10 Hydrology and Flood Risk

10.1 Introduction

10.1.1 This chapter summarises the assessment of hydrology and flood risk associated with the proposed Resource Recovery and Renewable Energy (3Rs) Facility at Langhurstwood Road, Horsham, West Sussex.

10.1.2 This chapter describes the policy context, input data and methods used to assess the proposed facility. It reviews the baseline hydrology, flood risk and water quality at the site and assesses the likely effects of the facility taking into account the measures which have been adopted to prevent, reduce, mitigate or offset the identified effects.

Scope of Study

10.1.3 The overall aim of this assessment is to determine whether the proposed facility may affect the hydrology, surface water drainage, flooding or water quality of the site and surrounds, or whether these factors may affect the facility and surrounds.

Study Area

10.1.4 The site is located within the former Wealdon Brickworks Site, Langhurstwood Road, West Sussex, occupying a relatively flat lying parcel of land approximately 3.8 hectares in area.

10.1.5 A 500 metre search radius for data collection was selected primarily to identify any existing assets or infrastructure that might affect or be affected by the proposed facility (see Figure 10.1 Study Area). A 500 metre radius is considered appropriate for data collection taking into account the nature of the development and likely zone of influence on hydrological receptors. Given the landscape surrounding the development, other ongoing anthropogenic activities are likely to have a greater effect than the proposed facility at a distance beyond 500 metres.

10.2 Legislation and Policy Context

Introduction

10.2.1 This section summarises legislation and policies that are directly relevant to hydrology and flood risk.

Legislation

The European Water Framework Directive 2000

10.2.2 The European Water Framework Directive (WFD) came into force in December 2000 and became part of UK law in December 2003. It aims to protect and enhance the quality of surface water, groundwater, groundwater dependent ecosystems, estuaries and coastal waters. Member States must aim to reach good chemical and ecological status for inland and coastal waters subject to certain limited exceptions. The WFD establishes a strategic framework for managing the water environment and requires a management plan for each river basin to be developed every six years.

Flood Directive 2007

10.2.3 The European Floods Directive came into force in 2007 and aims to engage statutory bodies to draw up flood risk assessments and prepare flood maps and management plans.

Drinking Water Directive (2015)

10.2.4 The Drinking Water Directive concerns the quality of water intended for human consumption. Its objective is to protect human health from adverse effects of any contamination of water intended for human consumption by ensuring that it is wholesome and clean.

Environmental Protection Act 1990

10.2.5 The Environmental Protection Act is an Act of the Parliament of the United Kingdom that as of 2008 defines, within England and Wales and Scotland, the fundamental structure and authority for waste management and control of emissions into the environment.

The Environment Act 1995

10.2.6 The Environment Act 1995 (Section 57) amends the Environmental Protection Act 1990 and makes provisions for a risk based framework for the identification, assessment and management of contaminated land within the UK. It includes measures for protection of the environment, including powers to prevent water pollution.

Water Resources Act 1991

10.2.7 The Water Resources Act (1991), as amended in 2009, principally relates to the protection of controlled water (i.e. rivers, lakes, canals and groundwater) from pollution. It sets out the responsibilities of the Environment Agency in relation to water pollution, resource management, flood defence, fisheries, and in some areas, navigation.

10.2.8 The Water Resources Act regulates discharges to controlled water and groundwater and provides legislation on the definition of controlled waters. The Act enforces the offences of polluting controlled water and places the financial costs of the results of a water pollution incident on the polluter.

Land Drainage Act 1991

10.2.9 The Land Drainage Act 1991 (as amended in 1994) sets out the responsibilities of the Environment Agency, Internal Drainage Boards, local authorities, navigation authorities and riparian owners in the mitigation of flooding.

Water Act 2003

10.2.10 The Water Act 2003 amends the Water Resources Act 1991 to improve the management of long term water resources, primarily through significant changes to the way in which abstraction and impoundment of water is regulated. The Water Act aims for the sustainable use of water resources; strengthening the voice of consumers; a measured increase in competition; and the promotion of water conservation.

Groundwater Regulations (2009)

10.2.11 The Groundwater (England and Wales) Regulations 2009 supplement existing regulations to protect groundwater in England and Wales. These regulations control groundwater pollution from contaminated land. The regulations provide a more flexible, risk-based approach than previous legislation and cover a wider range of substances.

Flood Risk Regulations 2009

10.2.12 These regulations transpose Directive 2007/60/EC on the assessment and management of flood risks for England and Wales. The regulations impose duties on the Environment Agency and local authorities to

prepare preliminary assessment reports about past floods in each river basin district, and the possible harmful consequences of future floods. The Environment Agency is also under a duty to prepare a preliminary assessment map of each river basin district. Following these assessments, the authorities must identify areas which are at significant risk of flooding.

Flood and Water Management Act 2010

10.2.13 The Flood and Water Management Act (2010) implements the recommendations from Sir Michael Pitt's review of the floods in 2007 and aims to improve flood risk management. It designates Lead Local Flood Authorities, whose responsibilities include reviewing all proposed sustainable drainage systems for new planning applications.

Water Act 2014

10.2.14 The Water Act 2014 amends the Water Industry Act 1991 and improves regulation of the water industry through licensing, as well as increasing competition within the water and sewerage industries for the benefit of customers. It also details that the long term resilience of water supply and sewerage systems should be secured. In place of the existing multiple permitting/consent schemes, a single environmental permitting regime for the regulation of the water environment is set out, in addition to the mechanisms through which households can obtain flood insurance.

Environmental Permitting (England and Wales) 2016

10.2.15 The Environmental Permitting (England and Wales) Regulations 2016 regulate discharges to controlled waters.

Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

10.2.16 These regulations implement the Water Framework Directive and set out details of the river basin districts, protected areas and environmental objectives for water bodies (including groundwater).

National Planning Policy

National Policy Statement for Energy (NPS) EN-1, EN-3 and EN-5 (2011)

10.2.17 Whilst the National Policy Statements (NPSs) are at the heart of the planning regime for Nationally Significant Infrastructure Projects, they are also recognised as a material consideration in decisions on planning applications. Therefore, where relevant, the policy set out within the Overarching National Policy Statement (NPS) for Energy (EN-1) (Department of Energy and Climate Change (DECC), 2011a), the NPS for Renewable Energy Infrastructure EN-3 (DECC, 2011b) and the NPS for Electricity Networks Infrastructure EN-5 (DECC, 2011c) in relation to hydrology and flood risk has been considered.

10.2.18 Paragraph 4.8.6 (NPS EN-1) specifically identifies that applicants should have regard to climate change and should assess the resilience of their project to climate change. Paragraph 2.4.1 of NPS EN-5 specifically identifies the potential issues applicants should consider in terms of resilience to climate change.

National Planning Policy Framework (2012)

10.2.19 The National Planning Policy Framework (NPPF) published on 27 March 2012 sets out the Government's planning policies in England and how these are expected to be applied (DCLG, 2012).

