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# Circular Economies and Sustainable Health and Well-being

The public health impact of public bodies refocusing on waste reduction and reuse in Wales

Supporting Information Report



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(Alphabetical order).

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# 1.0 Glossary

**Biorefining:** Biorefining refers to the extraction of small quantities of valuable materials such as proteins from industries that create biowaste. These valuable materials are converted from waste into energy (WRAP and Green Alliance, 2015).

**Circular Economy:** An economy that gives us the tools to tackle climate change and biodiversity loss together, while addressing important social needs. It gives us the power to grow prosperity, jobs, and resilience while cutting greenhouse gas emissions, waste, and pollution (Ellen MacArthur Foundation, 2019b).

**Closed loop recycling:** This involves keeping products and resources in use for as long as possible through recovery, reuse, repair, remanufacturing and recycling. It is an important way to improve resource efficiency (WRAP and Green Alliance, 2015).

**Deposit Return Scheme (DRS):** A DRS is where you pay more money for a drink in a bottle or can. This extra money or deposit is returned when you take the drinks container back (Department of Environment Food and Rural Affairs, 2019).

**Extended Producer Responsibility (EPR):** An environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle (OECD, 2016).

**Open loop recycling:** Otherwise known as downcycling, this uses recovered materials to create products that have lower value compared to those produced in closed loop recycling, for example turning glass containers into aggregate.

**Recovery:** Any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy.

**Recycling:** Any recovery operation by which waste materials are reprocessed into products, materials, or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations. For waste to be considered as recycled it must have undergone a reprocessing recovery operation so that it has been reprocessed into a product, material, or substance, whether for its original or other purpose, with the effect that it has ceased to be waste.

**Repair:** Includes the replacement of worn damaged or malfunctioning component or parts. This includes all carpentry operations required to repair wooden items (including furniture) all metal working operations on relevant items, the replacement of glass in mirrors and similar, re-upholstering of furniture – and all other operations that are required such that an item is fit for use for its originally intended purpose.

**Reuse:** "any operation by which products or components that are not waste are used again for the same purpose for which they were conceived." (WRAP, 2021) While 'preparing for re-use' means checking, cleaning or repairing for recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing (WRAP, 2021).

**Servitisation:** Servitisation is the reference to any system which increases the effective use of assets. A common example is the conversion from providing products to providing services (WRAP and Green Alliance, 2015).

**Waste prevention:** Measures taken before a substance, material or product has become waste that reduce: (a) the quantity of waste, including through the re-use of products or the extension of the life span of products; (b) the adverse impacts of the generated waste on the environment and human health; or (c) the content of harmful substances in materials and products (European Union, 2008).

**Waste:** Any substance or object which the holder discards or intends or is required to discard.

## 2.0 Methodology

This section reflects established and previously reported Health Impact Assessment (HIA) methodology (Green et al., 2020b).

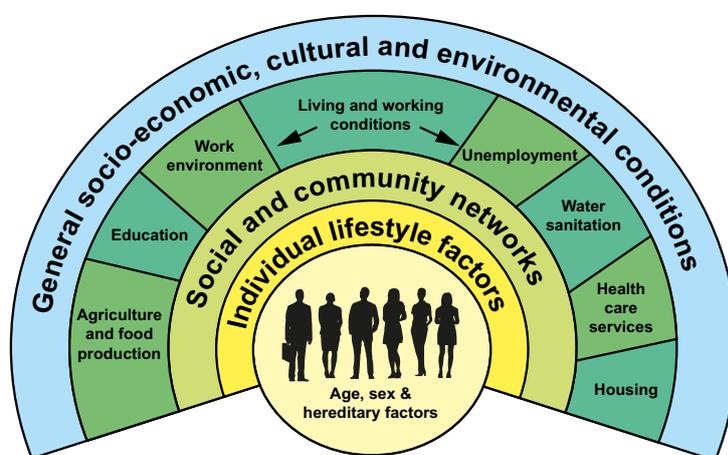
The European Centre for Health Policy (1999) Gothenburg Consensus is widely accepted as the seminal definition of (HIA), and defines it as:

*'A combination of procedures, methods and tools by which a policy, programme or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population'<sup>1</sup>*

HIA is a process which supports organisations to assess the potential consequences of their decisions on people's health and well-being. Currently, it is not statutory in Wales. However, the **Public Health (Wales) Act** (2017) has legislated that HIA will become statutory for public bodies in specific circumstances; this will likely take effect from 2021-22. HIA also supports the implementation of the **Well-being of Future Generations (Wales) Act** (2015) through the ability to address and maximise 'A Healthier Wales' and 'A more Equal Wales' Well-being Goals as part of a 'health in all policies' approach.

A major objective of a HIA is to inform and influence decision-making or policy; however, it is not a decision-making tool per se. HIA provides an evidence based systematic, yet flexible and practical framework that can be used to consider the wider effects of local and national policies or initiatives and how they, in turn, may affect people's health and well-being – in the present and in the future.

HIA, as practised in Wales, is grounded in the World Health Organization (WHO) definition of health and well-being (World Health Organization, 2020) which encompasses physical, mental and social health and well-being. HIA also views population impact through the lens and framework of the social determinants of health. This framework considers not just the biophysical and environmental health impacts that can be derived from policies, proposals and plans but also assesses the social factors that can have an impact and the population groups which are affected. These factors, such as environment, transport, housing, access to services and employment can all interact to a greater or lesser extent with an individual's behaviours and genetic makeup to influence health and well-being. The diagram below summarises the relationship between these determinants.



**Figure 1: A social determinants of health and well-being framework. Redrawn from Dahlgren and Whitehead (2006)**

1 (European Centre for Health Policy, 1999)

HIA can be used to help address the persistent inequalities in Wales by identifying any groups within the population who may be particularly affected by a policy, plan, or proposal.

HIA is based on triangulation of health intelligence and data, stakeholder knowledge / evidence and a review of the literature including peer-reviewed research. As practised in Wales, HIA is grounded in this mixed methodological approach and embraces community and lay knowledge. HIA works best when it involves people and organisations who can contribute different kinds of relevant evidence, contextual knowledge and insight. The information is then used to identify measures to maximise opportunities for health and to minimise any detrimental impacts and identify any ‘gaps’ that need to be filled. Wales emphasises the inclusion of all stakeholders including local community citizens as part of the process. Including this type of qualitative evidence is important to assess individual and community concerns, anxiety and fears, for example, and data can be quantified for use in decision-making and / or mitigation and can give a more holistic, contextual view of impacts.

There are three main types of HIA - prospective, concurrent and retrospective.

- **Prospective HIA** – at the start of the development of a project, proposal or plan.
- **Concurrent HIA** – runs alongside the implementation of the project (or policy).
- **Retrospective HIA** – assesses the effect of an existing project or policy and can be used as an evaluation tool. Retrospective assessments can also be utilised for unexpected events, as a way of learning lessons for the future.

HIA is best used prospectively during the development of a proposal. The process should be activated late enough in a proposal’s development to be clear about its nature and purpose, but early enough to be able to influence its design and / or implementation.

Within any of the above, HIA can take one of three different forms depending on the focus and the time and resources available - desktop, rapid or comprehensive. A desktop HIA may take only a few hours or a day to execute; a rapid HIA may take a few days to a few months to complete; and a comprehensive HIA is more in-depth / time and resource intensive and can take many months to complete. The most appropriate type to conduct can be decided through a short scoping meeting and discussion of timeframes and resources and levels of stakeholder involvement.

Often, however, any particular HIA may fit in between two of these categories, as the approach taken will be determined by the nature of the proposal, the timescales involved and the human, organisational and financial resources available to undertake the process.

HIA is also based on a number of key principles and values – these include equity, robustness, transparency, ethical use of evidence, participation, sustainability and democracy (see Figure 2).

Health Impact Assessment (HIA) Process							
Evidence – peer reviewed; qualitative; quantitative; health intelligence; stakeholder							
Principles and Values							
Ethical	Equitable	Transparent	Open	Robust	Participatory	Sustainable	Democratic

**Figure 2: Health Impact Assessment (HIA) Process (Green et al., 2020b)**

There are several ways in which the potential impacts may be described. Where possible, the following should be assessed:

- **The nature of the impact** - how will the proposal affect health, and will the impact be positive or negative? Will it be direct or indirect i.e., via a direct pathway as an associated impact?
- **The likelihood of the impact** - is the likelihood of the impact of the proposal confirmed, probable or possible? (See Figure 4: Descriptors of Impact, Summary Report)
- **The scale and significance of the impact** - what proportion of the population is likely to be affected? How significant or minimal will the impact be (i.e., will it cause mild distress, improve well-being or increase mortality?)
- **The timing of the impact** - will the impact be in weeks, months, years? In some instances, impacts may be negative in the short term, but in the longer term may be beneficial
- **The distribution of the effects** - will the proposal affect different groups of people in different ways? A proposal that is likely to benefit one section of the population may not benefit others. In some cases, the assessment will identify ways in which those worst affected, most disadvantaged or particularly vulnerable populations could be helped. This can be an important contribution to reducing the health inequalities that exist between some communities.

There are five main steps to HIA (see Box 1). However, it does not need to be a linear process and HIAs are most useful and effective when the process is iterative. It is systematic yet flexible to particular timescales and circumstances. The five steps are:

#### Box 1. HIA Process

1. **Screening:** does the proposal or plan have an impact on population health?
2. **Scoping:** what resources, timeframes, policy windows, evidence need to be considered? Does a Steering Group need to be established? Roles and responsibilities of any Steering Group.
3. **Appraisal / Assessment of evidence:** triangulation of qualitative and quantitative evidence and health intelligence.
4. **Reporting and recommendations:** construction of HIA report and any non-technical summary.
5. **Review and reflection:** including monitoring and evaluation – did the HIA and any findings have an impact on health and well-being or decision-making process?

## The Waste Reduction and Reuse HIA Process

In Autumn 2018, the Health and Sustainability Hub of Public Health Wales and the Wales Health Impact Assessment Support Unit (WHIASU) agreed to conduct a HIA on the recycling provision of public bodies in Wales. A small working-group was created, and an initial screening template was completed, however, during the first working group meeting it was decided that the HIA should broaden its focus to include all stages of the waste hierarchy, rather than concentrating purely on recycling. This decision was made as often the emphasis is on recycling, whereas the upstream actions of reducing and reusing are often overlooked. Following this decision, the screening and scoping templates were re-examined in order to broaden the remit of the HIA.

This HIA is a participatory and comprehensive HIA and was undertaken between 2018 and 2021. It was suspended from 2020 until early 2021 due to the COVID-19 pandemic and Public Health Wales' role in the emergency response.

This section describes how the HIA was carried out, who was involved, and the methodological approach taken. It followed the 5-step standard process contained in Box 1.

This HIA was iterative and followed the systematic methodology described in the Welsh HIA guidance of 'Health Impact Assessment: A Practical Guide' WHIASU (Chadderton et al., 2012). WHIASU checklists<sup>2</sup> were used in the assessment to ascertain the impact on population groups and determinants of health and well-being. Terminology in the final editing of this HIA has been aligned with the updated WHIASU checklists (Public Health Wales, 2020).

A Public Health Wales Working Group was established to oversee and carry out the HIA.

Scoping and screening of the potential public health impacts of waste reduction and reuse took place during October-December 2018.

Screening was undertaken by the core working group.

Screening considered how a wide range of groups could be affected in Wales by waste reduction and reuse and which determinants may be particularly impacted upon, utilising the WHIASU checklists. The session was informed by a range of evidence that had been reviewed beforehand.

A screening paper that preliminarily identified the potential determinants, populations and areas of policy focus that could be affected by the policy of increased focus on reduce and reuse as part of wider circular economy approaches was completed. This is contained in Section 7 of this document.

The population groups to be explored further included:

- Children and young people (future generations)
- Families
- Older adults
- General adult population
- Carers
- Economically inactive / unemployed
- People on a low income
- People employed in the waste management sector
- People with physical and mental health needs
- Homeless
- Asylum seekers / refugees

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<sup>2</sup> Available at: [www.whiasu.wales.nhs.uk](http://www.whiasu.wales.nhs.uk)

The impacts to be explored further are reported under the following in the screening checklist (Section 7) under headings of:

- Lifestyles
- Social and community influences on health
- Living and environmental conditions affecting health
- Economic conditions affecting health
- Access and quality of services
- Macro-economic, environmental, and sustainability factors

A scoping document was developed and defined the scope of the HIA and how it would be carried out, the timeframes for the work, who would be involved and how, and the evidence needed. It also outlined the governance mechanisms and the types of evidence required to ensure that the HIA and any report based on it was high quality and robust. Quality assurance was carried out by multi-disciplinary internal Public Health Wales public health specialists and external reviewers who reviewed the draft Summary Report.

## Evidence

As part of the HIA, the following evidence was gathered.

### Literature review:

A research protocol was constructed with support from Public Health Wales Library Service to rapidly identify relevant published evidence including: published evidence on initiatives to reduce, reuse and recycle waste; high level evidence (reports, policies) on strategies to reduce, reuse and recycle waste, within a UK context (e.g. UK government, Welsh Government, Department of Health, Environment Agency, Natural Resources Wales etc.), Wales Waste strategy, regional waste plans, Wales waste sector plans, Wales Centre for Public Policy.

Grey literature including: Third sector reports – Cynnal Cymru; Keep Wales Tidy; Invest in Nature; Wrap Cymru.

Two members of the working group appraised and triangulated the evidence (peer-reviewed literature, qualitative stakeholder insight, grey literature and population health data) and identified the potential public health impacts (both positive and negative) from public bodies refocusing on waste reduction and reuse. This included the key mechanisms at play, so that positive opportunities could be harnessed and maximised, while negative consequences could be mitigated against. The population groups with the greatest potential to be affected were also identified.

The findings from the literature review can be found in Section 4 of this report.

### Public body websites review:

Review of public bodies websites was carried out to collect information on waste strategies and current practices, including case studies of good practice e.g. Our place, Public Health Wales. See Section 6.0 for a list of the public bodies websites that were reviewed.

This was an important aspect of the HIA as in the literature (Johansson and Corvellec, 2018), waste reduction plans often focus on redirecting waste and not on reducing the amount of waste being produced. Reviewing the 44 public bodies websites helped us to identify if this was the case in Wales.

A rapid review of the public facing websites for the 44 public bodies was undertaken and relevant information was analysed to identify key themes. The content and accessibility of relevant information on the public facing websites varied considerably.

### Qualitative participatory workshops and interviews:

The HIA captured knowledge and information held by stakeholder organisations and individuals. Stakeholders (n=28) from public bodies (n=15) participated in either a workshop (n=9), small group discussion (n=18), or in one case an interview (n=1). This combination of methods was used in order to maximise participation.

Consistent approaches were used: WHIASU's wider determinants and population group checklists were used to facilitate discussions and to identify population groups that could be susceptible to the impacts of public bodies refocusing their efforts towards waste reduction and reuse.

**Workshop:** A half-day participatory workshop was held in Cardiff in December 2018 to gather stakeholder views on the public health impacts (positive and negative) of refocusing efforts towards waste reduction and reuse by public bodies in Wales. A member of the working group facilitated the workshop whilst other members took real-time notes on a flipchart. Following the workshop, the notes were transcribed and distributed to attendees for comment. This was to ensure that they were a fair and valid representation of what was discussed (see Section 5.0).

**Small groups and interview:** stakeholder availability prevented several interested members from attending the main workshop, therefore the working group decided to host further small group discussions in south and north Wales, as well as one telephone interview. Nineteen stakeholders, from five public bodies, were engaged via this method, and additional useful insight was gained. Following each small group discussion, the notes were transcribed and distributed to attendees for comment (see Section 5.0).

Health Intelligence data: a community and demographic profile of Wales was developed utilising recognised Welsh and United Kingdom (UK) sources such as the Public Health Wales Observatory and the Office for National Statistics (see Section 3.0 of this report)

### Assessment of impact:

All of the above evidence and data was collated, synthesised and analysed. The evidence was weighted so that peer-reviewed literature and robust health intelligence evidence provided the central platform for the HIA.

A matrix summarising the nature of the impacts was completed based on the collated evidence (see Tables of Impact contained in Section 8.0).

The following descriptors and definitions were used to categorise the impact:

**Figure 3: Descriptors of Impact**

Positive – impacts that improve or maintain health status or provide an opportunity to do so	Negative – impacts that diminish health status
<p> <b>Major</b> – Significant in intensity, quality, or extent. Significant or important enough to be worthy of attention, noteworthy.</p> <hr/>	
<p> <b>Moderate</b> – average in intensity quality or degree</p> <hr/>	
<p> <b>Minimal</b> – of a minimum amount, quantity, or degree, negligible</p> <hr/>	
<p> <b>Confirmed</b> – Strong direct evidence e.g., from a wide range of sources that an impact has already happened or will happen</p> <hr/>	
<p> <b>Probable</b> – more likely to happen than not, direct evidence but from limited sources</p> <hr/>	
<p> <b>Possible</b> – may or may not happen. Plausible, but with limited evidence to support.</p> <hr/>	
<p> <b>Short</b> – less than 1 year</p> <hr/>	
<p> <b>Medium</b> – 1–5 years</p> <hr/>	
<p> <b>Long term</b> – 5 years or more</p> <hr/>	

These descriptors were used in the assessment of impact initially by one researcher (Mark Drane). A workshop was held with a second reviewer (Richard Lewis) and third reviewer (Liz Green) on 3 March 2021 to review and agree the assessed impact by consensus.

### Review and Reflection:

To conclude the HIA process, the working group will hold an internal debrief meeting to reflect upon the process and to consider options for monitoring future health indicators and evaluating the outcome of the HIA post publication.

## 3.0 Health Intelligence Summary

Routine data sources including Census data, Public Health Outcomes data and National Survey for Wales data, were searched to identify relevant data for each of the population groups. These are reported generally within the narrative of the relevant impact sections.

Stakeholders at the participatory workshop and small group discussions used the HIA population group checklist (Section 5) to identify population groups that were increasingly susceptible to the impacts of public bodies refocusing their efforts towards waste reduction and reuse.

Relevant data was not identified for every population group identified by stakeholders. This is identified as a gap for future investigation. Where possible, these population groups have been considered within broader themes.

### Demographics:

The total population of Wales in 2018 was 3,138,600 people, of which 51% were women and 49% men (Office for National Statistics, 2021a). The population estimate for Wales at mid-year 2019 was 3,152,879, with the highest number of individuals (366,903) located in the local authority area of Cardiff and the least in Merthyr Tydfil (60,326) (StatsWales, 2020b).

### Deprivation and poverty:

High levels of multiple deprivation exist within the cities and valleys of South Wales and coastal and border towns in north Wales (Welsh Government, 2019c).

Findings from the 2018-19 National Survey for Wales shows that 14% of adults are classified as materially deprived (Welsh Government, 2017b).

Of all households in Wales, on average 12% were recorded as experiencing fuel poverty in 2018 (Welsh Government, 2019c). However, rates differ depending on local authority area in Wales, with higher proportions of households in Gwynedd and Ceredigion living in fuel poverty (23% and 21% respectively) than those in the Vale of Glamorgan, Torfaen and Bridgend (all under 9% of households living in fuel poverty) (Welsh Government, 2020c).

### Employment and Skills:

Data for February to April 2020 shows that 74% of individuals aged 16-64 in Wales reported being in work, 23% were economically inactive and 3% unemployed (StatsWales, 2020a).

In 2019, there were 9.31 million women in the UK working full-time and 6.30 million (40%) working part-time compared with only 13% of men recorded as working part-time during the same period (Devine, 2021). In 2019, women were more likely than men to be employed in jobs paying the National Minimum Wage (8.1% of women compared with 4.4% of men) and men are more likely than women to be self-employed (19% of men compared with 11% of women) (Devine, 2021).

In Wales, between April and June 2019, 77.2% of women and 89.9% of men with dependent children were employed compared with 70.9% of women and 71.3% of men without dependent children (Office for National Statistics, 2019a; Office for National Statistics, 2019b). In the UK in 2019, of 1.8 million lone-parent families with dependent children, most (69.9%) were employed, of which half (49.6%) worked full-time (Office for National Statistics, 2019a).

People employed within the waste and recycling sector has increased in recent years (WRAP and Green Alliance, 2015). There are over 4,180 full-time equivalent (FTE) posts in municipal services and waste processing facilities across all 22 local authorities in Wales of which 90% are operational posts (Welsh Government, 2017b).

18.3% of the people in employment in Wales work within process plant, machinery operative, and elementary occupations, higher than the UK average (16.8%). The water supply, sewerage and waste management sector employs 13,000 people (0.9% of total workforce) in Wales (Office for National Statistics, 2019b).

Around two thirds of people employed in repair activities are skilled workers; reflecting the skilled jobs required for the original manufacturing. In Wales, only 38.8% of adults aged 16-64 years have a qualification level of NVQ4 and above (Office for National Statistics, 2021a).

Britain is already experiencing a loss of low and mid-level occupations; a 2015 study (WRAP and Green Alliance, 2015) notes further declines projected in categories including 'administrative and secretarial', 'skilled', and 'plant and machinery operatives'.

## 4.0 Literature Review

### 4.1 Search Strategy

The Public Health Wales library service supported the development of a literature search of peer-reviewed journals. A literature search of Medline was undertaken in October 2018, using the following relevant search terms: recycling / refuse disposal / waste management, HIA, waste disposal facilities, waste reduction / reuse / recycling / collection, landfill, and sanitation. To capture the literature that focused on the health impacts, the search including the terms public health, environmental health and public policy. The geographies searched included the UK and Europe. Inclusion and exclusion criteria were applied to the search. The literature search of published peer review journals used the PICO framework and is outlined below.

**Table 1: PICO framework**

Population	Intervention	Comparison	Outcomes
44 public bodies Welsh population	Ways / Strategies / Interventions to: Reduce use of resources Reduce waste production Increase reuse of items Increase recycling rates Reduce landfill use	UK wide EU countries	Proportion of waste reused Proportion of waste recycled Proportion of waste in landfill Public health impacts of waste reduction

### 4.2 Inclusion and Exclusion Criteria

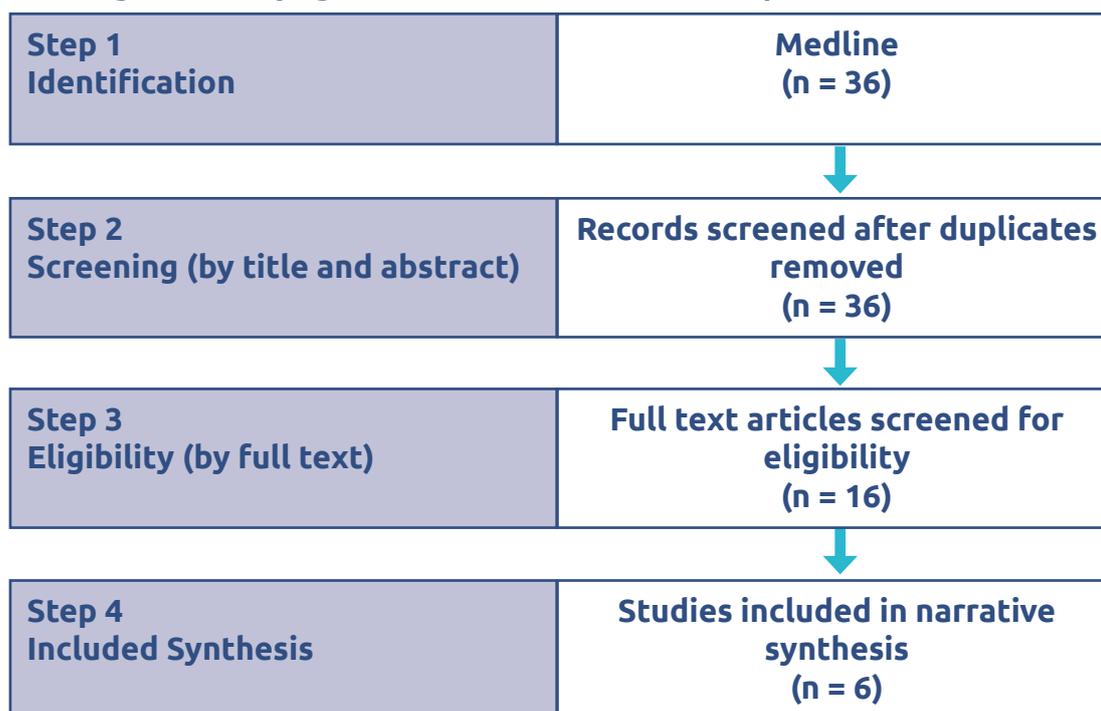
Prior to the literature review being carried out, an inclusion criterion was created. The papers were deemed relevant if they satisfied the following inclusion criteria:

- Papers focusing on ways to reduce the number of resources (natural and manmade) being used.
- Papers focusing on ways to reduce waste production.
- Papers focusing on ways to increase reuse of items / waste.
- Papers focusing on ways to increase recycling rates.
- Papers focusing on ways to reduce landfill use.
- Papers including public health impacts of waste reduction, reuse, and recycling.
- Limited to English language.
- Sources published after January 2010.

