPRN and unique customer name are used as the data building blocks. At present, the customer database is driven by the assigned 'Operating Site / Business Name'. A challenge with this approach is that names are spelt differently in different places (including worksheets within the same spreadsheet). By way of example 'Mackenzie Jones Solicitors' also appears in DCC's data as 'McKenzie Jones'. Having a unique, geo-referenced data building block to which customers and their associated transactions (e.g. sack purchases) are assigned represents a critical starting point. Other watchpoints include avoiding the use of merged cells and ensuring all reference (linked) data is time-stamped. On the latter point it was unclear what date range the lift charge information applies to within the supplied customer database, as this differs from the price list information supplied separately (and used in the baseline model).

The current hybrid arrangement involving a mix of outsourced and co-collected service elements introduces challenges to accurate data collection, but also makes it potentially more important – if the aim is to have a transparent view of service performance.

2.6 Customer profile and service uptake

Headline statistics from the cleansed/formatted customer data (described above) indicate:

- 632 unique customers/sites, the majority of which (496, 78%) are external, i.e. private businesses; and
- 136 internal customers being serviced, including 53 schools and 42 (commonly co-located) school catering departments¹³.

An exercise was completed as part of the customer data cleansing to manually assign business categories to each customer. This was completed in line with the categories used by the Office for National Statistics (ONS) so that comparisons could be drawn with the overall market structure in the County. SIC categories (at Section level) were obtained through a combination of Google and Companies House searches. Figure 2.2 presents the distribution of the customer database entries according to the ONS categories, alongside the overall County profile (derived from the market analysis presented in section 3 of this report). This provides the Authority with an indication of its current market share and those sectors that may be under or over-represented in the customer base¹⁴.

The figures show that:

- By number, it is estimated that the Authority provides collection services to just over 20% of target enterprises in the County¹⁵;
- The Authority's current customer base is dominated by outlets in the Accommodation and Food Services sector (making up 29% of the Authority's customer base) and Retail (making up 24% of the customer base); and
- In terms of market share, i.e. the percentage of all available units in the Authority in each sector that the Authority already serves, the highest ranking sectors are:
 - Public Administration and Defence (where the Authority has an estimated 54% market share);
 - Accommodation and Food Services (where it is estimated the Authority has a 52% market share); and
 - Education (48% market share).

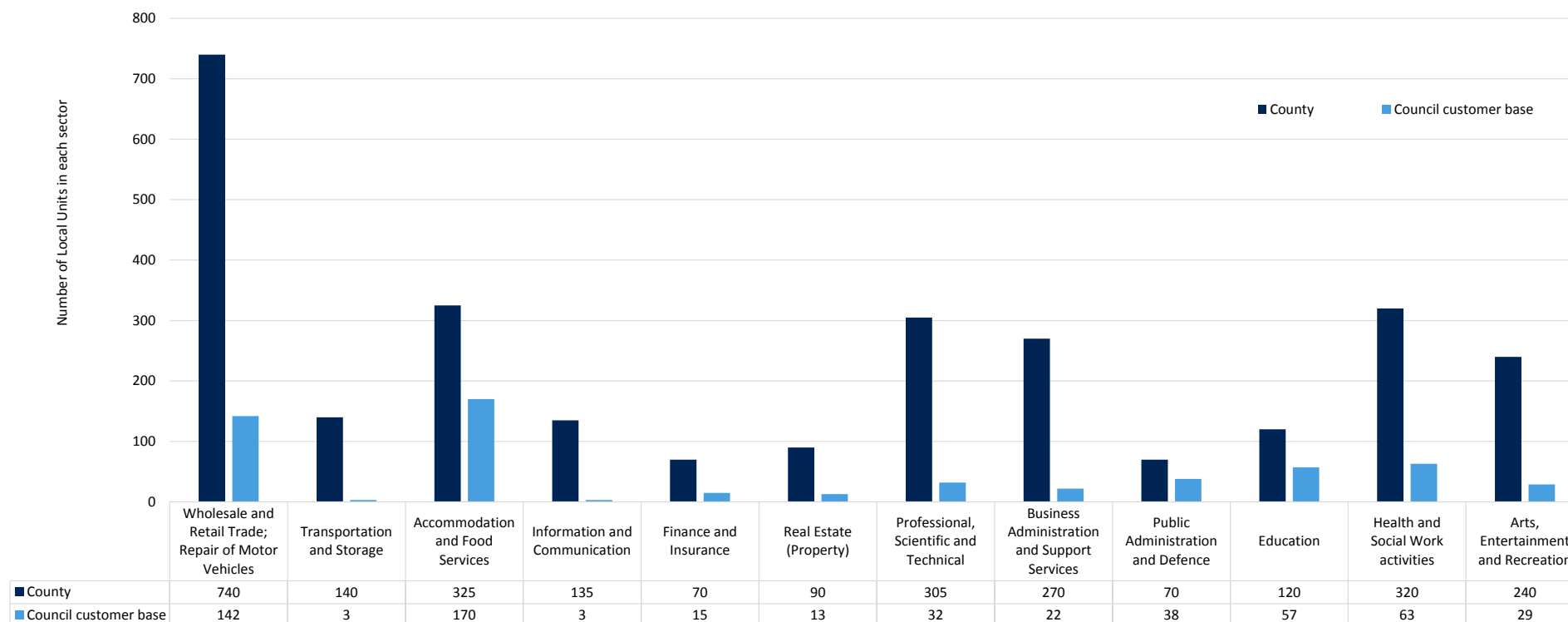
Issues of market size and target waste streams, in the context of the future development of the trade waste service, are explored further in section 3 of this report.

¹³ The majority of which receive 42 (term-time) collections per annum.

¹⁴ Of the 632 unique customers/sites, 19 were identified as Manufacturing businesses and 26 as Other. These were subsequently excluded from the sectoral analysis due to Manufacturing sector weights tending to skew the estimate of waste arisings/available – most of which won't be suited to local authority (sack and wheeled bin) trade collection services, and due to a lack of arising / composition data for businesses defined as Other in the ONS data.

¹⁵ Acknowledging duplication of locations within the Authority's customer base concerning Schools and their associated Canteens, and exclusion of Manufacturing and Other businesses from the analysis.

Figure 2.2 Comparison of the Authority's commercial waste collection customer profile with that of the County's entire commercial sector (unique business numbers derived from business name)¹⁶. Excludes 19 'Manufacturing' and 26 'Other' businesses in the Authority's customer base.



¹⁶ During the assignment of the current customer base to IDBR (Inter Departmental Business Register) categories canteens and catering departments (within schools and hospitals) were assigned to 'Accommodation and food service activities' as this category best aligns with the expected waste production profile of these outlets.

2.6.1 Transaction profile

The number of unique customers/sites (by business name) taking up the primary service (material/container) options is presented in table 2.2. For those identified as being bag customers the true number of active service users is not actively monitored.

Table 2.2 Unique customer numbers by service type.

Service element	Number of unique participating businesses
Residual waste (bins)	359
Residual waste (bags)	140 identified in customer database
Mixed recycling (bins)	294
Mixed recycling (bags)	140 identified in customer database
Cardboard labels	54
Food caddies (23ltr)	10
Food bins (120ltr)	42

Table 2.3 below provides a summary of lift transaction numbers. The annual volume (litres) lifted figures provide an 'at a glance' view of the relative levels of usage of each of the separately recorded material/container options¹⁷.

Table 2.3 Annual service uptake numbers (sacks, bundles and bins) across the recorded lift types.

Collection	Containment options	Individual sacks / bundles set out	Bins lifted	Total litres uncompacted (per annum)
General (residual) waste	80 litre brown sack	7,752 ¹⁸		620,160
	180 litre wheeled bin		70	12,600
	240 litre wheeled bin		4,052	972,480
	360 litre wheeled bin		4,196	1,510,560
	660 litre wheeled bin		5,676	3,746,160
	1,100 litre wheeled bin		732	805,200
	1,280 litre wheeled bin		5,419	6,936,320
	General waste sub-total			14,603,480
Mixed recycling	80 litre clear sack	1,818 ¹⁹		145,434
	180 litre wheeled bin		12	2,160
	240 litre wheeled bin		3,580	859,200
	360 litre wheeled bin		3,252	1,170,720
	660 litre wheeled bin		2,718	1,793,880
	1,100 litre wheeled bin		164	180,400
	1,280 litre wheeled bin		4,373	5,597,440
	Cardboard labels (bundles)	655		58,950
	Dry recycling sub-total			9,808,184
Food	23 litre caddy		273	6,279
	120 litre wheeled bin		5,702	684,240
	Food sub-total			690,519

¹⁷ For all of the lift-related analyses carried out and presented here the focus has been on those primary container types that make up the majority of the quantified collections. Peripheral elements such as 'bulky' and 'garden' collections have not been analysed, owing to the small numbers involved.

¹⁸ The arithmetic average of recorded sacks sold in 2019/20 (6,865) and recorded sacks lifted (8,638) from 2019 Veolia lift data.

¹⁹ Total trade recycling sack usage derived from sacks sold in 2019/20 (1,620) uplifted by c.13% to account for existing stocks held/used by customers from prior years. 13% chosen to be consistent with equivalent uplift applied to residual sack sale number. Same logic applies to cardboard labels/bundles, whereby the number sold in 2019/20 (580) has been uplifted by 13%.

Observation: DCC's customer base and service uptake profile

The trade service portfolio is dominated by hospitality businesses (serving food and drink) and retail outlets. The "over-representation" of these sectors in local authority customer portfolios reflects a national pattern. Food service businesses include takeaways and small food outlets which produce larger quantities of heavier organic wastes which will contaminate any recyclables collected in the same bin. Private waste collectors tend to avoid such customers (by pricing themselves out of the market or simply not contacting such customers) because of the waste they produce (both in terms of weight and composition) and to some extent the commercial risk (for example the non-payment of invoices). This is particularly true where those operators run dirty MRFs where diversion rates are dependent upon recyclable streams being uncontaminated by wet organic waste streams. This can leave local authorities as the provider of last resort without the ability to make a similar commercial judgement. However, in DCC's case, this may represent a growth opportunity – the current service design and pricing is geared up to appeal to small (retail) businesses and those in the hospitality sector, with the separate food waste collections, sack and small bin options being both cost-effective and flexible to customer requirements.

The analysed transaction profile shows that trade refuse lifts (by volume) represent 58% of everything lifted. Dry recycling makes up an estimated 39%, and food waste 3%.

Beyond the analysed numbers, observations coming back from discussions with Authority Officers and time spent in the region are as follows:

- The authority is characterised by smaller (e.g. retail and hospitality businesses) focused in the southern towns of Corwen and Llangollen, and larger mixed use (manufacturing / logistics / office / retail) in the Mid and North;
- Municipal buildings (internal customers) can use whatever service provider they choose, i.e. they are not obliged to use the Authority service;
- The general hospital is the largest food waste service user. Excluding this key customer, the balance of lifts is made from small external customers, e.g. cafes and holiday cottages (making up just over 50% food waste lifts), with catering departments within schools being the next largest customer type (making up 33%); and
- DCC's branding on bins is much less prominent/clear when compared with competitors operating in the region.

2.7 Materials management

Understanding quantities of materials collected from customers is key to assessing the overall performance (recycling rate) and financial standing of the service. This is deployed in the model by assigning an average weight per container type.

2.7.1 Service tonnage

Detailed lift weights are recorded by Veolia on the trade residual waste service. Data was supplied in spreadsheet format for each month in 2019, recording the customer name and address, container lifted (e.g. Euro 1280ltr), date, no. of bags, no. of lifts, lift weight and associated charge information. Analysis of this data involved compiling each month of data into a single master spreadsheet, and use of pivot tables to calculate average weights for each lift type (bin number and size, sacks). Whilst the majority of lifts have a unique lift weight recorded it is observed that for sack lifts (in most cases) a default 20kg per sack lifted is assigned. This suggests small numbers of sacks are not weighed, e.g. because this would require use of slave bins. There may also be accuracy issues with the weighing equipment with smaller weights; by way of example a number of records in the data identify a lift being made but with 0kg recorded as the lift weight. 20kg per sack is considered unrealistically high, especially in the context that the average 240ltr bin weight (as derived from Veolia's data) is 17.7kg, hence a weight from WRAP's C&I waste apportionment tool has been applied in its place (6.3kg per residual sack).

Currently within DCC there is limited data recorded against, or apportioned to, the trade recycling and food waste services – which represents a challenge in the context of this study. The absence of (accurate) data is due to:

- The lack of a weighbridge at the Kinnel Park depot where mixed recycling is currently tipped off, despite this being collected on dedicated rounds; and
- The current co-collection strategy adopted on food waste with no back-end apportionment of the weights recorded to trade versus domestic.

No estimate of either food or trade recycling weights collected could be supplied during the review as a result of the above. For these streams a set of apportionment factors (average unit weights for different container/material combinations) have been assigned to each material and container option identified in the customer data, derived from WRAP's kerbside C&I waste apportionment tool.

Despite the data limitations the model generated waste flows, which are calculated bottom-up, are viewed as representing the best currently available estimate of trade service arisings and thus recycling performance.

The key output figures are provided in Table 2.4, with supporting commentary beneath.

Table 2.4 Unit weights used in the model derived from DCC (Veolia) and reference data, along with modelled tonnage figures (2019/20 hybrid waste flows – rounded to nearest whole number).

Collection	Containment options	DCC unit weight (kg/lift)	WRAP unit weight (kg/lift)
General (residual) waste	80 litre brown sack		6.3
	180 litre wheeled bin	5.6	
	240 litre wheeled bin	17.7	
	360 litre wheeled bin	25.7	
	660 litre wheeled bin	50.5	
	1,100 litre wheeled bin	95.2	
	1,280 litre wheeled bin	72.1	
	Annual waste flow (tonnes)		976
Mixed recycling	80 litre clear sack		6.1
	180 litre wheeled bin		7.7
	240 litre wheeled bin		10.3
	360 litre wheeled bin		15.4
	660 litre wheeled bin		28.3
	1,100 litre wheeled bin		47.1
	1,280 litre wheeled bin		54.8
	90 litre cardboard bundle		5.5
	Annual waste flow (tonnes)		426
Food	23 litre caddy		11.7
	120 litre wheeled bin		38.0
	Annual waste flow (tonnes)		220
Total waste arising (tonnes)			1,622

The service as modelled achieves an overall recycling rate of 40 percent²⁰.

²⁰ Based on the 'collected' tonnage. Contamination in the recycling stream will mean the true recycling rate is slightly lower.

2.7.2 Treatment and reprocessing

Materials management routes for the separately collected streams comprise:

- Residual (general) waste: Parc Adfer EfW (contracted directly by Veolia. A gate fee and bulking/transport fee was agreed for any option where DCC collects this stream itself)
- Mixed recycling: MRF processing via UPM Shotton (processing gate fee includes haulage)
- Food waste: Biogen Waen AD (where it is assumed that 50% would be direct delivered, the rest bulked/transported at the same rate applying to residual waste)

Local depot and bulking infrastructure is as shown in Figure 2.2.

Gate fees and bulking charges (£/t) were supplied or assumed for all of the above management routes, approved by DCC. A surcharge applies to the MRF processing fee based on rolling contamination levels in the mixed recycling, which currently averages 10%. No income is currently received for any of the collected dry recycling.

2.8 Baseline model construction

Once the master customer data had been compiled and analysed, a strategy was needed to enable a trade-specific baseline to be modelled, representing the service as operated during the financial year 2019/20. This required various assumptions to be made, e.g. regarding the level of operational resource from within the current co-collected food system committed to trade lifts and residual / food vehicle utilisation and costs. Whilst the core of the model is based on known data, describing the contracted lift profile and verified trade residual weights, the number of assumptions required to fill gaps in the data mean the outputs should be taken as a guide to the operational and financial standing of the service, as opposed to a confident position statement.

The master worksheet that pulls all of the model calculations together is structured by service element (residual / mixed recycling / cardboard / food). When modelling multi-stream trade services it is an aim to assign, as far as possible, costs and income to each individual stream. This allows margins to be calculated for each. This is important when considering future marketing strategies and the mix of services to promote to customers to ensure the service overall does not lose money. When it comes to collection resources, the recycling and cardboard are dealt with together, reflecting the fact these materials are mixed together on the same vehicle. Back-office support costs (Officer admin time) have been distributed across the services based on the proportional split of lifts undertaken on each service, i.e. the relative workload on each. No other fixed overheads have been included in the baseline model, as per DCC's direction.

The model worksheet is ultimately built up in stages, comprising:

- Customer numbers and containers lifted;
- Revenue from lifts;
- Operational resources and costs;
- Materials management, incorporating:
 - 'bottom-up' waste flow calculation by multiplying the number of lifts of each container/stream by their unit weights; and

- waste management costs based on the multiplication of the annual tonnage of each stream by specified gate fees, revenues, bulking and haulage costs;
- Summary compilation drawing in outputs from the above calculations and including service support cost lines.

The model ultimately generates a set of summary statistics for the service, as shown in figure 4.1 for the baseline, along with a breakdown of the financial margins achieved on each element of the service.

2.9 Financial summary

This section of the baseline review considers the overall financial standing of the service, calculating income and costs from Authority-supplied, assumed data. It also provides the Authority with an indication of current service profitability²¹. The baseline model includes a cost projection for the residual waste service as if it were operated directly by the Authority, as well as the equivalent cost based on Veolia delivering this service. It also embeds two different ways of dealing with the ongoing cost of container replacements/repair. Within DCC's budget commercial bin costs, equating to £13k for residual and £1.8k for recycling in 2019/20, appear high. It is unclear what is included in the underlying cost codes, but it is inferred that these represent outright purchase (i.e. Opex) costs as opposed to ongoing depreciated asset (Capex) costs. The latter approach is normally adopted in the baseline model build; however, reflecting the Authority's approach model-predicted container costs have been presented both as Opex and Capex variants.

2.9.1 Service budget / model reconciliation

A high-level budget for the trade waste and recycling service was supplied as part of the study, drawing data from various cost codes used to monitor expenditure. This covers the residual and recycling services but appears to exclude food incomes and costs (presumably due to this material being co-collected on the domestic rounds). It also appears to be missing recycling material processing charges. As a result, it can only be viewed as providing a partial picture of the service financial standing, as monitored by the Authority.

Recognising the above limitations and omissions, **the Authority's 2019/20 budget shows gross income being £375.4k, with gross costs being £272.2k.** This indicates an **operating surplus of £103.2k.**

The baseline model developed through this study incorporates a set of revenue and cost calculations that are based on the detailed analysis of elements contributing to the financial standing of the service, working wherever possible on a 'bottom-up' basis. The modelled outcomes, for comparison with the internal Authority numbers cited above, are as shown in table 2.5.

Table 2.5 Financial summary (annual outturn) by modelled variant.

Element	1) Residual inhouse, container CAPEX	2) Residual inhouse, container OPEX	3) Residual Veolia, container CAPEX	4) Residual Veolia, container OPEX
Total income	£422,896	£422,896	£422,896	£422,896
Total costs	£358,593	£364,836	£355,629	£361,871
Operating surplus	£64,303	£58,061	£67,268	£61,025

²¹ Referred to from this point forward in terms of the level of surplus or deficit that the service operates at.

In those variants where Veolia deliver the residual collections, the annual contract cost element is modelled to be £209,038. This is approximately £3k lower than the equivalent costs were the Authority to undertake these collections internally. There is a clear difference between the budget incomes / costs (£375k / £272k) and those modelled (£423k / c.£360k). Reasons for these differences may include:

- The omission of food waste incomes and costs from the budget;
- The omission of MRF processing fees from the budget;
- The potential omission of support staff costs in the budget; and
- Changes in customer prices and Veolia charges between 2019/20 (as the budget outturn relates to) and 2020/21.

It would be advisable to investigate the differences, particularly with respect to incomes and whether all contracted collections are being charged for as they should.

2.9.2 Service margins

Based on the modelled numbers above the overall service margin (profitability) is 15%, which would be considered a healthy return for any private sector operator. The residual waste lifts deliver a healthy margin (averaging £150 of 'profit' per annum per customer for the model variant 1). The mixed recycling delivers a small surplus (of £21 per annum per customer), whereas the food service is modelled as making a loss. Figure 2.3 below provides a full breakdown of the margin analysis from the baseline model (variant 1), where the residual service is delivered inhouse and container replacements are treated as Capex. The trend observed in these findings is consistent with many Welsh local authority trade service providers, whose pricing structures have evolved to encourage uptake of recycling over residual waste. In all cases the financial health of the service is dependent on the Authority retaining a reasonable level of residual waste customers, in order to offset recycling that may be operated closer to breakeven or at a loss.

Figure 2.3 Baseline financial margin analysis by service element.

	Residual Waste	Mixed Recycling (incorporating Cardboard)	Food	15%
Service Margin	25%	10%	-115%	Overall Service Margin
Margin per customer	£ 151.20	£ 21.04	-£ 411.82	£ 101.75
Margin per lift (average)	£ 2.70	£ 0.73	-£ 3.58	
Revenue per lift (average)	£ 10.95	£ 7.01	£ 3.11	
Cost per lift (average)	£ 8.25	£ 6.28	£ 6.69	
Treatment cost per lift	£ 4.21	£ 2.03	£ 1.39	
Margin per litre lifted	£ 0.0052	£ 0.0010	-£ 0.0310	
Revenue per litre lifted	£ 0.0209	£ 0.0101	£ 0.0269	
Cost per litre lifted	£ 0.0158	£ 0.0090	£ 0.0579	

3.0 Market appraisal

When considering options for the future development of the trade waste service it is helpful to understand the nature of the market the service operates within, including its size and business profile. This section of the report presents outputs from a market segmentation exercise that develops estimates of the quantities of commercial waste arising in the County, and its composition.

To develop both the waste arising estimation and composition, calculations were based on published data applicable to Wales and Denbighshire. The segmentation of the commercial sector uses ONS 'UK Business – activity, size and location' data for the County. Waste arising estimations draw on the outputs of the Natural Resources Wales 'Survey of Industrial & Commercial Waste Generated in Wales 2012'²².

