

Engineering Justification Paper

EAP: Resource Use and Waste

Version: Final

Date: December 2019

Classification: Highly Confidential



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2 Introduction

Over GD1 we have nearly reached zero waste to landfill for our offices and depots, and for GD2 we intend on expanding our scope to include other business areas such as Reinstatement and Major Projects.

Between 2013 and 2019 our office and depot waste performance has improved from 14% to 0.27%. This small percentage of landfilled waste comes from our Scottish Independent Undertakings (SIU). These sites are reliant on the local councils for weekly waste collections and these have limited (if any) recycling facilities, which results in a high proportion of the SIU waste being sent to council landfill sites.

We already record the amount of excavated material sent to landfill and have been working towards our reduction target, we are currently at 2.6% spoil to landfill.

Currently we do not report internally on waste to landfill and recycling rates from our holder demolition and major projects, although a waste management plan is usually used for large projects. To expand our scope, we intend to begin gathering data from Major Projects and Holder demolition, so we have a better understanding of the wider business waste and what percentage is being sent to landfill.

2.1 General Background

2018/19 data for office and depot recycling rates and spoil to landfill are shown in Tables 1 and 2 below:

Table 1: Office and Depot Waste streams
(incl. Recycling, General waste, PE Scrap, Batteries and PPE)
2018/19

Waste totals by disposal 2018/19	Total Tonnes
Office /depot rec	964
Office/ depot incinerated	377
Office / depot landfill	2
Total PE Scrap recycled	284
Total office/depot waste	1627

Figure 1: Office & Depot waste disposal

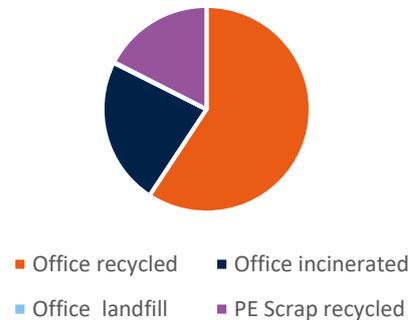
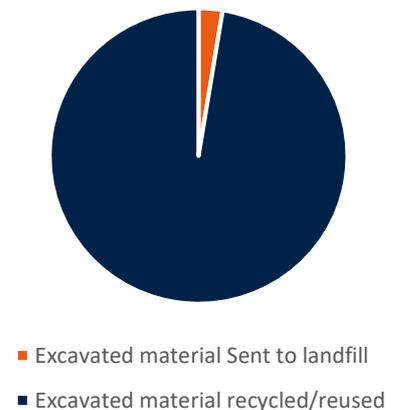


Table 2: Spoil to Landfill 2018/19

Material Disposal	Volume (Tonnes)	Percentage by disposal type
Excavated material Sent to landfill	8824	2.6%
Excavated material sent to recycle centre	323,565	97.4%
Excavated material reused for landfill sites	2389	

Figure 2: Spoil disposal types



Circular Economy

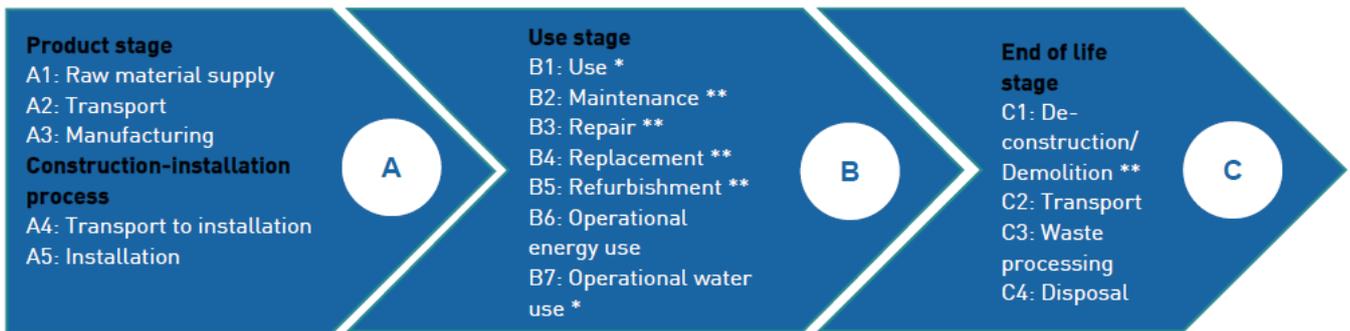
We have worked hard to better understand and manage the resources and waste produced across our offices and depots. In the transition to GD2 we will look to better understand the carbon emissions of the materials we procure through our supply chain. This will include working with our suppliers to collect data on the carbon emissions of the materials we purchase. This will help us enhance the scope of our Business Carbon Footprint reporting to begin to capture the full lifecycle of the materials we use.