If the papers did not satisfy the above criteria, they were excluded from the review.

In total, thirty-six papers were identified in the literature search. Two researchers reviewed the abstracts, and 16 papers were identified as potentially relevant. These papers were read in full and six were identified as relevant to the HIA. The six papers were appraised, and key findings were extracted to inform the HIA. A summary of the literature search and screen procedure is outlined in Figure 4.

In addition to searching Medline, grey literature was reviewed from key organisations including, Welsh Government, the European Union, Third sector organisations and the World Health Organization. The aim was to identify information from legislation, policies, directives, and other publications that were relevant to the HIA.

**Figure 4: Flow diagram identifying the literature search and screen procedure.**

### 4.3 Literature Review Methodology

The literature review included the following stages:

- Stage 1: Rapid scoping of published evidence via internet search, expert contacts, specialist websites including public body websites.
- Stage 2: Systematic search of peer review journals via databases.
- Stage 3: Title and Abstract screening.
- Stage 4: For included studies undertake data extraction into a themed bibliography to include: Authors; Organisation; category of evidence; methods; key findings (excel or word table).
- Stage 5: Review full text and Quality Assurance of literature: critical appraisal undertaken using appropriate critical appraisal tools
- Stage 6: Thematic analysis of all included sources structured by topic (determinants). Critical analysis of strengths and weaknesses of currently available literature.
- Stage 7: Appraisal and analysis of literature alongside other evidence of impact gathered in the HIA.

### 4.4 Risk Log

The main risks to successful completion of this literature review include:

- Timescales are not met due to competing work commitments or due to changes in available resources: This will be mitigated against by development of a project plan, careful time management and clear objectives for members of the group.
- Inadequate engagement with stakeholders, this will be mitigated against by sending out workshop invitations in ample time.
- Limited published evidence or limited access to relevant documentation from public bodies.

## 4.5 Table 2 Summary of Literature Review

Study	Type		Specific Waste Stream					Systemic	Management & Intervention					Outcomes (+ve impact except as noted)							
	Household	Commercial, Industrial, Military	Food waste	Bulky Items	Junk mail	Nappy waste	Polyethylene		Paper	Systemic (e.g. Infrastructure, packaging)	Waste prevention interventions	Waste management interventions	Consumption patterns	Reuse (incl. donation & 2nd hand)	Economic & social context of waste creation	Procurement	Economic Growth	Cost Reduction	Carbon reduction	Employment	Education
Sharp and Wilson (2010)	●		●	●	●	●				●											
Andreoni, <i>et al.</i> (2015)	●	●					●				●		●			●	●	●			
Johansson and Corvellec (2018)	●	●								●	●	●	●						●		-ve
Silva, <i>et al.</i> (2017)											●										
Zacho and Mosgaard (2016)	●		●					●	●	●	●	●	●					●	●	●	●
Wilson, <i>et al.</i> (2012)		●	●						●	●					●	●	●				
Cox, <i>et al.</i> (2010)	●		●	●								●	●		●			●			●

## 4.6 Table 3: Evidence from the literature

Study details	Results of Review	Main findings
<p><b>Author and title</b> Sharp V, Giorgi S and Wilson D.C (Sharp, Giorgi and Wilson, 2010) Delivery and impact of household waste prevention intervention campaigns (at the local level).</p> <p><b>Type of study</b> synthesis review with the aim of providing a discussion of the lessons learned on both delivery and impact on waste prevention initiatives.</p> <p><b>Relevant outcomes</b> Effective delivery of waste prevention initiatives. Key areas to address waste prevention in households.</p> <p><b>Study population</b> 30 studies - waste prevention. Intervention campaigns delivered at a local level.</p>	<p><b>Description of study (methods used):</b> Paper is derived from a wider research project commissioned by the Waste and Resources Evidence Programme (WRAP) of the UK Department for the Environment, Food and Rural Affairs (DEFRA). 30 waste prevention interventions reviewed for: Delivery (the implementation of intervention campaigns structured according to enable, engage, encourage, and exemplify)/ Process (the design, management, and coordination of intervention campaigns)/ Factors that impact upon the delivery of intervention campaigns, such as attitudes to waste prevention and social norms.</p> <p><b>Quality of study:</b> Robust study</p> <p><b>Finding (results):</b> <b>Delivery</b> The delivery of intervention campaigns can be optimized using the Defra 4Es behaviour change framework, 'enable', 'engage', 'encourage', and 'exemplify' (DEFRA, 2005) (Cox et al., 2010). <b>Enabling:</b> including a mix of information, support, encouragement, progress-monitoring and feedback mechanisms on waste prevention e.g., weight food waste. <b>Engagement:</b> including door stepping, community talks, and use of media &amp; leaflets. "Positive lessons about communicating waste prevention messages included the importance of 'enabling' action through practical, achievable, lifestyle tips (rather than a general exhortation to reduce waste); and engaging participants' attention through repetition. Focusing on lifestyles rather than waste also conveyed a sense of helpfulness (rather than exhortation or instruction)." <b>Encouragement:</b> main forms of 'encouragement' identified were financial incentives. <b>Exemplify:</b> e.g. campaign feedback. Biggest impacts are attributed to food waste prevention and home composting (1.5 kg household-1 week-1 through food waste prevention and 2.88 kg household-1 week-1 through home composting) (WRAP 2009a).</p>	<p><b>Main outcomes (discussion):</b> The delivery of intervention campaigns can be optimized using the Defra 4Es behaviour change framework, 'enable', 'engage', 'encourage', and 'exemplify' (DEFRA, 2005) (Cox et al., 2010).</p> <p><b>Key areas for waste prevention in households include:</b> Food waste / composting / green cones Donating bulky items for reuse Reducing plastic shopping bags / packaging Reducing junk mail Reusing clothes / nappies</p> <p>The reasons why the interventions have worked is not always clear due to limited evaluations. However, "behaviour change has been supported by a number of integrated 'enabling' tools and 'engagement' promotions – measures which have made a collective rather than isolated difference". "It is estimated that a package of waste prevention measures could achieve around 0.5 to 1 kg household-1 week-1 reduction at source. More specifically, in terms of diverting biodegradable municipal waste from landfill in the UK, the biggest impacts can be attributed to food waste prevention (1.5 kg household-1 week-1) and home composting (2.9 kg household-1 week-1)."</p>

Study details	Results of Review	Main findings
	<p><b>Key areas for waste prevention initiatives:</b></p> <p><b>Food waste / composting / green cones</b>            Food waste is a big problem in the UK. Evidence suggests that people throw away as much as a third (6.7 million tonnes) of all the food we buy (21.7 million tonnes) – most of which (61%) is avoidable food waste (i.e. food which could have been eaten if it had been managed better) (WRAP 2007b).            WRAP estimates that 150 kg household–1 week–1 (equivalent to 2.88 kg household–1 week–1) is attributable to home composting (Sharp, Giorgi and Wilson, 2010).            Research into green cones has found that diversion levels vary from 1.7 to 3.9 kg household–1 week–1 (Bench et al. 2005, Swabey &amp; Harder 2006, Harder &amp; Woodard 2009).</p> <p><b>Donating bulky items for reuse</b>            Evidence suggests 15% of bulky waste is directed for reuse by householders (Curran &amp; Williams 2007).            Widdicombe &amp; Peake (2008) cite an estimate that in the UK 100 tonnes of material could be reused per working day (25,000 tonnes per year).</p> <p><b>Waste prevention projects</b> providing a package of measures, including sustainable consumption practices and small changes in the home e.g. reusable shopping bags and buying products with reduced packaging.</p> <p><b>Reducing junk mail</b> Households opting out of direct marketing through the UK’s Mail Preference Scheme (MPS) are estimated to prevent 73 570 tonnes of junk mail per year.</p> <p><b>Using cloth / reusable nappies</b> If 10–20% of households started using reusable nappies and reduced their impact by 10%, this could lead to an overall reduction on waste arising of approximately 0.5–1%; a 10% switch to reusable nappies alone could save around 0.2 to 0.3% of household waste.</p>	<p><b>Authors conclusions:</b>            “Relatively few local authorities (at least in the UK) have so far undertaken large-scale waste prevention campaigns and much of the impact data comes from small- to medium-scale projects”.</p> <p>“Delivering a package of interventions is important to achieving behaviour change: ‘an accumulation of campaigns is what will have the impact’ (Dorset County Council et al. 2008 [WR0116], Brook Lyndhurst and Waste Watch 2006 [WR0504]).”</p>
<p><b>Author and title</b>            Andreoni V, Saveyn H.G.M and Eder P.            (Andreoni, Saveyn and Eder, 2015)            Polyethylene recycling: Waste policy scenario analysis for the EU-27.</p> <p><b>Type of study</b>            Modelling study of polyethylene (PE) waste disposal across the EU.</p> <p><b>Study population</b>            EU 27 states – modelling so hypothetical.</p>	<p><b>Description of study (methods used):</b>            Modelling use and recycling of polyethylene.</p> <p><b>Finding (results):</b>            Optimum collection and recycling of PE leads to reduction in PE waste, reduced waste management costs, reduced CO2 emissions. With an increase in energy requirements and an increase in waste-management associated jobs.            Importance of combing full implementation of waste prevention initiatives with waste collection, recycling plus reduced consumption in order to generate economic and environmental outcomes.            By implementing the above benefits could include (model data):            Reduction of 4.4 million tonnes of non-recycled PE waste and a 90 million Euros in waste management costs.            Reduction in CO2 emissions of 1.46 million tonnes.            Increased energy expenditure (waste not incinerated – energy production of PE and waste management of PE).            Rise in waste management jobs 35,600 higher.</p>	<p><b>Main outcomes (discussion):</b>            Increases in gross domestic product (GPD) leads to increase demand for and consumption of PE.</p> <p><b>Authors conclusions:</b>            Based on numerous assumptions.</p>

Study details	Results of Review	Main findings
<p><b>Author and title</b> Johansson N and Corvellec H (Johansson and Corvellec, 2018)</p> <p><b>Type of study</b> Waste policies gone soft: An analysis of European and Swedish waste prevention plans.</p> <p><b>Relevant outcomes</b> Focus on prevention as a part of waste management and do not deal with the underlying cause of increased consumption related to economic growth.</p>	<p><b>Description of study (methods used):</b> Analysis of plans and policies, pulling out key themes.</p> <p><b>Quality of study:</b> No clear structure outlined of assessment of rigour – however the paper was reviewing plans as opposed to scientific papers or a research project.</p> <p><b>Finding (results):</b> Waste prevention must be seen as different to waste management. Therefore may need to remove waste prevention from the hierarchy and see it as a different mechanism requiring different approaches. Appears difficult for waste planners to prevent the generation of waste. Plans to reduce consumption of resources equate to &lt;1% of plans at an EU and national level (Sweden). Need to break the link between the cause (economic growth) and the effect (generation of waste). Ignoring consumption limits the opportunity to reduce waste. It is estimated that only 1-3% of household waste prevention can be affected if consumption is not addressed. Attention is on household waste e.g. food waste, Waste from Electrical and Electronic Equipment (WEEE) and textile waste but pay little attention to industrial, military and commercial waste.</p>	<p><b>Main outcomes (discussion):</b> Objectives and measures in plans are following short of the European Commission's (2008) definition as often focus on the handling of existing waste. With 51% of all objectives reviewed aimed at redirecting waste and not on prevention of consumption. Reuse is often seen as prevention – but this will only be effective at preventing waste if the reuse prevents the purchase of and the production of an item to replace the object being reused. However reuse can help increase social sustainability by providing local jobs and in providing products at a lower price. However, reuse is already linked into our 'throw away culture' as the cost of second hand goods is low and could promote spontaneous purchases and not actual replace a product i.e. increased consumption.</p> <p><b>Main findings:</b> Waste prevention and measures avoid addressing the underlying driver of waste generation i.e. consumption. Waste prevention plans often look at improving the handling of waste rather than preventing the production of waste at source. Plans often focus on small streams of waste in households and not large industrial / commercial based waste. Often soft measures in plans. Unclear incentives / and sanctions if measures not met. Control entrusted to markets rather than controlled through planner.</p>

Study details	Results of Review	Main findings
		<p><b>Authors conclusions:</b> Need to remember focus that waste prevention is about averting the existence of waste and not managing waste once it's been produced.</p> <p>Regulation may therefore need to change and may need to remove waste prevention from the waste hierarchy (although to date inclusion has increased its visibility) as harder to distinguish waste prevention from waste management.</p>
<p><b>Author and title</b> Silva A, Rosano M, Stocker L and Gorrissen L (Silva et al., 2017)</p> <p>From waste to sustainable materials management: Three case studies of the transition journey.</p> <p><b>Type of study</b> Review of three case studies.</p> <p><b>Relevant outcomes</b> Not relevant.</p>	<p><b>Description of study (methods used):</b> Written comparison of three waste management options in USA, Holland and Japan.</p> <p><b>Quality of study:</b> Descriptive study.</p> <p><b>Finding (results):</b> Not applicable.</p>	<p><b>Main outcomes (discussion):</b> Not applicable.</p> <p><b>Authors conclusions:</b> Not applicable.</p>

Study details	Results of Review	Main findings
<p><b>Author and title</b>            Kristina O Zacho and Mette A Mosgaard (Zacho and Mosgaard, 2016)</p> <p>Understanding the role of waste prevention in local waste management: A literature review 2016.</p> <p><b>Type of study</b>            Systematic review / Review article / literature review.</p> <p><b>Relevant outcomes</b>            Study population            Authors are from Denmark. Literature relevant to European context.</p>	<p><b>Description of study (methods used):</b>            This is a literature review examining the evidence available on household waste prevention and methods of incorporating waste prevention into local waste management services. The paper provides a detailed description of the search strategy and analytical framework guiding the analysis of evidence.</p> <p><b>Quality of study:</b>            The authors provide a comprehensive account of their search strategy which increases the replicability / reliability of the study.            No concerns regarding quality.</p> <p><b>Finding (results):</b>            59 articles were included in the review which the authors report to be a relatively low number and therefore indicates a lack of attention in academia. However, they do note that the number of publications has steadily increased over the last seven years which indicates growing interest in this subject area.            Several of the papers were published by WRAP.            Most of the research (21 studies) focussed on the behavioural aspects of the individual or household.            Most of the studies (26) discuss reducing household waste in general without specifying waste stream e.g. food, paper, glass etc.            The literature agrees that the two waste streams with the most potential to reduce in households are food and paper – mainly because it is easier to control the generation of them. It was also noted that reducing these two types of waste have major upstream benefits in terms of resource conservation and mitigating for climate change.            “In the UK, household waste broadly speaking, can realistically be reduced by 0.5–1 kg waste / household / week, for instance through campaigns (Cox et al., 2010; Sharp, Giorgi and Wilson, 2010).            The authors mention the social benefits of reuse –second hand products allow people on a low income to purchase good quality items at reasonable prices. The reuse industry also provides local jobs and is a way of integrating marginalised people into the labour market.            The behaviours and motivations for reducing and recycling were found to be very different. People are influenced to reduce their waste by factors such as moral obligations, concerns for the environment and avoidance of negative emotions.            The literature recognises that the solution to preventing waste is not merely individual knowledge or attitudes, it is also reliant on infrastructure and packaging.            The literature discusses the cross-over between reuse and donation / circulating surplus products / equipment. Donation is perceived to be the socially acceptable thing to do. However, donation requires a willing recipient.            Very little has been published on the monitoring and evaluation of effective waste prevention measures. It was acknowledged that much of the work around reuse occurs in the third sector as social enterprises. The advantages of these were noted as employment opportunities and education. The literature recommends partnering local waste managers with social enterprises.            Barriers to waste prevention include a lack of financial support and no policy or legislative background and therefore it is not prioritised.</p>	<p><b>Main outcomes (discussion):</b>  <b>Authors conclusions:</b>            “Among social practice researchers, there seems to be consensus that it is too simplistic to view waste reductions as merely a question of individuals making better choices. Rather there is a need to change the structures in which practices related to waste prevention occur. Both Evans (2011) and Bulkeley and Gregson (2009) advocate for waste prevention initiatives that target the social conditions in which waste is produced rather than only conceptualising waste generation as a problem of the individual’s behaviour.”            “In the design of future case studies, we suggest specific attention be paid to monitoring methods of specific types of initiatives.”            “Hence, we encourage well-designed assessment studies on the environmental effects of reuse. Moreover, there are uncertainties about the legal aspects of how reuse can become a part of local waste management. Once defined as waste, products can no longer legally be reintroduced to the market. How this barrier can be overcome will also need to be investigated by future studies.”            “Finally, there needs to be coherence in the regulative waste framework. Currently, EU member states are obliged to increase recycling targets to 50% of all household waste. Setting quantitative targets is important for a successful implementation. Quantitative targets are more binding than softer declarations of intent, and this may have the effect that recycling will be prioritised over prevention in the practical implementation in the member states.”</p>

Study details	Results of Review	Main findings
<p><b>Author and Title</b> David C Wilson, David Parker, Jayne Cox, Kit Strange, Peter Willis, Nick Blakey and Lynn Raw (Wilson et al., 2012)</p> <p>Business waste prevention: a review of the evidence. 2012.</p> <p><b>Type of Study</b> Evidence review.</p> <p><b>Study population</b> Authors are UK based. Literature is from UK and international.</p>	<p><b>Description of study (methods used):</b> This is a literature review. “Eight types of policy intervention were identified: standards, labelling, procurement, commitments and voluntary agreements, communication, incentives, waste minimisation clubs and other business support. Six illustrative sectors were selected: construction and demolition, food and drink, hospitality, retail, automotive and office-based services.”</p> <p><b>Quality of study:</b> The literature that was included in this study was critically reviewed by seven experts in the field. However, the description given to the search strategy is limited in comparison to Zacco and Mosgaard, and would therefore be difficult to replicate. Overall, no major concerns regarding quality.</p> <p><b>Finding (results):</b> Understand that 28 articles were included in the review – but it is not clear. One of the key benefits of waste prevention is economic – the amount of money a business or organisation can save. The UK could save £55billion per year if it were more resource efficient (Lee et al., 2011). Categorises approaches to waste prevention into waste minimisation, clean operations, green products and product / service innovation. A new conceptual framework was developed based on the evidence. Waste prevention behaviour in businesses should be considered on three levels: individual, organisational, institutional. Within each of these three levels the authors describe four factors: ethos, roles and relationships, resources and contextual. Motivations and barriers to business waste prevention are categorised into these e.g. on an individual level under roles and relationships, champions and leadership are mentioned as motivations. On an organisational level under ethos, the corporate culture is mentioned as a motivator. As is productivity, efficiency and cost-savings under resources. On an organisational level under resources, a lack of resources is mentioned as a barrier. As is business priorities under ethos. The literature reviewed had little reference to interventions involving procurement and the supply chain in offices. “One of the most effective drivers for waste prevention is the leadership of some larger-scale businesses, particularly in suitably-structured sectors, such as food retailing (Willis, 2012a). Harnessing the resources of these leading organisations—where corporate culture has already changed so that other businesses are drawn in and engaged—represents a common theme arising from this research (Wilson et al., 2012).”</p>	<p><b>Main outcomes (Discussion):</b> <b>Authors conclusion:</b> Although waste prevention is at the top of the waste hierarchy, the progress towards it has been quite limited. Further research is required around: measuring success, encouraging ambition and changing culture.</p>

Study details	Results of Review	Main findings
<p><b>Author and Title</b> Jayne Cox, Sara Giorgi, Veronica Sharp, Kit Strange, David C Wilson, Nick Blakey. (Cox et al., 2010)</p> <p>Household waste prevention – a review of evidence. 2010.</p> <p><b>Type of Study</b> Evidence review</p> <p><b>Study population</b> Authors are UK based. Evidence is predominantly UK (England) but also international.</p>	<p><b>Description of study (methods used):</b> The authors searched published peer-reviewed literature and grey literature reports. An overview of the process is shown schematically in Figure 4. They also engaged with stakeholders to gain their professional knowledge.</p> <p><b>Quality of study:</b> This paper appears very comprehensive. They have used mixed methods to generate their findings and have provided a good explanation of their methodology i.e. 88 documents were reviewed in detail, 50 other sources were also used, and an international review was conducted etc.</p> <p><b>Finding (results):</b> “Unlike recycling, which is a more singular act, prevention comprises many small individual actions.” “Waste prevention is not one but many behaviours; the review revealed a general hierarchy in their popularity, from donating goods to charity at the top; through small reuse behaviours around the home; to activities involving changes in consumption habits at the bottom; one estimate is that 60% of the public does at least one of these activities, some of the time.” “The main opportunities are to ensure more strategic planning for reuse by local authorities and better co-ordination and joint working with the third sector.” The categories where most waste can be diverted is food, home composting and bulky waste. Also mentions Defra’s Behaviour Change Framework (4Es) – enable, engage, encourage and exemplify. Behaviour change interventions need to take all of these into account. Social psychological frameworks describe the following considerations as important to waste prevention practice: personal values, norms and identities; social norms and identity; external conditions; and habits. Motivators for waste prevention in the literature are as follows: the values of universalism and moral motivations; personal responsibility; self efficacy; costs; social norms; and habits. Barriers to waste prevention in the literature are as follows: apathy; “it’s someone else’s responsibility”; inconvenience; cost; weak self efficacy and a sense of powerlessness; social norms don’t favour waste prevention; and dominance of the recycling norm. “Examples exist in Europe where there is a more developed second hand retail sector and / or greater integration of reuse organizations with the local authority bulky waste infrastructure. A notable example of the latter is the Belgian region of Flanders (Arold and Koring 2008, Vandenbussche undated).” One of the success factors for involving the third sector in waste prevention is: “Co-ordination with local authority activities – most often where activity is formalized in service level agreements. Some authors cite this as a key barrier where it is not seen (e.g. Curran &amp; Williams 2007); or show a correlation between levels of reuse activities and authorities which have service agreements with reuse organizations (LCRN undated). The Flanders example shows how a package of policy provisions (including reuse targets, special exemptions, allowances, employment subsidy and tax treatment of reuse) can support the development of an integrated reuse sector (Vandenbussche undated).”</p>	<p><b>Main outcomes (Discussion):</b> <b>Authors conclusion:</b> The barriers to waste prevention are lack of understanding what it constitutes, and a lack of visibility as most of these behaviours are done in private or unbeknown to others. However, there are opportunities to raise its visibility by identifying specific activities and helping consumers to do them. The authors agree that there is a good opportunity to increase the volume of items reused. More monitoring and evaluation needed to provide robust evidence.</p>

Study details	Results of Review	Main findings
	<p>Strengths of using the third sector are: being able to utilise volunteers, strong ties with the local community, it creates jobs for low-skilled workers or those who are unemployed, and it provides appliances / furniture to low income households.</p> <p>Page 210 mentions collaborative procurement (joint public sector procurement to eco-standards). However they state the potential impact of this is unknown.</p> <p>“there are hints in the evidence that (kerbside) recycling may get in the way of developing prevention habits. Therefore it cannot be assumed that prevention is the next ‘natural step’ from recycling.”</p>	

## 4.7 COVID-19 Evidence review in 2021

Considering the recent global pandemic, an additional evidence review was completed to gauge the potential impact the COVID-19 pandemic has on waste production with the elevated use of single use products. Severe acute respiratory syndrome coronavirus 2, SARS-CoV-2 (commonly known as coronavirus or COVID-19) has caused illness (morbidity), death (mortality) and upheaval across the world. Most of the globe's nations have been affected by the pandemic and have established policies to ensure that the risk of transmission within the population is reduced. Separate health impact assessments of Home and Agile working in Wales (Green et al., 2020a) and the Staying at Home and Social Distancing Policy in Wales (Green et al., 2020c) have been reported separately.

These interventions are varied and have had an impact on existing waste management systems as well as goals to reduce and reuse more. These can be categorised as direct implications of COVID-19 and indirect systemic impacts on resource usage and waste management.

Some of the positive environmental impacts reported with lockdowns such as cleaner air, improved water quality, and less noise pollution have not been replicated in terms of waste which, within the scope of this assessment, appear to be overwhelmingly negative (Benson, Bassey and Palanisami, 2021; Dharmaraj et al., 2021; Sharma et al., 2020).

Little was known about COVID-19 at the start of 2020 and an example of how this impacted waste policy was the designation of COVID-19 first as a high consequence infectious disease (HCID) in the UK, with this being downgraded from March 2020 (Public Health England, 2020). This for example has implications for waste management, how waste is categorised, and therefore treated (NHS Wales, 2013) and it is complicated, as a face mask in a healthcare setting may be categorised as infectious waste or not depending on who has worn it and for what procedure.