When reviewing the outputs from the adopted methodology, underlying challenges caused by inconsistent data need to be acknowledged. Care is needed interpreting the results; it is advisable to focus on high-level differences and trends in the data, and on drawing comparisons with other studies adopting the same method and assumptions. The following text box introduces some of the underlying issues:

Cautionary points: C&I waste estimation limitations

The accurate estimation of C&I waste arisings in any given region is compromised by information and data limitations. These limitations occur at each stage in the calculation methodology. For example, when seeking to estimate numbers and types of active businesses within a given region, inaccuracies are introduced through:

- Companies registering their head offices with registration brokers, accountants or solicitors in an area, but not actually operating from those addresses;
- Delays that occur between registering as a PAYE and/or VAT enterprise and registering for businesses rates; and
- The common scenario whereby more than one business operates from a single registered premise.

C&I waste surveys have followed differing methodologies in the past, and with varying sample sizes. Weaknesses are commonly caused by:

- The sampling of just one business waste stream, e.g. residual waste, and not recycling; and
- Sample timing, e.g. where samples are taken on a single day in the week, the results from which will be affected by the day(s) of the week on which waste is usually collected from the sample location.

When it comes to estimating the composition of C&I waste, some sectors (e.g. Hospitality) have much better data than others (e.g. Transport and Storage). Various assumptions have to be made to address gaps and reconcile differences, e.g. between sector classifications used by the ONS and those used in waste surveys.

²² A 2018 update was published part way through the study, outputs from which have been reviewed to assess differences with the more granular 2012 data used to support the market analysis.

3.1 Denbighshire's business sector and size distribution

3.1.1 Sectoral breakdown

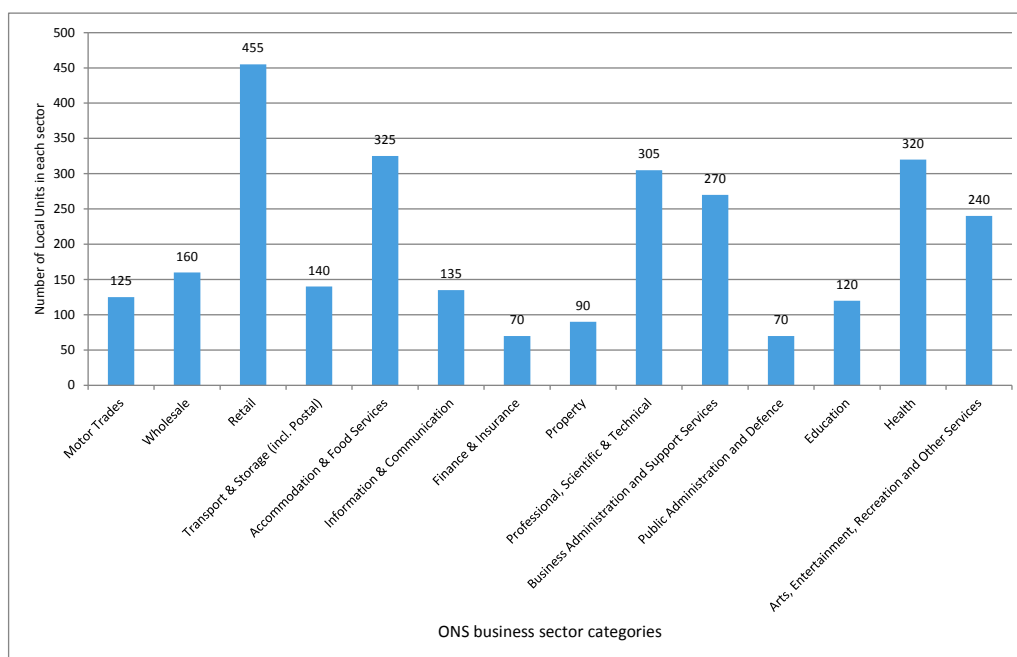
The Office of National Statistics (ONS) publishes business activity information, derived historically from the Inter Departmental Business Register (IDBR). This presents, amongst other criteria, the number of Enterprises²³ and Local Units²⁴ operating in each local authority area in each commercial sector and by size (based on the number of recorded employees in either PAYE jobs or derived from VAT turnover information).

The 2016 ONS annual data set has been used in this study, providing consistency with other Welsh local authority market assessments undertaken by WRAP Cymru. From this data the business sector profile across any County can be characterised in terms of the:

- Total number of VAT and PAYE registered enterprises;
- Number of enterprises operating in each commercial sector; and
- Number of enterprises operating in each of a number of size bands (defined by the number of employees).

Excluding the agriculture, fisheries, forestry, production and construction sectors (which are generally not served by local authority commercial waste collection services because of the type and quantity of wastes produced) the ONS data identifies 2,825 VAT and PAYE registered businesses²⁵ operating in Denbighshire. The segmentation is presented in Figure 3.1.

Figure 3.1 Enterprise segmentation for Denbighshire.



²³ An Enterprise can be thought of as the overall business, made up of all the individual sites or workplaces. It is defined as the smallest combination of legal units (generally based on VAT and/or PAYE records) that has a certain degree of autonomy within an enterprise group.

²⁴ A Local Unit is an individual site (for example a factory or shop) associated with an enterprise. It can also be referred to as a workplace.

²⁵ The number of Local Units in a given area is higher than the number of registered Enterprises. Where the two parameters are not combined within the source data, the higher Local Unit count has been used, as this covers each outlet of a business - providing the best practical correlation with waste production.

The dominant sectors in Denbighshire are Retail, Accommodation and Food Services and Health. These are followed by Professional, Scientific & Technical, Business Administration, Arts, Entertainment, Recreation and Other Services.

3.1.2 Business size distribution

The ONS data provides a breakdown of the number of businesses by size (number of employees) in the following categories:

SME's:

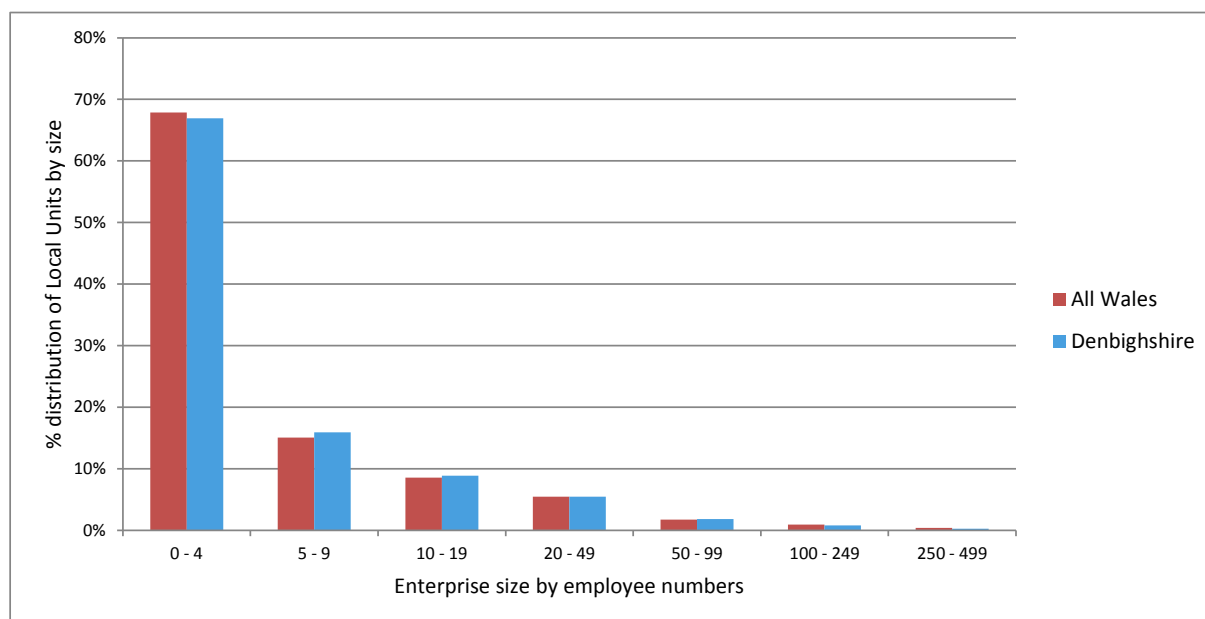
- 0-4 employees
- 5-9
- 10-19
- 20-49
- 50-99
- 100-249

Larger business:

- 250-499
- 500-999
- 1,000+

The size of an enterprise influences the amount of commercial waste generated. Figure 3.2 presents an analysis of the commercial sector by business size (based on the number of employees) and compared with the whole of Wales. Due to the way in which the source data is compiled it should be noted that this data is for all sectors, including Agriculture, Fisheries, Forestry, Production and Construction sectors.

Figure 3.2 Business size distribution (by number of employees): Denbighshire and Wales – 2016 totals.



Denbighshire's business size distribution closely matches the Welsh national pattern: the majority of enterprises by number are micro-SMEs (with fewer than 10 employees) – 83% of all businesses (Local Units) fall in this size band within Denbighshire.

3.2 Total commercial waste arisings

Estimating total commercial waste arisings is challenging, and is limited by data deficiencies at national, regional and local levels. The use of waste site returns is not reliable as waste will be managed from both within and outside the County.

Table 3.1 presents an estimate of total commercial waste arisings in Denbighshire. It excludes tonnage estimates from those sectors identified previously as being less likely to utilise wheeled bin collection services. The estimate uses the business sector profile identified through the ONS data (section 3.1), reconciled with the sector headings (and associated unit annual waste arising estimates by size band) used in the Natural Resources Wales 'Survey of Industrial & Commercial Waste Generated in Wales 2012' data.

Table 3.1 Estimation of total commercial waste arisings (tonnes per annum) by business sector and size (employee numbers).

Sector	Employee size bands						Total (t)
	0-9	10-19	20-49	50-99	100-249	250+	
Wholesale and Retail Trade; Repair of Motor Vehicles	9,393	2,906	8,908	3,488	5,547	1,037	31,278
Transportation and Storage	680	128	403	127	789	150	2,276
Accommodation and Food Services	4,580	1,004	1,318	755	370	669	8,696
Information and Communication	186	118	14	48	180	39	584
Finance and Insurance	140	67	57	63	9	33	369
Real Estate (Property)	207	54	51	74	12	88	487
Professional, Scientific and Technical	693	1,619	222	438	193	162	3,328
Business Administration and Support Services	283	1,393	374	36	239	26	2,351
Public Administration and Defence	595	20	112	38	65	32	861
Education	513	92	168	83	110	207	1,174
Health and Social Work activities	2,151	285	244	546	791	472	4,488
Arts, Entertainment and Recreation	382	324	421	177	204	417	1,925
	19,801	8,010	12,293	5,873	8,508	3,333	57,817

At 57,817 tonnes, the estimated total amount of commercial waste arisings may seem high compared to the market share the Authority currently has (providing collections to c.21% of all businesses and collecting approximately 1,620 tonnes of waste and recycling – representing around 3%). However, it should be remembered that the vast majority of the Authority's customers will be enterprises at the bottom end of the size range, which individually produce very small quantities of waste. The Authority also contains a number of national chains, which will produce significant volumes of (e.g. packaging) material which the Authority is unlikely to have access to. This is because these companies typically have national contracts in place with the larger waste operators (such as Biffa, Veolia and SUEZ) or use alternative waste management arrangements such as back hauling. This reduces the true size of the market the Authority may have access to (which is explored further below).

3.2.1 Accessible waste

Although the analysis indicates that the whole commercial market across Denbighshire may be generating almost 58,000 tonnes of waste per annum, a proportion of this will be out of the reach of standard sack, two-wheeled and four-wheeled container-based collection services such as those provided by the Authority. The term 'accessible waste' is used to describe this subset of the total waste stream that might truly be available to DCC to collect.

Whilst the size of business, as measured by employee numbers, producing 'accessible waste' will vary by sector, previous comparable studies have applied cut-off thresholds at both the 0-9 employee (micro-business) and the lower end of the 20-49 employee ranges. Applying these ranges to the data presented in table 3.1 would indicate that the annual rounded amount of 'accessible waste' may be between 19,800 and 34,000 tonnes. Whilst these ranges capture the vast majority of businesses by number, the output waste generated is closer to half of the total estimated for the region. The minority of remaining larger businesses therefore clearly produce much greater unit waste arisings. Whilst being somewhat obvious as a statement, it is perhaps easier to place this in context when looking at the sorts of commercial operations at St Asaph business park, Denbigh and Ruthin industrial estates. Many businesses on these sites, e.g. TRB automotive (switch manufacturers), will produce waste at a scale that places them beyond the reach of DCC's trade waste service.

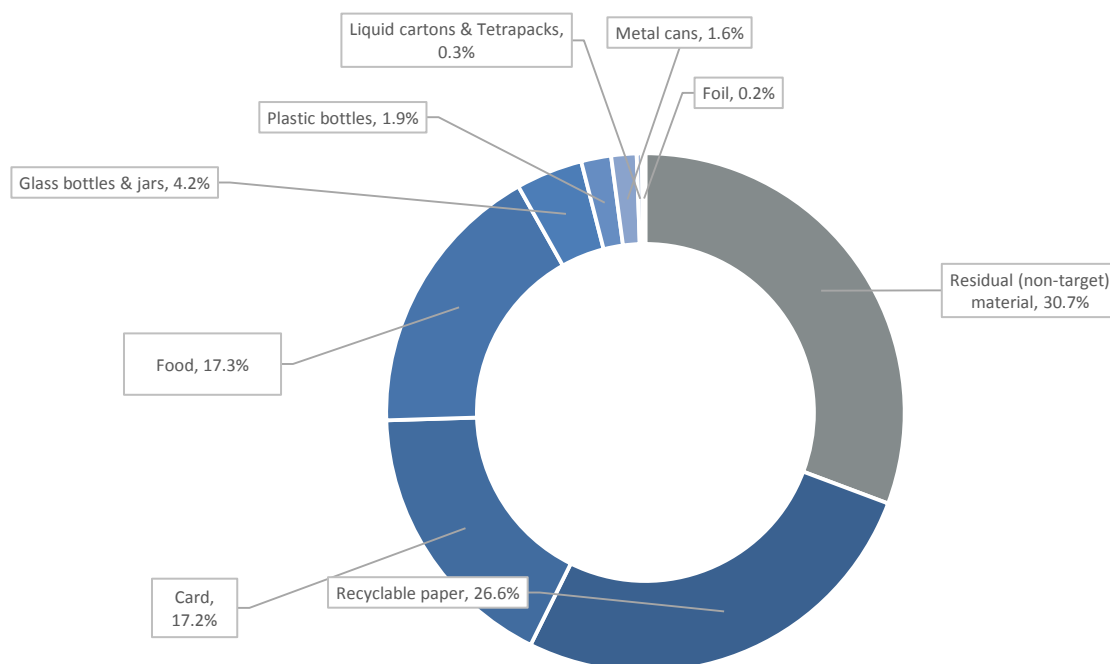
Whilst a high level of caution is needed concerning the absolute numbers presented here, and acknowledging the points made above on the proportion of the market that might be accessible to the Authority, the data does indicate potential for future growth – in terms of tonnage that may be available for the Authority to collect.

3.3 Waste composition

Using available commercial waste compositions (based on individual sectors) it is possible to approximate the composition of the commercial waste generated in the study region²⁶. This, again, reflects the segmentation of the region's commercial sector.

Figure 3.3 provides the compositional analysis of commercial waste arising in the County, broken down by the materials currently targeted for recycling²⁷.

Figure 3.3 Estimated composition (percentage by weight (rounded)) of commercial waste arising in Denbighshire²⁸.



The three largest fractions are recyclable paper (26.6%), food waste (17.3%) and card (17.2%) - all of which are priority materials defined in the Welsh Collection, Infrastructure and Markets Sector Plan, and are accepted for recycling via DCC's trade service.

²⁶ Some sectors, such as the Hospitality sector, are well defined in terms of researched/published waste composition data. Others, such as Transportation and Storage have very limited data (but are likely to be dominated by wood, cardboard and plastic packaging (shrink wrap etc)). Hence, the outputs from such analyses should be taken as indicative of the true waste composition.

²⁷ Applied to the target sectors previously described, excluding Agriculture, Fisheries, Forestry, Production and Construction businesses. Of those theoretically recyclable materials that are not currently accepted in the Authority's trade recycling service, plastic film (4.6% by weight) and dense plastic (4.3% by weight) are the largest fractions.

²⁸ This estimate of the commercial waste composition is based on the full business profile generating the estimated 57,817 tonnes of waste across the authority. The composition will change when the businesses and waste streams truly accessible to the Authority are considered. However, this provides a useful starting point when considering potential flows of key recyclable streams in and around the County.

When this composition is combined with the estimation of 'accessible waste' arisings in the study region (19,800 – 34,000 tonnes per annum) it is possible to estimate the quantities of target materials potentially available for recycling, and for which DCC is competing for. Figure 3.4 presents this estimation, showing the total arising estimate and the upper and lower 'accessible waste' estimates.

Based on the materials already accepted for recycling / composting by the Authority, approximately 70% of the commercial waste arising in the County is considered to be either recyclable or compostable. Not all of this recyclable material will be generated by organisations that are likely to engage the Authority to collect, however it does show that there is considerable potential to grow a larger, recycling-led, trade waste service.

The information presented in figures 3.3 and 3.4 points towards paper, food waste and cardboard being the primary streams (by weight) available to target. Of these materials:

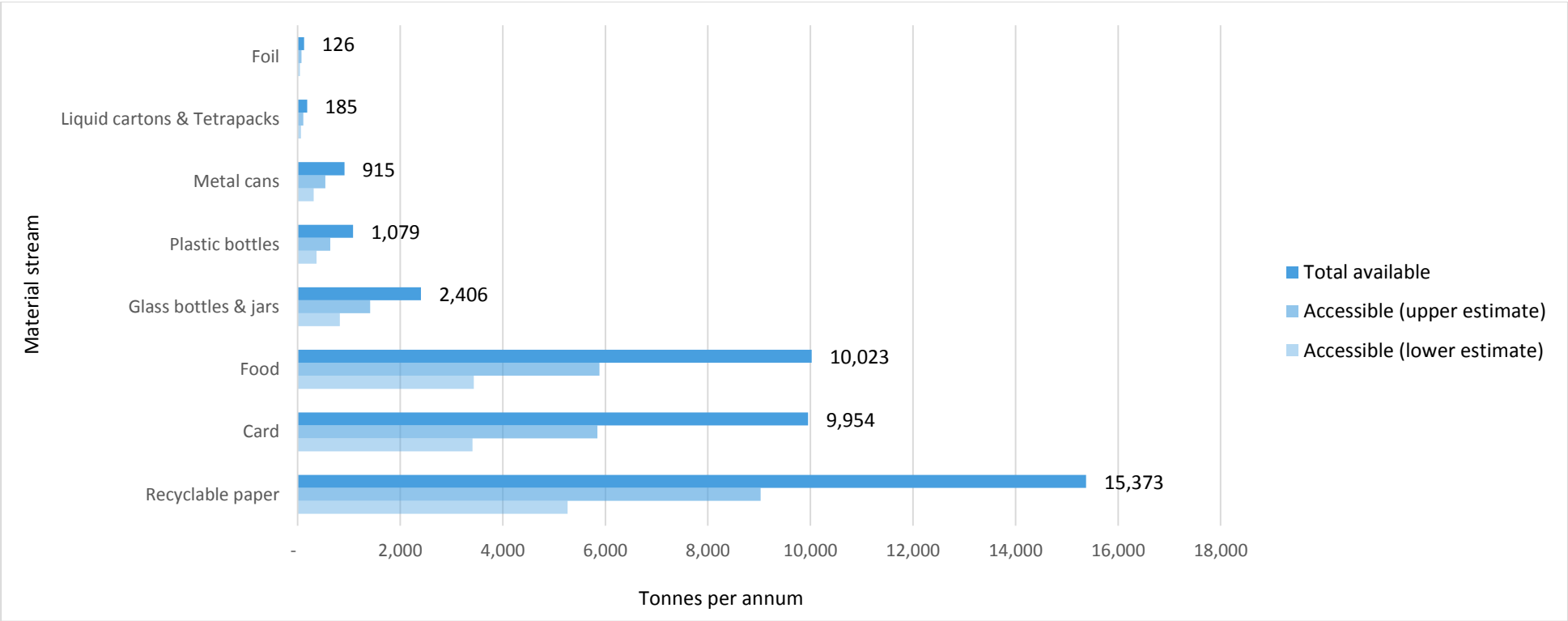
- The market for clean cardboard has perhaps remained most buoyant in recent times, although OCC prices dropped steadily (along with paper) during 2019 and have only partially recovered during 2020;
- It should be remembered that the analysis is based on 2012 C&I waste survey data²⁹. Since that time consumption of paper has steadily declined, within both businesses and the domestic sector, linked to the rapid digitisation of processes³⁰. It will also be the case that many businesses will recycle their paper via confidential shredding services. Hence, the true amount of paper available to the Authority may be significantly lower than the presented numbers;
- Mixed paper prices have dropped since China ceased accepting (unsorted) paper and UK mills have become more stringent in how they price in and accept contaminants; and
- DCC is currently estimated to collect in the region of 220 tonnes of food waste via the trade service. The analysis indicates there may be between 15 and 25 times as much of this available to collect in the accessible market, i.e. 2,400 – 5,900 tonnes. Hence, this stream represents a significant growth opportunity, and may be one that the Authority is better placed to capitalise on than some of its private sector competitors.

The overall decline in material values and tightening up of material acceptance standards by MRFs and reprocessors is reflected in the fact that DCC currently pay a relatively high gate fee to have the mixed recycling sorted, with no income share at the back end. Material contamination adds to the processing fee charged by UPM in Shotton.

²⁹ Headline results from the 2018 I&C survey for Wales were published by NRW partway through this study. Whilst overall arisings of I&C waste have reduced by approximately 21% between 2012 and 2018, arisings of the Commercial fraction have stayed more consistent, reducing slightly but not by statistically significant amounts.

³⁰ At the joint CIWM/LARAC event 'Recycling in the World of the Circular Economy' held July 2018, Newport Paper advised that News & Pams arisings have reduced at an average rate of 10% per annum in recent years.

Figure 3.4 Quantities of target recyclable materials potentially available in the commercial waste stream across Denbighshire.



3.4 Competitive positioning

Previous sections place DCC's current service in context with the profile of enterprises operating in the County, and the expected types and quantities of waste and recycling that might be available to collect. This closing part of the market analysis considers the services offered by DCC's closest competitors.

