# 27 Conclusions

27.1 This PEIR has been submitted to inform the s42 Consultation phase for 'Rail Central'. It takes the format of a draft ES prepared under the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the 'EIA Regulations').

27.2 A final ES will accompany an application for Development Consent made by Ashfield Land Management Limited and Gazeley GLP Northampton s.à.r.l. (the 'Applicant') for the construction, operation, maintenance and decommissioning of the proposed Strategic Rail Freight Interchange along with associated highways works at J.15a of the M1, other highways works and associated development (the 'Proposed Development').

27.3 This PEIR has considered the potential environmental effects of the Proposed Development based on a range of detailed technical assessments undertaken to date. Where identified in this PEIR further assessment work will be undertaken prior to the submission of the application for Development Consent.

27.4 The following technical topics have been assessed in this PEIR (**Table 27.1**).

**Table 27.1: Technical topics assessed in the PEIR**

| PEIR Chapter No. | Topic |
|---|---|
| 9 | Air Quality |
| 10 | Agricultural Land |
| 11 | Archaeology |
| 12 | Built Heritage |
| 13 | Ground Conditions |
| 14 | Hydrology, Drainage and Flood Risk |
| 15 | Utilities |
| 16 | Biodiversity |
| 17 | Landscape and Visual |
| 18 | Noise and Vibration |
| 19 | Highways and Transportation |
| 20 | Socio Economics |

| | |
|---|---|
| 21 | Lighting |
| 22 | Waste |
| 23 | Climate Change |
| 24 | Human Health |
| 25 | Major Accidents and Disasters |

27.5 A brief summary of the main findings of each of the technical topics assessments is provided below, along with an overview of the residual effects that remain following the application of embedded and adaptive mitigation as prescribed in the respective topic chapters.

**Air Quality (Chapter 9)**

27.6 A number of Air Quality Management Areas (AQMA) have been designated in the area due to elevated concentrations of nitrogen dioxide (NO2) attributable to road traffic emissions, the nearest being along the M1. The Air Quality Assessment considers the air quality impacts from the construction phase and the impacts once the Proposed Development is operational.

27.7 For the construction phase, an important consideration is dust. Without appropriate mitigation, dust could cause temporary soiling of surfaces, particularly windows, cars and laundry. The embedded mitigation measures relating to dust management included in the Construction Environmental Management Plan (CEMP) will ensure that the risk of adverse dust effects is reduced to a level categorised as 'not significant'. These include measures such as using enclosed chutes, use of dust suppression facilities and dampening down of potentially dusty areas.

27.8 For the construction and operational phases, arrivals at and departures from the Proposed Development may change the number, type and speed of vehicles using the local road network. Changes in road vehicle emissions are the most important consideration during this phase of the development.

27.9 Detailed atmospheric dispersion modelling has been undertaken for 2021 (first operation) and 2031 (full operation) and pollutant concentrations are predicted to be within the relevant health-based air quality objectives at the façades of existing receptors. The operational impact of the Proposed Development on existing receptors modelled within South Northamptonshire is predicted to be 'negligible' taking into account the changes in pollutant concentrations and absolute levels. Using the criteria adopted for this assessment together with professional judgement, the operational air quality effects in South

Northamptonshire are considered to be 'not significant' overall. Further improvements in air quality could be achieved through measures such as Travel Planning, tree planting, provision of electric charging points, incentives for low carbon transport, and ensuring vehicles on site do not idle. However, the assessment has not relied on these measures.

27.10 Detailed modelling will also be undertaken for Northampton and the results included in the ES Chapter to be submitted as part of the DCO application. An assessment of cumulative effects will also be undertaken for the ES Chapter. A preliminary cumulative assessment suggests that provided both the Proposed Development and the cumulative developments (including the adjacent Northampton Gateway) incorporate appropriate mitigation measures, the residual cumulative effect would be 'not significant'.

