



**Smarter Regulation of Waste in Europe
(LIFE13 ENV-UK-000549)
LIFE SMART Waste Project**

Action B5:

Waste flow audits - Final report

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Table of Contents

LIST OF FIGURES.....	II
LIST OF TABLES	II
LIST OF ABBREVIATIONS	II
LIST OF LIFE SMART WASTE PROJECT TECHNICAL ACTIONS.....	II
FOREWORD	III
1.0 EXECUTIVE SUMMARY.....	1
2.0 INTRODUCTION.....	3
2.1 <i>Waste flows</i>	3
2.2 <i>Report structure</i>	3
3.0 CURRENT APPLICATION OF WASTE FLOWS THINKING IN REGULATION.....	4
4.0 THE LEGAL AND FUNDING FRAMEWORK	5
4.1 <i>Legal framework</i>	5
4.2 <i>Funding</i>	6
5.0 ADDITIONAL BARRIERS TO AND OPPORTUNITIES FOR ADOPTING WASTE FLOW APPROACHES.....	7
5.1 <i>Site Based Inspections</i>	7
5.2 <i>Resources</i>	7
5.3 <i>Complexity and Data Quality Issues</i>	7
5.4 <i>Traceability</i>	8
6.0 CURRENT APPLICATION OF WASTE FLOWS THINKING IN TACKLING WASTE CRIME.....	10
6.1 <i>UK</i>	10
6.2 <i>Wales</i>	10
6.3 <i>Northern Ireland</i>	11
6.4 <i>Scotland</i>	12
6.5 <i>England</i>	12
6.6 <i>What does it all mean? Assessing the differences and designing the LIFE SMART Waste Project, Waste Flows approach</i>	13
7.0 APPLYING THE APPROACH: ATTEMPTING TO MAP THE FLOW OF WASTE FINES IN SCOTLAND.....	15
7.1 <i>Purpose</i>	15
7.2 <i>Methodology</i>	15
7.3 <i>Initial data analysis stage</i>	15
7.4 <i>Obtaining operational data</i>	15
7.5 <i>Data analysis stage</i>	15
8.0 DATA QUALITY ISSUES.....	18
8.1 <i>Coding discrepancies</i>	18
8.2 <i>Waste transfer notes not recording waste quantities</i>	18
8.3 <i>Amended waste transfer notes</i>	18
8.4 <i>Lack of Data and slow responses</i>	18
8.5 <i>Overview</i>	18
9.0 NEXT STEPS	19
ANNEX I - THE BARRIERS FACING ENVIRONMENTAL AGENCIES IN IMPLEMENTING WASTE FLOW AUDIT APPROACHES.....	I

List of Figures

Figure 1 - Example waste flows process diagram	13
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List of Tables

Table 1 - Disposal site discrepancies	16
Table 2 - Production site discrepancies	16
Table 3 - Production & receiving site anomalies	17

List of abbreviations

Term	Definition
DAERA	Northern Ireland Department of Agriculture, Environment and Rural Affairs
EA	Environment Agency
EU	European Union
EU MS	European Union Member States
LIFE	EC Financial Instrument for the Environment
LSW	LIFE SMART Waste
NIEA	Northern Ireland Environment Agency
NRW	Natural Resource Wales
SEPA	Scottish Environment Protection Agency
UK	United Kingdom of Great Britain and Northern Ireland
OECD	Organisation for Economic Co-operation and Development

List of LIFE SMART Waste project technical actions¹

No.	Description
B1	Design innovative intelligence communication hub
B2	Develop waste crime intelligence gathering strategy
B3	Design and demonstrate innovative methods to understand and analyse competitive behaviour in waste businesses and market trends ('Competitive Intelligence')
B4	Build innovative emerging threat and predictive analysis approach ('Horizon Scanning')
B5	Develop innovative waste flow audit approaches
B6	Develop innovative financial investigation approaches
B7	Develop innovative ways to use waste flow tracking devices
B8	Develop, pilot and evaluate Remote Sensing techniques
B9	Deploy and test intelligence communication hub
B10	Undertake investigation to fill intelligence gaps and pilot innovative investigatory tools
B11	Produce intelligence reports including recommendations for interventions
B12	Scope out barriers to joint working between agencies nationally and trans-nationally on interventions to tackle waste crime
B13	Specify how to set up group structures to overcome barriers and deliver joint interventions
B14	Create innovative interventions menu and design manual for selecting interventions
B15	Set up cross-agency intervention groups and deliver interventions to tackle waste crime issues associated with 'challenging' waste streams
B16	Produce recommendation reports for policy and legislative interventions

¹ As per the project's EC Grant Agreement for LIFE funding, key project deliverables are denoted by alphanumeric actions throughout the report (e.g. Actions B1, B2, B3, etc.).

Foreword

By the LIFE SMART Waste project

The LIFE SMART Waste project's final Waste flow audits report (Action B5) was prepared in early 2017 and this foreword is an addendum to highlight subsequent, highly significant, developments in the waste regulatory landscape and to place the continuing value of the report in context.

The most notable development in 2018 was China's ban on the import of contaminated waste for recycling. This may both decrease the risk of illegal exports to Asia and also increase the risk of illegal waste disposal in EU Member States and in Non OECD countries.

From a waste flows perspective, the continuing need to understand waste flows and changes in markets has never been greater. Agencies should continue to enhance their use and understanding of this approach by using intelligence gathered from the analysis of waste data. This will inform understanding and support investigative action where appropriate. The LIFE SMART Waste project has continued work in this area during 2018, developing a *Waste Crime Indicators Toolkit* that is designed to provide practical indicators of waste crime using simple analysis of waste operator data. Pilots for this toolkit will commence in 2019.

There is an increasing government and regulatory understanding of the importance of waste data as illustrated by, for example, the Scottish Government publication, *A Strategy for Improving Waste Data in Scotland* (October 2017)², with strong focus on waste flows.

Public examination of environmental agencies and the key role they undertake in waste regulation has increased substantially. In part, it is driven through widespread media coverage of plastic waste disposal in our oceans, heightening concern for the environment and highlighting the threat from illegal waste disposal. Governments and regulators will come under increasing scrutiny and be expected to answer questions on their ability to track and account for what is happening to waste and recycle material.

Waste data teams across environment agencies have been essential in developing a stronger, fit-for-purpose, waste flows approach within the Scottish Government Materials Recovery Code³ work in the last year. However, it is recognised that our ability to track vulnerabilities in the supply chain requires further resource support.

In addition, waste data and intelligence teams continue to struggle with poor, missing, incomplete and, in some cases, falsified waste data that fundamentally undermines the value of their analysis work. Waste data integrity issues therefore need to be tackled as a priority through the use of existing regulatory tools, including the enforcement of Duty of Care regulations, and co-ordinated action taken to promote better compliance and data reporting behaviours. In tandem, legislative and policy developments on the implementation of an electronic Duty of Care (*EDoC*) system are welcome.

Willie Wilson

Environmental Crime International Liaison Manager, SEPA
Vice Chairperson of INTERPOL Environmental Compliance and
Enforcement Committee Advisory Board

2 August 2018



² <https://www.environment.gov.scot/media/1902/a-strategy-for-improving-waste-data-in-scotland-october-2017.pdf>

³ <http://www.gov.scot/Resource/0047/00472355.pdf>

1.0 Executive Summary

This report presents an overview of progress made in Implementation of Action B5, to develop innovative waste flow audit approaches.

A waste flow approach is one which tracks the movement and management of waste and recyclable material through each step in the chain, from cradle-to-grave, rather than viewing each waste management site in isolation. The approach has the potential to provide enhanced opportunities to deliver intelligence and intervention options to help eradicate waste crime.

It has not been possible to meet the specified objective for Action B5 – that is, to design an innovative waste flow audit approach that meets the specific objectives of being less complex, less time-consuming and less labour-intensive. The achievement of this objective assumes that data quality is sufficiently robust and accurate for auditing purposes, and accessible in a form that best serves meaningful analysis and audits of challenging waste streams. As explained in this report, these are flawed assumptions and have constrained the progress of this action.

