

Appendix 15C

ICCI Assessment

File:

[ICCI user note for technical specialists and EIA coordinators.pdf](#)

Location:

[\\Global.arup.com\london\ATG\Jobs\Climate Change Group Data\06- Technical\EIA ICCI and CCR tools\ICCI\Master ICCI tool\](#)

How to assess ICCIs using this spreadsheet:

1. Navigate to the relevant technical discipline tab at the bottom of the spreadsheet;
2. Review the list of potential impacts that have been identified from previous EIAs for your topic, in the context of the future baseline climate (defined by the climate change team) and the Proposed Development, and delete those not relevant;
3. Add any additional potential impacts to the bottom of the spreadsheet and email the climate change team details of this so that the master spreadsheet can be updated;
4. Brainstorm additional mitigation measures to address any impacts that you believe may be significant via workshops, other projects, etc.
5. Consider if the new mitigation measures proposed would reduce the significance of the remaining significant impacts. If they do, then delete the effect. The spreadsheet could be used as an appendix to the technical chapter.
6. Write a short summary paragraph in your chapter acknowledging that ICCIs were assessed. This should list all impacts that are considered to be significant.

Note: Example sentences have been provided for grey tabs. ICCIs for these topic areas have not been assessed in previous EIAs. This is a work in progress and we welcome any thoughts for developing the content in this spreadsheet.

Agriculture, forestry and soils

Resources/receptors potentially impacted by the Proposed Scheme identified by environmental topic	Effects of Proposed Scheme on receptors/resources identified by environmental topic	Each effect should be identified as occurring during construction or operation by environmental topic	Existing/embedded mitigation measures	Potential climate change hazards impacting on resources/receptors	In-combination climate change impact	Can this change the significance given existing/embedded mitigation measures	Justification of Likelihood/Consequence of in-combination climate change impacts given existing/embedded mitigation measures	Significance of in-combination climate change impacts given existing/embedded mitigation measures	Additional mitigation measures to address significant effects on the ability of resources and receptors to adapt to climate change
Soils	Disruption to soil, including removal and reinstatement	Construction		Drier/drought conditions	The quality and capability of soils if effected, potential risk to harvest and increased risk of soil erosion	No	Drier/drought conditions may reduce the quality of the soils and make it more difficult to reinstate soils to their previous condition	Not Significant	<p>To mitigate the permanent effect from construction plus climate change impact there is the potential for the creation of deeper soil profiles or more moisture retentive textures to mitigate longer term drought effects on restored soils.</p> <p>The current good practice is to separate different soil types during the restoration process, however this measure may not be sufficient following any potential CC impacts. To combat this, soil types could be mixed during the restoration process.</p> <p>Future measures and monitoring: Soil moisture and texture to be monitored. A land/soil management guidance document could be produced and provided to aid with management of the soil.</p>
				Increase in frequency and intensity of heavy rainfall events/ flooding	Increased loss of soil	No	For areas already affected by flooding it is unlikely that increased flooding will enhance soil erosion because good practice techniques are in place for handling the soil during construction. In addition, mitigation measures are already in place; including the creation of suitable well-drained landforms, installation of field drains and borrow pits to minimise any potential flood risk. The potential for soil loss in areas subject to new flood risk is likely however the soils have been designed to retain more water and therefore soil erosion from potential flood risk is considered to be low	Not Significant	Potential for land/soil management guidance document to be produced and provided to landowners/farmers when they retain ownership of the land following the 5 year after care period
				Increase in frequency and intensity of heavy rainfall events/ flooding	Increase area of lower quality	No	The potential for soil quality in areas with medium to poor quality land that is subject to new flood risk is likely. Wetter soils may be less biologically active therefore reducing soil quality and functionality	Not Significant	<p>Potential need for creation / installation of measures to mitigate areas subject to new flood risk.</p> <p>A land/soil management guidance document could be produced and provided to aid with management of the soil on poor/medium land quality when handed back to farmers/landowners.</p>

				Increase in frequency and intensity of heavy rainfall events/ flooding	Increased erosion	No	Increased erosion risk is likely due to more intense rainfall. It is of low consequence on land, which will remain in HS2 ownership following the 5yr aftercare period, because HS2 have produced a proposed planting strategy. However, there is a high consequence on land handed back to farmers, following the 5yr aftercare period. As a result no long term mitigation measures are to be enforced on this land and it may therefore more subject to increased erosion	Not Significant	No addition mitigation measures required because the HS2 Landscape maintenance, management and monitoring plan TS provides details on how manage the soil in the longer term. Potential for land/soil management guidance document to be produced and provided to landowners/farmers when they retain ownership of the land following the 5 year after care period
				Increased wind speed	Increased loss of soil	No	There is considerable uncertainty in projecting wind changes, from wind speed to wind direction, and studies show statistically insignificant variation in wind speed. If wind speeds were to increase then there would not be a significant impact with regard to soil erosion because of the mitigation measures in place i.e. planting and monitoring strategy	Not Significant	Potential for land/soil management guidance document to be produced and provided to landowners/farmers when they retain ownership of the land following the 5 year after care period
Forests	Permanent effects on areas of woodland Need to discuss temporary and permanent effects	Construction		Drier/drought conditions	Loss of trees	No	It is unlikely that drought conditions will increase the loss of trees during the construction works because any damaged and/or diseased trees, which are more susceptible to incidents of drought, will be replaced with new forest stands as part of the Ecology Site Management Plan	Not Significant	No additional mitigation measures are required because ecological resilience has been built into the existing mitigation measures for the design of new; and reinstatement of existing, woodlands
				Hotter and wetter conditions	Longer growing season - changes in tree growth. Certain species will flourish/suffer in particular locations, fast growing species will become more dominant	No	It is unlikely that drought conditions will increase the loss of trees during the construction works because any damaged and/or diseased trees, which are more susceptible to incidents of drought, will be replaced with new forest stands as part of the Ecology Site Management Plan	Not Significant	No additional mitigation measures are required because ecological resilience has been built into the existing mitigation measures for the design of new; and reinstatement of existing, woodlands

	Permanent effects on areas of woodland Need to discuss temporary and permanent effects	Construction		Increased wind speed	Risk of tree loss and consequent exposure of soils to surface water erosion	No	There is considerable uncertainty in projecting wind changes, from wind speed to wind direction, and studies show statistically insignificant variation in wind speed. Mitigation measures include planting native species which are pre-adapted to warmer conditions and therefore are more resilient to potential changes in wind reducing the potential for tree or habitat losses	Not Significant	No additional mitigation measures are required because ecological resilience has been built into the existing mitigation measures for the design of new; and reinstatement of existing, woodlands
	Permanent effects on areas of woodland	Operation		Drier/drought conditions	Loss of trees	No	N/A - no in-combination CC impact.	Not Significant	
				Hotter and wetter conditions	Longer growing season - benefit tree growth	No	N/A - no in-combination CC impact.	Not Significant	
Irrigation and water supply systems	Disruption to soil, including removal and reinstatement	Construction		Drier/drought conditions	Greater need for irrigation, potential risk to harvest, affects effectiveness of	No	Mitigation measures in place	Not Significant	No additional mitigation measures required
Drainage systems	Loss of, or disruption to drainage systems	Construction		Drier/drought conditions	Dry soils damage drainage systems	No	Mitigation measures in place	Not Significant	No additional mitigation measures required
					Increase in frequency and intensity of heavy rainfall events/ flooding	Increased need to drain lower lying areas of land, failure of drainage system could lead to flooding	No	It is unlikely that increased frequency or intensity of heavy rainfall events will cause the drainage systems to fail because HS2 critical assets have been designed with an embedded climate change allowance to account for changes in rainfall and therefore potential flooding of drainage systems is considered to be low	Not Significant
Land required temporarily from holdings		Construction		Increased wind speed	Increase spread of weeds and invasive species	No	There is considerable uncertainty in projecting wind changes, from wind speed to wind direction, and studies show statistically insignificant variation in wind speed. If wind speeds are likely to increase, the Ecology TS sets out mitigation measures to limit the spread of weeds and invasive species	Not Significant	No additional mitigation measures required, as ecological resilience has been embedded into existing mitigation measures
					Variation in temperature and rainfall patterns	Alters optimum growing conditions	No	There is likely to be changes in temperate and rainfall patterns during constructino works. The design of suitable well-drained landforms, installation of field drains and borrow pits will minimise the increased potential of erosion or saturation of soils which and therefore not affect optimum growing conditions	Not Significant

Agricultural land

<p>Quality of reinstated agricultural land may be affected</p>	<p>Construction</p>		<p>Increase in frequency of extreme weather events (e.g. drought, flooding, heat waves)</p>	<p>Increase the susceptibility of agricultural land</p>	<p>No</p>	<p>Reinstatement of soil back to agricultural land may become more vulnerable to extreme events therefore disrupting the soil structure</p>	<p>Not Significant</p>	<p>Design suitable well-drained landforms, and install field drains and borrow pits to manage the additional flood risk from extreme weather events To manage the in combination drought risk deeper soil profiles or more moisture retentive textures should be used to mitigate longer term drought effects on restored soils Additional measures: Potential for land/soil management guidance document for farmers when they retain ownership of the land following the 5yr after care period</p>
<p>Propensity of land to harbour noxious weeds</p>	<p>Operation</p>		<p>Increased wind speed</p>	<p>Increase spread of weeds and invasive species</p>	<p>No</p>	<p>There is considerable uncertainty in projecting wind changes, from wind speed to wind direction, and studies show statistically insignificant variation in wind speed. If wind speeds are likely to increase, the Ecology TS sets out mitigation measures to limit the spread of weeds and invasive species</p>	<p>Not Significant</p>	<p>No additional mitigation measures required, as ecological resilience has been embedded into existing mitigation measures</p>

