Title: Introduction of mandatory digital waste tracking IA No: RPC Reference No: Lead department or agency: DEFRA Other departments or agencies: Welsh Government, Scottish Government and Department of Agriculture, Environment and Rural Affairs (DAERA)	Impact Assessment (IA)
	Date: June 2021
	Stage: Consultation stage
	Source of intervention: Domestic
	Type of measure: Secondary legislation
	Contact: wastetracking@defra.gov.uk
Summary: Intervention and Options	RPC Opinion: Awaiting scrutiny

Cost of Preferred (or more likely) Option				
Total Net Present Value £317m	Business Net Present Value -£39m	Net cost to business per year (EANDCB in 2019 prices) -£10m	One-In, Three-Out Not in scope	Business Impact Target Status In scope

What is the problem under consideration? Why is government intervention necessary?

The current regulations, and supporting IT, do not require (or enable) waste to be easily and consistently tracked from the point of production to end-fate (e.g., recycled, landfilled, or incinerated). Currently, multiple IT services collect specific elements of waste data, however large amounts of data are either not collected, or not collated centrally. The overall picture is of a fragmented set of services that do not 'talk' to each other. The current services do not allow for regulators to target operators who manage waste inappropriately as it is difficult to track waste to operators that previously handled it. Waste crime is a significant issue for the environment, society, and the public sector. The total UK cost to these parties is estimated to be £900m/year (2020 prices). Regulatory intervention is necessary to reduce waste crime and address several associated market failures. Specifically, waste tracking will tackle negative social and environmental externalities and the intervention will help to reduce inefficiencies within the waste industry by improving access to data for industry, government, and regulators. In addition, the data obtained will support waste infrastructure planning and enable government to monitor progress against specific targets.

What are the policy objectives and the intended effects?

- To integrate and simplify the recording of all waste movements and transfers.
- To improve the quality and accuracy of data on waste movements and transfers.
- To reduce the opportunities to commit waste crime (and in turn reduce the negative environmental impacts, risks to human health, and disamenity effects associated with waste crime).
- To ensure that the data captured is easily accessible and usable.
- To realise efficiencies and resource savings and remove risks associated with existing legacy services.

What policy options have been considered, including any alternatives to regulation? Please justify preferred option

Three regulatory policy options have been considered within this Impact Assessment. Non-regulatory alternatives were considered, for example, voluntary initiatives. However, a number of voluntary services to record waste data digitally are already in place but uptake of these services has been very low. Therefore, whilst non-regulatory alternatives were considered, they have not been analysed within the options appraisal. See section 6 for further details.

Option 1 (baseline): The baseline represents a 'do minimum' option – due to forthcoming legislative commitments, waste operators will be mandated to digitally record and submit data on movements of hazardous waste and persistent organic pollutants (POPs) waste.

Option 2: Baseline, plus mandate that non-hazardous waste transfers are digitally recorded through an application of the waste operators' choice. Operators will not be mandated to submit non-hazardous waste data centrally.

Option 3 (preferred option): Mandate that waste holders/businesses moving/transferring waste of any type will need to digitally record these movements/transfers and submit the data into a central Waste Tracking service for all waste. This option is the preferred option, as the analysis indicates that it offers the best value for money to the taxpayer, due to the centralised data system being more efficient and effective than a non-centralised data system.

Will the policy be reviewed? It will be reviewed. If applicable, set review date: September 2028

Does implementation go beyond minimum EU requirements?		Yes		
Are any of these organisations in scope?	**Micro**Yes	**Small**Yes	**Medium**Yes	**Large**Yes
What is the CO$_2$ equivalent change in greenhouse gas emissions?		**Traded: n/a**		**Non-traded: n/a**

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible SELECT SIGNATORY: --   Date: --

Summary of Analysis & Evidence: Implement a Waste Tracking system for hazardous waste and POPs waste. Mandate that all non-hazardous waste transactions are recorded digitally but do not provide/specify a central service to use for non-hazardous waste (Option 2).

FULL ECONOMIC ASSESSMENT

Price Base Year: 2020	PV Base Year: 2022	Time Period Years: 15	Net Benefit (Present Value (PV)) (£m)		
			Low: -£16m	High: £57m	Best Estimate: £20m

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant	Total Cost (Present Value)
Low	-13.3		0.0	**-13.1**
High	30.4	1	0.0	**29.5**
Best Estimate	8.5		0.0	**8.2**

Description and scale of key monetised costs by 'main affected groups' (all figures discounted - 2022-2036)
A number of the costs that we expect to be incurred in Option 2, will also be incurred in the baseline. However, the costs that will be greater in Option 2 (compared to the baseline) are: the expected transition costs for the regulator (£0.06m); and the expected transition costs for permitted waste sites (£8.1m).

Other key non-monetised costs by 'main affected groups'
Non-monetised costs include: the costs to producers; 'exempt waste sites'; and waste carriers, brokers and dealers of transitioning to digitally recording their waste transfers/movements. Another non-monetised cost to businesses is the payment of fees to the appropriate regulator to cover the additional costs of monitoring compliance with the reformed regulations (we hope to include these costs in the final Impact Assessment).

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant	Total Benefit (Present Value)
Low	0.0		1.2	**13.5**
High	0.0	1	3.8	**43.4**
Best Estimate	0.0		2.5	**28.5**

Description and scale of key monetised benefits by 'main affected groups' (all figure discounted - 2022-2036)
A number of the benefits that we expect to be incurred in option 2, will also be incurred in the baseline. However, benefits that will be greater in option 2 (compared to the baseline) are the ongoing savings to businesses from using digital services (£28.5m). These savings include benefits associated with reduced time spent recording data, reduced data storage costs, reduced time spent checking data quality and reduced time spent obtaining/providing waste information from or to customers.

Other key non-monetised benefits by 'main affected groups'
The key non-monetised benefits for businesses are reduced avoidable errors, improved data for investment decisions and efficiency savings. Option 2 may also provide opportunities to digital companies to innovate, to provide a range of IT solutions that work for different business types and data requirements. We expect that the regulators will benefit from time savings spent on administrative tasks (e.g. processing data returns, raising invoices and responding to data requests).

Key assumptions/sensitivities/risks	Discount rate (%)	3.5%

The number of businesses that will be impacted by the reforms is uncertain. We have therefore monetised the transition costs and ongoing savings for waste sites only at this stage. This assumption and the associated analysis will be revised ahead of the final Impact Assessment. In addition, the estimated transition costs and ongoing savings to businesses stem from survey responses – these survey responses may not reflect the impact on businesses at a market-wide level. All the assumptions used in the appraisal of this option have been shared with policy experts in the four nations (including the regulatory bodies) for approval.

BUSINESS ASSESSMENT (Option 2)

Direct impact on business (Equivalent Annual) £m:			Score for Business Impact Target: -£7.5m
Costs: £0.7m	Benefits: £2.4m	Net: -£1.7m	

Summary of Analysis & Evidence: Provide a central digital Waste Tracking service and mandate its use (Option 3)

FULL ECONOMIC ASSESSMENT

Price Base Year: 2020	PV Base Year: 2022	Time Period Years: 15	Net Benefit (Present Value (PV)) (£m)		
			Low: £182m	High: £453m	Best Estimate: £362m

COSTS (£m)	Total Transition (Constant Price) Years		Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	60.0		17.7	257.8
High	77.0	1	26.0	366.8
Best Estimate	68.5		21.8	312.3

Description and scale of key monetised costs by 'main affected groups' (all figure discounted - 2022-2036)

The government will face transition costs associated with the decommissioning of Electronic Duty of Care (EDOC) (£0.01m). Regulators will face costs associated with familiarisation and training (£0.1m). Businesses will face transition costs too – the estimated transition costs to permitted waste sites are expected to amount to £66.5m. Businesses will also face additional taxation from bringing more waste into the legitimate market (£246m).

Other key non-monetised costs by 'main affected groups'

Non-monetised costs include the costs to: producers; exempt waste sites; and waste carriers, brokers and dealers; of transitioning to digitally recording their waste transfers/movements. Another non-monetised cost to businesses, is the payment of fees to the appropriate regulator to cover the additional costs of monitoring compliance with the reformed regulations.

BENEFITS (£m)	Total Transition (Constant Price) Years		Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	2.6		47.8	548.4
High	2.6	1	70.2	801.0
Best Estimate	2.6		59.0	674.7

Description and scale of key monetised benefits by 'main affected groups' (all figure discounted - 2022-2036)

The governments will benefit from no longer needing to fund current IT services (WasteDataFlow (WDF) and Electronic Duty of Care (EDOC)) (£5.5m) as these will be superseded by the Waste Tracking service for all waste. The governments will also benefit from reduced waste crime (£246m). Businesses will benefit from no longer needing to submit data returns (£133m), from reduced waste crime (£72m) and from ongoing savings associated with storing data digitally on a central service (£63m). There will be time savings to local authorities from no longer needing to submit WDF returns (£143m). There will be societal and environmental benefits from reduced waste crime (£10m).

Other key non-monetised benefits by 'main affected groups'

The key non-monetised benefits for businesses are reduced avoidable errors, improved data for investment decisions, efficiency savings, and improved business experience. There will also be societal benefits associated with communities enjoying living in a safer and cleaner environment, and environmental benefits associated with improved resource efficiency and reduced environmental damage. We expect that the regulators will benefit from time savings spent on administrative tasks (e.g., processing data returns, raising invoices and responding to data requests).

Key assumptions/sensitivities/risks	Discount rate (%)	3.5%

The policy will impact on all four nations, however, to estimate some specific costs/benefits we have used England-only data and inflated the cost/benefit to reflect a UK-wide impact. The waste crime reduction assumptions are not based on evidence related specifically to a waste tracking intervention. The digital Waste Tracking service is a novel service and as such we do not have access to domestic or international evidence on the impacts that it will have on waste crime reduction. We have instead used evidence on the impacts of targeted interventions to reduce specific waste crimes. The targeted interventions have some similarities with the Waste Tracking service insofar as they all include an element of improved data use. All of the assumptions used in this IA have been shared with policy experts in the four nations (including the regulatory bodies) for approval.

BUSINESS ASSESSMENT (Option 3)

Direct impact on business (Equivalent Annual) £m:			Score for Business Impact Target: -£47.3m
Costs: £5.6m	Benefits: £16.4m	Net: -£10.8m	

Contents

Duty of care codes of practice[1]: Codes of practice apply to operators that produce, carry, keep, dispose of, treat, import, or have control of waste in each nation. The law requires such operators to:
- prevent unauthorised or harmful deposits, treatment, or disposal of waste;
- prevent a breach (failure) by any other person to meet the requirement to have an environmental permit, or a breach of a permit condition;
- prevent the escape of waste from their control;
- ensure that any person they transfer the waste to has the correct authorisation; and
- provide an accurate description of the waste when it is transferred to another person.

'Green list' waste movements: Includes types of waste that are considered to pose a low risk to the environment when shipped to the EU/OECD and some non-OECD countries for recycling or recovery.

Hazardous waste: Waste that displays specified properties that might make it more harmful to human health or the environment if not managed appropriately.

HWDI: Hazardous Waste Data Interrogator.

LA: Local Authority.

Non-hazardous waste: Waste that does not display properties that would classify it as hazardous waste.

Persistent Organic Pollutants (POPs): Organic compounds that are resistant to environmental degradation through chemical, biological, and photolytic processes.

Regulators: These are the authoritative bodies that oversee compliance with legislation related to Resources and Waste (amongst other legislative areas). There is a regulator responsible in each of the four nations – they are:
- The Environment Agency (EA) in England;
- Natural Resources Wales (NRW) in Wales;
- Scottish Environment Protection Agency (SEPA) in Scotland; and
- Department of Agriculture, Environment and Rural Affairs (DAERA) in Northern Ireland.

Waste exemption: Waste exemptions allow waste operations considered low risk to be carried out according to general rules, without the need to apply for an environmental permit.

WEEE: Waste Electrical and Electronic Equipment.

Waste movements: Refers to *hazardous waste* being moved.

Waste permit: An environmental permit gives permission to an operator to carry out a set of particular activities.

Waste transaction: Refers to *either* a non-hazardous waste transfer *or* a hazardous waste movement.

Waste transfers: Refers to *non-hazardous waste* being moved.

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[1] https://www.gov.uk/government/publications/waste-duty-of-care-code-of-practice and https://www.gov.scot/publications/duty-care-code-practice/pages/1/

The UK is committed to moving towards a more circular economy, meaning we keep resources in use for as long as possible, extract maximum value from them, minimise waste and promote resource efficiency. We need to be able to 'close the loop' by turning the waste that does end up being produced, into a resource. To do this we must ensure we have the information about what waste is being produced and where it ends up. Over 200 million tonnes of waste is produced in the UK each year[2] but there is currently no single or comprehensive way of tracking it.

The government also wants to support and make the system fairer for those operating legally. At present waste tracking is still carried out using largely paper-based record-keeping, making it very difficult to track waste effectively. Waste can be fraudulently reclassified and transferred or can simply be illegally dumped and the paper trail disappears. It makes it difficult to identify and deal with waste crime ranging from fly tipping and deliberate misclassification to illegal waste exports and the operation of illegal waste sites.

In order to meet Circular Economy commitments, the UK have committed to introducing a waste tracking system for hazardous waste[3] only. Separately, persistent organic pollutants (POPs) legislation has been introduced to mandate the tracking of POPs waste[4]. This policy proposes to supersede both the Circular Economy commitments and the proposals made in the POPs legislation to introduce a Waste Tracking system for all waste.

1. REGULATORY BACKGROUND

Currently in the UK there is no comprehensive service for tracking waste transactions. Multiple IT services collect specific elements of waste data, however large amounts of data are either not collected, or not collated centrally. The overall picture is of a fragmented set of services that do not 'talk' to each other. Legal requirements are focussed on having a written description of the waste which should be transferred along the supply-chain when the waste is passed from one holder to another. Handwritten or digital waste descriptions of waste composition and details of the waste transaction must be accurate and contain all the information the holder is reasonably in a position to provide. This is to ensure the lawful and safe handling, transport, treatment, recovery, or disposal of the waste by subsequent holders.

Those receiving waste must ensure that the waste matches the written description and that any permit[5], if applicable, allows the acceptance of such waste. Those operating under a waste exemption must ensure that any waste received does not contravene the exemption[6] criteria e.g., waste limits or types.

The specific legal requirements for the information that must be recorded when waste is moved or transferred differ depending on the *type* of waste being handled and *how* the waste is transferred or moved.

- **Hazardous waste –** waste that displays specified properties that might make it more harmful to human health or the environment if not managed appropriately.
- **Non-hazardous waste** - waste that does not display properties that would classify it as hazardous waste.

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[2] https://www.gov.uk/government/statistics/uk-waste-data
[3] Waste that displays specified properties that might make it more harmful to human health or the environment if not managed appropriately.
[4] POPs waste is toxic, bio accumulative, long-ranging and does not break down in the environment and can be found in a wide range of products from sofas to IT equipment.
[5] An environmental permit gives "permission" to an operator to carry out a particular set of activities.
[6] Waste exemptions allow waste operations considered low risk to be carried out according to general rules, without the need to apply for an environmental permit.

- **'Green list' waste movements** - includes types of waste that are considered to pose a low risk to the environment when shipped to EU/OECD and some non-OECD countries for recycling or recovery.

Non-hazardous waste

Legislation[7] states that when non-hazardous waste is transferred from one holder to another, an agreed written description of the waste should also be transferred. This is known as a **'waste transfer note'** and should include the waste description and code, information about how the waste is contained, details of the parties involved in the transfer, as well as other information specified in the 'Waste Duty of Care Codes of Practice' in England and Wales[8], Scotland[9] and Northern Ireland[10]. Waste transfer notes can be completed in a number of different ways: in paper form; online via the voluntary Electronic Duty of Care (EDOC) service[11]; or by using the operator's own electronic services. These notes do not need to be submitted centrally, unless requested.

Where the same type of waste is transferred regularly between the same parties a **'season ticket'** may be used. A season ticket is a single waste transfer note that covers a series of non-hazardous waste transfers. Businesses are expected to keep a log of individual transfers covered by a season ticket for audit purposes.

A waste transfer note is currently not required for non-hazardous waste if the waste holder does not change on the transfer of waste e.g., the waste is moved to other premises belonging to the same business. Under the Duty of Care Codes of Practice[12] however, businesses are expected to keep a record of internal transfers for audit purposes.

Hazardous waste

Waste legislation[13] requires hazardous waste producers, carriers, brokers, dealers, permitted/authorised treatment sites and some exempt waste sites to keep certain records relating to the production, transport, and management of hazardous waste. Currently, moving hazardous waste involves a similar transfer of information to moving non-hazardous waste albeit more information is required for hazardous waste movements[14].

Details of the waste moved must be recorded on **'consignment notes'** and these must be completed for all movements of hazardous waste including movements from one premises to another within the same business. The only two exceptions where a consignment note is not needed, are where domestic hazardous

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[7] Regulation 35 of the Waste (England and Wales) Regulations 2011 - https://www.legislation.gov.uk/uksi/2011/988/contents. In addition, all businesses that produce or handle waste are required under Section 34 of The Environmental Protection Act 1990 to complete a written description of waste when they transfer it to someone else.
[8] https://www.gov.uk/government/publications/waste-duty-of-care-code-of-practice/waste-duty-of-care-code-of-practice
[9] https://www.gov.scot/publications/duty-care-code-practice/
[10] https://www.daera-ni.gov.uk/sites/default/files/publications/doe/duty-of-care-code-of-practice-june2016.pdf
[11] https://www.edoconline.co.uk/
[12] https://www.gov.uk/government/publications/waste-duty-of-care-code-of-practice and https://www.gov.scot/publications/duty-care-code-practice/pages/1/
[13] Hazardous Waste (England and Wales) Regulations 2005 in relation to England, the Hazardous Waste (Wales) Regulations 2005 in relation to Wales, the Special Waste Regulations 1996 in relation to Scotland and the Hazardous Waste Regulations (Northern Ireland) 2005 in relation to Northern Ireland.
[14] Examples of additional information required are: details of where waste will be taken, details of the process which has given rise to the waste, chemical component details and UN classification numbers.

waste (other than asbestos waste) is removed from a domestic household, and where waste is imported or exported under international waste shipment controls[15].

The four administrations in the UK require businesses that handle hazardous waste to use consignment notes – but different approaches are used in the different nations. In England and Wales, operators must submit returns to the regulatory bodies on a quarterly basis – these returns do not currently need to be submitted in a digital format. In Northern Ireland, businesses must pre-notify the Northern Ireland Environment Agency (NIEA) of hazardous waste movements 72-hours before the movement of the waste. In Scotland, businesses need to obtain a hazardous waste code from Scottish Environment Protection Agency (SEPA) to put on their consignment note.

Circular Economy commitments[16] will require records of hazardous waste movements to be made available to the relevant regulator through an electronic registry. Therefore, a new IT service will be required to enable businesses to submit records of hazardous waste movements into a central system. Businesses will need to digitally record and submit the quantity and nature of materials and products resulting from re-use, recycling, or other recovery of hazardous waste.

These requirements, to submit records relating to the production, transport and management of hazardous waste, will also apply to waste containing persistent organic pollutants (POPs) (which may be either hazardous or non-hazardous) following new Persistent Organic Pollutants Regulations[17].

‘Green list’ waste movements (non-hazardous waste that is imported/exported abroad)

An ‘Annex VII’ document must be completed and travel with ‘green list’ waste at all times. This must contain information regarding who has arranged the shipment of the waste, who is transporting it, as well as information about the waste’s description (including required identification codes) and details of where it is being taken. In Scotland and Northern Ireland, the Annex VII forms for waste exports must be submitted to the relevant regulatory agency in advance of the movement taking place; however, in England and Wales, there are currently no requirements for exporters to pre-notify the regulator or to submit any information on these exports.

Summary

It is estimated that each year there are ~26m notes recording waste movements/transfers being issued each year in the UK[18]. The ~26m estimation counts season tickets as one note, but these could represent many hundreds of movements each year. Recent estimates suggest that there are around 500 million waste transactions each year in the UK[19].

Table 1 – Number of waste transfers and movement notes issued (estimated[20])

Waste type	Notes (UK wide)
Non-hazardous waste	23m waste transfer notes[21]
Hazardous waste	2.4m consignment notes[22]
Green list waste	0.35m Annex VII notes
Total	**25.8m movements**

[15] This is controlled by separate legislation involving equivalent notes - The Transfrontier Shipment of Waste Regulations 2007 (applies to the UK).

[16] https://www.gov.uk/government/publications/circular-economy-package-policy-statement/circular-economy-package-policy-statement and https://gov.wales/circular-economy-package-policy-statement for the bilingual statement.

[21] This is likely to be an underestimate of total waste transfers as the total waste transfer notes figure does not include transfers of waste that are carried out using a season ticket.

[22] 3-year average over 2016, 2017 and 2018

Further development of waste tracking in the UK[23] will help to meet regulatory requirements under the Persistent Organic Pollutants regulations[24]. It will also meet commitments made by the four nations to mandate digital waste tracking for all waste (see Annex A2 for a list of strategies in which this commitment has been made) as well as delivering on recommendations from the National Infrastructure assessment, and independent reviews of serious and organised waste crime for England[25] and separately for Wales[26].

2. THE PROBLEM UNDER CONSIDERATION

The current regulations, and supporting IT, do not enable waste to be easily and consistently tracked from the point of production to end fate.

Multiple IT systems collect specific elements of waste tracking data (see Table A2 in Annex A3) – but large amounts of data are either not collected or not collated centrally. Some data is paper-based and other data is captured digitally. Some data is managed by private contractors, whilst other data is managed by government or the regulatory agencies. There are separate services for household waste, commercial waste, hazardous waste and international waste shipments. As government requirements have changed over time, various add-ons and separate databases have been developed in isolation. Therefore, the overall picture is of a fragmented set of systems that do not 'talk' to each other.

Many of the existing digital services available for businesses to record non-hazardous waste transactions are voluntary, as a result, use of these services is very low. In 2016, only 150 organisations a month voluntarily used EDOC (a non-mandatory service for commercial waste transfers). This compares to the 5.5m businesses that are estimated to be carrying out non-hazardous waste transactions[27].

The lack of a central digital service for recording waste movements/transfers presents a number of problems:

- Policymakers do not have sufficient data to monitor the effectiveness of interventions and identify opportunities to move towards a Circular Economy[28].
- Up to date information is not available to allow the efficient and effective regulation of waste.
- There is opportunity to commit waste crime – waste can easily be 'lost' or deliberately misclassified therefore, regulators cannot easily gather or interrogate the information needed in order to investigate waste crime.
- Regulators and policymakers do not have access to data on the treatment or end fate of waste (e.g. if materials are recycled into something or if material is disposed of in landfill or is incinerated).

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[19] Estimates have not been published.
[20] Estimates have not been published.
[21] This is likely to be an underestimate of total waste transfers as the total waste transfer notes figure does not include transfers of waste that are carried out using a season ticket.
[22] 3-year average over 2016, 2017 and 2018
[23] The service will be bilingual, in line with the Welsh Language (Wales) Measure 2011, which makes Welsh an official language in Wales. This means Welsh must be treated no less favourably than English.
[24] Regulation (EU) No 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants, as it forms part of domestic law on and after Transition Period completion day, and as amended by The Persistent Organic Pollutant (Amendment) (EU Exit) Regulations 2020
[25] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/915937/waste-crime-review-2018-final-report.pdf .
[26] In 2017, Eunomia undertook work for Natural Resources Wales to appraise the scale, cost and impact of waste crime in Wales. Eunomia's recommendations included mandating the use of electronic waste transfers to make the service more auditable. Further detail is included in Annex A2.
[27] Internal evidence – not published.
[28] A circular economy is an economic system aimed at eliminating waste and the continual use of resources.

- Industry lacks information on products from waste which could be used to reduce raw material costs, for example.
- It is more difficult and time consuming for producers of waste to comply with their duty of care.
- Lack of reliable information for infrastructure planning and investment.