**Table 27.2: Copy of residual effects table contained within Chapter 9**

| Description of Impact | Significance of effect | Possible mitigation measures | Residual effect |
|---|---|---|---|
| Construction | | | |
| Increase in suspended particulate matter concentrations and deposited dust | Not significant after application of control and mitigation measures | Range of dust control and mitigation measures including using enclosed chutes, use of dust suppression facilities and dampening down of potentially dusty areas. | Not Significant |
| Operation | | | |
| Increase in $NO_2$, $PM_{10}$ and $PM_{2.5}$ concentrations from tragic generated by the development | Not significant for South Northamptonshire. Will be fully determined when modelling is complete for Northampton | Travel Planning, provision of electric charging points, incentives for low carbon transport,<br>No idling, monitoring of vehicle types and tree planting | Expected to be Not Significant |
| Decommissioning | | | |
| Increase in suspended particulate matter concentrations and deposited dust | Not significant after application of control and mitigation measures | Similar mitigation to construction phase | Not Significant |
| Cumulative | | | |
| Increase in $NO_2$, $PM_{10}$ and $PM_{2.5}$ concentrations from tragic generated by the developments | Will be determined when modelling of traffic data is complete | Travel Planning, provision of electric charging points, incentives for low carbon transport,<br>No idling, monitoring of vehicle types and tree planting | Expected to be Not Significant |

## Agricultural Land (Chapter 10)

27.11 Most of the effects on agricultural land, soils and agricultural holdings will occur during the construction of the Proposed Development, but will be permanent. Mitigation measures to reduce the potentially significant adverse effects on the existing soil resources across the Main SRFI Site and J15a are available, although there are no universally applicable measures to mitigate the direct loss of agricultural land in the same location and to the same extent. Mitigation of the impacts on the farm holdings will be by private negotiation between the relevant parties.

27.12 Measures to mitigate the impact on soil resources relate to recording (within a Soil Resources Management Plan) the existing soil resources of the Main SRFI Site and the land at the J15a works, and setting out measures to ensure that they are handled, stored and replaced according to good practice as set out in the Defra Construction Code of Practice for the Sustainable Use of Soils. In this way, soils that are re-used on the Potential Development Area will be used for their most suitable purposes in the detailed design and will be able to continue to fulfil their various ecosystem functions.

27.13 Of the 274ha of agricultural land permanently affected by the Proposed Development, 203ha (74%) is classified as Subgrade 3b land, which is not best and most versatile (BMV) quality. Approximately 71ha is BMV quality, predominantly of Grades 2 and 3a. The magnitude of change to BMV land is assessed as high to a resource of moderate sensitivity. The effect on BMV agricultural land would be 'moderate adverse'.

27.14 The soil resource is dominated by the heavy clay loam and clay loams of the predominant soil type which is of high sensitivity. The embedded mitigation relating to soil resources would enable the re-used soil resources to continue the various ecosystem functions on site within the soft landscaping, principally as a medium for producing biomass; for storing and cycling water and carbon; and for supporting habitats and biodiversity. As such, the permanent magnitude of impact on soils is assessed as medium as displaced soils would mostly fulfil the primary soil functions off-site or would have a reduced capacity to fulfil the primary functions on site. The permanent effect on the soil resource is assessed as 'moderate adverse'.

27.15 The sensitivity of the affected farm holdings has been determined by the extent to which they have the capacity to absorb or adapt to impacts. This is largely determined by their nature and scale, with most of the holdings assessed as being of moderate sensitivity. The Proposed Development would result in a high magnitude of change for all the farm holdings, with the loss of over 20% of the farmable area of each. The Proposed Development would have a moderate adverse effect on each of the affected farm holdings, which is significant.

27.16 An assessment of cumulative effects considered a total of 25 potential schemes in the locality which would involve the loss of agricultural land. The resultant cumulative loss would exceed 800ha of agricultural land, predominantly of Subgrade 3b but with substantial areas of Subgrade 3a and a smaller area of Grade 2. The sensitivity is moderate to low, and

the magnitude of change is high, resulting in a 'moderate adverse' effect on BMV agricultural land.