Vaccination programmes and testing for COVID-19 also create waste streams with significant complexities: for example, NHS England has identified the need to dispose of vaccination packaging as confidential waste for fear of security risks (NHS England, 2021).

As COVID-19 has spread so has potentially infected waste with households, workplaces, care settings, education, and many other settings now collecting potentially infectious waste where systems of segregation and handling may not be so well established or known and with used personal protective equipment (PPE) and potentially infected waste mixed with general waste streams including people self-isolating at home with confirmed COVID-19 but also people with asymptomatic COVID-19.

PPE started as a priority for healthcare workers and globally WHO called for production to increase by 40% early in 2020 (World Health Organization, 2020). PPE use has now spread across the whole population to varying degrees, availability of PPE in the workplace in Wales is considered by Green et al. (Green et al., 2020c). In Wales guidance has been issued on PPE in healthcare settings (Public Health England, 2020), for the public (Welsh Government, 2021a), and duties for employers of key workers including waste sector workers (Welsh Ministers, 2020).

One study estimates that every day because of the pandemic 1.6 million tonnes of plastic waste is generated globally including 3.4 billion single use facemasks. The COVID-19 virus could be viable on these surfaces for several days. Some of this waste results in pollution and litter especially for marine environments and is projected to reverse previous actions to reduce plastic waste pollution globally (Benson et al., 2021).

Washing and sanitising hands has also been a recommended health protection measure with increased use of liquids of varying chemical contents for this. Several studies identified sanitiser as

a problem and the creation of sanitiser container waste (Benson et al., 2021; Benson, Bassey and Palanisami, 2021; Dharmaraj et al., 2021; Rosadi et al., 2020; Sharma et al., 2020) a further study from Indonesia identified sanitiser liquids themselves as a potential risk to health (Rosadi et al., 2020).

Indirect and equally powerful drivers of implications for waste management and reduce and reuse approaches in Wales include stay at home lockdowns; requirements to isolate at home if suffering COVID-19 symptoms or in case of a positive test; closure of food services such as restaurants and cafes; closure of non-essential shops including those involved in reuse activities; childcare provision for key workers; and actions to maintain most household and commercial waste collections.

Taking one of these: charity shops and third sector organisations play an important role in existing reduce and reuse approaches. In Swansea, The British Heart Foundation for example operates a furniture and electrical shop that also make collections of bulky items; and Siop Ailddefnyddio Trysorau'r Tip / Tip Treasures Reuse Shop allows people to donate and buy previously unwanted electrical goods and furniture. Both of these have been affected by closures due to Covid during the pandemic. This potentially has an impact on the amount of waste that is reduced and reused, although specific data was not identified, and also reduces the availability of low-cost products to customers who may suffer poor living conditions without access to these goods.

## 5.0 Summary of Qualitative Interviews and Workshop with Stakeholder Organisations

**5.1 Table 4: Summary of Population Groups Identified within Qualitative Interviews**

Population Groups Identified (summarised) People with / subject to / living in / working in...	Workshop	Interview 1A	Interview 1B	Interview 2	Interview 3	Interview 4	Interview 5	Interview 6
Whole population	●							
<b>Sex / Gender Related Groups</b>								
None identified								
<b>Age Related Groups</b>								
None identified								
<b>Groups at Higher Risk of Discrimination or Other Social Disadvantage</b>								
Chronic conditions (various)	●				●			
Mental health conditions	●							●
Modern day slavery / slave labour		●						
First language other than English				●				
Low literacy	●							
<b>Income Related Groups</b>								
Long-term unemployed / unemployed / economically inactive		●						
Living on low income		●						
<b>Geographical Groups</b>								
Areas of high deprivation / poor economic indicators		●		●				
Rural areas of high deprivation / poor economic indicators		●						
Near an incinerator		●		●				
Gypsy or Irish Traveller ethnic group				●				●
Areas with higher turnover of households				●				
Dementia / memory impairment	●							
Visual impairment	●							
<b>Settings Groups</b>								
Waste sector workers (lower waged / lower skilled)	●	●			●			●
Hospital staff, health board workers	●	●			●			
People living in housing with communal bins	●			●				
Staff working in public bodies	●							
Public bodies staff with influence on decisions (fleet managers, facilities managers, catering managers).		●						
Carers	●							
Students	●							

Populations beyond Wales excluded.

## 5.2 Table 5: Assessment of Health and Well-being Determinants

<b>Behaviours affecting health</b>	
<b>Opportunities / positive impacts</b>	<b>Unintended consequences / negative impacts</b>
<b>Physical activity</b>	
<p>Reduce transport emissions</p> <p>Promote active travel e.g., cycling or walking to work, rather than driving a car, as this would reduce emissions, contribute towards decarbonisation, improve air quality, save the organisation money in business mileage, and improve staff health and well-being through exercise.</p> <p>[Source: workshop]</p>	None Identified
<p>Reduce transport emissions</p> <p>Opportunity to reduce fuel consumption by promoting active travel.</p> <p>[Source: interview 6]</p>	
<p>No individual waste bins by desks in offices. These have been replaced by communal areas for recycling which will lead to increased physical activity of staff who have to get up from their chair and walk to another area of the office.</p> <p>[Source: interview 1A]</p>	
<b>Diet / healthy eating</b>	
<p>Reduce packaging of food</p> <p>For example, fruit. There are certain schemes that deliver unpackaged, organic, and local fruit / veg to your door. Some also include healthy recipes which include the food.</p> <p>[Source: workshop]</p>	<p>Food packaging</p> <p>Unpackaged food may be more expensive because they are organic and more local – this may disadvantage some (inequalities).</p> <p>Choice when shopping – loose options are not always easily available to the consumer, may only be able to buy pre-packaged versions.</p> <p>Organic produce may also be more expensive – may disadvantage some (inequalities).</p> <p>What is / isn't recycled (good intentions) – different plastic packaging - can be confusing to understand what is and isn't recyclable in your local area.</p> <p>Unintended consequence - Hydration in schools – free single-use plastic bottles given to children after lunchtime for hydration and better concentration in the classroom (example of a Cardiff school given), however after 1 week of stopping this new policy 1000 bottles were saved, and the school have now switched to reusable plastic cups instead – policies 'colliding'.</p> <p>[Source: workshop]</p>
<p>Reduce packaging of food</p> <p>Food sold to staff and visitors in leisure centres, staff canteens, and on hospital grounds (including vending machines) – both the food and its packaging e.g., sweets, crisps and soft drinks in single use plastics. There is an opportunity to reduce this which could have a positive impact on staff / visitor's diets also.</p> <p>[Source: interview 1A]</p>	
<p>Local food</p> <p>Procurement of food from cooperatives – healthy, local food e.g., Cae Tan Community Supported Agricultural Project (CSA) <a href="http://caetancsa.org/en/">http://caetancsa.org/en/</a></p> <p>Swansea local authority, ABMU health board, Swansea University – e.g., to set up cooperative to pool resources and procure local community grown food. Gower Power co-operative <a href="http://www.gowerpower.coop/">http://www.gowerpower.coop/</a> US example also (in Ohio?)</p> <p>[Source: interview 1A]</p>	

Opportunities / positive impacts	Unintended consequences / negative impacts
<p>Reduce packaging of food</p> <p>Need an increase in allotments for food production, with the added benefits of:</p> <ul style="list-style-type: none"> <li>• Improved Health and well-being</li> <li>• Improved diet</li> <li>• Reduced food packaging</li> </ul> <p>Waste packaging is not included within discussions on diet and health – this is a missed opportunity. Government / society ask producers to reduce salt and sugar, but we have not included packaging within this dialogue.</p> <p>[Source: interview 2]</p>	<p>Government talks about food content and not packaging – missed opportunity to consider holistic approach to food production and consumption.</p> <p>[Source: interview 2]</p>
<p>Reduce packaging of food</p> <p>Opportunity to increase cooking skills in communities and promote cooking from ‘scratch’ with a reduction in food packaging and healthier diet / weight.</p> <p>Opportunity to re-educate away from a ‘throw away nation’.</p> <p>[Source: interview 3]</p>	<p>Reduce packaging of water.</p> <p>The Water Bottle Replacement Project is currently in process of being implementing – so not yet in place. As a result, we are not yet sure of any negative impacts.</p> <p>[Source: interview 4]</p>
<p>Reduce packaging of water</p> <p>Initiative to reduce the use of bottled water (crates of 500ml bottles) previously used as a water supply for personnel on a call out. Now changed by providing staff with a reusable bottle and a large water container (5 litre) on each fire unit to refill as required.</p> <p>[Source: interview 4]</p>	
<p>Reduce packaging of food</p> <p>Opportunity to reduce packaging and to be able to buy loose fruit and vegetables in supermarkets</p> <p>A healthier diet using less processed foods will lead to less packaging and waste and fewer non-communicable diseases.</p> <p>[Source: interview 6]</p>	
<p>Reduce food waste</p> <p>If we know which foods are being wasted by public bodies and in what quantities, we can identify solutions to prevent this.</p> <p>Promote ‘wonky fruit and veg’ to ensure the whole crop is utilised (increase money for farmers and reduce food waste).</p> <p>[Source: workshop]</p>	<p>Food waste</p> <p>Buying en-mass as is done for certain public bodies e.g., hospitals– leads to food waste.</p> <p>Marked / damaged fruit not popular ‘wonky fruit and veg’ and may be unbought and wasted.</p> <p>Need to simplify the messages around recycling etc.</p> <p>[Source: workshop]</p>
<p>Reduce food waste</p> <p>Food waste – link to portion control (nutritional standards in hospitals and care settings are creating food waste because portion control is not by age of patient – this has previously been identified by the Public Accounts Committee). A change to this system such as a patient meal ordering system could reduce food waste.</p> <p>[Source: interview 1A]</p>	<p>Cooking versus take-away – convenience and pre-prepared food can be cheaper and more appealing and can have more associated waste.</p> <p>[Source: interview 3]</p>

Opportunities / positive impacts	Unintended consequences / negative impacts
<p>Food waste / provision and availability of services</p> <p>Food waste services are offered to school catering contractors, but they have the choice to opt in / opt out of the service.</p> <p>Commercial waste collectors offer a limited food waste collection service. Therefore, opportunity for local authority (LA) to promote this aspect of their waste collection service. Need legislation and enforcement so businesses are required to collect food waste.</p> <p>LA sends food waste to an aerobic digestion facility in St Asaph. Aim to increase the capacity of this over time. Food waste is used for energy production, fertilizer (trail ongoing) and potential for heat capture and use.</p> <p>Need to increase awareness of food waste. 12% of black bin waste is food e.g., Love food Hate waste campaigns.</p> <p>[Source: interview 5]</p>	<p>None identified</p>

## Social and community influences on health

### Normative behaviour

<p>Positive reinforcement of recycling</p> <p>Continuing 'virtuous circle', e.g., stickers on bins. Messaging now is often centred on peer pressure. May increase recycling.</p> <p>[Source: workshop]</p>	<p>Positive reinforcement of recycling</p> <p>Recycling messaging may distract from reduce and reuse as 'doing well at recycling' gets promoted.</p> <p>[Source: workshop]</p>
<p>Need behavioural change to reduce waste production. Need investment in education to increase awareness and the community's understanding that they have a responsibility for their waste production.</p> <p>Need a change in focus and for LA and public to work together to reduce waste production and change the focus from recycling as a transaction.</p> <p>Need to tackle the root cause and not leave it to sporadic consumers or small groups to make a stand.</p> <p>Need a different focus away from putting the right waste in the right bins but more towards the way we live and to reducing our use of resources and to being more sustainable.</p> <p>Society sees waste as a separate thing that is not their responsibility but the responsibility of others e.g. council. The public need increased awareness and increase responsibility for reducing their own consumption.</p> <p>Too much focus on recycling and downstream interventions. Need more education to reduce waste production.</p> <p>Leadership</p> <p>Need leadership to focus minds (at all levels of government and society) on waste reduction and sustainable living.</p> <p>Need to change the mind-set 'someone else will deal with that...'</p> <p>[Source: interview 2]</p>	<p>Our lifestyles lead to increase waste and also increased complexity of waste to be dealt with (mixed packaging etc.).</p> <p>[Source: interview 2]</p>

Opportunities / positive impacts	Unintended consequences / negative impacts
<p>Reduction of single use plastic</p> <p>Betsi Cadwaladr University Health Board (BCU) staff have set up a 'plastics reduction group', inspired by the TV programmes on plastic waste. All staff who are interested in this area, volunteer to attend the group, including nurses, infection control staff and catering colleagues. Work so far includes, introducing reusable cups and crockery in Ysbyty Glan Clwyd (new dining rooms) and staff are also working to reduce 'polystyrene take away tubs, replace 'plastic property bags' for patients on discharge with paper bags, remove plastic cups from water stations, allow staff to refill water bottle at water stations, replace plastic cups for medicine dispensing.</p> <p>Senior leadership</p> <p>The Chief Executive signs the 'Environmental Policy Statement' and there are senior BCU colleagues on the Sustainability group (sits within the planning directorate) and plastics reduction group.</p> <p>The environmental steering group focuses on ISO14001 standards.</p> <p>Opportunity for policies to 'reuse / refurbish furniture' during all new developments / redevelopments. Need policies that ensure staff cannot order new furniture e.g., as with white goods.</p> <p>[Source: interview 3]</p>	<p>Senior leadership</p> <p>BCU HB priority is patient care using limited finite resources, so there is limited influence on waste reduction / reuse and recycling as cost is a major decision tool.</p> <p>BCU does not have a sustainability policy.</p> <p>[Source: interview 3]</p>
<p>Champion / authoritative person</p> <p>Green champion volunteers based at each site, who feed back any issues to the sustainability officer e.g., amounts of glass being thrown away or energy consumption at each site.</p> <p>[Source: interview 4]</p>	<p>None identified</p>
<p>Senior leadership</p> <p>Community councils have a role to play in waste reduction in Local authorities (LA) as they are important community influencers.</p> <p>Opportunity for public bodies to lead by example and refurbish / reuse furniture within their buildings.</p> <p>Need cultural shift to ensure public bodies and their staff recycle at source, there are different levels of influence and responsibility. We require senior leadership support to change culture within public bodies.</p> <p>The third sector have a major role to play in supporting communities to reduce waste production. They are well placed and are often ahead of the game compared to public bodies.</p> <p>[Source: interview 6]</p>	<p>None identified</p>

Opportunities / positive impacts	Unintended consequences / negative impacts
<b>Provision of information</b>	
<p>Promote messages</p> <p>Use social media to drive behaviour change, especially for younger generations. As well as social media, these types of messages are already being ‘backed-up’ by popular children’s tv channels 3 i.e., CBeebies.</p> <p>Promote message to teenagers and young people (student population).</p> <p>Lead by example.</p> <p>Opportunity to show and demonstrate benefits of Reduce, Reuse, Recycle – cleaner / healthier environment.</p> <p>Opportunity to look at other countries’ work.</p> <p>Opportunity for Public sector in leading and ‘telling’ e.g. Outwardly telling people that public bodies are being proactive on this issue.</p> <p>Procurement.</p> <p>What is the ‘story’ of Wales’ recycling?</p> <p>public bodies contribute 1-3% towards decarbonisation?</p> <p>Public Health Wales strategy is this consistent across the estate?</p> <p>Reporting on car trips saved – telling our public.</p> <p>Public Health Wales need to be seen to be taking the lead and trialling different models.</p> <p>We should practice what we preach.</p> <p>We need to engage staff, but not just at the corporate level.</p> <p>Welsh Government (WG) estates need to set the marker down for others.</p> <p>[Source: workshop]</p>	<p>Messages</p> <p>Need to simplify the messages around recycling etc.</p> <p>Are we missing out on targeting teenagers (given that they are often the worst at recycling)?</p> <p>[Source: workshop]</p>
<p>Media stories</p> <p>Opportunity to develop communication strategies to counterbalance the negative messages of vermin which is often untrue.</p> <p>Language / messages.</p> <p>Local authorities provide information in different languages (example given of Polish and Braille materials).</p> <p>Opportunity to simplify messages and improve understanding (Literacy) by using visual imagery e.g., Infographics – images more powerful than text. Could address confusion issues.</p> <p>WRAP has developed a set of images / labels.</p> <p>WRAP has a catalogue of labels.</p> <p>Could these be shared widely?</p> <p>Care in communication needed. Messages (e.g., kiwi fruit discussion) can come across as middle-class and privileged.</p> <p>[Source: workshop]</p>	<p>Media stories</p> <p>Negative media presentation of monthly black bin collections versus reasons for this (Conwy example, rats ‘scare’ in media stories).</p> <p>Language / messages</p> <p>The public may perceive the LA to be cutting down on black bin collections so that they can save money, rather than for environmental reasons.</p> <p>[Source: workshop]</p>
<p>Zero waste week – WG has previously trialled.</p> <p>Opportunity to re-launch for all public bodies.</p> <p>[Source: interview 1B]</p>	
<p>Schools have the Green Flag award and have educational sessions on Carbon awareness and waste reduction – however funding for such initiatives has now ceased.</p> <p>[Source: interview 2]</p>	<p>We have a ‘rules’ led recycling infrastructure and we hope the public understand these rules (pictorial messages) but many do not and there are still language barriers. This approach is not conducive to behaviour change.</p> <p>[Source: interview 2]</p>

Opportunities / positive impacts	Unintended consequences / negative impacts
<b>Education and awareness raising</b>	
<p>Education</p> <p>Opportunity to educate staff (perception &amp; attitudes) that a change in furniture / redevelopment of a ward / area does not mean 'new furniture'. Need to re-educate staff to reuse furniture and for BCU HB to utilise refurbishment schemes e.g. WARP IT.</p> <p>Work ongoing to increase awareness and educate staff that recycling done off site and not at source and of the negative consequences of not dividing waste on wards / areas into hygiene (clear bags) or clinical waste (orange bags).</p> <p>Opportunity to increase awareness of waste reduction, reuse, and recycling amongst staff.</p> <p>[Source: interview 3]</p>	<p>None identified</p>
<p>Education / awareness</p> <p>Need to increase awareness and consciousness of people on how much plastic is used within everyday scenarios. Need to make it the 'easiest option' for staff to reduce waste (not just 'displace' waste i.e., staff take their waste back to their homes) and to increase awareness of reusable products.</p> <p>Need education (people, tenants, landlords) plus dedicated enforcement officers to ensure black bins put out and collected appropriately and that recycled bins do not contain black bin waste as recycling cannot be collected if it is contaminated and will be sent to landfill.</p> <p>People often choose convenience over cost and sustainable options e.g., disposable nappies. However disposable nappies are now very cheap and young families live in smaller houses with less space to store reusable nappies and often work so less time to wash nappies etc. therefore complex to resolve.</p> <p>Behaviour change through design of waste collection receptacles / collection frequency is key to reducing waste e.g. People will produce less waste if the design of the waste collection bins limit the space for rubbish e.g., smaller black bin.</p> <p>[Source: interview 5]</p>	<p>Awareness raising</p> <p>Furniture needs to be able to be cleaned. If ripped, then it is disposed of as infection risk. Also requires fire safety certificates.</p> <p>As waste not segregated at source, some staff do not believe that waste is recycled – ongoing education across BCU, including arranged visits to waste recovery facilities.</p> <p>[Source: interview 3]</p>
<p>Staff awareness achieved through email circulars, sustainability pages on intranet.</p> <p>[Source: interview 4]</p>	<p>None identified</p>
<b>Citizen power and influence</b>	
<p>Community</p> <p>Plastic-free communities and small businesses e.g., RIPPLE shop in Cardiff; similar shop in Monmouth – driven by the communities.</p> <p>[Source: interview 1A]</p>	<p>None identified</p>
<p>Examples of community stores opening to sell used items including furniture.</p> <p>[Source: interview 1B]</p>	

<b>Mental health and well-being</b>	
<b>Opportunities / positive impacts</b>	<b>Unintended consequences / negative impacts</b>
<b>Community / public engagement</b>	
<p>Increasing interest in 'Reuse' cafes. Wrexham County Borough Council (WCBC) has facilities at the waste management sites to support reuse of items. LA will refer households to charities for bulky collections e.g., furniture in good condition, rather than take away as waste.</p> <p>'Reuse' is an area where communities can develop initiatives and social enterprises.</p> <p>Need to develop incentives for reduction in waste and remove the burden from LA. The public expect their waste to be collected as they pay their council tax. If you charged for waste collection it may reduce the production of waste.</p> <p>HMP Berwyn has initiatives where the men in the prison work with waste / recyclable products e.g., repair bikes, make tyre planters, make wooden bird boxes etc.</p> <p>[Source: interview 2]</p>	<p>Community cohesion</p> <p>If community cohesion is poor, then there is increasing risk of issues with waste management / collection.</p> <p>Issues with waste collection, are often a key tension within communities.</p> <p>[Source: interview 6]</p>
<p>Included Cycle Sheds and lockers at several locations to encourage cycling to work.</p> <p>Have held a number of Cycle to workdays over the last few years to encourage Green Travel and well-being.</p> <p>[Source: interview 4]</p>	<p>Difficulties in obtaining accurate annual data on Waste collection to be able to report on in the Annual Environmental Report. This results in estimates or data which may not be accurate.</p> <p>[Source: interview 4]</p>
<b>Sense of control</b>	
<p>Increased sense of control if we say that what we are doing (in terms of recycling) goes to a particular plant and this is the energy that we get out of it, rather than our waste going to another country.</p> <p>Patients in Mental health units in Abertawe Bro Morgannwg (ABMU) health board – recycling is one of the ways these patients are phased back into day-to-day living / integrating back into mainstream living.</p> <p>Recent news stories about consumers leaving food packaging in the supermarket after the goods have been purchased -&gt; 'civil unrest' / peaceful protest. Opportunity to engage teenagers / people with the Reduce, Reuse, Reuse agenda in a different way to usual.</p> <p>[Source: workshop]</p>	<p>An unintended consequence for these patients in mental health units can be that they become obsessed by it (OCD). Seeing recycling thrown in together (when bins emptied) – confusion as to what happens with this waste once co-mingled.</p> <p>[Source: workshop]</p> <p>LA has limited control / influence over packaging of items that they procure.</p> <p>[Source: interview 2]</p>
<p>None identified</p>	<p>No control</p> <p>People want to choose plastic free and if unable to do so e.g. unable to buy food without packaging, this can cause stress and anxiety.</p> <p>Feeling of no control over the 'Health of our planet' at an individual level can lead to stress and anxiety particularly in younger generations.</p> <p>[Source: interview 6]</p>

Opportunities / positive impacts	Unintended consequences / negative impacts
<b>Emotional well-being</b>	
<p>Staff will feel better, if employers are actively working to reduce waste production. [Source: interview 6]</p>	<p>Stress / worry about what to recycle, when other people don't recycle, when told to recycle and you don't want to, or when facilities aren't available to recycle. [Source: interview 1B]</p> <p>Staff had some concerns as saw recycling being put into a single vehicle 'hard work for nothing' but staff reassured as the waste contractor separates after collection. [Source: interview 4]</p>
<b>Living and environmental conditions affecting health</b>	
<b>General</b>	
<p>Opportunity for WHIASU to update 'Waste Disposal' on HIA Checklist.</p> <p>Opportunity to increase recycling at events / festivals (Welsh Government example of National Eisteddfod and Royal Welsh Show) – volunteers monitoring bins.</p> <p>Example given of hospital patient cubicle curtains being changed every three months – the quantities generated in a small HB like Powys are quite low, however they could be recycled in 'collaboration' with other HBs.</p> <p>Need to consider how much is being spent in Wales by public bodies and opportunities to pool investment (no all-Wales contract).</p> <p>Is there a commercial role for LAs to collect more waste?</p> <p>We need public bodies and households knowing where contractors are disposing waste and increase understanding that the waste producer is liable, not the person disposing of the waste (if dumped illegally). [Source: workshop]</p>	<p>Limited availability of recycling bins out and about (on the go recycling). Rates are historically very poor.</p> <p>The reason that this method doesn't work is likely cultural – it's like dog fouling being left on the street and not disposed of in the bins provided by councils.</p> <p>The canteen in one large hospital uses a lot of single use plastic. Cost of recycling bins is a 'barrier'. Health and safety and hygiene considerations, also.</p> <p>Houses in multiple occupancy – example given of bins being removed from dementia settings.</p> <p>Communal recycling points / shared wheelie bins for many houses / flats – some people use them correctly / responsibly whilst others do not.</p> <p>2,000 refuse fires this year (South Wales Fire and Rescue Service).</p> <p>Environmental impact of fires in waste recycling plants – days of dealing with fires, poor air quality, water run off unintended consequence of recycling.</p> <p>Unlicensed business dumping, e.g., building and garden waste. [Source: workshop]</p>
<p>Food waste within organisations – building regulations require space to be created outside and ideally inside the building for food waste and other recyclables (in new build premises, but not for older premises). Not currently required to separate the waste at source however this will be consulted upon in 2020. [Source: interview 1B]</p>	<p>Future new requirements around recycling and separation – challenge for space on wards. [Source: interview 1B]</p>
<p>WCBC has had an increase in new houses and so has seen an increase in waste collected. 3% rise in waste year on year due to new houses.</p> <p>There is a potential opportunity to increase recycling rates by moving to a three weekly black bin collection.</p> <p>Need increase profile of the 'Eco footprint' of an area and organisations, with a view of 'a one living planet' and increased awareness of the rate at which we are consuming resources. [Source: interview 2]</p>	<p>If move to a 3 weekly bin collection, people will pay for private waste collection – so this may not reduce waste production.</p> <p>In surveys, the main complaints with LA are waste collection and fly-tipping. People who fly tip will continue to do irrespective of frequency of collections. [Source: interview 2]</p>