The report concludes that the delivery of waste flow approaches to both regulation and waste crime intelligence is also inhibited by legislative and funding frameworks. These frameworks place site inspection as the primary regulatory interaction with waste management facilities. Waste flow approaches are therefore not resourced appropriately and are seen as a 'nice-to-do', but not 'must-do', activity that can be incorporated into traditional site inspections as required.

The most significant issues precluding the development of an innovative approach, however, are poor quality data and a still-prevailing paper-based system. The paper-based system puts the burden of data collection and collation onto the regulator. This, and the poor quality data, precludes effective analysis. As per the findings of other regulatory agencies (summarised in this report), the only answer to this is a more advanced approach to data collection and analysis through modern IT software applications. This is beyond the scope of this project⁴ but formed the basis for a policy change recommendation for an electronic duty of care system.

These constraints notwithstanding, the project has sought to make an independent contribution to the ongoing discussion about waste flow approaches across the four UK agencies. As outlined in this report, a common theme across the agencies has been the need to maintain time- and resource-intensive site visits as the central component in all waste flow approaches. The LIFE SMART Waste project has explored the value of an alternative approach that removes the need to visit waste sites and therefore reduce the inevitable demand upon time and resource required to analyse the data sets held by a regulatory agency. This novel approach allows agencies to focus attention and resources on potential problematic and illegal sites.

That approach is to establish waste flows as a core service of intelligence teams and to make it a central component in intelligence collection and analysis priorities. The objective is to make waste flow assessment as much a focus of intelligence as collection via partnership exchange with law enforcement, or from members of the public or confidential sources. This is about putting waste intelligence back into purpose of intelligence teams.

⁴ A waste flows policy recommendation has been noted for LSW Action B16.

The central aspect of this approach explored in this action is to place a requirement upon intelligence teams to obtain and analyse data from the single largest, under-explored source of waste movements available to regulators: waste transfer notes. The report outlines exploratory attempts made by LIFE SMART Waste in Scotland to obtain notes for a defined period of time from sites of interest and to subject these to an analysis which looks for discrepancies in the declarations made by two or more points in the chain. Timely identification of these discrepancies in the waste transfer notes by intelligence would then allow them to notify inspectors of suitable sites for subsequent, and more intensive, site-based audit and potential investigation.

This report refers to this intelligence approach as enhanced data screening, and initial results do show that the identification of timely discrepancies in the notes between sites can provide intelligence about likely leakage of waste to unknown sites. However, as also outlined in the report, any attempt to upscale this approach would be significantly limited by very poor data quality and inconsistency in the notes. Waste transfer notes remain woefully underexplored as an intelligence source but their value remains uncertain owing to significant data issues.

The establishment of waste flow approaches to regulation – and therefore contributing to the eradication of waste crime – remains the goal. Indeed, the increasing emphasis by regulatory agencies upon supply-chain regulation in the delivery of waste to resource strategies makes it even more necessary. The report concludes therefore by suggesting options for next steps and the potential to re-scope project aims and objectives to continue to contribute to the exploration and delivery of waste flow approaches by the UK regulatory agencies.

One option is to seek out collaboration opportunities with the current NIEA-led eDoc+ project which is exploring the potential for commercial off the shelf software applications in providing real-time monitoring capabilities and to investigate case study options following the end of that project in March 2017; this is currently being explored.

Another option is that LIFE SMART Waste and NRW work together to explore required improvements to the existing eTool and to consider how the tool could bring together electronic data prior to an audit to make data collection less labour intensive and time consuming.

A third option is to initiate work to consolidate the learning of all UK regulators in waste flows approaches. This would be done via an initial workshop and questionnaire with the possible intention of building a cross-border intervention group to explore options for development across the agencies later in the project. Cross-border work is currently being developed by LIFE SMART Waste and UK regulators.

A fourth option is to initiate an activity to provide a robust analysis of waste transfer notes and how poor quality submissions, often deliberate and obfuscating, can hinder effective regulation and investigations into waste crime. An outcome of this work could be to provide evidence in the development of policy recommendations or legislative interventions under Implementation Action B16. The aim of this option would be to build a robust evidence case on the issue of poor quality data and to use this in discussions with policy makers and others to seek legislative change re: consistent data issues and Duty of Care.

2.0 Introduction

2.1 Waste flows

The structure of the waste sector is complex and involves many actors: producers, waste management operators, brokers, hauliers and shipping agents. This means that it is extremely difficult for regulators to track waste movements; a situation that is further complicated by the fact that waste transfer notes are not routinely submitted to the regulator for meaningful audit and analysis. This means that it is easy to move waste around and to conceal where it finally ends up.

This has made the sector more vulnerable to the infiltration of criminals who can take advantage of the complexity and profit from vulnerable points in the chain. Waste crime is evolving and becoming more difficult for regulators to detect at the site level.

The lack of a comprehensive analysis of all our existing sources of information about waste flows, and the inability practically to track the flow of waste throughout the system, is a major vulnerability on the part of regulatory agencies in preventing waste crime that requires a response⁵. By comprehensive, we mean specifically the outputs from one facility being tested against recorded inputs to subsequent facilities in order to identify pathways, and test and validate declarations. An ideal solution to this problem would be the adoption of waste flows-based regulation. The aim of LIFE SMART Waste Implementation action B5 is to explore the practical opportunities of waste flow audit approaches in delivering intelligence and intervention opportunities to eradicate waste crime.

A waste flow approach is one which seeks to track the movement and management of waste and recyclable material through each step in the chain from cradle-to-grave. Rather than view each site in isolation, the approach seeks to understand the “whole life” cycle of the waste. This approach could help environmental regulators better identify illegal activities and tackle the root causes of waste crime. Although waste flow pilot studies have been undertaken by all the UK agencies, we are still a long way from fully embedding it as a complementary or complete alternative to site-based compliance: it is inhibited by our principal legislative framework and funding provisions as well as practical barriers faced by regulators wanting to establish or adapt activities to include waste flow approaches.

2.2 Report structure

This report consists of the following sections:

- A summary of the current application of waste flows thinking in environmental regulation
- A summary of waste flows approaches in efforts to identify and tackle waste crime
- A review of the current regulatory waste framework and the barriers faced by agencies in applying waste flow audit approaches
- A summary of progress made in the development of a waste flow methodology and analytical technique and the results of an initial trial of this approach.
- Options for future development of action B5.

⁵ The issue was specifically identified as one of the causes of the emergence of the Mobuoy waste site in Northern Ireland in, C. Mills., *A Review of waste disposal at the Mobuoy site and the lessons learnt for the future regulation of the waste industry in Northern Ireland* (December, 2013)

3.0 Current application of waste flows thinking in regulation

It could be argued that waste flows thinking has been a central component of waste regulation for decades: the registration of waste carriers; the legal requirement to complete waste transfer or consignment notes; and, in addition, the submission of licenced site returns and Local Authority waste data are all built on the principle of monitoring the movement of waste. However, it is generally accepted that monitoring has been severely limited: it has never been undertaken systematically; and the legislative framework means that waste transfer notes are not subjected to anything approaching regular review and analysis. The situation is further aggravated by often poor quality, and on occasion, suspected falsified data submissions. These deficiencies are some of the primary reasons that regulators have not had an overview of the entire waste system and why, therefore, waste crime is able to go undetected.

The importance of waste flows thinking is becoming increasingly important as agencies engage with the major issues of 21st century regulation, including the delivery of circular economy principals and Zero Waste targets and ambitions. Sustainable resource use is in part built upon a supply chain approach to regulation. This is generally about providing an enhanced understanding of the flow of waste from a strategic perspective and, through mass balance approaches, seeking to understand the feed-back loops from waste to resources⁶. The established approach of regulating sites against authorisation conditions, however, does not deliver the comprehensive understanding of waste flows that this requirement entails⁷.

The need to examine waste flows by regulatory authorities is undeniable. In seeking to understand the complete story of a waste stream, the environmental regulator will:

- improve its evidence base and allow a greater certainty on where waste has come from and where it is going;
- better regulate businesses and improve compliance within the sector;
- help ensure that wastes are prepared to a standard which is appropriate and recovered or disposed of properly;
- help identify potential illegal activities or other issues in the waste stream.