We currently have these circular economy processes, but we want to expand this into other waste streams and products:

- PE Scrap repurposed into lower grade pipe e.g. sewage and drainage pipe
- Cones and barriers recycled into new
- Innovation working with waste service providers to close the loop

We need to better understand the life cycle impacts of our materials and how they can contribute to a circular economy. As PE Pipe is one of our biggest material purchases, we have initially focussed in this area. An Extract from the PE Supplier Life Cycle Assessment (LCA) is shown below (See Appendix for further information).

Figure 2: Flow diagram of processes included in the LCA of PE pipe



3 Equipment Summary

Resource use and waste are created through business-as-usual daily operations and are not specific to particular locations or pieces of equipment. Instead they are tied to work streams and departments, particularly:

- Operations (Including Mains Replacement, Maintenance, Emergency and Connections)
- Reinstatement
- Offices and depots
- Major Projects
- Holder Demolition

4 Problem Statement

The problem we are trying to tackle is the achievement of zero waste to landfill and increase in circular economy wherever possible. Landfill is no longer economically or environmentally viable for the majority of products. Energy from waste can be useful but we need to increase our closed loop processes and strive for circular economy in order to reduce the resource strain on the planet.

Why are we doing this work and what happens if we do nothing?

If we do nothing the available space in landfill sites will continue to diminish and we will waste money paying for the rapidly increasing landfill tax. Resource scarcity will spread, and we may find sourcing specific products including PE pipe more challenging.

What is the outcome that we want to achieve?

We want to achieve zero waste to landfill with the exception of hazardous wastes that have no other possible disposal route. This will include a reduced reliance on energy from waste incineration and increased percentage of reuse and recycling. For key waste streams we would look to embed closed loop circular economy processes.

How will we understand if the spend has been successful?

If the spend has been successful we will see a further reduction in waste to landfill and may be able to achieve external certification for this such as the Carbon Trust Standard for Waste. We should also be reducing the amount we spend on waste management including skip hire and any landfill tax.

4.1 Narrative Real-Life Example of Problem

Our current issue around achieving zero waste to landfill is the location of our Scottish Independent Undertakings and their reliance on council waste collections. The councils send a high proportion of their waste to landfill due to the lack of recycling facilities. With holder demolition and spoil to landfill waste a small percentage of waste may have to be sent to landfill as it is hazardous and cannot be reused, recycled or incinerated.

Current split of waste sources recorded over GD1 are shown below along with total tonnage.

Table 3: GD1 Waste performance by Network

	Start GD1 (2013/14)	GD1 to date (2018/19)	Average GD1
Southern			
Office/Depot (%)	0.39%	0.37%	0.45%
PE scrap (%)	0.10%	0.07%	0.07%
Spoil (%)	99.50%	99.68%	99.52%
TOTAL (tonnes)	235,956.56	232,043.21	251,587.57
Scotland			
Office/Depot	0.73%	0.46%	0.64%
PE scrap	0.10%	0.13%	0.11%
Spoil	99.17%	99.41%	99.26%
TOTAL	88,215.23	104,084.72	92,639.95

Figures 4 and 5 below show the split of waste treatment types including how we have increased our recycling and reduced our waste to landfill since the start of GD1.