**Table 27.3: Residual effects contained within Chapter 10**

| Description of impact | Significance of effect | Possible mitigation measures | Residual effect |
|---|---|---|---|
| Loss of agricultural land | Moderate adverse | None | Moderate, adverse |
| Loss of or damage to soil resources | Moderate adverse | No additional mitigation | Moderate, adverse |
| Loss of farmable area and/or farm infrastructure | Moderate adverse | Private financial negotiations | Moderate, adverse |

## Archaeology (Chapter 11)

27.17 As opportunities for preservation of the archaeological resource in situ are limited, a programme of archaeological mitigation works would be carried out to offset the predicted direct impacts on archaeological assets at the Main SRFI Site and at A43/A5 Tove Roundabout.

27.18 The mitigation measures to be adopted would consist of identifying, investigating and recording the archaeological resource identified by geophysical survey and archaeological evaluation within the Main SRFI Site and by desk-based assessment at A43/A5 Tove Roundabout, providing an enhancement of the archaeological record. The mitigation proposals would be set out in one or more Written Schemes of Investigation (WSI) prepared in consultation with the Northamptonshire County Council (NCC) Archaeology Team and designed to satisfy any archaeological planning condition placed on the Proposed Development.

27.19 Whilst the predicted effects on archaeological remains would not be avoided or reduced by the proposed mitigation, they would be offset through preservation by record of the archaeological resource and the dissemination of archaeological knowledge, resulting in enhancement of the archaeological record. Taking the proposed mitigation into account, no significant residual effects would be anticipated in relation to the archaeological resource and the development proposals would conform to the aims and requirements of national, regional and local planning policy as regards heritage.

27.20 The potential for operational effects, arising from the possibility of future construction works being required during the lifetime of the Proposed Development, has also been considered, but it is considered that construction phase mitigation, to be agreed with the

NCC Archaeology Team, will have been sufficient to ensure that no significant operational effects arise during the operational phase.

27.21 The potential cumulative effect of the Proposed Development in combination with other proposed developments has been considered; in particular the potential for cumulative effects in combination with the proposed Northampton Gateway development site, adjacent to the Main SRFI Site. It has been assessed that there would be a direct cumulative effect on a group of potentially contemporary archaeological sites on the adjoining developments, but that the cumulative effect will not be significant in EIA terms when the embedded mitigation for the Rail Central development is taken into account.

27.22 Overall, taking the mitigation into account, no significant residual effects are anticipated in relation to the archaeological resource.

**Table 27.4: Residual effects contained within Chapter 11**

| Description of impact | Significance of effect | Possible mitigation measures | Residual effect |
|---|---|---|---|
| **Construction** | | | |
| Loss of archaeological resource across the Main SRFI Site | Moderate, adverse | Implementation of an agreed programme of archaeological set-piece excavations offset effect through recording archaeological assets in advance of construction and enhancing the archaeological record | Minor, adverse |
| M1 J15a Site | Moderate, adverse | Implementation of an agreed programme of archaeological set-piece excavations offset effect through recording archaeological assets in advance of construction and enhancing the archaeological record | Minor, adverse |
| A43/A5 Tove Roundabout | Moderate, adverse | Implementation of an agreed programme of archaeological set-piece excavations offset effect through recording archaeological assets in advance of construction and enhancing the archaeological record | Minor, adverse |
| Minor highway works | None | None required | None required |
| **Operation** | | | |
| None | None | None required | None required |
| **Decommissioning** | | | |
| None | None | None required | None required |

| | | | |
|---|---|---|---|
| **Cumulative** | | | |
| Cumulative intra-project effects on buried archaeological deposits and features within the Main SRFI Site | Minor, adverse | Implementation of an agreed programme of archaeological set-piece excavations offset effect through recording archaeological assets in advance of construction and enhancing the archaeological record | Minor, adverse |
| Cumulative inter-project effects on buried archaeological deposits and features within the Main SRFI Site | Moderate, adverse | Implementation of an agreed programme of archaeological set-piece excavations offset effect through recording archaeological assets in advance of construction and enhancing the archaeological record | Minor, adverse |

## Built Heritage (Chapter 12)

27.23 The effects arising from the Proposed Development on Built Heritage will be direct and indirect in nature having potential to affect the significance of the identified assets through direct works and change within their setting.