A move towards a more comprehensive application of a waste flows approach has begun but its development has been recent and is still very difficult because of a number of significant regulatory, funding and legislative barriers. These barriers are explored in more detail below.

⁶ For example, as outlined in *A Waste Data Strategy for Scotland*, p.7

⁷ *One Planet Prosperity – A Waste to Resources Framework* (SEPA, 2016), p. 8

4.0 The Legal and Funding Framework

4.1 Legal framework

The current legal framework of EU law, and its subsequent implementation and transposition into UK and devolved legislation, means that it is practically difficult for environmental agencies to move away from the current, site-based approach to compliance inspection and to adopt a waste flow orientated approach to regulation.

The Waste Framework Directive (Directive 2008/98/EC) sets out the basic concepts and obligations on waste management and its regulation⁸:

- the prevention of harm to human health and the environment through inspection of criteria including site operations and safety measures;
- technical competence;
- monitoring and controls;
- waste types and quantities.

It obligates competent authorities specifically to carry out inspections of *waste establishments or undertakings* and these requirements for regular inspections have been implemented into UK and devolved legislation through the:

- Environmental Permitting Regulations 2010;
- Waste Management Licencing Regulations 1994;
- Environmental Protection Act 1990;
- Waste Management Licencing (Scotland) Regulations 2011.

In Wales, the environmental permitting regime requires operators to obtain permits register exemptions for facilities and provides for ongoing supervision by regulators. The regulations place a duty on authorities to undertake periodic inspections of regulated facilities and identify principal offences as the operation of a site without a permit and failing to comply with the conditions of that permit.

In Scotland, the majority of facilities are licenced by way of a Waste Management Licence issued under the Waste Management Licencing Regulations 1994; whereas other facilities that operate under exempt activities fall under The Waste Management Licencing (Scotland) Regulations 2011. The provision for a system of waste management licencing is set out in the Environmental Protection Act 1990 which seeks to prevent unacceptable emissions to the environment through specific site-based management and control systems. The duties upon the regulator to ensure that these conditions are being met by the regulated party are outlined in section 42 of the Act. Fulfilling this duty include making *inspections* of the site and, where necessary, taking enforcement action.

In summary, the respective regulatory regimes require SEPA and NRW to authorise waste facilities through permits or licences and then undertake regular inspections of those facilities. This legal requirement therefore presents an obstacle to environmental agencies seeking to adopt waste flow approaches. However, it is made more difficult, as is described later, by the fact that as much as half of regulatory agency income is obtained from charging schemes to recover the costs of carrying out these same regulatory functions; poor quality data and information and the lack of modern data collection systems.

⁸ Source: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008L0098>

4.2 Funding

The majority of charging schemes for environmental licences across the UK are to recover the costs of undertaking regulatory functions, inspections and compliance assessments and are made either under powers given in the Environment Act 1995 or, in Scotland, by the Environmental Regulation (Scotland) Charging Scheme 2016. Although there are some differences in detail across the various schemes the aim is consistent: to recover charges relating directly to the provision of our waste regulation but not overcharge for the cost incurred in doing so.

The impact of all of this upon the practicality and feasibility of adopting waste flow approaches to regulation is clear. Under the current legislative framework, waste flow approaches are not part of our service provision and are therefore not chargeable. It is a resource-intensive and time consuming activity and, significantly, agencies are prohibited from funding it either from subsidies from collected charges or from cost recovery. Indeed, cost recovery would be considered a tax and any monies obtained in that way would likely be lost to agencies.

Complying with the legislative and funding guidelines therefore presents a considerable challenge to environmental authorities seeking to adopt waste flow and supply chain approach to regulation. Indeed, the link between chargeable subsistence fees and the provision of regulatory services becomes much less tangible when we begin to talk about adopting waste flow approaches.

Although waste flow approaches offer many potential benefits to regulatory agencies, particularly in tackling illegal and non-compliant activities, the barrier presented by the legislative and funding framework has slowed exploration and hindered adoption of auditing techniques. Legislation and funding are the two major obstacles, and further barriers are explored below.

5.0 Additional barriers to and opportunities for adopting waste flow approaches

5.1 Site Based Inspections

The regulatory framework at European and national levels requires that environmental agencies permit waste activities. As we have seen above, inspection regimes are organised to monitor compliance against the conditions of those permits, and so ensure controls and infrastructure remain adequate against the risk posed by the activity. The regulatory framework in itself does not prevent environmental regulators adapting their inspection activities to help better detect and prevent the problems that have emerged as the waste industry has evolved, and partial waste flow audits could be conducted during inspections. However, significant challenges remain: the collection and analysis of additional data requires additional workload, skills and resources; a requirement for new systems; and, a subsequent need to respond to any identified issues and to undertake inspections to upstream and downstream operators.

There is also the inherent challenge in any proactive work of how to prioritise work. The proactive approach of actively auditing to identify problems may be at odds with the reactive response programmes that environmental authorities are typically required to operate. Therefore authorities need to have the ability and the resources to both deal with any issues that are proactively identified (through auditing), as well as respond effectively to reactive pressures. Unless reactive workloads can be serviced and managed appropriately then there is likely to be internal resistance to the adoption of approaches that may actively uncover issues.

5.2 Resources

As described above, environmental authorities are unlikely to be able to resource waste flow work from permitting subsistence charges. Authorities need to maintain a clear link between their activities and the services provided, and avoid over-recovery of costs and cross subsidies. Waste flows work will require subsequent audits of producers, carriers, brokers and additional sites which fall outside of the permitting regime, as well as additional visits to permitted sites. It is highly unlikely that these activities could be funded through subsistence charges.

Although an alternative funding approach is via Grant in Aid (GiA), many environmental authorities have seen a reduction in their GiA and face difficult decisions on the activities they carry out using that funding stream. Enforcement activities against illegal operators are typically already funded through GiA and so the addition of waste flow audits – and therefore an increase in resource demands upon GiA - may be seen as burdensome and unwanted. The danger is that the activities of legitimate operators continue to be scrutinised, while unscrupulous operators continue to undercut the market and reap the financial benefits.

5.3 Complexity and Data Quality Issues

As described in Section 6 below, indications from trial waste flow auditing approaches undertaken by SEPA are that the process is likely to be more resource-intensive to undertake than even traditional site based inspection. Further research is needed to quantify the differing resource demands against the complexity of the approaches used. Environmental Authorities are seeking ways to make waste flow audits less complex and less labour intensive. Fundamentally, a waste flow audit requires the collection and analysis of information.

The degree to which the Authority collects data and the number of data sources it consults can be reduced but this could limit its value and make outcomes less robust.

Regulators have recognised that they need to do more and carry out more meaningful analysis with the data they currently hold. Better data quality and analysis will help authorities prioritise and target their efforts more effectively. The development and monitoring of data indicators could help identify where waste is being accepted in greater quantities than is permitted; where the wrong waste is in the wrong place; and where it is being mis-described. There is a significant challenge, however, to achieving this: data collection in the agencies is not being collected for the purposes of waste flow audits. This is likely to mean that the data is incomplete, generalised or in a format that is difficult to process on a large-scale, multi-site basis. One example is waste returns data which could aid regulators' understanding of waste flows. This is currently limited in that the data is summarised by Local Authority area which makes linking flows through permitted sites difficult. Environmental authorities should consider reviewing their data handling and reporting requirements to identify where changes can be made that make the data more useful for understanding and identifying waste flow. Data quality issues also need to be addressed to facilitate effective analysis.

As described in the Mills report (2013), the UK Duty of Care system is still mainly paper-based and this precludes effective analysis since, to make it useful for auditing purposes, it is necessary for the regulator to manually enter data obtained from each paper record. This is a time consuming task and often the quality of data makes it difficult to interpret or is simply incomplete. Finally, the onus is on the regulator to actively obtain Duty of Care documentation. A move to a mandatory electronic Duty of Care (*eDoc*) system, which already exists on a voluntary basis, would greatly enhance the ability of environmental authorities to undertake efficient waste flow audit approaches. This would reduce much of the information collection and data entry burden that currently sits with the regulator.