Opportunities / positive impacts	Unintended consequences / negative impacts
<p>Ysbyty Gwynedd are developing 'trim trails' for staff and patient use. Opportunity to share learning across three acute sites and reduce car use.</p> <p>Opportunity when redeveloping sites to ensure recycling facilities (space for bins etc.) are included in the design stage. Need facilities that are easy to use and space for storage.</p> <p>[Source: interview 3]</p>	<p>None identified.</p>
<p>Opportunity to develop plastic free catering facilities (Headquarters and at regional station - Aberystwyth).</p> <p>In one area working with community to develop green space around station for community vegetable patch (in collaboration with fire cadets and community).</p> <p>Mid and West Wales Fire and Rescue Service (MWF&amp;R) have removed wastepaper bins from desks and have centralised bins at exists of open plan offices. Led to an 80% reduction in waste collected as waste is now segregated.</p> <p>[Source: interview 4]</p>	<p>Waste contracts are renewed annually therefore any new considerations for stations can be included within the next annual contract.</p> <p>[Source: interview 4]</p>
<p>Plastic free</p> <p>Denbighshire County Council (DCC) are aiming to reduce the amount of plastic waste produced by staff and as an organisation.</p> <p>[Source: interview 5]</p>	<p>None identified.</p>
<p>Littering</p> <p>Littering in schools is partly due to an increase in the sale of packaged products in canteens but may also be as a result of the wide availability of packaged products which children are bringing into schools with them.</p> <p>Opportunity for the WG Deposit Return Schemes (DRS) to reduce littering of plastic bottles.</p> <p>[Source: interview 5]</p>	<p>Littering</p> <p>Littering in schools is partly due to an increase in the sale of packaged products in canteens but may also be as a result of the wide availability of packaged products which children are bringing into schools with them.</p> <p>As a coastal council, littering is a big issue for marine pollution as littering along coastal areas will end up in the sea and has a negative influence on attracting tourism to area.</p> <p>[Source: interview 5]</p>
<p>Need to invest in electric vehicles for waste collection</p> <p>Public bodies are responsible for local transport therefore there is an opportunity to promote / use electrical vehicles and to develop 'smart routes' to produce a more efficient transport system.</p> <p>[Source: interview 6]</p>	<p>None identified.</p>
<b>Air quality</b>	
<p>If more RRR then less incineration -&gt; better air quality -&gt; cost saving to the NHS e.g., from people with chronic respiratory conditions like asthma or COPD.</p> <p>Opportunity to improve air quality – as less burning / smoke from fires in bins.</p> <p>[Source: workshop]</p>	<p>None identified.</p>
<p>Fleet diesel vehicles and their impact on air quality, more public bodies are investing in electric vehicles now.</p> <p>[Source: interview 1A]</p>	
<p>Staff have access to salary sacrifice offers on new cars which are more environmentally friendly / electric cars</p> <p>Follow strict controls on air quality at training facilities.</p> <p>[Source: interview 4]</p>	

Opportunities / positive impacts	Unintended consequences / negative impacts
<b>Housing quality and tenure / Public Body sites and buildings</b>	
<p>Half of all Welsh local authorities still control social housing – a proportion of the families living in these homes live in fuel poverty whereby &gt;10% of their net income is spent on keeping the house warm. Energy and money could be saved by putting some simple energy efficiency measures into these homes. [Source: interview 1A]</p>	<p>People living in houses in multiple occupation (HMO) will find it difficult as less storage and communal bins (not everyone will recycle). [Source: interview 2]</p>
<p>Fuel poverty / fuel efficiency Opportunity to reduce fuel consumption and fuel poverty by insulating houses. Increasing problem within the private sector housing as many LA / housing association stock has been refurbished to address insulation etc. WG are developing new indicators for energy efficiency, to measure how people use their fuel. People need advice on how to reduce their fuel use and the money they spend on fuel. Need all public bodies buildings / sites to be fuel efficient. [Source: interview 6]</p>	<p>Lack of ventilation Increasingly ‘airtight’ housing with inadequate ventilation can lead to poor air quality within the house with a subsequent negative impact on respiratory diseases. [Source: interview 6]</p>
<b>Economic conditions affecting health</b>	
<b>Procurement</b>	
<p>National Procurement Service (take a percentage ‘cut’ of approx. 2-3%) framework criteria. £6 billion public sector spend. Example of a public body using recycled paint. Better jobs, closer to home. Preston Model: Preston, Lancashire (local sourcing) example given whereby the money spent by i.e., council / HB / Uni was calculated and pooled, and circular strategies were developed – delivered very good results. This model has been taken up by the Cabinet Secretary for Finance? ‘Public Service Board £’ being talked about in some areas - how do we maximise their effectiveness? Shared Services (NHS Wales) tools need ‘bringing to life’. Example given of a confidential waste tender considering distance travelled – need sustainability champions on tender groups. Opportunity for social enterprises to take usable food (destined for food waste) – which is left over from public bodies to give to charity. OPPORTUNITY Carbon budgets – could give to public bodies (a ‘carbon tax’) which would put more ‘sway’ behind positive environmental procurement processes. Wales Audit Office’s profiling of Basque example. A social enterprise system (value versus transaction). Need culture change – ‘computer says yes!’ Reassessment of risk. Need to upscale (initiatives) used by the public to happen within public bodies, e.g., ‘Freecycle’.</p>	<p>Local producers may be too small for public bodies, especially if that Public Body is national. Social enterprises – health board stated the challenges / barriers in procuring these. Welsh Government decarbonisation agenda (including reducing car use) – messaging to public needs improving. Unintended consequence – no warranty on repurposed old furniture. [Source: workshop]</p>

Opportunities / positive impacts	Unintended consequences / negative impacts
<b>Procurement</b>	
<p>Asset disposal</p> <p>How can we make money from the circular economy? Industry of the future.</p> <p>OPPORTUNITY to create a new system for public bodies for remanufacturing office furniture by social enterprises (example of CQ2).</p> <p>OPPORTUNITY – seized property team to sell acquired property on online auctioning sites to raise funds for the police – a private company currently does this for them.</p> <p>[Source: workshop]</p>	
<p>An opportunity of reducing the amount of new furniture produced is that jobs could be created in Wales to refurbish existing furniture.</p> <p>Half of all Welsh local authorities still control social housing – a proportion of the families living in these homes live in fuel poverty whereby &gt;10% of their net income is spent on keeping the house warm. Energy and money could be saved by putting some simple energy efficiency measures into these homes.</p> <p>[Source: interview 1A]</p>	<p>Potential loss of jobs due to lack of new furniture being produced (often at the European level).</p> <p>There are examples of Welsh based suppliers of single-use disposable (clinical) items to NHS Wales. Switching to re-usable alternatives, whilst being a positive environmental step, could have negative economic consequences for those suppliers.</p> <p>[Source: interview 1A]</p>
<p>Jobs could be created in Wales to refurbish existing furniture.</p> <p>Employment – recycling / remanufacture jobs - often community enterprises. Providing meaningful employment and a step up.</p> <p>Remanufacturing can support social enterprises and meaningful employment.</p> <p>Move towards low carbon, disinvestment from disposables, business models need to change. Provide longer contracts to those who wish to invest in this new model.</p> <p>[Source: interview 1B]</p>	<p>None identified.</p>
<p>Need to be innovative and use EU directives to support and not limit sustainable procurement. Need to consider changing the ‘weighting’ in procurement to provide additional ‘weight’ to sustainable procurement rather than solely cost.</p> <p>Aim to use local providers as part of procurement.</p> <p>Need public bodies to develop a market for refurbished / reused furniture and upscale good practice, for social enterprises to develop a service.</p> <p>Need changes to procurement to purchase refurbished / reused furniture (not currently doing this).</p> <p>[Source: interview 2]</p>	<p>Opportunities to buy ‘Green energy’ but you are limited in choosing a ‘green tariff’ as you need to choose the cheapest tariff (EU directive). If discretionary services, then cost has the greatest ‘weighting’.</p> <p>Recycled waste provides an income to the LA, however certain plastics are ‘good’ and easier to sell to recycling firms, while others are ‘poor’ plastics and harder to sell. If there is a bottle return scheme, the number of recycled ‘good’ plastics will be reduced and therefore the waste will be worth less and harder to sell.</p> <p>The LA must manage the market fluctuations of selling recycling and therefore it is difficult to plan.</p> <p>[Source: interview 2]</p>
<p>Opportunity to give food ‘out of date’ but fit for human consumption to local charities to reduce food waste.</p> <p>Food waste is collected from hospital sites – from restaurants and patients food waste (not community hospitals / offices) and sent for anaerobic digestion at local facilities (St Asaph and Runcorn).</p> <p>Procurement of food is from local companies / sources (Wales wide).</p>	<p>Need space to store furniture for refurbishment and reuse and people to manage the processes e.g., WARP IT provide this service.</p> <p>[Source: interview 3]</p>

Opportunities / positive impacts	Unintended consequences / negative impacts
<p>Opportunity to free up financial resources for patient care if reduce spend on new items or reduce food waste.</p> <p>Monthly skip purchased for bulky items which are then recycled.</p> <p>[Source: interview 3]</p>	
<p>Use Cymru copiers Wales which is reusable / recycled paper – amended procurement so this is the only paper that can be ordered. Also aiming to move to paper free in HQ.</p> <p>Procurement has strict rules on ‘value’ and set procedures dependent on the size of the order. Opportunity to add weight to sustainable / green criteria.</p> <p>[Source: interview 4]</p>	None identified.
<p>Procurement is key to driving down use of plastic by public bodies. Need to rebalance environment and cost when procuring items.</p> <p>Opportunity to use consultancy advice to support public bodies to prevent waste e.g., WRAP.</p> <p>Is there any potential in using ‘salary sacrifice’ schemes to support staff to buy reusable / sustainable products?</p> <p>Need a hierarchy of plastic within the procurement process and understand the lifecycle of an item from production to end of use and then work out which is the environmentally friendliest option and give more weighting to these products.</p> <p>[Source: interview 5]</p>	None identified.
<p>Opportunity to increase jobs related to the Deposit Return Scheme (DRS) (bottle collection and transport to counting facilities).</p> <p>Opportunity to start using refurbished furniture in buildings and provide employment to local social enterprise companies / 3rd sector organisations, many of whom provide work for local vulnerable adults.</p> <p>End Producer Responsibility (EPR) will drive the quality of recycled materials as the better quality the waste items are from a product, then the more valuable the end products are, and the more money is retrieved by the producer of the product.</p> <p>Opportunity for new jobs / technologies from EPR in developing quality constitutional parts of products and in the recovery and recycling / reusing of them.</p> <p>Opportunity for local companies to develop high quality goods.</p> <p>Opportunities at tendering stage for any contract to build in a requirement to report how their waste is managed.</p> <p>[Source: interview 5]</p>	None identified.
<p>Opportunity to use recycled materials within clinical situations and an opportunity to streamline the packaging of medicines.</p> <p>Transport of items are packaged ++ to protect products during transport. We need to question if this is required and to change our expectations / culture.</p> <p>Opportunity to develop jobs as new industries / technologies develop regarding waste prevention / waste reuse and recycling.</p> <p>[Source: interview 6]</p>	None identified.

Opportunities / positive impacts	Unintended consequences / negative impacts
<b>Access and quality of services</b>	
<p>Need to advocate for RRR as part of a ‘whole system’ approach by public bodies.</p> <p>Share examples of good practice - some housing associations will hire skips for the community to use on certain days if they are unable to afford bulky household collections.</p> <p>Suggestions of a cross-border agreement by several LAs about the colours of bins and how to separate recycling – this would be less confusing for residents moving between LAs.</p> <p>[Source: workshop]</p>	<p>Lack of money in LA to spend on this agenda.</p> <p>Not having access to a vehicle within the household may increase ‘fly-tipping’.</p> <p>Different local authority approaches to collection of waste (mentioned again) – can cause confusion.</p> <p>People will fly-tip regardless of black bin bag collection frequency.</p> <p>Public bodies (based in small / satellite sites) not generating enough waste for collection by commercial collectors, e.g., plastics as it is not commercially viable for them to pay for the companies to collect the small volumes of waste. In fact, it would be detrimental to do this given the emissions generated by the waste lorries. Profit driven reality.</p> <p>Rural Wales not covered by private sector collectors (local authorities therefore have the responsibility in rural areas).</p> <p>[Source: workshop]</p>
<p>New duty on public bodies to separate key recyclables at source including food waste – currently in the consultation phase, due to be published in 2023 . There is currently a mix of systems in place across Wales for disposing food waste. In some locations food waste is separated for anaerobic digestion (AD), in others it is macerated.</p> <p>[Source: interview 1A]</p>	<p>Services provided by waste partners (private companies and Local Authorities) differ by area which can lead to discrepancies in practice.</p> <p>The Environment (Wales) Act consultation is welcomed to clarify requirements.</p> <p>The situation with clinical waste is different as this is much more strictly regulated, and the segregation requirements are clearly defined.</p> <p>[Source: interview 1B]</p>
<p>Food waste is collected from schools but not trade partners. Need businesses to separate and recycle their food waste.</p> <p>Waste oils and cardboard are collected but not general food waste as some waste management firms cherry pick ‘valuable’ waste for collection and do not collect ‘non-valuable’ food waste.</p> <p>[Source: interview 2]</p>	<p>None identified.</p>
<p>Opportunity to develop telemedicine and reduce outpatient visits, thereby reducing transport emissions.</p> <p>Reduce visits to Outpatient departments with a reduction in clinical / hygiene waste.</p> <p>[Source: interview 3]</p>	
<p>Within public bodies the opportunities for staff to recycle is not the same across all sites e.g. Public Health Wales Capital Quarter 2 site compared to regional offices.</p> <p>Regional sites require separate bins for recycling / food waste bins.</p> <p>[Source: interview 6]</p>	
<p>All stations with catering on site collect food waste – but not at retained stations.</p> <p>[Source: interview 4]</p>	

3 This has subsequently been published, and full information can be sourced from Beyond Recycling (Welsh Government, 2021a).

Opportunities / positive impacts	Unintended consequences / negative impacts
<b>Education, training and learning</b>	
<p>Opportunity to influence school curriculums to allow children to grow their own fruit / veg and to understand where our food comes from e.g., eco schools.</p> <p>'WRAP' provides a pack to students for life-changing events ('moments'), including starting university – opportunity to promote this initiative.</p> <p>Opportunity to share learning - Project in Torfaen to classify different types of refuse (burnt).</p> <p>Opportunity to incorporate this agenda and also social enterprises into the Welsh Baccalaureate curriculum.</p> <p>Opportunity to advocate, e.g., circular economy within this degree and to give a prize for those who win.</p> <p>Opportunity to incorporate into the Duke of Edinburgh award (volunteering opportunities etc.).</p> <p>[Source: workshop]</p>	<p>Demonisation of plastic driving consumers to new / worse materials – compostable not always better. It is about people rather than plastic.</p> <p>[Source: workshop]</p>
<b>Macro-economic, environmental and sustainability issues</b>	
<b>Legislation</b>	
<p>Welsh Government is consulting on a deposit-return scheme.</p> <p>Welsh Government are scoping the introduction of 'end-life cost to producers' so that they are liable for the costs of processing the waste derived from their products. This agenda has been driven by consumers. Opportunity to support this approach.</p> <p>[Source: workshop]</p>	<p>On requesting Plastic Waste collections to be increased by Swansea Council, we were told that Plastic Business Collections are being cancelled at certain locations as Council will no longer collect plastic. Resulting in Mid and West Wales Fire and Rescue Service having to change Waste Contractors for Swansea.</p> <p>[Source: interview 4]</p>
<p>LA waste management is traced through the 'waste streams website'. Much of Wrexham County Borough Council waste is recycled in the UK.</p> <p>Need greater responsibility by manufacturers for the waste generated by the product e.g., WEEE regulation should be applied to plastic production.</p> <p>Need to focus on production at source. When licencing a product, the producer should complete a sustainability assessment on the product and its waste products at end of use.</p> <p>[Source: interview 2]</p>	<p>Local authority not able to influence packaging of items.</p> <p>Do large industries meet their recycling targets?</p> <p>Who regulates private waste collectors – 'what happens to their waste'?</p> <p>WG bring in legislation, but due to cut within LA funding, there are no people available to enforce the new regulations e.g., trading standards and micro plastics in shower gels.</p> <p>[Source: interview 2]</p>
<p>Have annual targets to meet / report against for greenhouse gas emissions, fuel consumption etc.</p> <p>[Source: interview 4]</p>	<p>None identified</p>
<p>End Producer Responsibility (EPR) will drive the quality of recycled materials as the better quality the waste items are from a product, then the more valuable the end products are, and the more money is retrieved by the producer of the product.</p> <p>WG are consulting on new legislation for recycling at sources, but it will need to be adequately enforced to make a difference in some sectors as often the cheapest option is taken (landfill rather than recycling).</p> <p>[Source: interview 5]</p>	
<p>New duty on public bodies to separate key recyclables at source including food waste – currently in the consultation phase, due to be published in 2020. Some hospital food waste is macerated to sewer, some is collected separately.</p> <p>[Source: interview 1B]</p>	

Opportunities / positive impacts	Unintended consequences / negative impacts
<b>General</b>	
<p>We disassociate ourselves with our waste, opportunity to re-connect people with where waste goes etc. for example Blue Planet effect made people care more about their waste.</p> <p>Opportunity of leaving the EU – could have more recycling plants in the UK, and closer to the point of use. Example given of anaerobic digestion system in Bridgend for food waste (private provider), which is used by several local authorities.</p> <p>Also, much of the medical waste goes to Europe and we are leaking the benefits in terms of energy and repurposing opportunities.</p> <p>Remember that the RRR waste hierarchy should start with 'Eliminate' / 'Refuse'.</p> <p>The % that we 'reduce' has hardly reduced at all.</p> <p>Is there the opportunity to compare waste production between residents in an area as you can do with energy bill comparison with other properties on the same street, can we do something like this for our waste?</p> <p>Opportunity to work in collaboration with our neighbours in England too for better and cheaper infrastructure on waste management / recycling facilities etc.</p> <p>Opportunity for Wales to focus on a 'downstream sites' (for value). For example, Wales could focus on a specific material e.g. scrap metal or cardboard (plastic is difficult) and be a leader in reuse / recycling of that specific product (create skills / jobs and income from process).</p> <p>Generating money from our rubbish (recycling is priced in tonnes) "there's money in our rubbish" – opportunity. However, because waste is priced in tonnes, it requires a lot of volume to generate any money from it especially for things like plastic bottles "plastic bottles aren't gold bars" Is there an opportunity to price waste differently?</p> <p>[Source: workshop]</p>	<p>Cooking versus take-away – convenience and pre-prepared food can be cheaper and more appealing and can have more associated waste.</p> <p>Our infrastructure 'Hospitals, supermarkets etc. the 'car is king' (this needs to be considered during the planning / design and build). Using the bus or other public transport is harder.</p> <p>Is there too much positive association with recycling (rather than focusing on reduced consumption of materials / resources).</p> <p>Cheaper clothes and buying more for the same price, so consumption is rising.</p> <p>Food waste (compostable points limited in Wales).</p> <p>Cost impact (economic) – could reduce (buying less etc.).</p> <p>[Source: workshop]</p>
<p>[Company name] holds the all-Wales clinical waste contract. The company recovers the majority of treated clinical waste (called flock) which is now turned into a fuel for energy from waste processes. Previously the end product went to landfill.</p> <p>Sourcing more (renewable) energy within Wales would add money to the Welsh economy (£10 billion is spent outside of Wales on energy).</p> <p>Electric vehicles would reduce 50p per litre of fuel going to Norway / Saudi Arabia.</p> <p>[Source: interview 1B]</p>	<p>Changes to procurement - NHS silos and management of budgets makes this difficult.</p> <p>The treatment and disposal of clinical waste is tightly regulated due to the risks it poses. Because of its importance, it is often the focus in waste management in hospital settings - could this be to the detriment of other forms of waste and how they can be reused / recycled?</p> <p>[Source: interview 1B]</p>

Opportunities / positive impacts	Unintended consequences / negative impacts
<p>Wrexham County Borough Council have many sustainable initiatives including:</p> <ul style="list-style-type: none"> <li>• Electric cars</li> <li>• Grey fleet</li> <li>• Procurement – However, LA have limited say over how items are packaged.</li> </ul> <p>WCBC use route optimisation technology to ensure effective use of their waste collection vehicles and the collection routes.</p> <p>Some LAs do not collect commercial waste – WCBC support local organisations e.g., pubs to recycle glass.</p> <p>Charging for plastic carrier bags is a good intervention; we need more leadership from WG to reduce waste production.</p> <p>General waste is sent to a microbiological treatment works that generates fuel pellets for an electricity company. This is a short-term contract and has a cost but less than landfill tax.</p> <p>Need Welsh Government level influence to ‘push’ commercial organisations to reduce packaging and to use recyclable packaging.</p> <p>[Source: interview 2]</p>	<p>Garden and food waste are currently collected and sent to an Inviseral composter. If WG requires LA to separate at source this will lead to a need in additional food caddies, caddy liners and additional waste collections with extra cost (vehicle, fuel, staff and time costs). This may also lead to fewer people recycling food waste as most people already do collect garden waste.</p> <p>Collection of commercial food caddies require a bin lift on the vehicles, as they are heavy – the lifts are not integral to the current recommended collection vehicles.</p> <p>Industrial heritage and legacy of industrial waste in landfill sites is ongoing issue for this and future generations.</p> <p>[Source: interview 2]</p>
<p>Promote car share schemes and reduce cost of public transport e.g., buses.</p> <p>BCUHB has pool cars from each of the three acute sites and a travel bureau to support organising more sustainable travel options.</p> <p>BCU do not separate recycling at source, this is not feasible in clinical areas due to:</p> <ul style="list-style-type: none"> <li>• Cost of bins</li> <li>• Space for multiple bins</li> <li>• Staff time</li> </ul> <p>At present the waste collection contractor (company name) collects hygiene waste (clear bags) and recycles at their waste recovery facilities. Only 3% of waste is not recycled and is transported to Sweden and used as an energy source.</p> <p>Clinical waste is heat treated or incinerated and the ‘flock’ is then used as a fuel source or as a binding agent e.g., concrete.</p> <p>Carbon footprint of waste is very low and managed in local facilities with opportunities for local jobs.</p> <p>[Source: interview 3]</p>	<p>None identified.</p>
<p>Waste contracts are renewed annually therefore any new considerations for stations can be included within the next annual contract.</p> <p>Moved waste collection at some sites to [company name] as have an online portal which allows Mid and West Wales Fire and Rescue Service to monitor their waste e.g., the proportion that goes to landfill and the proportion of CO2 produced. Planning to move further sites to [company name] as the LA does not provide this detail for their environmental reports (for internal auditors). Battery collection also have an online portal to monitor the collections etc.</p>	