Air Quality

Resources/receptors potentially impacted by the Proposed Scheme identified by environmental topic	Effects of Proposed Scheme on receptors/resources identified by environmental topic	Each effect should be identified as occurring during construction or operation by environmental topic	Existing/embedded mitigation measures	Potential climate change hazards impacting on resources/receptors	In-combination climate change impact	Can this change the significance given existing/embedded mitigation measures	Justification of Likelihood/Consequence of in-combination climate change impacts given existing/embedded mitigation measures	Significance of in-combination climate change impacts given existing/embedded mitigation measures	Additional mitigation measures to address significant effects on the ability of resources and receptors to adapt to climate change
Atmosphere, people, ecology and communities	Increase dust and air pollutants from construction works will have temporary local effects Increase in NO2, NOx and particulate matter from construction vehicles and changes in the volume, composition and location of traffic on the highway network during construction works - if we identify significant affects then monitoring will be required during construction	Construction	Construction dust mitigation for *high* risk schemes will be put in place. This can be seen in the Air quality chapter.	Hotter and drier/drought conditions	Exacerbate dust generation and concentrations of certain air pollutants.	No	It is unlikely that hotter and drier/drought conditions will exacerbate dust generations and concentrations of air pollutants because there are sufficient mitigation measures in the air quality chapter to limit the generation and dispersion of construction dust.	Not Significant	No further mitigation measures required Future measures/monitoring: Construction related dust monitoring requirements are covered by the air quality chapter/CMP.
				Increase in frequency and intensity of heavy rainfall events/ flooding	Suppress dust movement.	No	It is likely that heavy rainfall events/flooding will become more frequent in future therefore suppressing dust movement and reducing the amount of dust in the	Not Significant	No further mitigation measures required Future measures/monitoring: Construction related dust monitoring requirements are
				Increased wind speed	Could influence dispersion of pollutants	No	There is considerable uncertainty in projecting wind changes, from wind speed to wind direction, and studies show statistically insignificant variation in wind speed. Construction dust mitigation outlined in the air quality chapter will mitigate any further impacts due to climate change impacts.	Not Significant	No further mitigation measures required Future measures/monitoring: Construction related dust monitoring requirements are covered by the air quality chapter/CMP.
	Impacts from the operation of the Proposed Scheme could arise from vehicle emissions due to changes in the volume, composition and distribution of traffic in the area.	Operation	None	Hotter and drier/drought conditions	Increased concentration of air pollutants such as ozone and NOx.	No	Hotter and drier conditions are likely in the future however vehicle emissions are predicted to reduce significantly and therefore the	Not Significant	No further mitigation measures required
				Increase in frequency and intensity of heavy rainfall events/ flooding	Increase in frequency and intensity of heavy rainfall events/flooding – decreased concentration of air pollutants	No	Increased rainfall and flooding is likely in the future. This will have a beneficial impact on air quality.	Not Significant	No further mitigation measures required
				Increased wind speed	Could influence local pollutant levels	No	There is considerable uncertainty in projecting wind changes, from wind speed to wind direction, and studies show statistically insignificant	Not Significant	No further mitigation measures required
	Impacts from the construction of the Proposed Scheme could arise from vehicle exhaust emissions associated with construction related traffic	Construction		Increased wind speed	Could influence local pollutant levels	No	No conclusive projections relating to wind patterns are available, however, it is unlikely that there will be major changes to the spread of pollutants. The consequences are uncertain; however, it is unlikely that	Not Significant	No further mitigation measures required

Community

Resources/receptors potentially impacted by the Proposed Scheme identified by environmental topic	Effects of Proposed Scheme on receptors/resources identified by environmental topic	Each effect should be identified as occurring during construction or operation by environmental topic	Existing/embedded mitigation measures	Potential climate change hazards impacting on resources/receptors	In-combination climate change impact	Can this change the significance given existing/embedded mitigation measures	Justification of Likelihood/Consequence of in-combination climate change impacts given existing/embedded mitigation measures	Significance of in-combination climate change impacts given existing/embedded mitigation measures	Additional mitigation measures to address significant effects on the ability of resources and receptors to adapt to climate change						
Residential property	Isolation - Isolation of residential properties from other properties and infrastructure. This could be physical e.g. islanding or isolation of resource or psychological	Construction		Increase in frequency and intensity of heavy rainfall events/ flooding	Exacerbate isolation of properties	No	An increase in extreme weather events is likely. There are sufficient mitigation measures in place.	Not Significant	No additional mitigation measures required						
	In-combination effects - combination of significant residual effects, such as noise, vibration, construction dust, poor air quality and visual intrusion. During construction, significant noise, visual and HGV effects will result in in-combination effects on the community.	Construction		Increased temperatures and occurrence of heat waves	Negative effect to thermal comfort - may increase need to open windows increasing effect of noise for example	No	A temperature increase is likely. The in combination impact of climate change with noise effects is not significant. Relevant mitigation measures are proposed by the noise topic.	Not Significant	No additional mitigation measures required						
										Drier/drought conditions	Could lead to loss of vegetation and defoliation, drought tolerant trees may become more prevalent (therefore also changing landscape character), wetlands may disappear.	No	Drier/drought conditions are likely which could cause these effects. Incombination with climate change, these effects are not significant. Relevant mitigation measures are also proposed by the Landscape and visual topic.	Not Significant	No additional mitigation measures required
	In-combination effects - combination of significant residual effects, such as noise, vibration, poor air quality and visual intrusion	Operation		Increased temperatures and occurrence of heat waves	Negative effect to thermal comfort - may increase need to open windows increasing effect of noise for example	No	A temperature increase is likely. There are sufficient mitigation measures in place.	Not Significant	No additional mitigation measures required Future measures and monitoring: There are no area-specific community monitoring requirements during operation of the Proposed Scheme. Any area-specific operational monitoring requirements in relation to air quality effects, noise and vibration effects, traffic effects and visual effects that have contributed to the in-combination assessments are described in the relevant topic chapters.						
Community and recreational facilities	Isolation - Isolation of community infrastructure from other properties and infrastructure. Physical/psychological.	Construction		Increase in frequency and intensity of heavy rainfall events/ flooding	Exacerbate isolation of facilities	No	An increases in the number of extreme weather events is likely. There are sufficient mitigation measures in place.	Not Significant	No additional mitigation measures required						
	In-combination effects - combination of significant residual effects, such as noise, vibration, construction dust, poor air quality and visual intrusion. During construction, significant noise, visual and HGV effects will result in in-combination effects on the community.	Construction		Increased temperatures and occurrence of heat waves	Negative effect to thermal comfort - may increase need to open windows increasing effect of noise for example	No	A temperature increase is likely. There are sufficient mitigation measures in place.	Not Significant	No additional mitigation measures required						
										In-combination effects - combination of significant residual effects, such as noise, vibration, construction dust, poor air quality and visual intrusion	Operation		Increased temperatures and occurrence of heat waves	Negative effect to thermal comfort - may increase need to open windows increasing effect of noise for example	No
Land take - open space and PROW lost due to land required for construction (temporary loss) or operation of the Proposed scheme (permanent loss).	Construction		Drier/drought conditions	Exacerbate loss of grassland	No	A temperature increase and increases in the number of extreme weather events is likely. In combination with HS2 this could increase pressure on remaining areas of open space.	Not Significant	Refer to landscape and Ecology strategies for replacing vegetation in open spaces							

Open space and public rights of way (PROW)	Land take - open space and PROW lost due to land required for construction (temporary loss) or operation of the Proposed scheme (permanent loss).	Construction		Increase in frequency of extreme weather events (e.g. drought, flooding, heat waves)	Impact quality and patterns of use of open spaces/green spaces	No	An increase in extreme weather events is likely. In combination with HS2 this could increase pressure on remaining areas of open space.	Not Significant	Refer to landscape and Ecology strategies for replacing vegetation in open spaces Ecological resilience and technical standard and planting strategy
	In-combination effects - combination of significant residual effects, such as noise, vibration, construction dust, poor air quality and visual intrusion. During construction, significant								
		Operation		Drier/drought conditions	Exacerbate loss of grassland	No	A temperature increase is likely. There are sufficient mitigation measures in place during operation	Not Significant	No additional mitigation measures required Future measures and monitoring: There are no area-specific community monitoring requirements during operation of the Proposed Scheme. Any area-specific operational monitoring requirements in relation to air quality effects, noise and vibration effects, traffic effects and visual effects that have contributed to the in-combination assessments are described in the relevant topic chapters.
In-combination effects - combination of significant residual effects, such as noise, vibration, construction dust, poor air quality, visual intrusion and traffic and transport.				Increase in frequency of extreme weather events (e.g. drought, flooding, heat waves)	Impact quality and patterns of use of open spaces/green spaces	No	An increase in the number of extreme weather events is likely. There are sufficient mitigation measures in place during operation	Not Significant	No additional mitigation measures required Future measures and monitoring: There are no area-specific community monitoring requirements during operation of the Proposed Scheme. Any area-specific operational monitoring requirements in relation to air quality effects, noise and vibration effects, traffic effects and visual effects that have contributed to the in-combination assessments are described in the relevant topic chapters.