5.4 Traceability

The simple fact is that current thinking on waste flow audit approaches demands access to detailed, accurate information in order to trace waste movements through the system. This is labour intensive and extremely time consuming and constitutes a significant barrier. In essence, it is akin to a financial investigator attempting to trace and audit a financial transaction by needing to visit each bank, clearing house and courier involved and to collect and then analyse each paper stub, receipt and statement. In order to be more efficient the majority of work undertaken during waste flow audits needs to take place through an analysis of electronic data which is validated and submitted to the regulator by the waste industry.

There are, however, wider potential benefits of adopting a more advanced approach to data collection and use:

*“Collecting and sharing the right data on waste resources would open our eyes to what it is we are trying to manage. There is huge potential to link the technology we use within the waste sorting and treatment industry and to add to it and feed off that data”.*⁹

⁹ <https://www.mrw.co.uk/latest/material-flow-map-essential-for-tackling-waste/10014731.article>

A useful comparative here is the enhanced focus on food traceability since 2013, and an increasing awareness of the vulnerability of the European food supply chain to crime:

*“the concept of ‘traceability’... food and feed businesses – whether they are producers, processors or importers – must make sure that all foodstuffs, animal feed and feed ingredients can be traced right through the food chain, from farm to fork”.*¹⁰

If similar traceability advancements could be made in the waste industry, then not only could waste flow mapping be undertaken more efficiently but it may also lead to improvements in the management of waste in the EU as a whole.

¹⁰ http://ec.europa.eu/dgs/health_food-safety/information_sources/docs/from_farm_to_fork_2004_en.pdf

6.0 Current application of waste flows thinking in tackling waste crime

6.1 UK

It is a fair observation that although waste flow thinking is not new to environmental agencies it is mostly concerned with mass balance and the support of waste-to-resource strategies, and this means that it has not yet become a practical approach in delivering regulation of waste. In addition, the current context of waste flows thinking means that these approaches have never specifically been utilised to deliver focused intelligence about waste crime. This is not to say, of course, that intelligence about waste crime cannot emerge from this approach. Rather, that it is not its primary purpose and waste flows have never been used as a specific intelligence development and analytic framework to identify points vulnerable to crime. A key objective of Action B5 was to design a method with the specific aim of delivering a structured approach to waste crime intelligence teams for them to deliver, for the first time, dedicated and actionable intelligence based on waste flows; and to build this into their intelligence requirements and analytic approaches.

As indicated above, the most obvious potential source of intelligence based on waste flow monitoring should come from an analysis of existing data sources: waste transfer notes, Waste Data Flow and licenced site returns. However, as pointed out by Christopher Mills in his review of the circumstances and contributory factors leading to the illegal disposal of waste at Mobuoy, “the data is so coarse-grained that it is of relatively limited value for analysis”¹¹. Although made with specific reference to Northern Ireland prior to 2013, Mills’ tactful assessment does not conceal the simple fact that all the UK environmental agencies are prevented from deriving regular actionable intelligence from a waste flows approach because the data is fragmented, often incomplete and characterised by omissions and errors. The potential of a combined analysis of licenced site returns and waste transfer notes to deliver actionable intelligence on waste crime remains substantially underexplored, and this action explores the opportunities presented by a structured waste flows intelligence analysis approach.

As represented by Mills’ comments, UK regulators have been aware for a long time of the barriers and obstacles to practical waste flows monitoring and analysis; and so, in recent years, each agency has explored different ways to improve their application of a waste flow approach in tackling waste crime. It is necessary to consider briefly the experiences of each agency in order to better contextualise the development of action B5 and the opportunities and limitations of the proposed approach. What is clear is that progress in each of the agencies has been relatively finite and hampered by fundamental obstacles and barriers. Although these issues in part explain the overall difficulty in designing a practical waste flow approach to tackling waste crime, the following review highlights good practice identified by regulatory colleagues across the UK agencies, as well as identifying obstacles, for consideration in future attempts at dealing with waste flow approaches. The following is *not a comprehensive review of activities* conducted by UK agencies, and further work is required in this area.

6.2 Wales¹²

Between 2013 and 2015 Natural Resources Wales with funding from the Welsh Government developed and trialled a practical intelligence *eTool* hosted on Microsoft Access to support

¹¹ Mills, *Review*, p.46

¹² Information provided by John Fry, Waste Advisor, Natural Resources Wales.

standardised collection and analysis of waste flow data. The *eTool* was field tested in a pilot and mapped the flow of waste wood from nine production sites and it represents perhaps the most complete attempt to date in moving towards developing a comprehensive approach to waste flows monitoring. The opportunities presented by the *eTool* are evident: the chance to validate licenced site returns against data collected from site visits; the collection of data and evidence about stockpiling and an assessment of its impact throughout the chain; as well as, importantly, the ability to provide individual assessments of the volume of waste moving between sites throughout the chain and therefore to identify the full range of final sites from the largest to the smallest, and potentially even non-permitted final destination sites.

There are, however, a few issues which make the *eTool* less attractive as an immediate solution, although it is acknowledged that it has only been tested and trialled in one pilot and that Natural Resources Wales have already identified requirements for future development. The *eTool* does not collect hauliers' information and this means a lost opportunity to begin to map the network of transporters who play such a central role, and largely without any regulatory oversight, in the movement of waste across the UK.

More importantly, however, is the question of resource. The *eTool* is built on the premise that it is the local waste inspectors who will undertake a programme of site inspections necessary to collect the data required by the tool for subsequent analysis. This is a challenging – and challenged – premise: the capacity of waste inspectors to undertake their regulatory duties is already stretched, and in this context the bigger picture value of the work is not clearly seen. In short, it is a *nice-to-do activity*, but not one that is the central purpose of waste regulators. Overall, the *eTool* clearly has the potential to deliver the sort of actionable intelligence on vulnerable points to crime within individual waste streams that we need; and must, therefore, be considered seriously as an answer to the question of how regulatory agencies use and develop waste flows intelligence to tackle waste crime.

6.3 Northern Ireland¹³

Whereas Wales has developed a potentially very powerful – but currently underused – *eTool* to drive waste flows work, Northern Ireland is undertaking dedicated, on-the-ground waste flow data collection and analysis with a view towards delivering the enhanced traceability of waste as demanded by Mills in 2013.

The primary difference with Wales, however, is scale: whereas the intention in Wales is to map the flow of an entire waste stream through all sites from production to final disposal, in Northern Ireland the focus is more limited practically to tracking the movement of waste from a relatively small number of problematic sites. It is essentially an enhanced Duty of Care audit in which the key process is a reconciliation exercise to determine whether the codes and descriptions of waste recorded entering a facility are broadly matched by expected codes and descriptions of waste subsequently leaving the site.

Firstly, problematic sites are identified by looking for unexpected data anomalies through a comparative analysis of licenced site data returns and weighbridge records. Next, these sites are the subject of rigorous on-site inspection to gather the data required for a waste flows assessment. For each site officers then analyse and assess whether the codes used to record waste imports are broadly balanced by codes used for waste exports; and follow-

¹³ Information provided by Warren Linstrom, Higher Scientific Officer (Waste Management), Northern Ireland Environment Agency.

up with visits to both source and destination sites to ensure that appropriate coding is also recorded at those sites.

DAERA colleagues report that since this approach started there has been a noticeable improvement in sites' Duty of Care obligations. The problem with this approach is again resource: the work is very resource-intensive and means in practice that waste flows are mapped through no more than six problematic sites in any one year. It is clear that an approach is needed that is much less reliant on the requirement to visit each site to assess the integrity of the supply chain in presenting a barrier to waste crime.

6.4 Scotland¹⁴

The most well established application of waste flows approaches in Scotland is undertaken in the work of the Producer Compliance and Waste Shipment Unit (PCWSU) which is responsible for regulating the trans frontier shipment of waste from Scotland. In some respects, the approach adopted by the PCWSU mirrors those designed by Wales and Northern Ireland: the identification of source sites from which the supply chain of precursor and destination sites is then mapped so that waste assessments can be made and appropriate interventions designed.