Figure 4: Southern waste treatment by type

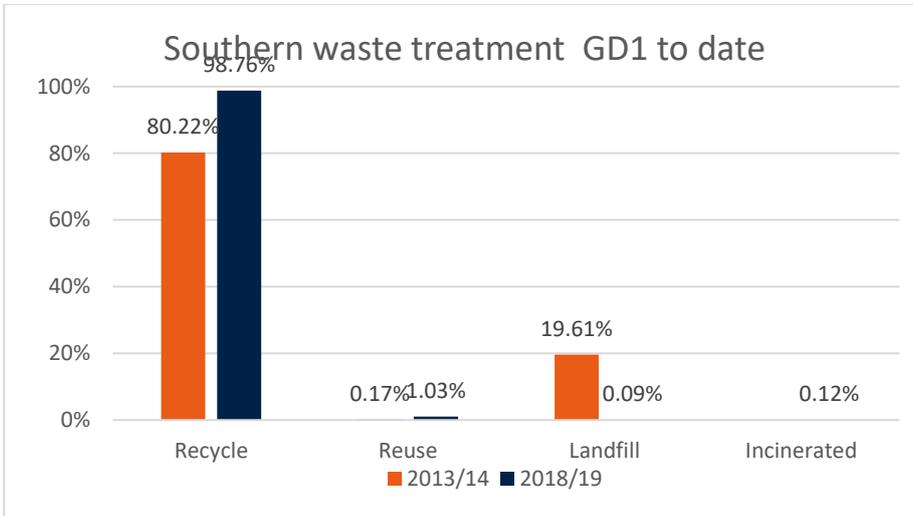
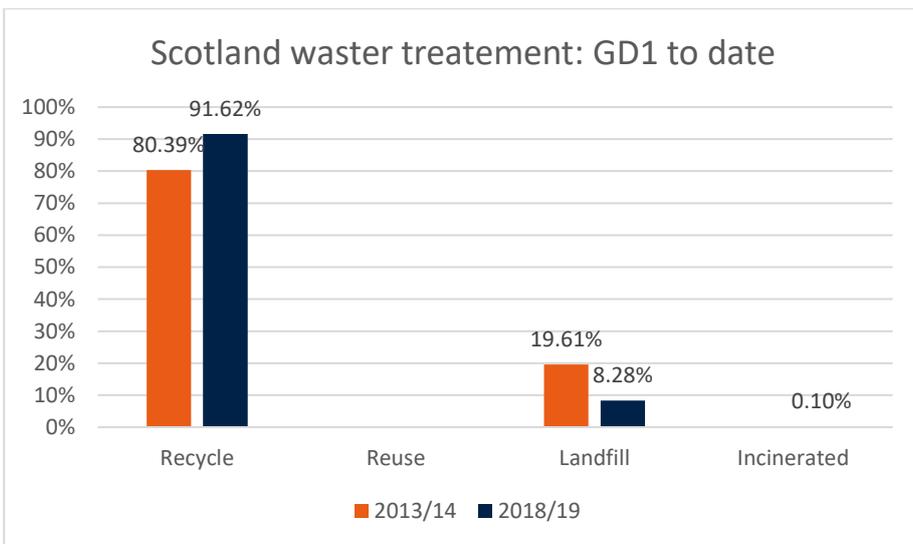


Figure 5: Scotland waste treatment by type



Opportunities and Challenges

Opportunities will arise when we work more closely with our suppliers to highlight and realise areas we can improve. This has already occurred at a low level in GD1 where we have engaged with our PE pipe scrap company who recycle our pipe into low grade sewage and drainage pipe. There are further opportunities for closing the loop on our key processes which will increase our recycling rates and efficiency whilst driving down cost.