GHG

Resources/receptors potentially impacted by the Proposed Scheme identified by environmental topic	Effects of Proposed Scheme on receptors/resources identified by environmental topic	Each effect should be identified as occurring during construction or operation by environmental topic	Existing/ embedded mitigation measures	Potential climate change hazards impacting on resources/receptors	In-combination climate change impact	Can this change the significance given existing/embedded mitigation measures	Justification of Likelihood/Consequence of in-combination climate change impacts given existing/embedded mitigation measures	Additional mitigation measures to address significant effects on the ability of resources and receptors to adapt to climate change	Topic Specific Reference
Atmosphere	GHG emissions resulting from construction works including energy, transport and new materials for the construction of the proposed scheme. This can relate to any works, including earthworks, infrastructure, structures and buildings	Construction		Increase in frequency of extreme weather events e.g. drought flooding heatwaves	Loss of material due to extreme weather such as high temperatures, drought, flooding, can damage material during construction. Thus, more material required and more GHG associated with this.	No			
	Energy needed to maintain necessary environmental conditions for suitable materials storage	Operation		Increase in frequency of extreme weather events e.g. drought flooding heatwaves	Variation in temperatures may require more or less energy to maintain env conditions depending on season, and may affect GHG emissions	No			
	Carbon emissions resulting from activities related to any works and new materials for the maintenance, repair, replacement, and refurbishment of the Proposed scheme during the use stage. This can relate to earthworks and assets e.g. infrastructure	Operation		Variation in temperature and rainfall patterns	Weathering of material due to extreme weather may cause additional material requirements, therefore more maintenance, repair and replacement and GHG emissions	No			
	Carbon emissions resulting from the (i)energy used by the proposed scheme's infrastructure (ii)building integrated systems (e.g. fans, pumps, lights)	Operation		Increased temperatures	Increased summer cooling demand in buildings etc	No			
	Carbon emissions from water provision required to enable operation. Includes all water used and its treatment (pre/post use) during the normal operations of the proposed scheme.	Operation		Hotter and drier conditions in summer	Less water available in drought for water provision and treatment and thus emergency plan needed	No			

****Example sentence to include in your topic chapter:**
 This assessment may be affected by a potential change in GHGs brought about by climate change. However, it is unlikely to have a material impact on the carbon assessment and therefore, unlikely to increase the significance of any residual effects.

Daylight and sunlight

Resources/receptors potentially impacted by the Proposed Scheme identified by environmental topic	Effects of Proposed Scheme on receptors/resources identified by environmental topic	Each effect should be identified as occurring during construction or operation by environmental topic	Existing/ embedded mitigation measures	Potential climate change hazards impacting on resources/receptors	In-combination climate change impact	Can this change the significance given existing/embedded mitigation measures	Justification of Likelihood/Consequence of in-combination climate change impacts given existing/embedded mitigation measures	Additional mitigation measures to address significant effects on the ability of resources and receptors to adapt to climate change	Topic Specific Reference
n/a						No			

****Example sentence to include in your topic chapter**

This assessment may be affected by a potential change in cloud cover brought about by climate change. However, significant uncertainty exists regarding future projections of cloud cover and therefore, no potential in-combination climate impacts have been identified that are thought to increase the significance of any residual effects.

Resources/receptors potentially impacted by the Proposed Scheme identified by environmental topic	Effects of Proposed Scheme on receptors/resources identified by environmental topic	Each effect should be identified as occurring during construction or operation by environmental topic	Existing/embedded mitigation measures	Potential climate change hazards impacting on resources/receptors	In-combination climate change impact	Can this change the significance given existing/embedded mitigation measures	Justification of Likelihood/Consequence of in-combination climate change impacts given existing/embedded mitigation measures	Significance of in-combination climate change impacts given existing/embedded mitigation measures	Additional mitigation measures to address significant effects on the ability of resources and receptors to adapt to climate change		
Habitats and wildlife species	Disruption to breeding, feeding and migration patterns of species Decline of species populations Permanent loss, removal, degradation of habitats	Construction	Recommending native species for the local area including drought tolerant species	Drier/drought conditions	Low flows and decrease in water levels – enhanced opportunity for species to adapt and move more freely	No	Drier drought conditions are more likely in future and therefore lower water levels will increase species migration and adaptation because the Proposed Scheme is located xxx which will limit habitat fragmentation.	Not Significant	No additional mitigation measures required. Ecological resilience is embedded within the design and mitigation measures for the Proposed Scheme		
			Millennium green developed on a flood plain and the flooding here is manually managed. This has been incorporated into the assessment.	Increased wind speed	Increased tree loss, habitat loss and/or fragmentation.	No	There is considerable uncertainty in projecting wind changes, from wind speed to wind direction, and studies show statistically insignificant variation in wind speed.	Not Significant	No additional mitigation measures required. Ecological resilience is embedded within the design and mitigation measures for the Proposed Scheme		
			Increasing green corridors and recommending species which are naturally able to adapt.	Increase in frequency and intensity of heavy rainfall events/ flooding	Habitat loss	No	It is likely that the intensity and frequency of rainfall events would increase, however, the likelihood of this causing further habitat loss.	Not Significant	No additional mitigation measures required. Ecological resilience is embedded within the design and mitigation measures for the Proposed Scheme		
				Variation in temperature and rainfall patterns	Exceed thresholds for certain habitats and species	No	Temperature changes could cause some species to exceed thresholds. Plant species will be recommended which are able to naturally adapt making this an unlikely.	Not Significant	No additional mitigation measures required. Ecological resilience is embedded within the design and mitigation measures for the Proposed Scheme		
		Operation				Drier/drought conditions	Leads to low flows and decreases in water levels, habitat loss and/or fragmentation	No	Drier/drought conditions are unlikely to cause habitat fragmentation or increase habitat loss because the ecological design for there is considerable uncertainty in projecting wind changes, to wind speed and direction, and studies show statistically insignificant variation in wind speed.	Not Significant	No additional mitigation measures required. Ecological resilience is embedded within the design and mitigation measures for the Proposed Scheme
						Increased wind speed	Increased tree loss, habitat loss and/or fragmentation, and reduction in woodland blocks.	No	Mitigation measures include planting native	Not Significant	No additional mitigation measures required. Ecological resilience is embedded within the design and mitigation measures for the Proposed Scheme
						Variation in temperature and rainfall patterns	Exceed thresholds for certain habitats and species. Could change the growing season of species. Changes in precipitation patterns may have an effect on pollution caused by runoff	No	Temperature changes could cause some species to exceed thresholds. Plant species will be recommended which are able to naturally adapt making this an unlikely	Not Significant	No additional mitigation measures required. Ecological resilience is embedded within the design and mitigation measures for the Proposed Scheme
						Increased frequency of extreme weather events (e.g. drought, flooding, heat waves)	Increased frequency and intensity of storm events lead to destruction of trees and affect nesting birds by disturbance and reduce availability of nesting habitat.	No	Increased levels of damage due to storms are expected to occur. Potential impacts to habitat are not expected to be permanent	Not Significant	Future measures and monitoring: Ecological monitoring for habitats and species will be carried out in line with the Ecological monitoring strategy. This strategy is routewide and will monitor the effectiveness of and maintain the ecological conditions based on the mitigation measures provided in the Ecology Chapter.
						Increase in frequency and intensity of heavy rainfall events/ flooding	Extreme rainfall events lead to flooding and disturbance and destruction of habitat. Flooding may affect riparian mammals i.e. water vole and otter – potentially reducing suitability of habitat to shelter/breed and also making it more likely that animals would need to cross roads as they move through waterbodies/connecting estuary – therefore increasing risk of mortality from collisions.	No	It is likely that the intensity and frequency of rainfall events would increase, however, the likelihood of this causing fragmentation, disturbance and destruction of habitat is low. This would not change the significance of the ecological effect and thus the ICCI consequence is low. Millennium Green evolved on a flood plain so the species are	Not Significant	Future measures and monitoring: Ecological monitoring for habitats
						Hotter and drier/drought conditions	Hot and dry (drought-like) conditions lead to habitat degradation, including potentially drying out of waterbodies and therefore making less suitable for otter/water vole.	No	Projected temperature increases and precipitation changes are expected to be within the tolerance of local habitats. Potential impacts to habitat are not expected impact the viable locations of vulnerable species	Not Significant	Future measures and monitoring: Ecological monitoring for habitats and species will be carried out in line with the Ecological monitoring strategy. This strategy is routewide and will monitor the effectiveness of and maintain the ecological conditions based on the mitigation measures provided in the Ecology Chapter.
						Increased temperatures and occurrence of heat waves	Increased temperature may change the suitability of habitat conditions, potential for increase in spread of non-native species if native species/plants can't survive.	No	Projected temperature increases and precipitation changes are expected to be within the tolerance of local habitats. Potential impacts to habitat are not expected impact the viable locations of vulnerable species	Not Significant	Future measures and monitoring: Ecological monitoring for habitats and species will be carried out in line with the Ecological monitoring strategy. This strategy is routewide and will monitor the effectiveness of and maintain the ecological conditions based on the mitigation measures provided in the Ecology Chapter.

	<p>Increase in frequency and intensity of heavy rainfall events/ flooding</p>	<p>Damaging habitats and increasing habitat fragmentation. Increased winter rainfall combined with increase airborne pollutants may result in increased acid rain. Damage to wildlife: Acid rain- damage to trees, soils, water bodies,</p>	<p>No</p>	<p>Low likelihood of flooding in the local area. Further mitigated through robust drainage design, incorporating climate change considerations. The effect of any potential flooding and resulting habitat fragmentation is not expected to be large or long-lasting</p>	<p>Not Significant</p>	<p>No additional mitigation measures required. Ecological resilience is embedded within the design and mitigation measures for the Proposed Scheme Future measures and monitoring:</p>
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Electromagnetic interference

Resources/receptors potentially impacted by the Proposed Scheme identified by environmental topic	Effects of Proposed Scheme on receptors/resources identified by environmental topic	Each effect should be identified as occurring during construction or operation by environmental	Existing/ embedded mitigation measures	Potential climate change hazards impacting on resources/receptors	In-combination climate change impact	Can this change the significance given existing/embedded mitigation	Justification of Likelihood/Consequence of in-combination climate change impacts given	Additional mitigation measures to address significant effects on the ability of resources and	Topic Specific Reference
n/a						No			

****Example sentence to include in your topic chapter**

No potential in-combination climate change impacts have been identified for this project.