Opportunities / positive impacts	Unintended consequences / negative impacts
<p>Use a local company (company name) to collect confidential waste. This is a local company that only hire staff with learning difficulties from disadvantaged areas (social enterprise company).</p> <p>Using vehicle tyres that can be recycled into playground flooring.</p> <p>In process of procuring 13 electric vehicles to replace diesel pool cars with charging points at HQ. Also have 2 hydrogen cars in Neath Port Talbot area used for officers attending school and community safety educational sessions. Staff have access to two electric pedal bikes in Swansea instead of pool cars if attending meetings / community events in the city (often easier to reach their location if traffic congestion).</p> <p>Comply with Section 6 Environment act. Currently piloting a scheme to work with communities to identify vulnerable areas (e.g. roosting bats in a building, invasive plants in a pond so avoid using that water etc.) that need to be highlighted and avoided during a call out.</p> <p>[Source: interview 4]</p>	
<p>An 'Energy From Waste' site is being built in north Wales, so reducing carbon footprint of waste management as currently going abroad.</p> <p>Opportunity for businesses / public bodies to refresh their waste contracts with LAs as new tariffs may be available with the new resource.</p> <p>Opportunities with Deposit Return Scheme (DRS) – however need investment for the infrastructure for the reverse vending machines for people to deposit the bottles in. Opportunity for LAs to develop a role in collecting the waste from the reverse vending machines and transport to the sorting facilities.</p> <p>DRS will potentially reduce the volume of recycling being collected at kerbside if all plastic bottles are recycled via reverse vending machines. Therefore, reduction in the number of collection vehicles required to collect waste with subsequent reduction in cost (reduced cost in fuel and human resource).</p> <p>Denbighshire County Council recycling goes to a plant in Flintshire, some is sold overseas, there is a destination report, which provides assurance on how waste is treated abroad.</p> <p>Need to increase recycling quality and reduce contamination of recyclable products.</p> <p>[Source: interview 5]</p>	<p>Not easily able to separate the waste produced by the LA buildings / sites from that collected at kerbside, so no clear picture on how well LA's recycling their waste from their own buildings / sites.</p> <p>Limited enforcement by WG upon businesses to recycle their waste. Therefore, if LA collect business waste they would have to recycle once collected (as not being separated at source by businesses).</p> <p>Loss of 'higher value plastic' with DRS from recycling process. However, milk cartons which are the 'best quality plastic' will still be collected at kerbside.</p> <p>Recycling being sent overseas is changing which will increase costs for LA as less waste is being sent overseas.</p> <p>Littering.</p> <p>As a coastal council, littering is a big issue for marine pollution as littering along coastal areas will end up in the sea and has a negative influence on attracting tourism to area.</p> <p>[Source: interview 5]</p>
<p>Opportunities to link waste prevention with carbon reduction schemes.</p> <p>Opportunities to increase biodiversity within public bodies sites.</p> <p>[Source: interview 6]</p>	<p>None identified.</p>

Opportunities / positive impacts	Unintended consequences / negative impacts
<b>Reuse</b>	
<p>Apparatus e.g., Zimmer frames, crutches, wheelchairs etc. might currently be thrown away when they have the potential to be remanufactured / reused.</p> <p>Redundant electronic equipment and furniture from public bodies has the potential to be reused. Some social enterprises take laboratory equipment from Universities for reuse in schools.</p> <p>Drive to re-use plastics in NHS (working with companies – this is a big culture change for private manufacturers).</p> <p>Opportunities to sell used specialist medical equipment to developing countries (e.g., old MRI scanners) which are still serviceable but obsolete in modern UK healthcare facilities. A risk-averse culture means that this often does not happen which leads to old equipment being scrapped. Providing this service could be financially beneficial to the NHS (as well as the environmental benefits and help to developing countries).</p> <p>[Source: interview 1B]</p>	<p>Liability issues for second-hand use (e.g., furniture) – health and safety.</p> <p>[Source: interview 1B]</p>
<p>Follow BREEAM excellence when refurbishing / rebuilding stations e.g., construction excellence, recycling building waste, environmentally friendly materials used etc. One site won an award as 90% of construction waste was diverted from landfill (case study available).</p> <p>Office furniture given to a local charity for remanufacturing of furniture. The Estates HQ outfitted with remanufactured furniture.</p> <p>[Source: interview 4]</p>	<p>None identified.</p>
<p>Is there an opportunity to make medical equipment into something else?</p> <p>[Source: workshop]</p>	<p>Medical equipment not currently recyclable which can't be avoided because of legislation – oxygen masks / oxygen tubing / medicines in plastic or glass bottles (single-use) – currently burnt / landfill.</p> <p>[Source: workshop]</p>

## 6.0 The 44 Public Bodies in Wales

Source: (Future Generations Commissioner for Wales, 2015)

National Bodies	Local Authorities	Local Health Boards (LHB)	Fire and Rescue Authorities	National Park Authorities
<ul style="list-style-type: none"> <li>• Welsh Government</li> <li>• Public Health Wales</li> <li>• Natural Resources Wales</li> <li>• Sports Wales</li> <li>• National Museums of Wales</li> <li>• The National Library of Wales</li> <li>• Arts Council of Wales</li> <li>• Higher Education Funding Council for Wales</li> <li>• Velindre NHS Trust</li> </ul>	<ul style="list-style-type: none"> <li>• Blaenau Gwent County Borough Council</li> <li>• Bridgend County Borough Council</li> <li>• Caerphilly County Borough Council</li> <li>• Carmarthenshire County Council</li> <li>• Ceredigion County Council</li> <li>• City and County of Swansea</li> <li>• City of Cardiff Council</li> <li>• Conwy County Borough Council</li> <li>• Denbighshire County Council</li> <li>• Flintshire County Council</li> <li>• Gwynedd Council</li> <li>• Isle of Anglesey County Council</li> <li>• Merthyr Tydfil County Borough Council</li> <li>• Monmouthshire County Council</li> <li>• Neath Port Talbot Council</li> <li>• Newport City Council</li> <li>• Pembrokeshire County Council</li> <li>• Powys County Council</li> <li>• Rhondda Cynon Taf County Borough Council</li> <li>• Torfaen County Borough Council</li> <li>• Vale of Glamorgan Council</li> <li>• Wrexham County Borough Council</li> </ul>	<ul style="list-style-type: none"> <li>• Betsi Cadwaladr University HB</li> <li>• Cwm Taf Morgannwg University HB</li> <li>• Cardiff and Vale University HB</li> <li>• Swansea Bay University HB</li> <li>• Hywel Dda University HB</li> <li>• Powys Teaching HB</li> <li>• Aneurin Bevan University HB</li> </ul>	<ul style="list-style-type: none"> <li>• Mid and West Wales</li> <li>• South Wales</li> <li>• North Wales</li> </ul>	<ul style="list-style-type: none"> <li>• Brecon Beacons</li> <li>• Pembrokeshire Coast</li> <li>• Snowdonia</li> </ul>

## 7.0 Screening Paper

### Aim:

To understand the Public Health impacts (opportunities and unintended consequences) of reducing the amount of resources (natural and manmade) being used by Public Bodies and of increasing the amount of waste that is reused and recycled.

### Objectives

- To understand the current waste management processes of the 44 Public Bodies in Wales;
- To understand the Public Health impacts (unintended consequences and opportunities) of reducing the amount of resources (natural and manmade) being used by Public Bodies;
- To understand the Public Health impacts (unintended consequences and opportunities) of increasing the reuse and recycling of waste;
- To build consensus (evidence base, examples of good practice / case studies, participatory feedback) on the optimum approaches for Public Bodies to reduce the amount of waste they produce and to increase the amount of waste they reuse and recycle;
- To use the findings of the HIA to support Public Bodies in achieving the Well-being goals, including: A Healthy Wales; A Globally responsible Wales; A Prosperous Wales and A Resilient Wales.

### Nature of Evidence considered / to be used (including baseline data, technical and qualitative research, expert and community knowledge)

#### Literature search:

Published evidence on initiatives to reduce, reuse and recycle waste.

High level evidence (reports, policies) on strategies to reduce, reuse and recycle waste, within a UK context (e.g. UK government, Welsh Government, Department of Health, Environment agency, Natural Resources Wales etc.), Wales Waste strategy, Regional waste plans, Wales waste sector plans, Wales centre for Public Policy.

Grey literature including: Third sector reports – Cynnal Cymru; Keep Wales Tidy; Invest in Nature; Wrap Cymru.

To determine the impacts of waste reduction, reuse and recycling on the wider determinants:

- |  |  |
|--|--|
| • Cost of living, including food                   | • Injury hazards                                   |
| • Sense of belonging / playing a part              | • Housing design                                   |
| • Citizen power and influence                      | • Employment                                       |
| • Language / culture                               | • People living in urban / densely populated areas |
| • Air and water quality                            | • Medical services                                 |
| • Noise / odour pollution                          | • LA services                                      |
| • Athletics of communities                         | • Climate change / carbon footprint                |
| • Waste disposal (landfill and incineration sites) | • Economic development                             |

## Review of current practices in the 44 Public bodies:

Review of public bodies websites to collect information on waste strategies and current practices, including case studies of good practice e.g. Our place, Public Health Wales.

How do public bodies manage their recycling? Where does the recycling go? Is it consistent across all sites?

What are other public bodies doing around reduce, reuse and recycling and the Well-being of Future Generations (Wales) Act – what policies do they have in place?

Public bodies opinion on recycling – is it a priority, barriers, what is done well, what would they like to see done to improve it.

## Community profile

Summary of current recycling rates across Wales.

DEFRA waste statistics <https://data.gov.uk/dataset/882186e7-97b0-4ad0-b253-e28607252f42/uk-statistics-on-waste>

To estimate how close are we to achieving a recycling rate of 70% by 2015 and to determine if we are on track to achieve Zero waste (100% recycling) by 2025?

What are the current levels of recycling in each local authority in Wales (Welsh Government – Stats Wales) - 'This dataset shows the flows of major recyclable material types from each local authority to each destination facility' <https://statswales.gov.wales/Catalogue/Environment-and-Countryside/Waste-Management/Recycling-Destinations>.

Data on types of recycling being undertaken 'Open' versus 'Closed'.

Data on each LA and all Wales - % and weight (kg) recycled, reused, composted and sent to landfill – since 2010 when 'Towards Zero Waste' was published.

Data on population groups who may be impacted by waste reduction, reuse and recycling including:

- Children and young people (future generations)
- Families
- Older adults
- General adult population
- Carers
- Economically inactive / unemployed
- People on a low income
- People employed in the waste management sector
- People with physical and mental health needs
- Homeless
- Asylum seekers / refugees
- Language
- People living in isolated or over-populated areas
- People unable to access services and facilities
- Including, demography, distribution and number of each group, potential impacts, and consequences to health outcomes

## Qualitative research:

Participatory workshop (Cardiff 4th Dec 2018) – expert knowledge.

Qualitative interviews / small group-based discussions with colleagues unable to attend the workshop.

## Key population groups affected by the programme, policy or project.

Using the list of **vulnerable and disadvantaged groups** included, assess which groups amongst the general population will potentially be affected by the proposal

Population groups
<ul style="list-style-type: none"><li>• Children and young people (future generations)</li><li>• Families</li><li>• Older adults</li><li>• General adult population</li><li>• Carers</li><li>• Economically inactive / unemployed</li><li>• People on a low income</li><li>• People employed in the waste management sector</li><li>• People with physical and mental health needs</li><li>• Homeless</li><li>• Asylum seekers / refugees</li><li>• Language</li><li>• People living in isolated or over-populated areas</li><li>• People unable to access services and facilities</li></ul>
Geographical settings
<ul style="list-style-type: none"><li>• Wales</li></ul>
Other groups
<ul style="list-style-type: none"><li>• Whole population</li></ul>

## Determinants of Health

Lifestyles		
Positive Impacts	Negative Impacts	Vulnerable Groups Affected
<ul style="list-style-type: none"> <li>• Opportunity – to promote reduction in use of resources (natural and manmade).</li> <li>• Opportunity – for promotion of local and sustainable products e.g. greengrocers / local markets, growing your own fruit / veg – as this will generate less plastic waste in the form of packaging.</li> <li>• Opportunity to promote organisational-wide schemes like Time to Move as a way of incentivising cycling or walking to work.</li> <li>• Opportunity for more public bodies to give staff business mileage on cycling to work, like Public Health Wales does.</li> <li>• 'Tip shops' opening on the premises of LA household waste recycling shops e.g. shops in Llantrisant, Swansea and Britton Ferry – these shops raise money for charity and allow families on lower incomes to purchase useable, good quality goods.</li> </ul>	<ul style="list-style-type: none"> <li>• Nappy collection / breast pad collection / sanitary wear less frequent collection (logistic difficulties to co-ordinate bespoke collections) → opportunity to establish or promote 'real nappies' / reusable nappies like Swansea Council – they give up to £100 to help with purchasing the nappies. 'Real Nappy Campaign'.</li> <li>• Increased cost of living, including cost of food (food poverty).</li> <li>• Increasing cost of energy production (fuel poverty).</li> </ul>	<ul style="list-style-type: none"> <li>• General adult population</li> <li>• Families</li> <li>• Females</li> <li>• People with physical and mental health needs</li> <li>• Whole population</li> <li>• Workers</li> <li>• Workers and cyclists</li> <li>• Families and individuals on lower incomes, socioeconomically deprived, unable to work, long-term unemployed.</li> </ul>
Social and Community Influences on Health		
Positive Impacts	Negative Impacts	Vulnerable Groups Affected
<ul style="list-style-type: none"> <li>• Peer pressure – may positively influence neighbours to reduce, reuse and recycle.</li> <li>• Citizen power and influence – can be a positive voice for change as in Monmouthshire e.g. Plastic free Council after lobbying from the local community.</li> <li>• Local pride increased if less fly-tipping.</li> <li>• Family relationship and roles – opportunity for certain family members e.g. children, to take on the role of recycling and waste reduction in the house. Seen as part of their 'pocket money chores' and may link in with work / projects in their school.</li> <li>• 3rd sector / volunteering – tip shops offer volunteering opportunities and raise money for charity.</li> <li>• Social enterprises – CQ2 example for office furniture refurbishment.</li> </ul>	<ul style="list-style-type: none"> <li>• Citizen power and influence – community's voice not heard if LA do not take their concerns on board and do not involve them in any new consultations.</li> <li>• Community cohesion, identity, local pride / Divisions in community / Neighbourliness – black bins everywhere / fly-tipping could increase / filling neighbours bins could cause community tension and disputes.</li> </ul>	<ul style="list-style-type: none"> <li>• Whole population</li> </ul>

Living and Environmental Conditions affecting health		
Positive Impacts	Negative Impacts	Vulnerable Groups Affected
<ul style="list-style-type: none"> <li>• Higher rates of reuse and recycling will reduce the amount of waste going to landfill. This in turn will reduce the impact that landfill has on air quality, land contamination and potentially water quality.</li> <li>• It will also reduce the noise and odour generated from areas of landfill.</li> <li>• Waste disposal, recycling – increasing recycling that is easy for people to do and is an efficient and effective way of managing waste for LA.</li> <li>• Opportunity for councils to provide more recycling bins in public places e.g. parks, town centres.</li> </ul>	<ul style="list-style-type: none"> <li>• Lorries used to collect kerbside waste and recycling collections are noisy, produce extra emissions and could pose a road safety risk to young children / the elderly on residential roads (cumulative impact in overpopulated / busy / congested areas and those which are deprived – Road Traffic Collisions (RTCs) involving children more likely in deprived areas).</li> <li>• They may also cause increased road congestion, which could detrimentally affect air quality due to idling traffic. Kerbside collection vehicles move two to three times slower.</li> <li>• Less attractiveness of area if rubbish in streets / overflowing bins / fly-tipping. Offensive odour.</li> <li>• Community safety – children playing by rubbish / infestations / vermin of non-collected black bags – Mitigation - offer extra collections for nappies etc.</li> <li>• Indoor environment / Health and safety i.e. falls, – safe space to store recycling. Mitigation – new housing developments or commercial buildings must have adequate facilities for recycling.</li> <li>• Lack of indoor space for recycling more likely in flats and smaller houses which may be more commonplace in areas of increased socioeconomic deprivation.</li> <li>• Safety of public places / Quality and safety of play areas – rubbish on kerbside.</li> <li>• Noise / emissions of recycling plant / incinerator.</li> <li>• Public perception about living or working near a waste incinerator.</li> <li>• Odours – black bins / food collection especially indoors in warm weather.</li> </ul>	<ul style="list-style-type: none"> <li>• Whole population</li> <li>• Young children</li> <li>• Older adults</li> <li>• People with physical and mental health needs e.g. sensory impairment, wheelchair users.</li> <li>• Homeless people</li> <li>• People living in urban / densely populated areas.</li> <li>• People living in areas with limited recycling facilities (no kerbside).</li> </ul>

<b>Economic Conditions Affecting health</b>		
<b>Positive Impacts</b>	<b>Negative Impacts</b>	<b>Vulnerable Groups Affected</b>
<ul style="list-style-type: none"> <li>• The recycling and waste management sector provides employment across the country-potential to increase jobs in this sector to match demand for higher recycling rates.</li> <li>• Potential for new jobs and industries to emerge producing recyclable products or machinery which can recycle different types of products e.g. plastics.</li> <li>• Potential for innovation to reuse things / waste.</li> <li>• Potential for innovation in reducing use of resources.</li> <li>• Opportunity for these new careers of the future to feed back into schools' curriculums and STEM (science, technology, engineering, maths) subjects – are these subjects currently being promoted to girls?</li> <li>• Opportunity for new small businesses to develop which support communities e.g. new wholefood, plastic free shop on Albany Rd, Cardiff.</li> </ul>	<ul style="list-style-type: none"> <li>• Risk if automated process on unemployment.</li> <li>• Potential working conditions i.e. work environment (increase risks of black bins) health and safety.</li> <li>• Quality of jobs on offer and income may be low if the jobs are unskilled -&gt; Opportunity to upskill these workers, promotions, increased pay.</li> </ul>	<ul style="list-style-type: none"> <li>• Unemployed and those in low income jobs</li> <li>• People working in the sector</li> </ul>
<b>Access and quality of services</b>		
<b>Positive Impacts</b>	<b>Negative Impacts</b>	<b>Vulnerable Groups Affected</b>
<ul style="list-style-type: none"> <li>• Reducing the costs of waste collection and disposal will free up money for other essential public services.</li> <li>• Public amenities i.e. village halls, libraries, community hub – used as sites for people to collect additional recycling bags if run out – may use facilities if visiting for recycling bags. People new to the area need to know where to collect them.</li> </ul>	<ul style="list-style-type: none"> <li>• Information technology, internet access, digital services – if all information online or via an app then this excludes certain population groups (elderly, rural areas, low internet, poor internet connection) from accessing the appropriate information.</li> <li>• May be limited access to recycling bags etc. if local amenities e.g. library have already closed.</li> <li>• Rural areas may have reduced access to reuse schemes or plastic free shopping.</li> <li>• Unintended consequence – if public bodies (like councils) put more money into Reduce Reuse Recycle then could it be to the detriment of other areas e.g. leisure facilities, schools etc?</li> </ul>	<ul style="list-style-type: none"> <li>• Older adults</li> <li>• People on a low income</li> <li>• People living in rural or isolated areas</li> <li>• Language</li> <li>• Homeless people</li> <li>• Asylum seekers and refugees</li> </ul>

Macro economic, Environmental and sustainability Factors		
Positive Impacts	Negative Impacts	Vulnerable Groups Affected
<ul style="list-style-type: none"> <li>• Devolved power to the Welsh Government – the overarching waste strategy for Wales is ‘Towards Zero Waste’ (2010).</li> <li>• Reduce landfill waste.</li> <li>• Reduce use of natural / manmade resources.</li> <li>• Increase reuse and recycling of waste.</li> <li>• Biodiversity – more natural environments if less used as landfill space.</li> <li>• Reduce climate change through reduction of natural resources / reduce carbon footprint / CO2 reduce emissions.</li> <li>• Economic development including trade Gross Domestic Product – opportunity to develop new technology / skills and employment.</li> <li>• Government policies – Well-being of Future Generations (Wales) Act considering impact on future generations – positive impact.</li> <li>• Regeneration – future proof house design / flat development / (workplaces) for recycling facilities.</li> <li>• Wales already seen as a world leader in recycling – best in the UK, second in Europe and 3<sup>rd</sup> in the World – unsure if there are such ranking for reduce and reuse and where Wales would place on these.</li> </ul>	<ul style="list-style-type: none"> <li>• Cost of living i.e. food - increased price if recyclable packaging becomes statutory.</li> <li>• Unintended consequence – if individuals / families are trying to buy loose food it can be more expensive.</li> <li>• More expensive loose food - may need to travel to shops that provide these, may not be available in rural areas</li> <li>• Limited access to reuse schemes.</li> <li>• Economic development including trade – cost of exporting recycling / cost of dealing with recycling – may be compounded by Brexit deal.</li> </ul>	<ul style="list-style-type: none"> <li>• Whole population</li> <li>• Children and young people (future generations)</li> <li>• People on a low income / economically inactive</li> </ul>

## Recommendations

Are the impacts that have been identified above enough to warrant a more comprehensive health impact assessment?

**Yes**

Do any additional actions need to be taken as a result of this HIA process?

**Yes**

**If Yes, please outline (list recommendations and / or mitigation / enhancement here)**

Recommended Actions	
<ul style="list-style-type: none"> <li>➤ Undertake a scoping of the Recycling HIA</li> <li>➤ Complete a rapid participatory HIA, which will include:</li> <li>➤ A HIA report;</li> <li>➤ Evidence based recommendations;</li> </ul>	<ul style="list-style-type: none"> <li>➤ Using the findings to support the Sustainability Hub series of briefings;</li> <li>➤ Using the findings to write a position statement for Public Health Wales and partner organisations, in order to inform future work / policy development.</li> </ul>

**If a further HIA is required, outline next steps**

## 8.0 Tables of Impact

The Summary Report presents impacts that have been identified as being **major or major-moderate**. This further Supporting Information Report details impacts that are moderate or minimal in nature.

The results from the three sections of evidence, (literature review, health intelligence summary and the qualitative evidence) were analysed and are presented firstly by population groups affected and secondly by health domain within the wider determinants of health.

The table below depicts the key impacts that have been identified from waste reduction and reuse and the population groups affected. The descriptors of the impact were used to categorise the impacts identified (**Figure 1**).

