FRITH RESOURCE MANAGEMENT

Gloucestershire Resources & Waste Partnership
Options Appraisal Report

29-Aug-23

Acknowledgements:

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Disclaimer:

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Executive Summary

Gloucestershire County Council (GCC) are working in partnership with the 6 District and Borough Councils, through the recently formed Gloucestershire Resources and Waste Partnership (GRWP) to develop a new Resources and Waste Strategy.

Frith Resource Management were asked to model alternative waste collection systems for all districts from the Partnership. The options were selected to identify the cost implications and impacts on recycling performance[1] of service changes which may be required under the national Resources and Waste Strategy and will inform the development of a new Strategy for the Partnership. As per the national Resources and Waste Strategy, key service changes are anticipated to include: mandatory separate food waste collections; free garden waste collections, and; a move towards 'consistent' collections for all Local Authorities across England. The service implications of these policies have been included in the modelling. The options are summarised in the following table.

Option	Collection Stream	Frequency	Capacity	Comments
Option 1 *Restricted residual waste capacity (140L bins)*	Residual waste	Fortnightly	140L WHB	• Additional materials such as small WEEE, batteries and textiles collected as per each Districts current arrangement. • PTT added for FoDDC
	Dry recycling	As per current service for each Waste Collection Authority (WCA).[2]		
	Food waste	Weekly	Kerbside caddy + kitchen caddy	
	Garden waste (charged)	As per current service for each WCA.		
Option 2 *As Option 1 plus plastic film, cartons collected as part of the dry recycling and a free garden waste collection*	Residual waste	Fortnightly	140L WHB	• Additional materials such as small WEEE, batteries and textiles collected as per each Districts current arrangement. • PTT added for FoDDC
	Dry recycling	As per current service for each WCA, plus plastic film and cartons.		
	Food waste	Weekly	Kerbside caddy + kitchen caddy	

[1] Recycling performance within this report refers to a combination of dry recycling and organics

[2] The District / Borough Councils have responsibility for collection of waste and recycling from households and the County Council is responsible for disposal

Option	Collection Stream	Frequency	Capacity	Comments
	Garden waste (uncharged)	All districts move to a free garden waste collection.		• Cartons added for CBC and FoDDC • Film added for all districts
Option 3 *Weekly kerbside recycling to areas currently providing fortnightly collections*	Residual waste	As per current service for each WCA.		• Additional materials such as small WEEE, batteries and textiles collected as per each Districts current arrangement. • PTT added for FoDDC
	Dry recycling	Weekly	As per current service for each WCA.	
	Food waste	Weekly	Kerbside caddy + kitchen caddy	
	Garden waste (charged)	As per current service for each WCA.		
Option 4 *Common Scenario 1 – All WCAs move to a weekly kerbside sort collection system for dry recyclables*	Residual waste	As per current service for each WCA.		• Additional materials such as small WEEE, batteries and textiles collected as per each Districts current arrangement. • PTT added for FoDDC
	Dry recycling (kerbside sort)	Weekly	2x box, 1x bag	
	Food waste	Weekly	Kerbside caddy + kitchen caddy	
	Garden waste (charged)	As per current service for each WCA.		
Option 5 *Common Scenario 2 – All WCAs move to a twin-stream (paper and card out) dry recycling collection including plastic film and cartons. A free garden waste collection is introduced.*	Residual waste	As per current service for each WCA.		• Additional materials such as small WEEE, batteries and textiles collected as per each Districts current arrangement. • PTT added for FoDDC • Cartons added for CBC and FoDDC • Film added for all districts
	Dry recycling (twin-stream)	Fortnightly	240L WHB 1x 50L bag / box (including plastic film and cartons)	
	Food waste	Weekly	Kerbside caddy + kitchen caddy	
	Garden waste (uncharged)	All districts move to a free garden waste collection.		