Environmental wind

Resources/receptors potentially impacted by the Proposed Scheme identified by environmental topic	Effects of Proposed Scheme on receptors/resources identified by environmental topic	Each effect should be identified as occurring during construction or operation by environmental topic	Existing/ embedded mitigation measures	Potential climate change hazards impacting on resources/receptors	In-combination climate change impact	Can this change the significance given existing/embedded mitigation measures	Justification of Likelihood/Consequence of in-combination climate change impacts given existing/embedded	Additional mitigation measures to address significant effects on the ability of resources and receptors to adapt to climate change	Topic Specific Reference
n/a						No			

Pedestrians, cyclists, vehicles

usability of spaces, base Operation

trees/screens/canopies Changes in wind roses - speed and direction

This assessment may be affected by a potential change in environmental wind brought about by climate change. However, significant uncertainty exists regarding future projections of wind speeds. Effect on mitigation - resilience of planted trees

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People	Potential impact on human health on-site and off-site (direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and groundwater and inhalation of ground gases).	Construction		Increased temperatures and occurrence of heat waves	May enhance landfill gas production, but this may be ameliorated by lower moisture content associated with dry weather.	No	The construction phase is expected to have a neutral to minor beneficial effect on the receptors overall (although there may be temporary worsening during the construction phase, occasionally leading to temporary minor to moderate adverse effects) and is not considered to be significant in relation to potential land contamination. Existing mitigation measures are also in place (see column 3).	Not Significant	No additional measures required as there are sufficient mitigation measures in place. Future measures and monitoring: Requirements for monitoring will be determined as part of the site investigation, treatment and validation of contamination on a site specific basis as part of the detailed design process.
				Increased temperatures and occurrence of heat waves	May cause increased volatility of organic compounds (VOC) causing unpleasant odours locally.	No	The construction phase is expected to have a neutral to minor beneficial effect on the receptors overall (although there may be temporary worsening during the construction phase, occasionally leading to temporary minor to moderate adverse effects) and is not considered to be significant in relation to potential land contamination. Existing mitigation measures are also in place (see column 3).	Not Significant	No additional measures required as there are sufficient mitigation measures in place. Future measures and monitoring: Requirements for monitoring will be determined as part of the site investigation, treatment and validation of contamination on a site specific basis as part of the detailed design process.
				Increased wind speed	Wind-blown dusts.	No	The construction phase is expected to have a neutral to minor beneficial effect on the receptors overall (although there may be temporary worsening during the construction phase, occasionally leading to temporary minor to moderate adverse effects) and is not considered to be significant in relation to potential land contamination. Existing mitigation measures are also in place (see column 3).	Not Significant	No additional measures required as there are sufficient mitigation measures in place. Future measures and monitoring: Requirements for monitoring will be determined as part of the site investigation, treatment and validation of contamination on a site specific basis as part of the detailed design process.
	Users of the Proposed Scheme (i.e. rail passengers) are at all routine times within a controlled environment (i.e. within trains), and have, therefore, been scoped out of the assessment.	Operation		Increased temperatures and occurrence of heat waves	May enhance landfill gas production, but this may be ameliorated by lower moisture content associated with dry weather.	No	Users of the Proposed Scheme have been scoped out. Sufficient mitigation measures are in place to prevent harm in the case of unexpected incidents.	Not Significant	No additional measures required as there are sufficient mitigation measures in place. Future measures and monitoring: Requirements for monitoring will be determined as part of the site investigation, treatment and validation of contamination on a site specific basis as part of the detailed design process.
				Increased temperatures and occurrence of heat waves	May cause increased volatility of organic compounds (VOC) causing unpleasant odours locally.	No	Users of the Proposed Scheme have been scoped out and low consequence because mitigation measures are in place to prevent harm in the case of unexpected incidents.	Not Significant	No additional measures required as there are sufficient mitigation measures in place. Future measures and monitoring: Requirements for monitoring will be determined as part of the site investigation, treatment and validation of contamination on a site specific basis as part of the detailed design process.
				Increased wind speed	Wind-blown dusts.	No	Users of the Proposed Scheme have been scoped out. Sufficient mitigation measures are in place to prevent harm in the case of unexpected incidents.	Not Significant	No additional measures required as there are sufficient mitigation measures in place. Future measures and monitoring: Requirements for monitoring will be determined as part of the site investigation, treatment and validation of contamination on a site specific basis as part of the detailed design process.
Ground and surface water	Potential impact on groundwater quality (leaching, vertical and lateral migration from soils and water), and on surface water quality (lateral migration through groundwater, direct run-off from site).	Construction		Increase in frequency and intensity of heavy rainfall events/ flooding	May cause and increased risk of run-off of sediments.	No	The construction phase is expected to have a neutral to minor beneficial effect on the receptors overall (although there may be temporary worsening during the construction phase, occasionally leading to temporary minor to moderate adverse effects) and is not considered to be significant in relation to potential land contamination. Existing mitigation measures are also in place (see column 3).	Not Significant	No additional measures required as there are sufficient mitigation measures in place. Future measures and monitoring: Requirements for monitoring will be determined as part of the site investigation, treatment and validation of contamination on a site specific basis as part of the detailed design process.

	Possible impact on health of altered landscape due to changed perception of local environment.	Operation		Hotter and drier/drought conditions	Might affect the effectiveness of landscape planting	No	It is unlikely that hotter and drier/drought conditions will cause stress to plants because species will be chosen based on their ability to adapt to climate change and ability to cope with changes in soil moisture conditions to minimise the impact of drought.	Not Significant	No additional measures required as there are sufficient mitigation measures in place. Future measures: continue to engage with the owners and occupiers of sensitive receptors directly affected by the Proposed Scheme to develop mitigation measures that will reduce or avoid impacts.
Older People	Vulnerability to fluctuations in temperature (heat waves or extended cold periods)	Operation		Increased temperatures and occurrence of heat waves	Extreme heat events to cause increased morbidity and mortality in elderly residents (note also potential opportunity: reduction in excess winter deaths)	No	Statistically heatwave events increase the morbidity and mortality rate, however there are few extreme heat days predicted. Additional fatalities are classified as a major consequence	Not Significant	
Residents and users of the site facilities	Access to healthcare services and other social infrastructure (including education)	Operation		Increase in frequency of extreme weather events (e.g. drought, flooding, heat waves)	Increased frequency and intensity of storm events lead to temporary isolation from services due to flooding and other infrastructure failure	No	Storm events expected to increase in frequency and intensity, however extensive flood mitigation has been incorporated into design of infrastructure. Inability to access facilities will limit the beneficial impact of the LWLV.	Not Significant	
	Access to open space and nature Accessibility and active travel	Operation		Hotter and drier/drought conditions	Opportunity: Increased temperatures lead to increased outdoor recreation, walking and cycling opportunities for development occupants	No		Not Significant	
				Increase in frequency and intensity of heavy rainfall events/ flooding	Increased frequency and intensity of storm events lead to reduced opportunity for occupants and local residents to access and enjoy open space and nature, reduced suitability of conditions for active travel options	No	Storm events expected to increase in frequency and intensity.	Not Significant	