DCC does not have a monopoly position in the local commercial waste and recycling collection market. Key competitors observed as having bins in the region are Veolia, ASH, Gaskells, SUEZ, CAD Recycling, Thornccliffe and Biffa. A distinct North / South divide exists, in terms of the level of observed competition. Within those towns within easy reach of the A55 (North Wales expressway) competition is high, with ASH being dominant in Rhyl town centre. Heading further South:

- Within Denbigh - Veolia, CAD and DCC are the main operators;
- In Corwen - DCC is dominant; and
- In Llangollen there is more of a mix (presumably due to being easier to access for operators servicing Wrexham) – with ASH, CAD and Biffa present.

3.4.1 Service offering and alignment with the Environment Act

Overall, there is very limited evidence of trade recycling materials segregation across the County. Nearly all observed containers appear to be for either residual waste or dry mixed recycling. There is relatively little clearly separate food waste being collected, or additional dry materials segregation such as separate glass³¹. Another overarching observation is that DCC's bin profile is low compared to others, which may be due to bin storage locations but also because DCC's bins lack clear branding and / or a bold colour scheme compared to the competition. With a stable customer base it is justifiable to argue that visible branding is of lesser importance than service quality. However, at the rear of mixed use properties in Rhyl DCC bins were present but it was difficult to know whether these are for domestic or trade use, which would suggest there may be scope for either stream to be managed as the other. Hence, clear bin labelling is important. When DCC move to 4-weekly residual lifts it is likely that trade residual bins will come under additional pressure, at which point it will be important for all to have locks so that they do not become a repository for excess domestic waste.

A unique selling point (USP) of DCC's service is the option for customers to pre-purchase sacks for both residual waste and recycling. Whilst this introduces administration, auditing and waste containment challenges, this PAYT option (along with cardboard labels) is likely to be attractive to micro businesses and those where access is constrained (e.g. Denbigh town centre).

³¹ Examples of separate cardboard (DCC) and glass (Veolia) were observed, but this was by exception. Whilst being more expensive than the Authority's food waste service it is known that ReFood offer a 'full for clean/empty' bin replacement service, which has become more popular as a local bin cleansing service has been temporarily offline due to Covid-19.

Compliance observation: Alignment with the separate collection requirements of the Environment (Wales) Act 2016

The Welsh Government published its consultation document 'Increasing Business Recycling in Wales' in September 2019. The consultation sets out proposals to bring forward statutory instruments (SIs) to increase recycling from non-domestic premises such as businesses and the public sector in Wales.

In terms of key principles, the SIs will:

- Require the occupiers of non-domestic premises to present specified recyclable materials for collection separately from each other and from residual waste;
- Require those that collect the materials to collect them by means of separate collection and to keep them separate;
- Ban certain separately collected recyclable materials from incineration and landfill;
- Commence a ban on disposal of food waste to sewer from business premises;
- Provide for civil sanctions to be available in relation to criminal offences associated with the above requirements.

Under the preferred option, non-domestic producers of waste (including the public sector and charities) will be required to present the following waste streams separately for collection:

- Food produced by premises producing more than 5kg/week;
- Paper & card;
- Glass;
- Metal & plastic;
- WEEE; and
- Textiles.

Given the current mixed recycling collection arrangements prevalent across Denbighshire, the proposals have significant implications for DCC and its competitors. In terms of broad implications for local authorities:

- The RIA (Regulatory Impact Assessment) assumes all local authority commercial waste services operate on a full cost recovery basis, meaning there will be no financial impact on local authorities as a result of the proposed changes;
- The RIA outputs recognise that smaller waste producers are likely to face increases in their overall waste management costs as a result of the proposals. As local authorities tend to focus on the smaller businesses, they may face a disproportionately high level of commercial resistance to these changes from their existing customer base;
- Local authorities tend to have a high proportion of 'Hospitality' businesses on their trade customer portfolios, so would expect many to require separate food waste collections. However, there will be small (or seasonal) businesses serviced who claim not to exceed the food waste de-minimis threshold; assessing and policing those in and out of scope businesses may place an extra burden on trade waste officers;
- The background modelling assumed separate collections are made using 3-compartment Toploader vehicles; the exact configuration of vehicles to streams is not defined; and
- An option that would exempt business waste producers in rural areas from the separate collection requirement was assessed, but is not supported by Welsh Government, i.e. all businesses will be covered irrespective of their location and proximity to others

The new duties were originally proposed to take effect in October 2021, however it seems inevitable that this date will be pushed back, due to Covid-19 and the fact that any formal announcement as follow up to the consultation has yet to be made.

3.4.2 Pricing

The private sector is known to offer residual lifts at a significant discount to those commonly levied by local authorities. They also tend to price favour 1,100litre wheeled bins as these tend to be less well packed (higher void space), and having a standardised offer minimises the level of spare bin provision at depots, simplifies administration etc. As is demonstrated by Veolia's pricing, 1100litre residual bins collected by private sector operators commonly range from £13 - £18 per lift. Equivalent recycling bins tend to be only marginally cheaper, e.g. by 5-15%, meaning local authority recycling almost always costs less. This is also true of food waste, where 120litre bin lifts offered by the private sector commonly cost £8 - £12 per lift (for a 2-wheeled bin), compared with £3.18 charged by DCC. It is also the case that the private sector will almost always apply additional charges to cover:

- Duty of Care administration (typically lying in the range £25 - £45 per annum);
- Bin rental (typically in the range 5-10p/day, up to £1/week); and
- Excess weight charges on residual lifts, underpinned by the use of onboard weighing on vehicles. This represents a way of incorporating weight-based disposal charges alongside the collection element as part of the overall lift price. One commercial operator is known to levy a 12p/kg surcharge to any heavy 1,100ltr bins lifted over 78kg, although weight thresholds as low as 65kg have been known to apply on other contracts.

There is an argument that DCC's equivalent price per litre for sack usage should be some way above those for bin-based collections, owing to the additional costs incurred on the Authority's side. At present the cost per litre for sacks, on both residual and recycling, is only marginally above the equivalent for the nearest sized wheeled bin (240 litres), e.g. the sack recycling cost is 1.33p/litre whereas for 240 litre bins it is 1.31p/litre. A greater price differential applies to cardboard collections, which based on the assumed average volumes set out per collection (90 litres) cost 2.38p/litre.

3.4.3 Marketing

No formal sales and marketing strategy or plan were provided in support of this review. The current service webpage (<https://www.denbighshire.gov.uk/en/bins-and-recycling/trade-waste.aspx>) does little to promote the service, and at the time of the baseline review included the headline statement that due to Coronavirus trade recycling has stopped (with customers transferred to CAD)³². There was no indication that this may be a temporary measure. Whilst there is a contact number to arrange a collection near the top of the page, this is buried in the text. The general trade waste enquiry button takes visitors on a circular loop back to the top of the page, unless they are prepared to register/log in, hence there is no option to generate a quote directly via the website. Most lift prices are quoted on the site, excluding residual bin lifts, albeit the prices are out of date. The overall impression gained from the site is that the Authority is not trying to win new customers.

³² It is acknowledged that due to reduced staffing resources growing the service has not been a priority for the Authority. A number of obstacles to growth remain, including securing space at the new depot to handle additional trade tonnages.

Commercial observations: competitive position and pricing

DCC faces significant competition in the mid and northern parts of the authority, and without a fresh marketing strategy (e.g. linked to a change of service design), is unlikely to significantly grow the service should this be an objective. The existing customer contract and pricing strategy provide little commercial defence against competitor promotions or customer defaults, which requires future consideration. Whilst the service customer base is understood to be relatively stable, Covid-19 has caused significant disruption, and has perhaps brought into focus areas where the Authority needs to improve, e.g. in handling and quickly responding to service queries and complaints. No competing service provider appears to offer a greater level of service flexibility or materials segregation than DCC. Should the separation requirements of the Environment (Wales) Act be enforced, all operators therefore face significant disruption. DCC may be well placed to capitalise on this, if it can make preparations now for what might be a very different market, which needs to happen anyway in advance of the domestic service changes. It may be that a significant opportunity could emerge whereby DCC takes on lifts for other service providers, e.g. if it can offer an expanded, cost-effective food waste collection service. The opportunity may also exist to offer a seasonal contract option, targeting holiday accommodation. If the Authority wishes to respond in these ways, it needs to become more proactive and commercial in its outlook, supported by dedicated (accountable) Officer resource, improved back-office systems, in-cab technology and a much more sales-focused service website enabling easy generation of quotes.

Overall, from the competitor analysis it can be concluded that:

- Larger (VAT-registered) businesses producing greater amounts of residual waste are expected to find a cheaper service through DCC's competitors than through the Authority.
- Smaller businesses, including those falling below the VAT registration threshold, and those in the South are likely to find the Authority's offer competitive in price terms and highly flexible, which undoubtedly has created some defence against aggressive sales tactics deployed by the private sector.
- Dry recycling and food waste collections are likely to be considerably cheaper via the Authority than the private sector. Hence, the Authority is well placed to develop a marketing strategy built around 'Recycling First', being able to sell this on both financial and environmental/legal compliance grounds to customers.

It is advisable for the Authority to maintain records (and track timescales) of any lost customers, including details of who they have moved to. This may help with any future marketing campaigns should a change in service design be introduced. DCC may also wish to follow the approach adopted in other local authorities where departing customers (that have not closed or left the area) are required to supply evidence of a Waste Transfer Note being in place with a new supplier – to deter those who may seek to illicitly dispose of waste via the domestic service. However, it is acknowledged that this can be challenging where enforcement is kept at arm's length from commercial service provision.

4.0 Interim findings and future service development considerations

4.1 Baseline summary

DCC operate a stable trade waste and recycling service to over 600 business and internal customer sites, delivering a modelled turnover of approximately £420k and a trading surplus of around £60k per annum. Residual waste lifts and charges generate a healthy financial surplus; despite incurring increasing processing costs the mixed recycling service also delivers a small surplus, which in part is a function of low collection costs. These positive income positions offset the modest loss made from the food waste service.

The service operates through a mix of outsourced (residual waste, through Veolia) and in-house (mixed recycling and food waste) collections. The relatively small food waste service, used by just over 50 unique customer sites, benefits from being co-collected with domestic food waste on the same vehicles – improving its efficiency. All streams can be collected at varying frequencies, e.g. weekly, fortnightly or monthly, and schools have access to term-time only collections (42 weeks per year). As well as a range of contracted wheeled bin options, sacks are available for use (by small or space-limited businesses) for both residual waste and dry recycling containment. Similarly, cardboard collections can be pre-paid (through the purchase of labels) and set out in bundles; this service is likely to be attractive to small retailers in particular. Food waste is collected either in caddies or (120 litre) wheeled bins. Free food waste liners are provided. A simple pricing policy applies consistently across all customer types, with no preferential rates applied to internal (Authority) properties. The lift price quoted is the price paid, with no additional charges levied for items such as Duty of care administration or bin rental. This is consistent with the 'One Council' core commitment, where rigid pricing applies regardless of geographic location or volume of waste. All collections are made over 5 days (Monday – Friday) through a standard shift pattern.

The Authority has a reasonably balanced portfolio of lifts, albeit residual waste continues to be the most popular, representing 55 – 60% of totals lifts/volume, yielding 72% of customer income. The result is a modelled service recycling rate of 40%. Recycling is not mandatory, and in common with most local authority trade waste and recycling services, there is limited proactive marketing of the service, supported by a dedicated sales resource. It is likely that lifts in the South are loss-making. However, the Authority is not capturing operational and financial data in sufficient granularity to assess the extent and implications of this.

The geographical scale and location of the authority introduces quite different operating and competitive market conditions. The north of Denbighshire, populated by larger towns such as Rhyl is easily accessible to waste operators in the East, e.g. ASH, with high levels of competition. Heading South, through Denbigh and beyond that competition drops away and travel times increase between customers, until reaching Llangollen where it picks up again e.g. due to its proximity to Wrexham. There seems to be little to differentiate operators in terms of service design, with residual waste and fully mixed recycling being the core offer of all operators. Where the Authority has a USP is around its flexible range of containers (including sacks), separate food waste collections and competitive recycling/organics lift rates. DCC's customer contract and pricing policy offers little protection against competitors seeking to increase their market share. There will need to be significant change in the market if the proposals to 'Increase Business Recycling in Wales' come into force, requiring separate collection of paper/card, plastics/metals, glass, food, WEEE and textiles.

Overall, the Authority is viewed as offering a flexible range of collection options that enable customers to maximise the value they receive from the service. This is underpinned by a hybrid system of contracted wheeled bins and PAYT options, e.g. sacks. Low cost recycling and food waste options align well with the business demographic of the area, albeit have not (in isolation from other policy measures) resulted in high recycling rates.

4.1.1 Model outputs

From a service review and modelling perspective, it has been difficult to accurately assess the costs and performance of the service due to data limitations. These limitations apply both to those aspects of the service that are outsourced and those that are operated internally. The outsourced service element benefits from accurate lift (weight) data, which is missing for both the recycling and food waste elements. Both the residual and food waste service components suffer from limited information regarding collection resources and productivities. The absence of validated information in a number of areas has required a large number of assumptions to be made, as summarised in Appendix 1. As a result of these issues, and others cited throughout Section 2, **a high level of caution is urged when interpreting and using the model outputs, with respect to overall service economics and achievable collection rates.**

Figure 4.1 presents summary statistics from the baseline model populated with data described in Section 2 of the report. These results apply to the variant of the model where it is assumed that DCC undertake the residual collections directly, and where ongoing container replacement costs are dealt with as CAPEX. Within the equivalent variant where Veolia deliver the residual waste collections and treatment the total costs are reduced by approximately £3k, which elevates the surplus by the same amount³³.

Figure 4.1 Baseline service statistics.

Baseline						
The current trade waste and recycling service collects residual waste, co-mingled dry recycling (including separately presented cardboard) and food waste as separate streams. Residual waste and mixed recycling are collected on dedicated vehicles, whereas food waste is co-collected with domestic food waste on the same vehicles / rounds. All streams are collected on a weekly cycle, albeit customers may choose to receive fortnightly or monthly lifts, in the case of sacks (residual and mixed recycling) and cardboard bundles, customers set material out 'as needed'. All collections are made using single compartment vehicles. A simple 'per lift' charging model applies, with no additional or hidden costs. The true level of resource required to collect from trade customers on the rounds is known only for the mixed recycling element of the service and validated weights do not exist for the mixed recycling or food waste collections, hence the baseline model is based upon a number of assumed or apportioned inputs.						
Service Element	Residual Waste	Mixed Recycling	Cardboard	Food	Service Totals	Commentary
<u>Customers</u>						
Unique customers/sites	499	434	54	52		All customer and lift statistics are taken from the Council's cleansed customer database extract issued August 2020. Key model inputs are generated from pivot tables applied to the customer data, covering those lift types making up the majority of collections undertaken across the service, i.e. garden waste is excluded. Unique customer numbers (by name), including duplicate canteens on schools sites, is 632.
<u>Collections</u>						
Lifts per annum	27,897	15,917	655	5,975	50,444	Based on quantity of sacks and labels used, bins contracted (including number and collection frequency). Each sack is classed as a single lift
Annual volume lifted (litres)	14,603,480	9,749,234	58,950	690,519	25,102,183	
<u>Waste Flow</u>						
Tonnes lifted per annum	976	422	4	220	1,622	Service Recycling Rate 40% Waste flows calculated 'bottom-up' based on lifts and combination of recorded (residual) and apportioned (residual sacks, recycling and food) unit weights
<u>Resources</u>						
Days work per week	5.8	4.0		32.0		Assumed or specified total resource (food includes domestic resource)
Vehicles	1.2	0.8		0.3		Estimated vehicles apportioned to each service
Crew level	D	D		D+1		Assumed (food) or specified (residual waste, recycling) crewing levels
Day length (hrs)	6.5	6.5		6.5		Assumed
Work allocation to trade (%)	100	100		5		Model has sought to reflect just the DCC trade element of the work currently undertaken on the co-collected food rounds.
Sites serviced per day (per round)	86	122		2		Site counts needing to be achieved based on apportioned resources to trade and current round profile data
Lifts per day (all containers)	93	80		4		Back-calculated from annual totals. Each sack = single lift. Reduced lifts on recycling reflects reduced frequencies
<u>Financial Summary</u>						
Total Income	£305,467	£97,458	£1,402	£18,569	£422,896	Includes all income from customer charges
Costs	£230,018	£88,544	£47	£39,984	£358,593	No material incomes apply to the baseline
[gate fees/haulage]	£117,518	£33,660	(in Recycling)	£8,292	£159,471	These figures are incorporated in the total Cost line above
Net Revenue & Service Margin	£64,303				15%	

³³ Appendix 3 includes the financial summary outputs for each of the variant options applied to all modelled options, i.e. where the residual service is delivered inhouse vs outsourced, and where container costs are dealt with as Capex or Opex.

4.2 SWOT analysis

Table 4.1 presents a high-level SWOT analysis of the service, developed from the perspective of the Authority and its ability to deliver an efficient, commercially viable service that meets its customers' needs.

Table 4.1 High-level SWOT analysis of the existing service.

Strengths	Weaknesses
<ul style="list-style-type: none"> - Flexible containment options provide a good level of choice to customers, including those with limited storage space - Co-collection methodology enables efficient incremental growth of the food waste service - Access to local low cost and sustainable food waste treatment infrastructure - In-county depot/bulking infrastructure - Lack of local competition in the South of the County - High margin residual waste service - Competitive recycling and food waste service pricing provides a platform for delivering improved recycling performance - Trusted supplier with a stable customer base 	<ul style="list-style-type: none"> - Lack of income for recycling - Service brand and bin labelling. With bins being lifted by subcontractors the Authority's function is potentially unclear to customers - Blurred lines between domestic and trade bins (on the ground) - Limited internal accountability and lack of clear communication channels with customers - Customer contract provides limited commercial protection to the Authority - Lack of trade-specific operational performance metrics and transparency, including validated collection productivities - Budget lacks detail, and it remains unclear whether all costs are being recovered / apportioned to the service - Lack of real-time data capture and analysis - Lack of control and integration between operations and business support functions - Commercial understanding, e.g. of margins achieved per lift - Absence of a strategy or future 'vision' for the service - Limited service marketing and promotion. No apparent sales targets and protected time for new business development, service website is not outward-looking
Opportunities	Threats
<ul style="list-style-type: none"> - Cross or upselling services to existing customers - Ability to 'influence' internal customers - Potential to go beyond providing 'waste' services to local business, e.g. expansion to include resource efficiency training, support around adoption of the Circular Economy - Growth potential due to market size, including potential to drive up recycling levels whilst still delivering a surplus - Transition to a service design that is fully compliant with the Environment (Wales) Act separate collection requirements, creating the basis for a key marketing message and market differentiator. This might include the option to co-collect domestic and business WEEE, textiles from 2023 onwards - Targeting high value (clean) streams for separate collection 	<ul style="list-style-type: none"> - Ability to respond (quickly) to competitor promotions (e.g. lift rate discounts) - Ability to control potential future outsourced contract costs - Recycling contamination levels - Ability to respond quickly to the separate collection requirements of the Environment (Wales) Act - Lack of dedicated resource to manage change, which will become increasingly important as the domestic service is transformed - Increasing cost of mixed recycling processing

4.3 Baseline recommendations

The following headline recommendations have emerged from the baseline review for DCC to consider:

- Update website content to reflect current position with respect to trade recycling (clarifying CAD Recycling's role), ensure lift prices are current and highlight how prospective customers can get in touch. Subject to the longer term aims for the service, a marketing strategy is required that embraces digital channels;
- Consider long term approach to bin (asset) management. This may include options to enable customers to purchase or hire bins, or pay an upfront bond as security. A programme of improved bin labelling, refurbishment and checks on locks is advisable, along with improved service branding - subject to future decisions regarding the service and whether it is an ambition to transform and grow it;
- Revise the customer agreement (E-Forms) to incorporate improved definition of responsibilities on both sides. This might include formalising the requirement for recycling to be mandatory for new customers, including a defined notice period, e.g. 3 months, or a bin bond to provide commercial protection against departing customers;
- Initiate a review of back-office processes to improve data capture and management. With advances in technology it should be possible to move to a position of real-time data capture and management. As part of this review a more rigorous, detailed and transparent service budgeting and monitoring process would help ensure the service is delivering against financial targets. As an example detail to follow-up, the 20kg per sack unit weight reported by Veolia would appear high;
- Undertake a calibration exercise to verify the trade recycling and food waste weights being collected. The modelling applied assumed figures for these key parameters, upon which all future options are based. Hence, it is advisable to undertake a sample weighing exercise³⁴ to assess the implications of any significant variance; and
- On the assumption that the Authority has a desire to retain and potentially grow the service going forward, consideration should be given to reinstating a formal trade waste officer post - to improve internal ownership of the service. A sensible starting point would be to draft a role description for this post and to identify key interfaces with other service support functions (e.g. streetscene enforcement, One-Stop shops).

³⁴ That captures not just weights collected, but verified details of bins lifted. Ongoing business disruption due to Covid-19 is likely to mean the profile of containers lifted is significantly different than the pre-Covid steady state modelled in this study.

5.0 Future options assessment

This section of the report describes the tasks associated with defining and modelling service delivery options of potential future interest to DCC, along with the outputs.

5.1 Introduction and future service considerations

Whilst the existing trade waste and recycling service is perceived as being profitable, offering flexibility and reliability from an established (and relatively stable) customer base, upcoming changes to the domestic service and the requirement to offer greater (and enhanced) levels of recycling material segregation creates both opportunities and challenges for DCC. Future success will depend on the Authority's ability to provide a cost-effective, flexible service that remains focused in the short term on smaller businesses – predominantly in the hospitality, retail and service / support sectors. Many of these have seasonal peaks in service demand so managing lift demand and maximising customer route density are important considerations. The PAYT (sack and cardboard bundle) elements of the service require all customers to be passed, irrespective of whether they set material out for collection or not. When material is not presented this represents lost income for the Authority or increased costs for outsourced operators. However, this flexibility represents a USP for DCC's service; the important thing is to ensure it can be retained in a cost-effective manner.

An initial list of areas considered for assessment in the second, forward-looking, phase of the study is provided in table 5.1. These were discussed at the interim project review meeting held 30th September 2020.

Table 4.2 Future service design considerations and modelling options.