27.24 During the construction phase, it has been identified that there are adverse effects on a number of heritage assets relevant to the Proposed Development as a whole. A moderate adverse significance of effect has been identified on the grade II listed Milton House and Manor Cottage, Mortimers, Milton Malsor Conservation Area, the grade II listed Lock No 10-11 on the Grand Union Canal during the construction phase. A slight adverse effect has been identified to the grade II listed Railway Bridge over Northampton Road, Lock's 6-9 and Lock No 13 on the Grand Union Canal and the grade II listed Drawbridge to Lock No 13 during the construction phase. This assessment has been undertaken as a worst case scenario without any embedded or proposed mitigation. The identified effect is as a result of the site preparation works, construction of buildings and the construction of and enlargement of road infrastructure on the above heritage assets.

27.25 For the operational phase, it is concluded that for many of the heritage assets there will be a neutral effect having taken into consideration their significance, the relative distance between them and the Site, the extent of intervening development and the nature of the Proposed Development. Despite this and the various mitigation measures, it has been identified that there are adverse effects on a number of heritage assets relevant to the Proposed Development. A moderate adverse significance of effect has been identified on the grade II listed Milton House and Manor Cottage, Mortimers, Milton Malsor Conservation Area, the grade II listed Lock No 10-11 on the Grand Union Canal during the operation phase. A slight adverse effect has been identified to the grade II listed Lock's 6-9 and the grade II listed Railway Bridge over Northampton Road during the operation phase.

27.26 With regards to cumulative effects of the Proposed Development in combination with other developments, it has been concluded that there will be a cumulative effect with the Northampton Gateway scheme. Construction works such as the movement of materials and construction machinery, including the use of tall construction equipment would be expected to give rise moderate adverse level of cumulative effect on Built Heritage, specifically Milton Malsor Conservation Area and Mortimers.

27.27 Considering the potential for cumulative effects on Built Heritage during the operational phase, the Proposed Development and its associated landscaping works will largely screen the Northamptonshire Gateway scheme in views from the south and south-east. The scheme will, however, remove a further section of agricultural fields (to the east) which surround the village and Milton Malsor Conservation Area. Cumulatively, the overall effect of this and the Proposed Development are considered to cumulatively result in a moderate adverse effect on the significance of the Milton Malsor Conservation Area. In addition to this and due to the orientation of the grade II listed Mortimers with views of the building facing towards the scheme, it is likely that there will be additional built development and/or gantry cranes experienced within this view (subject to mitigation by the scheme). Cumulatively, the overall effect of this and the Proposed Development are considered to result in a moderate adverse effect on the significance of Mortimers.

27.28 The above effects are assessed to constitute 'less than substantial' harm.

**Table 27.5: Residual effects contained within Chapter 12**

| Description of impact | Significance of effect | Possible mitigation measures | Residual effect |
|---|---|---|---|
| **Construction** | | | |
| Effect on Milton House (MM9) and Mortimers (MM10) due to visual effects, noise, dust, vehicular movement and excavation | Moderate, adverse | Implementation of CEMP | Moderate, adverse |
| Effect on Milton Malsor Conservation Area (MM36) due to visual, construction traffic, noise, dust and excavation | Moderate, adverse | Implementation of CEMP | Moderate, adverse |
| Effect on Grand Union Canal Conservation Area (GU18) due to visual effects, vegetation removal, noise and dust | Moderate, adverse | Implementation of CEMP | Moderate, adverse |
| Effect on the Lock No 10 (HW12) and No 11 (HW13) due to visual effects, vegetation removal, and excavation works noise, and dust. | Moderate, adverse | Implementation of CEMP | Moderate, adverse |