Where the approach adopted by the PCWSU deviates from the others however, is in its emphasis upon testing waste *quality* at each stage in the supply chain rather than focussing upon the assessment and reconciliation of the *coding* and *quantity* of waste as it moves between sites in the chain. By focussing less on the actual movement of the waste and more upon the performance of the network, the aim is to drive positive behavioural changes by all individuals, businesses, companies, and organisations as compromises in quality are revealed and results in demands by sites to their suppliers to improve the quality of waste. The risk of persistent failure and repeat detection leading to a cancellation of contracts is plausibly seen as a more pertinent driver of change than the risk of prosecution.

6.5 England¹⁵

It has been much more difficult to obtain information on the current state of waste flows approaches utilised by the Environment Agency in tackling waste crime. This is hardly surprising given the enormous scale of illegal waste site detection each year in England and the demanding targets imposed on closing these sites.

The priority of the EA clearly lies in tactical and operational responses to its illegal waste sites problem and the agency has sought to adopt waste flow approaches to their response by undertaking, for example, waste stream approaches in both Strategic and Tactical Assessments; the use of analytic software to analyse waste data and map the flow of waste; the production of market and market assessments; and the design of focused campaigns.

Like the other agencies, the EA is exploring the opportunities presented by waste flows approaches and their project has adopted an approach like that in Northern Ireland: a small number of problematic sites were nominated by local waste officers and then investigated via a reconciliation-type process to check that the quantities, coding and description of waste leaving these sites was broadly mirrored at the next site in the chain.

¹⁴ Information provided by Colin Morrow, Unit Manager, Producer Compliance & Waste Shipment Scottish Environment Protection Agency.

¹⁵ Information provided by Graham Winter, Senior Advisor, Waste Regulation Environment Agency

However, some initial observations are possible: even with a limited sample, the project work has been resource and labour intensive; the assessments of waste quantities, coding, and descriptions between sites relied mostly upon an analysis of quarterly waste data returns which were found to contain site specific coding errors which made comparison ineffective; and, finally, although waste transfer notes were used as an initial source to identify the next site, it does seem that no further analysis was conducted which could have delivered greater insight into the supply chain network facilitating waste movements between these problematic sites. It is clear that further work is required to produce a comprehensive review of all agencies' work in this area in order to use this information in designing future approaches to waste flow approaches.

6.6 What does it all mean? Assessing the differences and designing the LIFE SMART Waste Project, Waste Flows approach

Although applications have differed across the UK, a number of common themes are identified in current attempts to explore the application of a waste flow approach to regulation:

- use of data and intelligence to identify a problematic challenging waste stream for further audit;
- identification of priority sites through a further analysis of data and intelligence;
- an emphasis upon robust site audits;
- an attempt to construct the facilitating supply chain behind the movement of the waste;
- subsequent analysis to provide further insight and intelligence and opportunities for interventions.

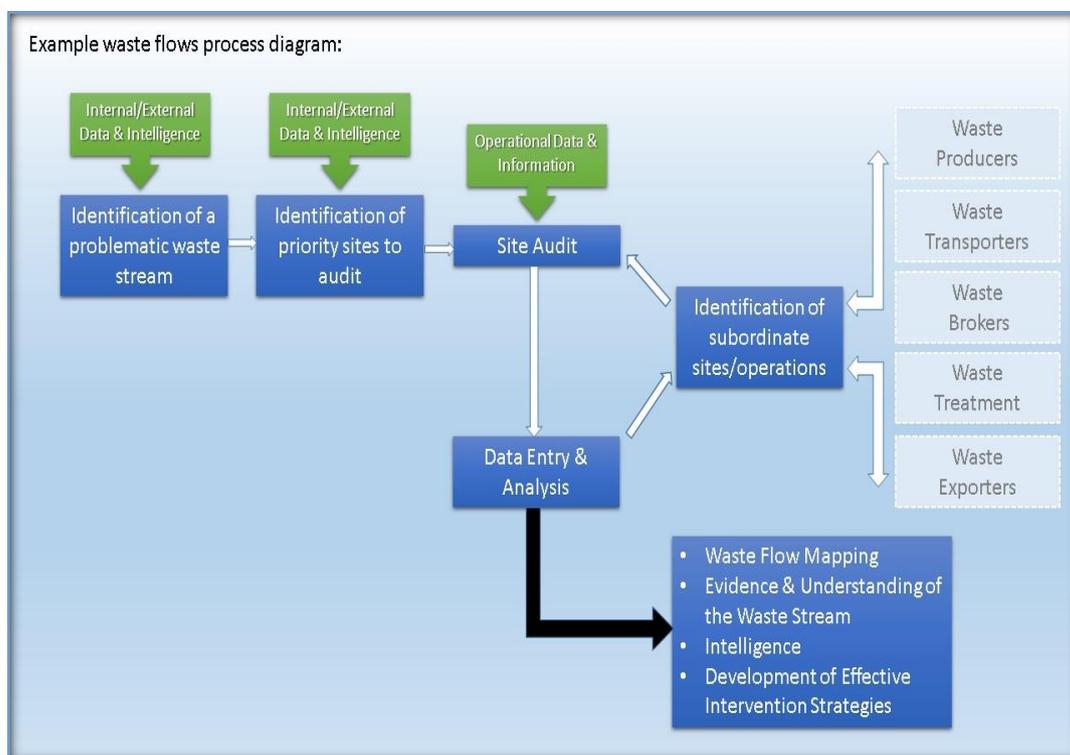


Figure 1 - Example waste flows process diagram

This review of waste flows approaches explored by each of the UK agencies allows us to identify strengths and weaknesses which can then be adopted or avoided in the design of the LIFE SMART Waste Project's own Waste Flows approach. It is clear, however, that there is no single established methodology for carrying out a waste flow audit. The aim of the project therefore is not to provide a LIFE SMART Waste version of previous regulatory attempts nor, indeed, to simply duplicate approaches. Instead, the aim is to provide an additional contribution to all our efforts by exploring the feasibility of an approach that is "less complex, less time and labour intensive for environmental authorities to undertake". What does that approach look like?

Most attempts at waste flows approaches are characterised as complex time consuming and labour intensive. The emphasis upon a programme of inspections, visits to multiple sites in the chain, and reliance upon local waste inspectors to undertake the work has resulted in significant resource and capacity issues and has clashed, perhaps inevitably, with the demands of daily regulatory business. That clash, however, reflects the core of the issue: the prevailing mind-set is that waste flows are delivered as a regulatory function by waste officers, and with a resulting focus around inspection, compliance, and assessment.

An alternative approach is to view waste flows as a distinct intelligence collection and analysis function undertaken exclusively by intelligence analysts. In this approach, the aim of the intelligence analyst is to identify high risk operators for consideration of more thorough regulatory audits by inspectors, but to do this through an enhanced screening approach to the data and without the need to undertake time consuming and resource-heavy site inspections, mass balance assessments and quality audits. This move to intelligence assessments based on representative data samples is challenging, but does have the potential benefit that a larger section of the waste sector and, indeed, an entire challenging waste stream could be "screened" for its vulnerable points in the supply chain in a relatively short period.

The aim of the approach outlined in this report, therefore, is to explore the feasibility of establishing waste flows as a distinct function of environmental agencies' intelligence teams rather than as a potential additional function of regulatory inspectors. The end goal is the same – improving compliance performance and reducing waste crime – but the means of delivery are different. Intelligence is about delivering dynamic assessments to help decision makers, and the approach described here is an attempt to relocate waste flows thinking into intelligence frameworks.

7.0 Applying the approach: attempting to map the flow of waste fines in Scotland

7.1 Purpose

The purpose of the approach is to explore waste flow analysis undertaken as a specific function of an intelligence team and to consider its value in providing a less resource-intensive, time consuming and complex approach for use by environmental regulators in tackling and reducing waste crime. For the purposes of this action, waste fines were identified as a priority challenging waste stream by SEPA Operational Delivery Team Management.

7.2 Methodology

Although the process explored shares broad similarities with earlier pilots and approaches across the UK agencies, the approach differs in two aspects:

- i. It puts aside the focus on site-based inspection as the key activity in waste flow work;
- ii. It places an enhanced role of agencies' intelligence teams in delivering actionable intelligence based on waste flow approaches, and establishes the collection and analysis of waste transfer notes as the primary analytical method and source base for this work.