Cultural Heritage

Resources/receptors potentially impacted by the Proposed Scheme identified by environmental topic	Effects of Proposed Scheme on receptors/resources identified by environmental topic	Each effect should be identified as occurring during construction or operation by environmental topic	Existing/embedded mitigation measures	Potential climate change hazards impacting on resources/receptors	In-combination climate change impact	Can this change the significance given existing/embedded mitigation measures	Justification of Likelihood/Consequence of in-combination climate change impacts given existing/embedded mitigation measures	Significance of in-combination climate change impacts given existing/embedded mitigation measures	Additional mitigation measures to address significant effects on the ability of resources and receptors to adapt to climate change
Historic buildings	Temporary/permanent disruption to historic landscape setting	Construction		Increased wind speed	There could be an impact on the designed landscape due to trees lost from variation in wind patterns	No	There is considerable uncertainty in projecting wind changes to wind speed and direction and studies show statistically insignificant variation in wind speed. There are sufficient mitigation measures in place.	Not Significant	Incombination impact is unlikely and sufficient mitigation measures in place, no additional mitigation measures required.
				Hotter and wetter conditions	This can lead to an increase in the growing season which will lead to an increase rate of growth of vegetation. The landscape setting will therefore be either postively or negatively affected.	No	An increase in temperatures and frequency and intensity of rainfall is likely, however, this will lead to a positive impact. The potential increased rate of growth is beneficial to reducing impacts on the setting of assets.	Not Significant	Positive impact, therefore, no additional mitigation measures required
	Temporary/permanent disruption to historic landscape setting	Operation		Hotter and wetter conditions	This can lead to an increase in the growing season which will lead to an increase rate of growth of vegetation. The landscape setting will therefore be either postively or negatively affected.	No	An increase in temperatures and frequency and intensity of rainfall is likely. The potential increased rate of growth is negative as this could disrupt the view of historic buildings. however most of the historic buildings will be located around public squares which are paved or on roads and therefore will the risk will be low consequence.	Not Significant	No additional mitigation measures required
				Drier/drought conditions	This could exacerbate the risks of ground settlement and threaten the foundations of any buildings.	No	It is likely that there will be an increase in drought conditions however there is sufficient mitigation in place to preserve records of any historic buildings and there is a strategy in place to deal with basements.	Not Significant	No additional mitigation measures required
	Temporary/permanent disruption to designed landscape			Increased wind speed	There could be an impact on the designed landscape due to trees lost from variation in wind patterns	No	There is considerable uncertainty in projecting wind changes to wind speed and direction and studies show statistically insignificant variation in wind speed. There are sufficient mitigation measures in place.	Not Significant	No additional mitigation measures required
				Hotter and wetter conditions	This can lead to an increase in the growing season which will lead to an increase rate of growth of vegetation. The landscape setting will therefore be either postively or negatively affected.	No	An increase in temperatures and frequency and intensity of rainfall is likely. The potential increased rate of growth is negative as this could disrupt the view of historic buildings. Find out if there is a management plan in place to maintain the vegetation	Not Significant	No additional mitigation measures required
Palaeo-environmental sites and remains	Complete/partial removal of palaeo-environmental remains Potential temporary adverse effects on landscape settings (local flora and fauna, including protected species)	Construction		Increase in frequency and intensity of heavy rainfall events/ flooding	Changes to water courses	No	Flash flooding could cause diversions to water courses and, therefore, cause drying out to palaeo-environmental sites. Given the location and condition of remains is unknown it is uncertain how likely and significant this impact might be.	Not Significant	No additional mitigation measures required
				Increase in frequency and intensity of heavy rainfall events/ flooding	Stabilising of palaeoenvironment	No	It is likely that there will be an increase in the frequency and intensity of heavy rainfall and extreme rainfall events such as flooding. However, this could have a positive impact.	Not Significant	No additional mitigation measures required
	Complete/partial removal of palaeo-environmental remains	Construction		Drier/drought conditions	Drying out of waterlogged remains.	No	Potentially significant in-combination effect with insufficient mitigation. It is currently unknown what palaeo-environmental sites and remains exist and so it is uncertain how significant this impact might be.	Not Significant	No additional mitigation measures required
				Increase in frequency and intensity of heavy rainfall events/ flooding	Changes to water courses	No	Flash flooding could cause diversions to water courses and, therefore, cause drying out to palaeo-environmental sites. Given the location and condition of remains is unknown it is uncertain how likely and significant this impact might be.	Not Significant	No additional mitigation measures required
	Potential permanent adverse effects on landscape settings (local flora and fauna, included protected species) Expectation that conservation areas are expected to be permanently significantly affected visually once the Proposed Scheme becomes operational.	Operation		Increased wind speed	Impact on settings due to trees lost	No	There is considerable uncertainty in projecting wind changes to wind speed and direction and studies show statistically insignificant variation in wind speed. There are sufficient mitigation measures in place.	Not Significant	Incombination impact is unlikely and sufficient mitigation measures in place, no additional mitigation measures required.
				Hotter and wetter conditions	Leads to longer growing season – increase rate of growth of vegetation	No	An increase in temperatures and frequency and intensity of rainfall is likely. This will lead to a positive impact. The potential increased rate of growth is beneficial to reducing impacts on the setting of assets.	Not Significant	Positive impact, therefore, no additional mitigation measures required

				Drier/drought conditions	Exacerbate the risks of ground settlement, stability of archaeological site	No	No in-combination effect identified as the scheme will not impact on the stability of the archaeological sites during operation.	Not Significant	No additional mitigation measures required
Designed landscapes	Potential temporary adverse effects on landscape settings (local flora and fauna)	Construction		Increased wind speed	Impact on settings due to trees lost	No	There is considerable uncertainty in projecting wind changes to wind speed and direction and studies show statistically insignificant variation in wind speed. There are sufficient mitigation measures in place.	Not Significant	Incombination impact is unlikely and sufficient mitigation measures in place, no additional mitigation measures required.
				Hotter and wetter conditions	Leads to longer growing season – increase rate of growth of vegetation	No	An increase in temperatures and frequency and intensity of rainfall is likely. This will lead to a positive impact. The potential increased rate of growth is beneficial to reducing	Not Significant	Positive impact, therefore, no additional mitigation measures required
	Significant change in setting	Operation		Increased wind speed	Impact on settings due to trees lost	No	There is considerable uncertainty in projecting wind changes to wind speed and direction and studies show statistically insignificant variation in wind speed. There are sufficient	Not Significant	Incombination impact is unlikely and sufficient mitigation measures in place, no additional mitigation measures required.
	Potential temporary adverse effects on landscape settings (local flora and fauna)	Operation		Hotter and wetter conditions	Leads to longer growing season – increase rate of growth of vegetation	No	An increase in temperatures and frequency and intensity of rainfall is likely. This will lead to a positive impact. The potential increased rate of growth is beneficial to reducing	Not Significant	Positive impact, therefore, no additional mitigation measures required
Buried archaeology	Permanent removal of buried archaeological features due to construction of the Proposed Scheme.	Construction	Keep a record of any buildings which are demolished or buried archeology which is removed due to the construction of the scheme	Increase in frequency and intensity of heavy rainfall events/ flooding	This could exacerbate the risk of ground settlement and threaten any burried remains or lead to water damage of remains.	No	It is likely that there will be an increase in heavy rain conditions however there is sufficient mitigation in place to make a record of any remains which have	Not Significant	No additional mitigation measures required
				Drier/drought conditions	This could lead to drying out of waterlogged remains causing damage.	No	It is likely that there will be an increase in drought conditions however there is sufficient mitigation in place to make a record of any remains which have	Not Significant	No additional mitigation measures required

Major Accidents and Natural Hazards

Resources/receptors potentially impacted by the Proposed Scheme identified by environmental topic	Effects of Proposed Scheme on receptors/resources identified by environmental topic	Each effect should be identified as occurring during construction or operation by environmental topic	Existing/embedded mitigation measures	Potential climate change hazards impacting on resources/receptors	In-combination climate change impact	Can this change the significance given existing/embedded mitigation measures	Justification of Likelihood/Consequence of in-combination climate change impacts given existing/embedded mitigation measures	Significance of in-combination climate change impacts given existing/embedded mitigation measures	Additional mitigation measures to address significant effects on the ability of resources and receptors to adapt to climate change	
Members of the public and local communities	Spillage or longer term seepage of pollutants into watercourse, potential to affect drinking water	Construction		Increase in frequency of extreme weather events (e.g. drought, flooding, heat waves)	Exacerbate the risk of spreading pollutants to watercourses	No	Given the mitigation in place, it is considered that the risks of this effect are ALARP (as low as reasonably practicable).	Not Significant	There are sufficient mitigation measures in place, no additional mitigation measures required. Future measures and monitoring: Tunnel design and construction methods includes risk assessment for overlying structures and monitoring or mitigation if subsequently required.	
	Collapse of or damage to existing structures	Construction		Increased wind speed	Could cause increased loads on structures leading to collapse	No	There is considerable uncertainty in projecting wind changes to wind speed and direction and studies show statistically insignificant variation in wind speed. Therefore this is not considered an in-combination impact. It is considered that the risk of this impact is mitigated to be ALARP.	Not Significant	There are sufficient mitigation measures in place, no additional mitigation measures required. Future measures and monitoring: Tunnel design and construction methods includes risk assessment for overlying structures and monitoring or mitigation if subsequently required.	
	Train derailment or collision causing severe disruption to rail transportation, major accident causing harm to staff/passenger/adjacent receptors. Train derailment or collision - no passengers but potentially carrying flammable fuel. Could cause a diesel spillage	Operation			Increase in frequency and intensity of heavy rainfall events/ flooding	Could increase the likelihood of a train derailment.	No	The system is designed both to reduce the likelihood of a derailment and manage the impact. This risk will be ALARP. Mitigation measures include designing to appropriate environmental parameters including 'designed in' or embedded considerations of climate change.	Not Significant	There are sufficient mitigation measures in place, no additional mitigation measures required. Future measures and monitoring: Real time monitoring and integrated communication for rolling stock will be used.
	Train derailment or collision causing severe disruption to rail transportation or spillage of pollutants.	Operation			Increased wind speed	Could increase the likelihood of a train derailment.	No	There is considerable uncertainty in projecting wind changes to wind speed and direction and studies show statistically insignificant variation in wind speed. Therefore this is not considered an in-combination impact. The system is designed both to reduce the likelihood of a derailment and manage the impact. This risk will be ALARP. Mitigation measures include designing to appropriate environmental parameters including 'designed in' or embedded considerations of climate change.	Not Significant	There are sufficient mitigation measures in place, no additional mitigation measures required. Future measures and monitoring: Real time monitoring and integrated communication for rolling stock will be used.

built environment	harm to adjacent receptors.			Increased wind speed	Could increase the likelihood of a train derailment.	No	There is considerable uncertainty in projecting wind changes to wind speed and direction and studies show statistically insignificant variation in wind speed. Therefore this is not considered an in-combination impact. The system is designed both to reduce the likelihood of a derailment and manage the impact. This risk will be ALARP. Mitigation measures include designing to appropriate environmental parameters including 'designed in' or embedded considerations of climate change	Not Significant	There are sufficient mitigation measures in place, no additional mitigation measures required.
	Collapse of structures leading to non-train incident	Operation		Increase in frequency of extreme weather events (e.g. drought, flooding, heat waves)	Could cause increased loads on structures leading to collapse	No	There is considerable uncertainty in projecting wind changes to wind speed and direction and studies show statistically insignificant variation in wind speed. Therefore this is not considered an in-combination impact. It is considered that the risk of this impact is mitigated to be ALARP. Mitigation measures include designing to appropriate environmental parameters including designed in considerations of climate change.	Not Significant	There are sufficient mitigation measures in place, no additional mitigation measures required.
Natural environment (including ecosystems, land and soil quality, air quality, surface and groundwater resources and landscape)	Spillage or longer term seepage of pollutants into watercourse, potential to affect drinking water	Construction		Increase in frequency and intensity of heavy rainfall events/ flooding	Exacerbate the risk of spreading pollutants to watercourses	No	Given the mitigation in place, it is considered that the risks of this effect are ALARP (as low as reasonably practicable).	Not Significant	There are sufficient mitigation measures in place, no additional mitigation measures required.
	Collapse of or damage to existing structures	Construction		Increased wind speed	Could cause increased loads on structures leading to collapse	No	There is considerable uncertainty in projecting wind changes to wind speed and direction and studies show statistically insignificant variation in wind speed. Therefore this is not considered an in-combination impact. It is considered that the risk of this impact is mitigated to be ALARP.	Not Significant	There are sufficient mitigation measures in place, no additional mitigation measures required.
	Train derailment or collision causing major accident causing harm to adjacent receptors.	Operation		Increase in frequency and intensity of heavy rainfall events/ flooding	Could increase the likelihood of a train derailment.	No	The system is designed both to reduce the likelihood of a derailment and manage the impact. This risk will be ALARP. Mitigation measures include designing to appropriate environmental parameters including 'designed in' or embedded considerations of climate change.	Not Significant	There are sufficient mitigation measures in place, no additional mitigation measures required. Real time monitoring and integrated communication for rolling stock will be used.
	Train derailment or collision - could cause a derailment	Operation							