Outputs from a 2021 questionnaire to the Waste Tracking user panel[29] found that 13% of waste operators currently use **paper records only** for recording movements of waste. The pen and paper approach to completing these records is inadequate as producers often do not know what has happened to their waste and are not confident their waste has been handled correctly. In addition, regulators do not have easy access to the information they need to monitor waste activities. Using paper records also allows operators undertaking illegal activities to operate with impunity, safe in the knowledge that regulators lack comprehensive data on the waste they have handled.

Table 2 - How businesses currently keep records for waste transfers, movements and shipments (UK average)

	Non-hazardous waste	Hazardous waste
Both paper and electronic records	71%	75%
Paper records	13%	13%
Electronic records	15%	12%

See Table A12 in Annex A6 for the responses split by the devolved administrations

In order to effectively regulate and manage waste, make the most of the resources within waste and discourage its production in the first place, an effective Waste Tracking service needs to provide information on:
- what the waste is;
- who produces the waste;
- who is responsible for the waste at any point in the journey (including treatment);
- how the waste is treated;
- where it ends up, and in what form;
- the description of the recyclate; and
- any products or materials that have been made from the waste.

There is lacking information available on all the above – particularly with regards to waste that is treated at exempt sites[30], and commercial and industrial waste.

<div style="background-color:green;">3.   RATIONALE FOR INTERVENTION</div>

Being able to track waste, and resources, will transform the way that waste is regulated and provide the information that agencies need to prioritise regulatory activities, tackle waste crime and support a shift to a circular economy.

Social and Environmental negative externalities

Under the current waste regulations, there are significant negative externalities arising as a result of criminal activity in the waste industry. Negative externalities are a type of market failure, which occur when economic

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[29] The Waste Tracking user panel has around 1200 members representing waste producers, carriers, brokers, dealers, waste site operators, local authorities and regulators from across the UK. Members of this panel are helping to develop the service by getting involved in user research and testing the system as it is developed.

[30] Waste exemptions allow waste operations considered low risk to be carried out according to general rules, without the need to apply for an environmental permit.

activities give rise to costs that are not reflected in market prices. Externalities in this case consist of the negative environmental impacts, risk to human health, and disamenity effects.

Negative externalities stem from disposing of waste in a non-optimal manner (e.g., not recycling, disposing of hazardous waste unsafely and fly-tipping). Operators do this to avoid the private costs associated with the correct disposal of waste, for example, paying landfill tax. However, in doing so, there are costs to society and the environment – including, carbon emissions, the release of harmful chemicals, the release of foul odours, the pollution of surface or ground water, noise and dust from vehicle movements or on-site operations, and safety risks from fires.

A Waste Tracking system will reduce the amount of 'waste crime' that is committed in the UK, by reducing the incentive for waste operators to act illegally on the basis that they're more likely to be caught committing crimes. Specifically, mandating that digital records of waste transactions are uploaded to a central system will enable regulators to identify when 'waste goes missing' and/or when 'the description of waste changes'. In addition, once waste is added to the system (and is being 'tracked'), any subsequent omissions in the data trail will raise an alert to the regulator. This intelligence will support regulators to carry out more targeted monitoring of compliance and provide useful evidence to effectively enforce against criminal activity.

Being able to track timely data on waste movements to regulated sites would mean that interventions to prevent waste crime could be proactive, rather than reactive - for example when a site receives waste that it is not permitted to accept or it is nearing its maximum capacity, regulators could respond accordingly. Data on site activities is currently submitted to the agencies in quarterly returns, potentially up to three months after a given waste movement, so little value can be extracted from the available information.

The Independent Serious and Organised Waste Crime Review in England[31] highlighted that the lack of digital record-keeping in the waste industry is frequently exploited by organised criminals, as it provides ample opportunity to hide evidence of the systematic mishandling of waste. This report recommended that to better address the problems we face, mandatory electronic (digital) tracking of waste should be introduced at the earliest opportunity.

Economic inefficiencies

Not only do illegal operators directly generate negative externalities, they also compromise fair competition and impede resource efficiency by undercutting compliant businesses that seek to recycle or recover resources and feed them back into the economy. The main economic costs are lost business revenues to the legitimate waste sector (which can hinder investment and employment opportunities), loss of taxation that would have been paid by businesses operating legitimately, and costs to the environment from the non-optimal handling of resources.

In 2015, it was estimated that the cost of waste crime in England alone was at least £604m (see Table 19)[32],

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[31] Independent Review into Serious and Organised Crime in the waste sector, November 2018. https://www.gov.uk/government/publications/serious-and-organised-waste-crime-2018-review
[32] Rethinking Waste Crime, 2017, commissioned by the Environmental Services Association and written by Eunomia. http://www.esauk.org/application/files/7515/3589/6448/20170502_Rethinking_Waste_Crime.pdf. The specific costs monetised include the cost of illegal waste sites, illegal burning, fly-tipping, misclassification and fraud, illegal exports of waste, serious breaches of waste permits and exemptions and local authority and EA enforcement activities.

and if the same expected level of criminality was experienced in other parts of the UK, the total UK impact would exceed £731m[33].

Information inefficiencies

Tracking the UK's annual approximate 220mt of waste[34] – what the waste is, where it comes from, where it goes to, and what is done to it – is vital to helping businesses, regulators and policy makers understand how they can maximise resource efficiency and support strategic goals. See annex A2 for further details.

Access to timely information on waste movements would help legitimate businesses to identify opportunities for cost savings and more sustainable routes for their waste. Timely information would also allow regulators to prioritise their interventions and make better use of the resources they have – increasing efficiency and effectiveness.

In addition, waste producers are often not confident that they have met the requirements of the duty of care[35] as, in most cases, they do not know with certainty what has happened to their waste.
The Independent Serious and Organised Waste Crime Review in England[36] report observed that the lack of digital records undermines efforts to improve transparency, as it presents a significant barrier to information access by interested members of industry, academia and the public. This echoes a report from the Government Chief Scientific Adviser on the value of waste, which identifies a lack of data on waste as a key barrier to making the most of waste as a resource[37].

Summary

Without the ability to effectively and efficiently track waste and communicate timely relevant data, the UK faces the following consequences:

- Ineffective regulation and poor management of waste will increasingly threaten human health and will increase environmental pollution.
- We will be less able to meet our strategic goals. See Annex A2[38].

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[33] A separate study on waste crime in Wales found that the estimated costs of waste crime in 2015/16 in Wales were between £15.2m and £32.4m, (excluding lost income of £950k that could have been recovered by NRW). If the upper-estimate of this range (£32.4m) was scaled-up to present the UK cost (based on population factors), we would get £687m. This suggests that waste crime in Wales may be slightly less per capita, compared to waste crime in England per capita.

[34] https://assets.publishing.service.gov.uk/government/uploads/service/uploads/attachment_data/file/918270/UK_Statistics_on_Waste_statistical_notice_March_2020_accessible_FINAL_updated_size_12.pdf. According to the data, England was responsible for 85% of the UK total.

[35] https://www.gov.uk/government/publications/waste-duty-of-care-code-of-practice and https://www.gov.scot/publications/duty-care-code-practice/

[36] Independent Review into Serious and Organised Crime in the waste sector, November 2018.
https://www.gov.uk/government/publications/serious-and-organised-waste-crime-2018-review

[37] Report of the Government Chief Scientific Adviser 2016, From Waste to Resource Productivity, The Government Office for Science London.https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/667476/from-waste-to-resource-productivity-final-report.pdf

[38] For example, those outlined in the Resources and Waste Strategy and the 25-year Environment Plan and Clean Growth Strategy in England, the Welsh Government's Circular Economy Strategy "Beyond Recycling", and the Scottish Government's Circular Economy Strategy "Making Things Last"

- We will not be able to deliver on recommendations of the National Infrastructure Assessment[39] and the Review of Serious and Organised Waste Crime in England,[40] and the LIFE Smart Waste recommendations[41].
- We will be less able to pursue policies to develop new waste infrastructure in the four nations.[42]
- We will be less able to identify and tackle waste crime, including serious organised crime.
- We will be unable to reduce the burden on businesses that the current service imposes.
- The waste industry will be blocked in its efforts to innovate and improve, reducing economic growth and limiting improvements in productivity.
- We will be unable to realise efficiency cost savings and streamline IT in government, regulatory bodies, and businesses.
- We will be less able to unlock the opportunities presented by moving to a more circular economy.

> **Box 1: A key recommendation of the Government Chief Scientific Advisers report on the value of waste**
>
> *"This leads to one of our strongest recommendations to policymakers: that we need to put in place the fundamental building blocks of data gathering and analysis to ensure we know the <u>types, amounts and quality of waste, and where it is generated and ends up</u> – and to make this information publicly available. **Without a strong and open understanding of our waste data, we will have no firm basis to unlock the resource productivity potential of waste.** That knowledge should be openly available, so that everyone with an interest in waste and its prevention and management has access to the same data sets."[43]*

Finally, in the statutory review in England and Wales of the 2011 Waste Regulations[44] stakeholders were asked what changes they would like to see in the sector in the longer term – a Waste Tracking service will help to deliver on two of these proposed changes. In particular, businesses asked the government to:

- further develop the electronic duty of care (EDOC) platform and increase uptake to improve data on the use and movement of materials and facilitate compliance work. In order to limit burdens, ensure that EDOC can be integrated with existing waste information management services; and
- improve monitoring and evaluation.

Details on specific studies, commitments and user research that support the rationale for intervention are described in Annex A1.

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[39] Recommendation 29: The government should establish a common data reporting framework for businesses handling commercial and industrial waste by the end of 2019, ideally through voluntary reporting but if necessary, by legislation.

[40] https://www.gov.uk/government/publications/serious-and-organised-waste-crime-2018-review

[41] The LIFE SMART Waste project developed and piloted a range of innovative tools, techniques and approaches offering capacity-building potential for tackling waste crime. The project was led by the Scottish Environment Protection Agency working in partnership with several partners including NRW, Brussels Environment and ACR+.
https://www.sepa.org.uk/regulations/waste/life-smart-waste/publications/

[42] Including to ensure an adequate and integrated network of facilities to manage mixed municipal waste in accordance with the principles of self-sufficiency and proximity.

[43] Report of the Government Chief Scientific Adviser 2016, From Waste to Resource Productivity, The Government Office for Science, London https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/667476/from-waste-to-resource-productivity-final-report.pdf.

[44] https://www.legislation.gov.uk/uksi/2011/988/pdfs/uksiod_20110988_en.pdf

4. GEOGRAPHICAL EXTENT

The geographical extent of a new Waste Tracking service will be UK wide and the Environment Bill[45] provides the legislation for this. In Annex A6, we have presented a breakdown of each of the costs and benefits within each of the four nations.

The analysis for reduced waste crime has been carried out for England only, and then has been scaled up based on population data to include Northern Ireland, Wales, and Scotland. This approach has been taken due to a lack of data on the costs of waste crime in Scotland and in Northern Ireland. Whilst we have data on the costs of waste crime in Wales, we have chosen to use scaled-down English data to represent the impacts consistently across the four nations – we have included a sensitivity analysis in Annex A7 on the impact of using Welsh data instead[46].

5. POLICY OBJECTIVES

Public awareness of the global opportunities and problems associated with waste is growing and businesses in the waste sector are demanding improvement in regulation and data management. Policy makers are responding to these demands with ambitious objectives to make progress towards zero avoidable waste and the efficient use of resources required to create a circular economy. We have an opportunity to support these overarching policy objectives by designing and implementing a new Waste Tracking service.

Supporting the drive for zero avoidable waste and a circular economy is the overarching aim for a Waste Tracking system. This overarching aim will be supported if the Waste Tracking service delivers the specific objectives listed below.

- To **integrate and simplify** recording of all waste transactions and treatment details – bringing together separate systems covering commercial, household, and hazardous waste and linking this to other waste systems (waste carriers, permitting etc.).
- To **improve the quality and accuracy of data** on waste transactions by ensuring the right data is captured at each point in the waste chain to meet diverse user needs.
- To **realise the full value of the data** captured by making it easily accessible and usable (e.g. facilitate strategic decision-making for all parties).
- To **realise efficiencies and resource savings** and remove risks associated with existing legacy systems.
- To **reduce the amount of waste crime committed in the UK.**
- To **monitor performance** against targets.
- To ensure that waste tracking data **supports key government policies, strategies and regulatory activities.**

6. DESCRIPTION OF POLICY OPTIONS

In the initial stages of the Waste Tracking project, non-regulatory options for tracking waste were considered – for example, running communication campaigns and running free training to promote the use of digitally recording waste movements/transfers in IT systems.

Non-regulatory options have not been presented in the formal options appraisal as we do not believe that they are capable of meeting the policy objectives (see section 5 above) and would not offer the same net

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[45] https://services.parliament.uk/Bills/2019-21/environment/documents.html
[46] Our sensitivity analysis indicated that using Welsh data within the analysis for the costs of waste crime in Wales, rather than scaled-down English data, would result in lower total savings from reduced waste crime as a result of Waste Tracking (due to the Welsh study estimating a lower cost of waste crime per capita).

benefits. For example, communication campaigns have been disregarded as a suitable option given the widespread non-compliance, and the cost to some businesses of transitioning to digital recording of data, communication campaigns alone are unlikely to have the desired impact of bringing all businesses into digitally recording their waste movements/transfers.

Effective non-regulatory options would rely on all businesses voluntarily recording their data in a digital format (and using unique ID codes to identify each movement of waste from producer to receiving site). As described in section 2, there are already a number of voluntary IT systems that can be used to record waste data, however, insufficient uptake of these systems has prevailed. Even if a significant number of businesses voluntarily complied with digital recording (and unique ID codes) but a relatively small number of operators did not voluntarily comply, then the whole system would be undermined and the potential benefits to businesses, government and regulators would quickly be diminished. This is because non-compliance from a small number of operators would create 'breaks' in data which would hinder the utility of the dataset. In addition, non-compliance is more likely to be carried out by illegal operators that are motivated by the perceived private benefits of illegal activity and without these operators reporting data, voluntary initiatives will not be able to deliver one of the key objectives of tracking waste – reducing waste crime.

A baseline and two regulatory proposals have instead been presented in this Impact Assessment. Table 3 below summarises the differences between the three options.

Table 3 – Summary of Waste Tracking options

	Waste in-scope of regulatory change	<u>Central system</u> for **Hazardous waste** and **POPs waste** digital records	<u>Central system</u> for **Non-Hazardous waste** digital records
Option 1 (baseline)	**Hazardous waste** and **POPs waste** only	**Yes** – hazardous waste and POPs waste transactions to be digitally recorded in a central system.	**No** – no change to non-hazardous waste recording.
Option 2	**All waste**	**Yes** – hazardous waste and POPs waste transactions to be digitally recorded in a central system.	**No** – non-hazardous waste transactions will need to be recorded digitally, but they will not need to be uploaded to a central system.
Option 3 (preferred option)	**All waste**	**Yes** – hazardous waste and POPs waste transactions to be digitally recorded in a central system.	**Yes** – non-hazardous waste transactions will be digitally recorded within a central tracking service.

The baseline is a 'do minimum' option. This option will not facilitate the commitments made by the four nations to mandate the digital recording of waste movements (see Annex A2 for more details) – and the problems that a Waste Tracking service is looking to address will therefore remain present.

In the absence of a central Waste Tracking service for all waste, the four nations will be required to meet **legal requirements for digitally tracking waste containing persistent organic pollutants (POPs)[47]** and to **track hazardous waste** in order to meet Circular Economy commitments.[48] The four nations will therefore need to develop a new IT service, to enable all records of hazardous waste movements and waste containing POPs to be made available to regulators via a coordinated electronic registry. The costs and benefits associated with this digital Waste Tracking service (for hazardous waste and waste containing POPs) have therefore been captured in the baseline scenario.

In addition, in the baseline scenario, WasteDataFlow (WDF) would need to be rebuilt as the current service is reaching end of life[49], and local authorities would need an effective way to provide the information they report to governments. According to an internal review from 2016[50], the current WDF system is not fit for purpose. For instance, the four governments and regulatory bodies struggle to access the information within the system and it is deemed to offer a poor customer experience. The WDF system therefore needs to be rebuilt, rather than renewed.

The WDF system will only need to be rebuilt in the do minimum scenario, if a Waste Tracking system for all waste is not built. Therefore, the costs associated with building a replacement for WDF are included in the baseline.

It is necessary to capture the costs associated with building and running the new IT service to track hazardous waste and waste that contains POPs and the new WDF IT service in the baseline. A new Waste Tracking service **for all waste** would facilitate the majority of the functions that these services would be built for, and therefore these IT services would not need to be built/run if **a Waste Tracking service for all waste** is implemented.

Table 4 – Required changes to IT services in the baseline

Hazardous and POPs Waste Tracking (new IT)	Build a mandatory digital Waste Tracking service that will track hazardous waste (and materials and products produced from hazardous waste) and track waste that contains POPs (that may be hazardous or non-hazardous waste). This is required due to the new POPs regulations[51] that specify that POPs waste will need to be digitally trackable and due to Circular Economy commitments.[52]

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[47] Regulation (EU) No 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants, as it forms part of domestic law on and after Transition Period completion day, and as amended by The Persistent Organic Pollutant (Amendment) (EU Exit) Regulations 2020.

[48] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/904511/circular-economy-policy-statement-annex2.pdf (page 13).

[49] The current WDF contract is due to expire. It has been deemed insufficient to renew the contract as there are several fundamental issues that can only be addressed by rebuilding the service.

[50] Not published.

[51] Regulation (EU) No 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants, as it forms part of domestic law on and after Transition Period completion day, and as amended by The Persistent Organic Pollutant (Amendment) (EU Exit) Regulations 2020.

[52] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/904511/circular-economy-policy-statement-annex2.pdf (page 13).

WasteDataFlow (WDF), (procurement, development and rebuild)	Rebuild WDF[53] which is reaching end of life.

These new IT systems are expected to be built over a 3-year period (2022-2024) in such a way that meets current, and future, regulatory requirements. The digital tracking of hazardous waste is expected to result in some significant benefits compared to the current IT services that are in use to capture hazardous waste data (typically Excel and xml documents sent via email). The benefits include increased Landfill Tax receipts and time savings to businesses from no longer needing to submit consignment returns. These are described in further detail in section 7.3.

However, a new Hazardous and POPs Waste Tracking service, and a rebuilt WDF system, will not effectively track and monitor **all waste from production to disposal,** as there will be significant gaps in the types of waste covered by these services, most notably a large proportion of non-hazardous commercial and industrial waste and waste exported under green list controls[54]. As a result, these new IT services will not deliver the benefits that we expect a centralised Waste Tracking service for all waste to deliver.

Option 2: Implement a Waste Tracking system for hazardous waste and POPs waste. Mandate that all non-hazardous waste transactions are recorded digitally but do not provide or specify a central service to use for non-hazardous waste

See Annex A4 for a detailed description of how Options 2 and 3 were developed.

Under this option, all those involved in the production or handling of non-hazardous waste would be required to record individual movements and transfers of waste using some form of digital service. This is an extension of the baseline scenario (where there would already be a specific mandatory service for **tracking hazardous waste and any waste (hazardous or non-hazardous) that contains POPs)**. The choice of what type of digital service to use would be open to businesses to decide. Services could range from an Excel spreadsheet to a bespoke digital solution. This option will therefore have the most significant impact on businesses that do not currently hold digital records of their waste transfers (expected to be ~13% of operators according to responses from the Waste Tracking user panel[55]).

This additional data would only need to be reported to regulators upon request. However, by mandating that records are held digitally, they would be able to be submitted to regulators more easily and with increased accuracy. Waste Transfer notes will continue to be used in Option 2 for non-hazardous waste transfers. The requirement for businesses to digitally hold information on their waste transfers will be in addition to the current practice of sharing waste transfer notes.

A new process would be required to ensure waste transactions between parties could be easily identified from their digital records. A process akin to current hazardous waste requirements, whereby a unique code using a prescribed format must be applied to every waste transaction, could be used. Those businesses transporting the waste would likely be in the best position to ensure that a unique code, developed in accordance with some centrally provided government guidance, is shared with both the producer of the waste and the receiving party in a waste transaction.

These codes would need to be included on relevant records required to be kept digitally by businesses and/or submitted to regulators (if requested).

In addition to the digital recording of waste movements and transfers, waste receiving sites would also be expected to digitally record details of what happens to the waste they have received i.e. how much has

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[53] WDF is currently used by LAs to collect data on the types and quantities of all municipal waste collected.
[54] https://www.gov.uk/guidance/importing-and-exporting-waste#article-18
[55] This data was recorded in a survey carried out in January 2021.

been treated, disposed of or recovered, or whether any products or materials have been produced from the waste.

As in the baseline scenario, new IT services will need to be built (as described in Table 4) to replace the WDF IT service and to meet the new requirement to track hazardous waste and waste containing POPs.

Option 3 (Preferred option): Provide a central digital Waste Tracking service and mandate its use[56]

See Annex A4 for a detailed description of how Options 2 and 3 were developed.

Under Option 3 a mandatory electronic Waste Tracking service for all waste will be created. It will provide a means for businesses to record all waste movements and transfers in one central service and will enable the UK to effectively track waste through the economy, as well as products and materials produced from waste.

The Waste Tracking service will be an IT service that will replace the current requirement for written waste transfer notes (for non-hazardous waste), consignee returns (for hazardous waste), waste site returns and Annex VII forms for green list waste imports and exports. The service will be developed with the requirement to record and submit information on hazardous waste and the requirement to trace waste containing POPs in mind, to ensure that the requirements set out in the POPs Regulations and circular economy commitments are met. With a central Waste Tracking service for all waste in place, WDF would not need to be rebuilt as the Waste Tracking service will include the majority of the functions that are currently carried out by WDF.

Businesses will have the option to digitally record their data through their own services, and then upload their data to a central online service. Alternatively, the central Waste Tracking service will likely offer a data capture function which will provide the necessary infrastructure for businesses to comply with Waste Tracking, without investing in their own software or spending time building spreadsheets and then uploading them. If a business is digitally excluded (they do not have access to a device or internet), then the regulator will likely accept the required information over the phone and in the post.

Waste Tracking will go beyond the mere tracking of waste from source via the carrier to the site at which it is recovered or disposed. It is envisaged that Waste Tracking will also 'track' the transformation of waste within a treatment site, into non-waste 'products' and to track at least the first movement of that 'product' back in the product economy.

It is expected that registration on the Waste Tracking service will commence in 2023 and, subject to consultation, in 2024 all waste producers and waste operators in scope of the reform will be required to comply with the Waste Tracking service. Businesses will be financially responsible for covering the costs of running the service.

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[56] Mandating that digital records of **all waste** movements and transfers are **held and submitted** by obligated businesses is an alternative scenario to the baseline – a new Waste Tracking service for **all waste**, rather than just **hazardous waste and POPs waste**.

7. DESCRIPTION OF COSTS AND BENEFITS

We have used an appraisal period of 15-years rather than the standard 10-years[57]. We expect that the Waste Tracking system will have a long lifespan - longer than traditional 'off the shelf' IT systems or those based on bespoke hardware or software. The Waste Tracking service will be developed in line with the Cabinet Office's Open Standards Principles[58], which means the system will be built to support flexibility and future change. It is also being developed based on user needs through user research, and these needs will continue to be reviewed when the system is in use which should help to promote longevity of the system.

The costs and benefits that fall prior to January 2022 are assumed to have been incurred already and are therefore not included in the appraisal.

7.1 SUMMARY OF COSTS AND BENEFITS (2022 – 2036)

Table 5: Summary of non-discounted costs and benefits, £m

	Option 2 (net impacts)	Option 3 (net impacts)
Costs		
Regulators – Transition costs	0.1	0.1
Businesses - Transition costs	9	68
Government – Cost of decommissioning EDOC	-	0.0
Businesses – Increased taxation		328
Benefits		
Government - IT development cost savings	-	3
Government - Benefits from reduced waste crime (*Increased tax receipts*)	-	328
Government – Savings from no longer running EDOC	-	2
Government – Savings from no longer running WDF	-	5
Local government – Time savings to local authorities from no longer needing to submit WDF returns	-	188
Businesses - Time savings to businesses from no longer needing to submit certain waste returns (Permit site returns and waste exemption returns)	-	172
Businesses - Benefits from reduced waste crime	-	95
Businesses – Ongoing savings from storing waste records digitally (and in a central service for Option 3)	37	82
Environment - Benefits from reduced waste crime	-	13

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[57] We explored the impact of reducing the appraisal period from 2022-2036 to 2022-2032. With the shorter appraisal period, the NPV was **£315m** (2020 price, 2022 present value). This compares to **£223m** for the appraisal period 2022-2036 (2020 price, 2022 present value).
[58] https://www.gov.uk/government/publications/open-standards-principles/open-standards-principles

	Option 2 (net impacts)	Option 3 (net impacts)
Total costs (rounded)	9	396
Total benefits (rounded)	37	887
Net impact (rounded)	28	491

See Tables A13 and A14 in Annex A6 for a summary of the costs and benefits incurred by each of the devolved administrations.

