

Havant Thicket Reservoir Project

Environmental Statement Volume 2 - Main Report Chapter 14 Material Resources and Waste

Portsmouth Water Ltd.

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14. Material Resources & Waste

Introduction

- 14.1. This chapter of the ES Volume 2, Chapter 14 Material and Waste, details the assessment of the Scheme's use of materials and generation of solid wastes during the construction phase of the Scheme.
- 14.2. The following definitions are used in this chapter:
- Materials are defined as primary, recycled or secondary and renewable sources of materials required for construction; and
 - Waste is defined as any substance or object which the holder discards or intends or is required to discard.

Competent expert evidence

- 14.3. The Material Resources and Waste chapter has been prepared by the following competent experts in the field of resources, waste and environmental assessment, who hold professional memberships and are committed to undertaking continued professional development:
- a Waste Management Consultant (MSci (Hons) Geology, Chartered Resource and Waste Manager (CRWM) with full membership of the Chartered Institution of Wastes Management (CIWM)) with six years of experience in the management of resources and wastes, including experience on EIAs for major infrastructure projects.
 - a Senior Waste Management Consultant (BSc (Hons) Environmental Science, Chartered Waste Manager (CWM)) with over 14 years of knowledge and experience in environmental and waste management and holds professional membership with CIWM.
 - a Principal Waste Management Consultant (MSc Environmental Diagnostics, BSc (Hons) Biology, Chartered Environmentalist) with over 15 years of experience in waste management including EIAs for major infrastructure. They co-authored the Institute of Environmental Management and Assessment (IEMA) guidance on materials and waste in EIA.

Legislative and policy framework

- 14.4. This section provides a non-exhaustive list of legislation, policy and public framework guidance of relevance to the assessment of the likely materials and waste impacts associated with the Scheme. The relevant documents are summarised in Table 14-1.

Table 14-1 - Legislation, regulatory, and policy framework for material resources and waste

Legislation/ Regulation/ Policy	Summary of requirements
International	
EU Directive 2008/98/EC on waste	The 'Waste Framework Directive' (WFD) provides the legislative framework for the management of waste, including collection, transport, recovery and disposal. It includes definitions related to waste management, such as definitions of waste, recycling, and recovery, and when waste ceases to be waste based on 'end-of-waste criteria'. In addition, it sets out the principles for classifying waste including the properties that render a waste as hazardous. It also establishes the 'waste hierarchy', a priority order for managing wastes, the 'proximity principle' and the 'polluter pays principle'. It sets a national target to reuse, recycle and recover 70% by weight, of construction and demolition waste by 2020.
EU Directive 1999/31/EC on the landfill of waste	The 'Landfill Directive' provides specific requirements for the disposal of waste at landfills to prevent or reduce as far as possible the negative effects of landfilling on the environment, as well as any resultant risk to human health. This requires landfills to meet certain

Legislation/ Regulation/ Policy	Summary of requirements
	technical requirements and to hold an operating permit. It establishes three classes of landfill, hazardous, non-hazardous and inert, and the requirements for acceptance of waste at each landfill class.
National	
Environmental Protection Act 1990, as amended	The Act sets requirements for managing waste on land to protect human health and the environment. Section 34 sets out a statutory Duty of Care for all those importing, producing, carrying, keeping, treating or disposing of controlled waste and on those who have control of such waste as a broker. This includes a requirement to check waste carriers hold a licence and waste facilities hold a permit enabling them to receive the waste. The aim is to ensure that, once produced, waste remains within the control of a legitimate chain until final authorised disposal.
The Waste (England and Wales) Regulations 2011, as amended	The Regulations transpose the requirements of the WFD ¹ into national legislation.
The Hazardous (England and Wales) Waste Regulations 2005, as amended	The Regulations transpose the requirements of the WFD ¹ into national legislation.
Environmental Permitting (England and Wales) Regulations 2016, as amended	The Regulations transpose several EU Directives, including the Landfill Directive ² and the Industrial Emissions Directive ³ , and put in place requirements to ensure that any person undertaking a waste operation or operating a waste installation holds an appropriate environmental permit or exemption registered with the Environment Agency. This includes the operation of mobile plant to process and treat wastes.
Waste Management Plan for England 2013	The Plan outlines the national regulations for waste and the specific arrangements for construction and demolition waste. This includes meeting the WFD target of recovering at least 70% by weight, of construction and demolition waste by 2020. It states that the UK has achieved an estimated recovery rate of 93% of construction and demolition waste. The Plan is being updated to reflect policies set out in the Resources and Waste Strategy for England 2018 and the forthcoming Environment Bill ⁴ .
Resources and Waste Strategy for England 2018	The strategy sets out national policy for minimising waste, promoting resource efficiency and moving towards a circular economy. It focuses on the importance of driving waste management up the waste hierarchy and states the importance of considering the Government's ambition of achieving zero avoidable waste. The strategy is based around two overarching objectives which aim to maximise the value of resource use and to minimise waste and its impact on the environment. It puts a strong emphasis on waste prevention through making products using fewer natural resources. The strategy references the UK statistics on waste which show that over 90% of non-hazardous construction and demolition waste was recovered in 2016.