	<p>Train derailment or collision causing spillage of pollutants.</p>	<p>Operation</p>		<p>Increased wind speed</p>	<p>Could increase the likelihood of a train derailment.</p>	<p>No</p>	<p>There is considerable uncertainty in projecting wind changes to wind speed and direction and studies show statistically insignificant variation in wind speed. Therefore this is not considered an in-combination impact. The system is designed both to reduce the likelihood of a derailment and manage the impact. This risk will be ALARP. Mitigation measures include designing to appropriate environmental parameters including 'designed in' or embedded considerations of climate change.</p>	<p>Not Significant</p>	<p>There are sufficient mitigation measures in place, no additional mitigation measures required. Real time monitoring and integrated communication for rolling stock will be used.</p>
	<p>Collapse of embankments</p>	<p>Operation</p>		<p>Increase in frequency and intensity of heavy rainfall events/ flooding</p>	<p>Could cause collapse of embankments</p>	<p>No</p>	<p>It is considered that the risk of this impact is mitigated to be ALARP. Mitigation measures include rail infrastructure designed to accommodate 1 in 100 (1%) annual probability flood plus climate change and remain safe during a 1:1000 (0.1%) annual probability flood. The embankment design will include an allowance for extreme weather and climate change.</p>	<p>Not Significant</p>	<p>There are sufficient mitigation measures in place, no additional mitigation measures required.</p>
<p>Historic environment (including archaeology and built heritage)</p>	<p>Collapse of or damage to existing structures</p>	<p>Construction</p>		<p>Increased wind speed</p>	<p>Could cause increased loads on structures leading to collapse</p>	<p>No</p>	<p>It is considered that the risk of this impact is mitigated to be ALARP. In addition, there is considerable uncertainty in projecting wind changes to wind speed and direction and studies show statistically insignificant variation in wind speed. Therefore this is not considered an in-combination impact.</p>	<p>Not Significant</p>	<p>There are sufficient mitigation measures in place, no additional mitigation measures required.</p>
	<p>Collapse of structures leading to non-train incident</p>	<p>Operation</p>		<p>Increased wind speed</p>	<p>Could cause increased loads on structures leading to collapse</p>	<p>No</p>	<p>It is considered that the risk of this impact is mitigated to be ALARP. Mitigation measures include designing to appropriate environmental parameters including 'designed in' or embedded considerations of climate change. There is considerable uncertainty in projecting wind changes to wind speed and direction and studies show statistically insignificant variation in wind speed. Therefore this is not considered an in-combination impact.</p>	<p>Not Significant</p>	<p>There are sufficient mitigation measures in place, no additional mitigation measures required.</p>

Resources/receptors potentially impacted by the Proposed Scheme identified by environmental topic	Effects of Proposed Scheme on receptors/resources identified by environmental topic	Each effect should be identified as occurring during construction or operation by environmental topic	Existing/embedded mitigation measures	Potential climate change hazards impacting on resources/receptors	In-combination climate change impact	Can this change the significance given existing/embedded mitigation measures	Justification of Likelihood/Consequence of in-combination climate change impacts given existing/embedded mitigation measures	Significance of in-combination climate change impacts given existing/embedded mitigation measures	Additional mitigation measures to address significant effects on the ability of resources and receptors to adapt to climate change
Presence of construction sites, cranes, compounds etc., vehicle movement and the loss of trees or vegetation could affect the character of the site, the setting of the townscape as well as view from the proposed development of key site lines to the city of York e.g.xxx	Construction			Drier/drought conditions	Could lead to loss of vegetation and defoliation and receptors could become more vulnerable to stress. Could further disrupt views to and from the site.	No	Drier/drought conditions could increase loss of vegetation and defoliation. There are a number of mitigation measures in place to reduce the impacts of this however the in-combination climate change impact could affect the significance of the effects identified within the townscape and visual assessment and therefore extra mitigation has been suggested to address this and to account for climate change. This means that if the local existing plants and vegetation can not survive there will still be vegetation providing screening.	Not Significant	Potential to include deeper soil profiles or more moisture retentive textures to mitigate longer term drought effects on soils and associated tree species or vegetation. The current good practice is to separate different soil types during the restoration process, however this measure may not be sufficient following any potential CC impacts therefore to combat this, soil types may be mixed to provide greater flexibility for plant and trees species to be more resilient to drought. Future measures and monitoring: Operational monitoring to take place in the form of cross-checking works undertaken with contractor specification documents Soil moisture and texture to be monitored during the 5yr after care period.
				Drier/drought conditions	Drought tolerant trees may become more prevalent (therefore also changing landscape character)	No	Drier/drought conditions could increase loss of vegetation and defoliation. There are a number of mitigation measures in place to reduce the impacts of this; including compliance with the Plant Procurement Strategy which aims to minimise impacts of drought on native tree species; undertake post-construction monitoring and design planting palettes for replacement planting lost during construction to align with soil profiles.	Not Significant	Potential to include deeper soil profiles or more moisture retentive textures to mitigate longer term drought effects on soils and associated tree species or vegetation The current good practice is to separate different soil types during the restoration process, however this measure may not be sufficient following any potential CC impacts therefore to combat this, soil types may be mixed to provide greater flexibility for plant and trees species to be more resilient to drought.
				Drier/drought conditions	Wetlands may disappear (also dependent on elevation and spilt type) and certain soil types may be less readily available.	No	Drier/drought conditions could encourage the drying out of wetlands. There are a number of mitigation measures in place to reduce these potential impacts and therefore the consequence is low; the Ecology chapter sets out the design specification, management and monitoring details for wetland ecosystems.	Not Significant	Potential to include deeper soil profiles or more moisture retentive textures to mitigate longer term drought effects on soils and associated tree species or vegetation. The current good practice is to separate different soil types during the restoration process, however this measure may not be sufficient following any potential CC impacts therefore to combat this, soil types may be mixed to provide greater flexibility for plant and trees species to be more resilient to drought.
				Hotter and wetter conditions	Could lead to an increase in pests and diseases, leading to loss of vegetation and defoliation making species more susceptible to external stress	No	Hotter and wetter conditions are likely. Increased risk of pests and diseases is low because traceability studies will be used to minimise risk of spreading diseases during planting	Not Significant	No additional mitigation measures required
				Increase in frequency and intensity of heavy rainfall events/ flooding	Loss of species in certain areas, because soils become water-saturated and can no longer support existing species	No	Heavy rainfall events and flooding are more likely to occur in the future. The loss of species is low because planting palettes will be designed in advance to increase species resilience and adaptability	Not Significant	To further reduce the impact of flood risk on plant/tree species the drainage profile of the soil could be increased.
				Hotter and wetter conditions	Leads to a longer growing season – increased rate of growth of vegetation. Could be a beneficial impact.	No	Longer growing seasons have both positive and negative impacts. Vegetation will be in leaf for longer and reduce adverse views, but it may increase number of leaves on the line, change the trees structural capacity which could increase the stress on trees to external stressors. There are a number of mitigation measures in place including the planting of a wide variety of species including drought tolerant species. This means that if the local existing plants	Not Significant	No additional mitigation measures required
				Increased wind speed	Impact on landscape through potential tree losses. Could further disrupt views to and from the site.	No	There is considerable uncertainty in projecting wind changes, to wind speed and direction, and studies show statistically insignificant variation in wind speed. If wind speed does increase then its more likely to affect more mature, existing trees however the future Tree Survey will assess risks to trees in proximity to construction sites and work in combination with tree protection works to minimise tree damage	Not Significant	No additional mitigation measures required