7.2 COSTS: BASELINE (OPTION 1)

*In the baseline we have assumed that the proportion of operators currently using digital systems (12%), a mix of paper and digital systems (75%) and only paper systems (13%) to record **non-hazardous waste transfers** remains constant over the appraisal period[59].*

A number of the costs included in the baseline have been lifted from the Circular Economy Regulatory Triage Assessment (RTA)[60], which sets out the costs for implementing a system for reporting more information about hazardous waste. For transparency, Table 6 sets out the costs that been directly lifted from the RTA and those that we have updated in light of more recent evidence and policy development.

Table 6 –Baseline costs summary table (baseline costs related to the hazardous waste tracking system that have been lifted from the RTA, baseline costs related to the hazardous waste tracking system that have been amended since the RTA and other baseline costs)

Same costs as included in the RTA			
Cost description	Original cost from the RTA that has been included in the baseline		
Business transition costs	£16.3m in total – see RTA for details on how this was derived.		
Regulator transition costs	£52,168 in total – see RTA for details on how this was derived.		
Cost amendments since the RTA			
Cost description	Original cost (RTA)	New cost (Baseline)	Reason for change
IT development and set-up costs for a waste tracking system for waste containing POPs and hazardous waste (incurred by government)	£0.25m In total	£4.3m in total	This estimate has been reviewed as it is now deemed that to only amend current IT systems in order to report more information about hazardous waste (as monetised in the circular economy analysis) would not sufficiently 'track' hazardous waste. In addition, this cost estimate only covered the reporting of hazardous waste information and does not estimate the costs of a system to track POPs waste.
IT running and management costs (incurred by businesses)	*Not monetised*	£1m/year	Since the circular economy analysis was carried out, progress has been made by the Waste Tracking project team to better understand the running and management costs of an effective waste tracking system – these costs will be incurred by businesses

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			through fees. We have therefore included this additional evidence in the baseline[61].
Other costs that have been included in the baseline			
IT development and set up costs for a replacement WasteDataFlow service (incurred by government)	£2.6m in total – see below for details on how this figure was derived.		

7.2.1   Costs to government: baseline (Option 1)

IT development and set up costs (incurred by government)

There will be costs incurred in the baseline scenario associated with building new IT systems; a new WasteDataFlow (WDF) IT system and a new Waste Tracking system for Hazardous Waste and POPs waste, that are required to comply with current and future regulations. The cost associated with building new IT services will be £6.9m (the cost is assumed to be spread equally over 2022-2024).

The cost of rebuilding WDF is estimated to be £2.6m. This cost estimate has been derived based on guidance from Digital, Data and Technology Services (DDTS) and policy experts. The assumptions underpinning this cost estimate are based on the expected resource FTE required to build such a system. These assumptions are outlined below in Table 7.

Table 7 – Assumptions underpinning the cost estimate of building an IT system to replace WDF (rounded)

Phase/length	Resource (FTE) – based on standard team profiles for the relevant stages	Total cost (based on day rate of £525/day[62])	Total cost (including optimism bias at 41%)
Discovery (3 months)	4	£125,000	£176,000
Alpha (3 months)	6	£200,000	£282,000
Private beta (6 months)	12	£750,000	£1,058,000
Public beta (6 months)	12	£750,000	£1,058,000
Total		**£1,825,000**	**£2,573,000**

The cost of building the Waste Tracking service for hazardous waste and POPs waste is estimated to be £4.3m[63]. This estimate is based on the outstanding costs associated with building the Waste Tracking service for **all waste** – including IT development, system setup and agency integration costs[64]. The technical functionality required for a Waste Tracking service for hazardous waste and POPs waste, will be very similar to that required for a Waste Tracking service for all waste types. In the absence of a digital Waste Tracking

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[61] If these costs had been included within the CEP RTA, the EANDCB for the RTA would have still amounted to less than £5m.

[62] This is a standard day rate assumption used within digital projects – the rate includes non-wage costs (rate provided by DDTS).

[63] £0.7m of this cost will be allocated to supporting the four nations integrate their systems with the Waste Tracking service and help the regulators to transition.

[64] In 2019, we estimated that to move from a prototype solution to a live service will require capital funding from the exchequer of £7m over four years for the UK. This funding was secured through the 2019 Autumn Budget, and some of this capital funding has already been spent (£2.8m up to the end of 2021). This £2.8m is therefore excluded from the appraisal. We have applied an Optimisation Bias (OB) to all the costs as defined for "Outsourcing". We have not considered any contributory factors at this time nor how to manage and mitigate them in order to reduce the OB since there are still many unknown factors. Defra officials have considered whether this project falls within the definition of "Outsourcing", or "Equipment and development" (which has a maximum OB factor of 200%) – based on policy expertise and evidence that project spend to date has fallen within the forecasted budget (which allowed for an OB of 41%) we do not think an optimism bias of 200% would be appropriate.

service for all waste, the hazardous waste and POPs waste tracking service would be able to be built on the foundations of the digital Waste Tracking service that have already been delivered.

The remaining £4.3m build costs will be split between the following three workstreams.

- **System set-up costs (£2.3m)** cover the transition from a prototype to a live service and include initial hosting costs for platforms for three environments: live, development/test and backup.
- **Service development costs (£1.3m)** cover the costs of the development of a service wrap during the Beta Public phase.
- **Agency integration costs (£0.7m)** cover initial costs to regulators of integrating Waste Tracking with existing IT systems such as those used for the registration of permitted sites, and registered exemptions and waste carriers, as well as those used for charging, recording of compliance and enforcement action.

The total baseline IT development and set up costs are summarised in Table 8.

Table 8: Summary of undiscounted baseline UK IT development costs (for government), £m

	2022	2023	2024	**Total**
WDF (rebuild)	0.9	0.9	0.9	**2.6**
Hazardous Waste and POPs Waste Tracking system (new)	2.91	1.22	0.14	**4.3**
Total	**3.8**	**2.1**	**1.0**	**6.9**

See Table A15 in Annex A6 for a breakdown of the costs incurred to each of the devolved administrations

7.2.2 Costs to businesses: baseline (Option 1)

Transition costs - Hazardous waste and POPs Waste Tracking service (incurred by businesses)

The Circular Economy RTA[65] outlines that there will be costs to businesses associated with transitioning to using a new hazardous waste tracking system. The costs assumed in the RTA were based on a bare minimum Waste Tracking service being introduced (for hazardous waste only and not for non-hazardous waste that include POPs). This service that would require hazardous waste consignors to submit additional information in their hazardous waste returns through an updated IT service. Therefore, the costs to businesses of complying with the hazardous Waste Tracking service will be higher when adding the POPs Waste Tracking element to the service as there will be more businesses in scope.

We do not have accurate data on the number of waste sites that handle POPs, we have therefore not been able to further develop these cost estimations. The implication of this is that the Waste Tracking service **for all waste** may appear to have relatively higher transition costs to businesses than is accurate, on the basis that the baseline transition costs to businesses may be underestimated. We will endeavour to improve this estimate for the final IA through continued work with the regulators.

Table 9: Summary of monetised baseline transition costs (for businesses)

	Assumptions and cost for <u>a hazardous Waste Tracking service</u> – as included in the CEP RTA
Familiarisation	Each business will have to spend 8 hours, in total, familiarising themselves with the reform. This task is assumed to be carried out by an administrative member of staff (£97.70 per

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[65]https://assets.publishing.service.gov.uk/government/uploads/service/uploads/attachment_data/file/904511/circular-economy-policy-statement-annex2.pdf

	business[66]). With 4,075 hazardous waste treatment sites in the UK, this will cost businesses approximately **£398,000**[67] over a 2-year period.
Transitioning to use of new functions	A new process will be developed so that information is recorded and made available to the necessary worker to report it into the hazardous Waste Tracking service. We assume that waste managers will need to spend four working weeks in the first year developing this new service. With an average monthly salary cost of £3,909 and 4,075 hazardous waste treatment sites in scope, this total cost is expected to be **£15.9m** to businesses[68].
Total	**£16.3m during the transition period (2-years).**

IT service running and management costs (incurred by businesses)

The hazardous waste and POPs Waste Tracking service will be funded by waste operators through fees. We expect that the total costs to businesses will be approximately £1m/year[69]. This is based on the same estimate determined for the running of the central Waste Tracking service for all waste. It is reasonable to assume the same running costs for these two services as they will have very similar functionality. The running costs are based on a number of assumptions – detailed in box 2.

Table 10 – costs to businesses of running the hazardous waste and POPs Waste Tracking service (not discounted) - (baseline)

Year, £m	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Service running costs[70]	0.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	**6.6**
Service management costs[71]	0.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	**6.6**

See Table A19 in Annex A6 for a breakdown of the costs incurred to each of the devolved administrations

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Box 2 – assumptions underpinning the service running and service management costs for a digital Waste Tracking service

This cost forecast is based on a number of assumptions including:
- The service **platform and infrastructure** will be a **commercial cloud-based service.**
- A **service provider** will **manage** the platform and service.

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[66] This is the expected wage cost of £10.01 (ONS, Annual Survey of Hours and Earnings) plus overheads for 8-hours. Overheads are assumed to be 22% of the wage rate as per [RPC guidance](#) (i.e. £80.08*1.22=£97.70).

[67] As per information sourced from environment agencies, the number of hazardous authorised and exempt treatment sites affected by the policy in each nation are: England (3,260), Scotland (349), Wales (282), Northern Ireland (184).

[68] Methodology: 4,075 hazardous sites x £3,909 (ONS, Annual Survey of Hours and Earnings – uplifted to include non-wage costs) = £15,929,175.

[69] For transparency, the costs to businesses of running a hazardous Waste Tracking system were not previously estimated in the CEP RTA. If these had been included at £1m/year then the EANDCB for the CEP would still be below £5m per year (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/904511/circular-economy-policy-statement-annex2.pdf).

[70] The **service running costs** include hosting platforms for three environments (Live, Development/Test & backup), application development for service integration, service improvement and 2nd & 3rd line support.

[71] The **service management costs** cover the costs of a service manager, help desk function, ongoing user engagement and communications.

- The **service provider** will **provide 2nd & 3rd line support.**[72]

Service running costs include:
- Hosting platforms for three environments: live, development/test and backup.
- Application development for service integration and service improvement.
- 2nd & 3rd line support.

To estimate the hosting costs, we have made the following assumptions:
- There will be three environments in the service –each of the same size and capacity:
  - *A live platform.*
  - *A development and test platform for service enhancements.*
  - *A backup service platform.*

- Standard service costs for the MS Azure cloud service provide a reasonable high-end estimate.
- The storage capacity required for 500,000,000 transactions will be 1.46 Tb per annum per environment.
- To ensure sufficient capacity we have rounded the storage requirements up to 4Tb per environment.
- MS Azure has many costing profiles including a government rate. At the moment we have used standard pricing of £5,000 per Tb per annum.
- The high-level estimate for 12Tb of hosting is therefore £60,000 per annum.

The service management costs cover the costs of a service manager, help desk function, ongoing user engagement and communications. The size and shape of the service management will to some extent depend on what is required by industry.

Increased total expenditure on waste return fees

Whilst a Waste Tracking service for hazardous waste will negate the need for **formal consignment returns** (as the electronic system will instead collate the data), businesses handling hazardous waste will still need to pay for the running of the hazardous waste regime which is likely to be similar to the current consignment fee system. We expect that a Waste Tracking service for hazardous waste and POPs waste will **reduce opportunities for operators to avoid reporting hazardous waste movements** and therefore there will be an increased cost to business through total consignment fees paid. This cost to businesses (and benefit to the regulator) has not been monetised.

7.2.3 Costs to the regulator: baseline (Option 1)

Transition costs to the regulator

As outlined in the CEP RTA[73], there will be costs to the regulators associated with advising businesses in the waste sector that handle hazardous waste on new requirements. In addition, regulators will advise businesses in the waste sector that handle POPs waste (that may be hazardous or non-hazardous) on the new requirements. To calculate this cost, it has been assumed that an official[74] in each of the regulatory bodies, will spend the equivalent of one-month's work over the 2-year transition period on this task. This amounts to £26,084[75] per year for 2-years.

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[72] 2nd and 3rd line support will be teams with technical knowledge and expertise to help with very difficult IT challenges (3rd line support is there to provide support for the most challenging IT tasks).
[73]https://assets.publishing.service.gov.uk/government/uploads/service/uploads/attachment_data/file/904511/circular-economy-policy-statement-annex2.pdf
[74] At a grade 5 level, or equivalent.
[75] Monthly salary would be £6,521 (including overheads at 22%) and there are four regulators that would incur this cost.

In addition, central government have allocated £0.7m of the remaining £4.3m projected capital expenditure to supporting regulators to integrate the Waste Tracking system with regulator's current systems. We expect that this cost would still be incurred if a Waste Tracking system for hazardous waste and POPs waste was built. This cost is accounted for as a cost to government rather than a cost to the regulators - see "IT development and set up costs (incurred by government)" section above.

7.3   BENEFITS: BASELINE (OPTION 1)

The regulatory commitment to implement digital tracking for hazardous waste and POPs waste has meant that the baseline scenario of this impact assessment, differs to the current context. It is therefore important that the benefits associated with implementing hazardous waste and POPs waste tracking are understood before presenting the marginal additional benefits associated with implementing a Waste Tracking system for all waste.

In Options 2 and 3, we have presented the marginal benefits of implementing a central Waste Tracking service for all waste, relative to implementing a Waste Tracking service for hazardous waste and POPs waste and building the replacement WDF service.

Implementing a digital tracking service for hazardous waste and POPs waste alone will result in:

- **Increased income for the regulators** – the mandatory digital tracking of hazardous waste and POPs waste will result in increased compliance with the hazardous waste regime and hence an increase in income through fees[76].

- **Increased landfill tax receipts** – misclassification of waste is typically carried out to describe waste as being non-hazardous, rather than hazardous, in order to benefit from paying the lower rate of landfill tax at £3/tonne, rather than £94.15/tonne[77]. Digital tracking of hazardous waste will make such misdescription more difficult as changes in the description of waste will be highlighted to the regulators.

- **Reduced illegal waste exports** - It is illegal to export hazardous waste to non-OECD countries, but illegal exports can be an attractive option for waste operators, as waste disposal in non-OECD countries tends to be cheaper due to less stringent environmental regulations. Digital tracking of hazardous waste will likely deter illegal exports of waste as regulators will more easily be able to identify operators involved in such criminal activity.

- **Improved knowledge of material flows** - It is expected that hazardous waste treatment operators will have to digitally record valuable secondary materials created during hazardous waste treatment – this would enable the information held to be more accessible to regulators and businesses. In addition, regulators will have improved access to data for cross-border material flows.

- **Improved compliance monitoring** - The new hazardous waste and POPs Waste Tracking service will help regulators to have more streamlined record keeping of hazardous waste and POPs waste which will facilitate easier referencing, operational research and investigations of activities. This will

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[76] Whilst a Waste Tracking system for hazardous waste will negate the need for **formal consignment returns**, instead collecting data through the electronic system, businesses handling hazardous waste will still need to pay for the running of the hazardous waste regime – likely to be similar to the current consignment fee system – more compliance will mean higher fees.
[77] https://www.gov.uk/government/publications/changes-to-landfill-tax-rates-from-1-april-2020/changes-to-landfill-tax-rates-from-1-april-2020#:~:text=Landfill%20Tax%20is%20charged%20on,include%20recycling%2C%20composting%20and%20recovery. The rate is the same in Wales and Scotland for 2020: https://gov.wales/landfill-disposals-tax-rates
https://revenue.scot/taxes/scottish-landfill-tax/slft-rates-accounting-periods

also allow for greater visibility and transparency on operators' activities with regards to hazardous waste and POPs waste. Improved record keeping could reduce waste crime; improve efficiency; fill data gaps and improve information on the availability of underutilised waste materials. This will lead to improved use of public money.

- **Benefits to business from not needing to submit hazardous waste returns (England and Wales)** – There may be time savings to waste sites that handle hazardous waste from no longer needing to submit consignment returns. However, this time saving may be negated by the time spent complying with the new hazardous waste and POPs Waste Tracking service.

- **IT cost savings to the regulators** – The regulators operate several IT services to manage Hazardous Waste data and returns. For example, the EA specifically uses the Hazardous Waste database (where they process all the consignee returns) and the Hazardous Waste Data Interrogator. It is expected that the Waste Tracking service for Hazardous and POPs waste will supersede these services and therefore there will be savings associated with no longer paying for the running and maintenance of such services.

- **Reduced administration costs for regulators** – There may be time savings to regulators from having a central database of hazardous waste returns, rather than reviewing emails and spreadsheets which can be time-consuming.

- **Improved data for policy decision making** – Collecting data will allow government to implement better targeted policies and report on progress against specific targets.

7.4 COSTS: MANDATE THAT DATA ON WASTE MOVEMENTS ARE RECORDED DIGITALLY BUT DO NOT PROVIDE/SPECIFY A CENTRAL SERVICE TO USE (OPTION 2)

7.4.1 Costs to government: Option 2

The IT capital costs associated with Option 2 are the same as those described in the baseline section (see section 7.2.1).

7.4.2 Costs to businesses: Option 2

Transition costs (incurred by businesses)

Permitted Waste sites
Under Option 2, there will be transition costs for waste sites that are currently still using paper systems to record their waste data. This is due to the requirement proposed under Option 2 for businesses to record their waste movements and transfers digitally – any business that is already doing this will therefore not incur any transition costs. Waste sites will still need to comply with their current duty of care requirements[78] albeit using digital rather than paper systems.

The transition costs may include familiarisation, training and new on-site technology costs (e.g., mobile devices). In total we expect these transition costs to amount to **£24.8m** in the 12-months prior to the point at which all businesses in scope of the regulations will be mandated to comply with the regulations.

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[78] Waste sites will need to make sure that a unique code has been applied to the waste, they will need to share the details of the waste movement/transfer with the party that previously handled the waste and the party where the waste is moved to and they will be responsible for reporting what happens to the waste if it is treated or disposed of at their site.

This transition cost to waste sites was estimated through analysing responses to a survey shared with members of the Waste Tracking user panel[79]. In the survey, we asked businesses how they expected to comply with a Waste Tracking service for all waste, and what they expected the costs to be of transitioning to complying with a Waste Tracking service for all waste. There are a number of ways that businesses could comply with a Waste Tracking service: manually type records into an online form or app, store data in their own privately built spreadsheets, or store data in their own software/bespoke solution.

We expect businesses that are currently using **only** paper to record their data to choose to use the simplest method of complying with the digital recording requirements – manually entering records individually into an online form or mobile app. We assume that the businesses who use a **mix of paper and digital recording** will already use spreadsheets/other software to store at least some of their data and therefore we have assumed that they will copy records into a standardised spreadsheet provided by the Waste Tracking service and upload this to the Waste Tracking service website.

According to a separate Waste Tracking user panel survey[80], 13% of respondents reported **only using paper recording** and 73% of respondents reported **using a mix of paper and digital recording**. Of the 73% of businesses that reported using a mix of paper and digital systems, it is unclear the extent to which these businesses are reliant on paper-based recording and hence will incur transition costs of moving to digital recording. Given the uncertainty, we have derived a low-estimate in which only those that currently use solely paper-based systems (13% of businesses) incur transition costs, and a high-estimate in which businesses that are assumed to use solely paper or a mix of paper and digital systems (86% of businesses) are impacted. We have taken the average of the low and the high estimates to present a 'best estimate'.

The survey results identified that 10% of businesses that reported using paper-based systems did not expect to incur any costs from switching to the Waste Tracking service. Therefore, the total number of waste sites that are expected to incur transition costs has been scaled down by 10%, from 14,042 to 12,674[81].

The average cost per compliance method (e.g. manually entering records and copying records into standardised spreadsheets) was calculated using the individual transition costs (which include familiarisation, training, customer engagement, and new on-site technology costs) that businesses stated that they expected to incur[82]. The average costs were applied to the number of businesses in scope for the low-estimate and the high-estimate – see Table 11. In the low estimate, we expect that 1,648 businesses who currently use only paper to record their waste movements will incur an average cost of £1,780. In the high estimate, we expect 10,900 businesses will bear an average cost of £4,281. The central estimate represents the average estimation between the low and high scenarios.

A full breakdown of the methodology used to calculate the average cost can be found in Annex A5.

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[79] The survey polled 92 businesses in February 2021.
[80] The survey polled 331 businesses and was carried out in January 2021
[81] Data held by Defra and the devolved administrations on the estimated number of businesses with waste sites that are likely to be impacted.
[82] These costs include non-wage costs.

Table 11 – Transition costs to different business types (Option 2)

	Assumptions	Number of businesses in scope	Average cost	Total costs
Low estimate	Manual recording by all businesses which currently only use **paper records.**	1,648 (13%)	£1,780	£2,933,000
High estimate	**As above**, plus businesses which currently use a **mix of paper and digital records** – we have assumed that these businesses will copy data into a spreadsheet and upload this to the Waste Tracking service.	10,900 (86%)	£4,281	£46,661,000
Central estimate	**Average between the low and high estimates**			**£24,797,000**

Table 12 – Transition costs to waste sites during the transition period (not discounted) - central estimate (Option 2)

Year, £m	2022	2023	Total
Option 2 transition costs	£6.2m	£18.6m	**£24.8m**
Baseline transition costs	£7.96m	£7.96m	**£15.93m**
Option 2 net transition costs	**-£1.96m**	**£10.43m**	**£8.47m**

See Table A22 in Annex A6 for a breakdown of the costs incurred to each of the devolved administrations

Producers of waste, exempt waste sites and waste carriers, brokers and dealers

The expected transition costs for waste carriers, brokers and dealers, exempt waste sites and waste producers have not been monetised at this stage – please see section 8 for a qualitative description of these costs. We will seek additional views on the likely impact of transitioning to using digital records and a centralised service on producers of waste through stakeholder engagement.

7.4.3 Costs to the regulators: Option 2

Transition costs to the regulators

As in the baseline scenario, there will be costs to the regulators associated with advising hazardous waste treatment site operators on the new requirements on compliance with a Hazardous Waste Tracking system. To calculate this cost, it has been assumed that an official[83] in each of the regulatory bodies, will spend the equivalent of two-months' work over the 2-year transition period on this task. This amounts to £52,168 per year[84] (for 2-years). The net of the baseline cost to the regulator is **£26,084** per year[85].

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[83] At a grade 5 level, or equivalent.

[84] Monthly salary would be £6,521 and there are four regulators that would incur this cost.

[85] In addition, central government have allocated £0.7m of the remaining £4.3m projected capital expenditure to supporting regulators to integrate the Waste Tracking system with regulator's current systems. We expect that this cost would still be incurred if a Waste Tracking system for hazardous waste and POPs waste was built. This cost is accounted for as a cost to government rather than a cost to the regulators.

7.5 BENEFITS: MANDATE THAT DATA ON WASTE MOVEMENTS ARE RECORDED DIGITALLY BUT DO NOT PROVIDE / SPECIFY A CENTRAL SERVICE TO USE (Option 2)

The key **monetised benefits** associated with Option 2 are the savings to businesses from recording records digitally.

Whilst we expect there to be other benefits associated with mandating that waste movements/transfers (not already covered by the hazardous waste and POPs tracking service under the baseline) are digitalised – for example reduced waste crime – we do not believe these to be significant in magnitude. Mandating that businesses digitally record their waste movements/transfers will make it quicker and easier for businesses to provide information upon request which could help regulators to identify waste crime more quickly, however, the impact on reducing waste crime is expected to be negligible in contrast to a scenario where digital data is centrally held in a Waste Tracking system for all waste (Option 3).