¹ EU Directive 2008/98/EC on waste (Waste Framework Directive)

² EU Directive 1999/31/EC on the landfill of waste (Landfill Directive)

³ EU Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control)

⁴ UK Government Environment Bill 2019-21

Legislation/ Regulation/ Policy	Summary of requirements
National Planning Policy Framework (NPPF) 2019	The Framework sets out an objective to contribute to protecting and enhancing the natural environment including the minimisation of waste and pollution. It also encourages sustainable use of minerals through use of secondary and recycled materials and minerals waste in preference to primary materials and requires the planning authority to protect mineral resources by defining Mineral Safeguarding Areas (MSAs).
Draft National Policy Statement for Water Resources Infrastructure 2018	The statement provides guidance to applicants for Nationally Significant Infrastructure Projects for water resources. It includes considerations for materials and waste management and emphasises the need to adhere to waste legislation. In addition, it states that the applicant should consider local waste management infrastructure to determine if there is capacity to manage the waste arising from the project. With respect to reservoirs, it encourages the use of existing on-site materials to satisfy the fill requirement for land re-profiling and creation of embankments. It also encourages the reuse and recycling of materials and use of resource efficient processes, materials and building techniques. The statement requires the applicant to demonstrate that adequate steps have been taken to minimise the volume of waste arising and the volume of waste sent to disposal.
Local	
Hampshire Minerals and Waste Plan 2013	The Plan establishes Hampshire's strategy for managing minerals and waste. It sets out 34 policies relating minerals and waste, these include the safeguarding of mineral resources and infrastructure sites, ensuring an adequate supply of aggregate, maximising recycled and secondary aggregate production and the sustainable management of waste. The Plan defines the MSAs in Hampshire. In addition, the Plan states that a key objective is to maximise the reuse, recycling and recovery of construction, demolition and excavation (CDE) wastes. For non-hazardous waste, it sets targets for 60% to be recycled and 95% to be diverted from landfill by 2020.

Study area

- 14.5. To undertake the assessment, it is necessary to define the geographical areas that may be directly impacted by the Scheme.
- 14.6. The two areas that are likely to be impacted by the Scheme are:
- The first study area which comprises the Scheme's footprint, i.e. red line boundary, including the reservoir site and access roads, and pipeline corridor and areas for temporary access, site compounds, working platforms and other enabling activities.
 - The second study area extends to the availability of materials required to construct the main elements of the Scheme and suitable waste management infrastructure that could accept waste generated by the Scheme.
- 14.7. The second study area is defined separately for materials and waste. For materials, the second study area is the region of South East England, as it is probable that construction materials would be sourced from the wider region. For waste, the second study area is defined as the Hampshire Waste Planning Authority (WPA) area, as the majority of waste arising in Hampshire is managed within the local area.

Assessment methodology

- 14.8. An assessment of materials and waste has been prepared to determine the impacts and significance of effect on the environment of construction, demolition and excavation works during the construction phase of the Scheme. The operational phase was scoped out of further assessment in the EIA Scoping Report – Addendum⁵. The following section details the methodology and criteria used in the assessment.
- 14.9. The assessment methodology and criteria were established in the Scoping Report and are based on Atkins’ professional judgement and prior experience working on major infrastructure projects. The assessment determines the magnitude of the impacts (high to very low) and the sensitivity (very high to low) of the resources or receptors that may be affected. The magnitude of impacts and sensitivity of resources are combined to classify the effect (major to negligible). Effects considered to be moderate or major are deemed ‘significant’, and those minor or negligible to be ‘not significant’. The criteria for the assessment are set out below. Mitigation measures for materials and waste have been identified, and the residual effect has also been assessed using the method above.
- 14.10. To achieve this, the assessment has evaluated the estimated use of construction materials and waste generated during construction of the Scheme against existing baselines for sale of materials, waste arisings and waste infrastructure capacity.