10.2.20 Paragraphs 99 to 108 of the NPPF outline the development requirements in terms of flood risk, water quality and resources and the impact of climate change. The accompanying online Planning Practice Guidance: ID7 provides additional guidance in the implementation of the NPPF in relation to development in flood risk areas.

Planning Practice Guidance– Flood Risk and Coastal Change

10.2.21 Section ID7 Flood Risk and Coastal Change of the Planning Practice Guidance (DCLG, 2014a) provides guidance to ensure the effective implementation of the NPPF for development in areas at risk of flooding.

10.2.22 PPG ID7 states that a site-specific Flood Risk Assessment (FRA) is required for all proposals for new development in Flood Zones 2 and 3 and for any proposal of 1 hectare or greater in Flood Zone 1. An FRA should consider vulnerability to flooding from other sources as well as from river and sea flooding, and also the potential for any increased risk of flooding elsewhere resulting from a development.

10.2.23 The purpose of an FRA is to provide sufficient information to demonstrate that future users of the development would remain safe throughout its lifetime, that the development would not increase flood risk elsewhere and, where practicable, that the development would reduce flood risk overall.

National Planning Policy for Waste (2014)

10.2.24 The Waste Management Plan for England (DCLG, 2014b) sets out the Government's ambition to work towards a more sustainable and efficient approach to resource use and management. The specific responsibilities put onto planning authorities relevant to hydrology, flood risk and the environment are presented below:

- Ensure that the need for waste management facilities is considered alongside other spatial planning concerns, recognising the positive contribution that waste management can bring to the development of sustainable communities; and
- Give priority to the re-use of previously-developed land, sites identified for employment uses, and redundant agricultural and forestry buildings and their curtilages.

10.2.25 Waste planning authorities should assess the suitability of sites and/or areas for new or enhanced waste management facilities against each of the following criteria:

- The extent to which the site or area will support the other policies set out in the document;
- Physical and environmental constraints on development, including existing and proposed neighbouring land uses, and having regard to the appropriate level of detail needed to prepare the Local Plan; and
- The cumulative impact of existing and proposed waste disposal facilities on the well-being of the local community, including any significant adverse impacts on environmental quality, social cohesion and inclusion or economic potential.

10.2.26 The suitability of locations subject to flooding, with consequent issues relating to the management of potential risk posed to water quality from waste contamination, will also need particular care.

West Sussex Waste Local Plan (2014)

10.2.27 The West Sussex Waste Local Plan (West Sussex County Council and South Downs National Park Authority, 2014) provides the basis for making consistent land-use planning decisions about planning applications for water management facilities.

10.2.28 The specific policies relevant to hydrology and flood risk are presented below.

Policy W16: Air, Soil and Water

10.2.29 Proposals for waste development will be permitted provided that:

- There are no unacceptable impacts on the intrinsic quality of, and where appropriate the quantity of, air, soil, and water resources (including ground, surface, transitional and coastal waters);
- There are no unacceptable impacts on the management and protection of such resources, including any adverse impacts on air quality management areas and source protection zones;
- The quality of rivers and other watercourses is protected and, where possible, enhanced (including within built-up areas); and

- They are not located in areas subject to land instability, unless problems can be satisfactorily resolved.

Policy W17: Flooding

10.2.30 Proposals for waste development will be permitted provided that:

- Mitigation measures are provided to an appropriate standard so that there would not be an increased risk of flooding on the site or elsewhere;
- They are compatible with Shoreline Management Plans and / or Catchment Flood Management Plans and the integrity of functional floodplains is maintained;
- Appropriate measures are used to manage surface water run-off including, where appropriate, the use of sustainable drainage systems (SuDS); and
- They would not have an unacceptable impact on the integrity of sea, tidal, or fluvial flood defences, or impede access for future maintenance and improvements of such defences.

10.2.31 Proposals for waste development in 'areas at risk of flooding' will not be permitted unless they pass the sequential test and, where applicable, the exception test set out in national policy.

Horsham District Planning Framework (HDPF) (2015)

10.2.32 The HDPF (Horsham District Council, 2015) is the overarching planning document for Horsham district outside the South Downs National Park, and replaces the core strategy and general development control policy documents, which were adopted in 2007.

10.2.33 The specific policies relevant to hydrology and flood risk are presented below.

Strategic Policy 35: Climate Change

10.2.34 Development will be supported where it makes a clear contribution to mitigating and adapting to the impacts of climate change and to meeting the district's carbon reduction targets as set out in the Council's Acting Together on Climate Change Strategy, 2009.

10.2.35 Development must be designed so that it can adapt to the impacts of climate change, reducing vulnerability, particularly in terms of flood risk, water supply and changes to the district's landscape.

Strategic Policy 38: Flooding

10.2.36 Development proposals will follow a sequential approach to flood risk management, giving priority to development sites with the lowest risk of flooding and making required development safe without increasing flood risk elsewhere.

10.2.37 The development must comply with the tests and recommendations set out in the Horsham District Strategic Flood Risk Assessment (SFRA).

10.2.38 Where there is the potential to increase flood risk, proposals must incorporate the use of SuDS where technically feasible, or incorporate water management measures which reduce the risk of flooding and ensure flood risk is not increased elsewhere.

West Sussex County Council Local Flood Risk Management Strategy (2013 – 2018)

10.2.39 The strategy (West Sussex County Council, 2014) sets out how West Sussex County Council as a Lead Local Flood Authority will work alongside other risk management authorities to deliver improvements. It represents a positive step forward for West Sussex County Council, enabling the County Council to prioritise and invest money in flood risk for local benefit.

10.2.40 The report has been prepared so West Sussex County Council meets its duties to manage local flood risk and deliver the requirements of the Flood Risk Regulations (2009). West Sussex County Council is defined as a Lead Local Flood Authority (LLFA) under the regulations. The strategy and supporting annexes represent the first stage of the Preliminary Flood Risk Assessment (PFRA) requirements of the regulations.

Horsham District Strategic Flood Risk Assessment (April 2010)

10.2.41 Policy and legislation requires Local Planning Authorities to undertake SFRAs, which are to be used as the evidence base for planning decisions and to supply a key component of the Sustainability Assessment process that should be used in the review of Local Development Documents or in their production.

10.3 Assessment Methodology

10.3.1 The assessment methodology is based on guidance provided within the Institute of Environmental Management and Assessment (IEMA) Guidelines for Environmental Impact Assessment (2004), the Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 10 (Highways Agency *et al*., 2009) and DMRB Volume 11, Section 2, Part 5 (Highways Agency *et al.,* 2008). Although developed for linear schemes, the DMRB sets out a structured framework for assessment that can logically be applied to other types of development.

10.3.2 The assessment of likely effects on water resources has taken account of the impacts from the proposed facility on the prevailing hydrological, surface water drainage, flooding and water quality environments.