Details on the non-monetised impacts of Option 2 are described in section 8. We will seek to improve our understanding of these benefits through stakeholder engagement and the consultation.

7.5.1 Savings to businesses: Option 2

Savings associated with recording waste records digitally

Permitted Waste sites

Digitally recording waste movements will result in savings to businesses that are currently using paper-based systems. Savings include a reduction in data entry and recording costs, a reduction in time spent checking data quality and a reduction in time spent collecting or providing waste information from and to customers. We expect these savings to be ongoing and will amount to £36.9m in total over the appraisal period, as illustrated on Tables 13 and 14 below.

As outlined in section 7.4.2 (Costs to businesses), 13% of respondents according to a Waste Tracking user panel survey[86] reported that they **only use paper recording** systems and 73% of respondents reported that they **use a mix of paper and digital recording** systems. Using these responses, we have derived a low-estimate in which only those that currently use solely paper-based systems (13% of businesses) incur savings, and a high-estimate in which businesses that are assumed to use solely paper or a mix of paper and digital systems (86% of businesses) incur savings. We have taken the average of the low and the high estimates to present a 'best estimate'.

The savings were estimated using a survey sent to the Waste Tracking user panel. Each business was asked to select their most likely method of compliance with the Waste Tracking service (e.g., manually typing records into an online form or app, storing data in their own privately built spreadsheets, storing data in their own software/bespoke solution). Each business was also asked to specify the amount that they expected to save in a year after transitioning to complying with the Waste Tracking service. Specific savings analysed were: reduced data entry/recording costs, reduced data storage costs, reduced time spent checking data quality and reduced time spent obtaining or providing waste information from and to customers.

We analysed the proportion of businesses which expected to incur each type of saving from moving towards digital Waste Tracking, and the average saving reported. The survey is described in more detail in Annex A5.

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[86] The survey polled 331 businesses and was carried out in January 2021.

For the 'low' saving estimate (applied to businesses that currently use **solely paper systems** - 13% of businesses), we have assumed that these businesses will interact with the Waste Tracking service via manually recorded waste movements. For the 'high' saving estimate which includes businesses that are currently using **a mix of paper and digital records** (86% of businesses) we have assumed that businesses will comply by inputting data into a standardised spreadsheet.

Whilst we expect that there will be 14,042 waste sites in scope of the Waste Tracking service, 59% of businesses did not expect to receive any savings from switching to the Waste Tracking service (when polled in February 2021), so the savings have only been applied to 41% of businesses that are assumed to incur transition costs.

Focusing on permitted waste sites only, the central estimate of the average annual saving per business is estimated to be £553 and the annual total savings are expected to amount to £2.77m.

Table 13– Savings from storing waste movements digitally to different business types (Option 2)

	Assumptions	Number in scope	Average saving	Total savings per annum
Low estimate	Manual recording by all businesses which currently only use paper records.	757	£1,739	£1,316,000
High estimate	As above, plus businesses which currently use a mix of paper and digital records copying data in a spreadsheet and uploading this to the WTS website.	5,007	£844	£4,234,000
Central estimate	**Average between the low and high estimates**	**5,007**	**£553**	**£2,770,000**

Table 14 – Ongoing savings from storing waste movement digitally (not discounted) – central estimate, £m

2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
0.92	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	**36.93**

See Table A23 in Annex A6 for a breakdown of the costs incurred to each of the devolved administrations

Producers of waste, exempt waste sites and waste carriers, brokers and dealers

We also expect similar savings to be incurred by producers of waste, exempt waste sites and waste carriers, brokers, and dealers. However, the survey responses did not provide sufficient evidence on the likely savings to these specific business types. We will seek views on the potential savings to producers of waste, exempt waste sites and waste carriers, brokers, and dealers as a result of using digital records, through the consultation.

7.6   COSTS: PROVIDE A CENTRAL WASTE TRACKIING SERVICE AND MANDATE ITS USE (Option 3)

7.6.1 Costs to government: Option 3

Decommissioning IT contracts

With a central Waste Tracking service in place, EDOC and WDF will no longer be needed. The cost associated with decommissioning the EDOC contract will be £10k and will be incurred by Defra. We expect that the WDF service will come to its contract end and therefore there will not be a decommissioning cost associated with the WDF contract.

Costs to businesses to transition to the new Waste Tracking service

Permitted Waste sites
We have estimated that the cost to permitted waste sites of transitioning to a central Waste Tracking service for all waste will amount to around £85m in the lead up to the service going live.

This forecast was derived using responses to a survey of the Waste Tracking user panel on their estimated costs of transitioning to using a digital Waste Tracking service[87]. The survey asked businesses what approach they expected to use to comply with the Waste Tracking service:

1. **Manually type in records**[88]

2. **Upload data from your spreadsheets**[89]

3. **Upload data from your own Waste Tracking software via a spreadsheet**[90]

4. **Directly transfer data from your own Waste Tracking software to the Waste Tracking service**[91]

The survey also asked businesses what they expected their transition costs to be based on their preferred method of compliance. The specific transition costs that businesses were asked to quantify included: familiarisation, training, changes to businesses processes, changes to services and new equipment costs.

To calculate the average cost per approach we analysed the specific transition costs (listed in Table 15) that each respondent proposed for their chosen method of compliance. 'Average' costs refer to the mean of the observations. Outliers were sense-checked but no observations were excluded due to the survey's small sample size. The sample size prevented us from being able to judge whether a response for a given type of cost was truly an outlier or a plausible estimation which was much higher or lower than other observations due to business activity. We have summarised the average of these costs, across all the different approaches, in Table 15.

Table 15 –Transition cost outputs from the Waste Tracking user panel survey

Type of cost	% applicable[92]	Average reported cost
Staff training	80%	£1,965
Familiarisation time (cost of familiarising with the system)	80%	£2,533
Legal requirements familiarisation	73%	£2,156
Customer engagement	59%	£1,961

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[87] The survey polled 92 businesses in February 2021.
[88] "You could **manually enter records** individually, either using an online form or mobile app provided by the Waste Tracking service".
[89] "If you held your waste records in your **own spreadsheets** you could copy this data into **a standardised spreadsheet** provided by the Waste Tracking service and upload the standardised spreadsheet to the Waste Tracking service website".
[90] "If you used your **own Waste Tracking software** you could export the data into **a standardised spreadsheet** provided by the Waste Tracking service and upload that spreadsheet to the Waste Tracking service website. Your own Waste Tracking software could be a COTS (commercial-off-the-shelf) application or a bespoke application you have developed yourself or had developed for you".
[91] "If you used your **own Waste Tracking software** you could also **directly transfer data from it to the Waste Tracking service (without using a spreadsheet)**. This would be done via an API, an "application program interface", which is a set of routines, protocols, and tools that allow two software programs to directly share data".
[92] The percentage of businesses that we expect would incur the specific cost when they transition. For example, 80% of businesses stated that they expected to incur additional staff training costs.

Changes to current IT services	78%	£12,830
Provision of any on-site technology	49%	£13,391

The survey responses indicated that 10% of businesses did not expect to incur any transition costs – we therefore assumed that 10% of permitted waste sites in scope of the Waste Tracking service would not incur transition costs.

For each cost in Table 15, we applied the average reported cost to the number of businesses expected to incur this cost. Total transition costs for permitted waste sites were derived by summing each type of cost, to obtain the average total cost per approach.

The average cost per approach, and total costs incurred by businesses are summarised in Table 16. Using the costs provided through the survey, we calculated the average cost per approach (Column B). We then used the percentage split of responses for each of the approaches and scaled up the number of businesses based on the total number of permitted waste sites in scope of the Waste Tracking service (Column C).

Table 16 – Transition costs to different business types, by expected method to record waste movements (Option 3)

Approach (column A)	Average costs per approach (column B)	Number of permitted waste sites in scope (column C)	Total costs (rounded to £000) (column D)
Manual record *(20% of businesses preferred this approach)*	£4,390	2,473	£10,856,000
Spreadsheet - copy from own records *(29% of businesses preferred this approach)*	£5,336	3,710	£19,796,000
Spreadsheet - copy from own software *(41% of businesses preferred this approach)*	£9,406	5,255	£49,427,000
Transfer from software *(10% of businesses preferred this approach)*	£3,760	1,237	£4,652,000
Total	**£6,685**	**12,674**	**£84,731,000**[93]

Please see Annex A5 for the full methodology.

As the Waste Tracking Service is expected to go live from 2023/2024, we expect that three quarters of the transition costs will be incurred in 2023 (£63.5m), with the remaining £21.2m manifesting in 2022.

Table 17 – Transition costs to businesses during the transition period (not discounted) – best estimate (Option 3)

Year, £m	2022	2023	Total
Option 3 transition costs	£21.2m	£63.5m	**£84.7m**
Baseline transition costs	£7.96m	£7.96m	**£15.93m**
Option 3 net transition costs	**£13.0m**	**£55.4m**	**£68.4m**

See Table A26 in Annex A6 for a breakdown of the costs incurred to each of the devolved administrations

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[93] Sum of costs listed in Column D.

Due to the small sample size[94] and great variation in the estimated value of costs in the survey, the analysis is supplemented by a 'low' and 'high' set of estimates for each year the transition costs are expected to occur. This sensitivity analysis assumed a 10% variation – the 'low' estimate calculates costs at 90% of the reported totals above, whereas the 'high' scenario captures costs at 110%.

Producers of waste, exempt waste sites and waste carriers, brokers and dealers
The expected transition costs for waste carriers, brokers and dealers and waste producers have not been monetised at this stage. Please see section 9 for a qualitative description of these costs. We will seek views on the likely impact of transitioning to using a central Waste Tracking service for all waste on these businesses.

Service running and management costs (to be met by industry)

The ongoing running and management costs of a central Waste Tracking for all waste, in the order of £1m a year, will be met by industry through charges. We expect that the running and management costs of a central Waste Tracking service will be similar to the costs of running and managing a Waste Tracking service for hazardous waste and POPs waste. The required functionality of both IT services to effectively track waste in scope of each service, will be almost identical and hence we do not expect there to be a significant cost difference. See box 2 in section 7.2.2 for details on the assumptions. Therefore, the running and management costs of the central Waste Tracking service for all waste, net of the baseline, are **£0**. A key difference will be that the running costs under a tracking system for all waste will be spread between more businesses, therefore it will result in a lower 'per business' cost.

Increased taxation for businesses – this cost represents a transfer of costs from the public sector to businesses

A significant proportion of the annual UK public sector costs associated with illegal waste sites, fly-tipping of waste, misclassification of waste and illegal exports of waste (£328m – 2020 prices) is the loss of taxation revenue that would have been received if the waste had been handled legitimately[95]. By reducing criminal activity, waste will more likely be held by legitimate operators – either due to operators transitioning from illegal activities to legal activities, or by illegal operators leaving the market and therefore allowing the waste that they would have handled to be handled by a legitimate business instead. With more waste being handled legitimately, more taxation (e.g., landfill tax, corporation tax and VAT) will be paid. However, this benefit to government will be a cost to businesses - therefore we have accounted for this shift in costs as a transfer.

A very small proportion of the monetised benefit to the public sector from reduced waste crime will **not be increased taxation**. Reducing waste crime will also benefit the public sector through reduced waste clearing costs (via fewer fly-tipping incidents and fewer abandoned illegal waste sites) and reduced enforcement costs. It has not been possible to accurately extract these specific public sector benefits from increased taxation as they're reported as a single figure – therefore, by assuming that the whole public sector monetised benefit should be counted as a cost to businesses (increased taxation) is likely overestimating the costs to businesses slightly.

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[94] There were 92 responses.
[95] The public sector costs are made up of lost taxation, the cost of clearing of fly-tipped waste/abandoned waste sites and regulator costs of enforcement. This is based on evidence provided within the Rethinking Waste Crime study (http://www.esauk.org/application/files/7515/3589/6448/20170502_Rethinking_Waste_Crime.pdf) and more recent evidence on the size of the 'Landfill Tax gap' (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/907122/Measuring_tax_gaps_2020_edition.pdf - page 89).

Table 18 – Increased taxation for businesses as a result of waste being handled legitimately (therefore subject to taxation), rather than illegally (not discounted)

2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
5.2	9.9	14.5	19.1	23.7	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	**327.7**

See Table A27 in Annex A6 for a breakdown of the costs incurred to each of the devolved administrations

This cost to businesses is deemed to be 'indirect' and therefore it has not been included in the EANDCB calculation. The cost is deemed to be indirect on the basis that the additional taxation for businesses is dependent on illegal businesses leaving the industry or starting to operate in compliance with regulations (an increase in waste brought into the legitimate sphere is more likely to raise tax receipts). To transition to operating legitimately or to accept waste that was previously handled illegally may require some changes to business activities and/or infrastructure. On this basis the cost may not be immediate and therefore we have deemed it to be indirect.

7.6.3 Costs to regulators: Option 3

Transition costs to the regulators

There will be costs to the regulators associated with advising waste operators on new requirements. To calculate this cost, it has been assumed that an official in each of the regulatory bodies, will spend the equivalent of three-months of work over the 2-year transition period on this task. We expect the time required to be greater under Option 3 than under Option 2 as Option 3 proposes more extensive requirements on businesses. This cost amounts to £78,252[96] over 2-years. This is an additional cost of £52,168, net of the baseline.

In addition, central government have allocated £0.7m of the remaining £4.3m projected capital expenditure to supporting regulators to integrate the Waste Tracking system with regulator's current systems. This cost is accounted for as a cost to government rather than a cost to the regulators. This cost is the same in all three options.

7.7 BENEFITS: PROVIDE A CENTRAL WASTE TRACKING SERVICE FOR ALL WASTE AND MANDATE ITS USE (OPTION 3)

Option 3 will offer significant benefits to society, regulators, businesses and the governments. These benefits include increased efficiency within the agencies, savings to businesses from recording data digitally and reduced time spent on submitting data returns, savings to local authorities from reduced time spent submitting WDF returns and savings to central government from reduced costs associated with building and running alternative IT solutions. All parties will also benefit from reduced waste crime.

In 2017, the Environmental Service Association (ESA) published their estimates of the costs of waste crime in England – in total they calculated that waste crime costs amounted to over £600m each year (or more than £731m when scaled-up to the whole of the UK) see Table 19 for details[97]. This research has been drawn upon to improve our understanding of the **scope** for beneficial outcomes to different parties from reducing waste crime, and to help us monetise some of the expected impacts that a central Waste Tracking system for all waste could have. This research is currently being reviewed therefore we will draw on more up to date estimates of the cost of waste crime for the final Impact Assessment.

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[96] Monthly salary would be £6,521 (for a senior employee including non-wage costs at 22%) and there are four regulators that would incur this cost based on regulator data.
[97] http://www.esauk.org/application/files/7515/3589/6448/20170502_Rethinking_Waste_Crime.pdf

We have made a series of assumptions about the expected impact of reduced waste crime as a result of implementing a central Waste Tracking service for all waste. We have shared these assumptions with the regulators for their views, and approval.

Given the inherent uncertainty around the extent to which waste crime will reduce following the implementation of a Waste Tracking service for all waste, it is important to note that the policy would have a positive NPV (+£141m) even without accounting for benefits associated with reduced waste crime (which account for +£79m towards the NPV value).

Table 19 – Costs of waste crime estimations in England by the ESA (2015 prices)

	Private sector	Public sector	Wider society	Total
Illegal waste sites	£74,903,100	£11,216,000	£12,190,100	**£98,309,200**
Illegal burning	£2,224,100	£16,963,000	-	**£19,187,100**
Fly-tipping	£165,947,900	£30,482,300	£12,843,600	**£209,273,800**
Misclassification and fraud	-	£128,527,000[98]	-	**£128,527,000[99]**
Illegal exports of waste	£11,620,500	£2,628,000	£15,958,500	**£30,206,900**
Serious breach of permits and exemptions	£70,924,600	£16,312,100	-	**£87,236,700**
Local authorities and EA enforcement activities	-	£31,704,000	-	**£31,704,000**
Total	**£325,620,200**	**£237,832,300**	**£40,992,100**	**£604,444,600**

7.7.1 Benefits to Government and the Regulators: Option 3

Savings in IT building costs (incurred by government)

Under Option 3, there will be transitional costs to government from building the Waste Tracking IT infrastructure. These costs include: system set up costs; service development costs; and agency integration costs.

In 2019, Defra secured capital funding, from the exchequer, of £7m to carry out discovery work and to explore options for progressing Waste Tracking from a prototype solution to a live service over four years. This figure included an optimism bias of 41% for outsourced projects in line with Green Book guidance[100]. Some of this capital funding has already been spent (£2.8m by the end of 2021). This £2.8m is therefore excluded from the appraisal. The remaining capital costs include:

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[98] This figure has since been revised. The Landfill Tax gap report (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/907122/Measuring_tax_gaps_2020_edition.pdf) has estimated that the landfill tax avoided as a result of misdescription of waste is £235m in England or £275m in the UK.

[99] This figure has since been revised. The Landfill Tax gap report (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/907122/Measuring_tax_gaps_2020_edition.pdf) has estimated that the Landfill Tax avoided as a result of misdescription of waste is £235m in England or £275m in the UK.

[100] We have applied an Optimisation Bias (OB) to all the costs as defined for "Outsourcing". We have not considered any contributory factors at this time nor how to manage and mitigate them in order to reduce the OB since there are still many unknown factors. Defra officials have considered whether this project falls within the definition of "Outsourcing", or "Equipment and development" (which has a maximum OB factor of 200%) – based on policy expertise and evidence that project spend to date has fallen within the forecasted budget (which allowed for an OB of 41%) we do not think an Optimism Bias of 200% would be appropriate.

System set-up costs (£2.3m – between 2022 and 2024**)** cover the transition from a prototype to a live service and include initial hosting costs for platforms for three environments, live, development/test and backup.

Service development costs (£1.3m – between 2022 and 2024**)** cover the costs of the development of a service wrap during the Beta Public phase.

Agency integration costs (£0.7m – between 2022 and 2024**)** cover initial costs to the agencies of integrating Waste Tracking with existing IT systems such as those used for the registration of permitted sites, and registered exemptions and waste carriers, as well as those used for charging, and the recording of compliance and enforcement action.

Table 20: Capital costs to government (gross)

Year (£m)	2022	2023	2024	**Total**
Government capital costs with 41% OB	2.91	1.22	0.14	**4.3**[101]

Compared to the baseline scenario, whereby two new IT services will need to be built at an estimated total cost of £6.9m, a central Waste Tracking service for all waste, offers a comparably cheaper option, with total estimated costs of £4.3m. Therefore, net of the baseline, the building of a Waste Tracking service for all waste will result in a cost saving of **£2.6m**.

Table 21: Capital costs to government under Option 3, compared to Option 1

Year (£m)	2022	2023	2024	**Total**
Option 1 (baseline) IT capital costs	3.8	2.1	1.0	**6.9**
Option 3 IT capital costs	2.9	1.2	0.1	**4.3**
Saving under Option 3, relative to Option 1	**0.9**	**0.9**	**0.9**	**2.6**

See Table A28 in Annex A6 for a breakdown in costs to each of the devolved administrations

IT benefits (savings from decommissioning WDF and EDOC)

Under Option 3, there will be an ongoing running cost saving compared to the baseline scenario from no longer funding the running of WDF or EDOC. Waste Tracking will supersede these IT services and hence they will be dissolved in 2024 and the government will reap the associated running cost savings.

The WDF cost savings used in the analysis are the current costs of running WDF. In the baseline scenario, when the WDF IT service is assumed to be rebuilt from 2024 onwards, the ongoing running costs may increase under the new contract relative to the current running costs. We have chosen to use the current running costs (£365k/year) in the absence of more reliable estimates and in order to present a fairly low-cost saving.

Under Option 3, there will be an annual saving of £190k/year to the government as a result of dissolving EDOC.

Table 22: Summary of UK IT running cost savings (for government) under Option 3, £m

	Annual cost saving
WDF	0.37
EDOC	0.19
Total	**0.56**

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[101] £1.1m of this cost will be allocated to supporting the four nations integrate their systems with the Waste Tracking service and help the regulators to transition.

Increased Landfill Tax resulting from reduced misdescription of waste (government benefits)

Misclassification of waste can occur at any point in the waste management chain – either accidentally or deliberately. The financial implications of misclassification can be significant, for instance, waste classified as 'inactive'[102] is eligible for the lower rate of Landfill Tax, which, at £3 per tonne, is substantially lower than the standard rate of tax of £94.15 per tonne[103].

It is expected that Waste Tracking for all waste under Option 3 will make it easier for agencies to identify misdescription. It will remove at least some, if not all, of the need for time intensive waste stream audits and the scanning of paper waste transfer notes on which misdescription work is currently based. Waste Tracking will enable better insight on waste being rejected at disposal sites due to misdescription (either accidental or fraudulent) and regulators will be able to follow up with the parties involved much more effectively as a result of the improved information they will have from the Waste Tracking service.

The following pieces of research have been used to build the evidence base to estimate the impact that a Waste Tracking service for all waste could have on reducing waste misdescription.

Measuring Tax Gaps, 2020 edition[104]**:** This report states that the estimated Landfill Tax gap from the **misdescription of waste** is currently £235m in England (**£275m** when scaled-up to the UK).

Waste crime interventions and evaluation project, 2017[105]**:** This report found that a **2-year, £1.9m,** targeted intervention into reducing the misdescription of waste resulted in additional Landfill Tax of £38m (or £19m/year)[106].

Other EA evaluations of waste crime interventions have shown that investigating the deliberate misdescription of waste provides a payback for each £1 of additional funding of between £4 and £10[107] – demonstrating the magnitude of the benefits potential that could arise from Waste Tracking.

Given the uncertainty around this benefit profile we have presented a low, a high and a best estimate. To establish the 'high estimate' of the additional Landfill Tax received following the introduction of Waste

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[102] Inactive waste covers most materials used in a building's fabric as well as earth excavated for foundations. Most forms of concrete, brick, glass, soil, clay and gravel are classified as inactive.

[103] Rates as of 1st April 2020, https://www.gov.uk/government/publications/rates-and-allowances-landfill-tax/landfill-tax-rates-from-1-april-2013

[104] https://assets.publishing.service.gov.uk/government/uploads/service/uploads/attachment_data/file/907122/Measuring_tax_gaps_2020_edition.pdf

[105] https://assets.publishing.service.gov.uk/government/uploads/service/uploads/attachment_data/file/662841/Waste_crime_interventions_and_evaluation_-_report.pdf

[106] The specific targeted interventions used by the EA are summarised below:
- **Additional audits** - 30 waste stream audits from a sample of around 100 transfer and treatment sites that had been identified as potentially misdescribing waste.
- **The referral of sites that were suspected to be misdescribing waste to circumvent the standard rate of Landfill Tax to HMRC.** This included new, joint investigations with HMRC, as well as historical investigations that the Environment Agency had concluded. It was expected that a minimum of 60 referrals would be made to HMRC to target non-compliance.
- **Investigations of a number of sites identified by Environment Agency area teams because of suspected permit breaches** and the taking of enforcement actions if these breaches were confirmed.
  The EA's evaluation assumes that only 33% of potential misdescription cases raised are converted into benefits. This is because a significant element of preventing misdescription fraud relies on collaboration with HMRC to investigate the potential Landfill Tax fraud involving misdescription. Therefore, even if interventions (for example Waste Tracking) considerably improve agencies access to and analysis of waste data (as planned) the benefit of that will depend on the capacity of other agencies to act on it.

[107] This includes the benefits from increased Landfill Tax receipts, but also avoided environmental damage, https://assets.publishing.service.gov.uk/government/uploads/service/uploads/attachment_data/file/662841/Waste_crime_interventions_and_evaluation_-_report.pdf

Tracking for all waste, we have assumed that the Landfill Tax gap will reduce by **10%,** 5-years after implementing Waste Tracking (**£27.5m**/year). This assumption was derived through engagement with policy experts in each of the devolved administrations and the respective regulatory bodies. The benefit will be fully realised in 2028, up until this point we expect that the benefit will increase linearly from the implementation date.