The exercise is intended as a dynamic intelligence screening tool to identify likely waste offenders and points of vulnerability in the management of a particular challenging waste stream. It is not intended as a compliance-based site inspection which audits waste management activities but is concerned instead with Duty of Care and the movement of waste throughout the entire chain.

7.3 Initial data analysis stage

As undertaken by the other UK environment agencies in their pilots of waste flow approaches, the first stage was to undertake an analysis of internal SEPA data in order to identify priority sites for further assessment. The focus of this analysis was to identify indicators of waste crime across SEPA datasets and, particularly, by looking for anomalies within EWC reporting combinations which might indicate potential waste offending. A separate report is available for review on the results of this analysis¹⁶. The report identified sixteen sites that produce waste fines that would merit further examination of the flow of that waste stream for any non-compliant and / or illegal activity.

7.4 Obtaining operational data

In order to begin an analysis of the flow of waste fines from "cradle to grave", an initial visit to each of the identified sites was undertaken. The purpose of the visits was to obtain waste transfer notes from the site operator for a defined period (June 2016 – September 2016) to form the basis of subsequent analysis. As is described further below, this activity was itself extremely resource-intensive and time consuming and due to the volume of data and time constraints, it was decided that data for June 2016 only would be subjected to subsequent analysis.

7.5 Data analysis stage

¹⁶ Report on Challenging Waste Streams: Waste Crime Indicators in SEPA Data, LIFE SMART Waste, 2016.

Analysis is the crucial component of the exercise if we are to understand and identify points within the supply chain that are potentially subject to illegal activity. The benefits of such an analysis can support and drive investigations and operations, as well as influence strategy and policy of the environmental regulators. The aim in this stage was twofold. Firstly, to explore the value of data obtained from waste transfer notes to construct a network analysis of the relationships between the businesses, companies and hauliers in the overall supply chain and then use this insight to identify the central operators; and secondly, to use waste transfer notes to identify discrepancies between the declarations of operators.

In large part, the poor quality of the data has prevented substantial progress in both areas, although there was sufficient material available for analysis to identify several discrepancies between operators and provide justification for further, enhanced investigation and audit by inspectors. The discrepancies are listed in the sections below.

7.5.1 Disposal site discrepancies

In several cases, landfill disposal sites recorded greater tonnage of waste fines received from a specific operator than was actually recorded as output from the producing operator. For the month of June 2016, this highlighted a total discrepancy of 886.05 unaccounted tonnes of waste fines. These discrepancies involved three production sites and two disposal sites, as detailed below and therefore offers options for further, enhanced investigation.

Production Site	Disposal Site	Discrepancy (Tonnes)
P1	D1	31.38
P2	D2	687.50
P3	D2	167.17
Total		886.05

Table 1 - Disposal site discrepancies

7.5.2 Production site discrepancies

In several cases, the tonnage of waste fines recorded as output from a production site was greater than the tonnage of subsequently recorded by the receiving landfill site. For the month of June 2016, this highlighted a total discrepancy of 2077.59 unaccounted tonnes of waste fines. These discrepancies involved three production sites and three disposal sites (one of which also features above in the disposal site discrepancies), as detailed below:

Production Site	Disposal Site	Discrepancy (Tonnes)
P4	D1	103.88
P5	D3	1353.58
P6	D4	620.13
Total		2077.59

Table 2 - Production site discrepancies

Case Study:

Operator A produces waste fines that are sent to several disposal sites in June 2016. Operator A produced 1510.3 tonnes of waste fines in June 2016 which were recorded on their paperwork as being sent for disposal to Operator B. Operator B recorded on their paperwork that they received 156.72 tonnes of waste fines from Operator A in June 2016. This highlights a discrepancy of 1353.58 tonnes. Only 10% of the recorded waste fines from Operator A have been recorded by Operator B. Operator A utilises several different hauliers to transport the waste to Operator B, however, only the waste hauled by Haulier C (on behalf of Operator A) is recorded by Operator B. Where is the unaccounted 1353.58 tonnes of waste?

7.5.3 Production & receiving site anomalies

In some cases, the sites recorded output of waste fines to destination sites at which, however, no receipt of waste fines was recorded. For the month of June 2016, this highlighted a total discrepancy of 852.66 unaccounted tonnes of waste fines. These discrepancies involved two production sites (from the original 16 selected) and two disposal sites (both of which feature previously above), as detailed below:

Production Site	Disposal Site	Discrepancy (Tonnes)
P7	P5	672.16
P8	D2	180.50
Total		852.66

Table 3 - Production & receiving site anomalies

The value of analysis of waste flows data to influence future priorities and identify vulnerabilities within the flow is clear. However, in order for this type of approach to have an impact and become “*business as usual*” for intelligence staff, there are challenges that need addressed. These themes are explored further below.

8.0 Data Quality Issues

8.1 Coding discrepancies.

This refers to the waste being attributed a specific code by the producing site and thereafter being attributed a different code by the receiving site. An example of this is where the producing operator codes the waste as 170504, 170601 and/or 170904, however, the receiving site records the data as 191209. This issue accounted for 13% of the total waste transfer notes received for June 2016 from our sample and involved only one producing site and one disposal site.

8.2 Waste transfer notes not recording waste quantities.

A total of 726 waste transfer notes from two of the originally selected operators visited in September 2016 have not recorded any quantities of the outgoing waste loads. Therefore, it is not possible to fully analyse the flow of the waste.

8.3 Amended waste transfer notes.

This refers to waste transfer notes being retrospectively altered by operators or their employees. One instance of this is a site which had details printed on the waste transfer notes, with the exception of the EWC codes and the tonnage, both of which had been handwritten on the paperwork. It appeared that these details were retrospectively entered onto the 19 waste transfer notes, possibly as a result of SEPAs request for the data.

8.4 Lack of Data and slow responses.

Despite requests from SEPA, several sites did not provide waste transfer note data. Although sixteen waste companies were identified from the data analysis for further analysis, waste transfer notes were received from only eleven sites: two sites responded that they did not produce fines whereas the remaining three sites did not provide copies of their paperwork. The majority of sites also stalled in delivering waste transfer notes in a timely manner.

8.5 Overview

Overall, the quality of the data contained in waste transfer notes was very poor and greatly impeded the analysis stage of the pilot. Although some of the sites have complied by submitting copies of their paperwork, a large number of the waste transfer notes cannot be used by the pilot to map the waste flow or provide any intelligence. This is due to the omission of important details such as tonnages or European Waste Catalogue (EWC) codes. Indeed, over 224 waste transfer notes collected for June 2016 could not be analysed as information on either the tonnage or EWC was missing.

The fact that the Duty of Care relating to waste transfer notes is poor is not a surprise, but it is evidence that work must be undertaken to improve quality. The missing tonnage information prevented the producers' waste transfer notes being used to map the waste flow to the next destination site. This has in turn impacted on the quality of the analysis and whilst intelligence has been obtained, the true value of the intelligence is reduced from a waste flows perspective as very little waste flows mapping could be carried out.

9.0 Next Steps

It is apparent that the development of a less intensive, less time consuming and less complex waste flows approach is only realistically possible with the development of digital, live-time IT solutions which is beyond the scope of the project. The current UK paper based system puts the onus on the regulators to actively seek out the Duty of Care paperwork from sites with all the issues of quality, consistency, and response that this entails.

NIEA administered a project to explore the feasibility of developing a commercial off-the-shelf (COTS) *eDoc+* software solution to track – in live time – the movement, coding, quantities, producers, carriers and treatment of both hazardous and non-hazardous wastes. This project had six work activities including data reporting, IT infrastructure, and building a prototype COTS system, and ran until March 2017.

Although the provision of a live-time IT system will enhance our identification and analysis of waste flows, the fact is that practical deployment is still some time away and an interim position is still required if we are to better tackle waste crime. In part, this report has been carried out to provide an evidence base which determines the scale of poor quality waste transfer data and how this impacts upon regulation and investigations into waste crime. This evidence base is largely incomplete and additional work is required before it could be used in support of policy recommendations or legislative change in discussions with government.