Assessment Criteria and Assignment of Significance

10.3.3 The assessment considers the likely effects on environmental receptors and the pathways by which the receptors may be affected. The following terms have the following meanings in this section:

- Source: potential contaminant sources, ground/channel disturbance;
- Pathway: the mechanism by which the source may affect a receptor; and
- Receptor: identified features that may be affected, based on the sensitivity of the site.

10.3.4 The assessment includes consideration of the probability of harm occurring, taking into account potential sources of contamination and receptors that may be affected by such contamination.

10.3.5 The significance of the likely effects has been determined by consideration of the sensitivity of the key hydrology and flood risk receptors that may be affected and the magnitude of the predicted impact.

Determining the Sensitivity of the Receptor

10.3.6 The sensitivity or value of a hydrological receptor or attribute is largely determined by its quality, rarity and scale.

10.3.7 The determination of value or sensitivity takes into account the scale at which the attribute is important. This can be defined as being at a local level (site), district level (within Horsham District), County level (West Sussex), regional level (South East of England), national level (United Kingdom) or international level (Europe).

10.3.8 The definitions set out in Table 10.1 below have been followed in the consideration of sensitivity for this project. This table takes into account guidance provided in Table 2.1 A4.3 of the Design Manual for Roads and Bridges (DMRB) (Highways Agency *et al.,* 2009).

Table 10.1: Definitions of Sensitivity or Value

Sensitivity	Definition
Very High	Receptor is high value or critical importance to local, regional or national economy. Receptor is highly vulnerable to impacts that may arise from the project and recoverability is long term or not possible. Surface water: Water Framework Directive (WFD) Current Overall Status of High. Flood risk: Flood plain or defence protecting more than one hundred residential properties from flooding.
High	Receptor is of moderate value with reasonable contribution to local, regional or national economy. Receptor is generally vulnerable to impacts that may arise from the project and recoverability is slow and/or costly. Surface water: WFD Current Overall Status of Good. Flood risk: Flood plain or defence protecting between one and one hundred residential properties or industrial premises from flooding.
Medium	Receptor is of minor value with small levels of contribution to local, regional or national economy. Receptor is somewhat vulnerable to impacts that may arise from the project and has moderate to high levels of recoverability. Surface water: WFD Current Overall Status of Moderate. Flood risk: Flood plain with limited constraints and a low probability of flooding of residential and industrial properties.
Low	Receptor is of low value with little contribution to local, regional or national economy. Receptor is not generally vulnerable to impacts that may arise from the project and/or has high recoverability. Surface water: WFD Current Overall Status of Poor. Flood risk: Flood plain with limited constraints and a low probability of flooding of residential and industrial properties.
Negligible	Receptor is of negligible value with no contribution to local, regional or national economy. Receptor is not vulnerable to impacts that may arise from the project and/or has high recoverability. Surface water: WFD Current Overall Status of Bad. Flood risk: Area outside flood plain or flood plain with very low probability of flooding industrial properties.

Magnitude of Impacts

10.3.9 The magnitude of any predicted impact is dependent on its size, duration, timing (e.g. seasonality) and frequency (permanent, seasonal etc.). A qualitative appraisal of the likely magnitude of the predicted impact is provided within this assessment, taking into account the measures proposed to be adopted as part of the development to control such impacts. The magnitude of the predicted impact has been described using the criteria outlined in Table 10.2. This table takes into account guidance provided in Table 2.1, A4.4 of DMRB (Highways Agency *et al*., 2009).

Table 10.2: Definitions of Magnitude

Magnitude	Definition
High	Total loss of ability to carry on activities. Impact is of extended temporal or physical extent and of long term duration (i.e., approximately 50 years duration) (Adverse).
	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial).
Medium	Loss or alteration to significant portions of key components of current activity. Impact is of moderate temporal or physical extent and of medium term duration (i.e., less than 20 years) (Adverse).
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).
Low	Minor shift away from baseline, leading to a reduction in level of activity that may be undertaken. Impact is of limited temporal or physical extent and of short term duration (i.e., less than 2 years) (Adverse).
	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).
Negligible	Very slight change from baseline condition. Physical extent of impact is negligible and of short term duration (i.e., less than 2 years) (Adverse).
	Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).
No change	No change from baseline conditions.

Significance of Effects

10.3.10 The significance of predicted effects has been determined using publicly available environmental data to take into account the sensitivity of the receptor and the magnitude of each impact. Table 10.3 below has been used to inform the evaluation of the significance of effects. The table is based on guidance provided within the DMRB (Highways Agency *et al.,* 2008).

Table 10.3: Matrix for Determining Significance of Effect

Sensitivity	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	None	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	None	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	None	Negligible or Minor	Minor	Moderate	Moderate or Major
High	None	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very high	None	Minor	Moderate or Major	Major or Substantial	Substantial

10.3.11 The effect of relevant aspects of the project on hydrology and flood risk has been described and evaluated against the following criteria, defined as:

- Substantial: Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process with regard to planning consent. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer the most damaging impact and loss of resource integrity;
- Major: These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process;

- Moderate: These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision making if they lead to an increase in the overall adverse effect on a particular resource or receptor;
- Minor: These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project; and
- Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

10.3.12 For the purposes of this assessment any effect that is moderate, major or substantial is considered to be significant in terms of the EIA Regulations.

Relevant Guidance

10.3.13 The assessment methodology has been informed by guidance contained within the following documents:

- NPPF Chapter 10: Meeting the challenge of climate change, flooding and coastal change (DCLG, 2012);
- Planning Practice Guidance ID 7: Flood Risk and Coastal Change (DCLG, 2014a);
- Non-statutory technical standards for sustainable drainage systems, March 2015 (Defra, 2015);
- Non-Statutory Technical Standards for Sustainable Drainage: Practice Guidance (Local Authority SuDS Officer Organisation, 2016);
- CIRIA 753 The SUDS Manual (CIRIA, 2015a);
- CIRIA 741 (CIRIA, 2015b) Environmental Good Practice on Site;
- CIRIA 532 (2001) Control of Water Pollution from Construction Sites;
- Surface Water Environmental Quality Standards (EQS), UK Drinking Water Standards; and
- Environment Agency Pollution Prevention Guidelines (see below).

Non-statutory Technical Standards for Sustainable Drainage Systems (Defra, 2015)

10.3.14 This document sets out non-statutory technical standards for sustainable drainage systems. They should be used in conjunction with the NPSs, NPPF and Pollution Prevention Guidelines.

The SUDS Manual (CIRIA 2015a)

10.3.15 The guidance covers the planning, design, construction and maintenance of SuDS to assist with their effective implementation within both new and existing developments. The guidance looks at how to maximise amenity and biodiversity benefits, and deliver the key objectives of managing flood risk and water quality.

10.3.16 The guidance is a compendium of good practice, based on existing guidance and research in the UK and internationally and the practical experience of the authors, the project steering group and industry.

CIRIA Environmental Good Practice on Site (CIRIA, 2015b) and CIRIA Control of Water Pollution from Construction Sites (CIRIA, 2001)

10.3.17 These documents provide useful best practice information on hydrology and water quality. Furthermore, C502 provides guidance on how to avoid causing environmental damage during construction.