We have used the outcome of the EA's £1.9m targeted intervention as our 'low estimate'. We have again assumed that this benefit will increase linearly before being full realised in 2028 (additional LFT receipts of **£19.35m**/year).

The best estimate is the average of the low and high estimates. All prices have been uplifted to 2020 prices and inflated by a population factor of 1.19 to capture a UK-wide impact.

Table 23: Summary of public sector benefits as a result of reduced misdescription of waste (not discounted) – best estimate (Option 3), £m. [108]

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Best	**4.4**	**8.7**	**13.1**	**17.4**	**21.8**	**26.2**	**26.2**	**26.2**	**26.2**	**26.2**	**26.2**	**26.2**	**26.2**	**26.2**	**301**
Low	3.7	7.3	11.0	14.6	18.3	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	253
High	5.1	10.1	15.2	20.3	25.3	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	350

Increased taxation resulting from a reduction in Illegal waste sites and waste permit breaches (government and regulator benefits) – This saving represents a transfer of costs from the public sector to businesses

Criminal activity can be perpetrated by individuals or organisations through a breach of an environmental permit or the management of an illegal waste site. Examples include deliberately accepting too much waste, storing waste in an inappropriate manner or accepting waste that is not allowed under a certain permit.

By mandating that waste operators digitally record and submit their waste movements and transfers, the Waste Tracking service will make it harder for waste operators to run, or support, illegal sites (including waste sites breaching their permit conditions). In addition, a Waste Tracking system for all waste will enable regulators to build a more complete picture of waste production at sites that do not hold environmental permits. This would enable regulators to carry out data analysis of entire sectors, and identify anomalous sites that are worthy of further investigation.

We expect that with a central Waste Tracking system in place, some waste that would have been handled on illegal sites will instead be handled by authorised facilities in the legitimate market – offering benefits to businesses through increased profit and therefore the government through increased taxation (VAT, corporation tax and landfill tax) and the regulator through more cost-efficient enforcement[109]. Only public sector benefits are captured in this section.

In the absence of specific evidence on the impact that a digital Waste Tracking service could have on illegal waste sites, we have reviewed outcomes from **targeted interventions to reduce the number of illegal waste sites** instead. This approach has enabled us to present a realistic minimum benefit that the government could expect to incur from reducing the number of illegal waste sites as a result of implementing a central Waste Tracking service.

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[108] The figures in the table have been inflated to 2020 prices.
[109] The Waste Tracking service will provide intelligence and evidence to assist the regulators with compliance monitoring and targeted enforcement activity.

The waste crime interventions and evaluation project[110] reported that in England, 530 illegal waste sites[111] were stopped as a result of additional funding provided to the EA to target illegal waste sites (£3.1m over a 2-year period)[112]. The Waste Tracking service has some similarity with the specific EA intervention, most notably, the focus on gathering additional intelligence and evidence.

We have used the impact of this intervention as a proxy benefit of Waste Tracking's impact on stopping or preventing illegal waste sites. In order to be conservative in our estimation of the benefits, we have assumed that the total number of illegal waste sites stopped (530) will occur over a longer time frame (14-years), rather than the EAs targeted intervention (2-years).

We have two estimates for the benefit associated with the prevention or closure of a single illegal waste site.

High impact - The EA's targeted intervention[113] study found that stopping illegal waste sites from operating resulted in a total public-sector benefit of **£14,936[114]** per site on average (from increased taxation) – in 2015 prices.

Low impact - The ESA's 2017 study'[115], found that stopping illegal waste sites from operating resulted in a total public sector benefit of **£12,486[116]** per site on average (from increased landfill tax and reduced enforcement costs).

The 'high' and 'low' impact per site figures have been multiplied by 530 sites[117] and divided equally across the period 2023 to 2036 to derive an estimate for England. The best estimate is the average of the low-estimate and the high-estimate. Estimations have been scaled up by a factor of 1.19 to present the estimated UK-wide benefit[118] (i.e., the benefit reflects the prevention/closure of 630 illegal waste sites across the UK). We have also inflated the benefits so that they are in 2020 prices rather than in 2015 prices as recorded in the reports.

Table 24: Summary of public sector benefits as a result of reduced illegal waste sites and waste site permit breaches (not discounted) (Option 3), £m

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Best	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**8.64**
Low	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	**7.87**
High	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	**9.41**

[110]https://assets.publishing.service.gov.uk/government/uploads/service/uploads/attachment_data/file/662841/Waste_crime_inte rventions_and_evaluation_-_report.pdf

[111] It was estimated that the illegal waste sites stopped from operating handled a total of 429kt of waste

[112] The targeted intervention included the following activities:

- **Gathering intelligence and evidence** to assist Environment Agency staff to stop illegal waste sites and deter illegal operations. This included partnership work with industry, local authorities and Crime stoppers.
- Giving **advice and guidance** to stop or deter illegal waste sites.
- **Communications** work with the public and industry. This included responding to complaints and undertaking campaigns work.
- Undertaking **enforcement activity** to stop illegal waste sites. This included referring cases to partner agencies to take enforcement action where appropriate.

[113]https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/662841/Waste_crime_inte rventions_and_evaluation_-_report.pdf (page 36)

[114] 2020 prices - £368 (additional Corporation Tax to HMG), + £7,536 (additional Landfill Tax), +£7,032 (additional VAT).

[115] http://www.esauk.org/application/files/7515/3589/6448/20170502_Rethinking_Waste_Crime.pdf (page 18)

[116] 2020 prices - Includes Landfill Tax and reduced cost of enforcement activity

[117] The number of sites uncovered through the EA'S £3.1m 2-year intervention project, and the number of sites that we have assumed Waste Tracking will be able to deter/remove.

[118] 1:1.19 is the population ratio for England and the UK.

Box 3 – further detail on the impacts of fewer illegal waste sites and permit breaches

Fewer illegal waste sites and permit breaches will also impact on businesses, society and the environment. The high and low per year estimated savings to each of these parties are summarised below (in 2020 prices). The expected outcomes on these parties are described in more detail in section's 7.7.3 and 7.7.4, respectively.

High estimate[119]:

***Private sector impacts (+£83,202 per illegal waste site)** – additional profit to legitimate waste management industry (quantified), additional profit to secondary material processors, reduced unfair competition (unquantified).*

***Wider impacts (society and environment) (+£13,591 per illegal waste site)** – carbon impacts (quantified), disamenity (unquantified).*

Low estimate[120]:

***Private sector impacts (+£1,752 per illegal waste site)** - profit for the legal waste sector.*

***Wider impacts (£8,370 per illegal waste site)** - + £1,951/site (reduced environmental damage), +£6,419/site (reduced disamenity costs).*

Increased taxation resulting from a reduction in illegal waste exports (government benefits)

Whilst some wastes can be exported legally for recycling and recovery, it is illegal in almost all cases to export untreated waste from the UK for disposal[121]. Understanding the scale of illegal waste exports is extremely difficult. Current data are unreliable and incomplete[122], due to the data being based mainly on the crimes that are detected.

Waste Tracking will enable intelligence-led enforcement which we expect will deter operators from illegally exporting waste. In the absence of specific evidence on the impact that a digital Waste Tracking service could have on illegal waste exports, we have reviewed **targeted interventions to reduce illegal waste exports** instead.

In the waste crime interventions and evaluation project 2017[123], the EA spent £0.8m carrying out a targeted study on preventing the illegal exports of waste from England[124]. This resulted in between 192 and 672 illegal waste exports being prevented. The financial benefit to the public sector was estimated to amount to

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[119]http://www.esauk.org/application/files/7515/3589/6448/20170502_Rethinking_Waste_Crime.pdf. Inflated to 2020 prices and scaled-up to reflect a UK-wide benefit.

[120]https://assets.publishing.service.gov.uk/government/uploads/service/uploads/attachment_data/file/662841/Waste_crime_interventions_and_evaluation_-_report.pdf. Inflated to 2020 prices and scaled-up to reflect a UK-wide benefit.

[121] The Transfrontier Shipment of Waste Regulations 2007 define the procedures, offences and penalties relating to the export of waste from the UK.

[122] Currently green list waste movements shipped under Article 18 controls are only reported to NIES and SEPA – there is no oversight of these exports from England or Wales.

[123]https://assets.publishing.service.gov.uk/government/uploads/service/uploads/attachment_data/file/662841/Waste_crime_interventions_and_evaluation_-_report.pdf

[124] The intervention included:
- additional **intelligence gathering** and support to enforcement activity
- additional **port officers** to enable more containers to be stopped, checked and investigated
- additional **resource to inspect sites** suspected of illegally exporting waste

between £0.4m and £1.29m. This evidence is useful in presenting the scope for benefits from reduced illegal waste exports.

The key overlap between this intervention and Waste Tracking is additional funding for intelligence gathering to support enforcement activity making it a reasonable basis for a proxy benefit. In order to provide a conservative estimate, we have assumed that the low estimate of illegal waste exports being prevented will occur as a result of the reform (i.e.,192 illegal exports from England). The low estimate for the public benefits associated with the EA's targeted intervention (£0.4m), includes increased corporation tax, increased landfill tax and increased VAT. We have assumed that illegal exports will reduce gradually over a 5-year period following the introduction of Waste Tracking, until 2028 where we expect the benefit to be incurred annually (i.e., a reduction or prevention in illegal exports of 192 per year).

The costs included in Table 25 have been uplifted by a factor of 1.19[125] to present the UK-wide benefit for reduced illegal waste exports (i.e. a reduction or prevention of 228 exports per year), from 2028 onwards. In addition, the prices have been inflated from 2015 prices (as included in the EA's report) to 2020 prices.

Table 25: Benefits to government from reduced illegal waste exports (not discounted) (Option 3), £m

2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
0.08	0.16	0.24	0.32	0.41	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	5.59

There may be further benefits to the public sector from reduced illegal waste exports in the form of reduced repatriation costs[126]. Not only will Waste Tracking reduce the likelihood of illegal waste exports occurring in the first instance, but the regulator will have increased intelligence to identify the illegal operator(s) involved and to ensure that the repatriation costs are recuperated from the offending operator(s).

> **Box 4: Further detail on the impacts of reduced illegal waste exports**
>
> *Reduced illegal exports of waste will also impact businesses, society and the environment. The outcome from the studies on the impact on these parties is summarised below (in 2020 prices) and described in further detail in sections 7.7.3 and 7.7.4.*
>
> ***Annual wider impacts (society and environment) (+£44,000/year)[127]** – + £10,300/year (reduced environmental damage), +£34,000/year (reduced disamenity impacts).*
>
> ***Annual private sector impacts (+£29,152/year)[128]** - additional profit to the legitimate waste management industry.*

Increased taxation resulting from a reduction in fly-tipping

Fly-tipping is a wide-ranging offence, defined as the illegal deposit of household, industrial, commercial, or other 'controlled' waste without an appropriate waste management authorisation. In many instances it is an opportunistic, one-off occurrence, with perpetrators seeking to avoid waste treatment or disposal costs.

The Waste Tracking service will be able to directly address the fly-tipping of commercial waste, arising from construction, demolition, excavation, and other commercial activity. This is because all commercial waste will be tracked from where it is produced to where it is disposed of. Fly-tips of commercial waste account

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[125] 1:1.19 is the population ratio for England and the UK.
[126] The only repatriation cost that the EA has had to pay for in the last 10-years was from Poland at a cost to the EA of approx. £2.5m. However, there are significant administrative costs for the EA in managing repatriations even when they don't have to pay to return the waste. In 2019 the EA managed a total of 33 repatriation requests. In 2020 they managed more than 60 requests.
[127] UK-wide benefit, uplifted to 2020 prices.
[128] UK-wide benefit, uplifted to 2020 prices.

for 11% of fly-tipping in England[129], costing the public sector £3.7m annually[130] (or £4.4m when scaled-up to UK-wide costs).

We estimate that a centralised Waste Tracking service will decrease commercial fly-tipping by 25%[131]. The analysis assumes that it will take 5 years, after the Waste Tracking service goes live, for this benefit to be realised fully. This will be preceded by incremental increases between 2023 and 2028. We have also modelled a low-estimate (no reduction in commercial fly-tipping) and a high-estimate (50% reduction in commercial fly-tipping) to account for uncertainty.

Table 26 - Reduction in waste crime – fly-tipping (not discounted) (government benefits) – best estimate, £m

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Best	0.18	0.36	0.54	0.73	0.91	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	**12.5**
Low	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
High	0.36	0.73	1.09	1.45	1.82	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	**25.1**

> **Box 5: Further detail on the impacts of reduced fly-tips**
>
> *Reduced fly-tips of commercial waste will also impact businesses, society and the environment. The outcome from the studies on the impact on these parties is summarised below and explained in further detail in sections 7.7.3 and 7.7.4.*
>
> ***Annual wider impacts (society and environment) - + £0.5m/year***[132] *– of which reduced environmental damage contributes £10k/year, and reduced disamenity impact contributes £34k/year.*
>
> ***Annual private sector impacts - + £6m/year*** *– Increased turnover for legitimate businesses.*

Efficiency savings (for the regulators)

Whilst we expect that there will be a number of efficiency savings to the regulator, from improved access to data and more streamlined services, we expect the regulators will reallocate resources to focus on new Waste Tracking operations and other tasks that support the running of the waste industry rather than delivering cashable savings. Efficiency savings could include:
- Reduced time to review and process data returns.
- Reduced time responding to data requests.
- More efficient compliance monitoring.
- Removal of invoicing costs.
- Reduced time to process Annex VII forms.[133]

7.7.2 Benefits to local authorities (LAs): Option 3

Compliance with Waste Tracking will remove the need for LAs to submit WDF returns. We have assumed that the time spent on these returns will fall by 90% on the basis that a small amount of the data that is currently recorded (e.g. costs of managing waste) will not be captured through the Waste Tracking service.

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[129] https://www.gov.uk/government/statistical-data-sets/env24-fly-tipping-incidents-and-actions-taken-in-england.
[130] Inflated to 2020 prices http://www.esauk.org/application/files/7515/3589/6448/20170502_Rethinking_Waste_Crime.pdf (£33.7m * 11%).
[131] This estimate is based on policy expertise.
[132] UK-wide figure based on estimates provided in the EA study: https://assets.publishing.service.gov.uk/government/uploads/service/uploads/attachment_data/file/662841/Waste_crime_interventions_and_evaluation_-_report.pdf (page 50).
[133] Currently the EA does not receive Annex VII forms, therefore there will be no efficiency savings for the EA.

We expect that this small amount of data (not captured through the Waste Tracking service) will be collected through an alternative IT service to WDF and the Waste Tracking service[134].

The average amount of time that each LA, within each nation, spends on WDF reporting was estimated in an internal government review[135] (based on regular contact with LAs and user groups). The findings are summarised in Table 27.

We have used the average reported time spent on WDF returns and a wage rate for local authorities from the Annual Survey of Hours and Earnings[136] (projected to 2023/24 wages and accounting for +22% in non-wage costs, amounting to £32,511/annum) to estimate the cost saving.

Table 27 – Benefits to LAs from reduced time spent submitting WDF returns

	FTE spent on WDF returns	LAs	Reduced time	Salary	Annual time saving
Scotland	0.75	32	90%	£32,511	£702,231
NI	2.1	11	90%	£32,511	£675,898
England	1	333	90%	£32,511	£9,743,462
Wales	2	22	90%	£32,511	£1,287,424
Total					**£12,409,015**

See Table A36 in Annex A6 for a breakdown of the savings incurred to each of the devolved administrations

7.7.3 Benefits to businesses: Option 3

Increased profit for legitimate businesses as a result of reduced waste crime

The benefits to businesses from reduced waste crime are based on the same assumptions described above in the 'reductions in waste crime – benefits to government and the regulators' section in 7.7.1.

These savings to businesses are deemed to be 'indirect' and therefore have not been included in the EANDCB calculation. They are deemed to be indirect on the basis that the additional profit to legitimate businesses is dependent on illegal businesses leaving the industry (freeing up the waste to be handled by a legitimate operator) or moving their business into compliance. To transition to operating legitimately or to accept waste that was previously handled illegally may require some changes to business activities and/or infrastructure. On this basis, the benefit may not be immediate and therefore we consider the benefit to be indirect.

Reduction in illegal waste sites and breaches of permits – reduced illegal waste sites and breaches of waste permits will result in increased profit for legitimate operators. Based on 630 illegal waste sites closing over the appraisal period, as a result of the Waste Tracking implementation, the benefit to businesses is expected to amount to £1.91m/year. The 'best estimate' benefit to businesses for each illegal site that is closed or prevented (£42,477/site) is the average of the estimates proposed in the EA's waste crime intervention report[137] (£1,752/site, the low estimate) and the ESA's 'Rethinking Waste Crime study'[138] (£83,202/site, the high estimate)[139].

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[134] We expect that the costs associated with developing this new IT service will be captured through a separate Impact Assessment (likely to be Extended Producer Responsibility for packaging).
[135] Not published.
[136] https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/adhocs/11426annualsurveyofhoursandearningsasheestimatesofgrossannualandweeklyearningsforlocalauthorityby2digitoccupationuk2019
[137] https://assets.publishing.service.gov.uk/government/uploads/service/uploads/attachment_data/file/662841/Waste_crime_interventions_and_evaluation_-_report.pdf (page 36).
[138] http://www.esauk.org/application/files/7515/3589/6448/20170502_Rethinking_Waste_Crime.pdf (page 17).
[139] 2020 prices.

Table 28 – Monetised benefits to businesses from a reduction in the number of illegal waste sites and permit breaches (not discounted), £m

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Best	**1.91**	**1.91**	**1.91**	**1.91**	**1.91**	**1.91**	**1.91**	**1.91**	**1.91**	**1.91**	**1.91**	**1.91**	**1.91**	**1.91**	**26.76**
Low	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	**1.10**
High	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	**52.42**

Reduction in illegal waste exports – reduced illegal waste exports will result in additional profit for legitimate waste operators. Based on the assumption that there will be a reduction of 228 illegal waste exports per year 5-years after implementation of Waste Tracking, it is estimated that this benefit could amount to +£8,300/year[140] 5-years after the implementation of Waste Tracking.

Table 29 – Monetised benefits to businesses from illegal waste exports, £m

2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	**0.10**

Reduction in fly-tipping – Reducing the fly-tipping of commercial waste by 25% by 2028 will result in additional profit to legitimate businesses of £6m/year. This was calculated by reducing the total estimated cost to the private sector of fly-tipping (£166m – Table 19[141]) commercial waste (11% of all fly-tipped waste) by 25% and inflating the benefit to 2020 prices from 2015 prices and increasing the benefit by a factor of 1.19[142] to present a UK-wide benefit.

Table 30 – Monetised benefits to businesses from fewer fly-tipping incidents (not discounted), £m

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Best	**0.99**	**1.98**	**2.96**	**3.95**	**4.94**	**5.93**	**5.93**	**5.93**	**5.93**	**5.93**	**5.93**	**5.93**	**5.93**	**5.93**	**68.19**
Low	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
High	-	1.98	3.95	5.93	7.91	9.88	11.86	11.86	11.86	11.86	11.86	11.86	11.86	11.86	**11.86**

The total benefits to businesses from reduced waste crime as a result of Waste Tracking are summarised in Table 31.

Table 31 – monetised benefits to businesses from reduced waste crime (not discounted), £m

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Best	**2.90**	**3.89**	**4.88**	**5.87**	**6.86**	**7.85**	**7.85**	**7.85**	**7.85**	**7.85**	**7.85**	**7.85**	**7.85**	**7.85**	**95.05**
Low	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	**1.20**
High	5.72	7.70	9.68	11.66	13.63	15.61	15.61	15.61	15.61	15.61	15.61	15.61	15.61	15.61	**188.9**

See tables A32-A35 in Annex A6 for a breakdown of the savings incurred to each of the devolved administrations

Savings from no longer needing to submit waste returns (permitted site returns and exempt site returns)

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[140] UK-wide figure based on estimates provided in the EA study:
https://assets.publishing.service.gov.uk/government/uploads/service/uploads/attachment_data/file/662841/Waste_crime_interventions_and_evaluation_-_report.pdf (page 50).
[141] http://www.esauk.org/application/files/7515/3589/6448/20170502_Rethinking_Waste_Crime.pdf.
[142] 1:1.19 is the population ratio for England and the UK
(https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2019estimates).

We expect that there will be savings to waste operators from no longer having to submit waste returns[143].

To estimate this saving, we engaged with the Waste Tracking user panel. We asked the panel how long they currently spend submitting permitted site returns and waste exemption returns and how often they submit these. The responses were analysed and significant outliers were removed.

Using the median wage for workers in waste disposal (£20.72, from the Annualised Survey of Hours and Earnings[144]) and inflating this by 1.5% per annum to project wage rates from 2023 onwards, and then inflating this by 22% to include non-wage costs, we obtained the estimated savings from no longer needing to submit Permitted and non-hazardous waste exempt site returns. The outputs from this analysis are captured in Table 32 below.

Table 32 – monetised savings to businesses from no longer having to submit waste returns for permitted sites or non-hazardous waste exempt sites, £m

	Time spent on return	Returns made per year	No. of businesses submitting the returns	Annual saving[145]
Exempt site returns *(savings applied to exemptions for non-hazardous waste only)*	3.26 hours[146]	1	600	£43,000
Permitted site returns	10.65 hours[147]	4	14,042	£13,174,000
Total				**£13,217,000**

See Table A37 in Annex A6 for a breakdown of the savings incurred to each of the devolved administrations

Savings associated with recording waste transactions digitally, reduced storage costs, reduced time spent checking for errors

Complying with a central Waste Tracking service will bring financial savings to businesses through reductions in data entry and recording costs, data storage costs, and reductions in the time spent checking data quality and communicating waste information between businesses and their customers. We estimate that these savings will amount to **£82m** in the first 15 years of the reform, as illustrated in Table 35,

Using a survey posed to the Waste Tracking user panel[148] (described in more detail in Annex A5), we asked businesses which approach they would most likely use to comply with Waste Tracking (manually type in records, upload data via standardised spreadsheets, upload data from private Waste Tracking software via a spreadsheet, directly transfer data from private Waste Tracking software to the central Waste Tracking service) and which savings they expected to incur and how much they expected them to amount to. See Table 33 for the average individual savings (not specific to a particular approach).

Table 33 – Financial savings outputs from the Waste Tracking user panel survey

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[143] We have not captured the benefit associated with no longer needing to submit consignee returns for hazardous waste as this benefit will be incurred in the baseline scenario already – as a result of the Waste Tracking system for hazardous waste and POPs waste.

[144] https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/adhocs/11690annualsurveyofhoursandearningsasheestimatesofearningscoveringfourdigitoccupationbypublicandprivatesectors median 2020 wage for "Private, Waste disposal and environmental services managers".

[145] 2024 prices.

[146] A range of results were provided in the survey data for time spent submitting each return for an exempt waste site (0 – 16 hours).

[147] A range of results were provided in the survey data for time spent submitting each return for a permitted waste site (0 – 72 hours).

[148] Survey concluded in February 2021.

Type of saving	% applicable[149]	Average annual saving
Reduction in data entry / recording costs	32%	£6,579
Reduction in data storage costs	2%	£5
Reduction in time spent checking data quality	27%	£1,914
Reduction in time spent obtaining/providing waste information from or to customers	76%	£1,433

The average saving per approach is summarised in Table 34. Average savings were calculated using responses to the survey of the Waste Tracking user panel. The number of businesses in scope to incur savings represent 41% of industry (14,042) as 59% of businesses in our survey reported that they did not expect to incur any savings from transitioning to Waste Tracking. Total savings are calculated by multiplying average savings by the number of businesses in scope, by preferred approach of recording waste movements.

Table 34 – Savings to different business types, by expected method to record waste movements (Option 3), rounded

	Number of business in scope to require a permit	Average savings	Total savings (£000)
Manual record	1,136	£1,739	£1,976,000
Spreadsheet - copy from own records	1,704	£684	£1,166,000
Spreadsheet - copy from own software	2,414	£1,257	£3,034,000
Transfer from software	568	£3	£2,000
Total	**5,822**	**£3,683**	**£6,177,000**

The savings above are expected to be incurred annually. Focusing on waste sites only, we estimate that savings of £6.18m will manifest every year from 2024 onwards.