The main challenges will come if circular economy processes for some waste streams require additional spend or result in current suppliers not meeting our requirements and end up losing the contract. The costs may need to be shared between SGN and the supplier, which will increase overall spend in this area.

Upcoming Legislative Changes: RPS 211

We are currently working in preparation for the withdrawal of the Regulatory Position Statement 211: Excavated Waste from Utilities installation and Repair. The RPS applies to businesses who deal with excavated waste from unplanned utilities. In April 2020 the RPS will be withdrawn and in preparation for this we will be working within the utility industry to develop an appropriate alternative waste classification methodology based on an industry understanding of risk. This will support and assist us as a business to better manage and identify waste that is being sent to landfill and identify potential opportunities on how this spoil can be reduced in line with our targets and begin to budget accordingly to continue to minimise our environmental impact. There is a risk and uncertainty with regards to the amount of spoil requiring laboratory analysis which may result in increases in spoil to landfill. For additional information, please refer the Appendix 014 Repair- Managing uncertainty

4.2 Spend Boundaries

The spend for reducing non-hazardous waste to landfill across office/depot, holder demolition and major projects should be minimal, as diversion from landfill rates are already very high. There may be cost reductions in waste management as efficiency improves. Costs for embedding further circular economy processes have not been included here as further research is required to highlight the most suitable products and organisations to work with to close the loop on our most common waste types or products.

5 Probability of Failure

Equipment such as recycling and energy from waste plant would be owned and operated by external organisations. On our sites, failure is likely to be related to the regularity of waste collections and suitability of the on-site containers and waste storage area. This risk will be managed by working closely with our waste contractors to ensure key performance indicators are met.

5.1 Probability of Failure Data Assurance

No current failure data is known so assurance is not possible at this time. Failure will result in environmental, social and possibly financial impacts which are discussed below.

6 Consequence of Failure

Loss of Supply to Customers

Resource use and waste is not directly applicable to loss of supply but could have an indirect effect if material shortages occur and new kit or PE pipe for example cannot be supplied.

Safety Impact of Failure

This is not directly applicable to resource use and waste but often sites and operations that manage waste and resources well will also be safer sites.

Environmental Impact

- Failure to meet zero waste to landfill targets leads to environmental and social impacts and increased spend on landfill tax
- Failure to achieve circular economy and high reuse/recycling rates for key waste streams leads to resource scarcity and difficulty sourcing new products incl. PE Pipe
- Fall in reputation as customers and stakeholders see other companies achieving zero waste to landfill and SGN falling short

7 Options Considered

The standard options of replace/repair on failure/proactive were not deemed suitable for resource use and waste given the lack of 'equipment' to consider. Options of business as usual, medium and high ambition were considered instead. Hazardous waste has been excluded from this 'zero waste to landfill' target as disposal procedures and legislation limit how it can be disposed of.

7.1 Options summary

Business as Usual (Low ambition)

Continue to focus our zero waste to landfill target on the limited scope of office and depot waste.

Medium Ambition

Expand scope of target to include spoil to landfill, holder demolition and major projects. Promote reuse and recycling over landfill and energy from waste.

High Ambition

Carry out analysis on key waste streams to identify where we should focus on closing the loop. This may include life cycle assessments and work with innovative organisations on ways our products and waste can be reused.