Assessment criteria

- 14.11. The assessment criteria used are presented in the tables below. Table 14-2 presents the criteria for magnitude of impact, Table 14-3 presents the criteria for sensitivity of receptor and
- 14.12. Table 14-4 presents the criteria for classifying the effect.

Table 14-2 - Magnitude of impact assessment criteria

Impact severity	Description
High	<u>The Scheme meets one or more of the following criteria:</u> High quantities of key construction materials required such that it has a high impact on availability within the study area (greater than or equal to 5% of the baseline for any one material); High quantities of non-hazardous CDE waste generated such that it has a high impact on waste arisings within the study area (greater than 10% of the baseline); and High quantities of hazardous CDE waste such that it has a high impact on waste arisings within the study area (greater than 10% of the baseline).
Medium	<u>The Scheme meets one or more of the following criteria:</u> Moderate quantities of key construction materials required such that it has a high impact on availability within the study area (greater than or equal to 1% but less than 5% of the baseline for any one material); Moderate quantities of non-hazardous CDE waste generated such that it has a moderate impact on waste arisings within the study area (greater than 5% but less than 10% of the baseline); and Moderate quantities of hazardous CDE waste such that it has a moderate impact on waste arisings within the study area (greater than 5% but less than 10% of the baseline).
Low	<u>The Scheme meets one or more of the following criteria:</u> Low quantities of key construction materials required such that it has a low impact on availability within the study area (greater than or equal to 0.1% but less than 1% of the baseline for any one material);

⁵ Havant Thicket Reservoir Project, EIA Scoping Report – Addendum. Portsmouth Water. 2019

Impact severity	Description
	Low quantities of non-hazardous CDE waste generated such that it has a low impact on waste arisings within the study area (greater than or equal to 1% but less than 5% of the baseline); and Low quantities of hazardous CDE waste such that it has a low impact on waste arisings within the study area (greater than or equal to 1% but less than 5% of the baseline).
Very low	<u>The Scheme meets one or more of the following criteria:</u> Very low quantities of key construction materials required such that it has a very low impact on availability within the study area (less than 0.1% of the baseline for any one material); Very low quantities of non-hazardous CDE waste generated such that it has a very low impact on waste arisings within the study area (less than 1% of the baseline); and Very low quantities of hazardous CDE waste such that it has a very low impact on waste arisings within the study area (less than 1% of the baseline).

Table 14-3 - Sensitivity of receptor assessment criteria

Sensitivity of receptor	Description
Very high	<u>The Scheme meets one or more of the following criteria:</u> Very high quantities of CDE waste generated such that it may have a very high impact on estimated CDE waste infrastructure within the study area (greater than 10% of the baseline); and Very high quantities of hazardous CDE waste generated such that it may have a very high impact on estimated hazardous waste infrastructure within the study area (greater than 10% of the baseline).
High	<u>The Scheme meets one or more of the following criteria:</u> One or more MSAs or peat resources is sterilised; High quantities of CDE waste generated such that it may have a high impact on estimated CDE waste infrastructure within the study area (greater than or equal to 5% but less than 10% of the baseline); and High quantities of hazardous CDE waste generated such that it may have a high impact on estimated hazardous waste infrastructure within the study area (greater than or equal to 5% but less than 10% of the baseline).
Medium	<u>The Scheme meets one or more of the following criteria:</u> No MSAs or peat resources are sterilised; Moderate quantities of CDE waste generated such that it may have a moderate impact on estimated CDE waste infrastructure within the study area (greater than or equal to 1% but less than 5% of the baseline); and Moderate quantities of hazardous waste generated such that it may have a moderate impact on estimated hazardous waste infrastructure within the study area (greater than or equal to 1% but less than 5% of the baseline).
Low	<u>The Scheme meets one or more of the following criteria:</u> No MSAs or peat resources are sterilised; Low quantities of CDE waste generated such that it may have a low impact on estimated CDE waste infrastructure within the study area (less than 1% of the baseline); and Low quantities of hazardous CDE waste generated such that it may have a low impact on estimated hazardous waste infrastructure within the study area (less than 1% of the baseline).