Table 35 – Ongoing savings from storing waste records digitally and in a central system (not discounted), £m

2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
1.54	6.18	6.18	6.18	6.18	6.18	6.18	6.18	6.18	6.18	6.18	6.18	6.18	6.18	**81.84**

See Table A30 in Annex A6 for a breakdown of the savings incurred to each of the devolved administrations

Producers of waste, exempt waste sites and waste carriers, brokers and dealers
The expected transition costs for waste carriers, brokers and dealers and waste producers have not been monetised at this stage. See section 8 for a qualitative description of these costs.

7.7.4 Benefits to Society and the Environment: Option 3

Societal and Environmental benefits from reductions in waste crime
As described in section 7.6.1 above, The Environment Agency's waste crime intervention and evaluation research[150] and the ESA's 'Rethinking Waste Crime' report have been reflected on to derive the expected reduction in waste crime following the implementation of a central Waste Tracking service.

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[149] E.g. 32% of respondents said that they would expect to incur savings in data entry/ recording costs.
[150]https://assets.publishing.service.gov.uk/government/uploads/service/uploads/attachment_data/file/662841/Waste_crime_interventions_and_evaluation_-_report.pdf (page 56).

Illegal waste sites and breaches of permits – Illegal waste sites can blight local communities through the release of foul odours, pollution of surface or ground water, noise and dust from vehicle movements or on-site operations, or smoke from fires[151]. We have estimated that 5 years after the implementation of the Waste Tracking service, 630 illegal waste sites will be prevented or closed. Based on this assumption, the Waste Tracking service could lead to an environmental benefit of £494k per year as a result of the closure or prevention of ~45 illegal waste sites per year (630 illegal waste sites over 14-years). This benefit is due to reduced environmental damage (£115k/year[152]) and reduced disamenity effects (£379k/year). The benefit to the environment for each illegal site that is closed or prevented is the average of estimates proposed in the EA's waste crime intervention report[153] and the ESA's 'Rethinking Waste Crime study'[154]

Table 36 – monetised benefits to society and the wider environment from fewer illegal waste sites and breaches of permits (not discounted), £m

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Best	**0.49**	**0.49**	**0.49**	**0.49**	**0.49**	**0.49**	**0.49**	**0.49**	**0.49**	**0.49**	**0.49**	**0.49**	**0.49**	**0.49**	**6.92**
Low	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	**8.56**
High	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	**5.27**

Illegal waste exports – Illegal waste exports impact the society and environment of the country to which that waste is illegally exported to. Developing countries that accept illegal waste exports often carry out waste disposal practices that are unsafe to workers and residents, for example, burning Waste Electricals and Electronic Equipment (WEEE) to extract valuable materials, which results in adverse health impacts[155]. Similarly, residents in developing counties that accept illegal waste exports will likely be subject to disamenity effects due to waste being managed in a sub-optimal manner (illegal burning, fly-tipping and unsafe waste sites). In addition, waste disposal practices used, in developing countries accepting illegal waste exports, are less likely to prioritise environmental outcomes. Therefore, environmental damage will be greater than if the waste was disposed of in the UK or through legitimate export and disposal. Research at two scrap yards in Ghana where WEEE is burnt and broken down found lead and other metals in quantities 100 times greater than in normal soil samples.

We have estimated that 5 years after the implementation of the Waste Tracking service, there will be 228 fewer illegal waste exports per year. This equates to an annual environmental benefit of £44k/year[156], of which, reduced environmental damage contributes £10k/year and reduced disamenity impact contribute £34k/year.

Table 37 – monetised benefits to society and the wider environment from fewer illegal waste exports (not discounted), £m

2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
0.01	0.01	0.02	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	**0.51**

Fly-tipping - The ESA's Rethinking Waste Crime report estimates that fly-tipping has an annual cost to wider society of £16.8m (2020 prices, UK-wide cost) from carbon impacts. Based on our assumption that Waste Tracking will result in a 25% reduction in fly-tips of commercial waste 5-years after implementation (fly-

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[151] http://www.esauk.org/application/files/7515/3589/6448/20170502_Rethinking_Waste_Crime.pdf
[152] This benefit includes the monetised saving from reduced carbon emissions
[153] https://assets.publishing.service.gov.uk/government/uploads/service/uploads/attachment_data/file/662841/Waste_crime_interventions_and_evaluation_-_report.pdf (page 36)
[154] http://www.esauk.org/application/files/7515/3589/6448/20170502_Rethinking_Waste_Crime.pdf (page 17)
[155] https://www.greencustoms.org/sites/default/files/public/files/EIA_E-waste_report_0511_WEB.pdf
[156] UK-wide figure based on estimates provided in the EA study:
https://assets.publishing.service.gov.uk/government/uploads/service/uploads/attachment_data/file/662841/Waste_crime_interventions_and_evaluation_-_report.pdf (page 50)

tipping incidents containing commercial waste currently contribute 11% to all fly-tipping incidents[157]), the environmental benefit is expected to amount to £459k/year from 2028 (2020 prices, UK-wide benefit). Between 2023 and 2028 we expect this benefit will increase linearly. This monetised saving reflects the reduction in carbon emissions associated with waste being properly managed. There are further non-monetised benefits associated with reduced disamenity effects that have not been captured here.

Table 38 – monetised benefits to society and the wider environment from fewer fly-tipping incidents (not discounted), £m

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Best	**0.08**	**0.15**	**0.23**	**0.31**	**0.38**	**0.46**	**0.46**	**0.46**	**0.46**	**0.46**	**0.46**	**0.46**	**0.46**	**0.46**	**5.28**
Low	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
High	0.15	0.31	0.46	0.61	0.76	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	**10.56**

The total estimated impacts of reduced waste crime on society and the environment as a result of Waste Tracking are summarised in Table 39.

Table 39 – monetised benefits to society and the wider environment from reduced waste crime (not discounted), £m

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Best	**0.58**	**0.66**	**0.75**	**0.83**	**0.91**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**12.71**
Low	0.62	0.63	0.63	0.64	0.65	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	**9.07**
High	0.54	0.70	0.86	1.02	1.18	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	**16.34**

See Tables A32-A35 in Annex A6 for a breakdown of the savings incurred to each of the devolved administrations

8. NON-MONETISED BENEFITS (OPTION 2 AND OPTION 3)

There are ample benefits of Waste Tracking that are challenging to monetise. However, this does not detract from the value of these benefits and they should be considered alongside those that we have been able to monetise.

The benefits outlined below are relevant to both option 2 and option 3. However, the magnitude of each benefit is expected to be significantly greater under option 3, compared to option 2. This is due to the data being submitted and stored centrally under option 3, rather than data being digitally stored in a web of private and public IT services (as expected under option 2).

Resource efficiency - Waste Tracking will increase the flow of waste back into the economy. By digitising data, businesses/regulators will improve their understanding of the type and quantity of waste generated and this will enable businesses and regulators to identify high-value opportunities that increase resource productivity. For example, by facilitating improved data on the composition and destination of waste that could be repurposed, there could be a reduction in the amount of avoidable waste sent to landfill or incineration. In addition, if waste managers increase their engagement with the secondary material market, producers will have improved access to recycled material and hence will be less reliant on raw materials.

A safer, cleaner environment through reduced greenhouse gas emissions – By providing better data on the volume, composition and destination of waste, opportunities to reduce greenhouse gas emissions could be more easily identified. Such opportunities could include diverting waste from landfill or incineration and/or reducing energy-intensive resource extraction. Reduced greenhouse gas emissions would result in a safer and cleaner environment and this would deliver widespread benefits for the environment and society.

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[157] https://www.gov.uk/government/statistical-data-sets/env24-fly-tipping-incidents-and-actions-taken-in-england

Waste Tracking **will support more effective regulation** – Waste Tracking will provide regulators with the data and information they need to carry out targeted interventions, to further support legitimate businesses, to extract maximum value from data and to work more efficiently.

Improved data for investment decisions - Waste Tracking will improve the quality of data for business investment decisions.

More timely data – Having all records of waste movements digitised means that government and the regulators can quickly access data by making specific requests or viewing uploaded data. This access to more timely data will enable more effective compliance monitoring, targeted enforcement and effective decisions. We are also consulting on the principle of real-time reporting which would further enhance this benefit.

Reduced avoidable errors – By requiring that all data is digitally captured, there are likely to be fewer errors made in reporting data.

Potential to boost global competitiveness of the UK waste industry – Waste Tracking is expected to reduce illegal activity in the waste industry and, as such, legitimate businesses will have increased access to waste (that would have been handled illegally in the absence of Waste Tracking). As a result, legitimate waste operators will be incentivised to invest and expand and there may be more jobs available in the (legitimate) waste industry. This in turn may boost the UK's global competitiveness in the waste industry.

Efficiency savings - Routine work carried out by businesses, regulators, LAs and governments will likely be done automatically, to some extent, which will result in efficiency savings for all parties. For example, the government will need to issue fewer surveys and will spend less time responding to data requests.

Increased gate fee revenue - A gate fee is the fee levied on a quantity of waste received at a waste processing facility. The fee differs depending on the composition of waste. Reduced misdescription of waste will result in fewer incidents of operators attempting to reduce their gate fee charges by misdescribing their waste.

Greater security of supply of critical raw materials – By increasing our understanding of where we are 'losing' critical raw materials currently, we can carry out targeted interventions to divert these materials to recycling and reuse.

Compliance with duty of care – A waste producer will likely be better informed about what has happened to their waste and this will increase their confidence that they are legally compliant with the duty of care regulation[158].

Improved business experience when complying with data sharing commitments – Waste Tracking should make complying with regulation easier and less time-costly for businesses.

Improved insights for policy development – The four nations can use the information collected in the Waste Tracking system to inform future policy decisions. Waste Tracking will also provide the means to make more, and better, data widely available in line with the government's focus on open data.

Benefits specific to option 2

Unlike in option 3, for option 2 there will not be a data capture function for operators without current digital systems to use. Therefore, option 2 may provide specific opportunities for digital companies to innovate 'manual reporting' IT solutions that 'capture data' and work for different areas of the waste industry. This could encourage innovation within the tech industry and could also create new employment opportunities.

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[158] https://www.gov.uk/government/publications/waste-duty-of-care-code-of-practice

Benefits specific to Option 3

The central Waste Tracking solution under option 3 will offer a 'data capture' function as well as facilitating for a range of other ways for users to upload information into the system. There may be increased demand for specialised and bespoke software to integrate businesses spreadsheets or software with the central Waste Tracking system for all waste. As proposed above for Option 2, this could encourage innovation within the tech industry and could also create new employment opportunities.

The availability of comprehensive data on the volume and type of all waste being produced in the UK could also improve the ability of local authorities to predict the amount of waste that may be expected to arise within a particular area and to plan for appropriate levels of waste infrastructure. This would also help government (and businesses) to improve our understanding of the capacity for waste treatment in different plants, in particular, the capacity for residual waste treatment.

The four UK environmental regulatory bodies have outlined that a central Waste Tracking service for all waste will result in time savings associated with reduced time spent **processing** and **reviewing** waste data returns (from permitted sites and exempt sites), including Annex VII forms. In addition, Waste Tracking should help to reduce enquiries and direct contact with the agencies. We have assumed that the time saved on these returns/enquires will be used to respond to Waste Tracking queries and other operational tasks.

Finally, having one central Waste Tracking service for tracking waste movements across all waste types i.e. hazardous, non-hazardous and waste containing POPs will be far more streamlined and effective for users compared to using a multitude of IT systems (as proposed in the baseline).

9. NON-MONETISED COSTS (OPTION 2 AND OPTION 3)

Compliance monitoring costs (chargeable to industry)

Currently, the costs of compliance monitoring of operators that handle **hazardous waste** is chargeable to operators through the payment of **consignment fees**. As part of the proposals for a Waste Tracking service for all waste types, regulators would also be able to recover the costs associated with monitoring the compliance of operators that handle non-hazardous waste. The functions that would be in-scope of cost recovery are yet to be confirmed. The regulators, devolved administrations and Defra officials are working closely to establish these functions and an associated cost estimate.

The functions that the regulators are considering including under the Waste Tracking regulations are described in the consultation document.

Transition costs for carriers, brokers and dealers (CBDs) of waste

Waste carriers, brokers and dealers will be impacted by Waste Tracking as they will need to record their waste movements and transfers digitally under option 2 or they will need to comply with the Waste Tracking service under option 3.

The transition costs to CBDs for options 2 and 3 are expected to be similar to those assumed to be incurred for waste sites: staff training costs, familiarisation costs, customer engagement, and provision of required on-site technology. We would expect that the impact on CBDs of transitioning to using digital services to be less burdensome than the impact on waste sites. This is mainly because CBDs will not need to record how the waste is treated or disposed of.

In 2019, there were approximately 300k businesses in the UK registered as carrying out waste carrier, broker or dealer activities (some of these businesses may also be registered as having waste sites so they

are not necessarily additional businesses). Therefore, total transition costs to these businesses could be significant in magnitude. There are a number of uncertain factors that have made monetising the transition cost to CBDs difficult. Where feasible, we will look to improve our understanding of these areas ahead of the final Impact Assessment:

- The on-site technology (e.g., mobile devices) in place within each CBD business will impact on the total cost to each of these businesses. We have no data on this currently.
- Some CBDs may carry out a significant number of waste transfers/movements in a given year, whereas others may only carry out one or two movements/transfers per year.
- The number of active lower-tier operators may be less than the number of businesses that are currently registered. lower-tier CBD registrations do not need to be renewed and therefore this figure may capture businesses that are no longer involved in waste transfers.
- In the January 2021 survey to the Waste Tracking user panel, 71% of respondents reported that they used **both** paper and electronic records. The extent to which businesses use digital records already could impact the transition costs for a CBD operator.

Transition costs to producers – Producers may incur transition costs following the implementation of Waste Tracking as they will have to digitally record details of the waste that they have collected. If they rely on a waste carrier to enter this information for them there will be some requirement for producers to confirm that the carrier has entered the correct data for the waste that they have removed from the producer's premises. We are seeking views on producer responsibilities through the consultation; however, it is likely that their new obligations will not be significantly different from their current obligations to ensure that accurate information is transferred with their waste. The key difference will likely be the requirement that this information is recorded in a **digital format**.

Transition costs for producers of waste could include the time cost of staff familiarising themselves with the new regulations and the time cost of training staff to effectively comply with the regulations.

We are unable to accurately monetise the transition costs to producers of waste given the uncertainty around:
- The number of waste producers in scope.
- The number of producers who would choose to enter digital waste transfer records onto the service themselves as opposed to relying on the waste carrier to enter the information.

We will seek views through the consultation on the likely impact on producers of waste transitioning to using digital records.

Transition costs to exempt waste sites – Many exempt waste sites will incur transition costs to comply with the requirements to digitally record details about the waste that they move/transfer (under Option 2), and additional costs if the requirements are extended to having to upload data into a central Waste Tracking service (Option 3). The transition costs are likely to be similar to those that we assume will be incurred by permitted waste sites: staff training costs, familiarisation costs, customer engagement, changes to current IT services and the provision of any on-site technology. We have not been able to accurately estimate the costs to these businesses as we were unable to obtain accurate cost estimates through our industry survey (as only 6 exempt waste sites responded).

The transition costs to exempt waste sites will differ significantly between individual sites depending on how much waste they handle and their current use of IT services. We will endeavour to improve our understanding of the transition costs to exempt waste sites ahead of the final Impact Assessment.

10. RISKS AND ASSUMPTIONS

- The waste management industry has a good understanding of the wastes generated by their customers, as well as detailed information on waste treatment and final destinations, but this information is often viewed as **commercially confidential** by the waste management industry. Therefore, in order to increase the access to such data through Waste Tracking, the waste management industry would need assurances over data security, the granularity of publicly available information, and commercial confidentiality.

- The **waste crime reduction** assumptions are not based on evidence related specifically to a Waste Tracking intervention. The digital Waste Tracking service is a novel service and as such we do not have access to domestic or international evidence on the impacts that it will have on waste crime reduction. We have instead used evidence on the impacts of targeted interventions to reduce specific waste crimes. The targeted interventions have some similarities with the Waste Tracking service insofar as they all include an element of improved data.

  Given the uncertainty, we have ensured that the estimates are reasonable by discussing the impacts with experts in the devolved administrations and the regulatory bodies.

- The **IT building cost** assumptions for the hazardous waste and POPs Waste Tracking service are assumed to be the same as the outstanding costs for building the central Waste Tracking service for all waste. It is possible that because the hazardous waste and POPs Waste Tracking service covers fewer waste types than the Waste Tracking service for all waste, the build costs may be slightly lower.

- The renewed **WDF contract running cost** assumptions are based on the running costs of the current WDF contract. It is possible that if the WDF contract is renewed, the running costs to government might be higher.

- The **time savings** to permitted waste site and local authorities associated with no longer needing to submit specific waste returns were based on questionnaire responses and therefore may not reflect an accurate average time saving across the industry. The proposed time savings have been reviewed by policy experts and sense-checked for accuracy before being included in the appraisal.

- The **number of businesses that will be impacted by the reforms** is uncertain. For example, it might be the case that not all exempt waste sites will be required to comply with the reforms.

11. SMALL AND MICRO BUSINESS ASSESSMENT (SaMBA)

Based on ONS data[159] on business sizes by employment, we have estimated that 99% of operators are deemed to be 'Micro' or 'Small / Medium' with 77.5% of businesses falling into the 'Micro' category. This knowledge has been at the forefront of policy development in order to ensure that the additional cost imposed on these businesses is as small as possible, whilst ensuring that the new service can operate effectively.

Table 40 – businesses in the waste industry by employment size

Number of business in scope by size	Percentage

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[159]https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/datasets/ukbusinessactivitysizeandlocation (Table 3, row 43 – "waste collection, treatment and disposal activities and materials recovery"

Micro (0-9 employees)	77.5%
Small/medium (10-249 employees)	21.8%
Large (250+ employees)	0.7%

Exempting micro businesses from complying with Waste Tracking would undermine the objectives that Waste Tracking is trying to achieve – to digitally track **all** waste movements/transfers in order to provide better data and to reduce waste crime. Exempting small/micro businesses would lead to breaks in data chains which would make tracking waste more difficult and, in some instances, impossible. It is therefore not a feasible option to exempt such businesses.

The central Waste Tracking service (Option 3) has been designed for data to be captured or entered in a number of different ways, enabling all businesses, from the micro to the large, to choose a process that is the least burdensome and most effective for them. Large businesses may prefer to transfer data from their current digital services onto the central service using a digital platform (API[160]) and smaller companies may prefer to manually input data or upload spreadsheets directly into the service.

We will also reduce the impact on smaller businesses by allowing other appropriate parties in the waste chain to enter information on their behalf. Some large waste producers will want to enter information about the waste they want moved, into the service themselves and they will have the resources available to do this. Many smaller producers will want to rely, as they do now with the paper-based service, on the expertise of the waste carrier to enter the correct information onto the service. The service will provide the functionality to allow this to continue to happen, whilst ensuring that there is a process by which the producer must still review and confirm that they are happy with the information that has been entered.

A benefit of the central Waste Tracking service, for smaller businesses in particular, will be the improved ability to ensure compliance with their duty of care[161] responsibilities. Currently all waste producers have a duty to ensure their waste is managed, disposed of, or recovered appropriately. Under the current process, once the waste is passed to a waste carrier, many do not know where their waste ends up and to find out can be complex and time consuming. Many larger waste producers are able to conduct checks and audits of the sites their waste is taken to, in order to satisfy themselves of compliance with the legislation but smaller companies do not have the resources to do this. With a new central service under Option 3, all businesses will be able to easily see where their waste has been taken and will be able to check what type of waste authorisation the site has.

In 2019, we carried out user research with businesses on the Waste Tracking user panel on their preferred choice of reporting method – either submitting prepared data into a system or using a system that captures the data automatically. We found that the preferred choice of reporting method differed depending on the number of transactions handled by each operator. Operators that handled more transactions (typically larger businesses) had a preference to submit data into the service (data submission system) e.g. keep digital records on their own system and then upload their data to the Waste Tracking service. operators that handled fewer transactions (typically smaller businesses) expressed a preference to upload data straight into the service (use a data capture service) e.g. through direct webform entry on the service. See Table 42 below.

We expect operators who currently handle large numbers of transactions to already have their own Waste Tracking software in place, and hence they are less likely to require the data capture service (40% of these

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[160] API = application programming interface
[161] https://www.gov.uk/government/publications/waste-duty-of-care-code-of-practice/waste-duty-of-care-code-of-practice

businesses supported the data capture functionality) than operators who handle fewer transactions and may have less data infrastructure (71% of these businesses supported the data capture functionality).

Therefore, option 3 provides a reduced burden on small businesses as this option will not require businesses to set up new IT to comply with the proposals set out in Option 3. In contrast, option 2 will require businesses to set up their own IT services that will enable compliance. These new IT services may not be significantly costly (for example, building new spreadsheets), but it seems reasonable to assume that the burden will be much greater for small businesses compared to large businesses.

Table 41 – Data capture service according to number of transactions, operators were asked to select the approaches that they would likely use.

	Fewer than 30,000 transactions annually	**More** than 30,000 transactions annually
Data capture service	71.03%	39.62%
Copy records from their own spreadsheets into a standardised spreadsheet to upload	46.73%	58.49%
Export data from their own Waste Tracking software into a standardised spreadsheet to upload	21.5%	45.28%
Directly transfer data from their own Waste Tracking software to the Waste Tracking service	14.02%	50.94%

% figures don't add to 100% as operators were able to select more than one service that they would likely use.

12. COMPETITION ASPECTS

The key impact on competition will be encouraging a more level playing field within the waste industry and supporting legitimate businesses. We expect that the Waste Tracking system will move a significant proportion of illegally handled waste to being handled legally. This shift will offer opportunities to legitimate businesses, in terms of increased access to waste from which businesses can profit, and in turn improved opportunities to invest in their business (either through increased labour force or capital investments) as a result of having greater scope for profit. A more level playing field should also improve efficiency within the sector.

Only operators who can afford to comply with digital Waste Tracking will stay in the market. As such, increased investment and running costs may be an economic barrier to entry to some. However, this intervention has been carefully designed to prevent illegal and non-compliant waste operators from entering or staying in the waste sector, whilst still enabling compliant businesses to operate by ensuring costs of compliance are set at a reasonable level.

We will welcome views on the competition implications of Waste Tracking through the consultation.

13. CONCLUDING SUMMARY

Option 3 is the preferred option because it provides the best value for money for the taxpayer while achieving the policy aims and intended effects. Options 1 and 2 are not preferred because the current detrimental impacts incurred by the natural environment, local communities and legitimate businesses would not be sufficiently addressed.

Without the ability to effectively and efficiently track waste and communicate timely relevant data (as proposed under option 3) we risk the following impacts:

- Further environmental damage;
- Operational inefficiency and;
- Fewer investment opportunities for innovation.

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14.   MONITORING AND EVAULATION AND THE POST IMPLEMENTATION REVIEW

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The impact of the Waste Tracking policy will be monitored on an ongoing basis and the regulatory measures will be evaluated in a post implementation review (PIR) in 2028. The PIR will aim to analyse data captured through the Waste Tracking service, and data gathered through stakeholder engagement and calls for evidence to assess:

- **The impact of Waste Tracking on waste crime** - The specific data we will look to gather to support the PIR will be the estimated number, and scale, of illegal waste sites, illegal waste exports and waste operators in operation following the implementation of the reform. We will also review the amount of different wastes that are reported (trends in hazardous waste and non-hazardous waste) and data on waste landfilled under different tax rates to understand the benefits of a Waste Tracking service in reducing misclassification of waste.

- **The impact of Waste Tracking on legitimate businesses -** We are interested in the impact on legitimate businesses, specifically how much additional tonnage of waste they handle following the implementation of the reform, the number of new businesses joining the market, the extent of time savings incurred as a result of the policy, and any additional cost burdens that operators may have incurred.