Service aspect	Key issues / questions	Option / modelling considerations
Options to improve recycling segregation and alignment with the Environment (Wales) Act 2016	<ul style="list-style-type: none">- Could create growth opportunities in the medium to long term and a market differentiator for DCC- Potential to derive income from clean streams, e.g. glass?- How to efficiently collect each stream (glass, fibres, cans/plastics) bearing in mind variable volumes / bulk densities, and drive uptake levels through financial or promotional mechanisms?- Impact on receiving sites, sorting infrastructure and incomes?- Significant implications with respect to investment, efficiency and internal resources / systems- GMT implications?	<ul style="list-style-type: none">- Allocation of assumed splits of segregated streams to customers- Uncertain customer response concerning those that may not have space to accommodate multiple bins- Modelling of alternative vehicle configurations assessing different material splits and frequency combinations- Pod vs split-body vs multi-compartment (e.g. Toploader) vehicles
Introduce mandatory recycling	<ul style="list-style-type: none">- Applicable to existing customers or just new ones?- Requires ongoing monitoring to ensure customers utilise the recycling- Will DCC support rationalisation of residual capacity?	<ul style="list-style-type: none">- Identification of customers with no recycling service- Assumed conversion to recycling/food + residual, based on current capacity- Analysis of service impact

Service aspect	Key issues / questions	Option / modelling considerations
Expanding the food waste service in order to drive up recycling rates	<ul style="list-style-type: none"> - Interface with domestic service, e.g. retain 23ltr caddy customers on domestic rounds or keep separate? - Service design enhancements, e.g. whether a formal tie-up with a bin cleaning company can be arranged, and/or whether a (higher cost) bin exchange option might be feasible - Biogen (AD treatment) payment band implications? 	<ul style="list-style-type: none"> - Identifying existing Hospitality businesses in the customer base that might be targeted, and assessing uptake potential - Modelling resource implications - Informing the business case
Contracting strategy, and whether to internalise or outsource service elements	<ul style="list-style-type: none"> - Performance guarantees - Financial performance - Differential back-office support requirements - Alignment with corporate objectives - Parc Adfer GMT influence - Future control? 	<ul style="list-style-type: none"> - The headline financial implication of keeping the trade residual waste collections with Veolia vs bringing them inhouse has already been assessed in the baseline model variants - Alternative strategies may be considered, supported by risk-based commentary
Incorporating communal (flats) and other non-business premises not serviceable via RRVs	<ul style="list-style-type: none"> - This will be a consideration relevant to all of the above - Flats will have a time and weight loading on the trade service that does not exist currently - Increased conversion of Holiday Lets, and other non-domestic premises that emerge when residual goes 4-weekly, to the trade service 	<ul style="list-style-type: none"> - Agreement of plan to combine with outputs of communal service review - Confirmation of numbers of sites to be added to the trade service - Profiling of lifts needed across this additional number of sites - Agreement of modelling parameters (yields etc.)
Incorporating micro-businesses on the future domestic service	<ul style="list-style-type: none"> - There may be small businesses that are capable of being retained on the new weekly kerbsort and potentially even the 4-weekly residual service (when adopted) - Improved efficiency of the trade service, e.g. where these micro-businesses are in remote or disperse locations, e.g. the South 	<ul style="list-style-type: none"> - Requires identification of those business customers using the trade service at volumes below an agreed threshold, stripping these out and assessing the impact on costs/resources
Increased containerisation of waste and recycling in order to remove sacks	<ul style="list-style-type: none"> - Is there a drive towards increased containerisation of trade waste and recycling in order to improve efficiency? - Current sack / label system requires vehicles to drive a route without certainty of material being presented - Downside would be that it removes some of the flexibility for customers with limited storage space and/or fluctuating waste production profiles - Do alternative, technology-based, solutions exist to improve the efficiency of the PAYT model? 	<ul style="list-style-type: none"> - Modelling that considers conversion of sack usage to equivalent bin lifts <ul style="list-style-type: none"> - Complex model that would require demand profiling, update of bin provision (costs and incomes), yield and productivity adjustments - Uncertain customer response concerning those that may not have space to accommodate bins

It was concluded by DCC Officers that the focus of the forward-looking assessment should be on:

- Communal site integration with the trade service, recognising that it will no longer be possible to service bulk recycling and food waste bins on the proposed domestic (RRV) rounds;
- Transformation of recycling so that it aligns with the separate collection requirements of the Environment Act, including increased uptake of the food waste service. Further details of the proposed statutory requirements are set out in section 5.1.1 below; and
- Consideration of opportunities to service micro businesses on the domestic recycling / food (RRV) rounds when rolled out.

5.1.1 Separate collection requirements

As described in section 3.4.1 of this report, the Welsh Government intends to introduce Statutory Instruments requiring the separate presentation, collection and management of recycling from non-domestic premises such as businesses, charities and public sector buildings. This will fundamentally influence the design of DCC's trade service going forward, as offered to both external and internal customers. On the basis that it is the intention for the trade recycling/food round(s) to also service domestic properties with communal bins, it will be important to bring everything into line within the same service design. Under the Welsh Government's preferred option, non-domestic producers of waste will be required to present the following waste streams separately for collection:

- Food produced by premises producing more than 5kg/week³⁵;
- Mixed paper & card (fibres);
- Glass;
- Mixed metal & plastic (containers);
- WEEE; and
- Textiles.

Service design considerations: collecting WEEE and textiles from trade customers

For WEEE and textiles possible service delivery options include:

- Offering a chargeable 'on-demand' service aligned with the domestic bulky waste service, especially where businesses may be having clear-outs that generate larger quantities;
- Including underslung cages or boxes on trade recycling vehicles, enabling collection of small quantities of WEEE and textiles on the regular rounds; and
- Operating material-specific permits enabling businesses to deposit WEEE and textiles at bring facilities (Recycling Parks).

DCC may find that it has 'first mover' advantage where private sector competitors are not geared up to collect and handle WEEE and textiles. This may provide a marketing opportunity, creating leverage to win new customers should the Authority aim to grow its market share.

³⁵ It is observed that similar requirements in Scotland and Northern Ireland have not driven the shift in market uptake of commercial food waste collections that was intended. This represents a commercial risk for operators in Wales.

Given that WEEE and textiles are likely to be produced intermittently by businesses the focus of this study has been on the core dry recycling and food waste streams. With respect to food and glass, the focus of attention is on those hospitality businesses expected to produce these in meaningful quantities.

5.2 Options shortlisting

Based on the above scoping and the available modelling budget, the following future options for delivering the trade waste and recycling service were taken forward for assessment:

- Option 1: dedicated 'as-is' trade service operated standalone including communal (flats) recycling and food waste. Separate vehicles collect the existing trade residual (either inhouse or through Veolia (as the incumbent outsourced provider)). Mixed recycling and food waste from the enlarged population of existing trade customers and flats complexes are collected on dedicated vehicles, i.e. food is no longer co-collected on the domestic rounds. All collections are made on a weekly basis, albeit retaining any existing trade customer variations captured in the baseline model;
- Option 2: enhanced recycling service (greater segregation) applied across the existing trade customer base and flats complexes. The mixed recycling service switches to separate fibres (mixed paper and card), containers (mixed metal and plastics) and glass streams. These are assigned in proportions that are tailored to the business type, ensuring at least the current level of recycling capacity is provided. Once the allocation of containers and weight calculations across the new streams had been completed, the decision was taken to assess use of pod RCVs in the modelling, as these appeared to provide the best and most efficient capacity match. Two variants have been modelled in practice, with varying levels of food waste provision:
 - Option 2(a): food waste remains focused on those currently receiving this service
 - Option 2(b): food waste is collected from all relevant hospitality (including catering departments at Education establishments) and relevant Arts, entertainment and recreation businesses – drawing on the classification exercise described in section 2.6 of this report;
- Option 3: analysis of the extent of the opportunity to collect recycling and food presented in low quantities from micro businesses on the future RRV rounds.

5.3 Modelling approach

The baseline model, incorporating the master worksheet described in section 2.8, provides a platform from which a range of future service design and delivery options can be assessed. For the future modelled options, key steps in the assessment process comprised:

- Making changes to the profile of lifts for each stream. The addition of domestic communal lifts (flats) to the modelling required extra lifts to be added to the master customer database, in a format consistent with the original data. Starting with the existing profile of bins assigned at notified communal sites, work was required to estimate the weight of material collected from these bins. Assumptions were then needed governing the level of alternative bin (and sack, where used by trade customers) provision required when migrating from a mixed recycling service to one based on the separate collection of fibres, containers and glass. Bespoke bin assignment 'rules' were developed and applied to the communal locations and the existing trade customer base (recognising that different sectors have different material composition profiles);

- Recasting the lift and waste profile for the bins being serviced, to help inform vehicle selection, e.g. whether to attempt to collect all dry streams in a single pass on a multi-compartment vehicle or to partition the service such that, for example food / glass are collected separately on one vehicle (where compaction is not needed), and fibres / containers on another;
- Restructuring the model where different streams are being collected together or separately on vehicles, testing productivity implications and iteratively refining resource allocations; and
- Building new summary and results files.

Future options modelling: limitations and cautionary points

The limitations of a spreadsheet approach to modelling dynamic trade waste systems should be acknowledged. This area of work does not have the benefit of extensive investment in service timings that sit within WRAP's KAT model as applied to household collection systems, or the geographical routing capabilities of proprietary round design software. Significant assumptions are needed around future levels of service linked to any change in design, building off the current baseline.

The process is constrained by the specific granularity of data that exists. In Denbighshire's case the absence of validated collection weights, timings and sack usage represent key limitations. As a result, the outputs should be used to provide an indication of the scale of any resource/cost impacts, as opposed to absolute numbers to be used for budgeting purposes.

5.3.1 Assumptions

The future modelling required a significant number of assumptions to be made. These were developed and refined over a short period of time in parallel to the modelling commencing (at the start of November 2020). A detailed description of the option-specific changes and assumptions applied to the modelling of options 1 and 2 are set out in Appendix 2 (future options assumptions report). Analysis linked to microsites and their potential to be serviced on future RRV rounds is reported in section 5.4.4 below.

5.4 Outputs

5.4.1 Option 1: Integrated trade and communal (recycling / food) service, no change in design other than to collect food on dedicated rounds

Option 1 retains the existing trade service design, both in terms of what is offered to customers and how it is delivered on the ground. The main change from the baseline is that the service now includes the communal (flats) recycling and food lifts on the trade collection rounds³⁶. This might be considered as an interim step for DCC, integrating the communal recycling with the trade prior to transforming the service to greater level of materials separation (in option 2).

The following commentary box summarises the data preparation tasks that were undertaken to facilitate incorporation of the communal sites / lifts. No additional income comes into the trade service as a result of this change, so at the outset of the model rerun it was acknowledged that the financial performance would reduce, i.e. there would be a reduction in the modelled £ margin / surplus.

³⁶ DCC's intention is to retain the communal residual lifts on the domestic service, through an approach that enables the fortnightly communal lifts to be included in the wider 4-weekly domestic refuse lift schedule

Incorporating communal sites: service provision and capacity analysis

Prior to the work progressing it was necessary to identify those domestic properties (flats) serviced via communal bins, and to bring them into the trade model. The steps associated with this exercise are summarised as follows:

- Details of existing communal bin sites needing to be serviced by the trade round service were requested from DCC, including site / complex name, address and details of existing bin provision;
- Formatting of data files supplied separately for the North and South. Supporting information was requested and added to the data on an iterative basis, including details of the number of dwellings served at each site, food waste bins allocated and postcode information; and
- Inclusion in the master data such that it could be included in pivot table analyses with the rest of the trade customers.

As an output from the above data preparation exercise, an additional 82 site entries were added to the model, representing 1,750 individual dwellings. Of the 82 communal sites added, all have residual bins, 79 have mixed recycling bins and 74 have food waste bins.

Completing the communal data preparation, the weekly equivalent volumetric containment capacity provided at each site, as an average weekly volume (litres) per dwelling, was calculated. Numbers were calculated on the basis that residual bins are emptied fortnightly, and recycling, food bins are serviced weekly. The results, presented below in terms of overall range applicable to each of the existing streams lifted, were subsequently used to inform the allocation of future containment capacity in option 2. The data shows a wide range of containment levels assigned, presumably in response to site-specific constraints.

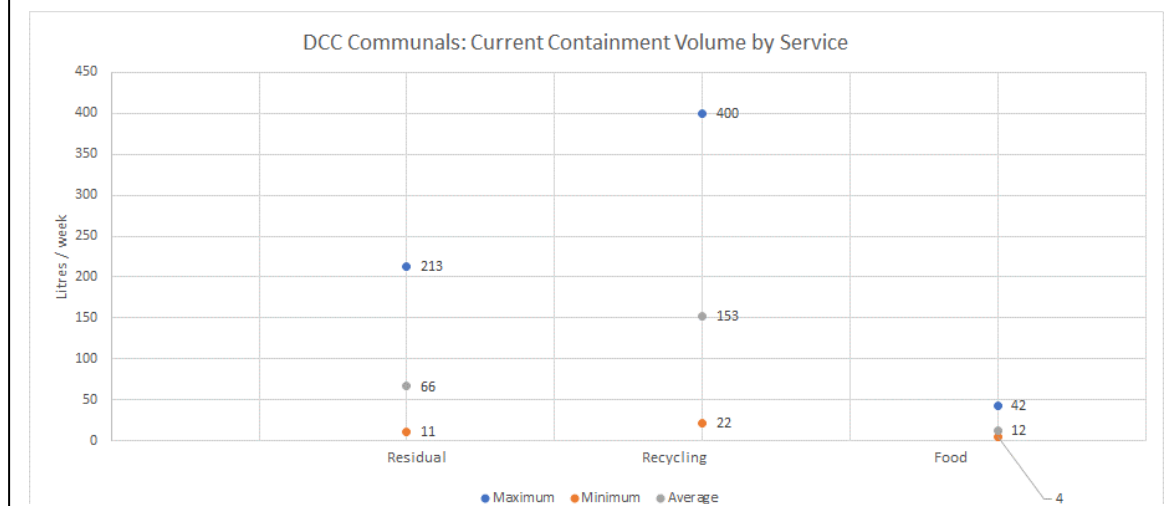


Figure 5.1 presents summary statistics from the modelled option 1. For consistency with the baseline model outputs presented in Figure 4.1, the results apply to the variant of the model where it is assumed that DCC undertake the residual collections directly and where ongoing container replacement costs are dealt with as Capex. Within the equivalent variant where Veolia deliver the residual waste service the total costs are reduced by approximately £3k, which elevates the surplus by the same amount. Financial summaries for all of the modelled variants can be found in Appendix 3.

Figure 5.1 Option 1: Integrated trade and communal collections, existing service design

Option 1

This option takes the existing trade waste and recycling service, collecting residual waste, co-mingled dry recycling (including separately presented cardboard) and food waste, and adds recycling and food waste from communal sites. Residual waste from communal sites continues to be collected on the domestic service and as such is excluded from this model. The service design does not alter from the baseline, other than food waste now being considered collected on a dedicated trade/communal round, meaning the service no longer has any operational ties to the domestic collections. All streams are collected on a weekly cycle, albeit existing customers receiving fortnightly or monthly lifts continue to do so; in the case of sacks (residual and mixed recycling) and cardboard bundles, customers set material out 'as needed'. All collections are made using single compartment vehicles. A simple 'per lift' charging model applies, with no additional or hidden costs. The model is built on the baseline, adopting the same underlying data / assumptions.

Service Element	Residual Waste	Mixed Recycling	Cardboard	Food	Service Totals	Commentary
Customers						
Unique customers/sites	499	513	54	126		All customer and lift statistics are taken from the Council's cleansed customer database extract issued August 2020, updated to include Communal sites. Key model inputs are generated from pivot tables applied to the customer data, covering those lift types making up the majority of collections undertaken across the service, i.e. garden waste is excluded. Unique customer numbers (by name), including duplicate canteens on schools sites, is 714.
Collections						
Lifts per annum	27,897	36,769	655	17,987	83,308	Based on quantity of sacks and labels used, bins contracted (including number and collection frequency). Each sack is classed as a single lift
Annual volume lifted (litres)	14,603,480	20,717,074	58,950	1,435,887	36,815,391	
Waste Flow						
Tonnes lifted per annum	976	657	4	328	1,964	<div>50%</div> <div>Waste flows calculated 'bottom-up' based on lifts and combination of recorded (residual) and apportioned (residual sacks, recycling and food) unit weights</div>
Resources						
Days work per week	5.8	7.5		2.5		Modelled resource
Vehicles	1.2	1.5		0.5		Estimated vehicles apportioned to each service
Crew level	D	D		D		Assumed crewing levels
Day length (hrs)	6.5	6.5		6.5		Assumed
Work allocation to trade (%)	100	100		100		All trade / communal lifts are undertaken on dedicated rounds
Sites serviced per day (per round)	86	76		51		Site counts needing to be achieved based on apportioned resources to trade and current round profile data
Lifts per day (all containers)	93	96		140		Back-calculated from annual totals. Each sack = single lift. Higher food lifts reflect near 50/50 split of bins:caddies (caddies being quicker to empty)
Financial Summary						
Total Income	£305,467	£97,458	£1,402	£18,569	£422,896	Includes all income from customer charges. No change from baseline
Costs	£223,227	£149,743	£47	£55,093	£428,110	No material incomes apply to the mixed recycling
[gate fees/haulage]	£117,518	£52,193	(in Recycling)	£12,362	£182,073	These figures are incorporated in the total Cost line above
Net Revenue & Service Margin	-£5,214				-1%	Based on DCC undertaking the residual collections inhouse and container costs managed as CAPEX.

Supporting metrics and commentary:

- Service recycling rate = 50%, an increase of ten percentage points vs the baseline which is a function of the waste flow impact of the incoming flats recycling and food;
- The inclusion of flats adds approximately 340 tonnes of material to the managed system, comprising c.230 tonnes of mixed recycling and c.110 tonnes of food;
- Modelled recycling resource increases to an estimated 1.5 vehicles (7.5 days work);
- Modelled dedicated food resource is estimated at half a vehicle (2.5 days work).

The addition of the flats (communal) complexes, with no additional income generated, sees the modelled £64k surplus in the baseline turn to a £5k annual loss.

5.4.2 Option 2(a): Integrated trade and communal (recycling / food) service, mixed recycling split into fibres, containers and glass, food 'as is'

Within option 2(a) the combined trade customers and communal sites see their dry recycling arrangements migrated from mixed recycling to an Environment Act-compliant service separately targeting fibres, containers and glass. Within the model set up it is assumed that these streams are collected along with food waste, through the introduction of pod RCVs³⁷.

³⁷ <http://www.ntm-gb.com/fk-pod/>

Figure 5.2 presents summary statistics from the modelled option 2(a). For consistency the results apply to the variant of the model where it is assumed that DCC undertake the residual collections directly and where ongoing container replacement costs are dealt with as Capex. Within the equivalent variant where Veolia deliver the residual waste service the total costs are reduced by approximately £7k, which elevates the surplus by the same amount. Financial summaries for all of the modelled variants can be found in Appendix 3.

Figure 5.2 Option 2(a): Integrated trade and communal collections, transformed dry recycling to provide alignment with the Environment Act. Existing food service coverage

Option 2(a)								
This increased separation option sees the mixed recycling at trade / communal sites split into fibres (mixed paper / card), containers (mixed plastics / cans) and glass streams. Residual waste remains separately collected, whilst fibres / glass and containers / food are collected on pod RCVs. All streams are collected on a weekly cycle, albeit existing customers receiving fortnightly or monthly lifts continue to do so; in the case of sacks (residual and mixed recycling) and cardboard bundles, customers set material out 'as needed'. A simple 'per lift' charging model applies, with no additional or hidden costs.								
Service Element	Residual Waste	Fibres	Cardboard	Glass	Containers	Food	Service Totals	Commentary
<u>Customers</u>								
Unique customers/sites	499	502	54	150	502	126		Key model inputs are generated from pivot tables applied to the updated customer data, covering those lift types making up the majority of collection undertaken across the service, i.e. garden waste is excluded. <u>Unique customer numbers (by name)</u> , including duplicate canteens on schools sites is 714.
<u>Collections</u>								
Lifts per annum	27,897	26,981	655	12,545	23,010	17,987	109,075	Based on quantity of sacks and labels used, bins contracted (including number and collection frequency). Each sack is classed as a single lift
Annual volume lifted (litres)	14,603,480	13,400,900	58,950	2,857,400	9,759,500	1,435,887	42,116,117	
<u>Waste Flow</u>								
Tonnes lifted per annum	976	391	4	185	127	328	2,010	<div>Service Recycling Rate</div> <div>51%</div> <div>Waste flows calculated 'bottom-up' based on lifts and combination of recorded (residual) and apportioned (residual sacks, recycling and food) unit weights</div>
<u>Resources</u>								
	Residual Waste	Fibres and Glass (pod)		Containers and Food (pod)				
Days work per week	5.8	5.0		5.0				Modelled resource
Vehicles	1.2	1.0		1.0				Vehicles apportioned to each service
Crew level	D	D		D				Assumed crewing levels
Day length (hrs)	6.5	6.5		6.5				Assumed
Work allocation to trade (%)	100	100		100				All trade / communal lifts are undertaken on dedicated rounds
Sites serviced per day (per round)	86	111	30	100	25			Site counts needing to be achieved based on modelled resources
Lifts per day (all containers)	93	106	48	89	69			Back-calculated from annual totals. Each sack = single lift.
<u>Financial Summary</u>								
Total Income	£305,467	£70,509	£1,402	£8,830	£58,742	£16,080	£461,030	Includes all income from customer charges. No change from baseline
Costs	£224,448	£97,301	£234	£1,764	£79,666	£20,837	£424,248	Incorporating any separate material incomes
[gate fees/haulage] / incomes (-ve)	£117,518	-£11,824	(in Fibres)	-£3,512	-£27,673	£12,362	£86,871	These figures are incorporated in the total Cost line above
Net Revenue & Service Margin	£36,782						8%	Based on DCC undertaking the residual collections inhouse and container costs managed as CAPEX.