Landscape character and visual receptors	Existence of new development . Specific elements taken into account in assessing visual impact include the loss of vegetation and landscape features such as ponds, streams, soils, hills, plains	Operation	Drier/drought conditions	Could lead to loss of vegetation and defoliation and receptors could become more vulnerable to stress	No	Drier/drought conditions could increase loss of vegetation and defoliation. There are a number of mitigation measures in place to reduce the impacts of this however the in-combination climate change impact could affect the significance of the effects identified within the townscape and visual assessments and therefore extra mitigation has been suggested to address this and to account for climate change. This means that if the local existing plants and vegetation can not survive there will still be vegetation providing screening.	Not Significant	Deeper soil profiles or more moisture retentive textures to mitigate longer term drought effects on soils and associated tree species or vegetation. The current good practice is to separate different soil types during the restoration process, however this measure may not be sufficient following any potential CC impacts therefore to combat this, soil types may be mixed to provide greater flexibility for plant and trees species to be more resilient to drought. Future measures and monitoring: Operational monitoring to take place in the form of cross-checking works undertaken with contractor specification documents Soil moisture and texture to be monitored during the 5yr after care period.
			Drier/drought conditions	Drought tolerant trees may become more prevalent (therefore also changing landscape character)	No	Drier/drought conditions could increase loss of vegetation and defoliation however there are a number of mitigation measures in place to reduce the impacts of this; including compliance with the Plant Procurement Strategy which aims to minimise impacts of drought on native tree species; undertake post-construction monitoring and design planting palettes for replacement planting lost during construction to align with soil profiles.	Not Significant	Deeper soil profiles or more moisture retentive textures to mitigate longer term drought effects on soils and associated tree species or vegetation. The current good practice is to separate different soil types during the restoration process, however this measure may not be sufficient following any potential CC impacts therefore to combat this, soil types may be mixed to provide greater flexibility for plant and trees species to be more resilient to drought. Future measures and monitoring: Operational monitoring to take place in the form of cross-checking works undertaken with contractor specification documents Soil moisture and texture to be monitored during the 5yr after care period.
			Drier/drought conditions	Wetlands may disappear (also dependent on elevation) and certain soil types may be less readily available.	No	Drier/drought conditions could encourage the drying out of wetlands however there are a number of mitigation measures in place to reduce these potential impacts and therefore the consequence is low; the Ecology chapter sets out the design specification, management and monitoring details for wetland ecosystems.	Not Significant	Deeper soil profiles or more moisture retentive textures to mitigate longer term drought effects on soils and associated tree species or vegetation. The current good practice is to separate different soil types during the restoration process, however this measure may not be sufficient following any potential CC impacts therefore to combat this, soil types may be mixed to provide greater flexibility for plant and trees species to be more resilient to drought. Future measures and monitoring: Operational monitoring to take place in the form of cross-checking works undertaken with contractor specification documents Soil moisture and texture to be monitored during the 5yr after care period.
			Increase in frequency and intensity of heavy rainfall events/ flooding	Loss of species in certain areas, because soils become water-saturated and can no longer support existing species	No	There are a number of mitigation measures in place to reduce the impacts of this; including the planting of a wide variety of species including drought tolerant species. This means that if the local existing plants and vegetation can not survive there will still be vegetation providing screening. The consequence is low because existing mitigation measures will minimise this increased flood risk. Loss of vegetation screening could affect the setting of character areas however it is not thought that this would change the level of effect.	Not Significant	No additional mitigation measures required
			Hotter and wetter conditions	Could lead to an increase in pests and diseases, leading to loss of vegetation and defoliation making species more susceptible to external stress	No	Warmer and wetter conditions are more likely. The increased risk of pests and disease to species is low because of compliance with Plant Procurement Strategy and management of trees during construction works i.e. removing trees that pose a threat/are diseased	Not Significant	No additional mitigation measures required Future measures and monitoring: Management/monitoring of newly planted trees during aftercare period (typically 12-24 months) will help to identify diseased or pest infested trees
			Hotter and wetter conditions	Leads to a longer growing season – increased rate of growth of vegetation.	No	Longer growing seasons have both positive and negative impacts. Vegetation will be in leaf for longer and reduce adverse views, but it may increase number of leaves on the line, change the trees structural capacity which could increase the stress on trees to external stressors. There are a number of mitigation measures in place including the planting of a wide variety of species including drought tolerant species. This means that if the local existing plants and vegetation can not survive there will still be vegetation providing screening.	Not Significant	No additional mitigation measures required Future measures and monitoring: Monitoring of the plant/tree species to be undertaken to identify changes in growth patterns
			Increased wind speed	Loss of valued landscape, opening up new views that were previously shielded, potential for damage to trees from construction making them more vulnerable to high winds	No	There is considerable uncertainty in projecting wind changes, to wind speed and direction, and studies show statistically insignificant variation in wind speed. If wind speed does increase then its more likely to affect more mature, existing trees. There are a number of mitigation measures in place to reduce the impacts of this; including the planting of a wide variety of species including drought tolerant species. This means that if the local existing plants and vegetation can not survive there will still be vegetation providing screening.	Not Significant	No additional mitigation measures required

Waste and Material Resources

Resources/receptors potentially impacted by the Proposed Scheme identified by environmental topic	Effects of Proposed Scheme on receptors/resources identified by environmental topic	Each effect should be identified as occurring during construction or operation by environmental topic	Existing/embedded mitigation measures	Potential climate change hazards impacting on resources/receptors	In-combination climate change impact	Can this change the significance given existing/embedded mitigation measures	Justification of Likelihood/Consequence of in-combination climate change impacts given existing/embedded mitigation measures	Significance of in-combination climate change impacts given existing/embedded mitigation measures	Additional mitigation measures to address significant effects on the ability of resources and receptors to adapt to climate change
Non-hazardous waste landfill	Excavated material - approximately 0 tonnes of chemically unacceptable U1B material to require off-site disposal to non-hazardous landfill. Demolition material and waste – forecast that quantity of demolition waste for off-site disposal would be 7,781 tonnes. Construction waste – approximate quantity of waste that would require off-site disposal to landfill during the overall construction period of 2020 to 2026 would be 41,954 tonnes. Reduction in on-hazardous landfill waste capacity in north yorkshire Excavated material, demolition material and construction waste to require off-site disposal to non-hazardous landfill.	Construction		Hotter and drier/drought conditions	Waste will desiccate instead of decompose.	No	It is unlikely that hotter, drier conditions will lead to waste desiccate instead of decomposing. Temperature change will not affect inert waste.	Not Significant	No additional mitigation measures required Monitoring of waste management activities will be undertaken by xxx.
				Hotter and drier/drought conditions	Increase consumption of beverages, increased frequency of waste collection required.	No	Whilst hotter and drier conditions are likely, there are sufficient mitigation measures in place, including compliance with the EMR requirements. This additional quantity of waste will also be insignificant compared to other waste generated.	Not Significant	No additional mitigation measures required Monitoring of waste management activities will be undertaken by xxx.
				Hotter and wetter conditions	Could affect decomposition and odour production (anaerobic more quickly)	No	It is unlikely that hotter, wetter conditions will lead to odour production. Temperature change will not affect inert waste.	Not Significant	No additional mitigation measures required Monitoring of waste management activities will be undertaken by xxx.
				Increase in frequency of extreme weather events (e.g. drought, flooding, heat waves)	Loss and reduction in quality of available waste and material resources	No	This is not considered a significant in-combination impact. Whilst some waste will be suitable for energy recovery, most waste will be sent to landfill and therefore this loss and reduction in quality of available waste and resources is not affected by the Proposed Scheme.	Not Significant	No additional mitigation measures required Monitoring of waste management activities will be undertaken by xxx.
				Increase in frequency and intensity of heavy rainfall events/ flooding	Impact excavated soils, turn valuable stock pile into waste through contamination	No	It is unlikely that increased frequency of heavy rainfall or flooding will reduce the value of excavated soils during construction. The consequence of any effects off-siting is low because precipitation change wouldn't affect inert waste.	Not Significant	No additional mitigation measures required Monitoring of waste management activities will be undertaken by xxx.
		Track maintenance waste – quantity that would require off-site disposal to landfill in 2027 will be approximately 119 tonnes. Ancillary infrastructure waste - The quantity of ancillary infrastructure waste that will require off-site disposal to landfill in 2026 will be approximately 27 tonnes.	Operation		Hotter and drier/drought conditions	Could affect decomposition and odour production, however there are limited amount of operational non-hazardous waste being sent to landfill.	No	This is not considered a significant in-combination impact. Whilst waste will be generated which needs to be disposed of in landfill, the additional odour from this waste will be insignificant.	Not Significant
	Ancillary infrastructure waste - The quantity of ancillary infrastructure waste that will require off-site disposal to landfill in 2026 will be approximately 27 tonnes.	Operation		Increase in frequency of extreme weather events (e.g. drought, flooding, heat waves)	Loss and reduction in quality of available waste and material resources	No	This is not considered a significant in-combination impact. While waste will be generated and resources needed, the quantities are small during	Not Significant	No additional mitigation measures required Monitoring of waste management
	Ancillary infrastructure waste - The quantity of ancillary infrastructure waste that will require off-site disposal to landfill in 2026 will be approximately 27 tonnes.	Operation		Hotter and drier/drought conditions	Increased frequency of waste collection required, increased consumption of beverages	No	Given there are no stations along the Proposed route and significantly reduced works on site during operation this is not considered to be a significant in-combination impact.	Not Significant	No additional mitigation measures required Monitoring of waste management activities will be undertaken by xxx.
Hazardous waste landfill	Excavated material - approximately 6,306 tonnes will require off-site disposal to landfill Demolition material and waste – forecast that quantity of demolition waste for off-site disposal would be 5,187 tonnes	Construction		Increase in frequency of extreme weather events (e.g. drought, flooding, heat waves)	Loss and reduction in quality of available waste and material resources	No	The likely significant environmental effects associated with the disposal of inert surplus waste has been considered a minor adverse and, therefore, it is not considered that there is a significant in-combination impact.	Not Significant	No additional mitigation measures required Monitoring of waste management activities will be undertaken by xxx.
				Increase in frequency and intensity of heavy rainfall events/ flooding	Impact excavated soils.	No	The likely significant environmental effects associated with the disposal of inert surplus waste has been considered a minor adverse and, therefore, it is not considered that there is a significant in-combination impact.	Not Significant	No additional mitigation measures required Monitoring of waste management activities will be undertaken by xxx.
	Operation FC 11/07/2016 Assume no effect post-construction	Construction			n/a	No	n/a	Not Significant	No additional mitigation measures required Monitoring of waste management activities will be undertaken by xxx.
Inert Waste	Excavated material - approximately 674,179 tonnes will require off-site disposal to landfill	Construction		Increase in frequency of extreme weather events (e.g. drought, flooding, heat waves)	Loss and reduction in quality of available waste and material resources	No	The likely significant environmental effects associated with the disposal of inert surplus waste has been considered a minor adverse and, therefore, it is not considered that there is a significant in-combination impact.	Not Significant	No additional mitigation measures required Monitoring of waste management activities will be undertaken by xxx.
				Increase in frequency and intensity of heavy rainfall events/ flooding	Impact excavated soils.	No	The likely significant environmental effects associated with the disposal of inert surplus waste has been considered a minor adverse and, therefore, it is not considered that there is a significant in-combination impact.	Not Significant	No additional mitigation measures required Monitoring of waste management activities will be undertaken by xxx.