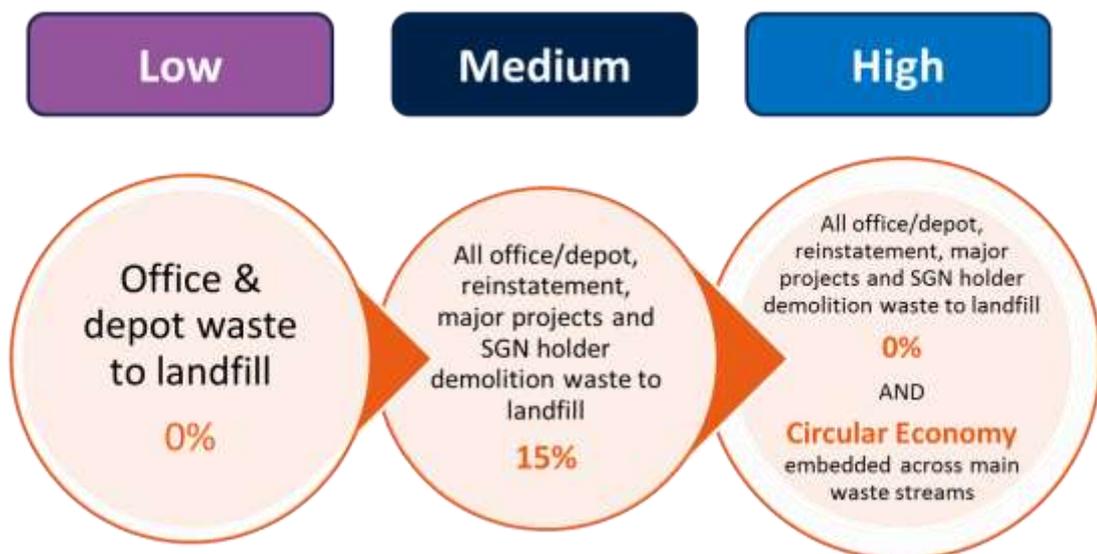
From our initial assessments we believe the waste streams we will be focussing on for circular economy are:

- PE Pipe
- Reinstatement materials
- Steel pipe and fittings
- Company vehicles
- Governors

We would look to extend this scope towards the end of GD2/start of GD3 to include PPE workwear, batteries and other key areas we identify.

Low, medium and high ambition overview targets may look like those shown in **Figure 6**.

Figure 6: Potential overview targets for the end of GD2



As part of the forecast requirements in BPDT 5.16-Environment Action Plan we have considered how breakdown and volumes of waste may change over GD2. An overview of this information is shown **Table 4** below.

Table 4: Waste disposal by type GD2 Forecast (Extract from BPDT 5.16)

	Lower bound - Measure under BAU 2025/6 (without RIIO-2 initiatives)	Upper bound - Measure under BAU 2025/6 (without RIIO-2 initiatives)	Lower bound - 2025/6 (with RIIO-2 initiatives)	Upper bound - Measure 2025/6 (with RIIO-2 initiatives)
Southern				
% reuse/reduce	1.5%	2.5%	3.5%	6.5%
% recycling	97%	96.48%	90%	93%
% to landfill	0.06%	0.02%	0%	0%
% incineration	1.4%	1%	1%	0.5%
TOTAL (tonnes)	240,358,158	217,466,905	231,318,317	209,288,001
Scotland				
% reuse/reduce	0%	0.5%	3.5%	6.5%
% recycling	94%	97%	95%	93%
% to landfill	5%	2%	0%	0%
% incineration	1%	0.5%	1%	0.5%
TOTAL (tonnes)	88,221,273	79,819,247	72,420,508	65,523,316

In GD2 we propose to set the following targets:

- Zero waste to landfill across office, depots, Reinstatement, Major projects and SGN Holder demolition for non-hazardous waste by 2026.
- We will recycle 93% of total materials by 2026
- We will reuse 6.5% of total materials by 2026

Waste to landfill, recycled and reused material as percentage of total to be measured and reported on annually.

Beyond GD2

Beyond GD2 we will look to extend our circular economy processes to all major waste streams and work with suppliers to meet our requirements, particularly local companies who may be new to circular economy. We will also work closely with procurement to ensure new contracts and overall supply chain embeds circular economy and life cycle perspective. We will set targets over these areas that align to our Sustainable Development Goal led strategy.

7.2 First Option Summary (*Business as Usual*)

Continue to focus our zero waste to landfill target on the limited scope of office and depot waste.

The technical detail of the option i.e. capacity, system rating, availability etc.

As this is business-as-usual, the technology and reporting are already embedded into normal activities.