Option	Collection Stream	Frequency	Capacity	Comments
Option 6 *As per Option 4, plus plastic film and cartons are added to the dry recycling collection. A free garden waste collection is introduced.*	Residual waste	As per current service for each WCA.		• Additional materials such as small WEEE, batteries and textiles collected as per each Districts current arrangement. • PTT added for FoDDC • Cartons added for CBC and FoDDC • Film added for all districts
	Dry recycling (kerbside sort)	Weekly	2x box, 1x bag (including plastic film and cartons)	
	Food waste	Weekly	Kerbside caddy + kitchen caddy	
	Garden waste (uncharged)	All districts move to a free garden waste collection.		
Option 7 *3-weekly residual collection, plus plastic film and cartons are added to the dry recycling collection. A free garden waste collection is introduced.*	Residual waste	Three-weekly	240L WHB	• Additional materials such as small WEEE, batteries and textiles collected as per each Districts current arrangement. • PTT added for FoDDC • Cartons added for CBC and FoDDC • Film added for all districts
	Dry recycling	As per current service for each WCA, plus plastic film and cartons.		
	Food waste	Weekly	Kerbside caddy + kitchen caddy	
	Garden waste (uncharged)	All districts move to a free garden waste collection.		
Option 8 *As per Option 6 plus residual waste capacity is restricted and projected impacts of Government policy on Deposit / Return (DRS) and Extended Producer Responsibility (EPR) are modelled*	Residual waste	Fortnightly	*140L WHB*	• Additional materials such as small WEEE, batteries and textiles collected as per each Districts current arrangement. • PTT added for FoDDC • Cartons added for CBC and FoDDC • Film added for all districts
	Dry recycling (kerbside sort)	*Weekly*	2x box, 1x bag (including plastic film and cartons)	
	Food waste	Weekly	Kerbside caddy + kitchen caddy	
	Garden waste (uncharged)	All districts move to a free garden waste collection.		

Option	Collection Stream	Frequency	Capacity	Comments
				• Impact of DRS/EPR modelled
Option 9 *Alternate waste storage*	*The introduction of alternative waste and recycling collection methods (specifically underground storage) in larger new housing developments.*			

The options have been modelled using the Kerbside Analysis Tool (KAT) which gives comparative annualised costs for different collection systems. The summary table and graph below is a comparison of the collection cost and kerbside recycling rate results for all options (Baseline and Options 1 to 8) that would affect the County as a whole[3]. It should be noted that this first table is the cost of the collection operation only. Other aspects like recyclate revenue, garden waste subscription income, gate fees and disposal costs are itemised in the second table. The total net costs of the service to the Partnership (Districts and County Council) including both collection and disposal costs are shown in the following table.

ES Table 1: Modelled kerbside collection cost and performance

	Annual gross collection cost[4]	Kerbside recycling rate[5]	Indicative collection cost increases relative to baseline	Indicative collection cost % increase relative to baseline	Collection cost per 1% increase in kerbside recycling performance[6]
Baseline (current service)	**c. £23.7 million**	**54.07%**	**-**		**-**
Option 1	**c. £24.4 million**	**59.09%**	**c. £674,000**	**2.8**	**c. £134,000**

[3] Option 9 – underground storage of waste is not comparable against the other options and so is dealt with separately in the report.

[4] There will be some variation from the actual budget costs, the KAT model is designed to compare systems on a 'like for like' basis, not account for every budget element, however they should be of a similar order to actual budget costs for these service elements, and are guided by cost data provided by the Councils

[5] The total Council recycling rate would also include the waste flows from the Bring Banks and other household waste streams not collected via the standard kerbside collection service. Therefore, for example, if a system in this report shows a +5% uplift in 'kerbside recycling rate', it would be envisaged that this would be a lower uplift in the total Council recycling rate (e.g. it could be +3 or +4% depending on other factors within the Council).