Pollution Prevention Guidelines

10.3.18 Produced by the Environment Agency, PPGs have been withdrawn from use as guidance, but still provide a useful framework upon which good environmental practice philosophies can be produced. Each PPG addresses a specific industrial sector or activity. Those of relevance to this assessment are listed below:

- PPG1 - General guide to the prevention of water pollution (Environment Agency, 2001a);
- PPG2 - Above ground oil storage tanks (Environment Agency, 2011a);
- PPG3 – Use and Design of Oil Separators in Surface Water Drainage Systems (Environment Agency, 2006);
- PPG5 - Works in, near or liable to affect watercourses (Environment Agency, 2007a);
- PPG6 - Working at construction and demolition sites (Environment Agency, 2010);
- PPG7 - Pollution prevention guidelines refuelling facilities (Environment Agency, 2011b);
- PPG8 - Storage and disposal of used oils (Environment Agency, 2004);
- PPG13 - High pressure water and steam cleaners (Environment Agency, 2007b);
- PPG18 - Control of spillages and firefighting run-off (Environment Agency, 2000);
- PPG21 - Pollution incident response planning (Environment Agency, 2009a);
- PPG22 – Dealing with Spills (Environment Agency, 2011c);
- PPG26 - Storage and handling of drums and intermediate bulk containers (Environment Agency, 2011d); and
- PPG27 – Installation, decommissioning and removal of underground storage tanks (Environment Agency, 2011e).

Consultation

10.3.19 In carrying out the hydrology and flood risk assessment consultation has included:

- A formal request for a Scoping Opinion;
- Informal scoping including:
  - Consultation with the Environment Agency;
  - Consultation with Horsham District Council; and
  - Consultation with West Sussex County Council.

10.3.20 The issues raised during consultation with appropriate authorities which are relevant to hydrology and flood risk are summarised in Table 10.4.

10.3.21 A full copy of the formal Scoping Opinion is provided in Appendix 4.2.

Table 10.4: Consultation Responses Relevant to Hydrology and Flood Risk

Date/Source	Consultee and Issues Raised	How/ Where Addressed
October 2015/Formal Scoping Opinion	*West Sussex County Council:* ▪ The approach to hydrology and flood risk set out in the Scoping Report is considered acceptable and appropriate. ▪ The Lead Local Flood Authority and Environment Agency should be consulted to define the information required in the ES, and confirm any design requirements.	EA Scoping Response received December 2015. Salient points for hydrology and flood risk detailed in table.
October 2015/Formal Scoping Opinion	*West Sussex County Council:* ▪ Measures to protect ground and surface water should be set out, whilst taking into account the impact this may have on drainage and flood risk. ▪ The Flood Risk Assessment should feed into this chapter, and drainage should be based on sustainable principles (SuDs).	A development specific FRA (Appendix 10.2) has been undertaken. The FRA takes into account any potential alterations in existing site run-off characteristics. A proposed drainage strategy will take account of the alteration in surface low permeability covering and look to mimic the pre-development run-off rates, in line with the NPPF and SuDS Manual.
October 2015/Formal Scoping Opinion	*West Sussex County Council:* ▪ The proposal should be discussed with the Environment Agency at the earliest stage so that their requirements can be defined, and the implications this may have for the site layout and design taken into account. ▪ The Environmental Permitting requirements in relation to the water environment should be identified to feed in to the final site layout.	EA Scoping Response received December 2015 and summarised below.
December 2015/ Formal Scoping Opinion	*Environment Agency* ▪ We have reviewed the EIA Scoping Report and agree with the issues scoped in. ▪ Your development may require an Environmental Permit for certain activities. The Environmental Permitting Regulations (England and Wales) 2010, cover water discharge activities, groundwater activities, radioactive substances, waste, mining waste and installations.	An Environmental Permit application is to be progressed for the development.
January 2017/Consultee comments	*Environment Agency* *Drainage Strategy* ▪ We recommend that the drainage proposals are clarified before the application is determined. Detailed comments provided on drainage strategy.	Associated reports have been updated, taking into account comments provided, and presented in Appendix 10.2: Flood Risk Assessment and Appendix 10.4: Drainage Strategy.
June 2017/ Consultee comments	*West Sussex County Council* *Flood Risk* ▪ The site is located within Flood Zone 1 as defined on The Environment Agency mapping. ▪ The proposals are for Recycling, Recovery and Renewable Energy Facility and Ancillary Infrastructure. The post development classification is compatible to flood zone 1. ▪ WSCC is not aware of any historic flooding and/or drainage problems at the site.	Associated reports have been updated, taking into account comments provided, and presented in Appendix 10.2: Flood Risk Assessment and Appendix 10.4: Drainage Strategy.

Date/Source	Consultee and Issues Raised	How/ Where Addressed
	▪ The LPA is not aware of any historic flooding and/or drainage problems at the site. ▪ A review of all sources of flooding concludes that there are some areas of the site with a low to medium risk of surface water flooding, however given the historic and post development use this is considered to be an overall low risk. Surface Water ▪ An updated drainage strategy (Revision P03) has been supplied – detailed comments provided. Foul Water ▪ All outstanding concerns in relation to the proposed foul drainage strategy have been addressed.	

10.4 Limitations of the Assessment

10.4.1 The assessment is primarily based on publicly available data obtained from the Environment Agency, local authorities and commercial data supply companies, as well as additional information supplied from stakeholders during the scoping and consultation stages.

10.4.2 The limitations of this chapter and how they were overcome are presented below:

10.4.3 No site / watercourse specific WFD assessment was available. This was overcome by reviewing and assessing the upstream and downstream WFD information obtained for the EA (http://environment.data.gov.uk/catchment-planning/). This provides the most up to date WFD Current Overall Status classifications for the Environment Agency designated main water courses within 1 km search radius of the proposed development.

10.4.4 Overall a moderate to high level of certainty has been applied to the study. Where available catchment data regarding water quality / WFD classification, a detailed site survey and engineering site has been used to inform the assessment. The information accessible in order to complete the assessment is considered sufficient to establish the baseline. Therefore, there are no data limitation that would affect the conclusions of this assessment.

10.5 Baseline Conditions

10.5.1 Baseline data have been collated to inform the assessment of the likely significant effects for the proposed development. Current site conditions were ascertained through a desk based assessment utilising publicly available data, including OS mapping, aerial photography and utility plans, described below. This provided an insight into surface water features and the existing land use within the immediate area.

10.5.2 Baseline conditions at the site have been established through a review of:

- Environment Agency flood maps;
- British Geological Survey, Geology of Britain Online Viewer;
- Horsham District Council (2007) Horsham District Strategic Flood Risk Assessment;
- Horsham District Council (2010) Horsham District Strategic Flood Risk Assessment;

- SLR Environmental Ltd (undated) Wealden Brickworks Environmental Statement Technical Chapter (Reference Water Environment 11); and
- SLR Environmental Ltd (2013) Flood Risk Assessment (Reference: 416.01258.00002).