**Table 6: summary of all (non-COVID-19 related) impacts identified and evidenced in this HIA.**

	Positive			Negative			Rationale
	Intensity	Likelihood	Duration	Intensity	Likelihood	Duration	
<b>Whole population</b>	 Major	 Probable	 Long-term	 Moderate	 Possible	 Medium-term	<p><b>Positive:</b> Whole population could be positively impacted. Grey literature shows that these impacts could include improved air quality, addressing the climate emergency and improved diet.</p> <p><b>Negative:</b> People in lower paid occupations, identified by stakeholders, are a population group at risk of being negatively impacted by changes to waste management systems.</p> <p>See Summary Report Section 3.1.1 for full analysis.</p>
<b>Groups at higher risk of discrimination or another social disadvantage</b>							
<b>People with physical health conditions</b>	-	-	-	 Moderate	 Possible	 Medium-term	<p><b>Negative:</b> Interview data found people with physical conditions may potentially suffer negative impacts due to exacerbation of existing conditions.</p> <p>See Supporting Information Report Section 8.1.1 for full analysis.</p>

	Positive			Negative			Rationale
	Intensity	Likelihood	Duration	Intensity	Likelihood	Duration	
<b>People with mental health conditions</b>	★ Moderate	⊙ Possible	Ⓜ Medium-term	▲ Minimal	⊙ Possible	Ⓛ Long-term	<p><b>Positive and Negative:</b> Grey literature and interview data identified people experiencing climate anxiety. Where positively supported with approaches to meaningfully contribute to the climate emergency, these anxieties plausibly reduce.</p> <p><b>See Summary Report Section 3.2.1 for full analysis.</b></p>
<b>People in low &amp; mid-level occupations</b>	★ Major	⊙ Probable	Ⓛ Long-term	★ Moderate	⊙ Possible	Ⓜ Medium-term	<p><b>Positive:</b> Grey literature identified that people who are employed in the reuse and repair industry are skilled workers and increase in demand for these skills would support creation of higher skilled jobs.</p> <p><b>Negative:</b> For those working in waste management sector with lower qualification levels, these people may be negatively affected as a result of the transition.</p> <p><b>See Summary Report Section 3.1.2 for full analysis.</b></p>
<b>Income related groups</b>							
<b>People who are economically inactive</b>	★ Moderate	⊙ Probable	Ⓜ Medium-term	-	-	-	<p><b>Positive:</b> Peer-reviewed literature and interview data identified positive impacts on people who are economically inactive by increased development in social enterprises within the waste reuse sector. Often community based, these could prove a great success in economic and skill development in local areas.</p> <p><b>See Supporting Information Report Section 8.2.1 for full analysis.</b></p>
<b>Geographical groups and / or settings</b>							
<b>People who live in houses in multiple occupation (HMOs) / apartments / flats</b>	▲ Minimal	⊙ Possible	Ⓜ Medium-term	▲ Minimal	⊙ Possible	Ⓜ Medium-term	<p><b>Positive:</b> Based on interview evidence in areas with high levels of HMOs, transition to reduce and reuse, as grey literature suggests, can improve living conditions of the individual houses but also wider neighbourhoods by less overall waste to be managed and disposed of in this group.</p> <p><b>Negative:</b> A transient population such as those living in HMOs potentially are not familiar with local waste management processes, so potential for negative impacts.</p> <p><b>See Supporting Information Report Section 8.3.1 for full analysis.</b></p>

		Positive			Negative		Rationale
	Intensity	Likelihood	Duration	Intensity	Likelihood	Duration	
People living in areas which exhibit poor economic indicators / disadvantaged areas	 Major	 Probable	 Long-term	 Moderate	 Possible	 Medium-term	<p><b>Positive:</b> Focus on reduce and reuse can have positive impacts on people exhibiting poor economic indicators such as job creation, and improved affordability of reuse and second-hand goods.</p> <p><b>Negative:</b> Plausible impacts (limited evidence) that could arise from the transition such as some disruption of job security.</p> <p><b>See Summary Report Section 3.1.3 for full description.</b></p>
People living in rural areas	 Moderate	 Possible	 Medium-term	 Moderate	 Probable	 Medium-term	<p><b>Positive:</b> Geographic distribution of employment from circular economy approaches can be beneficial for areas outside urban centres.</p> <p><b>Negative:</b> interview data shows that unviable waste collections in rural areas may have unintended negative impacts from transport emissions.</p> <p><b>See Supporting Information Report Section 8.3.2 for full analysis.</b></p>
People who live close to landfill / incinerator sites (current and historic sites)	 Moderate	 Possible	 Long-term	-	-	-	<p><b>Positive:</b> The amount of waste being sent to landfill and incinerator sites plausibly reduces. Plus, reduction in vehicular travel to these sites with reductions in air pollution will result.</p> <p><b>See Supporting Information Report Section 8.3.3 for full analysis.</b></p>
Public body employees	 Major-Moderate	 Possible	 Medium-term	 Moderate	 Possible	 Medium-term	<p><b>Positive:</b> Interview data suggests that by enabling public body employees to prioritise waste reduction and reuse in employment, there is potential they could carry these behaviours into their home and social networks.</p> <p><b>Negative:</b> Interview data captures the potential negative impacts on employees losing a sense of control over their ability to influence decisions of reuse and reduction within their organisations.</p> <p><b>See Summary Report Section 3.1.4 for full description.</b></p>

	Positive			Negative			Rationale
	Intensity	Likelihood	Duration	Intensity	Likelihood	Duration	
<b>People who work within the waste management sector</b>	★ Moderate	✓ Probable	Ⓜ Medium-term	★ Moderate	? Possible	Ⓜ Medium-term	<p><b>Positive:</b> Grey literature suggests that there are opportunities for retraining and skill redevelopment in the circular economy, plus employment opportunities in the repair sector.</p> <p><b>Negative:</b> Grey literature shows that there is a risk to unemployment or job disruption for those in waste management. This in turn can cause other negative impact such as poor mental health, deprivation, and inequality.</p> <p><b>See Supporting Information Report Section 8.3.4 for full analysis.</b></p>
<b>Potential determinants of health and well-being affected</b>							
<b>Behaviours affecting health</b>	★ Moderate	✓ Probable	Ⓜ Medium-term	★ Moderate	? Possible	Ⓜ Medium-term	<p><b>Positive:</b> Probable impacts include food systems that reduce food waste which also have the potential to be more sustainable.</p> <p><b>Negative:</b> Peer-reviewed literature suggests that although changes to behaviour want to be made, it cannot always be achievable in rural areas.</p> <p><b>See Supporting Information Report Section 8.4 for full analysis.</b></p>
<b>Social and community influences on health</b>	▲ Minimal	? Possible	Ⓜ Medium-term	▲ Minimal	? Possible	Ⓜ Medium-term	<p><b>Positive:</b> A move to reduce and reuse can alleviate the pressure to correctly sort waste, whilst making best use of less space in densely populated areas.</p> <p><b>Negative:</b> Plausible impacts include the affects waste has on social cohesion and the sorting of waste in communities.</p> <p><b>See Supporting Information Report Section 8.5 for full analysis.</b></p>
<b>Mental health &amp; well-being</b>	★-★ Major-Moderate	? Possible	Ⓜ Medium-term	★ Moderate	? Possible	Ⓛ Long-term	<p><b>Positive:</b> Peer-reviewed evidence identifies an impact on mental health but the pathways and impact of interventions are less well documented.</p> <p><b>Negative:</b> Interview data evidenced that the complexity of waste sorting could potentially contribute to existing anxieties.</p> <p><b>See Summary Report Section 3.2.1 for full analysis.</b></p>

		Positive			Negative		
	Intensity	Likelihood	Duration	Intensity	Likelihood	Duration	Rationale
<b>Living &amp; environmental conditions affecting health</b>	 Major-Moderate	 Possible	 Long-term	 Moderate	 Possible	 Short-term	<p><b>Positive:</b> Potential positive impacts from the peer-reviewed literature are reduced air pollution from fossil fuel use, an efficient waste management system, reducing the need for primary materials, and reducing transport emissions by cutting down on unviable waste.</p> <p><b>Negative:</b> Potential negative impacts are the move away from recyclable materials to materials that could pose a worse impact on the wider waste system.</p> <p><b>See Summary Report Section 3.2.2 for full analysis.</b></p>
<b>Economic conditions affecting health</b>	 Major	 Probable	 Medium-term	 Moderate	 Probable	 Medium-term	<p><b>Positive:</b> Higher skilled and new employment opportunities for local areas. Targeted investment and development in the waste sector could be written into policy. Interview data showed evidence of sustainable procurement within communities.</p> <p><b>Negative:</b> Possible negative impact of loss of employment in waste management sector but also in the single-use plastic manufacturing sector.</p> <p><b>See Summary Report Section 3.2.3 for full analysis.</b></p>
<b>Access and quality of services</b>	 Moderate	 Possible	 Medium-term	 Moderate	 Possible	 Short-term	<p><b>Positive:</b> Possible positive impacts include increased education and awareness of waste reduction but also the reason for change to waste management systems.</p> <p><b>Negative:</b> Possible negative impacts include difficulties in keeping informed with changes to waste collection.</p> <p><b>See Supporting Information Report Section 8.6 for full analysis.</b></p>
<b>Macro-economic, environmental &amp; sustainability factors: sustainable development &amp; circular economy</b>	 Major	 Possible	 Long-term	 Moderate	 Possible	 Medium-term	<p><b>Positive and Negative:</b> Interview data of impacts from reducing air pollution, greenhouse gas emissions, and the risk of extreme weather which will impact biodiversity and food production. The wider possible impact is that people feel that they are making a material contribution to the climate change.</p> <p><b>Negative:</b> Peer-reviewed literature suggests negative impacts due to the decline in demand and employment in plastic manufacturing.</p> <p><b>See Summary Report Section 3.2.4 for full analysis.</b></p>

## Potential population groups affected

### 8.1 Groups at Higher Risk of Discrimination or Other Social Disadvantage

#### 8.1.1 People with physical health conditions



#### Rationale i.e. positive / opportunity or negative / unintended consequence

**Positive:** None identified.

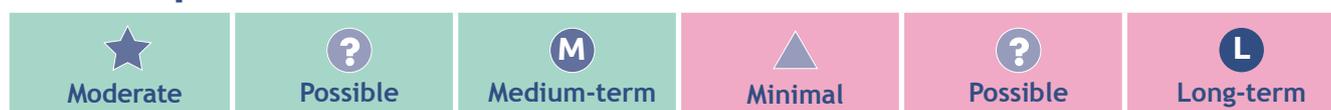
**Negative:** Evidence both from literature and from qualitative evidence was that people with pre-existing health conditions may suffer negative health impacts including exacerbating those existing conditions. However, the evidence is limited in identifying the scope, scale, and precise pathways for these impacts.

A variety of reasons for unequal distribution of impact were identified:

- People with pre-existing health conditions were more susceptible to the negative impacts of climate change: particularly those with conditions affected by air pollution and heat (Kjellstrom et al., 2010).
- Older age and experience of deprivation are related to reducing self-reported health measures. 47% of adults in Wales reported having a longstanding illness and 21% of adults reported having two or more longstanding illnesses (Welsh Government, 2017d).
- People with a visual impairment and people with mobility difficulties could potentially be impacted by public bodies refocusing on waste reduction and reuse although the mechanisms for this impact are unclear. In 2016, over 16,000 people were registered with a visual impairment in Wales. Over half of people newly certified as sight impaired were aged 80 years or over (Welsh Government, 2017e).
- Older aged adults and people who live in deprived areas are therefore more likely to have a pre-existing health condition and being negatively impacted if Local Authorities make changes to their waste collection services.

**More research needed:** None identified.

#### 8.1.2 People with mental health conditions



#### Rationale i.e. positive / opportunity or negative / unintended consequence

**Positive:** For people suffering solastalgia or climate anxiety if reduce and reuse approaches are seen to contribute to a meaningful response to the climate emergency then this potentially helps to reduce the cause of these anxieties. This is a plausible impact though not directly evidenced in this assessment. It is arguable that people working in the waste sector and in public bodies especially where they are working directly to combat the effects of climate change.

Evidence: not identified as part of assessment.

**Negative:** Stakeholders identified that people with a mental illness, in particular those who resided in a health or social care setting, could potentially be negatively impacted by public bodies refocusing on waste reduction and reuse due to the characteristics of their illness. It was noted that rehabilitation in some contexts includes recycling as an activity of daily living.

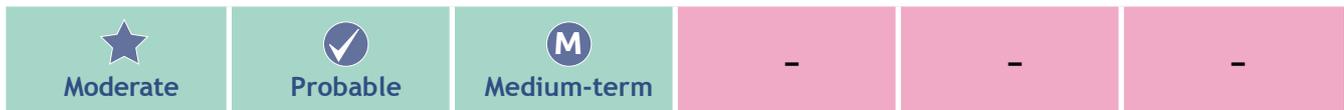
This data is not reflected in the literature review however, it was evidenced in other aspects of this HIA (Interview 1-5, Workshop). What this does highlight is the need for public bodies in Wales to assess and mitigate potentially negative impacts including in line with Equalities Act duties.

**More research needed:** Impacts on mental health are plausibly both negative and positive and these potential impacts need further investigation.

The prevalence and acuity of solastalgia and climate anxiety in the population requires further investigation as this could identify this as a major impact rather than moderate.

## 8.2 Income Related Groups

### 8.2.1 People who are economically inactive



#### Rationale i.e. positive / opportunity or negative / unintended consequence

**Positive:** This is a significant population group comprising 20.9% of adults aged 16 to 64 years in Wales (NB this measure includes students, people caring for family and home, people who are unable to work due to health reasons (short and long term sickness) and people who have retired) (Office for National Statistics, 2019b).

The literature (WRAP, 2019) and qualitative data identified that people who were economically inactive could potentially be positively impacted by public bodies refocusing on waste reduction and reuse, due to the increased development of social enterprises within waste reuse. These are often community based, which support economically inactive adults, people with learning difficulties and vulnerable adults into employment.

Opportunities are also identified for economic development and employment / skills development within the low carbon economy and within the circular economy. Public bodies have a vital role in working across all sectors to advocate for sustainable resource use across all stages of the resource life cycle (Welsh Government, 2019b).

Evidence: Andreoni, et al. (2015), Johansson and Corvellec (2018), Zacho and Mosgaard (2016), Wilson, et al. (2012), Cox, et al. (2010).

**Negative:** None identified.

**More research needed:** None identified.

## 8.3 Geographical Groups and / or Settings

### 8.3.1 People who live in Houses in multiple occupation / apartments / flats

 Minimal	 Possible	 Medium-term	 Minimal	 Possible	 Medium-term
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#### Rationale i.e. positive / opportunity or negative / unintended consequence

**Positive:** HMOs provide a source of accommodation for students who are temporarily resident in a locality and individuals and / or small households unable to afford private self-contained accommodation. Tenants in HMOs are therefore often transient in nature, with many residents being on low incomes and / or from vulnerable groups. Having a high density of HMOs in an area can impact on a number of wider determinants, including a reduction in the quality of the local environment and street scene, due to increased litter, refuse and fly-tipping (Welsh Government, 2017a). Areas of concentrated HMOs in Wales are focused in Cardiff, Swansea, Aberystwyth, and Bangor, and to a lesser extent in Rhondda Cynon Taf and Wrexham (Welsh Government, 2017a).

Counter to qualitative data in this assessment a move toward waste reduction and reuse could positively address some of these negative issues as well as improving the living conditions of residents of HMOs with less waste overall to be managed and disposed of. This positive impact could accrue to both the residents of HMOs and the wider neighbourhood.

Evidence: qualitative data.

**Negative:** Qualitative evidence identified a transient population may be new to an area and be unaware of waste collection arrangements in that area.

Evidence: qualitative data.

**More research needed:** Further investigation of the impacts of policy changes to reduce and reuse and whether this would generate more waste and confusion over household waste collection or less.

### 8.3.2 People living in rural areas

 Moderate	 Possible	 Medium-term	 Moderate	 Probable	 Medium-term
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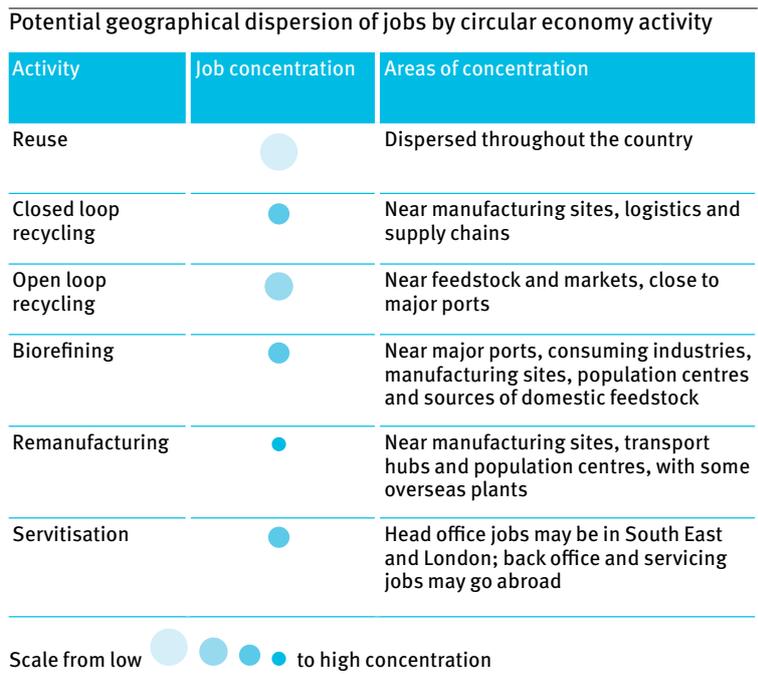
#### Rationale i.e. positive / opportunity or negative / unintended consequence

**Positive:** Whilst not identified in qualitative evidence, plausible positive impacts for rural communities include:

- Reduction in overall volume of recycling and waste needing to be processed and collected.
- Potential for skilled jobs in waste sector including repair sector which will be needed across Wales in all communities.
- Potential for addressing certain waste streams closer to source due to reduced volume where collections are currently uneconomic, such as food waste.
- Impacts at a whole population level would also be expected to plausibly benefit people living in rural areas however the scale of impact may vary.

Evidence: not identified within assessment.

It is identified that the geographic distribution of jobs resulting from some circular economy activities can be beneficial for areas outside of urban centres (WRAP and Green Alliance, 2015).



**Figure 5 Potential Geographical Dispersion of Jobs by Circular Economy Activity (reproduced from (WRAP and Green Alliance, 2015)).**

**Negative:** Qualitative interviews identified that public bodies who had sites in rural areas could be negatively impacted by refocusing on waste reduction and reuse. In particular in areas where the collection of waste e.g. food waste was currently economically unviable due to the small quantities of waste being collected over large geographical areas. Stakeholders expressed concern that such collections could have an unintended consequence of negative impact on the environment for example through transport emissions.

Rural areas are significantly affected by illegal fly-tipping. The Landfill Directive can have unintended consequence of increasing fly-tipping in some areas, which can include substances that are carcinogenic or toxic leading to potential negative health impacts.

Evidence: qualitative data.

**More research needed:** Further evidence on the precise nature and distribution of jobs in the waste sector including repair is needed to inform future investment and understanding of which communities these jobs may benefit, including strategies to spread the benefit as widely as possible (e.g. would repair services be centralised in larger towns and cities or more localised and based in smaller communities too).

### 8.3.3 People who live close to landfill / incinerator sites (current and historic)



#### Rationale i.e. positive / opportunity or negative / unintended consequence

**Positive:** Qualitative evidence identified that people who live close to landfill sites and incinerators could be positively impacted by public bodies refocusing on waste reduction and reuse, as a reduction in the amount of waste produced could lead to a reduction in the quantity of waste being sent to landfill and incineration sites, with consequent reductions in vehicles accessing the sites (reductions in air pollution and congestion) and a reduction in greenhouse gas emissions from the sites themselves.

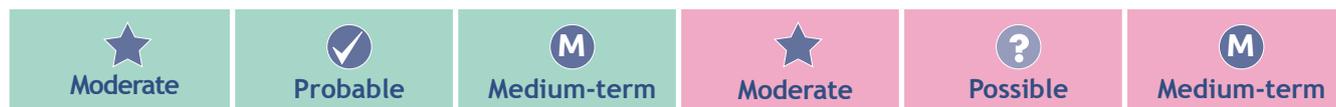
A move to reduce and reuse resources aims to reduce the amount of waste to such facilities and therefore benefits communities near them. It is plausible that existing facilities will be needed less in this scenario and may close. Longer term society may seek to remediate these sites further.

Evidence: qualitative data.

**Negative:** None identified.

**More research needed:** The nature, type, scale, scope, and location of waste management facilities required in future for an increased focus on reduce and reuse is required and any impacts of this considered in relation to health.

### 8.3.4 People who work within the waste management sector



#### Rationale i.e. positive / opportunity or negative / unintended consequence

**Positive:** Opportunities for retraining / skills development and employment within the low carbon economy and within the circular economy were identified.

Employment opportunities in the repair sector (see People with Low Qualifications and Literary Skills impact).

Plastic recycling: a recycle rather than reduce or reuse impact however qualitative data identifies that certain countries have revised their policies on receiving recycled plastics from the UK: this change could create positive opportunities in Wales as in 2018, less than 6% of plastic was treated in Wales and 70% was sent for treatment in the UK (WRAP, 2021).

**Negative:** Stakeholders identified the potential for people who work within the waste management sector to be at risk of unemployment under a focus towards waste reduction and reuse rather than waste collection and recycling.

People employed within the waste and recycling sector has increased in recent years (WRAP and Green Alliance, 2015). There are over 4,180 full-time equivalent (FTE) posts in municipal services and waste processing facilities across all 22 local authorities in Wales of which 90% are operational posts (Welsh Government, 2017c).

18.3% of the people in employment in Wales work within process plant, machinery operative, and elementary occupations, higher than the UK average (16.8%). The water supply, sewerage and waste management sector employs 13,000 people (0.9% of total workforce) in Wales (Office for National Statistics, 2019a).

These impacts may create unemployment and job insecurity which are risk factors for poor mental health and can compound other risk factors including deprivation, poverty, inequality, and other social and economic determinants of health (World Health Organization, 2011). It should be noted that unemployment does not need to happen for some health impacts to arise, stress and anxiety related to uncertainty and insecurity has an impact.

Evidence: qualitative data.

**More research needed:** Opportunities in the low carbon economy: evidence available in this assessment focussed significantly on risks to existing jobs and the status quo. More investigation of potential opportunities is needed to mitigate these potential negative effects.

Communication by public bodies to whom people look to for guidance and leadership is potentially important and more investigation is needed of both the impacts and potential strategies to mitigate mental health impacts from job insecurity and a fear of future change.

## Potential determinants of health and well-being affected

### 8.4 Behaviours affecting health

★ Moderate	✓ Probable	M Medium-term	★ Moderate	? Possible	M Medium-term
---------------	---------------	------------------	---------------	---------------	------------------

#### Rationale i.e. positive / opportunity or negative / unintended consequence

##### Positive:

**Diet / Nutrition:** Probable evidence that food systems that reduce food waste also have the potential to be more sustainable, provide access to affordable food, and encourage healthy eating. Increased affordability and accessibility of sustainable food. The population groups most affected are the whole population in particular people on low income / unemployed.

Sale of unpackaged food may encourage healthier eating and cooking from scratch / raw ingredients. The population groups most affected are the whole population.

**Abuse (or misuse) of prescription medication:** A plausible benefit of reducing waste in prescription medication would be an overall improvement in health due to reduced use of wrong, incompatible, or out of date medication plus a material contribution to reduction in Scope 3 carbon emissions through pharmaceutical supply chain. Interventions could include for example medicines review by pharmacies. The population groups most affected are people with long term health conditions.

Evidence: plausible impact not evidenced within original assessment.

##### Negative:

**Diet / nutrition:** Probable evidence within current frames of reference and economic thinking indicate benefits of food waste reduction may not be achieved in rural areas due to food waste collections being less economically affordable in rural areas. If mitigated this could become a positive impact however. The population groups most affected are people living in rural or isolated areas.

Potential negative impact on hydration in work if no mitigation put in place to provide alternative option to single use plastic bottles, also considering impact of communicable disease such as COVID-19. The population groups most affected are staff of public bodies, people working or volunteering in places of work.

Evidence: (Cox et al., 2010; Sharp, Giorgi and Wilson, 2010; Zacho and Mosgaard, 2016).

**More research needed:** Approaches to effective and economic food waste reduction in rural areas. Approaches to effective and economic pharmaceutical waste reduction in Wales.

Investigation of the potentially negative impact of many waste streams being considered as Scope 3 carbon emissions for public bodies and the potential for this creating a lack of incentive or requirement to prioritise and address these.

### 8.5 Social and community influences on health

▲ Minimal	? Possible	M Medium-term	▲ Minimal	? Possible	M Medium-term
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#### Rationale i.e. positive / opportunity or negative / unintended consequence

**Positive:** Possible evidence identifies community cohesion being negatively affected due to pressure to correctly sort waste and less space to recycle in densely populated areas. However, a move to reduce and reuse waste plausibly reduces these pressures. The population groups most affected are

people living in houses in multiple occupation (HMOs), people living in properties with communal waste facilities, people living in urban areas generally.

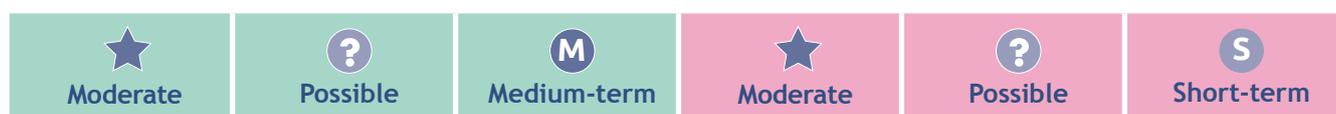
Evidence: qualitative data.

**Negative:** Possible evidence identifies community cohesion being negatively affected due to pressure to correctly sort waste and less space to recycle in densely populated areas. A move to reuse waste plausibly creates new pressures such as storage of items for reuse or repair. The population groups most affected are people living in houses in multiple occupation (HMOs); people living in properties with communal waste facilities; people living in urban areas generally.

Evidence: qualitative data.

**More research needed:** None identified.

## 8.6 Access and quality of services



### Rationale i.e. positive / opportunity or negative / unintended consequence

**Positive:** Possible evidence if increased access to plastic recycling points if Deposit Return Scheme is introduced (population groups most affected: whole population).

Possible increased education and awareness on the importance of waste reduction and the reasons for changes to waste collection services leading to further impact on waste reduction. The population groups most affected are people with visual impairment, people with low literacy skills, people whose first language is not English or Welsh, staff of public bodies.

Evidence: qualitative data.

**Negative:** Possible difficulties in keeping informed with changes to waste collection e.g., increased number of waste collection bins and changes to processes. The population groups most affected are the whole population.

Possible difficulties in keeping informed with changes to waste collection due to accessing relevant information (written or digital) (population groups most affected: people with low literacy skills).

Possible risks of falls if increased number of waste collection bins in the house (population groups most affected: people with visual impairment; people with mobility issues; older adults).

Possible risk of difficulties in keeping informed with changes to waste collection due to language barriers (population groups most affected: people whose first language is not English or Welsh). However, this may in part be mitigated through Equalities Act duties.

Possible difficulty in accessing waste collection services in rural areas e.g., sites of public bodies based in rural or isolated locations (population groups most affected: public body staff).

Evidence: qualitative data.

### More research needed:

Evidence for impacts was limited and warrants further investigation in future. This is particularly vital as the provision of services is a key domain for public bodies in Wales where they can have a positive impact on outcomes.

## 9.0 Tables of Impact – Covid Review

This section reports the COVID-19 impact on reduce, reuse, recycle, and broader circular economy approaches in Wales. Major and Major-moderate impacts are detailed in the Summary Report and only moderate and minimal impacts are outlined here.