	Annual gross collection cost[4]	Kerbside recycling rate[5]	Indicative collection cost increases relative to baseline	Indicative collection cost % increase relative to baseline	Collection cost per 1% increase in kerbside recycling performance[6]
Option 2	**c. £26.2 million**	**64.64%**	**c. £2.5 million**	**10.4%**	**c. £234,000**
Option 3	**c.£26.2 million**	**54.48%**	**c. £2.5 million**	**10.6%**	**c. £6.2 million**
Option 4	**c. £27.4 million**	**53.82%**	**c. £3.7 million**	**15.7%**	**n/a [decrease]**
Option 5	**c. £27 million**	**60.57%**	**c. £3.3 million**	**13.9%**	**c. £508,000**
Option 6	**c. £30.4 million**	**59.73%**	**c. £6.6 million**	**28.0%**	**c.£1.2 million**
Option 7	**c. £24.8 million**	**63.54%**	**c. £1.1 million**	**4.7%**	**c. £117,000**
Option 8	**c. £29.8 million**	**63.54%**	**c. £6 million**	**25.5%**	**c. £631,000**
Option 8 sensitivity (EPR & new burden payments)[7]	**c.£11.3 million**	**63.54%**	**c. -£12.4 million [cost decrease to Partnership]**	**-52.0%**	**c.-£1.3million**

All options have a greater cost in collection terms, than the baseline. Options 2, 5, 6 and 8 were modelled in-line with recommendations from the latest round of consultations on the National Resources and Waste Strategy for England, and as such incorporate the implementation of a free garden waste service and the expansion of the dry recycling collection to include plastic film and cartons. For the Forest of Dean District Council, pots, tubs and tray have been added to the recycling collection in all alternative options. Option 7 also closely follows the national policy; however Government is steering Council's away from 3 weekly residual waste collections.

Option 1 is the lowest cost alternative option (in collection terms) for the WCAs collectively, partly driven by garden waste remaining as a charged (more limited) service. This option models each WCA with a restricted residual waste collection (fortnightly 140L bin collection) which

[7] Subject to further detail arising from the Government response to the 2nd round of public consultation on the Resources and Waste Strategy. Similar orders of magnitude of third party 'payment' into the municipal waste collection service would be anticipated in most of the other options as well, again subject to the detail and implementation of the Government measures relating to EPR, DRS and new burdens formulae.

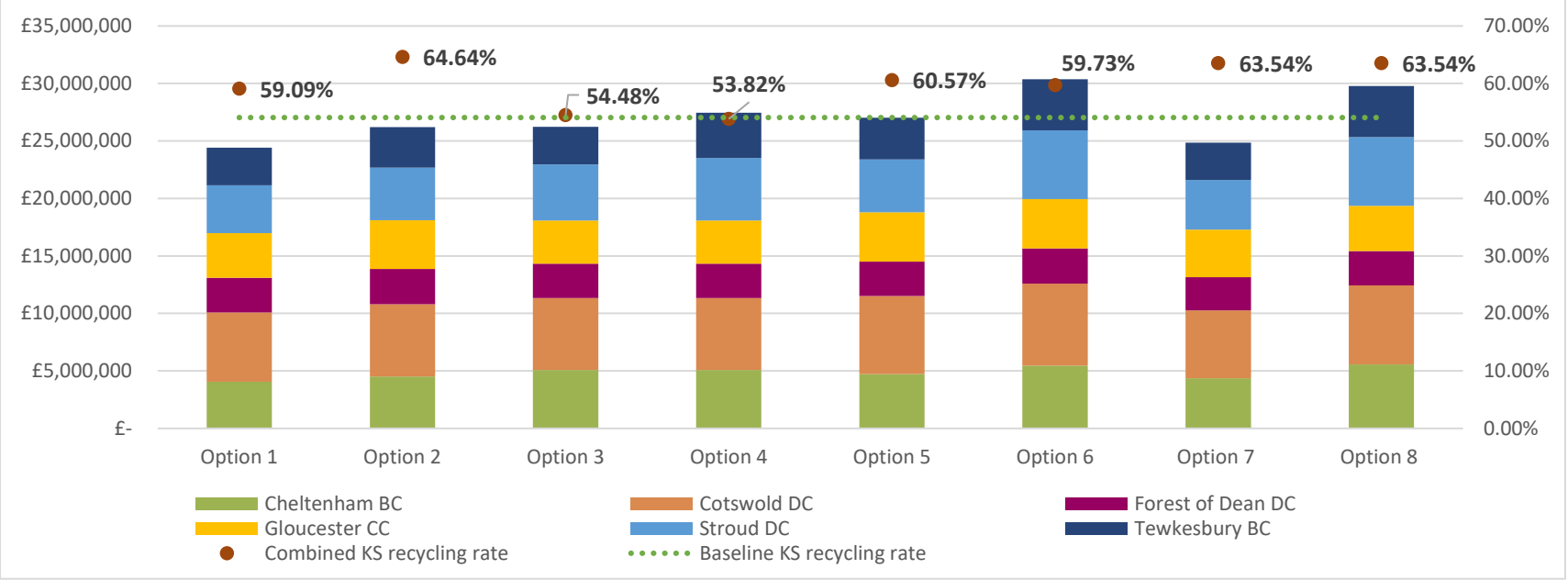
also encourages more separation for recycling. Of the options where both the additional recyclables are included, and garden waste collection is provided as a free service, Option 7 is the lowest cost option (in collection terms). This is because this option has the largest impact on residual waste collection (residual waste being collected on a three-weekly frequency). Option 2 provided the highest kerbside recycling rate for the Partnership, an increase of over 10 percentage points from the baseline, this is followed closely by options 7 and 8, all three of which have both some form of restriction on the residual waste service and have a full set of recyclables collected plus a free garden waste collection. These factors drive the high recycling performance expected.