10.5.3 The proposed development site lies within the district of Horsham. The majority of the district is characterised by a rural agricultural land with small settlements and villages.

10.5.4 The site is currently brownfield, containing the former brickwork development. The site surface is a mixture of low permeability concrete surfacing and permeable grassed areas.

Topography

10.5.5 The site falls from approximately 51.30 metres above ordnance datum (AOD) within the north east corner to 47.50 metres AOD within the south west corner of the site.

Hydrological Environment

10.5.6 The site is situated within the Boldings Brook hydrological catchment, which is classified as a main river maintained by the Environment Agency. The brook feeds into the River Arun where the responsibility for these watercourses falls under the jurisdiction of West Sussex County Council (WSCC) acting as the Lead Local Flood Authority under the Water and Flood Management Act 2010 and Land Drainage Act 1991.

10.5.7 The Arun and Western Streams Catchment Flood Management Plan (CFMP) (Environment Agency, 2009b) indicates that the Environment Agency has a rolling programme of flood defence reviews with a policy to protect properties, acknowledging that there would still be a risk from more extreme events, driven by climate change as land use and management changes.

10.5.8 Further descriptions of the key hydrological and flood risk characteristics within the study area are presented below.

Flood Risk and Flood Defences

10.5.9 Potential sources of flooding for the proposed development have been assessed within the FRA (Appendix 10.2) and are summarised below.

Fluvial and Tidal Flooding

10.5.10 The Environment Agency food map for planning (accessed February 2018) indicates that the site is situated within Flood Zone 1 (FZ1) defined as land at low risk of flooding (land at risk of flooding from fluvial or tidal flood events with less than 0.1% (1:1,000 year) annual probability of occurrence).

10.5.11 The Horsham Council SFRA also indicates that the site is situated within FZ1.

Flood Defences

10.5.12 The Environment Agency flood map for planning indicates that no flood defences are present within the vicinity of the site.

Overland Flow Flooding

10.5.13 The site is situated within an area of relatively flat topography. The Environment Agency surface water flood map indicates that the majority of the site is at low risk of surface water flooding. Areas within the site are defined as being of low to high risk of surface water flooding, associated with localised areas of low lying land.

10.5.14 Due to the presence of significant drainage systems within the site and the relatively flat lying land, it has been assessed that the risk of overland flooding is low.

Flooding from Rising / High Groundwater

10.5.15 British Geological Survey (BGS) online mapping indicates that the site is directly underlain by Weald Clay Formation – Mudstone (Dark grey thinly-bedded mudstones (shales) and mudstones with subordinate siltstones, fine- to medium-grained sandstones, including calcareous sandstone (e.g. Horsham Stone Member), shelly limestones (the so called "Paludina Limestones") and clay ironstones).

10.5.16 The bedrock is classified by the Environment Agency under the WFD as an unproductive stratum, defined as *"…rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow."*

10.5.17 Based on the information outlined above, the potential for groundwater flooding is considered to be low.

Flooding from Artificial Drainage Systems

10.5.18 A detailed drainage survey was commissioned and completed in April 2017. The survey indicates that existing surface run-off is directed into the underground system by a series of hardstanding gullies and roof rainwater pipes.

10.5.19 Site run-off is directed to the south west corner of the site and discharged into Boldings Brook via 'Culvert A', which passes beneath the rail embankment. There is no evidence of any flow control to limit discharge from site.

10.5.20 It is assumed that local sewer systems will have been designed to industry standards (e.g. Sewers for Adoption). However, the most common causes of flooding from sewers are inadequate flow capacity, blockages, pumping station failures, burst water mains, water inflow from rivers or the sea, tide locking, siltation, fats/greases, and sewer collapse. Should any of these events occur there is a risk of flooding by surcharge where the flood is in excess of the sewer capacity (usually 1 in 30 year event or greater).

10.5.21 The Horsham SFRA confirms that the majority of the sewers within the district are designed to accommodate a storm event with a 3.3% annual probability. The SFRA indicates that the site area has not been flooded due to drainage system failure.

10.5.22 Taking into account the above and the absence of any historical sewer flooding the overall risk of flooding via artificial drainage system to the site has been assessed to be low.

Flooding from Infrastructure Failure

10.5.23 Environment Agency data and the Horsham SFRA indicate that the site is not reliant on flood defence infrastructure.

10.5.24 The site has therefore been assessed as being at no risk of flooding due to infrastructure failure.

Historic Flood Events

10.5.25 The Horsham SFRA indicates that no historic flood events have occurred within the site area.

Current Flood Risk

10.5.26 The site has been assessed as being at low risk of flooding from all sources.

Surface Watercourses

10.5.27 Boldings Brook, an Environment Agency designated main river, flows in a southerly direction, located approximately 125 metres west of the site beyond the London to Horsham Railway Line. The Brook flows

into Warnham Mill pond (part of Warnham Mill nature reserve). Further downstream, the Brook discharges into the River Arun (an Environment Agency main river).

10.5.28 OS mapping and aerial photography indicate that there are a number of ponds and unnamed streams within close proximity to the site. The 2017 drainage survey indicates that the existing site discharges to Boldings Brook via a drainage network at an uncontrolled rate.

Surface Water Quality

10.5.29 The Environment Agency catchment data explorer (accessed February 2018) provides the most current Water Framework Directive (WFD) Overall Status classifications for a number of watercourses within the study area. Table 10.5 below lists the water body and associated WFD classification grade.

Table 10.5: WFD Water Quality Data

Waterbody Name	Current Overall Status (2016)	Objective Status (2027)
Boldings Brook	Poor	Good

10.5.30 In summary, the WFD records show that the watercourse within close proximity to the site has a WFD status of Poor, but the WFD requires all watercourses to aim for Good status. A full description of the WFD classification process and associated definitions is provided in Appendix 10.3.

Surface Water Abstraction

10.5.31 The Environment Agency 'what's in your backyard' database indicates that there is one active licenced surface water abstraction within the 500 metre study area (Table 10.6Table 10.6).

Table 10.6: Surface Water Abstractions within 500 m

Name of Holder	Licence Number	Grid Reference	Distance From Site (m)	Purpose	Permitted Annual Yield (m^3/year)
Wienerberger Limited	25/088 (SSD 10/41/428101)	TQ 173 342	39.0	General use / industrial	18,000 from surface water pond

Discharge Consents

10.5.32 The Environment Agency detailed public register indicates that there are three water discharges within 500 metres of the Site (Table 10.7).