| | | | |
|---|---|---|---|
| **Operation** | | | |
| Effect on Milton House (MM9) and Mortimers (MM10) due to the extent of modern development and landscaping within its setting. | Moderate, adverse | Implementation of CEMP | Moderate, adverse |
| Effect on Milton Malsor Conservation Area (MM36) due to the extent of modern development and landscaping within its setting. | Moderate, adverse | Implementation of CEMP | Moderate, adverse |
| Effect on Grand Union Canal Conservation Area (GU18 / HW17) due to the extent of modern development and transport infrastructure within its setting. | Moderate, adverse | Implementation of CEMP | Moderate, adverse |
| Effect on Lock No 10 (HW12) and Lock No 11 (HW13) to the Grand Union Canal due to the extent of modern development and transport infrastructure within its setting. | Moderate, adverse | Implementation of CEMP | Moderate, adverse |
| **Decommissioning** | | | |
| The impact of the potential decommissioning phase is expected to be similar to, or less than, those experienced during the construction phase. | | | |
| **Cumulative** | | | |
| Cumulative inter-project effects on the Milton Malsor Conservation Area in combination with the proposed Northampton Gateway development | Moderate, adverse | Implementation of CEMP | Moderate, adverse |
| Cumulative inter-project effects on the grade II listed Mortimers in combination with the proposed Northampton Gateway development | Moderate, adverse | Implementation of CEMP | Moderate, adverse |

## Ground Conditions (Chapter 13)

27.29 No ground conditions have been found that would prevent the Proposed Development being technically viable with respect to geology, soils or groundwater.

27.30 The site investigation confirmed that there is no widespread presence of soil contamination at the Main SRFI Site, and the desk studies and reviews have indicated that widespread contamination is not expected at the J15a Works site or minor highway works.

27.31 The construction works will lead to contaminated material being exposed and mitigation measures will be required to ensure this does not represent a risk to construction workers,

site visitors, trespassers or local residents and workers. Mitigation measures during construction will include appropriate design; prescribed methods of working (including works to be undertaken by appropriately trained (and where required, licenced) personnel; safe working practices and working in accordance with codes of practice; provision of appropriate Personal Protective Equipment (PPE) and Respiratory Protective Equipment (RPE) (where required); and, pre-construction identification of potential contamination by further ground investigation.

27.32 Mitigation measures, for example in accordance with Pollution Prevention Guidelines (PPG5), will also be required to protect surface watercourses during construction.

27.33 Monitoring will be required during construction to confirm that the works have been undertaken in accordance with the Construction Environmental Management Plan (CEMP); Pollution Prevention Method Statement (PPMS); Remediation Method Statement (RMS); and geotechnical design reports and the earthworks specifications.

27.34 During operation, mitigation measures will be required for receptors such as site users, future maintenance workers, buried concrete and buried water supply pipes. Mitigation measures proposed for the potential impacts to operational phase receptors include: design (such as no soakaways in Made Ground); use of appropriate materials (e.g. sulphate resistant concrete and barrier pipes, where required, for potable water supplies); appropriate materials management to ensure any potentially contaminated Made Ground is not exposed at the surface or in service corridors; and radon barriers in buildings as required.

27.35 No post-construction monitoring is required.

27.36 During decommissioning, the effects and mitigation measures are expected to be similar to that during construction.

27.37 There are no likely significant cumulative effects related to ground conditions.

27.38 There are no significant residual effects caused by the Proposed Development remaining after the implementation of the identified mitigation measures.