Table 14-4 - Criteria for classifying the effect

		Magnitude of impact			
		High	Medium	Low	Very Low
Sensitivity of receptor	Very High	Major	Major	Moderate	Moderate
	High	Major	Moderate	Moderate	Minor
	Medium	Moderate	Moderate	Minor	Negligible
	Low	Moderate	Minor	Negligible	Negligible

Assessment assumptions and limitations

14.13. The following assumptions have been identified for the assessment:

- The assessment is based on the principle that the embankment, wetland retention structure, clay blanket (Bognor Sand Member) and clay cut-off (Harwich Formation) are primarily constructed using site-won materials from the reservoir site.
- The quantities assessed are based on a reasonable worse-case design. This includes upstream embankment slopes with a 1:7 gradient and construction of both the north and south option access roads at the reservoir site.
- The pipework between the reservoir and control house is assumed to be constructed from steel and the pipework between the control house and Bedhampton is assumed to be constructed from ductile iron.
- Construction of the embankments, reservoir infrastructure (including culvert, valve access shaft, spillway and control house) and access roads has been assumed to take place between 2021 and 2026.
- Construction of the pipeline has been assumed to take place between 2022 and 2024.
- A preliminary construction programme has been used to inform the materials and waste assessments.
- Unused construction materials and equipment will be fed back into the supply chain for use on alternative schemes and as such will be excluded from the assessment.
- Material and waste quantities have been converted into tonnes using conservative industry standard conversion rates.
- All construction material estimates are grouped into high-level categories for the purpose of the assessment.
- It is assumed that soils used will be site-won. Therefore, soils have not been assessed against a baseline.
- The estimated quantities of construction materials and waste presented in this chapter are rounded to three significant figures.

14.14. The following limitations have been identified for the assessment:

- The materials and waste baselines presented in this chapter use publicly available data.
- The materials required for construction and waste arisings have been estimated from the design information available at the preliminary design stage.
- The construction material and waste quantities assessed in this chapter include the Scheme's main assets. This excludes construction of the Visitor Centre and car park, educational hide, public realm and temporary construction works, as details of the types and quantities of construction materials and wastes associated with these assets are not available at the preliminary design stage.

- A consistent dataset on the sale of key construction materials at a local scale is not available and it is anticipated that materials will be sourced locally or regionally, as required. Therefore, the materials baseline uses data for South East England.
- CDE waste arisings and CDE waste infrastructure capacity baselines have been interpreted from the Environment Agency Waste Data Interrogator (WDI)⁶.
- Indirect impacts, such as those from the offsite manufacture of products, extraction of minerals and transport are outside the scope of the Material Resources and Waste assessment.

Baseline conditions Including value/sensitivity of resources and receptors

- 14.15. A desk-based study has been undertaken to collate relevant information on material sales, waste arisings and waste infrastructure capacity in the study area, to establish the existing baselines that may be impacted by the Scheme.

Materials baseline

- 14.16. The key construction materials required for the Scheme, and their respective annual sales within the study area, are presented in Table 14-5. The majority of materials imported to the Scheme comprise aggregates, asphalt, concrete, ductile iron and steel. The baseline presented has been used to assess the magnitude of impact on material sales.

Table 14-5 - Materials baseline (annual sales)

Construction Materials	Sales in South East England (tonnes per annum)
Aggregates (including primary - land-won, recycled and secondary)	12,737,000
Asphalt	1,600,000
Concrete (ready-mixed)	2,500,000
Iron	560,000
Steel	1,072,000

Source: South-East England Aggregate Monitoring 2017⁷ for aggregate sales. Mineral Products Association: Profile of the UK Mineral Products Industry 2018 Edition⁸ for asphalt and concrete sales. World Steel Association: World Steel in Figures 2019⁹ for iron – south east sales have been approximated from UK sales of pig iron. International Steel Statistics Bureau¹⁰ for steel sales – south east sales have been approximated from UK sales.

Waste baselines

- 14.17. According to data interpreted from the WDI⁶, over 70% of Hampshire's CDE waste was managed within the county in 2018. Therefore, data for Hampshire has been used to establish the existing baselines for waste. CDE wastes are based on Chapter 17 Wastes as described in the List of Wastes¹¹.
- 14.18. The waste arisings baseline for Hampshire is presented in Table 14-6 and the waste infrastructure capacity baseline for Hampshire is presented in

⁶ Environment Agency Waste Data Interrogator 2018. Accessed from: [<https://data.gov.uk/dataset/312ace0a-ff0a-4f6f-a7ea-f757164cc488/waste-data-interrogator-2018>].

⁷ South-East England Aggregate Monitoring 2017/18. Accessed from: [https://www.surreycc.gov.uk/_data/assets/pdf_file/0004/190588/04-03-2019-AMR-17-18_Final_compressed.pdf]

⁸ Mineral Products Association: Profile of the UK Mineral Products Industry 2018 Edition. Accessed from: [<https://mineralproducts.org/documents/Facts-at-a-Glance-2018.pdf>]

⁹ World Steel Association: World Steel in Figure 2019. Accessed from: [<https://www.worldsteel.org/en/dam/jcr:96d7a585-e6b2-4d63-b943-4cd9ab621a91/World%20Steel%20in%20Figures%202019.pdf>].