Table 10.7: Water Discharges within 500 m

Name of Holder	Licence Number	Site Postcode	Distance From Site (m)	Purpose	Start Date
Redland Technology	SO/P03886/001	RH12 4QG	150	Undefined or Other	22/10/1991
Verve Investments Limited	SO/P00008/001	GRAYLANDS, HORSHAM	260	Undefined or Other	02/05/1985
Verve Investments Limited	SO/P01670/001	GRAYLANDS, HORSHAM	290	Construction of Buildings	28/07/1988

Pollution Incidents

10.5.33 The Environment Agency 'what's in your backyard' database indicates that there have been six pollution incidents and two industrial pollution incidents within a 500 m radius of the site summarised in Table 10.8 and Table 10.9 respectively.

Table 10.8: Pollution Incidents

Date	Incident number	Local Authority	Pollutant	Impact to Land	Impact to water
08/06/2001	8196	Horsham	Atmospheric Pollutants and Effects	No Impact	No Impact
16/06/2001	9708	Horsham	Atmospheric Pollutants and Effects	No Impact	No Impact
17/06/2001	9785	Horsham	Atmospheric Pollutants and Effects	No Impact	No Impact
18/06/2001	10016	Horsham	Atmospheric Pollutants and Effects	No Impact	No Impact

Table 10.9: Industrial Pollution Incidents

Name of Holder	Licence Number	Site Postcode	Distance From Site (m)	Process	Start Date
Biffa Waste Services Ltd	BV9896IY	RH14 4QD	320	Waste Processes / Landfilling	2005 - 2012
Waste Management Ltd	WAS002/19678	N/a	50	Waste Processes / Landfilling	2002 - 2004

Designated Environmentally Sensitive Areas

10.5.34 The site is located within a Nitrate Vulnerability Zone and nitrate sensitive area.

Future Baseline Conditions

10.5.35 The likely future baseline conditions in the absence of the proposed facility are considered below.

Proposed Development

10.5.36 In the absence of the proposed development, the site would remain as present. As a consequence, it is unlikely that there would be any change in the amount of permeable surfacing and/or additional built development at the site. A number of other developments are proposed in the surrounding area, as set out in Appendix 4.4 of the ES. However, none of these would affect the site directly and it is assumed that each of these would need to comply with relevant planning policy and legislative standards so that the overall flood risk in the area would not increase.

Climate Change

10.5.37 The site lies within Flood Zone 1, and is therefore considered to be at low risk of flooding from all sources. No detailed hydrological modelling including the revised Environment Agency Climate Change Allowances (February 2016) have been made available. An allowance for future climate change and increased flood risk has been made within this assessment and the FRA.

10.6 Incorporated Enhancement and Mitigation

10.6.1 Chapter 2 (Site Description and Description of Development) of this ES summarises the mitigation measures that form part of the design of the 3Rs Facility. In relation to hydrology and flood risk, a number of designed-in mitigation measures have been proposed to reduce the potential for impacts of the development. These

measures are considered standard industry practice for this type of development and are summarised in Table 10.10 below.

Table 10.10: Designed-in Mitigation Measures Adopted with Respect to Hydrology and Flood Risk

Designed in mitigation measures adopted as part of the project	Justification
Construction	
Surface water management strategy The proposed development would result in the construction of low permeability surfacing, increasing the rate of surface water run-off from the site. A surface water management plan is required to ensure the existing run-off rates to the surrounding water environment are maintained at pre-development rates. Measures to mitigate against water pollution would also apply and would include measures as set below. A development specific drainage strategy has been generated presented in Appendix 10.4.	To address NPS-EN1, the NPPF, Environment Agency and WSCC surface water run-off requirements.
Best practice measures All construction work would be undertaken in accordance with the Construction Environmental Management Plan and good practice documentation including: ▪ CIRIA – SuDS Manual; ▪ Prevent surface water being affected during earthwork operations. No discharge to surface watercourses will occur without permission from the Environment Agency; ▪ Environment Agency, Pollution Prevention Guidance Note 6 (PPG6): Pollution Prevention Guidelines – Working at Construction and Demolition Sites; ▪ Environment Agency, Pollution Prevention Guidance Note 5 (PPG5)– Working in, near or liable to affect watercourses; ▪ Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors CIRIA (C532); ▪ Prevent surface water being affected during earthwork operations. No discharge to surface watercourses will occur without permission from the Environment Agency; ▪ Wheel washers and dust suppression measures to be used as appropriate to prevent the migration of pollutants; ▪ Regular cleaning of roads of any construction waste and dirt to be carried out; and ▪ A construction method statement to be submitted for approval by the responsible authority.	To accord with guidance and best practice guidelines for construction works.
Pollution prevention measures Refuelling of machinery would be undertaken within designated areas where spillages can be easily contained. Machinery would be routinely checked to ensure it is in good working condition. Any tanks and associated pipe work containing substances included in List 1 of the Groundwater Directive would be double skinned and be provided with intermediate leak detection equipment. The following specific mitigation measures for the protection of surface water during construction activities would be implemented: ▪ Management of construction works to comply with the necessary standards and consent conditions as identified by the Environment Agency; ▪ A briefing highlighting the importance of water quality, the location of watercourses and pollution prevention included within the site induction; ▪ Areas with prevalent run-off to be identified and drainage actively managed, e.g. through bunding and/or temporary drainage; ▪ Areas at risk of spillage, such as vehicle maintenance areas and hazardous substance stores (including fuel, oils and chemicals) to be bunded and carefully sited to minimise the risk of hazardous substances entering the drainage system or the local watercourses. Additionally, the bunded areas will have impermeable bases to limit the potential for migration of contaminants into groundwater following any leakage/spillage. Bunds used to store fuel, oil etc. to have a 110% capacity; ▪ Disturbance to areas close to watercourses reduced to the minimum necessary for the work; ▪ Excavated material to be placed in such a way as to avoid any disturbance of	To prevent pollution of water courses and address stakeholder concerns for the construction of the 3Rs Facility.

Designed in mitigation measures adopted as part of the project	Justification
areas near to the banks of watercourses and any spillage into the watercourses; ▪ Construction materials to be managed in such a way as to effectively minimise the risk posed to the aquatic environment; ▪ All plant machinery and vehicles to be maintained in a good condition to reduce the risk of fuel leaks; ▪ Drainage works to be constructed to relevant statutory guidance and approved via the Lead Local Flood Authority prior to the commencement of construction; and ▪ Consultation with the Environment Agency to be ongoing throughout the construction period to promote best practice and to implement proposed mitigation measures.	
Operation	
Operational practices to incorporate measures to prevent pollution and increased flood risk, to include emergency spill response procedures, clean up and remediation of contaminated water run-off.	To reduce the risk of surface water pollution based on guidance in e.g. Environment Agency, Planning Policy Guidance Note 22 (PPG22): Pollution Prevention Guidelines – Dealing with Spills.
Decommissioning	
Decommissioning practices to incorporate measures to prevent pollution and increased flood risk, to include emergency spill response procedures, and clean up and remediation of contaminated soils.	To protect surface water based on guidance that will be appropriate at the time of decommissioning.

10.7 Assessment of Construction Effects

10.7.1 The effects of construction of the proposed development have been assessed in relation to hydrology and flood risk. A description of the significance of effects upon hydrology and flood risk receptors caused by each identified impact is given below.