- **Diversion of materials away from landfill/incineration and the improvement in the supply of critical raw materials –** We will review the flows of material that end up in landfill or incineration and that are sent for recycling or reuse following the implementation of Waste Tracking, and compare this to historical data.

- **Efficiency savings for regulators –** We will engage with the regulators to understand the extent to which they have benefited from efficiency savings as a result of holding waste data digitally (and in a central system for option 3).

The evaluation will be designed to address the following questions:

- Outcomes: What difference (if any) did the measures make?
- Mechanisms, Contexts and Attribution: Why did observed changes occur?
- How were the activities delivered, and what can we learn?
- Economic evaluation: Did the benefits justify the costs?

A1: Previous studies that support the Waste Tracking policy

Review of Serious and Organised Crime in waste sector, 2018[162]
The review recommends that mandatory electronic (digital) tracking of waste should be introduced at the earliest opportunity. It found that the lack of digital record-keeping in the waste industry is frequently exploited by organised criminals, as it provides ample opportunity to hide evidence of the systematic mishandling of waste. It also observed that the lack of digital records undermines efforts to improve transparency, as it presents a significant barrier to information access by interested members of industry, academia and the public.

Eunomia's Waste Crime Review for Natural Resources Wales, 2017
The review focused on the types of waste crime that have a large impact on the environment and the overall market. One of the recommendations of the review was to mandate the use of an electronic waste transfer service to make the service more auditable. The review also highlighted that the provision of near real-time data would allow NRW to identify and react to suspicious movements of waste in a timelier fashion.

The LIFE SMART Waste Project[163] (run from 2014-20)
The project was led by the Scottish Environment Protection Agency (SEPA) working in partnership with three partner agencies including Natural Resources Wales. The project aimed to develop and demonstrate innovative ways of understanding, tackling and reducing waste-related crime. One of the recommendations was that all UK administrations make electronic tracking of waste mandatory.

Assessment of Cost for a UK Waste Data Service – Zero Waste Scotland 2014
The assessment presented a cost benefit analysis of the development of a UK wide electronic Waste Tracking service against the 'do nothing' baseline. The assessment estimated significant cost savings for waste industries (producers and operators), local authorities and regulators presenting an NPV of £179m over 20 years.

Rethinking Waste Crime[164]
This report was commissioned by the Environmental Services Association and the Environmental Services Association Education Trust and supported by the 'Right Waste, Right Place' campaign.

In the report's 'Key Recommendations' section, Recommendation 2 was to 'Mandate the Use of Electronic Waste Transfer Notes'.

The Mills Report (Dec 2013)[165]

This report recommends the creation of a mandatory electronic service for tracking waste transfer notes.

The Waste Tracking Project Team's User Research

Drawing from user research findings from the discovery stage of the Waste Tracking project, the conclusion reached is that the current state of Waste Tracking is not fit for purpose to face the challenges and opportunities of the future. There are large gaps in data gathered and reported and problems with the

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[162] https://www.gov.uk/government/publications/serious-and-organised-waste-crime-2018-review
[163] https://www.sepa.org.uk/regulations/waste/life-smart-waste/about-life-smart-waste/
[164] http://www.esauk.org/esa_reports/20170502_Rethinking_Waste_Crime.pdf (page 30)
[165] https://www.daera-ni.gov.uk/publications/review-waste-disposal-mobuoy-site-and-lessons-learnt-future-regulation-waste-industry

quality and consistency of the data available. This negatively impacts the performance of both regulators and business.

The two strongest findings from user research were that:

   1) *Businesses want stronger and more effective regulation of the waste industry in order to provide a level playing field for legitimate and conscientious operators*

Currently, businesses do not have the information they need to identify and unlock the potential value of waste materials, to reduce raw materials costs and develop new revenue streams. This is a market failure that is preventing business growth and stifling innovation.

The waste sector is asking for clearer, more effective regulation in order to maximise resource use and good practice waste management. Key industry groups have told us that the provision of more data is a top ask of government, in relation to improving resource productivity.[166] By making all those in the production and consumer chain aware of the amount and type of waste they generate can unlock important social and commercial dynamics that will lead to waste reduction.

   2) *Regulators do not currently have the data they need to carry out their work effectively*

Regulators do not currently have access to all the data they need, and the quality and consistency of existing data is often insufficient to effectively regulate the sector. Regulators require transformational change in Waste Tracking in order to; address mismatches between data sets, enable better interrogation of data for compliance work, improve intelligence on falsely described waste, carry out intelligent validation to ensure waste goes to the right place and intelligent interrogation of comparative data to tackle waste crime.

Evidence that improved data can make compliance monitoring more effective (which we expect will in turn reduce waste crime).

The Hazardous Waste and Data investigations (HWDI) team in the EA produced a slicer tool in early 2019 to analyse hazardous waste returns at a national level. This enabled the EA to spot anomalies and identify consignee returns where hazardous waste may have been underreported. By September 2020, the data enabled the EA to bring an estimated **600,000 tonnes** of additional hazardous waste that had not previously been reported into the service – an estimated minimum saving of **£600k**/year.

In Wales, NRW is able to interrogate data on Power BI to identify business sectors where under-reporting may be occurring, thus informing targeted hazardous waste compliance campaigns.

A study carried out by UCL on fly-tipping causes, incentives and solutions[167], analysed how "fly capture" (a platform launched by the EA), which required LAs and the EA to submit monthly returns on fly-tips, supported compliance monitoring of waste operators. The study found that the EA was able to identify trends in waste crime which focused their compliance monitoring efforts (e.g. 45% of fly-tips were found to be incurred in just 5% of LAs). These findings could be used to enable more targeted compliance work.

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[166] UK Resources Council Sept19, Aldersgate Group - Feb17, Environmental Services Association - May17, CIWM - May17
[167] http://www.tacklingflytipping.com/Documents/NFTPG-Files/Jill-Dando-report-flytipping-research-report.pdf

A2: Strategic alignment with the four nations' strategies

Waste Tracking would help meet the objectives of multiple key government strategies by providing the data and the means to use that data. This goes beyond waste sector focused strategies into areas including climate change, economic productivity and growth and tackling crime.

The strategies (and their embedded objectives) listed below would be supported by the implementation of a Waste Tracking system for all waste. Tables A1 and A2 set out in detail how a Waste Tracking system for all waste would align with some of the strategies listed below.

- 25 Year Environment Plan for England[168]
- Industrial Strategy[169]
- Clean Growth Strategy[170]
- Welsh Government's Circular Economy Strategy, "Beyond Recycling"[171]
- Making Things Last: A Circular Economy Strategy for Scotland[172]
- One Planet Prosperity: SEPA's Regulatory Strategy[173]
- Resources and Waste Management Plan for England[174]
- Natural Resources Policy for Wales[175]
- Prosperity for All: Economic Action Plan for Wales[176]
- Natural Resources Wales: Second State of Natural Resources Report[177]
- Planning Policy Wales[178]
- A Manufacturing Future for Wales: A Framework for Action[179]

Table A1: Meeting the strategic objectives

Strategy	Key Objective	Waste Tracking **will…**
25 Year Environment Plan[180]	<u>Mitigating and adapting to climate change</u> - We will take all possible action to mitigate climate change, while adapting to reduce its impact. We will do this by: - Continuing to cut greenhouse gas emissions including those from land use, land use change, the agriculture and **waste sectors** and the use of fluorinated gases.	Provide better data on the volume, composition and destination of 'waste' from which opportunities to reduce greenhouse gas emissions could be identified.
	<u>Minimising waste and reducing the impact on the environment</u> - We will minimise waste, by reusing materials as much as we can and we will manage materials at the end of	Provide better data on the composition and destination of 'waste' that could be reused or diverted from residual waste to

[168] https://assets.publishing.service.gov.uk/government/uploads/service/uploads/attachment_data/file/693158/25-year-environment-plan.pdf

[169] https://assets.publishing.service.gov.uk/government/uploads/service/uploads/attachment_data/file/664563/industrial-strategy-white-paper-web-ready-version.pdf

[170] https://assets.publishing.service.gov.uk/government/uploads/service/uploads/attachment_data/file/700496/clean-growth-strategy-correction-april-2018.pdf

[171] https://gov.wales/beyond-recycling

[172] https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2016/02/making-things-last-circular-economy-strategy-scotland/documents/00494471-pdf/00494471-pdf/govscot%3Adocument/00494471.pdf

[173] https://www.sepa.org.uk/media/219427/one-planet-prosperity-our-regulatory-strategy.pdf

[174] https://www.gov.uk/government/publications/resources-and-waste-strategy-for-england

[175] https://gov.wales/natural-resources-policy

[176] https://gov.wales/prosperity-all-economic-action-plan

[177] https://cdn.cyfoethnaturiol.cymru/media/693283/sonarr2020-theme-waste.pdf

[178] https://gov.wales/planning-policy-wales

[179] https://gov.wales/manufacturing-future-wales-framework

[180] https://assets.publishing.service.gov.uk/government/uploads/service/uploads/attachment_data/file/693158/25-year-environment-plan.pdf

	their life to minimise the impact on the environment. We will do this by: - Working towards our ambition of **zero avoidable waste by 2050.**	recycling. This would lead to a reduction in the amount of avoidable waste.
	<u>Working to a target of eliminating avoidable plastic waste by end of 2042.</u>	Provide better data on the composition and destination of 'plastic waste' that could be repurposed, leading to a reduction in the amount of avoidable plastic waste.
	<u>Meeting all existing waste targets – including those on landfill, re-use and recycling – and developing ambitious new future targets and milestones.</u>	Provide better data on the composition and destination of 'waste' that could be repurposed, leading to a reduction in the amount of avoidable waste.
	Seeking to <u>eliminate waste crime</u> and <u>illegal waste sites</u> over the lifetime of this Plan, prioritising those of highest risk. Delivering a substantial reduction in litter and littering behaviour.	Enable more effective regulation leading to a reduction in waste crime and more efficient management of waste.
	Significantly <u>reducing and where possible preventing all kinds of marine plastic pollution</u> – in particular material that came originally from land.	Enable more effective regulation leading to a reduction in waste crime and more efficient management of waste.
Industrial Strategy[181]	<u>Raising the resource productivity of businesses</u>, including through the <u>promotion of recycling and strong secondary materials markets</u> where products are designed with efficiency and recyclability in mind.	Provide the data that businesses need to maximise resource utilisation. Incentivise the development of products that maximise efficiency and recyclability as these successes will be better understood and recognised.
	We are committed to <u>moving towards a more circular economy</u> – to raising productivity by using resources more efficiently.	Provide the quality of data required to identify and develop more efficient processes and products.
	Continually strengthening our policies in line with our national ambitions of <u>zero avoidable waste</u> and a <u>doubling of resource productivity by 2050</u>, including through our 25-year Environment Plan and a new strategy for resources and waste.	Provide better data, enabling a deeper understanding of the current state and potential improvements, leading to better development of policy.
	<u>Data-driven economy</u>: a digitally connected economy that realises significant value from connected, large-scale data that can be rapidly analysed by technology to generate insights and innovation	Provide electronic 'real-time' data. This type and quality of data is simply not available under the current arrangement.
Clean Growth Strategy[182]	Work towards our ambition for <u>zero avoidable waste by 2050</u>, maximising the value we extract from our resources, and minimising the negative environmental and carbon impacts associated with their extraction, use and disposal	Provide better data on the composition and destination of 'waste' that could be repurposed, leading to a reduction in the amount of avoidable waste. Provide better data on the volume, composition and destination of 'waste' from which opportunities to reduce greenhouse gas emissions could be identified.

[181] https://assets.publishing.service.gov.uk/government/uploads/service/uploads/attachment_data/file/664563/industrial-strategy-white-paper-web-ready-version.pdf
[182] https://assets.publishing.service.gov.uk/government/uploads/service/uploads/attachment_data/file/700496/clean-growth-strategy-correction-april-2018.pdf

Beyond Recycling: A strategy to make the circular economy in Wales a reality[183]	**Sustainability - We will strive to achieve the highest rates of recycling in the world.** This includes working with local government, businesses, social enterprises and communities to take the next steps in becoming a truly advanced recycling nation. A key early step will be to transform the recycling of commercial, industrial, construction and demolition waste.	Waste Tracking will help in the fight against Waste Crime in Wales and provide annual information on industrial, commercial, construction and demolition waste produced in Wales.
Prosperity for All: Economic Action Plan for Wales	To keep products and material resources in high value use for as long as possible.	Waste Tracking will increase the flow of waste back into the economy. For example, by facilitating improved data on the composition and destination of 'waste' that could be repurposed, there could be a reduction in the amount of avoidable waste sent to landfill/incineration. In addition, if waste managers increase their engagement with the secondary material market, producers will have improved access to recycled material and hence will be less reliant on raw materials.
NRW's Second State of Natural Resources Report for Wales 2020	Waste can be viewed as a resource or burden. In both of these views there is an opportunity for criminals to make money. A mandatory waste data tracking system is key to understanding waste and resource flows and to be able to target and focus interventions. Alongside other tools and accompanying resources, the system needs to: support businesses and operators to comply with their regulatory duties and responsibilities; highlight illegal operations and leakages from the system to waste regulators.	Record all movements and transfers of ownership of waste to improve accountability and auditability for all parties transferring waste in a chain. This real-time data would also enable the regulator to identify and respond to suspicious activity in a timelier manner than at present.
Making Things Last: A Circular Economy Strategy for Scotland	Waste Prevention To reduce waste and use resources more efficiently in Scotland, delivering economic and environmental benefits. Waste Prevention is fundamental to the circular economy. In particular, preventing food waste and waste arising from construction and demolition. Food waste is a significant source of carbon emissions and construction accounts for about 50% of all waste in Scotland and is a major influence on efficient use of resources.	Provide data to monitor progress towards key targets, including waste prevention by sector. Provide better data on the volume, composition and destination of 'waste' that could be repurposed, leading to a reduction in the amount of avoidable waste.
	Climate Change Estimates suggest that, by 2050, a more circular economy could reduce carbon emissions by 11 million tonnes per year. Moving the management of waste up the waste hierarchy to	Provide better data on the volume, composition and destination of 'waste' to help identify opportunities to reduce greenhouse gas emissions. Enable more effective regulation leading to a reduction in waste crime and more

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[183] https://gov.wales/beyond-recycling

	reuse, repair, remanufacture and recycling will help to reduce the carbon impact of waste.	efficient management of waste. These outcomes will reduce the contribution of waste to greenhouse gas emissions and enable better informed adaptations to impacts.
	Economy The circular economy agenda is seeking new ways to reduce our demand for natural resources and keep materials flowing through the economy at as high a value as possible for as long as possible.	Provide the data that businesses need to maximise resource utilisation and to identify and develop more efficient processes and products.
	Measuring progress We want to improve our understanding of how products and materials flow through Our economy - to track progress, understand the environmental benefits delivered, assess the scale of potential opportunities and help identify future actions. Tonnage-based targets remain important, but do not give us a full understanding of environmental or economic impacts, and further improvement in measures, data reliability and quality are required. We will move towards making the use of the electronic "EDOC" service mandatory for waste in Scotland and consider inclusion of trans-frontier shipment of waste and hazardous waste.	Provide better data on the movement of all waste allowing us to monitor progress against current and future targets and track material flows more efficiently. It will meet Scottish Government ambitions to introduce a mandatory electronic service for tracking waste as well as Circular Economy package aspirations for electronic data exchange.
One Planet Prosperity: SEPA's Regulatory Strategy	Compliance This Regulatory Strategy sets about helping regulated businesses to reduce water use, carbon-based energy use, materials use and all forms of waste and pollution beyond compliance standards in ways that, where possible, also create social and economic benefits. SEPA will continue to drive all those remaining businesses not yet meeting set standards into full compliance with the environmental laws in Scotland.	Enable more effective regulation leading to a reduction in waste crime and more efficient management of waste.
	Information and evidence SEPA's regulatory work will be carried out in accordance with six Organisational Characteristics, the first of which is, *Producing information and evidence that people use to make decisions.*	Provide timely, more detailed and complete data and information on the generation and management of waste materials. This would be available to support robust decision making in areas such as policy, regulation, planning and investment.
	Sector plans A sector plan will be developed for each sector SEPA regulates, focussing on practical ways of delivering environmental, social and economic outcomes. Sector plans will map existing levels	

		Provide sector-focused data to support the development and monitoring of sector plans.
	of compliance and focus on the key levers that influence a particular sector. SEPA's **Waste to resources framework** will primarily be delivered through sector plans.	
Resources and Waste Management Plan for England[184]	<u>Double resource productivity by 2050</u>	Provide the data that businesses need to maximise resource utilisation. Incentivise the development of products that maximise efficiency and recyclability as these successes will be better understood and recognised.
	<u>Eliminate avoidable waste of all kinds by 2050</u>	Provide better data on the composition and destination of 'waste' that could be repurposed, leading to a reduction in the amount of avoidable waste.
	<u>Eliminate avoidable plastic waste over the lifetime of the 25 Year Environment Plan</u>	Provide better data on the composition and destination of 'plastic waste' that could be repurposed, leading to a reduction in the amount of avoidable plastic waste.

A3: IT systems currently in use in the UK to record waste data

Table A2 – A summary of the IT systems currently in use in the UK to record waste data

	Description
WasteDataFlow (WDF)[185]	WDF is used by local authorities (LAs) to report data on the types and quantities of waste collected and its treatment. LAs report the data quarterly in England, Wales and Northern Ireland and annually in Scotland. Inputting returns into WDF is a **mandatory** requirement. Data extraction and reporting in WDF can be complex and time consuming and there are some inconsistencies in reporting by LAs. In addition, exempt activities are not always reported in WDF which decreases the utility of the data.
Electronic Duty of Care (EDOC)[186]	EDOC is a free online portal designed to give businesses a **voluntary** digital alternative to the paper-based Waste Transfer Note. There has been very limited uptake of EDOC to date.
National Packaging Waste Database (NPWD)[187]	NPWD provides data on reprocessed volumes, and imports and exports for specific recyclates for packaging. The National Packaging Waste Database also covers Waste Electrical and Electronic Equipment (used by businesses that place less than 5 tonnes of WEEE on the market) and batteries.
Hazardous Waste returns	Hazardous Waste returns are submitted to the Environment Agency and Natural Resources Wales on spreadsheets/xml files each quarter, detailing the hazardous waste that has been received, treated or disposed of. NRW returns are available on the Power BI system. In

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[184] https://www.gov.uk/government/publications/resources-and-waste-strategy-for-england
[185] https://www.wastedataflow.org/
[186] https://www.edoconline.co.uk/
[187] https://npwd.environment-agency.gov.uk/

	Scotland and Northern Ireland, individual hazardous waste consignment notes are submitted to SEPA and NIEA.
Waste data interrogator[188] and Hazardous waste data interrogator[189] (EA only)	Data is reported annually and includes data based on returns from permitted sites, and exports. The data excludes exempt facilities and most reprocessors for dry recyclate. It is aggregated data which is requested for monitoring a permitted site's compliance with its permit conditions.
Waste returns	Returns are submitted directly to the agencies, either quarterly or annually, providing a summary of information on waste inputs and outputs from licensed and permitted (and some exempt) sites. Returns are mostly submitted in spreadsheet format and are held on internal agency databases and public registers.
International Waste Shipments	International Waste Shipments Online is used by exporters of 'Amber List[190]' waste to notify regulators of shipments for approval. Not all operators use IWS online, some operators use email to provide information and then agency staff enter this information onto IWS. Exports of green list waste do not require approval or prenotification in England and Wales and there is no current service for tracking the movement of green list waste exports or imports. In Scotland and Northern Ireland data is collected on 'green List waste exports but not imports.
MRF reporting portal[191]	The MRF reporting portal gathers detailed sampling information undertaken by notified Material Facilities in England and Wales. This data is submitted via spreadsheet in Scotland, and subsequent data analysis published in an externally facing interactive tool.
WEEE settlement centre	A standalone service that is used to record "evidence" of WEEE (Waste Electrical and Electronic Equipment) collections.
WEEE online	A UK wide service used by Approved Authorised Treatment Facilities (AATFs) to record when WEEE is received and used by Producer Compliance Schemes (PCSs) to record EEE placed on the market and WEEE collected.
End-of-Life Vehicles (ELV) forms	Obligated businesses (vehicle manufacturers and authorised treatment facilities) across the UK complete a proforma and return this to Defra either via email or in paper form. Defra aggregate the data using Excel, and combine it with Certificate of Destruction data provided by the Driver & Vehicle Licensing Agency.

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[188] https://data.gov.uk/dataset/d409b2ba-796c-4436-82c7-eb1831a9ef25/2019-waste-data-interrogator
[189] https://data.gov.uk/dataset/d6819c00-9c98-42fe-84d1-397fc93d76f6/hazardous-waste-interrogator-2018
[190] Amber list waste is exported/imported waste that is hazardous or that contains both hazardous and non-hazardous wastes.
[191] https://mfrp.wrap.org.uk/

In the early stages of policy development, the project team used previous studies and the outputs of internal work to draw up the key variables of potential options. These are:

A. **Service description** – three types of service were considered.

Data submission service (*similar functionality to Option 2)***
The service provides the functionality for data, held on various external user services, to be transferred into government services digitally, when requested. It primarily provides a service for regulators and government to receive and use data in a digital format.

Data capture service
The service provides for the reporting of data by users directly through a government system. It provides a service for external users, government and regulators to track waste digitally. Some external users will already have digital systems of their own that do this.

Comprehensive service (submission + capture) (*similar functionality to Option 3)***
The service combines the two options above. It is closest to what most people think about when they talk about 'Waste Tracking'.

B. **Scope of Data / Waste Regimes**

We have identified three broad options for defining the scope of the service in terms of the data and waste regimes that will be covered:

- The **minimum option.** The service is used for obtaining data contained currently in waste transfer notes and hazardous waste consignment notes in digital format. The data does not include any additional markers or additional data fields.

- The **enhanced option.** The service is used for obtaining data on three-party transactions (this requires the waste transfer process to be aligned with Hazardous waste consignment process). The data obtained includes additional markers (e.g., to identify household versus commercial waste etc.) as well as some additional data fields that close key data gaps. The service could cover waste movements as well as waste transfers in a digital form.

- The **extensive option.** As well as the data covered in the enhanced option, the service is used to collect the maximum conceivable information related to waste transfers and movements across regulatory regimes (including WEEE, packaging, producer responsibility, international waste shipments etc.) in a digital form.

The matrix of options based on the above variables is set out below.

Longlist of options considered when developing the Waste Tracking service

Option	Service description	Scope of Data / Waste Regimes
1. Data submission service – minimum scope of data / waste regimes	Data submission service	Minimum
2. Data submission service – enhanced scope of data / waste regimes		Enhanced

3. Data submission service – extensive scope of data / waste regimes		Extensive (*basis for Option 2*)
4. Data capture optional service – minimum scope of data / waste regimes	Data capture service	Minimum
5. Data capture optional service – enhanced scope of data / waste regimes		Enhanced
6. Data capture optional service – extensive scope of data / waste regimes		Extensive
7. Comprehensive mandatory service (choice of submission and/or capture) – minimum scope of data / waste regimes	Both submission and capture service provided	Minimum
8. Comprehensive mandatory service (choice of submission and/or capture) – enhanced scope of data / waste regimes		Enhanced
9. Comprehensive mandatory service (choice of submission and/or capture) – extensive scope of data / waste regimes		Extensive (*basis for Option 3*)

Assessing and scoring the long list

The project team scored each option against each separate element of the 3 sets of assessment listed below. Each option was scored from 1 (very unlikely to meet this criteria) to 9 (very likely to meet this criteria) for each element. The combined scores are presented in the next section.