¹⁰ International Steel Statistics Bureau. Accessed from: [<http://www.issb.co.uk/>]

¹¹ EU Commission Decision 2000/532/EC establishing a list of wastes

- 14.19. Table 14-7. The baselines presented have been used to assess the magnitude of impact and sensitivity of receptors for waste.

Table 14-6 - Waste arisings baseline for Hampshire

Waste Type	Waste Arisings in Hampshire WPA (tonnes per annum)
Non-hazardous CDE	558,584
Hazardous CDE	17,509

Table 14-7 - Waste infrastructure capacity baseline for Hampshire

Waste Type	Waste Infrastructure Capacity in Hampshire WPA (tonnes per annum)
Non-hazardous CDE	2,510,673
Hazardous CDE	31,784

Potential impacts

- 14.20. The use of materials during construction of the Scheme is a direct impact. The adverse effect of this is the depletion of resources, resulting in the temporary or permanent degradation of the natural environment.
- 14.21. The generation and disposal of waste during the course of construction of the Scheme is a direct impact. The adverse effects of this are the reduction in the capacity of waste management facilities and the unsustainable use of landfill or the loss of resources resulting in a temporary or permanent degradation of the natural environment.
- 14.22. In addition to the direct impacts stated above, the management of materials and wastes on site has a number of potential indirect impacts. These include, but are not limited to, effects on climate, impacts on ground conditions, nuisance from storage, transport and processing (e.g. visual impacts, air quality, noise and disruption to traffic). These impacts are not considered to be within the scope of this chapter and are assessed in their respective chapters in the Environmental Statement.

Design, mitigation and enhancement measures

- 14.23. A significant proportion of the Scheme's environmental impacts and effects are determined at the design stage. The Scheme has used an environmentally led approach to avoid or mitigate adverse impacts and effects to the environment. For materials and waste this means applying the waste hierarchy and proximity principle and implementing the principles of a circular economy—including 'designing out' waste and keeping products and materials in use.
- 14.24. Following public consultation and value engineering, several measures have been developed through design progression, which when implemented, will avoid or mitigate the effects of material use and waste generation during construction. The Scheme-specific design, mitigation and enhancement measures for the reservoir site and access roads, and pipeline corridor are set out below.
- 14.25. In addition to these measures, the Scheme will aim to achieve a neutral cut and fill balance and recover 95% by weight of non-hazardous construction and demolition waste in accordance with the Hampshire Minerals and Waste Plan 2013. The management of materials and wastes will be monitored during construction to determine the Scheme's environmental performance. A Materials Management Strategy in Appendix 14.1 in ES Volume 4 sets out further measures for the management of materials.

Reservoir site

- 14.26. The following design, mitigation and enhancement measures are proposed or being considered for the reservoir site including access roads:
- Earthwork materials required to construct the embankment, wetland structures, clay blanket (Bognor Sand Member) and clay cut-off (Harwich Formation) will be sourced from the reservoir site. This will include the reworking of in-situ material and excavated material from areas within the footprint of the reservoir.
 - Excavated material will be managed on-site during construction in accordance with appropriate legislation and guidance to maximise the reuse of suitable soils during the construction works.
 - The embankment design has utilised the natural landscape and the total length of the embankment has been reduced. This has reduced the volume of earthwork material required for construction.
 - Realignment of the embankment and steepening of the downstream slope to a 1:5 gradient in localised areas on the border with Staunton Country Park has increased the ancient woodland retained at Round Wood and The Avenue. This will reduce the generation of timber and wood wastes requiring management.
 - Steepening of the embankment gradient from 1:7 to 1:5 on the upstream slope is being considered at the preliminary design stage. Implementation of this design measure would reduce the quantity of earthwork material required to construct the embankment and reduce the length of the concrete culvert housing the pipework between the reservoir and control house.
 - The wetland retention structure utilises the reservoir site's existing topography to reduce the quantity of material required. Materials that are required for construction of the structure will be sourced in-situ or from excavated materials from areas within the footprint of the reservoir.
 - Topsoil stripped from the reservoir, wetland retention structure and embankment footprints will be stored on-site for reuse once construction works are completed.
 - The anticipated surplus of topsoil from stripping at the reservoir site will need to be effectively managed to minimise waste. This should be achieved through applying the waste hierarchy and prioritising the reuse of the topsoil at other sites either in construction or restoration.
 - Where there is unavoidable loss of ancient woodland, the timber produced will be graded, stored to maintain its quality and used at its highest possible value. A strategy should be developed to consider the management of vegetation, timber and wood arising from the Scheme.
 - It is an aim of the Scheme to minimise the quantity of construction materials that are required and consider sustainability in the sourcing of materials, including the sourcing of aggregates from local suppliers.
 - The north option access road largely follows the route of an existing Forestry England track and the design has been changed to include passing bays, enabling the width of the road to be reduced and minimising the loss of ancient woodland. This will reduce the generation of timber and wood wastes requiring management.
 - The car park was relocated from Bells Copse to the adjacent northwest corner of the reservoir site, avoiding the loss of ancient woodland. This will reduce the generation of timber and wood wastes requiring management.