The strongest evidence base is one that will incorporate the findings and experiences of all UK environmental regulatory agencies. The exchange and consolidation of understanding and learning in this important area across the agencies, however, is largely absent. The initiation of a dedicated activity to exchange and consolidate understanding and learning of waste flow approaches will enhance our ability to identify, assess and intervene in waste flows associated with challenging waste streams, as well as provide a more robust evidence base in support of policy recommendations.

In support of these, the next steps are to:

1. Establish a cross-agency (SEPA, NRW, NIEA, EA) intervention group specifically to share current learning from waste flows work and to initiate a collaborative work package to propose specific policy recommendations for presentation via LIFE SMART Waste.
2. Explore collaboration opportunities with NIEA with a view to supporting and developing any pilot exercise of the COTS software application.
3. Monitor progress via the LIFE SMART Waste Action Log as a standing item.

Annex I - The Barriers Facing Environmental Agencies in implementing waste flow audit approaches

1.0 Background

1.1 The drive to decrease the use of landfill and to intervene higher up the waste hierarchy has had a significant positive impact on the way waste is managed in Europe

- In 2014, some 2,145 million tonnes of waste was treated in the EU (including imported waste). The quantity of waste recovered (excluding energy recovery), that was either recycled or used for backfilling grew by 20.1 % from 890 million tonnes in 2004 to 1,069 million tonnes in 2014.ⁱ
- EU member states treated 75.8 million tonnes of hazardous waste with 37.5% being recovered (recycled or backfilled).ⁱⁱ
- The quantity of municipal waste landfilled in the EU during 2014 was 54% lower than in 1995, while recycling rates have more than doubled during the same period.ⁱⁱⁱ

1.2 Governments have sought to introduce mechanisms that further increase recycling by setting recycling targets and dis-incentivising the use of landfill through taxation. The transition has been made from householders placing all of their waste into a black bag to the emergence of single waste streams that need to be collected, sorted and re-processed.

1.3 New businesses have been established seeking to take advantage of the lucrative opportunities that have developed and waste materials have increasingly become seen as a potentially valuable resource. The move away from landfill has resulted in waste being stored above ground in greater quantities. Where it is mismanaged this waste can present a greater risk to human health and the environment. Waste experts such as John Galvin MBE and Dr Colin Church have recently commented on these changes in recent CIWM (Chartered Institute of Waste Management) articles. Galvin (2016) explains

“The diversion of waste from landfill, and the use of waste as a resource, underpinned by the waste hierarchy and recovery and recycling targets is changing the nature and increasing the cost of waste management, and with it the incentive to avoid those costs at all stages in the waste management chain”.^{iv}

The potential difficulties are further described by Dr Church (2016):

“...segregation and stockpiling – have also given rise to new problems. Before, a lorry load of mixed rubbish heading for a landfill was unlikely to burn that well, or to be stockpiled for long enough for self-combustion or arson to be an issue. Now, a load of lumber, a pile of plastic or a roll of RDF can sit around for months, vastly increasing the potential fire risk even if it’s being managed competently and safely”.^v

1.4 Waste activities that have significant impacts on human health and the environment are more likely to occur when the waste:

- Is in the wrong place / type of facility
- Is mis-managed
- Is deliberately mis-described
- Is of low value or is contaminated
- 'escapes' from regulatory control

1.5 The interactions between waste producers, transporters, brokers, treatment sites and exporters are increasingly complex. This has made the industry more accessible to criminals, who can take advantage and profit from any vulnerable points in the chain. The types of crime are also evolving and becoming more difficult for regulators to detect at a site level. As Galvin (2016) goes on to say:

1.6 The interactions between waste producers, transporters, brokers, treatment sites and exporters are increasingly complex. This has made the industry more accessible to criminals, who can take advantage and profit from any vulnerable points in the chain. The types of crime are also evolving and becoming more difficult for regulators to detect at a site level. As Galvin (2016) goes on to say:

“Waste crime is not new, but it is changing, and the rewards are making it more attractive to criminals as it is relatively easy to get into and is more profitable and less risky than other forms of crime... More worrying are those who operate within the “resources industry” but deliberately misdescribe waste, either to evade paying landfill tax or to disguise it as non-waste and illegally export it. Some of these operators use their regulated status as a veil of legitimacy for criminal activity, or to persistently operate to poor standards and/or stockpile waste in order to maximise short-term income and leave an unwanted legacy for landowners or the public sector”.^{vi}

1.7 Regulatory authorities in the UK have already started examining alternative regulatory options that might help them adapt to meet these challenges and improve their ability to detect and prevent waste crime. One of these options is to move to a waste flow approach. Mills (2013) recommended that¹⁷:

“There is a need to consider the entire waste system, in order to understand how criminals can exploit it and which waste flows are particularly vulnerable The Duty of Care provisions, Fit and Proper Person Test and improving systems for monitoring waste flows, should all be strengthened”.

1.6 A waste flow approach is one which seeks to track the movement and management of waste and recyclable material through each step in the chain from cradle to grave. Rather than view each site in isolation, the approach seeks to understand the “whole life” cycle of the waste and could help environmental regulators to better identify illegal activities and tackle the root causes of waste crime.

1.7 Waste flow pilot studies have taken place amongst various environmental regulators in the UK. However waste flows approaches have yet to be fully embedded either as a complementary; or complete alternative to site based compliance. This appendix seeks to:

- Outline the principal legislative framework and funding that governs how environmental regulators approach waste regulation in the UK; and to
- Consider the potential barriers that these regulators may face when establishing or adapting their activities to include waste flow approaches.

2.0 The Legal Framework

- 2.1 The recovery and disposal of waste requires a permit under European Union legislation. The principal objective of the Waste Framework Directive (Directive 2008/98/EC) as set out in Articles 1 and 13 is to prevent harm to human health and the environment. Article 23 of the Directive requires an 'establishment or undertaking intending to carry out waste treatment to obtain a permit from the competent authority'.^{vii}
- 2.2 The permits issued by the competent authorities of member states should include the following as a minimum:
- a) the types and quantities of waste that may be treated;
 - b) for each type of operation permitted, the technical and any other requirements relevant to the site concerned;
 - c) the safety and precautionary measures to be taken;
 - d) the method to be used for each type of operation;
 - e) such monitoring and control operations as may be necessary;
 - f) such closure and after-care provisions as may be necessary.
- 2.3 Article 34 of the directive requires that competent authorities carry out inspections of waste establishments or undertakings. The inspections that take place under member state regimes should also have regard to the 'Recommendation of the European Parliament and of the Council' (2001/331/EC) on the minimum criteria for environmental inspection, including that the following actions are planned:^{viii}
- site visits,
 - monitoring compliance with environmental quality standards,
 - inspecting environmental audit reports and statements,
 - checking premises and equipment,
 - checking the suitability of environmental management and of the relevant records.
- 2.4 Article 35 amongst other things requires the quantity, nature and origin of the waste, and (where relevant) the destination of waste to be recorded. The records must be made available to the competent authority upon request. These requirements have been implemented in the United Kingdom primarily through:
- England and Wales - Environmental Permitting Regulations 2010
 - Scotland - The Waste Management Licensing (Scotland) Regulations 2011 and the Waste Management Licensing Regulations 1994. The provision for a system of waste management licensing is set out in Sections 33, and 35-42 of the Environmental Protection Act 1990
 - Northern Ireland Waste and Contaminated Land (Northern Ireland) Order 1997 and the Waste Management Licensing Regulations (Northern Ireland) 2003

Further explanation of the regimes in Scotland and Wales is provided below. In summary the respective regulatory regimes require SEPA and NRW authorise waste

facilities normally through permits or licences and then undertake regular inspections of those facilities.

In Wales the environmental permitting regime requires operators to obtain permits for some facilities, to register others as exempt and provides for ongoing supervision by regulators. Environmental Permits contain conditions to protect the environment and prevent harm to human health. The requirements of the Waste Framework Directive are sign posted within the regulations.

The regulations place a duty on authorities to undertake appropriate periodic inspections of regulated facilities (regulation 34, 2). There is also a duty on the exemption registration authority to carry out periodic inspections of exempt waste operations (Schedule 2, paragraph 15).