The option with the greatest annual collection cost for the Waste Collection Authorities (collectively) is option 6, costing an additional c.£ 6.6 million per annum more than the baseline. In this scenario, additional recyclable materials are also included (cartons, plastic film, and pot tubs and trays[8] are also added), and garden waste collections are provided free of charge. This is followed closely, in terms of cost, by option 8 at £29.8 million. Option 8 is similar to option 6, however it also models each district collecting restricted residual waste (by container size) and includes the impact from the proposed Deposit Return Scheme (DRS) and the implementation of an Extended Producer responsibility initiative (EPR). Both DRS and EPR are included within the Resources and Waste Strategy for England and the Environment Bill.

Sensitivity analysis has also been modelled on option 8 to estimate the potential costs to the Partnership should the proposals for the 'producer pays' principle of EPR and the new burdens doctrine be realised. On this basis, according to our high-level modelling, the districts gross collection costs could reduce by nearly £13m across the Partnership. The reason for this is that the producers of packaging are liable for the full cost of collection and management of the packaging component of the waste, and central Government would cover the full net costs of food and free garden waste collection and management.

[8] Pots, tubs and trays are added to the dry recyclables collection for Forest of Dean DC in all alternative options.

ES Figure 1: Modelled kerbside collection costs and performance



All options result in an increase in kerbside recycling rate for the collection authorities as a whole[9], with the exception of option 4. Option 4 models all WCAs moving to a weekly kerbside sort collection system. The small decrease in recycling performance is due to Stroud and Tewkesbury moving from a twin-stream and comingled collection, respectively, based on the assumption that households provided with more containers to separate into (a more complex system), results in lower capture rates. However, in the case of both Council's, the level of contamination of recyclables is modelled to be significantly improved.

This report also evaluates the collection, treatment and disposal costs of each option and is summarised for the WCAs, County and the Partnership as a whole, in the following tables. From a WCA perspective, option 4 provides the highest income from materials revenue. This is because all Councils move to a kerbside-sort system (which generates the highest dry recycling revenue and does not incur a gate fee[10]), and garden waste is retained as a charged service (with an annual income of £4.8 million). Of the options modelled which include free garden waste collections, option 6 provides the highest revenue for the WCAs at £6.26 million, followed closely by option 8 at £6.17 million. This suggests that

[9] In some cases individual Councils may have increases or decreases depending on the current system configuration and that which is being modelled

[10] As is the case in Stroud and Tewkesbury in the baseline, Option 1, 2, 3 and 5, as there is a gate fee for managing / sorting the comingled recyclate.

although option 8 reduces the overall tonnage collected at the kerbside (from DRS in particular), a restriction of residual waste capacity could result in a similar level of revenue for the districts.