Pipeline

- 14.27. The following design, mitigation and enhancement measures are proposed or being considered for the pipeline:
- The diameter of the emergency drawdown pipe has been reduced from 1500 mm to 1200 mm, requiring less material in its construction. The depth of the installed pipe has also been reduced. These factors combined will reduce the quantity of material excavated and requiring management from the pipeline trench.

- The emergency drawdown discharge point on Hermitage Stream has been relocated northwards to reduce the length of 1200 mm diameter pipe required. This will also reduce the quantity of excavated material requiring management.
- Breakout and excavation materials from installation of the pipeline are planned for recycling and reuse for pipeline bedding and to backfill the pipeline trench. The excavation material not used in the pipeline is planned for use in construction at the reservoir site.
- The pipeline route was changed to avoid Great Copse and prevent the loss of an area of ancient woodland. This will reduce the generation of timber and wood wastes requiring management.
- A ground investigation along the pipeline route is planned to inform the detailed design. This will provide a better understanding of the ground conditions and enable planning and mitigation for any contamination identified.

Assessment of effects

- 14.28. The anticipated types and quantities of materials used and wastes generated during construction have been estimated and are presented in the tables below. The materials have been assessed against the baseline for material sales presented in Table 14-5 and the wastes generated have been assessed against the baselines in Table 14-6 for waste arisings and
- 14.29. Table 14-7 for waste infrastructure capacity.
- 14.30. The reservoir site including access roads, and pipeline are first assessed separately and then in combination to assess the overall effect of the Scheme.

Reservoir site

- 14.31. The estimated quantities of key materials used in construction of the reservoir site including access roads are presented in Table 14-8 and the construction wastes are presented in Table 14-9. These estimates are based on the preliminary design and include construction of the main assets - embankments, wetland retention structure, clay blanket (Bognor Sand Formation), clay cut-off (Harwich Formation), north and south access roads, car park, pipework and concrete structures including the culvert, spillway, valve access shaft and control house.

Table 14-8 - Reservoir site including access roads estimated material quantities

Key construction materials	Estimated quantity (tonnes) per year					
	2021	2022	2023	2024	2025	2026
Aggregate/rock	12,800	50,700	50,700	25,700	-	-
Asphalt	5,340	-	-	-	-	-
Concrete	-	3,930	4,730	52	-	-
Fill materials (site-won*)	1,820	204,000	438,000	438,000	438,000	345,000
Steel	-	-	220	-	-	-

*Fill materials are site-won and therefore have not been assessed against a baseline.

- 14.32. The construction material use for the reservoir site and access roads was assessed against the baseline for each of the key construction materials. The effect in all years is determined to be Negligible.
- 14.33. The fill material required to construct the wetland retention structure, embankments, clay blanket (Bognor Sand Member) and clay cut-off (Harwich Formation) will be sourced from site-won material including in-situ material and materials excavated from within the footprint of the reservoir.
- 14.34. Based on a review of publicly available information, no peat resources are expected to be sterilised by the reservoir site and access roads. It should be noted that according to Hampshire County

Council's policies map¹², a Minerals and Waste Consultation Area (MWCA) is located on the reservoir site and access roads within the central and eastern area; this is designated for clay resources. The proposed development would utilise a large quantity of the clay resource within the reservoir site for construction of the embankments and wetland retention structure and therefore it is anticipated that this would constitute 'prior extraction' as referenced in Policy 15 of the Hampshire Minerals and Waste Plan¹³ on the safeguarding of mineral resources.