**Table 7: summary of all impacts identified and evidenced in this HIA as a result of COVID-19 on reduce and reuse in Wales.**

	Positive			Negative			Rationale
	Intensity	Likelihood	Duration	Intensity	Likelihood	Duration	
<b>Income related groups</b>							
<b>Households with resources below minimum needs<sup>4</sup></b>	-	-	-	★ Moderate	⊕ Possible	Ⓢ Short-term	<b>Negative:</b> Interview data identified that the potential closure of reuse shops may restrict the availability of low-cost goods and essentials.  <b>See Supplementary Report Section 9.2 for full analysis.</b>
<b>Settings related groups</b>							
<b>Workers in waste management</b>	★ Moderate	⊕ Possible	Ⓢ Short-term	★-★ Major-Moderate	⊕ Possible	Ⓢ Short-term	<b>Positive:</b> Possible short-term positive impact involves the creation of employment opportunities through manufacturing of PPE in response to the pandemic.  <b>See Summary Report Section 3.1.5 for full analysis.</b>
<b>Volunteers, workers, and service users in the reduce and reuse sector</b>	★ Moderate	⊕ Possible	Ⓢ Short-term	★-★ Major-Moderate	⊕ Possible	Ⓢ Short-term	<b>Positive:</b> This group was underrepresented in both peer-reviewed and grey literature, however, with their contribution to health protection, the positive impacts include recognised influence that this sector provides.  <b>Negative:</b> Possible negative impacts on this sector include the closure of reuse shops.  <b>See Summary Report Section 3.1.5 for full analysis.</b>

	Positive			Negative			Rationale
	Intensity	Likelihood	Duration	Intensity	Likelihood	Duration	
<b>Potential determinants of health and well-being affected</b>							
<b>Behaviours affecting health</b>	-	-	-	★ Moderate	⊕ Possible	Ⓜ Medium-term	<p><b>Negative:</b> Increased single-use plastic packaging to minimise infection spread causes harm to health. Increased recycling however could go against reduce and reuse approaches.</p> <p><b>See Supplementary Report Section 9.2 for full analysis.</b></p>
<b>Social and community influences on health</b>	★ Moderate	⊕ Possible	Ⓢ Short-term	-	-	-	<p><b>Positive:</b> The importance of the valuable role a sense of society performed in the community. Maintenance of waste collections supported community resilience.</p> <p><b>See Supplementary Report Section 9.3 for full analysis.</b></p>
<b>Mental health and well-being</b>	▲-★ Minimal-Moderate	⊕ Possible	Ⓢ Short-term	★-★ Major-Moderate	⊕ Possible	Ⓢ Short-term	<p><b>Negative:</b> Significant impacts through the threat of job insecurity during transition from linear reduce and reuse to circular economy.</p> <p><b>See Summary Report Section 3.2.1 for full analysis.</b></p>
<b>Living and environmental conditions affecting health</b>	★ Moderate	⊕-✔ Possible - Probable	Ⓢ Short-term	★-★ Major-Moderate	Possible-Probable	Ⓜ-Ⓛ Medium - long term	<p><b>Negative:</b> The potential for waste as a source of COVID-19 infection, changes in waste management regimes can affect people's daily lives and potential health impacts from the use of alcohol sanitiser and biocides.</p> <p><b>See Summary Report Section 3.2.2 and Supporting Information Report Section 9.4 for full analysis.</b></p>
<b>Economic conditions affecting health</b>	▲-★ Minimal-Moderate	✔ Probable	Ⓢ Short-term	★-★ Major-Moderate	✔ Probable	Ⓢ Short-term	<p><b>Positive:</b> Short-term probably positive impacts include the job creation in Wales through the PPE manufacturing sector.</p> <p><b>Negative:</b> Potential impacts in skill sets during the transition from linear reduce and reuse to circular economy approaches.</p> <p><b>See Summary Report Section 3.2.3 for full analysis.</b></p>
<b>Access and quality of services</b>	-	-	-	★-★ Major-Moderate	✔ Probable	Ⓢ Short-term	<p><b>Negative:</b> Impacts are primarily associated with the closure of reuse outlets during the pandemic and community initiatives ceasing operations.</p> <p><b>See Summary Report Section 3.2.5 for full analysis.</b></p>
<b>Macro-economic, environmental, &amp; sustainability</b>	-	-	-	★-★ Major-Moderate	⊕ Possible	Ⓜ Medium-term	<p><b>Negative:</b> Possible impacts of not achieving net zero goals then the outcomes will be undesirable. The impact of the pandemic on plastic pollution, and the wider impact on climate emergency means responses have been set back.</p> <p><b>See Summary Report Section 3.2.4 for full analysis.</b></p>

## Analysis of Population Groups

### 9.1 Income related groups

#### 9.1.1 Households with resources below minimum needs



**Positive:** None identified.

**Negative:** Closure of charity shops including reuse shops may restrict availability of low-cost goods and essentials like furniture or electrical goods which are necessary for healthy living conditions.

## Analysis: Determinants of Health and Well-being

### 9.2 Behaviours affecting health



**Positive: (i.e., in terms of waste, reduce, reuse, recycle, and broader circular economy approaches)** None identified.

**Negative: (i.e., in terms of waste, reduce, reuse, recycle, and broader circular economy approaches)**

#### Online shopping and food behaviours:

A move to online shopping including food ordering driven by stay-at-home restrictions, closure of other shops, and restrictions on what supermarkets could sell. Examples of food stockpiling are also reported (Green et al., 2020a; Sharma et al., 2020).

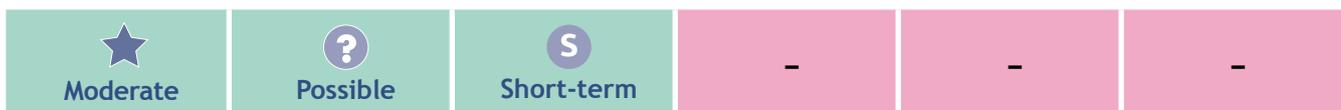
Increased use of plastic packaging including single use plastics with consequential impacts on plastic waste, pollution, and harm to health associated with these.

Potential increase in packaging materials including cardboard packaging subsequently disposed of and even if recycled this potentially conflicts with reduce and reuse approaches. This has an indirect consequence on potentially making it harder to achieve zero waste with the associated health impacts of climate change and pollution.

Increased food waste potentially generated from stockpiling of perishable items.

### 9.3 Social and community influences on health

#### 9.3.1 Community cohesion, identity, local pride; and community resilience



**Positive:** Appreciation by the wider population of the valuable role to society performed by waste sector workers and all key workers.

The ability of Wales in common with other European countries to maintain waste collections appears an important act supporting community resilience.

**Negative:** None identified.

## 9.4 Living and environmental conditions affecting health

### 9.4.1 Specific Waste Streams

The impact is provided in the Summary Report, however additional supporting evidence is reported here.

★ Moderate	✓ Probable	S Short-term	★-★ Major-Moderate	✓ Probable	M Medium-term
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**Positive: PPE / single use plastic:** PPE is vital for health protection. Biomedical and healthcare waste has been given the highest priority during the pandemic ensuring this is safely disposed of with benefits for health.

**Negative: Types of waste:** Large quantities of medical waste and hazardous waste have been generated containing a mixture of both COVID-19 infected and non-infected items; an increase in takeaway food packaging waste; more disposable and single-use plastic generally; more plastics due to online shopping, disposable wipes, cleaning agents, hand sanitiser, disposable gloves, and face masks.

**Biomedical and healthcare waste (BMW):** Management of this waste has been critical to combatting SARS-CoV, Ebola, and MERS-CoV disease outbreaks and this has also been the case in COVID-19. Healthcare settings and specialist processors are experienced in managing these waste streams and in Wales this waste was treated as the highest priority (Welsh Government, 2020b). Much of this waste stream is not recycled or recyclable currently and may require incineration and whilst alternative treatments are possible such as decontamination by steam and heat this is limited by capacity in the sector.

**Potentially infected waste:** This waste stream however goes well beyond medical settings as households with infections, including people who are asymptomatic, generate waste that is infected with COVID-19 and upon which the virus may live for hours to days depending on the materials. People working directly with these wastes for longer periods of time are most at risk of health impact.

**Plastic waste:** Health impacts from plastic pollution more broadly and the subsequent ingestion of plastics including microplastics from fish & seafood to which plastic waste from COVID-19 may be a material factor (Benson, Bassey and Palanisami, 2021). Also microplastics may act as vectors for pathogens (Benson, Bassey and Palanisami, 2021).

**Single use products:** Single use products are cited as positive for worker and public health but create negative impacts on the waste management systems and attempts to reduce plastic use (Sharma et al., 2020). Health protection measures however were apparent in quite the opposite direction however, the World Health Organization called for global production of PPE to be increased by 40% in March 2020 (World Health Organization, 2020).

**Waste from online shopping:** This has potentially increased including for packaging, and food packaging, and takeaway food deliveries. Consequent health impacts include broad impacts resulting from increased waste, potential for pollution, and associated carbon emissions linked to wider climate change.

**Hand sanitiser waste:** Hand sanitisers can contain high levels of alcohol or biocides, one study (Rosadi et al., 2020) from Indonesia identified risks for health from waste sanitiser and hand washing products including ones that by their nature are potentially hazardous; health impacts of products with high levels of surfactants; and risks of infection from contaminated water. Whilst individual quantities are

very small per use, this study in a population of about 262,000 people estimated circa 25,800 litres of contaminated waste from this source per day and more work would be needed to understand the implications of this for health in Wales and whether these quantities are material in the scale of waste water management systems and as a relative risk for human health. Possible health impact due to increased disposal of waste and contaminated liquids to sewers; potential risks from waste products not disposed of safely such as exposure of children to alcohol poisoning.

### 9.5 Evidence Gaps - Post Covid

This assessment did not assess data on impacts on levels of recycling, reuse, or overall waste during the pandemic which could be an area of future investigation.

There is some evidence of single-use plastic bag use increasing in the USA, with existing policies to reduce plastic bag use in Wales this is a potentially useful area to investigate whether plastic bag use has increased in Wales linked with the COVID-19 pandemic.

There is a need for increased research and disciplinary understanding between research and waste management practitioners and policy makers.

Further investigation is required of differential impacts by population group, especially those with protected characteristics. For example, COVID-19 has impacted the health of certain ethnic groups more (First Minister's BAME COVID-19 Advisory Group, 2020), has this resulted in impacts through the pathway of reduce and reuse approaches; or has there been a differential impact by gender considering people working in the waste management sector whose jobs and work have been largely protected compared to the third sector and volunteers which have not to the same extent and may have furloughed staff on partial pay or not been able to support volunteers.

More evidence needed: requirements to self-isolate with COVID-19 may have affected staff in lower level roles in waste management more however this review did not seek data on this. Depending on how employers' implemented these policies and the situation of the worker's wider household may have had an impact on this.

### 9.6 Future Actions – Post Covid

The pandemic has highlighted both strengths and weaknesses in relation to reduce and reuse and waste management. There are opportunities to address these to increase future resilience of services and communities.

In Wales during COVID-19 only essential retail outlets were permitted to open, this meant many outlets related to reduce and reuse such as charity shops and reuse hubs were closed. Waste collections by comparison were prioritised and kept going. In future and by 2050 zero waste policies, if successful, would imply that many more facilities for reduce and reuse will be required and that in future these would in fact be essential services to be maintained.

PPE procurement: should consider and price in the life cycle cost of PPE from manufacture to decontamination and remanufacture.

The reduce and reuse sector is vital to achieving zero waste and creating circular economy in Wales so will require rebuilding and support to recover from the pandemic and accelerate activities in future.

Opportunities for sustainable sterilisation of waste and remanufacturing of PPE in Wales should be urgently investigated.

The following actions have been identified from the literature (Sharma et al., 2020):

Addressing consumer fear of hygiene of reused and recycled products.

Investment in waste management infrastructure to improve safety for workers and improve quality of plastic streams for recycling processors.

Designing sustainable products such as bioplastics and approaches and technologies that support circular economy principles.

Waste management should be considered within disaster management planning. In particular, what actions would be required in a circular economy to respond to a pandemic – for example if waste from energy plants and incineration have played a significant role in managing waste during the current pandemic – plans will need to be put in place for how this is managed in a zero waste future.

Waste and resource management is clearly seen as needing to be socially viable not just environmentally and economically viable.

Food: circular economy approaches can support future resilience to pandemics including local production and consumption; reducing food waste; re-use of food; and nutrient recycling. Circular economy approaches should be introduced and expanded across the existing waste management sector to reduce waste in the first place and keep more resources in a continuous cycle.

More funding should be allocated to educating people about circular economy approaches. A small study from Indonesia found success in increasing knowledge about disinfectant waste and plastic waste related to COVID-19 and was able to demonstrate increased knowledge following an intervention using both electronic and hard copy materials (Rosadi et al., 2020).

Lessons globally including in countries with less structured waste management than Wales point to the issue that no matter how good waste management is, some single use plastic will end up as litter and pollution in the environment: a preventative approach should emphasise reduction in plastic waste alongside addressing existing pollution with benefits of preventing pollution of waterways, urban areas, and a risk of infectious disease transmission (Benson, Bassey and Palanisami, 2021).

## 10.0 Table 8: Pathways to Impact for Public Bodies

This section focusses on the pathways to impact health for public bodies in focusing on waste reduction:

Potential Impact (positive opportunity or unintended negative consequence)	Wider determinant	Population groups	WBFG Act Well-being / UN Sustainable Development Goals	Evidence
<b>Public bodies role in prioritising waste reduction</b>				
<p><b>Positive opportunities</b></p> <p>For leaders to focus minds (at all levels of government and society) on waste reduction and sustainable living</p> <p>To raise awareness that the waste hierarchy starts with waste prevention (reduction)</p> <p>To refocus attention and effort into the reduction of waste produced by public bodies</p> <p>To shift the balance and ensure sustainability and reduced use of resources have an equal weight in Public Body decisions e.g., procurement, strategic plans, service delivery etc</p> <p>To increase / support employment in new roles within waste reduction and reuse</p> <p>To make waste reduction the 'easiest' option</p> <p>To refocus on reducing the use of resources and to being more sustainable, rather than putting the right waste in the right bins</p> <p>To challenge the social norms on consumption and waste production</p> <p>For a cultural shift within public bodies (at all levels) towards waste reduction</p> <p>To re-connect people with the waste they produce e.g., Blue Planet</p> <p>To mobilise Public Body staff e.g. 'plastics reduction group' or as 'Green champions'</p> <p>To improve staff health and well-being by the Public Body actively working to reduce waste production</p> <p>To develop incentives for reduction in waste e.g. a charge for waste collection</p>	<p>Macro-economic, environmental and sustainability factors:</p> <p>Government policies</p> <p>Economic development including trade</p> <p>Social and community influences on health:</p> <p>Third Sector and Volunteering</p> <p>Citizen power and influence</p> <p>Access and quality of services:</p> <p>Education and training</p>	<p>Whole population</p> <p>People on low income</p> <p>Public Body staff</p> <p>People not in employment, education or training (NEETs)</p>	<p>Healthier Wales</p> <p>Globally responsible Wales</p> <p>Prosperous Wales</p> <p>Decent work and economic growth</p> <p>Life Below Water</p> <p>Climate Action</p> <p>Responsible production and consumption</p> <p>Good health and well-being</p>	<p>Workshop</p> <p>INT 2, 3, 4, 5 &amp; 6</p> <p>% that we 'reduce' has hardly reduced at all</p> <p>EU directive (2008)</p> <p>WG Zero waste (2018b)</p> <p>(Cox et al., 2010; Wilson et al., 2012; Zacho and Mosgaard, 2016)</p> <p>Welsh Government. Technical Advice Note (TAN) 21: Waste. (2014)</p>

Potential Impact (positive opportunity or unintended negative consequence)	Wider determinant	Population groups	WFG Act Well-being/ UN Sustainable Development Goals	Evidence
<p><b>Key policy pathways / mechanisms of impact</b></p> <p>Welsh Government strategy and policy</p> <p>Public bodies strategy and policy</p> <p>Linkage of waste reduction with carbon reduction schemes</p> <p>Procurement processes</p> <p>Service contracts e.g. building, refurbishment and waste management</p> <p>Legislation</p> <p>Enforcement and targets on waste reduction</p> <p>Pool public bodies investment e.g. an all-Wales contract</p> <p>Communication and education (internal and external)</p> <p>Engagement and education of public bodies staff e.g. email circulars, sustainability pages on intranet</p> <p>Mobilisation and enablement of Public Body staff</p> <p>Behaviour change through design of waste collection receptacles / collection frequency</p> <p>Increase the sense of control</p> <p>Sustainability champions on procurement and tendering processes</p> <p>Use of consultancy advice to support public bodies to reduce waste</p> <p>WHIASU change pro-forma to include waste reduction and reuse</p>				
<p><b>Unintended negative consequences</b></p> <p>Public bodies reduce their focus on competing priorities</p> <p>Increased economic cost for public bodies</p> <p>Loss of employment in 'downstream' waste management processes</p> <p>Loss of employment in 'production of new products' if reduced demand for new goods</p> <p>No change in rates of waste reduction as people often choose convenience over cost and sustainable options</p> <p>Industrial heritage and legacy of industrial waste in landfill sites is ongoing issue for this and future generations</p> <p>Public bodies limited influence on the packaging of items</p> <p>Increase in new houses has led to an increase in waste collected</p> <p>Cheaper clothes and products has led to an increase in consumption</p>	<p>Macro-economic, environmental and sustainability factors:</p> <p>Economic development including trade</p>	<p>Those currently employed in waste management e.g. manual workers</p> <p>Those currently employed in the production of new goods – manual workers</p>	<p>Prosperous Wales</p> <p>Globally responsible Wales</p> <p>Decent work and economic growth</p> <p>Responsible production and consumption</p>	<p>INT 1B, 2, 3 &amp; 5</p> <p>Employment data</p> <p>Qualification data</p>



Potential Impact (positive opportunity or unintended negative consequence)	Wider determinant	Population groups	WBFG Act Well-being/ UN Sustainable Development Goals	Evidence
<p><b>Key policy pathways / mechanisms of impact</b></p> <p>Welsh Governments new indicators for energy efficiency</p> <p>Legislation and incentives for production and use of renewable energy</p> <p>Legislation and incentives for insulation / energy saving actions in Public Body buildings and in people’s homes</p> <p>Development of Wales wide accessible and affordable active / green travel infrastructure</p> <p>Use planning and urban design to redesign environments so that the ‘car is not king’</p> <p>Development of local transport that uses green and smart technologies</p> <p>Increase opportunity for active travel / green travel to / within work</p> <p>To reduce reliance on transport using fossil fuel e.g. public bodies use green fleets / electric cars/ car share / pool cars / pool bikes</p> <p>Procure local sustainable products e.g. food</p> <p>Use of salary sacrifice offers on cycle to work schemes/ cycle millage / environmentally friendly cars</p> <p>Communications and shared learning</p> <p>Mobilisation of Public Body staff</p> <p>Strict controls on air quality at Public Body facilities</p>	<p>Lifestyles:</p> <p>Physical activity</p> <p>Diet</p> <p>Access and quality of services:</p> <p>Transport</p> <p>Medical / public amenities</p>		<p>Decent work and economic growth</p> <p>Sustainable cities and communities</p> <p>Climate action</p>	
<p><b>Unintended negative consequences</b></p> <p>Negative impact on respiratory diseases</p> <p>Risk of social isolation / reduce access to services</p> <p>Local producers may be unsuccessful in tendering processes</p> <p>Increased cost for public bodies</p> <p><b>Key policy pathways / mechanisms of impact</b></p> <p>Increasingly ‘air tight’ housing with inadequate ventilation</p> <p>Reduced reliance on cars, may increase difficulties for people with mobility issues / living in rural areas / people dependent on cars</p> <p>Local producers may be too small for public bodies, especially if that Public Body is national</p> <p>Limited opportunity to buy ‘Green tariffs’ as cost is the key driver (EU directive)</p> <p>Cost of acquiring green fleets / infrastructure</p>	<p>Living &amp; environmental conditions affecting health:</p> <p>Housing quality and tenure</p> <p>Indoor environment</p> <p>Access and quality of services:</p> <p>Transport</p> <p>Social and community influences on health:</p> <p>Social isolation / loneliness</p> <p>Macro-economic, environmental and sustainability factors</p>	<p>Those with chronic conditions i.e. respiratory diseases</p> <p>Socially isolated / elderly / living in rural areas</p>	<p>Healthier Wales</p> <p>Wales of cohesive communities</p> <p>Prosperous Wales</p> <p>Good health and well-being</p> <p>Decent work and economic growth</p> <p>Industry, innovation and infrastructure</p>	<p>Workshop INT 2 &amp; 6</p> <p>Data Respiratory disease</p>

Potential Impact (positive opportunity or unintended negative consequence)	Wider determinant	Population groups	WBFG Act Well-being/ UN Sustainable Development Goals	Evidence
<b>The role of public bodies in reducing plastic use and plastic waste</b>				
<p><b>Positive opportunities</b></p> <p>To purchase unpackaged goods with the potential to reduce excess purchasing e.g. food</p> <p>To improve people’s diet by purchasing unpackaged food, and cooking from ‘scratch’ with a reduced use of processed foods and less packaging</p> <p>For Public Body to purchase and use fewer plastic products</p> <p>To reduce use of plastic bottles (water) in the workplace</p> <p>For public bodies [and producers] to tackle the root cause of plastic packaging</p> <p>To increase the feeling that Public Body staff are contributing to waste prevention</p> <p>To increase jobs related to the Deposit Return Scheme (DRS)</p> <p>To save resources as reduced need for kerbside collections as DRS removes bottles from recycling</p> <p>To reduce littering of plastic bottles (DRS)</p> <p><b>Key policy pathways / mechanisms of impact</b></p> <p>Procurement</p> <p>Education and training for new jobs</p> <p>Staff awareness</p> <p>Mobilisation of Public Body staff</p>	<p>Lifestyles: Diet</p> <p>Macro-economic, environmental and sustainability factors: Government policies</p> <p>Economic conditions affecting health: Working conditions</p> <p>Mental Health &amp; Well-being: Sense of control</p> <p>Living &amp; environmental conditions affecting health: Air Quality Waste disposal</p>	<p>Whole population</p> <p>Public Body staff</p>	<p>Healthier Wales</p> <p>Globally responsible Wales</p> <p>Prosperous Wales</p> <p>Responsible production and consumption</p> <p>Climate action</p> <p>Good health and well-being</p> <p>Decent work and economic growth</p> <p>Life on land</p> <p>Life below water</p> <p>Industry, innovation, and infrastructure</p>	<p>Workshop INT 1, 2, 3, 4, 5 &amp; 6 (Zacho and Mosgaard, 2016)</p>
<p><b>Negative unintended consequences</b></p> <p>Negative impact on hydration in work / school if no alternative option to plastic bottles</p> <p>Increased anxiety if unable to buy plastic free products</p> <p>Risk of ‘demonization of plastic’ driving consumers to new / worse materials – compostable not always better</p> <p>Loss of ‘higher value plastic’ from recycling process (DRS)</p> <p>Loss of jobs at Welsh based suppliers of single-use plastic items</p> <p>Key policy pathways / mechanisms of impact</p> <p>Procurement</p>	<p>Mental health and well-being: Impact on sense of control</p> <p>Economic conditions affecting health: Unemployment</p>	<p>Public Body staff</p> <p>Young people</p> <p>People at risk of unemployment</p>	<p>Healthier Wales</p> <p>Prosperous Wales</p> <p>Good health and well-being</p> <p>Clean water and sanitation</p> <p>Decent work and economic growth</p>	<p>Workshop INT 1A, 3, 5 &amp; 6</p>

Potential Impact (positive opportunity or unintended negative consequence)	Wider determinant	Population groups	WBFG Act Well-being/ UN Sustainable Development Goals	Evidence
<p><b>Positive opportunities</b></p> <p>To limit purchasing of non-reused / non-recycled items</p> <p>To limit purchasing on single use plastic and items in plastic packaging</p> <p>To use 'Lean methodology' to reduce purchasing and therefore reduce waste</p> <p>To increase weighting and purchasing of items which have the most eco-friendly 'life cycle'</p> <p>Be innovative and use EU directives to support and not limit sustainable procurement</p> <p>Opportunity for policies to 'reuse / refurbish furniture' during all new developments / redevelopments</p> <p>To consider the 'distance travelled' by the new product / waste product in tendering processes</p> <p><b>Key policy pathways / mechanisms of impact</b></p> <p>Procurement processes</p> <p>EU directives</p> <p>WG legislation / procurement policies</p>	<p>Social and community influences on health:</p> <p>Third Sector and Volunteering</p> <p>Living &amp; environmental conditions affecting health:</p> <p>Waste disposal, recycling</p> <p>Macro-economic, environmental and sustainability factors:</p> <p>Government policies</p> <p>Economic development</p>	<p>Whole population</p>	<p>Globally responsible Wales</p> <p>Responsible production and consumption</p> <p>Climate action</p> <p>Industry, innovation and infrastructure</p>	<p>(Cox et al., 2010; Johansson and Corvellec, 2018; Wilson et al., 2012)</p> <p>Workshop</p> <p>INT 1B, 2, 3, 4, 5 &amp; 6</p> <p>Welsh Government. Climate Change Strategy for Wales (2010).</p>
<p><b>Negative unintended consequences</b></p> <p>Increase cost of items e.g. unwrapped food</p> <p>Increased cost to replace single use plastic utensils in Public Body canteens</p> <p>Limited control / influence over packaging of items that are procured</p> <p>Key policy pathways / mechanisms of impact</p> <p>Procurement processes</p> <p>Increased buying power if 'Joint Public Body procurement'</p>	<p>Macro-economic, environmental and sustainability factors:</p> <p>Government policies</p> <p>Economic development</p> <p>Economic conditions affecting health:</p> <p>Poverty including food and fuel poverty (household)</p>		<p>Equal Wales</p> <p>Reduce inequalities</p>	<p>Workshop</p> <p>INT 2 &amp; 3</p>