In terms of treatment and disposal costs for the County, option 8 is the most cost-effective option. This is due to a combined impact of residual waste capacity restriction and moving to a kerbside sort system. Modelling also suggests the introduction of DRS and EPR could reduce the overall residual waste arisings, decreasing the overall residual waste treatment costs.[11] However, when considered as a net treatment, haulage and disposal cost for the Partnership as a whole (final table), option 1 is the lowest cost option. Option 8 is the most cost-effective of the options modelling a free garden waste collection, which will be important to consider in light of the latest round of consultations on the National Resources & Waste Strategy for England.

ES Table 2: Additional costs and revenue post collection

	Baseline	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 8 (EPR & new burden payments)
Revenues Total (Districts)	**£9.4 million**	**£9.8 million**	**£5.2 million**	**£9.5 million**	**£10.8 million**	**£4.1 million**	**£6.3 million**	**£5.2 million**	**£6.2 million**	**£7.3 million**
		£435,000	*-£4.2 million*	*£67,000*	*£1.4 million*	*-£5.3 million*	*-£3.1 million*	*-£4.3 million*	*-£3.2 million*	*-£2.1 million*
Dry Recycling Revenue (income)	**£657,500**	**£731,000**	**£676,000**	**£662,000**	**£2,144,000**	**-£141,000**	**£2,123,000**	**£668,000**	**£2,282,000**	**£545,000**
Recycling credit (income)	**£3.1 million**	**£3.4 million**	**£3.6 million**	**£3.2 million**	**£3.1 million**	**£3.5 million**	**£3.3 million**	**£3.6 million**	**£2.9 million**	**£1.0 million**
Residual waste treatment payment incentive (income)	**£807,000**	**£921,000**	**£979,000**	**£817,000**	**£802,000**	**£879,000**	**£859,000**	**£952,000**	**£1.0 million**	**£1.0 million**
Garden Waste (income)	**£4.8 million**	**£4.8 million**	**£0**	**£4.8 million**	**£4.8 million**	**£0**	**£0**	**£0**	**£0**	**£4.8 million**
Additional sorting for films & cartons (cost)	**£0**	**£0**	**-£57,600**	**£0**	**£0**	**-£74,400**	**-£54,100**	**-£57,400**	**-£53,100**	**-£53,100**
Total Treatment & Haulage (AD, Composting & Residual Waste + payments to Districts) (WDA cost)	**£22 million**	**£20.5 million**	**£20.2million**	**£21.8 million**	**£21.9 million**	**£21.5 million**	**£21.7 million**	**£20.7 million**	**£19.2 million**	**£13.7 million**
		-£1.5 million	*-£1.8 million*	*-£180,000*	*-£42,000*	*-£494,000*	*-£303,000*	*-£1.3 million*	*-£2.8 million*	*-£8.3 million*
Net treatment, haulage and Disposal	**£12.6 million**	**£10.7 million**	**£15 million**	**£12.4 million**	**£11.1 million**	**£17.4 million**	**£15.4 million**	**£15.6 million**	**£13 million**	**£6.4 million**
		-£1.9 million	*£2.4 million*	*-£245,500*	*-£1.5 million*	*£4.8 million*	*£2.85 million*	*£3 million*	*£360,000*	*-£6.2 million*

[11] This evaluation has not considered any minimum input tonnage requirements at Javelin Park EfW.

The total net costs of each option to the Partnership (including collection, treatment and disposal) are presented below. All options incur an additional cost to the baseline, with the exception of option 1 which results in a saving of c. £1.3 million in comparison to the baseline (£36.3 million). This is because option 1 results in the smallest increase in collection cost and incurs the savings associated with reduced residual waste treatment costs (and as such increased material revenue and reduced disposal costs) whilst retaining the charged garden subscription income.