Note: the above costs do not include any 'one-off' costs associated with providing additional containers to facilitate the switch from mixed recycling to separate streams. Based on the assigned bin profile this requires an additional 631 bins to be purchased, at an estimated total cost of just under £20k. Appendix 3 includes the basis of this calculation. No other 'transformation' costs have been accounted for in the modelling. These are expected to include Communications and marketing costs, bin delivery and swaps, and resource costs associated with customer engagement in the run up to making a change – potentially requiring 6 months of an additional FTE working alongside the trade waste officer.

Supporting metrics and commentary:

- Improved financial position vs option 1 due to increased customer revenue from the increased suite of bins (and thus lifts) for separate recycling;
- Operational costs for recycling remain broadly similar to option 1, with increased collection costs being offset by material incomes;
- Modelled based on 2 pod vehicles working fulltime to collect the 4 dry recycling and food streams. This is aligned with DCC's budgeted position for the future service, albeit pod RCV purchase costs are higher than standard RCVs.

The main operational risk with this option is linked to the pod vehicle crewing levels. With increased lift numbers at sites the additional time taken to load vehicles (at the front and rear of the vehicle) may prove challenging.

The underlying assumption linked to this option is that the overall mass balance of recycling material produced by customers does not significantly change, hence the modelled recycling rate stays within a single percentage point of option 1. It is difficult to predict how different businesses will respond to a change of service design such as this. Key influencing variables will be the extent to which the separate collection requirements of the Environment Act are enforced on the ground, and availability of space at business premises to support greater levels of material segregation. The reality is that many smaller or space constrained businesses may respond by picking a primary recycling bin, e.g. fibres, whilst using sacks for the ad hoc recycling of other streams. The change might prompt certain businesses to recycle more as it drives realisation of an increased potential to divert material from the higher cost residual waste service. Conversely, it may prompt (price-sensitive) businesses to seek alternative, single-bin, outlets for their waste (including competitor operators or through backhauling of packaging).

Assigning segregated recycling containers: risks and long term aims

A key task underpinning the future options modelling, as applied to both the existing trade customers and communal properties co-collected on the rounds, was an estimation of how the existing mixed recycling stream will split out into separate fibres, containers and glass streams. This is challenging, as different business sectors produce higher or lower quantities of each stream (e.g. Retail generates proportionately more cardboard, Hospitality more glass), and not all locations will have sufficient space on site to accommodate multiple bins. As such, the approach set out in Appendix 2 represents a starting point, the detail of which would need to be refined on an individual customer and communal site basis.

In the longer term, the ideal position to be in as an operator would be to have a formulaic approach to assigning the optimum mix of containers to both communal and trade sites, based on factors such as size (driving waste production) and type (influencing waste composition). An attempt to do this has been applied in this study, but through necessity this has been semi-manual. Adopting a formula-based approach, combined with knowledge of the financial margins achieved per lift, would enable DCC to accurately forecast the service performance based on the customer profile. This should be retained as a long-term aim for the service, driving decisions around data capture and analysis. As stated previously, the private sector will actively target or avoid certain businesses as a result of having a good understanding of their waste production profiles. This knowledge and ability to flex the commercial offer may become increasingly important as new UK policy proposals, including EPR (Extended Producer Responsibility) for packaging, apply to Non-Household Municipal (NHM) waste.

5.4.3 Option 2(b): Integrated trade and communal collections, transformed dry recycling to provide alignment with the Environment Act. Expanded food service coverage

Option 2(b) extends the position modelled in option 2(a) by expanding food service uptake across all relevant businesses involved in providing food-related hospitality services, including schools-based catering departments. Figure 5.3 presents summary results from the model. For consistency the results apply to the variant of the model where it is assumed that DCC undertake the residual collections directly and where ongoing container replacement costs are dealt with as Capex. Whereas for all previously modelled options outsourcing of the residual service to Veolia is seen to be financially beneficial, within this option the equivalent variant costs increase by approximately £10k. This is because where DCC collects and manages residual trade waste inhouse, the diversion of food waste out of the affected residual bins results in lower gate fees at Parc Adfer. Financial summaries for all of the modelled variants can be found in Appendix 3.

Figure 5.3 Option 2(b): Integrated trade and communal collections, transformed dry recycling to provide alignment with the Environment Act. Expanded food service coverage

Option 2b								
This increased separation option sees the mixed recycling at trade / communal sites split into fibres (mixed paper / card), containers (mixed plastics / cans) and glass streams. Within this variant option 2b food waste uptake is maximised across applicable Accommodation and food services & Arts, entertainment and recreation customers. Diverted food waste tonnages are taken off of the residual waste weights. Residual waste remains separately collected, whilst Fibres / Glass and Containers / Food are collected on pod RCVS. All streams are collected on a weekly cycle, albeit existing customers receiving fortnightly or monthly lifts continue to do so; in the case of sacks (residual and mixed recycling) and cardboard bundles, customers set material out 'as needed'. A simple 'per lift' charging model applies, with no additional or hidden costs.								
Service Element	Residual Waste	Fibres	Cardboard	Glass	Containers	Food	Service Totals	Commentary
Customers								
Unique customers/sites	499	502	54	150	502	282		Key model inputs are generated from pivot tables applied to the updated customer data, covering those lift types making up the majority of collection undertaken across the service, i.e. garden waste is excluded. <u>Unique customer numbers (by name), including duplicate canteens on schools sites, is 714.</u>
Collections								
Lifts per annum	27,897	26,981	655	12,545	23,010	25,713	116,801	Based on quantity of sacks and labels used, bins contracted (including number and collection frequency). Each sack is classed as a single lift
Annual volume lifted (litres)	14,603,480	13,400,900	58,950	2,857,400	9,759,500	1,994,213	42,674,443	
Waste Flow								
Tonnes lifted per annum	838	391	4	185	127	466	2,010	Service Recycling Rate 58% Waste flows calculated 'bottom-up' based on lifts and combination of recorded (residual) and apportioned (residual sacks, recycling and food) unit weights
Resources								
Days work per week	5.8	Fibres and Glass (pod) 5.0			Containers and Food (pod) 5.0			Modelled resource
Vehicles	1.2	1.0			1.0			Vehicles apportioned to each service
Crew level	D	D			D			Assumed crewing levels (need for additional food loader?)
Day length (hrs)	6.5	6.5			6.5			Assumed
Work allocation to trade (%)	100	100			100			All trade / communal lifts are undertaken on dedicated rounds
Sites serviced per day (per round)	86	111		30	100	56		Site counts needing to be achieved based on modelled resources
Lifts per day (all containers)	93	106		48	89	99		Back-calculated from annual totals. Each sack = single lift.
Financial Summary								
Total Income	£305,467	£70,509	£1,402	£8,830	£58,742	£34,641	£479,592	Includes all income from customer charges, including extra food lifts
Costs	£207,058	£96,556	£221	£1,417	£79,030	£29,040	£413,322	No material incomes apply to the baseline
[gate fees/hauling] / incomes (-ve)	£100,899	-£11,824	(in Recycling)	-£3,512	-£27,673	£17,566	£75,455	These figures are incorporated in the total Cost line above
Net Revenue & Service Margin	£66,269						14%	Based on DCC undertaking the residual collections inhouse and container costs managed as CAPEX.

As with option 2(a) there will be additional rollout costs associated with this option (including the estimated £20k investment in recycling bins, plus additional food waste bins). These costs will also need to include marketing and engagement with hospitality establishments to encourage food waste uptake.

Supporting metrics and commentary:

- Improved financial position vs option 2(a) due to increased customer revenue from food waste collections;
- Resources have been modelled at the same level as option 2(a), based on there being spare capacity within the vehicles. For reference, the average daily modelled food waste weight in option 2(a) was 1.26 tonnes; in this option it is 1.79 tonnes. A 4CuM pod is estimated to have capacity to carry 2.6 tonnes of food.

The operational risk applicable to option 2(a) is increased with this option. It is increasingly likely that an additional loader will be needed to support collection of the extra food waste and maintain productivities at a level enabling all sites to be passed in the available time. An additional fulltime loader would reduce the modelled surplus by £26k, based on costs assumed in the model. The true ability to service participating locations in this option depends on the geographical spread of uptake. This is something DCC should look to drive / influence, as opposed to respond to – if proceeding with this option³⁸.

³⁸ Private sector operators will target customers along primary routes as a way of maximising route density and return on investment. DCC has many disperse customers which it may service at a loss based on the current fixed pricing strategy.

5.4.4 Option 3 (Microsite analysis): identifying micro-businesses that might be suitable to be serviced on future RRV recycling / food rounds

By co-collecting from businesses on the domestic rounds it is possible to service remote or disperse collection points along routes being travelled by the domestic vehicles; this represents the most efficient operational practice, particularly in areas where trade customers are not in close proximity to one another. The proposed change to the domestic service, comprising 4-weekly residual collections and weekly multi-stream dry recycling and food (on RRVs) limits the extent to which co-collection remains a viable practice for DCC. However, it is recognised that there will be a population of micro-businesses in the existing customer base that produce material at levels that make them feasible to be serviced via RRVs, i.e. utilising Trolleybocs¹, food caddies and potentially bundled cardboard. As such, participating businesses would automatically be offered a level of recycling materials segregation that is aligned with the Environment Act, owing to the design of the kerbsort scheme. If pursuing this option, DCC may choose to create a new 'all-in' microsite recycling and food waste contract, providing a price incentive for small businesses to move from a single DMR bin to multiple boxes, and reflecting operational efficiencies realised by the Authority through co-collection.

Whilst the extraction of microsites from the trade recycling and food service was not formally modelled, analysis of the Master customer data was undertaken to quantify the potential scale of the opportunity, i.e. the number of businesses and material weights that might transfer. Appendix 4 contains the sequential filters applied to the customer data to identify and quantify those businesses that it might be appropriate to service on future RRV rounds. The analysis applies to existing trade customers only; communal sites identified as needing to be serviced on the trade rounds are excluded from the assessment.

Dry recycling analysis

The underlying premise for recycling is that only those with 240ltr mixed recycling bins (or less, including sacks) would be appropriate to consider. *There is also a subset of businesses who are registered as using the cardboard labels service, but the extent of each customers' use is not consistently recorded.*

The headline output indicates 222 (microsite) dry recycling customer locations that may be feasible to service via the domestic RRV rounds, generating an estimated 732kg of recycling each week (in total), i.e. <1tonne.

Food waste analysis

The food waste analysis involved iterative filters being applied to the Master customer data, targeting those currently using 23ltr food caddies. The current food service is small, with just 52 unique sites receiving trade food lifts. Those customers serviced via 23ltr caddies number just 10, generating c.61kg of food waste each week. It is noted there are many customers with a single 120ltr food bin, which could potentially be moved over to 4/5 caddies each if it was concluded that the only viable way of maintaining a trade food service was to service them on the RRVs. This set of filters was not included in the analysis but could be, subject to DCC's decisions on a preferred way forward.

Modelling outputs: servicing micro-businesses on RRV rounds

The analysis summarised above (and detailed in Appendix 4) indicates that approximately half of the existing recycling customers (222 sites, out of a baseline number of 434) may be of a scale that would support them moving onto a 'domestic' model collected on RRV rounds. This is not an insignificant number, which could free up significant time on future dedicated trade recycling rounds to deliver increased recycling and/or win new, potentially larger customers. This may create commercial opportunities for DCC should the separate collection requirements be enforced (e.g. by Natural Resources Wales) and competitors are slow to respond to the changing market. There will be other 'cardboard' label customers that may also be appropriate to service on the RRV rounds, although the potential uptake has not been assessed in this study due to the lack of robust data defining individual customer usage levels.

The existing trade food service is considerably smaller than the dry recycling, with just 52 unique sites currently recorded as having food waste caddies/bins (though some have multiple visits per week). Those customers using just the 23litre caddies number 10 in total. The majority have a single 120litre wheeled bin, who potentially (subject to audit) could manage with caddies as an alternative, which may be worth of consideration if it is concluded that a separate trade food service is not viable going forward. As concluded during the baseline review the market conditions for growing the trade food service should be strong. DCC has 170 unique 'Accommodation and food service activities' customers, which includes 42 school-based catering departments. Only 35 of these currently take up a food waste collection, 19 of which are the school caterers. This would indicate a sizeable number of existing customers (135) that could benefit from food waste collections, which would help boost the service recycling rate.

The focus has been on those businesses that might be appropriate to service on recycling and food via the RRVs. However, there may also be some small businesses that could accommodate a 4-weekly residual waste collection, supported by provision of a larger bin. This analysis has not been completed as part of this study, but could be considered as follow-on work through agreement of appropriate residual containment volume cut-off thresholds to apply in the Master data that underpins the trade model.

It is understood that to date, micro-businesses that could be co-collected on the new RRV rounds have not been factored into the domestic round design and associated resource planning. The analysis completed here, along with the supporting .csv files supplied to WRAP Cymru as outputs from the exercise, should enable the inclusion of these microsites in the new recycling round designs.

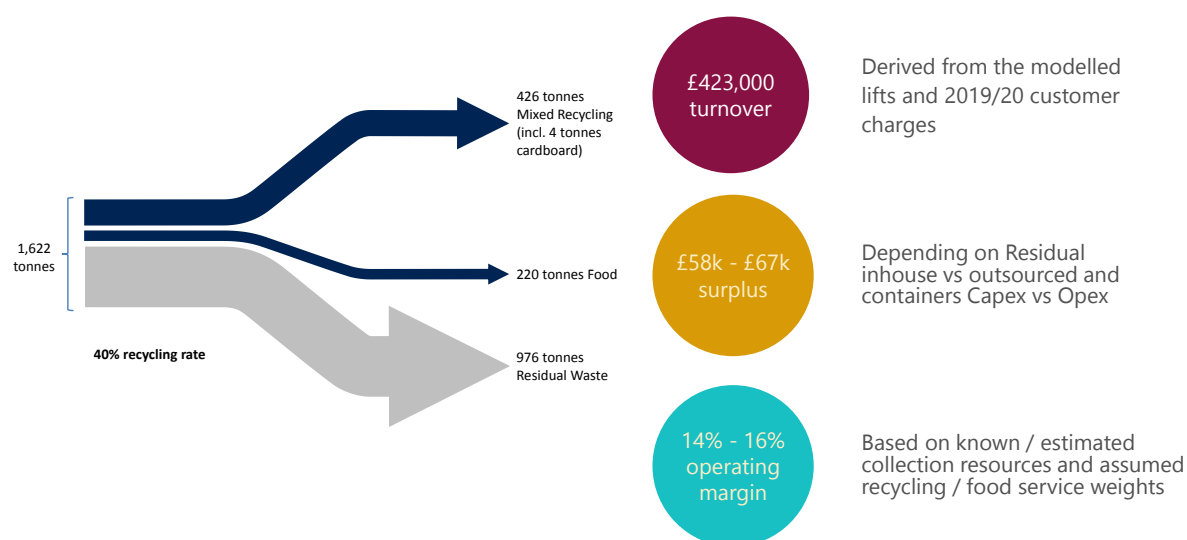
6.0 Summary and recommendations

This review of DCC's trade waste and recycling service has been prompted by changes to the domestic kerbside collection service due to take place in 2023. These changes will limit the extent to which the historic co-collection of trade and domestic food waste can continue, as well as requiring communal (flats) recycling and food waste to be serviced on the trade rounds. Furthermore, the proposed requirement for non-domestic premises in Wales (such as businesses, charities and public sector bodies) to have specified recyclable materials managed separately from each other requires the existing trade waste and recycling service design to be revised. This study has considered a range of future options, placed in the context of the current (baseline) service design and performance.

6.1 Baseline position

The performance of the current service (as modelled) is summarised in Figure 6.1.

Figure 6.1 Existing service performance headlines.



6.1.1 Operational delivery

The historic approach to operating the trade service, through outsourced residual lifts, inhouse mixed recycling and co-collected food waste, has influenced how the trade service is budgeted, delivered and internally managed. The mix of arrangements across the different streams offers both advantages and drawbacks. Overall, the residual waste contract with Veolia is seen to represent a reliable, cost-effective option in the short term, generating accurate weight information. Whilst mixed recycling from trade customers is collected separately, weights are not recorded by DCC, which represents a missed opportunity. Co-collection of food waste on the domestic rounds has provided operational flexibility whilst uptake of trade food has been relatively low. If this service is to operate standalone and be commercially viable, it needs to be grown.

The true resource requirements and performance profile of the trade service is difficult to quantify, due to lack of data, resulting in a lack of transparency upon which future service decisions can be based. This has been a significant challenge for this study and should be a top priority to be addressed as the service moves to a point where its design needs to change. **Collecting and analysing accurate, real-time data will be critical as the Authority seeks to become more commercial in its approach.** It will also be important to ensure there is effective internal ownership (and accountability) of the service, which is likely to come through the reinstatement of a formal trade waste officer post.

6.1.2 The market within which DCC operates

The market appraisal presented in section 3 indicates significant potential to grow the service. Whilst the geography and demographics of Denbighshire create certain challenges, DCC should be well placed to deliver a recycling-led service focused (in the short to medium term) on smaller businesses. DCC's service is regarded as being relatively stable. If the authority can move to a position where services are actively targeted at customers, as opposed to being wholly reactive, opportunities to increase recycling and revenue exist.

6.1.3 SWOT analysis

Figure 6.2 presents a high-level SWOT analysis of the existing service.

Strengths	Weaknesses
<ul style="list-style-type: none"> - Flexible containment options provide a good level of choice to customers, including those with limited storage space - Co-collection methodology enables efficient incremental growth of the food waste service - Access to local low cost and sustainable food waste treatment infrastructure - In-county depot/bulking infrastructure - Lack of local competition in the South of the County - High margin residual waste service - Competitive recycling and food waste service pricing provides a platform for delivering improved recycling performance - Trusted supplier with a stable customer base 	<ul style="list-style-type: none"> - Lack of income for recycling - Service brand and bin labelling. With bins being lifted by subcontractors the Authority's function is potentially unclear to customers - Blurred lines between domestic and trade bins (on the ground) - Limited internal accountability and lack of clear communication channels with customers - Customer contract provides limited commercial protection to the Authority - Lack of trade-specific operational performance metrics and transparency, including validated collection productivities - Budget lacks detail, and it remains unclear whether all costs are being recovered / apportioned - Lack of real-time data capture and analysis - Lack of control and integration between operations and business support functions - Commercial understanding, e.g. of margins achieved per lift - Absence of a strategy or future service 'vision' - Limited service marketing and promotion. No apparent sales targets and protected time for new business development, service website is not outward-looking
Opportunities	Threats
<ul style="list-style-type: none"> - Cross or upselling services to existing customers - Ability to 'influence' internal customers - Potential to go beyond providing 'waste' services to local business, e.g. expansion to include resource efficiency training, support around adoption of the Circular Economy - Growth potential due to market size, including potential to drive up recycling levels whilst still delivering a surplus - Transition to a service design that is fully compliant with the Environment (Wales) Act, creating the basis for a key marketing message and market differentiator. This might include the option to co-collect domestic and business WEEE, textiles from 2022 onwards - Targeting high value (clean) streams for separate collection 	<ul style="list-style-type: none"> - Ability to respond (quickly) to competitor promotions (e.g. lift rate discounts) - Ability to control potential future outsourced contract costs - Recycling contamination levels - Ability to respond quickly to the separate collection requirements of the Environment (Wales) Act - Lack of dedicated resource to manage change, which will become increasingly important as the domestic service is transformed - Increasing cost of mixed recycling processing

6.2 Future options

Through a combination of data analysis and modelling this study has evaluated a number of alternative service delivery options, as follows:

- Option 1 adds recycling and food lifts from 82 communal (flats) complexes to the trade service. The overall design of the enlarged service remains 'as-is', but with trade/communal food lifts now made on a dedicated vehicle. All collections are made on a weekly basis, albeit retaining any existing trade customer variations captured in the baseline model;
- Option 2 sees the mixed recycling collections transformed to a service targeting separate fibres (mixed paper and card), containers (mixed cans and plastics) and glass streams. These are assigned in proportions that are tailored to the business type, ensuring at least the current level of recycling capacity is provided. Collections of the four dry recycling and food streams are modelled through use of pod RCVs. In model variant (a) food waste remains focused on those currently receiving this service, in variant (b) food uptake is assumed to expand across all relevant Hospitality (including catering departments at Education establishments) and Arts, entertainment and recreation businesses; and
- Option 3 analyses the potential scale of the opportunity to collect recycling and food presented in low quantities from micro businesses on the future RRV rounds.

Figure 6.3 presents the headline results from the formally modelled options (1, 2(a), 2(b)) and option 3 analysis. These are shown sequentially as transitional steps away from the baseline. Care is needed when interpreting the vehicle numbers as these are cumulative totals across all services.

Figure 6.3 Headline results for the modelled / analysed options 'at a glance'.