The basis for the cost estimate/unit cost: There is no additional cost for this measure as there is no additional scope from normal activities.

The perceived benefits of the option: There is little additional benefit from this option and is not challenging us to meet circular economy goals or external verification such as Carbon Trust waste standard.

Delivery timescales N/A

Key assumptions made: There will be no additional cost for business as usual irrespective of a change in main waste contractor.

7.3 Second Option Summary (*Increased Scope*)

The technical detail of the option i.e. capacity, system rating, availability etc.

The availability of data for major projects and holder demolition will be a new requirement in some areas and will need to be incorporated from project planning stages and throughout the project life cycle.

The basis for the cost estimate/unit cost

After initial investigation it is believed waste to landfill volumes are very low from holder demolition and major projects, with high recycling rates. This data has not been captured centrally within SGN before but is usually held by the contractor or project team so it is believed there will be no additional costs for this increased reporting scope.

The perceived benefits of the option

There will be benefits in increased awareness of our total waste to landfill and where improvements can be made with no/little additional cost.

Delivery timescales: Could be quick roll out within a couple of months after communicating to contractors, suppliers, internal departments and Procurement of the increased scope reporting requirement.

Key assumptions made: There will be no additional cost for the increased scope as recycling rates are already high. We will continue to work with Reinstatement contractors to reduce spoil to landfill where possible. Relevant departments will take ownership of their contractor's waste management including site waste management plans for major projects including holder demolition.

7.4 Preferred (Third) Option Summary (*Circular Economy*)

Increased scope as option 2 above and tighter target aiming for zero waste to landfill across all departments with the addition of circular economy across our main waste streams.

The technical detail of the option i.e. capacity, system rating, availability etc.

Technical details of circular economy will be highlighted as part of life cycle assessments for the key waste streams. This will include information on how the products can be reused and reformed. The availability of circular businesses, suppliers and products is expected to increase as demand grows and this will give us more available options to source and reuse our waste/products.

The basis for the cost estimate/unit cost: Additional costs will be largely incorporated within the supplier’s business. Any additional costs to SGN’s contracts have not been identified at this stage but will be investigated when discussions with the suppliers have progressed.

The perceived benefits of the option: There is little additional benefit from this option and is not challenging us to meet a circular economy.

Delivery timescales Over the course of GD2 we plan to continue to reduce our waste to reach zero to landfill. We will also increase circular economy on the 5 key waste streams listed earlier in Section 7 (High ambition). If we achieve these 5 waste streams, we will look to expand this to other waste streams.

Key assumptions made: Hazardous/special waste streams may have no other disposable options other than a hazardous waste landfill disposal site, so these will be excluded from the scope.

7.5 Options Technical Summary Table

No costs or CBAs have been completed for resource use and waste as the costs are not yet understood. Many departments already have high recycling rates, so the recommended change mainly involves an increased reporting scope. For the high ambition circular economy scenario, the improvements will come by partnering with suppliers to complete Life cycle assessments for key waste streams and products. Where life cycle assessments are required the cost for this often sits with the product supplier, e.g. PE pipe so there will be no cost to SGN for the initial assessment.

Table 5: Options Technical Summary

Option	First Year of Spend	Final Year of Spend	Volume of Interventions	Equipment / Investment Design Life	Total Cost
Low (Business as Usual)	N/A	N/A	Low	N/A	N/A
Medium (Increased Scope)	N/A	N/A	Low	N/A	N/A
High (Circular Economy)	TBC	TBC	Medium	N/A	TBC

7.6 Options Cost Summary Table

No cost details have currently been developed as they are believed to be minimal or indeed lead to reductions in spend. The focus for the wider resource use strategy is on improvement of efficiency and collaboration with closed loop organisations with minimal investment required at this stage.