ES Table 3: Total net cost to Partnership

	Baseline	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 8 (EPR & new burden payments)
Total Net Cost to Partnership (Collection, treatment and disposal)	**£36,350,000**	**£35,078,000**	**£41,257,000**	**£38,613,000**	**£38,589,000**	**£44,468,000**	**£45,846,000**	**£40,438,481**	**£42,790,000**	**£17,708,200**
		-£1,272,000	*£4,906,500*	*£2,263,300*	*£2,239,000*	*£8,118,000*	*£9,496,000*	*£4,088,000*	*£6,407,000*	*-£18,675,000*

Option 3 and option 4 result in similar additional costs to the Partnership (at c. £2.2 million increase each). This is because four of the six WCAs currently operate kerbside sort systems and there is only a minor additional cost for Cheltenham BC and Cotswold DC to move from fortnightly to weekly collections and it is only Tewkesbury and Stroud that see a change in dry recycling collection configuration in Option 4, hence the more subtle difference between these two options. Note that these tables do not include the 'cost of change' that would be required by some WCAs in different options, this is explored within the report. Option 4 is also the only option which slightly decreases in kerbside recycling performance below the baseline.

Overall, the total net cost to the Partnership (including collection, haulage, treatment and disposal) of moving to a weekly kerbside sort system, with free garden and an expanded dry recycling collection (option 6) results in the highest total cost of all options modelled (c. £45.8 million). This is £9.5 million above the baseline cost. This is due to the increased capex and opex required to deliver a weekly kerbside sort system, whilst also providing a kerbside collection service for garden waste to all households. Although the increased material revenue from Stroud and Tewkesbury moving to a kerbside sort system negates over £2 million of the revenues lost by removing the charged garden service, this is not outweighed by the savings for the County on treatment and haulage costs.

Option 5 (all WCAs move to a twin-stream collection) results in the 2nd highest overall net cost to the Partnership (including collection, haulage, treatment and disposal) at £44.5 million, £8.1 million over the baseline. This is due to the decreased revenue for districts from moving to a twin stream, and loss of garden waste subscription revenue not outweighing the savings on the haulage and treatment costs. Option 8 is the 3rd highest overall net cost to the Partnership at £42.8 million (an increase in total net costs of £6.5 million). Option 8 is similar to option 6 but also models a restricted residual waste collection (by container size) and the potential impacts of DRS and EPR. This option results in the 2nd highest

(joint with option 7) kerbside recycling performance. Option 7 is the lowest cost (in total Partnership costs) of the five options which include delivery of a free garden waste collection service.

The collection options have also been modelled using the WRATE tool to determine the carbon impact as kg CO_2-eq savings. The WRATE modelling represents the Life Cycle Assessment results, and so considers the impact of containers, vehicles and infrastructure as a proportion of their use and their life.[12] The results of the WRATE modelling (carbon assessment) are presented for each option below in kg CO_2-eq savings.

ES Table 4: Carbon emissions by District and the HRC service

Carbon savings (kg CO_2-eq)	Baseline	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8
Cheltenham	-337,800	-1,016,500	-2,334,000	-119,700	-119,700	-997,900	-1,117,000	-1,482,100	-719,500
Cotswolds	-2,661,600	-2,861,400	-3,656,800	-2,406,900	-2,406,900	-2,870,600	-2,989,500	-2,559,900	-794,100
Forest of Dean	-1,044,400	-1,730,400	-2,451,100	-1,371,400	-1,371,400	-2,813,700	-2,089,900	-2,268,900	-1,108,027
Gloucester City	238,700	-371,100	-2,189,800	238,700	238,700	-1,362,700	-1,284,300	-1,683,500	-391,659
Stroud	-1,623,000	-1,623,00	-3,321,700	-1,356,600	-1,259,000	-3,321,700	-2,935,100	-3,000,800	-1,420,643
Tewkesbury	-70,700	-452,800	-865,300	-174,300	-362,500	-647,200	-532,600	-896,400	-128,857
County HRCs	-3,078,000	-3,078,100	-3,025,300	-3,078,100	-3,078,000	-3,025,300	-3,025,300	-3,025,300	-3,025,300
Swindon Rd HRC	-1,836,500	-1,836,500	-1,836,500	-1,836,500	-1,836,500	-1,836,500	-1,836,500	-1,836,500	-1,836,500
TOTAL	-7,810,872	-10,309,972	-16,956,519	-9,137,972	-9,228,672	-13,258,119	-14,814,919	-16,753,419	-9,424,556

[12] Figures may not add up due to rounding.