Flood Risk

10.7.2 For the purpose of this ES, flood risk is defined as the increase in low permeability surfacing leading to an alteration in pre-development surface water run-off rates or a derogation of floodplain storage. 'Temporary' flood risk is the temporary removal or alteration in permeable surfacing leading to a temporary increase in surface water run-off or derogation of floodplain storage (for example, during construction).

Sensitivity of Receptor

10.7.3 The site has been identified as not directly at risk of flooding. The land adjoining the site is of low vulnerability, high recoverability and low value. The sensitivity of the receptor is, therefore, considered to be low.

Magnitude of Impact

10.7.4 During the construction phase, a temporary increase in the low permeable area may occur due to the presence of the construction compound and the construction of the hardstanding required for the development, potentially increasing the risk of flooding to the surrounding area. The proposed engineering methods have been agreed in principle with the regulators. Together with the use of the Construction Environmental Management Plan, this would ensure that the risk of flooding during construction is not increased during construction.

10.7.5 The impact is predicted to be of local spatial extent, short term duration, intermittent and high reversibility. It is predicted that the impact will not affect surrounding local receptor directly. The magnitude is, therefore, considered to be negligible.

Significance of Effect

10.7.6 The overall significance of the effect on flood risk is assessed as negligible, which is not significant in terms of the EIA Regulations.

Further Mitigation

10.7.7 No additional mitigation measures are foreseen at this time.

Future monitoring

10.7.8 No future monitoring is considered to be required.

Accidents and/or Disasters

10.7.9 In the event that construction drainage channels or similar become blocked, surface water by virtue of the site layout would be directed to the next available channel, from where water would be discharged back into the drainage system. Alternatively, water would be conveyed directly to temporary construction settlement ponds/features for treatment, where required, prior to being discharged from site in accordance with the permit.

Effects on Surface Water Resources

Sensitivity of Receptor

10.7.10 The sensitivity of watercourses is dependent on the nature of the specific watercourse. WFD classification information obtained from the Environment Agency website and mapping for water quality indicates that the closest watercourse is of low sensitivity (poor WFD status). However, the assessment also takes into account the objective WFD status (good). Therefore, based on the criteria set out in Table 10.1, surface water resources are considered to be moderately vulnerable, of slow recoverability and medium value. The sensitivity of the receptor is, therefore, considered to be high.

Magnitude of Impact

10.7.11 Activities on site during construction could lead to an increase in turbid run-off and spillages/leaks of fuel, oil etc. that could affect nearby watercourses. However, the construction process would include measures to intercept run-off and ensure that discharges from the site are controlled in quality and volume. This would include the use of filter drains and ponds to remove sediment, temporary interceptors and a hydraulic brake. These would be implemented through the Construction Environmental Management Plan.

10.7.12 The impact is predicted to be of local spatial extent, short term duration, intermittent and high reversibility. The magnitude is therefore, considered to be low (adverse).

Significance of Effect

10.7.13 Effects in relation to run-off from construction sites and spillages which includes the integration of measures adopted in Table 10.10 would be of minor adverse significance, which is not significant in terms of the EIA Regulations.

Further Mitigation

10.7.14 No additional mitigation measures are foreseen at this time.

Future monitoring

10.7.15 No future monitoring is considered to be required.

Accidents and/or Disasters

10.7.16 In the event of a catastrophic/large scale spillage strategies outlined in the Construction Environmental Management Plan would be actioned. A member of staff trained in the use of a 'spill kit' or similar would attend to the event. Should material become mobilised via site surface water this would be directed by virtue of the site layout and drainage system to an interceptor for treatment and/or removal from site as appropriate.

Effects on the On-Site Drainage Network

Sensitivity of Receptor

10.7.17 On-site drains are considered to be of moderate vulnerability, moderate to high recoverability and minor value. The sensitivity of the receptor is, therefore, considered to be medium.

Magnitude of Impact

10.7.18 The impact of construction works effecting on-site drainage is predicted to be of local spatial extent, short term duration and intermittent occurrence. It is predicted that the impact would affect the receptor directly. The magnitude is therefore, considered to be negligible.

Significance of Effect

10.7.19 The significance of effects on on-site drainage networks which includes the integration of measures adopted in Table 10.10 is considered to be minor adverse significance, which is not significant in terms of the EIA Regulations.

Further Mitigation

10.7.20 No additional mitigation measures are foreseen at this time.

Future monitoring

10.7.21 No future monitoring is considered to be required.

Accidents and/or Disasters

10.7.22 In the event of an accident or disaster, the effect would be similar to those outlined in paragraphs 10.7.9 and 10.7.16.

10.8 Assessment of Operational Effects

10.8.1 The effects of the operation and maintenance of the proposed development have been assessed in relation to hydrology and flood risk area. A description of the significance of effects upon hydrology and flood risk receptors caused by each identified impact is given below.

Flood Risk

10.8.2 An FRA has been undertaken for the proposed development in accordance with NPS EN-1, the NPPF and associated Planning Practice Guidance. The proposed development type is defined as 'Less Vulnerable' in Table 2 of the Technical Guidance to the NPPF and is therefore suitable for the location within Flood Zone 1.

10.8.3 The proposed development would increase the amount of low permeability cover on the site and, as a consequence surface run-off, from the site to local watercourses. There would be an approximately 15% increase in the low permeable area within the site.

10.8.4 The proposed surface water drainage scheme is presented in the drainage strategy (Appendix 10.4).

10.8.5 The drainage strategy demonstrates that surface water run-off can be practicably managed, mimicking existing flows rates and, where possible, providing a betterment. Attenuation would comprise a mix of techniques including permeable paving and underground storage in line with SuDS guidance (Appendix 10.1). The type of underground structure would be agreed during the construction contract and is likely to be cellular, plastic arch or large diameter pipes, although other system suitability may be explored. The FRA is presented in Appendix 10.2 of the ES.

Sensitivity of Receptor

10.8.6 The site is located within Flood Zone 1 ('low probability'), defined by the Environment Agency as land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding in any year (<0.1%). Therefore, the site has been assessed as of low sensitivity to flooding.

Magnitude of Impact

10.8.7 The proposed development has been subject to a FRA in order to meet the requirements of planning policy and best practice. The development would be designed to ensure no increase in the rate of run-off. The impact is predicted to be of local spatial extent, short term duration, intermittent and high reversibility. The magnitude is, therefore, considered to be no change.

Significance of Effect

10.8.8 As the proposed development has been assessed as having a 'no change' within an area at low risk of flooding and therefore low sensitivity, the overall significance of effect is considered to be 'None' which is not significant in terms of the EIA Regulations.