The principal offences under the Regulations are operating a regulated facility without a permit and failing to comply with the conditions of a permit or an enforcement related notice.

In Scotland the majority of waste management facilities are licensed by way of a Waste Management Licence issued under The Waste Management Licensing Regulations 1994. Other facilities and exempt activities fall under the The Waste Management Licensing (Scotland) Regulations 2011.

The provision for a system of waste management licensing is set out in Sections 33, and 35-42 of the Environmental Protection Act (EPA 1990).

The licence seeks to prevent unacceptable emissions to land, air or water: it achieves this by specifying the management and control systems for the site or plant. The detail of the licence, however, will vary from one type of facility to another. Most waste facilities need to be controlled by a licence to manage the waste input, storage and treatment processes to control liquid spillages, adverse waste interactions, and emissions of noise, dust and litter.

Paragraph 6 of Schedule 4 to the Waste Management Licensing Regulations 1994 specifies the matters to be covered by environmental licences. For all facilities involving the disposal of waste the licence must include conditions to cover:

- The types and quantities of waste
- The technical requirements
- The security precautions
- The disposal site
- The treatment method

The EPA 1990 sets out the duties of SEPA for licensing and for supervising licensed activities. SEPA is under a duty (s.42 of the 1990 Act) to ensure that the conditions of the licence are being complied with, and that the prime objectives of the licensing system are achieved. Fulfilling this duty includes making inspections of the site, and where necessary taking enforcement action.

3.0 How inspection activities are funded

3.1 The legislation that enables SEPA and NRW to charge for services provided in the regulation of waste sites is set out below:

The Environment Act 1995 (sections 41 and 42) enables NRW to impose a charging scheme in relation to Environmental Permits (Licences) including a subsistence fee (s42, 2b). The Act also allows for different provisions to be made depending on the circumstances (section 42, 7).

In Scotland the charging is enabled through the Environmental Regulation (Scotland) Charging Scheme 2016, in particular Part 3 section 10 (1) says that an annual charge shall be payable for the subsistence of an authorisation (including waste activities. Section 10 (3c) goes further enabling SEPA to add to the subsistence fee (for relevant time and materials costs) for any project work relating to the annual regulation of a particular operator.

3.2 Charges made by Public Bodies in the UK are directed by guidance on Managing Public Money (in Wales, Managing Welsh Public Money).^{ix} The ability to charge for a service is normally based on primary legislation and the standard approach is to fully recover costs. When a charge is set it should exclude:

- externalities imposed on society (e.g. costs from pollution and crime)
- costs of policy work (other than policy on the executive delivery of the service) enforcement costs

3.3 When environmental authorities set their waste charging regime they must ensure that the charge relates directly to the service being provided and do not over recover for cost incurred. If overcharging is identified then this can be considered a tax. Taxes require parliamentary approval and the revenue is normally received by Government and may not subsequently be released back to the authority. Guidance states:

“The Office for National Statistics (ONS) normally classifies charges higher than the cost of provision, or not clearly related to a service to the charge payer, as taxes. Such charges always call for explicit ministerial decision as well as specific statutory authority”.

There is also clear direction that charges should not be used to subsidise other services:

“Cross subsidies always involve a mixture of overcharging and undercharging, even if the net effect is to recover full costs for the service as a whole. So cross subsidised charges are normally classified as taxes”.

3.4 Complying with these guideline could present a challenge for environmental authorities seeking to adopt waste flow approaches, particularly where the link between the subsistence fee and the service provided has the potential to become less tangible.

3.5 Environmental authorities are likely to be only able to resource a very limited portion of waste flow work from permitting subsistence charges. As outlined above authorities need to maintain a clear link between their activities and the services provided. They must also avoid under or over recovery of costs and cross subsidies. Subsequent audits may include producers, carriers, brokers and sites which fall out -side of the permitting regime, as well as trigger additional visits to permitted sites. It is unlikely that these audits could be funded through subsistence charges without the risk breaking rules governing public money.

In Scotland, SEPA may wish to explore opportunities presented by their charging scheme that may allow additional charges to be made in respect of any project work relating to the annual regulation of a particular operator and whether this could be applied to a group of operators within a waste stream.

3.6 An alternative open to authorities is to fund waste flow audits through Grant in Aid (GiA). GiA is funding which is allocated to the environmental authority by the Government. Many environmental authorities have seen Grant in Aid funding reduced and face difficult decisions on the activities they carry out. Authorities may view waste flow audits as an additional burden added on to its existing duties. While the proactive nature of the auditing approach may further increase the resource demand needed from GiA by uncovering new issues.

3.7 Public money guidelines make it clear that enforcement activities cannot not be funded from subsistence charges. Enforcement activities against illegal operators that help level the playing field for legitimate operators is typically funded through GiA. The potential funding paradox is that while the regulator finds it difficult to resource techniques that are more effective at detecting and tackling waste crime. The activities of the legitimate operators are scrutinised, while unscrupulous operators continue to undercut the market and reap the financial benefits.

3.8 In terms of the adoption of waste flow approaches funding and resource is likely to be a significant barrier. However opportunities are being sought that use funds from other charging regimes that are more flexible. One example that may allow greater use of waste flow techniques (that are funded from fees) is in the control of hazardous waste. This is considered in more detail in below:

In the European Union the control of hazardous waste is derived from the Waste Framework Directive (Waste framework directive 2008/98/EC), Article 17 of the directive requires that:

“Member States shall take the necessary action to ensure that the production, collection and transportation of hazardous waste, as well as its storage and treatment, are carried out in conditions providing protection for the environment and human health in order to meet the provisions of Article 13, including action to ensure traceability from production to final destination and control of hazardous waste in order to meet the requirements of Articles 35 (record keeping) and 36 (enforcement and penalties).

And Article 34 requires that inspections be undertaken:

1. Establishments or undertakings which carry out waste treatment operations, establishments or undertakings which collect or transport waste on a professional basis, brokers and dealers, and establishments or undertakings which produce hazardous waste shall be subject to appropriate periodic inspections by the competent authorities.

2. Inspections concerning collection and transport operations shall cover the origin, nature, quantity and destination of the waste collected and transported.

The requirement has been transposed into UK legislation through the Hazardous Waste Regulations (2005 as amended) and the Special Waste Regulations (1996 as amended).

The directive provides a clear statement with regard to the need of member states to take action to trace Hazardous Waste and that inspection regimes should include producers. In practical terms in the UK this has translated into a cradle to grave auditing approaches which are aligned to waste flow thinking.

The application of waste flow auditing using this mechanism can be expanded to producers and handlers of special/hazardous and non-hazardous waste, since it is necessary to ensure

that waste has been correctly classified at all stages. The funding from special/hazardous waste regulation could also be used to help resource enforcement activities that result from inspections that would allow authorities to undertake waste flow auditing in a comprehensive manner. However it should be recognised that the special/hazardous regimes are more applicable to certain waste types.

Other legislative and funding frameworks that may support waste flows work involve the regulation of waste carriers and shipments of waste, for example:

- In England and Wales authorities must ensure that appropriate periodic inspections of registered carriers, brokers and dealers are made. The inspection should cover the origin, nature, quantity and destination of that waste.
- The European regulations on shipments of waste (EU No 660/2014) recognise that illegal shipments of waste frequently stem from uncontrolled collection, sorting and storage. The regulations state that inspections of shipments of waste should be carried out in a systematic manner help identify and address uncontrolled activities.

These are examples of existing regulatory frameworks and associated charging mechanisms that authorities could look to utilise in order to help fund the introduction of waste flows approaches.

Annex I - References

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- ^v <http://www.ciwm-journal.co.uk/ciwm-chief-executive-blog-waste-crime/>
- ^{vi} <http://www.ciwm-journal.co.uk/downloads/CIWM-February-2016-Fight-or-Fly-Tip-John-Galvin-part-1.pdf>
- ^{vii} <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008L0098>
- ^{viii} <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32001H0331>
- ^{ix} https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/454191/Managing_Public_Money_AA_v2_-jan15.pdf