Option 2 results in the largest carbon saving of all options at 16,957 t CO_2-eq emissions. This is because option 2 has the highest recycling performance and the second lowest amount of residual waste to be processed at Javelin Park. Option 7 results in the 2nd lowest carbon performance, followed by option 5 and 6 respectively, driven by the free garden and enhanced dry recycling collections. Whilst the diversion of plastic film and cartons reduces the calorific value of the residual waste going to the Energy from waste plant, the increased food waste separation and some diversion of garden waste has the opposite effect. The removal of plastic film from the residual mix for recycling has a strong beneficial carbon balance as combustion of this material is a release of fossil carbon.

Option 8 has the lowest carbon saving of the options modelling a free garden waste collection. The impact of DRS and EPR is a driving factor in this option. A Deposit Return Scheme aims to provide a dedicated collection scheme for drinks containers (nominally plastic and glass bottles and metals cans), removing these from the kerbside collections. This reduces the total tonnage of dry recycling collection for all districts in option 8 and as such the carbon savings associated with recycling.

It should be noted that the DRS / EPR impacts have only been modelled on this option, and if the policy is implemented it would have similar effects on all options. For some authorities with Option 8 there is also a significant increase in transportation (by the need to collect more food and free garden) which has an impact of the performance of this option. This is demonstrated in the detailed carbon graphs illustrated in the accompanying 'Appendices' document. However, this option does still result in a saving of c.1,600t CO_2-eq emissions in comparison to the baseline.

Option 1 results in the highest carbon saving of those options not modelling a free garden waste collection / plastic film separation.

In preparation for the Partnership's Waste Management Strategy review, it is important to consider additional factors beyond cost and performance when assessing options for future waste management and recycling. For the purposes of this project, FRM have considered each option in turn and evaluated other indicators including public acceptability, operational flexibility, compliance to regulations and social value indicators using a traffic light system.

In terms of public acceptability, it is assumed that the baseline (business as usual) is the (equal) most widely accepted, as it requires no change to the household. Option 3 is also ranked the equal highest (green) as this requires the smallest amount of change; no change to configuration, only increased dry recycling collection frequency to weekly (no change for Forest of Dean DC and Gloucester City Council at all). As regards compliance to regulations, option 2, 6 and 8 are ranked highest (green) as they meet the requirements of the latest round of consultation on the Resources and Waste Strategy (free garden, consistent collections, food waste collection).

Option 7 has been ranked lower than 2, 6 and 8 as although it meets the requirements on free garden and food waste, the latest round of consultations document suggests that the preferred method for collection residual waste should be 'at least fortnightly' and dry recycling is retained as its current configuration. Option 5 has been ranked below option 2 and 6 as this is technically compliant against the R&WS, however this is subject to a TEEP (or equivalent) assessment. All other options are scored 'amber' as each WCA collects food, however garden waste collections are retained as a charged service and not all recyclables are collected, as per the consistent collections.

The creation (and retention) of jobs, community well-being and wider health benefits have all been considered when evaluating the social value of each option. Options 2, 5, 6 and 8 score most highly in terms of community well-being as these options provide collection for the greatest range of recyclables, enabling residents and business to contribute more. In terms of employment, all options require more staff than the baseline, with the exception of Scenario 5. However, the creation of a jobs is a trade-off for more general health impacts (e.g. air quality) as typically where those services provide a higher number of jobs this is due to more resource being required to operate the kerbside collection service (i.e. more vehicles requires more drivers and crew, however this means more transport miles are required and higher levels of air pollution).