Modelled Option Metrics and supporting commentary	Baseline Current service with estimated / apportioned collection resources	Option 1 Current service plus Communal (flats) recycling / food	Option 2(a) Mixed recycling transformed to separate fibres, containers, glass, collected with food in pod RCVs	Option 2(b) As per option 2(a) with food waste expansion	Option 3 Microsite analysis assessing potential for small recyclers to move to a Trolleybocs service
Arisings (tpa):	1,622	1,964	2,010	2,010	< 50 (recycling & food)
No. Vehicles	2.2	3.1	3.2	3.2	Not modelled
Recycling Rate (%)	40	50	51	58	
Annual service turnover (rounded to £1k)	£423k turnover	£423k turnover	£461k turnover	£480k turnover	232 dry recycling customers, out of a baseline number of 434, may be of a scale that would support them moving onto a 'domestic' model collected on RRV rounds
Net revenue position (rounded to £1k)	£58k to £67k surplus	-£2k to -£14k loss	£28k to £43k surplus	£47k to £66k surplus	Existing food customers using just the 23litre caddies number 10 in total
Commentary on variants	Modelled variants include residual inhouse vs outsourced and containers capex vs opex. Outsourced residual = £3k better	Modelled variants include residual inhouse vs outsourced and containers capex vs opex. Outsourced residual = £3k better	Modelled variants include residual inhouse vs outsourced and containers capex vs opex. Outsourced residual = £7k better	Modelled variants include residual inhouse vs outsourced and containers capex vs opex. Outsourced residual = £10k worse	

Subject to the previously stated data limitations and assumptions that have been applied, the results indicate:

- An existing service that generates a healthy surplus, with an overall margin level that most private sector operators would aim for. This position is driven by high margins per lift on residual waste. Despite high MRF processing costs the standalone mixed recycling collections also deliver a modest margin. Whilst food waste collections are operated at a loss, the small number and operational approach whereby they are co-collected on the domestic rounds means the impact is marginal. The baseline recycling performance is modest at 40% (as modelled). With 58% of lifts (by volume) and 72% of income coming from the residual waste service it cannot be said that the service is 'recycling-led, despite recycling being cheaper and with a flexible range of options on offer;
- Comparing the baseline with option 1, the inclusion of communal (flats) recycling and food collections impacts the service margin as there is no extra income assumed³⁹. The additional resource required to service these sites and downstream material processing / treatment costs result in a service that is predicted to make a small loss (of between £2k and £14k per annum);
- Transformation of the mixed recycling service in option 2a drives higher income levels, as it is assumed the extra bins lifted are all charged at standard rates. Whilst the number of bins lifted goes up, the weight lifted increases only marginally (adding a single percentage point to the recycling rate). Despite the inclusion of additional supervision time and use of more expensive vehicles, the pod RCVs provide better alignment with modelled arisings of recycling and food streams. Uncertainty remains around the productivity impact of a switch to pod vehicles and whether an additional loader may be needed on both of the modelled rounds – which would bring the service closer to operating at a cost neutral position. Acknowledging the risks around workload balancing, an alternative delivery model might be to collect fibres and containers on alternate weeks using single-compartment RCVs and to collect food and glass on a toploader vehicle – recognising that arisings of these two streams are maximised in hospitality businesses; and
- Expansion of food waste coverage in option 2(b) further drives up revenue and has the effect of reducing residual costs in the variant where DCC operate this service inhouse. This is because the residual waste weight reduces, resulting in lower gate fees at Parc Adfer. This benefit is not realised in the variant where residual waste remains outsourced to Veolia, as the contractor gets this benefit. As such, this is the only modelled option where it appears cheaper to operate the residual service inhouse. Increased food waste coverage, and linked diversion of this material from the residual stream, boosts the recycling rate to 58% overall, which would take DCC's service from somewhere at the bottom end of Welsh LA observed trade recycling rates to a position much closer to the top. Whilst the collection resources have been kept consistent with option 2(a), it is increasingly likely that an additional loader would be needed on the food pass under this scenario to enable the rounds to be deliverable.

³⁹ In reality a revenue transfer from the domestic budget might apply, recognising that the trade service is in effect subsidising the servicing of communal (recycling and food waste) bins.

6.3 Suggested actions and further work

Future activities to be considered by DCC as outcomes from this review are presented below.

Table 6.1 Suggested actions and further work.

Review Aspect	Suggested actions and further work
Baseline service	Review existing customer contract (E-Forms) to make it clearer what the responsibilities are on both sides. Consider introducing a 3-month notice period and/or a bin bond as mechanisms to provide greater commercial protection to the authority
	Undertake a review of back-office systems and processes, and linked customer interfaces (e.g. One Stop shops, website, customer services), in order to improve service messaging, marketing and response times. Ensure common data building blocks are used across systems, e.g. UPRN's, and create reports that enable improved service data capture. Examples include capturing SIC classifications for all customers, analysing Veolia weight data to understand trends by customer type, and recording mixed recycling weights.
	Consider making recycling compulsory for all (or all incoming) customers and undertake checks on customers to ensure they are complying with Duty of Care across all waste streams. The scale of the opportunity can be framed by considering DCC's top 3 sectors and the level of recycling uptake: <ul style="list-style-type: none"> - Of the 170 unique Accommodation and food service entries, 49 are without any form of dry recycling; - Of the 142 unique Retail entries, 21 are without any form of dry recycling; and - Of the 62 unique Human health and social work entries, 30 are without any form of dry recycling.
	Create an improved service budget and financial reporting structure to aid transparency of reporting and monitoring, ensuring the service bears all costs it should. Explore discrepancies between budgeted incomes and modelled income levels.
	Undertake a sample trade recycling weighing exercise, e.g. over a period of 1 month, to check the modelling assumptions applied in this study. Aswell as the weight this should record details of containers / streams lifted on each day / round - to ensure an accurate set of revised apportionment factors are derived from the exercise.
	Reinstate a formal trade waste officer post and revisit internal policies, including practical considerations such as use of bin locks (especially when the domestic service moves to a 4-weekly frequency) and branding of bins.
Future options	Undertake further work to assess possible uptake levels if the recycling service were to be transformed, e.g. through customer outreach. Put in place a fully resourced 'transformation plan' that recognises the risks linked to uncertain customer responses and identifies proactive steps the authority could take to ensure uptake levels align with the available resources. This requires a proactive, rather than reactive, approach to marketing the service and a refresh of the service brand.
	Consider financial incentives and/or new contract options that encourage a shift in behaviour to recycling. This is needed if the trade service is not to have the effect of pulling down the overall Authority recycling rate. Linked to the assessed transformation of the mixed recycling service (option 2(a)) and expansion of the food waste service (option 2(b)) there may be a need to cap short term cost increases to incentivise uptake, ideally coinciding with putting in resource to audit and rationalise residual waste arrangements on a customer-by-customer basis. This work should form part of a wider review of DCC's approach to pricing on the service. Balanced against this aim, it is understood that growing a recycling-led service may be restricted owing to the space restriction and space allocation for trade within the new depot.
	Extend the microsite analysis and model the impact of removing these sites from the trade system in order to quantify the spare capacity (and cost reduction) generated. This needs to go hand-in-hand with ensuring sufficient capacity is built into the new RRV round designs to support their future inclusion.

Appendix 1 Baseline modelling assumptions

This appendix sets out the key input assumptions applying to the existing trade service. Overarching assumptions and modelling principles are covered first, followed by a tabular summary of specific parameter values. The majority of these assumptions and underlying rules carry over to the future options, additional (option-specific) assumptions for which are set out in Appendix 2.

Core assumptions

A number of core assumptions and principles apply. These are listed below:

- All modelled options have been applied to the current customer base as supplied in early August 2020;
- Service uptake levels, i.e. numbers of sacks and labels used are based on estimates of quantities used (as opposed to quantities sold) where it has been possible to identify or infer this from the supplied data. The modelled number of residual sacks used in the model has been calculated by applying the arithmetic mean of recorded sacks sold (in 2019/20) and Veolia's recorded sacks lifted (in 2019). The average represented a 13% increase in the Authority's sack sale numbers, which was then applied to the equivalent recycling and cardboard labels sales figures in order to derive numbers populate in the model. All PAYT lifts (residual/recycling sacks and cardboard bundles) are distributed evenly across the businesses identified in the customer data as using these services;
- All model outputs relate to annual figures. As applied to yields unit container weights are multiplied by the total number of labels/sacks used in the year, or bins/caddies lifted;
- The standard working week is taken as being 5 days (Monday – Friday). Any rounds working for part of the week, e.g. recycling over 4 days, are apportioned as a percentage of the standard 5 day pattern, which in this example would mean 80% of vehicles and staffing costs are pulled through to the model summary calculations; and
- The productive time spent picking (actively collecting waste and recycling), which drives the daily site count calculations, has been assessed on the basis that all rounds make 1 tip per day (on average). The assigned productive picking time is then calculated assuming the average overall duration of each round (from start to finish) is 6.5 hours, with 1.25 hours deducted to allow for lunch breaks, transit times to and from the round and for material tipping.

Key (baseline model) inputs

The following table summarises key modelling inputs and their sources.

Modelling parameter	Units	Figure	Basis / source
Baseline			
Sack volume (residual, mixed recycling)	litres	80	Previous studies, WRAP C&I waste apportionment tool
Cardboard bundle average volume set out	litres	90	Previous studies, description of customer behaviour
Residual bin yields	kg/lift	See table 2.5	Veolia lift weight analysis covering 12 months of 2019 data

Modelling parameter	Units	Figure	Basis / source
Residual sack yield	kg/lift	See table 2.5	WRAP C&I waste apportionment tool
Mixed recycling, cardboard and food yield	kg/lift	See table 2.5	WRAP C&I waste apportionment tool with adjustments for expected void levels
Customer charges (internal & external)	£	See table 2.1	DCC 2019/20 price information and customer data, e.g. where customer-specific variants apply (such as the £2.50 food lift charge for 120litre bins at hospitals)
Customer charges (charities)	£	See table 2.1	Assumed by removing estimated disposal portion of standard charge based on DCC pricing principles
Residual waste collection vehicles	No.	1.15 (5.8 (6) days work)	Derived from a conservative target lift count of 80/day, which in turn was benchmarked against Monmouthshire which covers a similar area, with a similar number of customers and proportional uptake of sacks vs bins
Recycling collection rounds	No.	0.8 (4 days work)	DCC specified
Food waste collection rounds	No.	0.3 (1.5 days work)	Inferred from assumed 5% of domestic resource (32 rounds) being dedicated to trade food lifts
Crew level	No.	Driver only Driver only Driver + 1	Residual (DCC-specified) Recycling (DCC-specified) Food (average assumed)
Liners used per food caddy lifted	No.	2	Assumption
Residual waste, mixed recycling wheeled bin replacement rate	%	10	Assumption based on past projects
Food waste container replacement rates	%	15	Assumption based on past projects where caddies are subject to a higher loss rate
Residual waste, mixed recycling wheeled bin CAPEX depreciation period	Years	10	Assumption based on past projects
Food waste container CAPEX depreciation period	Years	5	Assumption based on past projects; lower value assets, food bins subject to shorter lives due to heavy weight/loadings
Recycling vehicle 'all-in' cost	£	22,500	DCC specified, based on 15t RCV owned outright (incorporating £10,500 per annum fuel costs)
Residual waste vehicle 'all-in' cost	£	49,000	Assumed based on other projects. Leased or purchased/depreciated 18t RCV (incorporating £14,000 per annum fuel costs)
Food waste vehicle 'all-in' cost	£	24,500	Assumed, based on 7.5t vehicle leased or purchased/depreciated (incorporating £6,500 per annum fuel costs)
Supervisor 'all-in' cost	£	36,000	Assumption based on past projects
Driver 'all-in' cost	£	32,815	DCC specified (grade 5)

Modelling parameter	Units	Figure	Basis / source
Loader 'all-in' cost	£	26,000	Assumption based on past projects
Service administrator 'all-in' cost	£	31,128	DCC specified (technical waste officer)
Service (corporate) overhead	£	0	DCC specified
IT/in-cab system costs	£	0	Assumed, not applicable
Veolia lift charges	£/lift	Redacted	DCC specified, covering collection and disposal
Residual waste treatment gate fee	£/t	105	Assumed - where DCC deliver the waste to Parc Adfer
Mixed recycling processing fee	£/t	79.01	DCC specified, including £5.52 contamination uplift
Food waste treatment gate fee	£/t	30	Assumed
Residual waste bulking/haulage	£/t	15.43	DCC specified – where DCC deliver the waste to Parc Adfer
Food waste bulking/haulage	£/t	15.43	DCC specified – applying to 50% of food waste arisings not direct delivered

Appendix 2 Future options assumptions report

This 'assumptions report' sets out the key inputs to the future options modelled as part of the DCC trade waste review. Overarching assumptions applying to all models are covered first, followed by a tabular summary containing option-specific commentary. Unless amended by figures presented here, all options build on the baseline data and assumptions set out in Appendix 1, reflecting the service as currently operated.

Core assumptions

A number of core assumptions apply throughout the modelled options, underpinned by the data and approach applied to the baseline review. These are listed below:

- All modelled options have been applied to the current customer base (supplied August 2020). No growth or decline in customer and lift numbers has been modelled unless specifically tested as part of the modelled changes. Similarly, service uptake levels, i.e. numbers of bin lifts, sacks and cardboard labels used are kept at levels consistent with the baseline, except where option-specific changes in service design dictate. All model outputs relate to annual figures;
- The modelling is based on verified (e.g. through the Veolia bin weights) or assumed yields for each type of container and material lifted. Revised yield profiles have been applied to the domestic communal (recycling and food) bins added to the system. The basis of the communal yields is set out below;
- All future options assume each stream is collected weekly, as the default collection frequency, which also applies to communals. Where existing trade customers are serviced at a revised frequency, e.g. fortnightly or monthly, as identified in the supplied customer database, these arrangements are already factored into the baseline modelling upon which the future options are based, i.e. by influencing the total annual lifts (from which weekly equivalents the resources are tested against are then calculated). The reality is that if a revised service design is rolled out, e.g. based on a greater level of recycling materials segregation, the balance between container provision (allowing for space constraints on site) and collection frequencies would need to be revisited on an individual customer basis. It would be possible to test the impact of alternative collection frequencies as part of future modelled option variants if required as additional work by DCC;
- Education catering establishments receive 42 lifts per annum, in line with the baseline. This also applies to expanded food waste uptake assessed in option 2a;
- All locations (trade and communal) are assumed to be accessible via 18 – 22t GVW vehicles. No vehicle access information was supplied or incorporated into the baseline model development, and this is something that would need to be considered prior to developing fully costed proposals to introduce new vehicles;
- Where vehicles or crew are modelled as being needed for just part of the week, only that proportion of the costs attributable to the time spent working on trade is assigned in the model. This adopts the principle that any part-time resource will be deployed to other tasks / services for the remainder of the week, and thus the costs associated with the balance of that time will be borne by those other tasks / services. This is viewed as the most consistent way of comparing costs between the baseline and modelled options, avoiding the need for grossing up of resource costs to cover whole crewed rounds. By way of example, should 7 days of collections be modelled, this equates to 1.4 rounds and thus a multiplication of the unit cost of a full vehicle and crew by 140%;

- Service infrastructure, in terms of supporting depots and tipping points, are assumed to remain the same as they are now. It is recognised that a new depot is due to come online, and that whilst this may have capacity constraints regarding acceptance of significant quantities of segregated trade recycling, it is assumed that a site capable of handling the modelled material will be available within close proximity. Where a proportional split of received waste flows through different facilities applied to the baseline, e.g. where trade food waste is assumed to be 50% direct delivered to Biogen and 50% via transfer station, the same proportional split applies in future models;
- Unit lift/customer charges have been applied based on those used in the baseline model, providing a basis for making direct comparisons between the 'before and after' financial positions of the modelled options. Further work could be done to assess the impact of price adjustments on service margins, however this has not been included as part of this study;
- Unit costs for elements such as labour, container purchase and gate fees remain fixed at baseline levels, unless specifically altered as a result of the modelled option; and
- Consistent with the baseline, no service overhead costs are applied to the trade service. Where option-specific adjustments to supervision or IT costs apply these are described below.

Option-specific workflow and assumptions

The following table introduces, for each future option, key steps associated with the modelling, assumptions required to complete the assessment and supporting caveats.

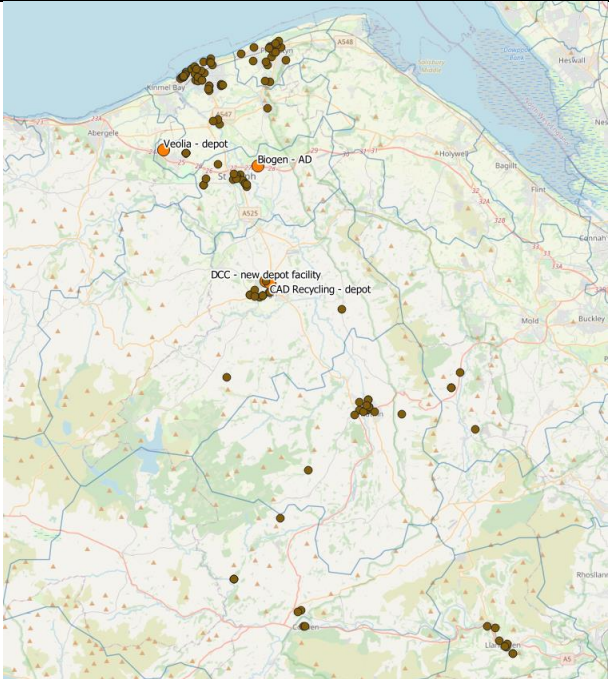
Modelling approach and key parameters	Option overview and assumptions
1: existing trade service with Flats included	<ul style="list-style-type: none"> ■ Existing trade service and customer lift profile modelled to include the addition of mixed recycling and food lifts from 1,750 flats (communal bins) across 82 sites ■ All streams collected on dedicated rounds, which in the case of food means these lifts are no longer made on the domestic rounds. Instead, a dedicated trade/communal food round is put in place, operated using its own 7.5t food waste vehicle
Modelling steps / approach	<ul style="list-style-type: none"> ■ Collation of Communal site data (property name, location, current bin provision), supplied separately for the North / South ■ Addition of dwelling numbers, postcodes and food bin details, not provided in original data ■ Formatting and inclusion of Communals in Master customer data as a new customer group ■ Analysis of the range of capacity (litres/dwelling per week) assigned across the communal sites by stream (residual, mixed recycling, food) ■ Assignment of assumed unit lift weights to communal bins based on dwelling numbers ■ Development of assumptions regarding the productivity impact of adding the population of communal sites to the existing trade service and recalibration of the estimated resource calculations (days work) needed to service the larger customer base ■ Reconstruct model ■ Results collation and analysis

Modelling approach and key parameters	Option overview and assumptions																												
Communal bin yields	<p>The addition of residual, mixed recycling and food waste bins at communal sites (flats) required new unit yields to be populated, as they do not feature in the baseline. Whilst the decision could have been taken to simply apply the existing trade bin yields, past project experience, anecdotal evidence and reported research points to the fact that is likely to over-estimate the true amount of waste produced by flatted properties. Applying standard property yields is also likely to be inaccurate due to the effect of the average household size being smaller in flatted properties, reduced internal space to store waste and recycling and the effect of transient populations (socio-demographics). As a result, assumptions were developed for an average set of yield figures (kg/dwelling/week), as follows:</p> <div><div>Assumed unit yield per dwelling (kg/hh/wk): recycling</div><div>Assumed unit yield per dwelling (kg/hh/wk): food</div><div>2.5</div><div>1.1</div></div> <p>These were subsequently mapped onto the different container types, as shown below:</p> <table><tr><th>Recycle</th><th>kg/lift</th><th>Food</th><th>kg/lift</th></tr><tr><td>140</td><td>2.9</td><td>23</td><td>3.1</td></tr><tr><td>240</td><td>5.0</td><td>120</td><td>16.1</td></tr><tr><td>360</td><td>7.5</td><td></td><td></td></tr><tr><td>660</td><td>13.7</td><td></td><td></td></tr><tr><td>1100</td><td>22.8</td><td></td><td></td></tr><tr><td>1280</td><td>26.6</td><td></td><td></td></tr></table> <p>On the basis that DCC, in the communals data, identified those complexes recognised as being above average, average and below average recyclers, the above unit dwelling yields and mapped container weights were adjusted.</p> <p>For above average recyclers, the figures are as follows:</p> <div><div>Assumed unit yield per dwelling (kg/hh/wk): recycling</div><div>Assumed unit yield per dwelling (kg/hh/wk): food</div><div>2.8</div><div>1.3</div></div>	Recycle	kg/lift	Food	kg/lift	140	2.9	23	3.1	240	5.0	120	16.1	360	7.5			660	13.7			1100	22.8			1280	26.6		
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⁴⁰ Which includes experience gained incorporating communal properties into trade recycling in Pembrokeshire, reported work by LWARB (Making recycling work for people in flats, January 2020) and WRAP (Barriers to recycling: A review of evidence since 2008, December 2014).

































































































































































































Modelling approach and key parameters	Option overview and assumptions																																																												
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Flats income and costs	<p>No new income is assumed to flow into the service through the addition of flats. N.B. in some LAs private landlords/agents are charged for the provision of bins. Therefore, as modelled the trade service absorbs the costs of managing waste and recycling from flats, including container maintenance/replenishment (assumed to be at the same rates as the wider trade service), collection (either through Veolia (where the 140ltr WB lift charges are assumed to be the same as 240ltr WBs) or collected inhouse) and treatment/disposal of the collected material. As such, the impact is a significantly reduced operating margin/surplus for the service. Depending on how DCC handles budget and cost code reconciliation, in reality there may be an element of revenue transfer from the domestic service to trade, reflecting the contribution from Authority tax receipts for the domestic portion of the overall service costs.</p>																																																												

Modelling approach and key parameters	Option overview and assumptions
Vehicle selection	<p>Vehicles remain the same as the baseline for the residual waste and mixed recycling collections. For the separately collected food waste a 7.5t PBUV (with the same cost profile as the baseline co-collected food rounds, i.e. £24.5k all-in annual capex/opex) was applied with a maximum achievable food payload of 2.75t (derived from Terberg data sheets).</p> <p>It is noted that under the revised modelled yield and pass rate assumptions, all vehicles are able to complete rounds with 1 tip per day.</p>
Collection productivities	<p>The addition of flats to the existing population of external and internal trade customers collected jointly on the trade service has the effect of increasing the overall customer density. This in turn should increase the collection productivities, i.e. lift rate, achievable as collections are now closer together – with less driving time in between.</p> <p>The true productivity impact will depend on the clustering of properties on any given day/round, which it is not possible to determine in a strategic model of the type used in this study. Despite the challenges, the following assumptions were developed to inform the potential effect on productivities against each service (residual waste, mixed recycling and food waste):</p> <ul style="list-style-type: none"> ■ On residual waste the benchmark lift rate has been increased by 15%, from 80/day (the conservative baseline figure) to 92/day. The reality is that Veolia will be able to achieve higher route densities still (due to the effect of their own customers being serviced also on the rounds) ■ On mixed recycling the lift rate (assessed as an hourly figure) has also been increased by c.15%, consistent with residual. Most communal sites have both residual waste and recycling bins so it is appropriate to increase rates on these services by a similar amount ■ Within this option it is assumed that food waste at trade customer sites and communal complexes is collected separate from other domestic food (as was the case in the baseline). As such, a new set of productivities needed to be applied. The true rate achievable will depend on the spread of locations to be serviced. There is also the issue of the general hospital needing to be serviced multiple times per week. A conservative starting point of 50 sites/day was selected as the target benchmark (which is the rate achieved on another LA commercial food waste standalone collection (where uptake is relatively low)). Across these sites 140 individual container lifts are needed, which may seem high but c.50% are via caddies which will be quicker to load than bins. A high level of caution is urged when viewing the modelled resource profile arising from these assumptions. <p>The map below shows the distribution of the combined (trade/communal) food collection locations. Judgement based on the visual distribution would suggest the work can perhaps be collected over 2 days (average c.70 site visits/day). However, with the need to service the hospital 5 days/week, the modelled outcome of 2.5 days of resource is perhaps reasonable.</p>