8 Business Case Outline and Discussion

8.1 Key Business Case Drivers Description

The key business driver for the low, medium and high ambitions is environmental, to differing extents in the areas below:

- Reduced requirement for virgin resources and increased use of recycled products
- Reduction in waste to landfill and incineration across the business
- Reduced risk of resource scarcity and difficulties sourcing key products

These areas will have associated social and reputational benefits along with some small financial bonuses. During the external stakeholder round tables circular economy and supply chain was an issue that was raised several times, so it is important we make progress on this and communicate our progress to our stakeholders.

Table 6: Summary of Key Value Drivers

Option No.	Desc. of Option	Key Value Driver
1	Business as Usual	Continued performance in waste to landfill reduction from office/depot
2	Increased Scope	Reduction in waste to landfill and incineration across the business
3	Circular Economy	Reduced risk of resource scarcity and difficulties sourcing key products. Reduced requirement for virgin resources. Improved reputation

As we move towards a circular economy we will reduce our reliance on landfill and new products. This will help us reduce our environmental impacts associated with waste production. An extract of the relevant environmental aspects and impacts register is shown in **Table 7** below.

Table 7: Environmental aspects and impacts likely to reduce over GD2

Environmental Aspect	Source	Significance score	Weighted significance score	Impact
Unsustainable Use of Natural Resources	Use of quarried materials	4.8	8	Depletion of natural resources
	Use of paper	0.4		
	Use of PE pipe	1.2		
	Procurement	1.6		Depletion of natural resources, climate change
Production of Solid and Liquid Hazardous Waste	Hazardous waste from operations	4.8	6	Depletion of landfill capacity, climate change, human health, changes in biodiversity, land/air/water contamination
	Hazardous waste from offices and depots	1.2		
	Production of inert waste	1.2	6	Depletion of landfill capacity

Production of Solid and Liquid Waste	Production of non-hazardous waste	4.8		Depletion of landfill capacity, climate change, human health, changes in biodiversity, land/air/water contamination
Pollution - Dust, Odour and Noise	Operational sites	0.6	4	Human health, changes in biodiversity, land/air/water contamination
	Construction sites	0.8		Human health, changes in biodiversity, land/air/water contamination
	Depots and offices	0.4		
	Street works	2		

8.2 Business Case Summary

This project is driven by the increase in resource scarcity and need to drive down our remaining waste streams in order to meet zero waste to landfill and increase the number of our processes which follow a circular economy approach. The cost associated with this has been deemed minimal at this stage but will be reviewed again during supplier engagement.

Table 8: Business Case Overview

Ambition	Overview	Approx. No. of sites	Approx. Cost
Low	Zero office and depot waste to landfill	44	None
Medium	Zero waste to landfill including offices, depots, reinstatement and major projects. Promotion of reuse and recycling over incineration.	44 + Operational sites and projects/ jobs	None
High	As above but circular economy and closed loop processes are embedded	Various	TBC

9 Preferred Option Scope and Project Plan

9.1 Preferred option

The preferred option is High ambition scenario to achieve zero waste to landfill across office, depots, reinstatement, major projects and SGN holder demolition for non-hazardous waste. This will also include a promotion of reuse and recycling over energy from waste. We will look to embed circular economy across selected key waste streams by working with suppliers. We will also consider external verification such as the Carbon Trust standard for Waste.

For hazardous waste there are limited disposal routes and it is unlikely it can be reused, recycled or incinerated. Asset Health Spend Profile

No costs have currently been identified at this stage, but a more thorough review will be conducted when we begin supplier engagement and review of any existing life cycle assessments for products such as PE Pipe.

9.2 Investment Risk Discussion

No funding requests have been included in this paper as they are currently unknown. In the transition to GD1 we will focus on better understanding the costs involved in increasing our circular economy elements and better incorporating the life cycle perspective. As some of the costs may fall onto suppliers, we will need to make sure we work closely with Procurement and with the suppliers to embed this. Carrying out more detailed reviews and discussions will allow us to highlight where further improvements could be made and what, if any, costs are associated.

Commercial Confidentiality

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