The full results for all options is presented as follows:

ES Table 5: Full Options Appraisal

Evaluation Criteria	Baseline	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 8 sensitivity
	Current service	*Restricted residual (140l bins)*	*As Option 1 plus plastic film, cartons, and free garden*	*Weekly kerbside recycling (no change to system)*	*Common Scenario 1 – All Councils move to a weekly kerbside sort*	*Common Scenario 2 – All Councils move to a twin-stream (fibres out), plus plastic film, cartons, & free garden*	*As Option 4 (weekly kerbside sort) plus plastic film, cartons & free garden*	*3-weekly residual collection plus plastic film, cartons and free garden*	*As per Option 6 plus restricted residual (fortnightly residual 140L) with DRS/EPR policy implications*	*As Option 8 with EPR and new burden payments applied*
Total Partnership cost (Collection, Treatment and Disposal)	£36,383,000	£35,077,900	£41,256,700	£38,613,500	£38,589,200	£44,468,800	£45,846,400	£40,438,500	£42,790,000	[See note [13]]
Total Kerbside Recycling performance (%) (KAT)	54.07%	59.09%	64.64%	54.48%	53.82%	60.57%	59.73%	63.54%	63.54%	63.54%
Environmental Benefit (WRATE carbon, tCO_2-eq) Total	-7,811	-10,310	-16,957	-9,138	-9,229	-13,258	-14,815	-16753	-9,424	-9,424
Operational flexibility (deliverability, cost of change)										
Public acceptability										
Compliance to R&WS / TEEP										
Social Value[14]										
Table key	Worst performing								Best performing	

[13] Option 8 with the EPR payments and new burden sensitivity applied cannot be directly compared to the other options within this options appraisal, therefore it has not been ranked as part of this RAG assessment.

[14] Wider health benefits, job creation, well-being, community benefits

The alternative options (1-8) were selected to identify the collection cost implications and impacts upon recycling performance of potential service changes, as agreed by the Partnership. Subject to Government consultation, key service changes could include mandatory separate food waste collections (already implemented by the Partnership), free garden waste collections and a move towards a 'consistent collection' approach across all Local Authorities across England.

Service changes are required to ensure Local Authorities achieve the national municipal solid waste (MSW) recycling target of 65% by 2035. To reach higher targets more investment is required, and the Government has stated a commitment to covering the additional costs to Local Authorities for both capital and operational costs from new required measures. Furthermore, Government is also intent on introducing Extended Producer Responsibility (EPR) on packaging materials, as modelled as an element of Option 8. A requirement of EPR is that the producers would be accountable for 100% of the collection / recycling / disposal cost of the packaging handled by Councils. The detail of this aspect is yet to be determined.

An overview of underground bin systems has also been provided as part of this report. Examples of Underground Recycling and Residual Waste Systems (URS) can be seen within the UK, including the London Borough of Tower Hamlets and Peterborough City Council. URS are commonly used in urban settings or for servicing communal buildings such as flats. Benefits of URS include effective space utilisation (no need to for multiple street-level containers), reduced noise pollution and odour, and the ability to be installed with sensors (to monitor fill rate) and key fob systems (to control those with access to the bins). There are high capital costs associated with URS as explored within this report, however there may be opportunities for efficiency savings (i.e. round optimisation, staffing etc). Given the level of investment required, the investment in URS is a medium to long term opportunity rather than a short-term financial gain. Furthermore, and subject to available capital funding, it is a concept that could be explored through a business case for trialling in suitable development/s with low risk in terms of installation costs in order to demonstrate the concept in Gloucestershire. Consideration of vehicle demands would be an additional factor for the business case.

Finally, the costs/savings and recycling figures estimated in this report should not be used directly to justify future changes in services. The figures in this report are indicative and provide a reasonable guide to the magnitude of changes that might be expected. They are modelled in comparison to the Partnerships estimated baseline costs, on an annualised basis. If the Partnership is minded to pursue any of the above changes, they are advised to undertake a more detailed assessment of any particular option, including detailed re-routing and asset reallocation, in order to satisfy themselves that any modelled improvements in recycling or efficiencies can be realised in practice.