Modelling approach and key parameters	Option overview and assumptions
	
2(a): enhanced recycling service (greater segregation)	<ul style="list-style-type: none"> ■ Additional level of customer dry recycling materials segregation targeting fibres (paper/card), containers (cans/plastics), glass. ■ Food remains at existing levels across trade and communal sites
Modelling steps / approach	<p>The modelling of this option required greater upfront work to recast the customer demand profile, in recognition of the increased level of recycling materials segregation now applied. This required any customer with an existing DMR collection to be reviewed and an exercise completed to split the material into 3 streams (fibres, containers and glass). A bespoke methodology was developed to generate the split (as described below), tailored according to the property type (communal vs trade) and sub-sector (e.g. Hospitality vs Office-based).</p> <p>Specific steps comprised:</p> <ul style="list-style-type: none"> ■ Development of a container allocation approach applicable to the option 1 communal and sector-specific mixed recycling configurations ■ Assignment of yields to the revised communal bin profiles ■ Calculation of new total tonnage and income figures ■ Consideration of overall waste flows to determine the 'best fit' vehicle type to model ■ Iterative assessment of resource profiles that best balance productivity considerations with compartment capacities ■ Reconstruct model ■ Results collation and analysis
Materials segregation and yield	<p>A rules-based approach to assigning containers to communal complexes was taken, taking the current level of mixed recycling provision as a starting point. Through a manual, iterative assignment process bins were assigned to fibres, containers and glass collections until such time as either a minimum of 200 litres capacity per</p>

Modelling approach and key parameters	Option overview and assumptions																																									
assumptions: <u>communal</u> <u>properties</u>	<p>dwelling per week had been achieved, or the revised recycling capacity (per dwelling per week) had exceeded 150% of the original level. Whilst it was the original intention to give each dwelling the same level of minimum capacity as applies to standard households under the Blueprint service, in many cases it was apparent that this would require numbers of recycling bins that individual sites may simply be unable to accommodate (due to constraints around space). The general approach adopted was to assign greater levels of capacity to fibres, followed by containers and then to glass. This was a desk-based exercise undertaken with no access to site plans for each complex or local knowledge. A full survey of sites would need to be undertaken to verify the optimum mix of containers, which in some cases may mean rationalising existing levels of residual capacity in order to support increased recycling.</p> <p>By way of a worked example (showing how the assignment exercise worked in practice), Laurie House on West Parade, Rhyl comprises 9 dwellings and currently has 5x360 mixed recycling bins delivering an average 164ltrs of recycling capacity per dwelling per week. Under the increased separation model this complex has been assigned 3x360 fibres bins, 3x360 containers bins and 2x240 glass bins, delivering 207 ltrs of recycling capacity per dwelling per week. Wherever possible a sensible transition that utilises and builds on the existing bins at each site was adopted.</p> <p>Once the new suite of dry recycling bins had been assigned to each flats complex, it was necessary to configure a new set of weights for the separate streams. This was completed taking the option 1 weight profiles as a starting point and assigning weights based on reference flats performance data and material bulk densities.</p> <p>Retaining the average, low and high performing recycling designations, the following unit yield and mapped bin weights are as follows (for flats regarded as average recyclers):</p> <table><tr><th>Assumed unit yield per dwelling (kg/hh/wk): fibres</th><th>Assumed unit yield per dwelling (kg/hh/wk): containers</th><th>Assumed unit yield per dwelling (kg/hh/wk): glass</th></tr><tr><td>1.7</td><td>0.5</td><td>0.8</td></tr></table> <p>Resulting in the following yields per container lifted when mapped across:</p> <table><tr><th>Fibres</th><th>kg/lift</th><th>Containers</th><th>kg/lift</th><th>Glass</th></tr><tr><td>140</td><td>2.8</td><td>140</td><td>1.2</td><td>140</td></tr><tr><td>240</td><td>4.9</td><td>240</td><td>2.1</td><td>240</td></tr><tr><td>360</td><td>7.3</td><td>360</td><td>3.1</td><td></td></tr><tr><td>660</td><td>13.4</td><td>660</td><td>5.7</td><td></td></tr><tr><td>1100</td><td>22.3</td><td>1100</td><td>9.5</td><td></td></tr><tr><td>1280</td><td>25.9</td><td>1280</td><td>11.1</td><td></td></tr></table>	Assumed unit yield per dwelling (kg/hh/wk): fibres	Assumed unit yield per dwelling (kg/hh/wk): containers	Assumed unit yield per dwelling (kg/hh/wk): glass	1.7	0.5	0.8	Fibres	kg/lift	Containers	kg/lift	Glass	140	2.8	140	1.2	140	240	4.9	240	2.1	240	360	7.3	360	3.1		660	13.4	660	5.7		1100	22.3	1100	9.5		1280	25.9	1280	11.1	
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Modelling approach and key parameters	Option overview and assumptions																																																																																				
	<p>The equivalent figures for above average recyclers are as follows:</p> <div><div>Communal Fibres +</div><div>Communal Containers +</div><div>Communal Glass +</div><div>2.10.71.2</div></div> <table><tr><td>Fibres</td><td>kg/lift</td><td>Containers</td><td>kg/lift</td><td>Glass</td><td>kg/lift</td></tr><tr><td>140</td><td>3.5</td><td>140</td><td>1.7</td><td>140</td><td>6.9</td></tr><tr><td>240</td><td>6.0</td><td>240</td><td>2.9</td><td>240</td><td>11.8</td></tr><tr><td>360</td><td>9.0</td><td>360</td><td>4.4</td><td></td><td></td></tr><tr><td>660</td><td>16.5</td><td>660</td><td>8.0</td><td></td><td></td></tr><tr><td>1100</td><td>27.5</td><td>1100</td><td>13.4</td><td></td><td></td></tr><tr><td>1280</td><td>32.0</td><td>1280</td><td>15.5</td><td></td><td></td></tr></table> <p>For below average recyclers, the figures are as follows:</p> <div><div>Communal Fibres -</div><div>Communal Containers -</div><div>Communal Containers -</div><div>1.40.40.5</div></div> <table><tr><td>Fibres</td><td>kg/lift</td><td>Containers</td><td>kg/lift</td><td>Glass</td><td>kg/lift</td></tr><tr><td>140</td><td>2.3</td><td>140</td><td>1.0</td><td>140</td><td>2.9</td></tr><tr><td>240</td><td>4.0</td><td>240</td><td>1.7</td><td>240</td><td>4.9</td></tr><tr><td>360</td><td>6.0</td><td>360</td><td>2.5</td><td></td><td></td></tr><tr><td>660</td><td>11.0</td><td>660</td><td>4.6</td><td></td><td></td></tr><tr><td>1100</td><td>18.3</td><td>1100</td><td>7.6</td><td></td><td></td></tr><tr><td>1280</td><td>21.3</td><td>1280</td><td>8.9</td><td></td><td></td></tr></table> <p>No changes were made to the food waste yields developed for the option 1 model.</p>	Fibres	kg/lift	Containers	kg/lift	Glass	kg/lift	140	3.5	140	1.7	140	6.9	240	6.0	240	2.9	240	11.8	360	9.0	360	4.4			660	16.5	660	8.0			1100	27.5	1100	13.4			1280	32.0	1280	15.5			Fibres	kg/lift	Containers	kg/lift	Glass	kg/lift	140	2.3	140	1.0	140	2.9	240	4.0	240	1.7	240	4.9	360	6.0	360	2.5			660	11.0	660	4.6			1100	18.3	1100	7.6			1280	21.3	1280	8.9		
Fibres	kg/lift	Containers	kg/lift	Glass	kg/lift																																																																																
140	3.5	140	1.7	140	6.9																																																																																
240	6.0	240	2.9	240	11.8																																																																																
360	9.0	360	4.4																																																																																		
660	16.5	660	8.0																																																																																		
1100	27.5	1100	13.4																																																																																		
1280	32.0	1280	15.5																																																																																		
Fibres	kg/lift	Containers	kg/lift	Glass	kg/lift																																																																																
140	2.3	140	1.0	140	2.9																																																																																
240	4.0	240	1.7	240	4.9																																																																																
360	6.0	360	2.5																																																																																		
660	11.0	660	4.6																																																																																		
1100	18.3	1100	7.6																																																																																		
1280	21.3	1280	8.9																																																																																		
Materials segregation and yield assumptions: <u>trade properties</u>	<p>For trade customers the underlying assumption is that the assigned fibres, containers and glass capacity should be no less than what is currently collected as mixed recycling. The more a business is asked to separate streams into fewer material types, the harder it becomes to efficiently utilise all of the volume (void space) within the assigned container(s). Hence, overall you tend to need more overall capacity to accommodate a multi-stream service compared to one that is co-mingled. Whilst the simplest approach would be to apply a blanket rule that splits the existing DMR out into fibres, containers and glass across all businesses, this fails to recognise the significant variations in composition of material produced by different business types. By way of example, whilst it is wholly appropriate to give a</p>																																																																																				

Modelling approach and key parameters	Option overview and assumptions																																																							
	<p>pub a glass bin, for most retail businesses this won't be needed. Hence, when going through the assignment process a sector-based guide was used to help inform where the containment bias should fall. The guide is focused on the business sectors that make up the majority of DCC's customer base. As the largest sector, Accommodation and food services have been further sub-divided for the purposes of assigning recycling capacity, because of the variable expected demand for glass at each. The guide provides a 'rule of thumb' indication of how the volume has been split (by stream). Glass bins are assigned to just a few business types (pubs, restaurants and entertainment (e.g. social clubs)). For food, this option (2(a)) applies the existing level of service uptake (across the combined flats/trade customer base). Within option 2(b) below all hospitality and arts/entertainment businesses are assumed to have a food waste service. <i>Please note that catering departments within Educational establishments have been categorised as Hospitality entities within the baseline model and linked market analysis (as already reported).</i></p> <p>The guide is shown below:</p> <div><p>STREAM BIAS</p><p>(if 6 bins of capacity needed assigning, what would the proportional split look like?)</p><table><tr><th></th><th>Fibres</th><th>Containers</th><th>Glass</th><th>Food</th></tr><tr><td>Accommodation and food service activities</td><td></td><td></td><td></td><td></td></tr><tr><td>(Pubs)</td><td></td><td></td><td></td><td></td></tr><tr><td>(Takeaway / Quick Service Restaurant)</td><td></td><td></td><td></td><td></td></tr><tr><td>Cafe / Restaurant</td><td></td><td></td><td></td><td></td></tr><tr><td>Educational catering</td><td></td><td></td><td></td><td></td></tr><tr><td>Wholesale and retail trade; repair of motor vehicles</td><td></td><td></td><td></td><td></td></tr><tr><td>Human health and social work activities</td><td></td><td></td><td></td><td></td></tr><tr><td>Education</td><td></td><td></td><td></td><td></td></tr><tr><td>Public admin and defence, social security</td><td></td><td></td><td></td><td></td></tr><tr><td>Arts, entertainment and recreation</td><td></td><td></td><td></td><td></td></tr></table></div> <p>For both glass and food, as heavy materials, bin sizes were capped at 2-wheeled options, i.e. 240 litres. Any larger is expected to result in manual handling and vehicle loading safety issues.</p> <p>For those customers currently recycling via sacks it is assumed that there is no change in total sacks numbers used; customers simply pick and choose their split use of fibres vs containers sacks (assumed to be distinctly branded) to suit their needs. No sack customers are assigned glass bins.</p>		Fibres	Containers	Glass	Food	Accommodation and food service activities					(Pubs)	 		  	 	(Takeaway / Quick Service Restaurant)	  	  		 	Cafe / Restaurant	 	 	 	 	Educational catering	  	  		 	Wholesale and retail trade; repair of motor vehicles	   	 			Human health and social work activities	  	  			Education	   	 			Public admin and defence, social security	  	  			Arts, entertainment and recreation	 	 	 	 
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Arts, entertainment and recreation	 	 	 	 																																																				

Modelling approach and key parameters	Option overview and assumptions																																																																																								
Income from lifts and material	<p>Consistent with option1, no new lift-based income comes from the flats recycling / food waste collections. For trade customers (internal and external) the same lift charges apply to the fibres, containers and glass collections as currently apply to mixed recycling. This inevitably results in extra service income overall and higher bills for customers, unless they are able to rationalise collection frequencies or their residual waste service. DCC may choose to adopt a pricing strategy whereby clean streams are charged at a discount to the outgoing mixed recycling, subject to the overall service economics and as a mechanism to defend against potential customer losses should the wider market still be offering DMR collections.</p> <p>With fibres, containers and glass now being collected as clean streams, the existing MRF processing costs no longer apply. Consultation with WRAP Cymru and DCC informed alternative figures to apply to the segregated streams. The selected figures were based upon pre-Covid (Sep'19 – Feb'20) inputs applied in the KAT household models and brokerage data for mixed fibres (over the same period), all of which were supplied by WRAP Cymru. The highlighted cells show the new unit (£/t) data, below that previously agreed and applied to the baseline, option 1. All figures are ex works prices (i.e. collected from DCC by the off-taker), with negative numbers indicating where an income is received. Within the model these figures apply to the total tonnages flowing out of the transformed service. A nominal £10/t contribution to the container processing costs incurred by DCC separating plastic and cans at the depot has also been assumed.</p>																																																																																								
<table><tr><th>Disposal Costs/Revenue (per tonne)</th><th>Residual Waste</th><th>Fibres</th><th>Cardboard</th><th>Glass</th><th>Containers</th><th>Food</th><th></th></tr><tr><td>Waste Treatment / Disposal Gate Fee</td><td>£105.00</td><td></td><td></td><td></td><td></td><td>£30.00</td><td>Residual = assumption, based on partnership average. Food = assumption (Thorncilffe). Biogen treat</td></tr><tr><td>Mixed Recycling Processing Fee</td><td></td><td>£79.01</td><td></td><td></td><td></td><td></td><td>UPM gate fee + average contamination charge. AR email 21/08/20</td></tr><tr><td>Mixed Recycling Income</td><td></td><td>£0.00</td><td></td><td></td><td></td><td></td><td>No income received. AR telcon 20/08/20</td></tr><tr><td>Materials Bulking & Haulage</td><td>£15.43</td><td></td><td></td><td></td><td></td><td>£15.43</td><td>AR email 21/08/20. A proportion of food waste would also need to be bulked (see row 282)</td></tr><tr><td>Containers Processing Fee (DCC site separation)</td><td></td><td></td><td></td><td></td><td>£10.00</td><td></td><td>Assumption, so trade / communal bears a share of the depot sorting costs</td></tr><tr><td>Stream Revenue - Fibres (mixed paper & card)</td><td></td><td>-£30.00</td><td></td><td></td><td></td><td></td><td>Derived from WRAP brokerage prices Sep'19 - Feb'20 (ex works incomes)</td></tr><tr><td>Stream Revenue - Glass</td><td></td><td></td><td></td><td>-£19.00</td><td></td><td></td><td>KAT reference data Sep'19 - Feb'20 (ex works incomes)</td></tr><tr><td>Stream Revenue - Plastic bottles, pots, tubs & trays</td><td></td><td></td><td></td><td></td><td>-£212.00</td><td></td><td>KAT reference data Sep'19 - Feb'20 (ex works incomes)</td></tr><tr><td>Stream Revenue - Aluminium cans</td><td></td><td></td><td></td><td></td><td>-£828.00</td><td></td><td>KAT reference data Sep'19 - Feb'20 (ex works incomes)</td></tr><tr><td>Stream Revenue - Steel cans</td><td></td><td></td><td></td><td></td><td>-£98.00</td><td></td><td>KAT reference data Sep'19 - Feb'20 (ex works incomes)</td></tr></table>		Disposal Costs/Revenue (per tonne)	Residual Waste	Fibres	Cardboard	Glass	Containers	Food		Waste Treatment / Disposal Gate Fee	£105.00					£30.00	Residual = assumption, based on partnership average. Food = assumption (Thorncilffe). Biogen treat	Mixed Recycling Processing Fee		£79.01					UPM gate fee + average contamination charge. AR email 21/08/20	Mixed Recycling Income		£0.00					No income received. AR telcon 20/08/20	Materials Bulking & Haulage	£15.43					£15.43	AR email 21/08/20. A proportion of food waste would also need to be bulked (see row 282)	Containers Processing Fee (DCC site separation)					£10.00		Assumption, so trade / communal bears a share of the depot sorting costs	Stream Revenue - Fibres (mixed paper & card)		-£30.00					Derived from WRAP brokerage prices Sep'19 - Feb'20 (ex works incomes)	Stream Revenue - Glass				-£19.00			KAT reference data Sep'19 - Feb'20 (ex works incomes)	Stream Revenue - Plastic bottles, pots, tubs & trays					-£212.00		KAT reference data Sep'19 - Feb'20 (ex works incomes)	Stream Revenue - Aluminium cans					-£828.00		KAT reference data Sep'19 - Feb'20 (ex works incomes)	Stream Revenue - Steel cans					-£98.00		KAT reference data Sep'19 - Feb'20 (ex works incomes)
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	<p>On the basis that unit incomes for containers were supplied according to the constituent materials making up this stream, an exercise was undertaken to estimate their constituent proportions - drawing on the composition profile (described in section 3 of this report). Based on this assessment, the total estimated tonnage of containers coming out of the model is assumed to break down (by material weight) as follows:</p> <p>■ 50% plastic, 10% aluminium, 40% steel</p>																																																																																								

Modelling approach and key parameters	Option overview and assumptions																								
Vehicle selection and operational costs	<p>Based on the modelled waste flows from the revised system and the splits between fibres, containers, glass and food streams consideration was given to the optimum vehicle configuration that minimises the number of customer site passes needed, whilst satisfying rules around compaction (applicable to fibres, containers but not food, glass) and bin sizes needing to be lifted (max. 2 wheeled bins on food and glass). The conclusion from this was that compacting RCVs with a front pod provide the 'best fit'. On the basis that all streams are collected weekly the most even load distribution comes from pairing fibres (main compartment) and glass (pod) on one pass, and containers / food on a second. The vehicle assigned is nominally an 18 or 22t pod RCV with a minimum 4CuM front pod. A large commercial operator is known to favour the NTM pod vehicle around this size, deploying a 6CuM front pod and 17CuM rear compacting compartment. Checks that this configuration would not run out of capacity were undertaken based on uncompacted bulk densities, and it was confirmed accordingly that under the modelled resources and daily tonnage estimates this vehicle would require just 1 tip across all streams. The payload capacity calculations underpinning these checks are shown below for food and glass across a range of pod sizes:</p> <table><tr><th>Pod size (Cum)</th><th>Glass bulk density (t/m3) - 2 wheeled bin</th><th>Calculated pod payload capacity (t)</th></tr><tr><td>2.5</td><td>0.277</td><td>0.69</td></tr><tr><td>4</td><td>0.277</td><td>1.11</td></tr><tr><td>6</td><td>0.277</td><td>1.66</td></tr><tr><th>Pod size (Cum)</th><th>Food bulk density (t/m3) - 2 wheeled bin</th><th>Calculated pod payload capacity (t)</th></tr><tr><td>2.5</td><td>0.667</td><td>1.67</td></tr><tr><td>4</td><td>0.667</td><td>2.67</td></tr><tr><td>6</td><td>0.667</td><td>4.00</td></tr></table> <p>The cost of the pod vehicles was assigned in the model as an 'all-in' value, incorporating any capital depreciation, maintenance, fuel etc. This was derived from similar vehicle types and costs modelled elsewhere as it remains unclear how DCC would finance new vehicle purchases. The assigned annual cost in the model is £60k, compared with £49k assigned to an 18t single body RCV where it is assumed DCC undertakes residual collections inhouse.</p> <p>The pod vehicles continue to be crewed by a driver only, as per DCC instructions.</p> <p>An allowance for supervision time, costed at 2 days/week (0.4FTE) was included in this option, due to the increasing complexity of the service.</p> <p>Finally, an additional (annually depreciated) cost of £4.6k per pod vehicle was included in the modelled financial summary to cover in-cab technology. This cost was derived from a previous local authority trade waste review.</p>	Pod size (Cum)	Glass bulk density (t/m3) - 2 wheeled bin	Calculated pod payload capacity (t)	2.5	0.277	0.69	4	0.277	1.11	6	0.277	1.66	Pod size (Cum)	Food bulk density (t/m3) - 2 wheeled bin	Calculated pod payload capacity (t)	2.5	0.667	1.67	4	0.667	2.67	6	0.667	4.00
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6	0.667	4.00																							

Modelling approach and key parameters	Option overview and assumptions
2(b): enhanced recycling service (greater segregation) + expanded food service	<ul style="list-style-type: none"> ■ Dry recycling is as per option 2(a), i.e. incorporating the additional materials segregation targeting fibres (paper/card), containers (cans/plastics) and glass. ■ Food uptake is expanded to all Accommodation and Food Service, and relevant Arts, Entertainment & Recreation customers
Modelling steps / approach	<ul style="list-style-type: none"> ■ Filter of Accommodation and Food service plus Arts, Entertainment and recreation customers in the master data ■ Sub-filter of those without food lifts already ■ Exclusion of sites not appropriate to supply with food bins ■ Assignment of either a food bin or caddy to each customer – based on business size ■ Assigned unit food lift weights (kg/lift) to new entries and calculated updated total annual weight of food waste collected ■ Removal of equivalent weight from residual waste stream for affected customers ■ Assigned new food lift incomes ■ Reconstruct model ■ Results collation and summary
Assignment of additional food bins, weights and incomes	<ul style="list-style-type: none"> ■ Filtering the master data against the two target sectors returned 201 unique customer entries. Of these, 36 have food bins or caddies currently ■ A review of the list to remove sites that do not appear appropriate to have food bins, e.g. School field, Meiford Wood, left 157 additional sites to which food waste is applied ■ All customers have been assigned a single food waste container, collected weekly. These have been assigned based on the scale of existing collections (capacity); all those on sacks have been assigned 23ltr caddies ■ For education-based catering customers food collections have been assigned based on 42 (vs 52) lifts per annum, i.e. term time only ■ Unit food lift weights have been assigned at levels consistent with other options ■ For those customers with newly assigned food bins that have residual waste collected by DCC, the estimated annual food waste weight was taken away from the equivalent residual waste quantity, i.e. it is assumed that the food is diverted directly from the residual waste stream. Downward adjustments were subsequently made to the annual food yield figure at each site where this was seen to exceed the model-estimated residual tonnage; reasons for this include where residual is collected at a reduced frequency, e.g. fortnightly/monthly ■ Whilst the residual weights of affected customers have been reduced, no reduction in residual lift income is assumed, consistent with the current pay per lift (vs pay by weight) charging model
Collection resources	<ul style="list-style-type: none"> ■ No changes to the vehicle types or collection resources were made, although tests were undertaken to confirm the additional food waste weight could still be accommodated with the modelled pod vehicles based on a 1 tip strategy ■ The daily lift count on food needs to increase to accommodate the additional bins set out. As such, it is acknowledged that on one of the modelled pod vehicles there may be a need for an additional loader – to avoid the need to increase the number of rounds

Appendix 3 Modelled variant financial summaries

For each modelled option four variants of the financial summary were generated. These cover the variable situations where DCC operate the residual trade collections inhouse vs outsourced, and where the financial reporting of annual container replacements is dealt with as either a Capex item (where costs are depreciated over time) or Opex (where the costs of replacement are borne in full on the year they occur). Whilst none of these variant options affect the modelled resources or performance, they do affect the balance of costs and thus the service margin (surplus or deficit).