Table 14-9 - Reservoir site including access roads estimated CDE waste quantities

Key waste types	Estimated quantity (tonnes) per year					
	2021	2022	2023	2024	2025	2026
Asphalt	92	-	-	-	-	-
Total non-hazardous CDE waste	92	-	-	-	-	-

- 14.35. The CDE waste for the reservoir site including access roads was assessed against the baseline. No significant construction or demolition wastes are expected to arise during construction. In addition, it is anticipated that suitable excavation materials will be reused within the reservoir site and access roads and therefore no significant wastes would arise. The effect in all years is determined to be Negligible.
- 14.36. A desk study¹⁴ and recent ground investigation¹⁵ found no significant contamination at the reservoir site. The existing ground conditions comprise natural geology and soil including Head deposits, Bognor Sand Member, Harwich Formation, Reading Formation and London Clay. Further details are set out in Chapter 10 Ground Conditions in ES Volume 2. On this basis, it has been assumed that no significant hazardous soils would arise from construction works at the reservoir site and access roads.
- 14.37. Small quantities of hazardous waste associated with adhesives, sealants, oils and their packaging are expected to arise during construction, however these are not expected to be generated in significant quantities.
- 14.38. In addition to the CDE waste presented in Table 14-9, biodegradable materials and wastes would arise from the management of vegetation and woodland. It is estimated that approximately 10,000 tonnes of green material would arise from stripping of vegetation within the footprint of the reservoir, and approximately 200,000 tonnes of oak and Corsican pine timber, 100,000 tonnes of brash and 70,000 tonnes of stumps would be produced from the unavoidable loss of woodland.
- 14.39. A strategy will be developed to effectively manage vegetation and wood. The vegetation is likely to be stripped in phases and provide opportunity for composting. The timber will need to be graded, processed and appropriately stored. Opportunities for reuse within the Scheme, reuse on other sites or sale on the market will be considered. The options for managing the brash and stumps should also be identified. These may include reuse at the reservoir site in visitor areas and in the creation of wildlife corridors, composting or processing to produce woodchip.

Pipeline

- 14.40. The estimated quantities of key materials used in construction of the Pipeline are presented in Table 14-10 and the construction wastes are presented in Table 14-11. These estimates are based on the preliminary design.

¹² Hampshire County Council Mineral Consultation Areas Map. Accessed from: <https://maps.hants.gov.uk/mineralsconsultationareas/>

¹³ Hampshire Minerals and Waste Plan. Hampshire County Council. 2013. Accessed from: <https://documents.hants.gov.uk/mineralsandwaste/HampshireMineralsWastePlanADOPTED.pdf>

¹⁴ Havant Thicket Winter Storage Reservoir Site, Site History Information. Portsmouth Water. 2012.

¹⁵ Havant Thicket Winter Storage Reservoir, Ground Investigation Report. Ref. HTR-ATK-RZ-RE-RP-C-0001. Atkins. March 2020

Table 14-10 - Pipeline estimated material quantities

Key construction materials	Estimated quantity (tonnes) per year		
	2022	2023	2024
Aggregate/rock	874	1,750	1,310
Asphalt & bituminous materials	546	1,090	819
Concrete	432	126	-
Ductile iron	251	503	377
Fill materials (site-won)*	13,800	27,600	20,700
Steel	-	227	453

*Fill materials are site-won and therefore have not been assessed against a baseline.

- 14.41. The estimated construction material use for the pipeline was assessed against the baseline. The effect in 2022, 2023 and 2024 was determined to be Negligible.
- 14.42. The material excavated from the pipeline trenches will largely be reused to backfill the trench around the installed pipeline. However, it is anticipated that pipe bedding material may need to be imported and this has been accounted for in the estimates for aggregates. Excavation material not used in backfilling the pipeline trench will be reused at the reservoir site.
- 14.43. Based on a review of publicly available information, no MSAs or peat resources are expected to be sterilised by the pipeline corridor.

Table 14-11 - Pipeline estimated CDE waste quantities

Key waste types	Estimated quantity (tonnes) per year		
	2022	2023	2024
Asphalt & bituminous materials	205	410	308
Excavation materials (unsuitable for reuse)	1,770	3,530	883
Total non-hazardous CDE waste	1,970	3,940	1,190

- 14.44. The estimated CDE waste for the pipeline was assessed against the baseline. The effect in 2022, 2023 and 2024 was determined to be Negligible.
- 14.45. At this stage no significant contaminated soils are anticipated along the pipeline corridor and therefore no hazardous soils have been included in the estimates. A ground investigation of the pipeline corridor is planned prior to construction and this will provide a detailed picture of contamination present. The existing ground conditions along the pipeline corridor vary from grassed areas to areas of road paving and Made Ground overlying the natural geology which largely consists of Head deposits. Further details are set out in Chapter 10 Ground Conditions in ES Volume 2.
- 14.46. Small quantities of hazardous waste associated with adhesives, sealants and oils and their packaging are expected to arise during construction, however these are not expected to be significant.