Potential Impact (positive opportunity or unintended negative consequence)	Wider determinant	Population groups	WBFG Act Well-being/ UN Sustainable Development Goals	Evidence
<b>The role of public bodies to reduce food waste</b>				
<p><b>Positive opportunities</b></p> <p>To reduce expenditure of Public Body by reducing food waste</p> <p>To reduce air pollution by increasing food collection from all Public Body sites and commercial premises (reduced going to landfill)</p> <p>To further develop food waste processes to produce energy (and potentially fertilizer)</p> <p>To promote Local Authorities role in food waste collection services</p> <p>To distribute food to social enterprises (charities)</p> <p><b>Key policy pathways / mechanisms of impact</b></p> <p>Procurement processes</p> <p>Investment in infrastructure</p> <p>Legislation and Enforcement</p> <p>Welsh Government and Public Body policies</p> <p>Mobilisation of Public Body staff</p>	<p>Lifestyle: Diet</p> <p>Living &amp; environmental conditions affecting health: Air quality</p> <p>Social and community influences on health: Third Sector</p> <p>Economic conditions affecting health: Poverty including food and fuel poverty</p> <p>Macro-economic, environmental and sustainability factors: Economic development Cost of living</p>	<p>Those with chronic conditions i.e. respiratory conditions</p> <p>Homeless, Low income, unemployed, socioeconomically deprived</p>	<p>Equal Wales</p> <p>Healthier Wales</p> <p>Industry, innovation and infrastructure</p> <p>Zero Hunger</p> <p>Reduce inequalities</p> <p>Good health and well-being</p>	<p>(Cox et al., 2010; Sharp, Giorgi and Wilson, 2010)</p> <p>Workshop INT 1A, 2, 3 &amp; 5</p> <p>The Landfill Directive (1999/31/EC)</p>
<p><b>Negative unintended consequences</b></p> <p>Increased food waste from convenience and pre-prepared food</p> <p>Limited compostable sites for food waste in Wales</p> <p>Waste management firms cherry pick 'valuable' waste for collection (not food waste)</p> <p>Reduced opportunity at all sites to collect food waste and recycle as limited space</p> <p>Need for additional food caddies, caddy liners and additional waste collections with extra cost (vehicle, fuel, staff and time costs) if separate food waste from garden waste</p> <p>People may collect less food waste if required to be separate from garden waste</p> <p>Lack of specialised vehicles with bin lifts</p> <p><b>Key policy pathways / mechanisms of impact</b></p> <p>Education and awareness raising</p> <p>Investment in infrastructure</p> <p>Legislation and policies to separate waste at source</p>	<p>Macro-economic, environmental and sustainability factors: Cost of living</p> <p>Living &amp; environmental conditions affecting health: Waste disposal</p>			<p>INT 1B &amp; 2, 3 &amp; 5</p>

Potential Impact (positive opportunity or unintended negative consequence)	Wider determinant	Population groups	WFG Act Well-being/ UN Sustainable Development Goals	Evidence
<b>The role of public bodies in increasing levels of reuse</b>				
<p><b>Positive opportunities</b>            For public bodies to lead by example e.g. refurbish / reuse furniture within their buildings            To create jobs in furniture refurbishment            To support social enterprises to provide remanufactured / reused office furniture to public bodies            To sell seized property on online auctioning sites to raise funds for Public Body            To raise awareness that redevelopment of an area does not mean 'new furniture'            For LAs to refer households to charities for bulky collections e.g. furniture            For health services to reuse 'apparatus' e.g. Zimmer frames and crutches            To sell used specialist medical equipment to developing countries (e.g. MRI scanners) which are still serviceable but obsolete in modern UK healthcare facilities / financially beneficial to the NHS and are beneficial to developing countries            To innovate and be a leader in developing the reuse / recycling of specific products            For industry to develop reusable plastic products for the NHS and other public bodies            Public bodies to work collectively and provide 'communal skips' for local areas if they are unable to afford bulky household collections            To 'reuse' green areas around Public Body sites to increase biodiversity</p> <p><b>Key policy pathways / mechanisms of impact</b>            Education and awareness raising            Financial incentives / support            Procurement processes            Welsh Government and Public Body policies            Share learning and good practice</p>	<p>Macro-economic, environmental and sustainability factors:            Economic development</p> <p>Social and community influences on health:            Third Sector</p> <p>Access and quality of services:            Education and training            Medical and health services</p>	<p>Unemployed, NEATs</p> <p>Those in developing countries</p> <p>Living in deprived areas</p>	<p>Prosperous Wales</p> <p>Equal Wales</p> <p>Resilient Wales</p> <p>Globally responsible Wales</p> <p>Cohesive communities</p> <p>Decent work and economic growth</p> <p>Industry, innovation and infrastructure</p> <p>Reduce inequalities</p> <p>Partnership for the goals</p> <p>Life on land</p>	<p>Zacho &amp; Mosgaard (2016).            Workshop            INT 1A, 1B, 2, 3, 4 &amp; 5</p> <p>Welsh Government. Towards Zero Waste 2010-2050: Progress Report (2015)</p> <p>Welsh Government. Technical Advice Note (TAN) 21: Waste(2014) (Welsh Government, 2014)</p> <p>Welsh Government. Towards Zero Waste Sector Plan and Waste Prevention Programme Actions Summary Report 2010-2016. (2018b).</p>
<p><b>Negative unintended consequences</b>            Liability issues if health and safety requirements e.g. fire certificates for refurbished / reused furniture is not complied with            Loss of jobs in the production of new furniture            Limited space to store furniture for refurbishment / reuse            Cost of refurbishment and management of the processes</p> <p><b>Key policy pathways / mechanisms of impact</b>            Risk averse culture</p>	<p>Living &amp; environmental conditions affecting health:            Health and safety</p> <p>Macro-economic, environmental and sustainability factors:            Economic development</p>	<p>Manual workers</p>	<p>Prosperous Wales</p> <p>Decent work and economic growth</p>	<p>Workshop            INT 1A, 1B &amp; 3</p>

Potential Impact (positive opportunity or unintended negative consequence)	Wider determinant	Population groups	WBFG Act Well-being/ UN Sustainable Development Goals	Evidence
<b>The role of public bodies in continuing their support to recycling</b>				
<p><b>Positive opportunities</b></p> <p>To increase recycling at events / festivals e.g. National Eisteddfod and Royal Welsh Show</p> <p>To ensure that when redeveloping Public Body sites that recycling facilities are included in the design stage</p> <p>For public bodies to use recycled materials e.g. within clinical situations</p> <p>To advocate for the streamlining of medicine packaging</p> <p>To increase jobs related to the DRS e.g. collection and transport</p> <p>For End Producer Responsibility (EPR) to drive up the quality of recycled materials as better quality waste items are more valuable</p> <p>For innovation and job creation within EPR e.g. development and recovery of products with high quality constitutional parts</p> <p>To price waste differently i.e. not in tonnage</p> <p>To innovate and use recycled materials for a secondary purpose e.g. tyres into playground flooring</p> <p>To continue the positive reinforcement of recycling but within the context of the hierarchy of waste management</p> <p>To develop more recycling plants in the UK, and closer to the point of use by several public bodies</p> <p>Remove individual waste paper bins from desks and have centralised bins at exit points</p> <p>To support dedicated enforcement officers to ensure black bins / recycling are put out appropriately</p> <p>To increase recycling rates by increasing the time interval between black bin collections</p> <p>To adequately enforce 'recycling at source' to ensure the cheapest option is not taken (landfill rather than recycling)</p> <p><b>Key policy pathways / mechanisms of impact</b></p> <p>Welsh Government and Public Body legislation, policy and strategy</p> <p>Investment in design and implementation of new technologies</p> <p>Education and awareness raising</p> <p>Enforcement</p>	<p>Macro-economic, environmental and sustainability factors:</p> <p>Government policies</p> <p>Economic development</p> <p>Climate change</p> <p>Living &amp; environmental conditions affecting health:</p> <p>Waste disposal</p> <p>Social and community influences on health:</p> <p>Third sector</p>	<p>Whole population</p> <p>Unemployed</p> <p>Those with mobility issues</p>	<p>Globally responsible Wales</p> <p>Prosperous Wales</p> <p>Climate action</p> <p>Decent work and economic growth</p> <p>Industry, innovation and infrastructure</p>	<p>workshop</p> <p>INT 1B, 2, 3, 4, 5 &amp; 6</p> <p>Welsh Government. Environment (Wales) Act (2016).</p> <p>Welsh Government. Technical Advice Note (TAN) 21: Waste (2014).</p>

Potential Impact (positive opportunity or unintended negative consequence)	Wider determinant	Population groups	WFG Act Well-being/ UN Sustainable Development Goals	Evidence
<p><b>Unintended negative consequences</b>                      Reduced opportunity at all sites to collect food waste and recycle as limited space                      Limited recycling bins in public spaces and poor rates of recycling by the public ‘on the go’                      Limitations to using recycled products due to Health and safety and hygiene considerations                      Additional time, space and cost requirements for public bodies e.g. recycling bins                      Misuse of communal recycling points e.g. Houses multiple occupation causing stress and contaminated recycling                      Loss of ‘good / valuable’ plastics from recycling due to DRS                      Difficult to plan / budget due to fluctuations within the recycling market                      Difficult to quantify the waste produced / recycled by the LA buildings / sites from that collected at kerbside                      Increased costs as recycling is no longer being sent overseas                      Recycling messaging may distract from reduce and reuse as ‘doing well at recycling’ gets promoted                      Seeing recycling thrown in together (when bins emptied) cause a sense of confusion                      People can become obsessed by recycling ‘getting it right’ and cause anxiety                      Within public bodies the opportunities for staff to recycle is not the same across all sites e.g. lack of space / resource / collection of food waste and recycling in satellite sites</p> <p><b>Key policy pathways / mechanisms of impact</b>                      Legislation and policies to separate waste at source                      Competing legislation (unintended consequence)                      Economic limitations                      Education and awareness raising</p>	<p>Macro-economic, environmental and sustainability factors:                      Government policies</p> <p>Access and quality of services:                      Medical and health services                      Education and training</p> <p>Mental Health &amp; Well-being:                      Impact on emotional well-being and resilience</p> <p>Social and community influences on health:                      Neighbourliness</p>	<p>Those with mental health conditions</p>	<p>Globally Responsible Wales</p> <p>Climate action</p>	<p>Workshop INT 1A, 1B, 2 3 &amp; 5</p> <p>The European Parliament and the Council of the European Union. (2013).</p>

Potential Impact (positive opportunity or unintended negative consequence)	Wider determinant	Population groups	WBFG Act Well-being/ UN Sustainable Development Goals	Evidence
<b>The role of public bodies in the disposal of waste</b>				
<p><b>Positive opportunities</b></p> <p>To ensure all companies (large or small) meet their waste reduction / recycling targets</p> <p>Strengthen regulation of private waste collectors</p> <p>Develop waste disposal sites in UK and benefit from the energy production and repurposing opportunities e.g. flock from incinerating / heat treating medical waste</p> <p>To work collectively with UK nations to develop more effective and efficient infrastructure for waste management</p> <p>Use technology and online portals to monitor waste e.g. the proportion that goes to landfill and the proportion of CO2 produced</p> <p>To support dedicated enforcement officers to ensure black bins / recycling are put out appropriately</p> <p>To limit littering along coastal areas and of marine pollution</p> <p>To align services provided by waste partners (private companies and LA) as they differ by area which can lead to discrepancies in practice</p> <p><b>Key policy pathways / mechanisms of impact</b></p> <p>Regulation and enforcement</p> <p>Innovation and investment</p>	<p>Macro-economic, environmental and sustainability factors:</p> <p>Economic development</p> <p>Government policies</p> <p>Living &amp; environmental conditions affecting health:</p> <p>Waste disposal</p>	<p>Whole population</p>	<p>Globally responsible Wales</p> <p>Resilient Wales</p> <p>Equal Wales</p> <p>Climate action</p> <p>Partnership for the goals</p> <p>Industry, innovation and infrastructure</p> <p>Life on land</p> <p>Life below water</p>	<p>Workshop INT 1B, 2, 3, 4 &amp; 5</p> <p>The Landfill Directive (1999/31/EC)</p>
<p><b>Unintended negative consequences</b></p> <p>Environmental impact of fires in waste recycling plants e.g. time, poor air quality, water run off</p> <p>Unlicensed / unregulated waste collection businesses</p> <p>Potential for the public to pay for private waste collection services if extend waste collection intervals</p> <p>Continuation / worsening of fly-tipping</p> <p>Public complaints on waste management</p> <p>Limited LA budgets may reduce their ability to enforce legislation</p> <p>Historical industrial legacy of waste in landfills</p> <p>Public bodies based in satellite sites (often rural areas) not generating enough waste for collection by commercial collectors (cost and environmental sustainability of collections)</p> <p>Society sees waste as a separate thing that is not their responsibility</p> <p>Littering increase in part due to availability of packaged products</p> <p>Difficulties in obtaining accurate annual data on waste collection from public bodies (to report on in the Annual Environmental Report)</p>	<p>Macro-economic, environmental and sustainability factors:</p> <p>Economic development</p> <p>Government policies</p> <p>Living &amp; environmental conditions affecting health:</p> <p>Waste disposal</p>	<p>Those on low income, unemployed</p> <p>Living in deprived areas</p> <p>Living and working in rural areas</p>	<p>Equal Wales</p> <p>Reduce inequalities</p> <p>Life on land</p>	<p>Workshop INT 2, 4 &amp; 5</p>

Potential Impact (positive opportunity or unintended negative consequence)	Wider determinant	Population groups	WBFG Act Well-being/ UN Sustainable Development Goals	Evidence
<p><b>Key policy pathways / mechanisms of impact</b>  Packaging of goods (transport, presentation)  Technology and monitoring  Economic considerations</p>				
<b>Public bodies role in supporting and upscaling community action</b>				
<p><b>Positive opportunities</b>  To support communities and social enterprises which collect / refurbish and sell reused products  To support community driven initiatives and calls for action e.g. plastic free communities  To work with communities to develop green space around Public Body sites for a community vegetable patch  To work with communities to identify vulnerable areas (e.g. roosting bats in a building, invasive plants in a pond so avoid using that water etc.) that need to be highlighted and avoided  To upscale initiatives commonly used by the public within public bodies e.g. 'Freecycle'  Use local companies (local employment) and local social enterprises (often hire staff with learning difficulties from disadvantaged areas)</p> <p><b>Key policy pathways / mechanisms of impact</b>  Engage young people / people with the Reduce Reuse Recycle agenda in a different way to usual e.g. peaceful protest  Consumers action against packaging</p>	<p>Social and community influences on health:  Citizen power and influence</p> <p>Mental Health &amp; Well-being:  participation in community and economic life</p> <p>Macro-economic, environmental and sustainability factors:  Economic development</p>	<p>Unemployed, NEATs, those with learning difficulties</p>	<p>Equal Wales  Prosperous Wales  Cohesive communities  Reduced inequalities  Decent work and economic growth  Life on land</p>	<p>Workshop  INT 1A, 1B, 2, 4 &amp; 5</p>
<p><b>Negative unintended consequences</b>  Issues with waste collection can cause community tensions  If community cohesion is poor, then there is increasing risk of issues with waste management / collection</p> <p><b>Key policy pathways / mechanisms of impact</b>  Community cohesion and community development</p>	<p>Social and community influences on health:  Community cohesion</p> <p>Living &amp; environmental conditions affecting health:  Waste disposal,</p>			<p>INT 6</p>

Potential Impact (positive opportunity or unintended negative consequence)	Wider determinant	Population groups	WBFG Act Well-being/ UN Sustainable Development Goals	Evidence
<b>Public bodies role in education and raising awareness</b>				
<p><b>Positive opportunities</b></p> <p>To use Social Media to engage with younger people and drive behaviour change</p> <p>To harness youth movement on climate change</p> <p>To develop communication strategies to counterbalance the negative messages on ‘black bin collections’</p> <p>To simplify messages and improve understanding (Literacy) by using visual imagery</p> <p>To increase awareness of Public Body staff for reduce, reuse and recycle</p> <p>To increase awareness and consciousness of people on how much plastic is used within everyday scenarios</p> <p>To educate (people, tenants, landlords) to ensure black bins / recycling are put out appropriately (and the consequence of increased landfill waste if not)</p> <p>To increase understanding that the waste producer is liable, not the person disposing of the waste (if dumped illegally)</p> <p>To increase awareness of the ‘Eco footprint’ of an area and an organisation and an awareness of the rate at which we are consuming resources</p> <p>To improve the ‘messages’ from the Welsh Government decarbonisation agenda e.g. the need to reduce car use</p> <p>To raise awareness of proportion of food waste in black bins</p> <p>To advise on ways to save money and reduce fuel use</p> <p>To influence school curriculums to allow children to grow their own fruit /veg and to understand where our food comes from e.g. eco schools</p> <p><b>Key policy pathways / mechanisms of impact</b></p> <p>Communication, education and awareness raising</p> <p>School curriculum; Welsh Baccaalaureate, Duke of Edinburgh and start of university life</p>	<p>Social and community influences on health:</p> <p>Citizen power and influence</p> <p>Third Sector</p> <p>Access and quality of services:</p> <p>Education and training</p>	<p>Young people</p> <p>Those with visual impairment, learning difficulties, or not first-language English / Welsh</p>	<p>Globally responsible Wales</p> <p>Cohesive communities</p> <p>Equal Wales</p> <p>Climate action</p> <p>Reduced inequalities</p> <p>Responsible production and consumption</p> <p>Quality education</p>	<p>Sharp, Giogri and Wilson (2010).</p> <p>Workshop INT 2, 3, 5 &amp; 6</p>
<p><b>Negative unintended consequences</b></p> <p>There is a ‘rules’ led recycling infrastructure, but many people do not understand these rules and there are still language barriers</p> <p>Different LA approaches to collection of waste</p> <p>Loss of funding educational sessions on Carbon awareness and waste reduction</p> <p><b>Key policy pathways / mechanisms of impact</b></p> <p>Communication, education and awareness raising</p> <p>Economic constraints</p>	<p>Social and community influences on health:</p> <p>Language</p> <p>Access and quality of services:</p> <p>Education and training</p>	<p>Not first-language Welsh or English</p> <p>Young people</p>	<p>Equal Wales</p> <p>Reduced inequalities</p> <p>Quality education</p>	<p>Workshop INT 2</p>

Potential Impact (positive opportunity or unintended negative consequence)	Wider determinant	Population groups	WFG Act Well-being/ UN Sustainable Development Goals	Evidence
<b>The role of public bodies to collaborate and develop collective actions</b>				
<p><b>Positive opportunities</b>                      Pool waste to increase efficiency / reduce costs e.g. individual quantities generated are small but collectively could be recycled                      Develop a ‘collective Public Body or Public Service Board (PSB) pound’ as a way to take collective action and maximise effectiveness e.g. Preston Model                      For LA to use the same colours of bins and how to separate recycling</p> <p><b>Key policy pathways / mechanisms of impact</b>                      Collaboration and pooling of resources                      Communication and sharing good practice</p>	<p>Macro-economic, environmental and sustainability factors:                      Economic development</p> <p>Mental Health &amp; Well-being:                      Sense of control</p>	<p>Whole population</p> <p>Public Body staff</p>	<p>Resilient Wales</p> <p>Partnership for the goals</p>	<p>Workshop INT 5 (Cox et al., 2010).</p> <p>Welsh Government. Climate Change Strategy for Wales (2010).</p>
<p><b>Negative unintended consequences</b>                      Currently different processes taking in place in different LA                      Key policy pathways / mechanisms of impact                      Communication and information sharing between public bodies</p>			<p>Equal Wales</p>	
<b>The role of public bodies as exemplars in waste reduction</b>				
<p><b>Positive opportunities</b>                      For public bodies to lead and ‘tell’ people about their contribution to waste reduction                      To trial different models... We should practice what we preach                      WG estates need to set the marker down for other public bodies                      To develop ‘Carbon budgets’ for public bodies to add sway behind positive environmental procurement processes                      To promote ‘Zero waste week’ in all public bodies                      To profile Basque example and develop a social enterprise system based on ‘value versus transaction’                      To be innovative and identify the economic benefits within the circular economy                      To develop new business models that move towards low carbon and disinvestment from disposables with longer contracts to those who wish to invest in this new model                      To advocate for RRR as part of a ‘whole system’ approach by public bodies (not solely the responsibility of the waste sector)                      Advocate for greater responsibility by manufacturers for the waste generated by their products</p>	<p>Macro-economic, environmental and sustainability factors:                      Economic development                      Government policies                      Biodiversity</p> <p>Access and quality of services:                      Education and training</p> <p>Social and community influences on health:                      Citizen power and influence</p>	<p>Whole population</p> <p>Public Body staff</p>	<p>Globally responsible Wales</p> <p>Equal Wales</p> <p>Prosperous Wales</p> <p>Climate action</p> <p>Reduced inequalities</p>	<p>Workshop INT 1B, 2, 3, 4 &amp; 6</p> <p>Sharp, Giogri and Wilson (2010).                      Wilson et al. (2012).</p> <p>Welsh Government. Climate Change Strategy for Wales. (2010).</p>

Potential Impact (positive opportunity or unintended negative consequence)	Wider determinant	Population groups	WBFG Act Well-being/ UN Sustainable Development Goals	Evidence
<p>To advocate that producers complete a sustainability assessment on their product and its waste products at end of use, when licencing a product</p> <p>Develop annual targets to meet / report against for greenhouse gas emissions, fuel consumption and other relevant indicators</p> <p>Develop more (renewable) energy within Wales</p> <p>Strengthen leadership from WG to reduce waste production</p> <p>To influence commercial organisations to reduce packaging and to use recyclable packaging</p> <p>Link waste prevention with carbon reduction</p> <p>To increase biodiversity within Public Body sites</p> <p>To follow BREEAM excellence when refurbishing / rebuilding Public Body buildings / sites</p> <p>To ensure waste reduction strategies are consistent across a public bodies portfolio of estates</p> <p><b>Key policy pathways / mechanisms of impact</b></p> <p>Legislation and policies</p> <p>Monitoring and reporting</p> <p>Innovation and investment in new technologies</p> <p>Communication, education / awareness raising</p> <p>End of Product Responsibility</p>			<p>Decent work and economic growth</p> <p>Industry, innovation and infrastructure</p> <p>Partnership for the goals</p> <p>Responsible production and consumption</p> <p>Affordable and clean energy</p> <p>Life on land</p>	
<p><b>Negative unintended consequences</b></p> <p>Inequality in waste reduction opportunities across public bodies estates e.g. between headquarters and satellite / rural sites</p> <p>Key policy pathways / mechanisms of impact</p> <p>Legislation and policies</p>			<p>Equal Wales</p> <p>Reduced inequalities</p>	<p>Workshop INT 6</p>

## 11.0 Bibliography

Combined bibliography for all report sections.

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# Our Priorities 2018-2030

**Building and mobilising knowledge and skills** to improve health and well-being across Wales

**Influencing the wider determinants of health**

**Improving mental well-being and resilience**

Supporting the development of a sustainable **health and care system focused on prevention** and early intervention

*Working to Achieve a Healthier Future for Wales*

**Promoting healthy behaviours**

**Protecting the public** from infection and environmental threats to health

Securing a **healthy future** for the next generation

**Our Values:**

*Working together with trust and respect to make a difference*



GIG  
CYMRU  
NHS  
WALES

Iechyd Cyhoeddus  
Cymru  
Public Health  
Wales



World Health Organization  
Collaborating Centre on Investment  
for Health and Well-being



GIG  
CYMRU  
NHS  
WALES

Iechyd Cyhoeddus  
Cymru  
Public Health  
Wales

Public Health Wales  
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