Water resources and flood risk

Resources/receptors potentially impacted by the Proposed Scheme identified by environmental topic	Effects of Proposed Scheme on receptors/resources identified by environmental topic	Each effect should be identified as occurring during construction or operation by environmental topic	Existing/embedded mitigation measures	Potential climate change hazards impacting on resources/receptors	In-combination climate change impact	Can this change the significance given existing/embedded mitigation measures	Justification of Likelihood/Consequence of in-combination climate change impacts given existing/embedded mitigation measures	Significance of in-combination climate change impacts given existing/embedded mitigation measures	Additional mitigation measures to address significant effects on the ability of resources and receptors to adapt to climate change
Surface water resources	Increased surface water discharge and run off to sewage systems leads to flooding of sewage systems and to discharge of contaminated water to surface water. This may trigger off-site operation of combined sewer overflows downstream of the site. Temporary surface water ponding. Potential indirect impact on traffic movements. Increase in foul flow resulting from the development	Construction		Drier/drought conditions	Reduced rainfall leads to lower flows in watercourses, low river flows, exacerbating effects of pollution.	No	Drought conditions will not lower flows in water courses along the route because climate change mitigation measures have been embedded into the design as per the Flood Risk chapter	Not Significant	No additional mitigation measures required because climate change has already been embedded into existing mitigation measures as per the Flood Risk Chapter
				Increase in frequency and intensity of heavy rainfall events/flooding	Increased flood risk, increased discharge volume, increased surface water run-off	No	Increased frequency and intensity of heavy rainfall events/flooding will not increase flood risk, discharge volumes and surface water runoff because climate change allowances have been provided in Section xx of the Cross-Drainage Chapter which states that a 30% allowance shall be added to design flood return period flows for future climate change	Not Significant	No additional mitigation measures required because climate change has already been embedded into existing mitigation measures as per the Flood Risk Chapter
		Operation		Drier/drought conditions	Reduced rainfall leads to lower flows in watercourses, low river flows, exacerbating the effects of spillages and increasing the concentration of pollutants in surface water resources.	No	Mitigation measures will comprise a net increase storage across the route, replacing all ponds that will be removed as part of construction. Natural wetlands act as a buffer against drought.	Not Significant	No additional mitigation measures required because climate change has already been embedded into existing mitigation measures as per the Flood Risk Chapter
				Increase in frequency and intensity of heavy rainfall events/flooding	Increased flood risk, increased run-off, increased discharge volume, increased surface water run-off	No	Structures are to be designed to 1 in 100yr event including a climate change allowance of 30% as described in the Cross-drainage chapter and adherence with NPPF policies will be undertaken to ensure proposed scheme is safe from flooding in future	Not Significant	No additional mitigation measures required because climate change has already been embedded into existing mitigation measures as per the Flood Risk and Cross Drainage Chapter
		Operation	Surface Water discharge rates to be restricted to 70% of existing or SIs (whichever is higher) Surface Water to be attenuated on site. System to be designed to retain surface water flooding on site up to 1 in 100 year. Exceedance flow in excess of 1 in 100 years to be directed away from the operational property. Surface Water discharge rates to be Debris Screens to be provided on downstream end of new swales to mitigate the risk of debris entering Holgate Beck A 40% climate change allowance has been added to design flood return period flows to account for future climate change.	Increase in frequency and intensity of heavy rainfall events/flooding	Increased flood risk, increased run-off, increased discharge volume, increased surface water run-off	No	Potential climate change impacts on flood risk and land drainage during operation works have been mitigated through a 40% climate change allowance has been added to design flood return period flows to account for future climate change, as described in section xx of the xxx chapter. A flood risk assessment has also been completed (ref to chapter). For more detail see the Water resources EIA chapter.	Not Significant	No additional mitigation measures required because climate change has already been embedded into existing mitigation measures as per the Flood Risk and Cross Drainage Chapter
Ground water resources	Groundwater resources impacted by the construction of tunnels Pollution to groundwater resources Loss of features (i.e. springs) due to the construction of culverts etc. Reduction in total area of permeable zones which will reduce recharge of the aquifer. Flow may be affected by short-term temporary excavations and temporary dewatering	Construction		Increase in frequency and intensity of heavy rainfall events/flooding	Lower flows in watercourses, reduction in groundwater levels, low river flows and reduced groundwater recharge and levels	No	There are no potential climate change impacts on ground water resources during construction works because of the mitigation measures set out in the Groundwater Protection chapter	Not Significant	No additional mitigation measures required because climate change has already been embedded into existing mitigation measures as per the Groundwater Protection Chapter
		Construction	Contractor to programme construction works to minimise the duration of open excavations in so far as practicable.	Drier/drought conditions	Lower flows in watercourses, reduction in groundwater levels, low river flows leading to further reduced groundwater recharge and levels.	No		Not Significant	
		Operation	Use of de-silting equipment prior to discharge of surface water off-site.	Drier/drought conditions	Lower flows in watercourses, reduction in groundwater recharge and levels.	No		Not Significant	
	Potential for accidental spillages that release contaminants into the water environment	Construction	Use of temporary drainage networks and ditches to intercept overland flow.	Drier/drought conditions	Lower flows in watercourses, reduction in groundwater recharge and levels and increasing the concentration of pollutants in groundwater resources.	No		Not Significant	
		Operation	Use of temporary attenuation ponds.	Drier/drought conditions	Lower flows in watercourses, reduction in groundwater recharge and levels and increasing the concentration of pollutants in groundwater resources.	No		Not Significant	
		Operation		Hotter and wetter conditions	Lower flows in watercourses, reduction in groundwater levels, low river flows and reduced groundwater recharge and levels	No	Water attenuation schemes for the surrounding environment should provide some extra buffer to groundwater levels, against drought conditions. There will be an increase in net storage across the route because for every pond removed as part of the construction works two smaller ponds will be created. Groundwater therefore recharges locally wherever possible	Not Significant	No additional mitigation measures required because climate change has already been embedded into existing mitigation measures as per the Groundwater Protection Chapter
Flood risk and land drainage	Surcharging and flooding leading to exceedance of sewers resulting in combined sewer effluent escaping from the system and flooding on site. Relasing contaminants into the water environment.	Construction		Increase in frequency and intensity of heavy rainfall events/flooding	Increased fluvial and ground water flood risk.	No	Potential impacts of extreme weather and climate change on flood risk during construction to be mitigated through resilient design guidelines, presented in the Design Guide (TBC)	Not Significant	No additional mitigation measures required because climate change has already been embedded into existing mitigation measures as per the Flood Risk and Cross-drainage Chapters
		Operation	New surface water drainage system implemented which will reduce the peak flow discharge from the existing site to the combined sewer creating capacity for the peak foul water discharge. A 40% climate change allowance has been added to design flood return period flows to account for future climate change	Increase in frequency and intensity of heavy rainfall events/flooding	Increased flood risk, increased run-off, increased discharge volume, increased surface water run-off	No	Potential climate change impacts on flood risk and land drainage during operation works have been mitigated through a 40% climate change allowance has been added to design flood return period flows to account for future climate change, as described in section xx of the xxx chapter. A flood risk assessment has also been completed (ref to chapter). For more detail see the Water resources EIA chapter.	Not Significant	No additional mitigation measures required because climate change has already been embedded into existing mitigation measures as per the Flood Risk and Cross-drainage Chapters

	Potential for accidental spillages that release contaminants into the water environment	Operation		Increase in frequency and intensity of heavy rainfall events/ flooding	Increased flood risk, increased run-off, increased discharge volume, increased surface water run-off	No	Structures are to be designed to a 1 in 100 year event including a climate change allowance of 30% (see Cross-drainage chapter) and adherence with NPPF policies will be undertaken to ensure proposed scheme is safe from flooding in future section 4 of the Spillage Risk Assessment Water Technical Note document states that mitigation measures will be identified to avoid, reduce	Not Significant	No additional mitigation measures required because climate change has already been embedded into existing mitigation measures as per the Flood Risk and Cross-drainage Chapters
	Increase discharge and run-off from site resulting in increasing flood risk downstream. Impacts on residential receptors, access routes through the site and debris/mareial causing blockages.	Operation	Surface Water discharge rates to be restricted to 70% of existing or 5l/s (whichever is higher) Surface Water to be attenuated on site. System to be designed to retain surface water flooding on site up to 1 in 100 year. Exceedance flow in excess of 1 in 100 years to be directed away from the operational property. Surface Water discharge rates to be Debris Screens to be provided on downstream end of new swales to mitigate the risk of debris entering Holgate Beck A 40% climate change allowance has been added to design flood return period flows to account for future climate change.	Increase in frequency and intensity of heavy rainfall events/ flooding	Increased flood risk, increased run-off, increased discharge volume, increased surface water run-off	No	Potential climate change impacts on flood risk and land drainage during operation works have been mitigated through a 40% climate change allowance has been added to design flood return period flows to account for future climate change, as described in section xx of the xxx chapter. A flood risk assessment has also been completed (ref to chapter). For more detail see the Water resources EIA chapter.	Not Significant	