Reservoir site and pipeline

- 14.47. The estimated quantities of key materials used and wastes generated in construction of the reservoir site including access roads, and pipeline have been combined and are presented in Table 14-12 and Table 14-13, respectively. This enables the combined effect of the entire Scheme to be assessed.

Table 14-12 - Reservoir site including access roads, & pipeline estimated material quantities

Key construction materials	Estimated quantity (tonnes) per year					
	2021	2022	2023	2024	2025	2026
Aggregate/rock	12,800	51,600	52,500	27,000	-	-
Asphalt & bituminous materials	5,340	546	1,090	819	-	-
Concrete	-	4,360	4,860	52	-	-
Ductile iron	-	251	503	377	-	-
Fill materials (site-won)*	1,820	218,000	466,000	459,000	438,000	345,000
Steel	-	-	446	453	-	-

*Fill materials are site-won and therefore have not been assessed against a baseline.

- 14.48. The combined construction material use for the reservoir site and access roads, and pipeline was assessed against the baseline. The effect in all years was determined to be Negligible.

Table 14-13 - Reservoir site including access roads, & pipeline estimated CDE waste quantities

Key waste types	Estimated quantity (tonnes) per year			
	2021	2022	2023	2024
Asphalt & bituminous materials	91	205	410	308
Excavation materials (unsuitable for reuse)	-	1,770	3,530	883
Total non-hazardous CDE waste	91	1,970	3,940	1,190

- 14.49. The combined CDE waste for the reservoir site including access roads, and pipeline was assessed against the baseline. The effect in all years was determined to be Negligible.

Monitoring

- 14.50. The monitoring of wastes generated during construction will be carried out through the implementation of a Site Waste Management Plan (SWMP). This will be produced by the appointed contractor prior to construction and be updated with waste types and quantities removed from site along with the method of waste management.
- 14.51. The appointed contractor, as waste producer, must produce a Waste Transfer Note (WTN) for non-hazardous waste removed from site and a Hazardous Waste Consignment Note (HWCN) for hazardous waste removed from site. Records of these must be kept for two and three years, respectively. The WTNs and HWCNs will contain details that can be recorded in the SWMP. It is also the responsibility of the waste producer to check that waste is collected by a licensed waste carrier and received at a facility with an appropriate waste permit or exemption.
- 14.52. The waste producer must characterise wastes prior to their removal from site. This may require testing and assessment to determine the waste classification—non-hazardous or hazardous. Further testing, in the form of Waste Acceptance Criteria (WAC) testing, may need to be undertaken for wastes requiring disposal at landfill.
- 14.53. The origin, quantity and suitability of excavated materials must be monitored during construction. The reuse of significant quantities of site-won materials from the reservoir site and access roads, and pipeline corridor means a tracking system should be in place to ensure that materials and

wastes are effectively segregated and that only chemically and geotechnically suitable materials are used in construction.

- 14.54. The management of materials and waste is considered further in the Materials Management Strategy in Appendix 14.1 in ES Volume 4.

Summary

- 14.55. An assessment of the estimated material use and generation of solid wastes during the construction phase of the Scheme has been completed. The operational phase of the Scheme was scoped out for both materials and wastes as materials are not expected to be used or solid wastes generated in significant quantities in relation to their respective baselines. As the assessment is based on the preliminary design, a reasonable worst-case scenario was used to assess the significance of effect. The reservoir site including access roads, and pipeline corridor were assessed separately to determine their separate effects and then in combination to determine the overall effect of the Scheme.
- 14.56. The effect of the Scheme on materials is presented in Table 14-14. The effect for the overall Scheme is considered to be Negligible in all years.

Table 14-14 - Classification of effect on materials

Scope of assessment	Classification of effect					
	2021	2022	2023	2024	2025	2026
Reservoir site including access roads	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
Pipeline	N/A*	Negligible	Negligible	Negligible	N/A*	N/A*
Reservoir site including access roads, and pipeline	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

*Construction of the pipeline is assumed to commence in 2022 and be completed in 2024.

- 14.57. The effect of the Scheme on CDE waste is presented in Table 14-15. The effect for the overall Scheme is determined to be Negligible in all years.

Table 14-15 - Classification of effect on CDE waste

Scope of assessment	Classification of effect					
	2021	2022	2023	2024	2025	2026
Reservoir site including access roads	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
Pipeline	N/A*	Negligible	Negligible	Negligible	N/A*	N/A*
Reservoir site including access roads, and pipeline	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

*Construction of the pipeline is assumed to commence in 2022 and be completed in 2024.



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