The project team used the outcomes of Discovery to draw up these 3 sets of assessment criteria;

- ➤ Critical Success Factors – these were used to assess the viability of an option to both meet key objectives and be achievable given dependencies and constraints:
  - o Data will fill current knowledge gaps
  - o Future legislative/ regulatory requirements and key strategic objectives are met
  - o Simple and effective process for all parties
  - o Service is affordable
  - o Service is achievable
  - o There is sufficient supply side capability and capacity

- ➤ Main Benefits – each option was assessed in terms of its likelihood to realise the main benefits:
  - o Reduces ongoing IT costs
  - o Increases resource efficiency within the regulators
  - o Reduced administration costs for businesses
  - o Increased revenue to legitimate businesses
  - o Improved customer service
  - o Reduced need to conduct statistical surveys
  - o More income from an improved charging process and increased compliance
  - o Reduced waste crime
  - o Wider economic and environmental benefits

- ➤ User Stories – each option was assessed in terms of its likelihood to deliver the initial needs identified by the user research:
  - o Effective regulatory change (increased deterrence for non-compliance)

- o Improved data
- o Understanding of where waste ends up
- o Understanding of data handling obligations
- o Able to track all waste
- o Includes data on producers of waste
- o Simplified reporting process
- o Amalgamate data in one report

Short listed options

The options were scored by the project team and subject matter experts representing the regulators and policy makers of the four nations. The subsequent shortlisted options are presented below.

Table A3: Shortlisted options for the Waste Tracking service

Option	Assessment Outcome
Option 3 - Data submission service – extensive scope of data / waste regimes	SHORTLISTED – One of the 2 highest scoring options *(basis for Option 2)*
Option 9 - Comprehensive mandatory service (choice of submission or capture) – extensive scope of data / waste regimes	SHORTLISTED – One of the 2 highest scoring options *(basis for Option 3)*

Both of the shortlisted options (Option 3 and Option 9) propose an extensive scope of data to be captured. The service will be used to digitally collect the maximum conceivable information related to waste transfers and movements across regulatory regimes.

Both Option 3 and Option 9 will allow for interoperability insofar as users who do have sufficient services in place will be able to integrate them with the Waste Tracking platform – they will be able to upload the required data, without having to replace existing services. However, only Option 9 offers the 'data capture' function which accommodates for users who may not have sufficient infrastructure in place to easily upload data to the Waste Tracking platform.

The extent of the need for the 'data capture' functionality, to ensure interoperability, was highlighted by the 2021 Waste Tracking service survey. The Waste Tracking service survey, which closed in January 2021, asked operators in the waste industry how they recorded hazardous and non-hazardous waste transfers, movements and shipment. The results of the survey showed that a number of different approaches were being used to report data and track waste, with 13% of operators still relying on paper records, and only 12-15% electronically recording all of their waste data – see Table A5. This suggests that there is currently a lack of electronic infrastructure in the industry which may make transposing and submitting accurate data difficult for some operators.

Table A4: How records are currently kept for waste transfers, movements and shipment

	Non-hazardous waste	Hazardous waste
Both paper and electronic records	71%	75%
Paper records	13%	13%
Electronic records	15%	12%

A5: Waste Tracking user panel analysis

The analysis of transition costs and ongoing savings to businesses was derived from a Waste Tracking user panel poll conducted in February 2021 – 92 businesses responded.

We focused on respondents who either operated or managed a waste facility – these businesses represented just over half of the sample. The split of these businesses by business size are described in Table A6.

Table A5: Number of respondents who operate or manage a waste facility, by business size

Respondents to Waste Tracking user panel of interest, by business size (operators/managers of waste facilities only)	
1 - 10 employees	13%
11 - 250 employees	43%
250+ employees	45%

Headline analysis of the expected approach to reporting waste movements in the Waste Tracking service (manually recording each waste movement, copying own records into a spreadsheet and uploading onto the service, copying movements from current software into a spreadsheet and uploading onto the service, or transferring data from current software) are presented below.

Table A6: Number of respondents who operate or manage a waste facility, by business size and expected approach to recording waste movements in the Waste Tracking service

Business size, by expected method of recording in WTS				
	Manual record	Spreadsheet - copy from own records	Spreadsheet - copy from own software	Transfer from software
1 - 10 employees	50%	17%	17%	17%
11 - 250 employees	15%	20%	50%	10%
250+ employees	24%	38%	29%	10%

For simplicity, we assumed that small businesses (1-10 employees) will fall into the exemption's category of the reform, whereas medium and large businesses (11-250 employees and 250+ employees) will need to apply for a permit.

The number of small business (1-10 employees) respondents in this sub-sample was not sufficient to include these businesses in analysis for the impact on exempt waste sites as we would have needed to extrapolate 6 responses to a business population of 64,783. In addition, these 6 responses did not provide any variance in estimates when broken down by expected approach of recording waste movements.

We analysed the proportion of businesses which expected to incur each type of cost or saving from moving towards a centralised Waste Tracking service, and the average cost or saving reported. The results are presented in the table below. 10% of respondents did not expect to incur any costs from transitioning to the new service, whereas 59% did not expect to incur any savings. The figures on average reported costs and savings focus only on the proportion of the sample who did expect to face any costs and benefits.

Table A7: Proportion of respondents expecting to incur each type of cost or saving and estimated average amount

Type of cost	% applicable	Average reported cost
Staff training	80%	£1,965
Familiarisation time	80%	£2,533
Requirements familiarisation	73%	£2,156

Customer engagement	59%	£1,961	
Changes to current IT services - software	78%	£12,830	
Provision of any on-site technology	49%	£13,391	
Type of saving	% applicable	Average reported saving	
Data entry / recording savings	32%	£6,579	
Data storage savings	2%	£5	
Reduction in time spent checking data quality	27%	£1,914	
Reduction in time spent obtaining/providing waste information from or to customers	76%	£1,433	

As the magnitude of the above costs and savings varies across the sample, we looked into the distribution of each cost and saving by expected method of interaction with the new service. Based on this breakdown by expected method of compliance with the service, and the applicability proportions for each cost or saving, we estimated the average amount expected to be incurred per method of reporting *per* cost or saving.

Extrapolation to the business population, that we expect to be in scope of the Waste Tracking service (14,042 businesses), was based on the proportion of respondents who expected to incur any costs multiplied by the breakdown of respondents expecting to use each method of recording waste movements. The same approach was used for savings. The number of businesses in scope is presented below.

Table A8: Business in scope, scaled to the UK business population expected to acquire a permit under the new regime

	Manual record	Spreadsheet - copy from own records	Spreadsheet - copy from own software	Transfer from software
Businesses in scope to incur costs	2,473	3,710	5,255	1,237
Businesses in scope to incur savings	1,136	1,704	2,414	568

Costs and benefits per preferred method of interacting with the Waste Tracking service are as follows:

Table A9: Total costs and benefits arising from using the Waste Tracking service, per method of recording waste movements (Option 3)

Method of recording	Total transition costs incurred in year 1	Annual savings
Manual record	£10,856,000	£1,976,000
Spreadsheet - copy from own records	£19,796,000	£1,166,000
Spreadsheet - copy from own software	£49,427,000	£3,034,000
Transfer from software	£4,652,000	£2,000
Total	**£84,731,000**	**£6,177,000**

The above figures refer to the costs and benefits under Option 3. For Option 2, we have assumed that in a high-estimate, 86% of businesses in scope under Option 3 will incur any costs and benefits. Under a low-estimate, 13% of businesses in scope under Option 3 will incur any costs and benefits.

Option 2 assumes that businesses currently using paper records only (13% of businesses) will record their waste movements/transfers into the system manually and businesses that currently use a mix of paper and digital recording will copy their records into standardised spreadsheets and upload these into a central Waste Tracking system.

Table A10: Total costs and benefits arising from using the Waste Tracking service, per method of recording waste movements (Option 2)

Method of recording	Total transition costs incurred in year 1	Annual savings
Manual record	£2,934,000	£1,316,000
Spreadsheet - copy from own records	£43,728,000	£2,907,000

A6: Devolved Administrations

This annex is provided to demonstrate how relevant data and impacts are expected to be divided between each of the devolved administrations.

Assumptions and data – split by the devolved administrations

Table A11: How records are currently kept for waste transfers, movements and shipment (UK average)

All nations	Non-hazardous waste	Hazardous waste
Both paper and electronic records	71%	75%
Paper records	13%	13%
Electronic records	15%	12%

Table A12: How records are currently kept for waste transfers, movements and shipment within each devolved administration

	England		Wales		Scotland		NI	
	Non-hazardous waste	Hazardous waste	Non-hazardous waste	Hazardous waste	Non-hazardous waste	Hazardous waste	Non-hazardous waste	Hazardous waste
Both paper & electronic records	73%	75%	69%	74%	69%	74%	66%	69%
Paper records	12%	12%	15%	11%	15%	13%	14%	11%
Electronic records	15%	13%	17%	15%	16%	13%	21%	20%

Summary of non-discounted costs and benefits – split by the devolves administrations

Table A13: Summary of non-discounted costs and benefits (Option 2), £m[192]

	England	Wales	Scotland	NI
Option 2 costs (net of the baseline impact)				

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[192] Split using population data.

	England	Wales	Scotland	NI
Regulators – Transition costs	0.01	0.01	0.01	0.01
Businesses - Transition costs	7.1	0.4	0.7	0.2
Option 2 benefits (net of the baseline impact)				
Businesses – Ongoing savings from storing waste records digitally	31.06	1.77	3.07	1.03
Total costs	7.13	0.41	0.71	0.24
Total benefits	31.06	1.77	3.07	1.03
Net impact	23.93	1.36	2.36	0.79

Table A14: Summary of non-discounted costs and benefits (Option 3), £m[193]

	England	Wales	Scotland	NI
Option 3 costs (net of the baseline impact)				
Regulators – Transition costs	3.12	0.01	0.01	0.01
Businesses - Transition costs	57.5	3.3	5.7	1.9
Government – Cost of decommissioning EDOC	0.01			
Businesses – Increased taxation[194]	276.4	15.8	27.3	9.2
Option 3 benefits (net of the baseline impact)				
Government - IT development cost savings	2.2	0.1	0.2	0.1
Government - Savings from reduced waste crime	276.4	15.8	27.3	9.2
Government – Savings from no longer running EDOC	2.1	0.1	0.2	0.1
Government – Savings from no longer running WDF	4.0	0.2	0.4	0.1
Local government – Time savings to businesses from no longer needing to submit WDF returns	158.0	9.0	15.6	5.3
Businesses - Time savings to businesses from no longer needing to submit certain waste returns (permit site returns and waste exemption returns)	144.4	8.2	14.3	4.8
Businesses - Benefits from reduced waste crime	84.2	4.8	8.3	2.8

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[193] Split using population data.
[194] In the absence of data on the split of waste crime costs to the public sector between taxation, clearing of illegally dumped waste and compliance monitoring/enforcement, we have assumed that the full cost to the public sector is loss of taxation. Therefore, the assumed reduction in waste crime reflects an increase in taxation receipts for the public sector (the increase in taxation receipts will be an additional cost to businesses). However, in reality the cost to businesses is likely to be less as some of this benefit will be reduced clean-up costs, or reduced compliance monitoring/enforcement costs.

	England	Wales	Scotland	NI
Businesses – Ongoing savings from storing waste records digitally, and in a central service	68.8	3.9	6.8	2.3
Environment - Benefits from reduced waste crime	11.0	0.6	1.1	0.4
Total costs	336.3	19.0	32.9	11.1
Total benefits	746.0	42.6	73.6	24.8
Net impact	+ 409.7	+ 23.6	+ 40.7	+ 13.7

Baseline costs – split by the devolved administrations

Table A15: Summary of baseline UK IT development costs (for government), £m[195]

	England	Wales	Scotland	NI	Total
WDF (rebuild)	2.19	0.12	0.22	0.07	**2.60**
Hazardous Waste and POPs waste digital tracking (new)	3.6	0.2	0.4	0.1	**4.3**
Total	**5.8**	**0.3**	**0.6**	**0.2**	**6.9**

Table A16: Summary of baseline UK annual IT running costs (for government), £m[196]

	England	Wales	Scotland	NI	Annual running cost
WDF running costs	0.31	0.02	0.03	0.01	**0.37**
EDOC running costs	0.16	0.01	0.02	0.01	**0.19**
Total	**0.47**	**0.03**	**0.05**	**0.02**	**0.56**

Table A17: Transition costs to businesses (baseline) – split by each of the four nations[197]

£m	England	Wales	Scotland	NI	Total
Familiarisation costs	0.32	0.03	0.03	0.02	**0.40**
Transitioning to use of new functions costs	12.74	1.10	1.36	0.72	**15.93**
Total	**13.06**	**1.13**	**1.40**	**0.74**	**16.33**

*Table A18: **Annual** costs to businesses of running the hazardous waste and POPs Waste Tracking service - (baseline)[198]*

£m	England	Wales	Scotland	NI	Total
Service running costs	0.40	0.03	0.04	0.02	**0.50**
Service management costs	0.40	0.03	0.04	0.02	**0.50**

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[195] Split using population factors.
[196] Split using population factors.
[197] Split based on information sourced from environment agencies, number of hazardous authorised and exempt treatment sites affected by the policy in each nation: England (3,260), Scotland (349), Wales (282), Northern Ireland (184).
[198] Split based on information sourced from environment agencies, number of hazardous authorised and exempt treatment sites affected by the policy in each nation: England (3,260), Scotland (349), Wales (282), Northern Ireland (184).

*Table A19: **Total** costs to businesses of running the hazardous waste and POPs Waste Tracking service - (baseline)[199]*

£m	England	Wales	Scotland	NI	Total
Service running costs	5.28	0.46	0.57	0.30	**6.60**
Service management costs	5.28	0.46	0.57	0.30	**6.60**

There will be costs to the regulators associated with advising hazardous waste treatment site operators on new requirements. To calculate this cost, it has been assumed that an official[200] in each of the regulatory bodies, will spend the equivalent of one-month's work over the 2-year transition period on this task.

Table A20: Baseline transition costs to the regulator (time spent familiarising, training and communication changes)

	England	Wales	Scotland	NI	Total
Transition costs to the Businesses (costs incurred per year[201] for 2-years)	£6,521	£6,521	£6,521	£6,521	**£26,084**

Option 2 costs – split by the devolved administrations

Table A21: Transition costs to the regulator (time spent familiarising, training and communication changes) – Option 2

	England	Wales	Scotland	NI	Total
Regulator transition costs (costs incurred per year[202] for 2-years)	£13,042	£13,042	£13,042	£13,042	**£52,168**

Table A22: Transition costs to the businesses (time spent familiarising, training and communication changes) – Option 2

£m	England	Wales	Scotland	NI	Total
Business transition costs	7.12	0.41	0.70	0.24	**8.5**

Option 2 benefits – split by the devolved administrations

Table A23: Total ongoing savings to businesses (Option 2)

£m	England	Wales	Scotland	NI	Total
Business savings	31.06	1.77	3.07	1.03	**36.93**

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[199] Split based on information sourced from environment agencies, number of hazardous authorised and exempt treatment sites affected by the policy in each nation: England (3,260), Scotland (349), Wales (282), Northern Ireland (184).

[200] At a grade 5 level, or equivalent.

[201] Monthly salary would be £6,521 and there are four regulators that would incur this cost.

[202] Monthly salary would be £6,521 and there are four regulators that would incur this cost.

Option 3 costs – split by the devolved administrations

*Table A24: **Total** costs to businesses of running the Waste Tracking service - (Option 3) [203]*

£m	England	Wales	Scotland	NI	Total
Service running costs	5.28	0.46	0.57	0.30	**6.60**
Service management costs	**5.28**	**0.46**	**0.57**	**0.30**	**6.60**

Table A25: Transition costs incurred by the regulators

	England	Wales	Scotland	NI	Total
Transition costs to the regulator (per year for 2-years)	£19,563	£19,563	£19,563	£19,563	**£78,252**

Table A26: Transition costs to the businesses (time spent familiarising, training and communication changes) – Option 3

£m	England	Wales	Scotland	NI	Total
Business transition costs	57.5	3.3	5.7	1.9	**68.4**

Table A27: Total costs to the businesses from increased taxation – Option 3

£m	England	Wales	Scotland	NI	Total
Business taxation costs	276.4	15.8	27.3	9.2	**328.6**

Option 3 benefits – split by the devolves administrations

Table A28: Savings in IT building/procurement costs for governments (Option 3) [204]

£m	England	Wales	Scotland	NI	Total
Option 1 (baseline) IT capital costs	5.8	0.3	0.6	0.2	**6.9**
Option 3 IT capital costs	3.6	0.2	0.4	0.1	**4.3**
Saving under Option 3, relative to Option 1	**2.19**	**0.12**	**0.22**	**0.07**	**2.60**

Table A29: Summary of UK IT running cost savings (for governments) under Option 3, £m

£m	England	Wales	Scotland	NI	UK Annual cost saving
WDF	0.31	0.02	0.03	0.01	**0.37**

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[203] Split based on information sourced from environment agencies, number of hazardous authorised and exempt treatment sites affected by the policy in each nation: England (3,260), Scotland (349), Wales (282), Northern Ireland (184).

[204] Split using population factors.

EDOC	0.16	0.01	0.02	0.01	**0.19**
Total	**0.47**	**0.03**	**0.05**	**0.02**	**0.56**

Table A30: Ongoing savings to businesses (Option 3)

£m	England	Wales	Scotland	NI	Total
Business savings	68.83	3.93	6.79	2.29	**81.8**

Table A31: Summary of assumptions that underpin the waste crime reduction benefits (Option 3) [205]

	England	Wales	Scotland	NI	UK
Reduced Illegal wastes sites and permit breaches	530	52	30	18	**630 per year from 2028**
Reduced fly-tipping	**Reduction in commercial waste fly-tips of 25%**				
Reduced illegal exports	672	38	66	22	**799 fewer exports per year from 2028.**

Table A32: Summary of benefits as a result of reduced waste crime in England (Option 3), £m[206]

England	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Public sector	4.4	8.3	12.2	16.1	20.0	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	**275.6**
Private sector	2.4	3.3	4.1	4.9	5.8	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	**79.9**
Wider society	0.5	0.6	0.6	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	**10.7**

Table A33: Summary of benefits as a result of reduced waste crime in Wales (Option 3), £m

Wales	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Public sector	0.3	0.5	0.7	0.9	1.1	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	**15.7**
Private sector	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	**4.6**
Wider society	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.6**

Table A34: Summary of benefits as a result of reduced waste crime in Scotland (Option 3), £m

Scotland	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Public sector	0.4	0.8	1.2	1.6	2.0	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	**27.2**
Private sector	0.2	0.3	0.4	0.5	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	**7.9**
Wider society	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	**1.1**

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[205] Split using population factors.
[206] Split using population factors.

Table A35: Summary of benefits as a result of reduced waste crime in Northern Ireland (Option 3), £m

Northern Ireland	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Public sector	0.15	0.28	0.41	0.54	0.66	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	**9.18**
Private sector	0.08	0.11	0.14	0.16	0.19	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	**2.66**
Wider society	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	**0.36**

Table A36: Benefits to LAs from reduced time spent submitting WDF returns[207]

	England	Wales	Scotland	NI	Annual saving
WDF returns	£10,696,226	£706,658	£1,027,866	£353,329	**£12,784,078**

Table A37: Monetised savings to businesses from no longer having to submit waste returns for permitted sites or exempt sites, £m

	England	Wales	Scotland	NI	Annual saving
Exempt site returns	0	0	**0.04**	0	**0.04**
Permitted site returns	11.08	0.63	1.09	0.37	**13.17**
Total	**11.12**	**0.63**	**1.10**	**0.37**	**13.22**

A7: Sensitivity analysis

Costs of waste crime in Wales data

In addition to the ESA's 'Rethinking Waste Crime' report[208], which analysed the costs of waste crime in **England**, a separate study has been carried out by Eunomia on the costs of waste crime in **Wales**. We have compared the proposed benefits of reduced waste crime for Wales using both the English and the Welsh data to establish the extent to which the Welsh data supports our approach of scaling English data on Waste crime to reflect Welsh impacts.

Fly-tipping: In Wales in 2018/19 commercial wastes accounted for 14% of fly tipping incidents, rather than 11% as in England. Using Welsh data, the estimated average cost of fly-tipping in Wales was estimated to be £8.3m/year.[209] Using English data, the scaled-down estimated impact of fly-tipping in Wales was £11.9m/year (both figures in 2015 prices). Applying the assumption that we used in section 7.7.1, that fly-tipping of commercial waste would reduce by 25%[210] 5-years after the implementation of Waste Tracking we get two different proposed annual benefits – one based on Welsh data and one based on English data.

Estimated saving from a reduction in commercial fly-tips of 25%	Welsh data (commercial fly-tips account for 14% of total fly-tips)	Scaled-down English data (commercial fly-tips account for 11% of total fly-tips)
Fly-tipping	£0.29m	£0.33m

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[207] Split using the ratio of local authorities/areas in each nation: England (343), Wales (22), Scotland (32), Northern Ireland (11).
[208] http://www.esauk.org/application/files/7515/3589/6448/20170502_Rethinking_Waste_Crime.pdf
[209] Average of a low estimate (£4.7m) and a high estimate (£11.8m).
[210] Low (0%) and high (50%) reduction assumptions have also been included in the appraisal.

This table shows that the costs of commercial waste fly-tipping in England are marginally greater per capita, than the costs of fly-tipping in Wales per capita. Therefore, to scale the costs of fly-tipping in England to the costs of fly-tipping in Wales using a population factor could slightly overestimate the potential savings from reduced fly-tipping. However, some of this divergence in costs between the two nations may be due to methodological differences in capturing the cost associated with fly-tipping of waste between the two studies. In the Eunomia study on waste crime in Wales, it is explained that more detailed data for England is more readily available which may make estimates more reliable.

To maintain consistency across the four nations we have chosen to include the scaled-down English data to capture the impacts of reduced misclassification of waste in Scotland, Northern Ireland and Wales.

Misclassification of waste: Five years after the implementation of Waste Tracking for all waste, we expect misclassification of waste to be 10%[211] lower, compared to the baseline scenario. Applying this assumption to the cost of misclassification of waste based on Welsh data results in an annual benefit of £0.4m and applying this assumption to scaled-down English data results in an annual benefit of £0.7m.

Estimated saving from a reduction in misclassification of waste by 10%	Welsh data	Scaled-down English data
Misclassification of waste	£0.4m	£0.7m

Therefore, as described above, to scale the costs of misclassification of waste in England to the costs of misclassification of waste in Wales using a population factor may overestimate the potential savings from reduced misclassification of waste. However, some of this divergence in costs may be due to methodological differences in capturing the cost associated with misclassification of waste. Therefore we have taken the same approach as with the benefits from reduced fly-tipping, to include the scaled-down English data to capture the impacts of reduced misclassification of waste in Scotland, Northern Ireland and Wales in order to maintain consistency across the four nations.

Illegal Waste sites and permit breaches illegal exports – Our approach to estimating a reduction in the number of active illegal waste sites and the number of illegal waste exports is based on a nominal reduction in illegal waste sites/exports, rather than a percentage reduction. For the purposes of this analysis, we do not assume that the saving associated with closing or preventing an illegal waste site or preventing an illegal waste export to be significantly different between England and Wales.

Outputs of the costs of waste crime studies in Wales and in England.

Estimated Costs of Waste Crime by Type in Wales 2015/16 (£m) – using Welsh data	Low	High	Average	Costs of waste crime in Wales using England data and scaled down
Illegal Waste Sites[212]	2.30	5.60	4.0	5.61
Fly-tipping (dealt with by NRW *and* LAs)	4.70	11.80	8.3	11.94

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[211] Low (5%) and high (15%) estimated reductions in misclassification of waste have also been included in the appraisal.
[212] Eunomia's 2017 Waste Crime Report for Wales included details of 15 major illegal waste sites in Wales which accounted for about 252kt of waste in 2015/16 at a cost of £2.3m-£5.6m. In Wales NRW deals with around 70 illegal waste sites each year, these sites acepting, storing and treating waste with no authorisation and having a direct impact on people, environment and legitimate business. In addition, the problem persists with permitted facilities accepting unauthorised waste types. In Wales, additional funding from Welsh Government has been used to establish a team focused on tackling waste crime. This team focuses on intelligence gathering and crime disruption, using innovative techniques like satellite imagery to identify problem wastes and develop upstream interventions and ultimately reduce the number of active illegal waste sites.

Misclassification	1.30	7.30	4.3		7.34
Permit Breaches	4.90	4.90	4.9		1.72
Illegal Exports	1.30	1.70	1.5		-
Total	**14.50**	**31.30**	**22.9**		**31.59**