Further Mitigation

10.8.9 No additional mitigation measures are foreseen at this time.

Future monitoring

10.8.10 Monitoring would be undertaken in accordance with the permit.

Accidents and/or Disasters

10.8.11 In the event that a drainage gully or similar becomes blocked, surface water by virtue of the site layout would be directed to the next available gully/chamber, from where water would be discharged back into the drainage system. Alternatively, water would be retained onsite by virtue of kerbed features or similar prior to being discharged from site in accordance with the permit.

Effects on Surface Water Resources

Sensitivity of Receptor

10.8.12 The watercourses are considered to be of low to moderate vulnerability, slow recoverability and moderate value. The sensitivity of the receptor is, therefore, considered to be high.

Magnitude of impact

10.8.13 The impact of potentially contaminated run-off entering local watercourses is predicted to be of local spatial extent, short term duration, intermittent and reversible. It is predicted that the impact would affect the receptor directly. The magnitude is therefore considered to be low (adverse).

Significance of Effect

10.8.14 Taking into account the measures integrated as part of the project outlined in Table 10.10, the effects are considered to be of minor adverse significance which would not be significant in terms of the EIA Regulations.

Further Mitigation

10.8.15 No additional mitigation measures are foreseen at this time.

Future monitoring

10.8.16 Monitoring to be undertaken in accordance with the permit.

Accidents and/or Disasters

10.8.17 In the event of a catastrophic/large scale spillage, operational procedures would be actioned. A member of staff trained in the use of a 'spill kit' or similar would attend to the event. Should material become mobilised via site surface water this would be directed by virtue of proposed drainage system to interceptor for treatment and/or removal from site as appropriate.

Effects on the On-site Drainage Network

10.8.18 Following the construction of the proposed development no impact on the on-site drainage network as a consequence of site operations is anticipated.

10.9 Assessment of Decommissioning Effects

10.9.1 The effects of decommissioning activities are expected to be the same or similar to the effects from construction. With effective control measures in place, no significant effects are likely to arise.

10.10 Inter-relationships

10.10.1 Inter-relationships are considered to be the impacts and associated effects of different aspects of the proposed development on the same receptor. These are considered to be:

- Contamination of surface water impacting upon groundwater quality; and
- Contamination of surface water impacting upon aquatic ecology.

10.10.2 The incorporation of appropriate and agreed upon mitigation measures (Table 10.10) within the construction and operational phase of the development would reduce the risk of contamination of surface water. Therefore, no significant effects on surface water contamination impacting upon groundwater quality and aquatic ecology are considered to be likely.

10.11 Further Mitigation Measures

10.11.1 No further mitigation measures are needed in relation to hydrology and flood risk. The mitigation measures presented within Table 10.10Table 10.10 are sufficient that no significant effects are predicted to arise from the proposed development.

10.12 Monitoring and Management Strategies

10.12.1 A drainage strategy has been developed to manage on site surface water and foul water flows (Appendix 10.4).

10.13 Assessment of Cumulative Effects

10.13.1 This section considers the cumulative effects of the proposed development on hydrology and flood risk in conjunction with other developments.

10.13.2 A review of approved and proposed developments within a 500 m search area from the proposed development has been undertaken.

10.13.3 A 500 m search area is considered appropriate for data collection, taking into account the nature of the development and likely zone of influence on hydrological receptors.

10.13.4 The review of approved and proposed development established that there are seven cumulative developments within the defined 500 m study area of the proposed development outlined below.

- Brockhurst Wood Landfill Site: Construction and operation of a materials recycling facility including offices and visitor centre, an anaerobic digestion plant and extension to an existing landfill site and ancillary infrastructure.
- Brockhurst Wood Landfill Site: Amendment of conditions.
- Land south of Brookhurst Wood landfill site (erection of carbon vessel systems and associated infrastructure).
- Land south of Brookhurst Wood landfill site (mechanical biological treatment).
- Land west of Brookjurst Wood landfill site (proposed facility for compaction and baling of Refuse Derived Fuel);
- Land north of Horsham (proposed mixed use strategic development, including up to 2,750 dwellings, business park, retail, community centre, leisure facilities, education facilties and public open space); and
- Graylands House: Prior approval for change of use of ground and first floor from use class B1(A) office to use class C3 residential for eleven dwellings.

10.13.5 It is assumed, where relevant, in accordance with the NPS and/or NPPF and Planning Practice Guidance, any new development is required to attenuate surface water run-off, where practicable, to the greenfield run-off rate and provide appropriate management techniques to treat potentially contaminated run-off prior to discharge into the local drainage network.

10.13.6 Any works undertaken within 8 m of a watercourse and / or flood defence will require consent. For the consent to be provided the developer is required to demonstrate that the risk of flooding during the lifetime of the development could be mitigated to a level acceptable to the Environment Agency, LLFA and / or Internal Drainage Boards. Therefore, cumulative effects on hydrology and flood risk are not predicted to be significant.

10.14 Residual Effects

10.14.1 Table 10.11 summarises the significance of effects for the construction and the operational phase for the project taking into account the mitigation measures incorporated into the development proposals.

10.14.2 The summary confirms that the development will have no significant residual effect on hydrology and flood risk following the implementation of appropriate and agreed upon mitigation measures.

Table 10.11: Summary of Likely Environmental Effects on Hydrology and Flood Risk

Parameter	Sensitivity of receptor	Likely impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Construction Phase									
Flood risk	Low	+Increase in Flood Risk on adjoining land	Short term	Negligible	Negligible	+ Surface Water Management Strategy + Detailed drainage design philosophy.	Low	None	No
Surface water resources	High	+ Increase in turbid run-off +Spillages +Decreasing the WFD classification of nearby watercourses	Short term	Low	Minor	+ Interceptor trenches for run-off during construction. +Best construction practices.	Low	None	No
On-site drainage network.	Medium	+Disruption of on-site drainage network due to heavy vehicles and construction.	Short term	Negligible	Minor	+ on-site drainage network will be disrupted as little as possible. + Drainage will be returned to pre development state post construction.	Low	None	No
Operational Phase									
Flood risk	Low	+Increase in Flood Risk within the Site and to adjacent land.	Long Term	No Change	None	Detailed drainage design to include: filter drain and pond storage.	Low	None	No

Parameter	Sensitivity of receptor	Likely impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Surface water resources	High	+ Decrease in surface water quality in close proximity to the Site.	Long Term	Low	Minor	+ Best operational practices including: 1) Correct storage of hazardous chemical and oils. 2) Fuel storage and filling area. 3) Hazardous spillage procedure	Low	None	No

10.15 Conclusions

10.15.1 The effects on hydrology and flood risk for the proposed development have been assessed in line with the relevant the NPPF, Planning Practice Guidance and other relevant legislation, guidance, planning policy and technical documentation.

10.15.2 The assessment has indicated that no significant effects are likely to arise from the proposed development following the implementation of the proposed mitigation measures.

10.15.3 There will be a c.15% increase in the low permeable area of the site due to the development. However, any increase in flood risk during the construction or operational phase due to disturbance of on-site drainage systems would be managed through the drainage strategy, restricting off-site surface water flows and incorporating best practice construction techniques.

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