Baseline model

Financial Summary	Residual Waste	Mixed Recycling	Cardboard	Food		
Total Income	£305,467	£97,458	£1,402	£18,569	£422,896	Includes all income from customer charges
Costs	£230,018	£88,544	£47	£39,984	£358,593	No material incomes apply to the baseline
[gate fees/haulage]	£117,518	£33,660	(in Recycling)	£8,292	£159,471	These figures are incorporated in the total Cost line above
Net Revenue & Service Margin	£64,303				15%	Based on DCC undertaking the residual collections inhouse and container costs managed as CAPEX.

Financial Summary	Residual Waste	Mixed Recycling	Cardboard	Food		
Total Income	£305,467	£97,458	£1,402	£18,569	£422,896	Includes all income from customer charges
Costs	£233,407	£91,303	£47	£40,079	£364,836	No material incomes apply to the baseline
[gate fees/haulage]	£117,518	£33,660	(in Recycling)	£8,292	£159,471	These figures are incorporated in the total Cost line above
Net Revenue & Service Margin	£58,061				14%	Based on DCC undertaking the residual collections inhouse and container costs managed as OPEX.

Financial Summary	Residual Waste	Mixed Recycling	Cardboard	Food		
Total Income	£305,467	£97,458	£1,402	£18,569	£422,896	Includes all income from customer charges
Costs	£227,054	£88,544	£47	£39,984	£355,629	No material incomes apply to the baseline
[gate fees/haulage]		£33,660	(in Recycling)	£8,292	£41,952	These figures are incorporated in the total Cost line above
Net Revenue & Service Margin	£67,268				16%	Based on Veolia managing residual and container costs managed as CAPEX.

Financial Summary	Residual Waste	Mixed Recycling	Cardboard	Food		
Total Income	£305,467	£97,458	£1,402	£18,569	£422,896	Includes all income from customer charges
Costs	£230,442	£91,303	£47	£40,079	£361,871	No material incomes apply to the baseline
[gate fees/haulage]		£33,660	(in Recycling)	£8,292	£41,952	These figures are incorporated in the total Cost line above
Net Revenue & Service Margin	£61,025				16%	Based on Veolia managing residual and container costs managed as OPEX.

Option 1

Financial Summary	Residual Waste	Mixed Recycling	Cardboard	Food		
Total Income	£305,467	£97,458	£1,402	£18,569	£422,896	Includes all income from customer charges. No change from baseline
Costs	£223,227	£149,743	£47	£55,093	£428,110	No material incomes apply to the mixed recycling
[gate fees/haulage]	£117,518	£52,193	(in Recycling)	£12,362	£182,073	These figures are incorporated in the total Cost line above
Net Revenue & Service Margin	-£5,214				-1%	Based on DCC undertaking the residual collections inhouse and container costs managed as CAPEX.

Financial Summary	Residual Waste	Mixed Recycling	Cardboard	Food		
Total Income	£305,467	£97,458	£1,402	£18,569	£422,896	Includes all income from customer charges. No change from baseline
Costs	£226,616	£154,194	£47	£55,434	£436,291	No material incomes apply to the mixed recycling
[gate fees/haulage]	£117,518	£52,193	(in Recycling)	£12,362	£182,073	These figures are incorporated in the total Cost line above
Net Revenue & Service Margin	-£13,394				-3%	Based on DCC undertaking the residual collections inhouse and container costs managed as OPEX.

Financial Summary	Residual Waste	Mixed Recycling	Cardboard	Food		
Total Income	£305,467	£97,458	£1,402	£18,569	£422,896	Includes all income from customer charges. No change from baseline
Costs	£220,263	£149,743	£47	£55,093	£425,146	No material incomes apply to the mixed recycling
[gate fees/haulage]	£0	£52,193	(in Recycling)	£12,362	£182,073	These figures are incorporated in the total Cost line above
Net Revenue & Service Margin	-£2,249				-1%	Based on Veolia managing residual and container costs managed as CAPEX.

Financial Summary	Residual Waste	Mixed Recycling	Cardboard	Food		
Total Income	£305,467	£97,458	£1,402	£18,569	£422,896	Includes all income from customer charges. No change from baseline
Costs	£223,651	£154,194	£47	£55,434	£433,326	No material incomes apply to the mixed recycling
[gate fees/haulage]	£0	£52,193	(in Recycling)	£12,362	£182,073	These figures are incorporated in the total Cost line above
Net Revenue & Service Margin	-£10,430				-2%	Based on Veolia managing residual and container costs managed as OPEX.

Option 2(a)

Financial Summary	Residual Waste	Fibres	Cardboard	Glass	Containers	Food		
Total Income	£305,467	£70,509	£1,402	£8,830	£58,742	£16,080	£461,030	Includes all income from customer charges
Costs	£224,448	£97,301	£234	£1,764	£79,666	£20,837	£424,248	Incorporating any separate material incomes
[gate fees/haulage] / incomes (-ve)	£117,518	-£11,824	(in Fibres)	-£3,512	-£27,673	£12,362	£86,871	These figures are incorporated in the total Cost line above
Net Revenue & Service Margin	£36,782						8%	Based on DCC undertaking the residual collections inhouse and container costs managed as CAPEX.

Financial Summary	Residual Waste	Fibres	Cardboard	Glass	Containers	Food		
Total Income	£305,467	£70,509	£1,402	£8,830	£58,742	£16,080	£461,030	Includes all income from customer charges
Costs	£227,836	£100,238	£234	£2,119	£81,788	£21,178	£433,393	Incorporating any separate material incomes
[gate fees/haulage] / incomes (-ve)	£117,518	-£11,824	(in Fibres)	-£3,512	-£27,673	£12,362	£86,871	These figures are incorporated in the total Cost line above
Net Revenue & Service Margin	£27,637						6%	Based on DCC undertaking the residual collections inhouse and container costs managed as OPEX.

Financial Summary	Residual Waste	Fibres	Cardboard	Glass	Containers	Food		
Total Income	£305,467	£70,509	£1,402	£8,830	£58,742	£16,080	£461,030	Includes all income from customer charges
Costs	£217,800	£97,301	£234	£1,764	£79,666	£20,837	£417,601	Incorporating any separate material incomes
[gate fees/haulage] / incomes (-ve)	£0	-£11,824	(in Fibres)	-£3,512	-£27,673	£12,362	£86,871	These figures are incorporated in the total Cost line above
Net Revenue & Service Margin	£43,429						9%	Based on Veolia managing residual and container costs managed as CAPEX.

Financial Summary	Residual Waste	Fibres	Cardboard	Glass	Containers	Food		
Total Income	£305,467	£70,509	£1,402	£8,830	£58,742	£16,080	£461,030	Includes all income from customer charges
Costs	£221,189	£100,238	£234	£2,119	£81,788	£21,178	£426,746	Incorporating any separate material incomes
[gate fees/haulage] / incomes (-ve)	£0	-£11,824	(in Fibres)	-£3,512	-£27,673	£12,362	£86,871	These figures are incorporated in the total Cost line above
Net Revenue & Service Margin	£34,284						7%	Based on Veolia managing residual and container costs managed as OPEX.

Separate recycling container outlay cost calculations:

	Fibres	Glass	Containers	Total Separate Stream Bins	Total Mixed Recycling Bins	Difference	Unit purchase cost	Container outlay
Commentary	Profile of Fibres (paper, card) bins	Profile of Glass bins	Profile of Containers (plastic, cans) bins	Sum of adjacent columns to the left	Taken from Option 1 model	Note, the population of 1280 litre bins actually reduces between the 2 options (by 73). These are not easily redeployed to offset the 1100 litre bins, so are assumed to be kept as spares	Used in model and based on a mix of WRAP / LA sources	Total outlay cost of additional / new containers
140ltr recycling WB	-	41	-	41	10	31	13.2	409
180ltr recycling WB	127	-	151	278	1	277	13.2	3,656
240ltr recycling WB	67	218	64	349	214	135	15.0	2,018
360ltr recycling WB	175	-	162	337	253	84	25.0	2,100
660ltr recycling WB	107	-	79	186	90	96	110.0	10,560
1100ltr recycling WB	20	-	5	25	17	8	147.5	1,180
1280ltr recycling WB	66	-	38	104	177		147.5	-
						631	SUM	19,924

Option 2(b)

Financial Summary	Residual Waste	Fibres	Cardboard	Glass	Containers	Food		
Total Income	£305,467	£70,509	£1,402	£8,830	£58,742	£34,641	£479,592	Includes all income from customer charges, including extra food lifts
Costs	£207,058	£96,556	£221	£1,417	£79,030	£29,040	£413,322	No material incomes apply to the baseline
[gate fees/haulage] / incomes (-ve)	£100,899	-£11,824	(in Recycling)	-£3,512	-£27,673	£17,566	£75,455	These figures are incorporated in the total Cost line above
Net Revenue & Service Margin	£66,269						14%	Based on DCC undertaking the residual collections inhouse and container costs managed as CAPEX.

Financial Summary	Residual Waste	Fibres	Cardboard	Glass	Containers	Food		
Total Income	£305,467	£70,509	£1,402	£8,830	£58,742	£34,641	£479,592	Includes all income from customer charges, including extra food lifts
Costs	£210,447	£99,493	£221	£1,773	£81,153	£29,516	£422,603	No material incomes apply to the baseline
[gate fees/haulage] / incomes (-ve)	£100,899	-£11,824	(in Recycling)	-£3,512	-£27,673	£17,566	£75,455	These figures are incorporated in the total Cost line above
Net Revenue & Service Margin	£56,989						12%	Based on DCC undertaking the residual collections inhouse and container costs managed as OPEX.

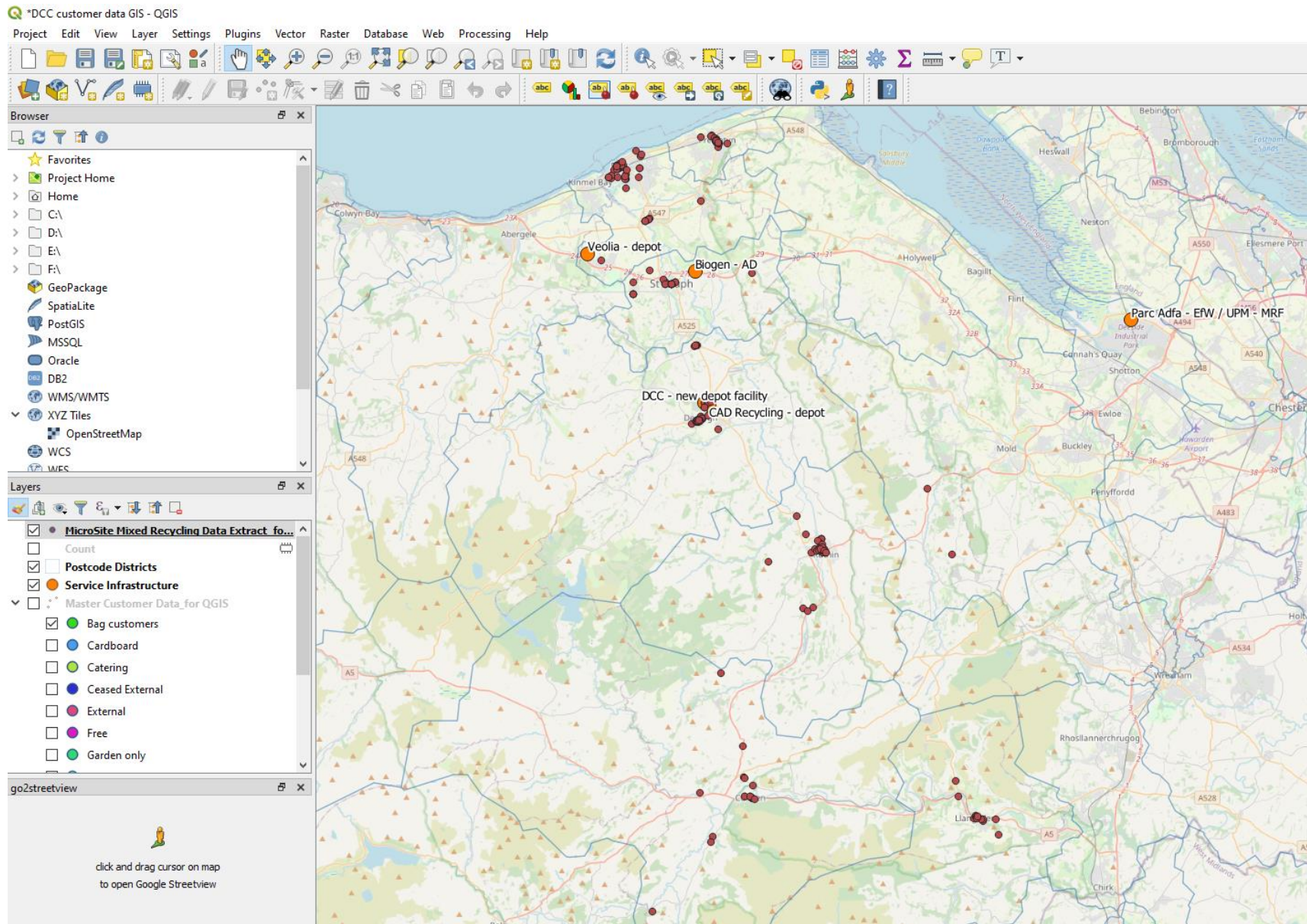
Financial Summary	Residual Waste	Fibres	Cardboard	Glass	Containers	Food		
Total Income	£305,467	£70,509	£1,402	£8,830	£58,742	£34,641	£479,592	Includes all income from customer charges, including extra food lifts
Costs	£217,274	£96,556	£221	£1,417	£79,030	£29,040	£423,538	No material incomes apply to the baseline
[gate fees/haulage] / incomes (-ve)	£0	-£11,824	(in Recycling)	-£3,512	-£27,673	£17,566	£75,455	These figures are incorporated in the total Cost line above
Net Revenue & Service Margin	£56,054						12%	Based on Veolia managing residual and container costs managed as CAPEX.

Financial Summary	Residual Waste	Fibres	Cardboard	Glass	Containers	Food		
Total Income	£305,467	£70,509	£1,402	£8,830	£58,742	£34,641	£479,592	Includes all income from customer charges, including extra food lifts
Costs	£220,662	£99,493	£221	£1,773	£81,153	£29,516	£432,818	No material incomes apply to the baseline
[gate fees/haulage] / incomes (-ve)	£0	-£11,824	(in Recycling)	-£3,512	-£27,673	£17,566	£75,455	These figures are incorporated in the total Cost line above
Net Revenue & Service Margin	£46,774						10%	Based on Veolia managing residual and container costs managed as OPEX.

Appendix 4 Microsite analysis steps and outputs

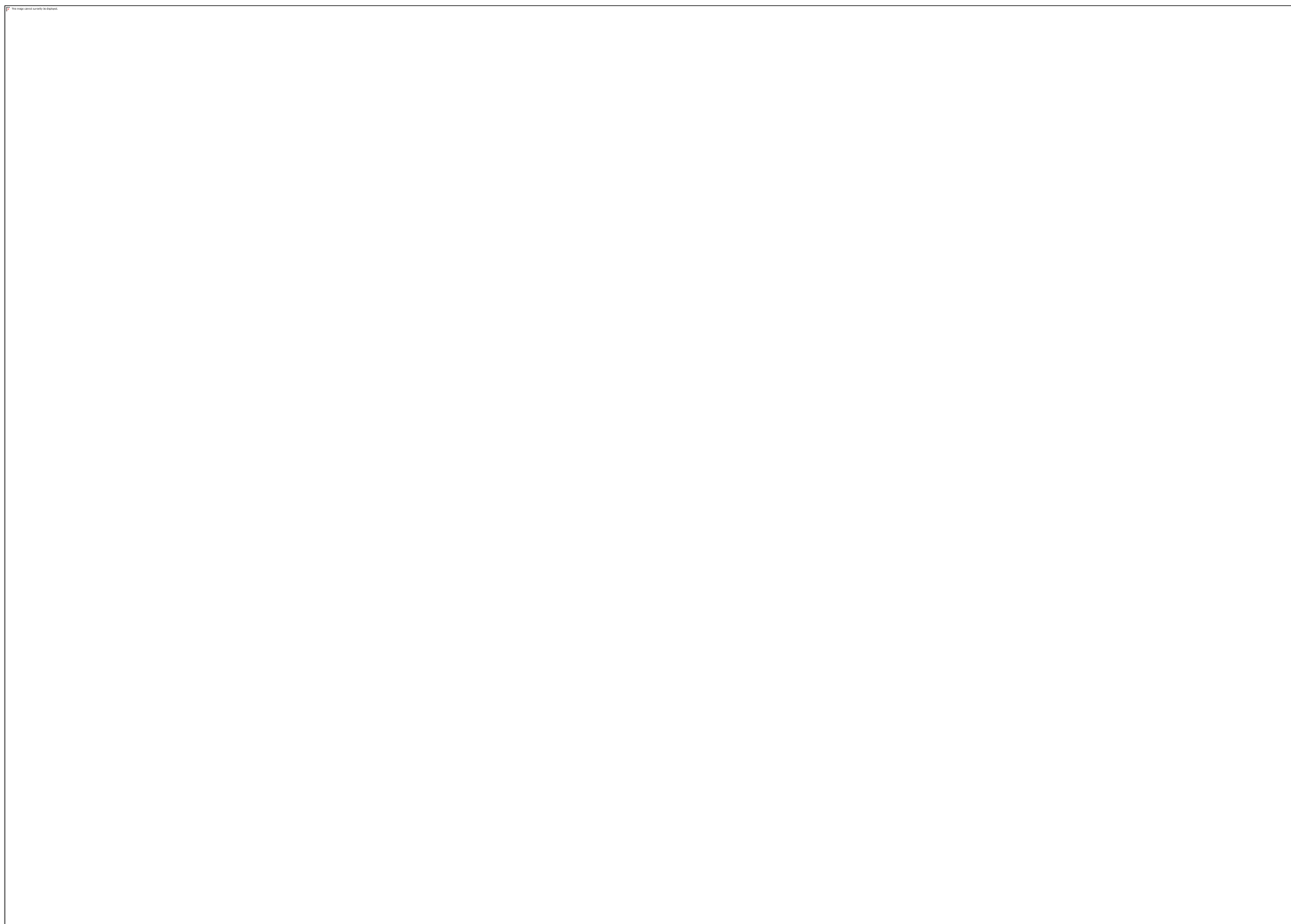
Mixed recycling

Step	Action	No. unique sites	No. unique sack sites (80ltr)	No. unique bin sites (180, 240ltr)	Total equivalent weekly volume (ltrs)	Total equivalent weekly weight (kg)
a)	Filtered master data for all active mixed recycling customers with 80, 180, 240ltr containers	233	139	94		
b)	6 of the above sites have multiple recycling bins on site. Each was assessed in turn (Bodelwyddan depot, NFU Mutual, Orakel, Pavilion Theatre, Rhyl Town Hall, Ysgol Bro Dyfrdw). The Pavilion has 1280, 660, 240 ltrs bins so can be discounted straight away. The others have a mix of 660, 360ltr, 240ltr bins and sacks. The only site retained in the data set was NFU Mutual, which has sacks and 1 240ltr bin, but collected fortnightly – so overall has a low total volume lifted.	228	138	90		
c)	On the basis that some of the above filtered sites have multiple smaller bins on site, a review of the total volume lifted in the year was assessed. Any sites with more than 13,000ltrs (1 single 240ltr bin lifted 52 times being equivalent 12,480ltrs) lifted per year were subsequently excluded.	222	138	84	14892 <i>Caution urged as sack usage averaged across all customers.</i>	732 <i>Caution urged as sack usage averaged across all customers.</i>
d)	The analysed data was combined with CodePoint data (for postcode regions ll, ch) from the Ordnance Survey to generate Easting/Northing grid references that could be mapped. Of the sample data points (222), 6 have no (or incomplete) postcodes assigned in the DCC database. These were manually searched (via Google) and postcodes added. Mapped output below.					



Food waste

Step	Action	No. unique sites	Total equivalent weekly volume (ltrs)	Total equivalent weekly weight (kg)
a)	Filtered master data for all active food waste customers with 23ltr caddies or 120ltr bins. <i>N.B. General hospital has multiple entries due to being visited every day of the week</i>	58		
b)	Filtered just those sites with 23ltr caddies	10	120 <i>Caution urged as a couple of entries are for fortnightly/monthly (seasonal) lifts with no actual visits recorded in the database</i>	61.4 <i>Caution urged as a couple of entries are for fortnightly/monthly (seasonal) lifts with no actual visits recorded in the database</i>
c)	The analysed data was combined with CodePoint data (for postcode regions ll, ch) from the Ordnance Survey in order to generate Easting/Northing grid references that could be mapped. All 10 postcodes were successfully assigned a grid reference from the CodePoint lookup			



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