**Table 27.6: Residual effects contained within Chapter 13**

| Description of impact | Significance of effect | Possible mitigation measures | Residual effect |
|---|---|---|---|
| **Construction** | | | |
| Asbestos in existing buildings impacting site workers during demolition (Main SRFI Site only) | Major, adverse | All asbestos in buildings to be removed works to be undertaken by appropriately trained contractors who would be required to obtain appropriate licences. | Negligible |
| **Operation** | | | |
| Effects of radon on site users. | Moderate, adverse | Mitigation to comprise construction of appropriate floor slabs and installation of an appropriate radon membrane. | Negligible |
| **Decommissioning** | | | |
| Similar to construction | | | |
| **Cumulative** | | | |
| Nil. | | | |

## Hydrology, Drainage and Flood Risk (Chapter 14)

27.39 The Flood Risk Assessment (FRA) confirmed that there are areas at flood risk within the Main SFRI Site which are predominantly located within the lower elevated sections of the site and in those areas that immediately border the Milton Malsor Brook and the Unnamed Watercourse. The same is the case for the J15a Works and minor highways works, with the majority of each area being at low risk of flooding but with localised lower elevated areas being at potentially increased risk.

27.40 Proposed mitigation measures included within the scheme (realignment and design of watercourse, installation of surface water drainage systems etc.) minimise any of the identified impacts. These measures form part of the design of the site and as such are considered as being embedded mitigation undertaken as enabling works during the construction phases.

27.41 During operation, whilst all embedded mitigation will be in place, adaptive mitigation measures will be required for some receptors (watercourses, attenuation storage areas, swales, pipe runs etc.).

27.42 Adaptive mitigation measures proposed to address potential impacts to operational phase receptors include regular and ongoing maintenance of all drainage features. These works are to include visual inspections and any clearance/maintenance works as required.

27.43 No post-construction monitoring is required.

27.44 During decommissioning, the impacts and mitigation measures are expected to be similar to that during construction.

27.45 There are no cumulative effects related to flood risk, hydrology, and drainage caused by the development.

27.46 There are no significant residual effects identified after implementation of the proposed mitigation measures.

**Table 27.7: Residual effects contained within Chapter 14**

| Description of impact | Significance of effect | Possible mitigation measures | Residual effect |
|---|---|---|---|
| **Construction** | | | |
| None | | | |
| **Operation** | | | |
| Decrease in efficiency of both fluvial and surface water features (Main SRFI Site) | Moderate, adverse | Management and Maintenance Schedule to be prepared for both the surface water and realigned watercourse. | Negligible |
| **Decommissioning** | | | |
| None | | | |
| **Cumulative** | | | |
| None | | | |

## Utilities (Chapter 15)

27.47 Baseline Information was gathered via a desktop study and direct consultations with key stakeholders and utility providers within the area. The information obtained was used to inform the Main SRFI Site design. Statutory utility undertakers, or District Network Operators (DNOs), were consulted to:

- establish locations of existing plant equipment;
- inform providers of the Proposed Development layout plans and the required utility provisions during the construction and operational phase;
- confirm predicted capacity requirements;
- request connection offers and associated network designs; and
- discuss construction phase works, in terms of diversionary works and Protective Provisions (PP).

27.48 The DNOs for electricity, telecoms, gas and water operating in the local area are respectively: Western Power Distribution (WPD), BT Openreach (BT), National Grid Ltd (National Grid) and Anglian Water Ltd (Anglian Water). Additionally the British Pipeline Agency Ltd (BPA) confirmed on site pipeline locations and identified relevant regulations and guidelines pertaining to acceptable structure proximity to existing pipelines.

27.49 Receptors for the utilities assessment included utility service-users within and adjacent to the proposed Order Limits (such as potential future users of the SRFI, and adjacent users including JBJ Business Park), receptors who could be affected by installation and maintenance work (including users of transport routes) and receptors who could be affected by the visual extent of utility services (such as the nearby settlements of Blisworth and Milton Malsor). Residential receptors and the adjacent JBJ Business Park were considered of high sensitivity. Users on the Towcester/ Northampton Road were moderate sensitivity, and other receptors such as the highway network were low or negligible sensitivity.

27.50 Ensuring best design practices would minimise the adverse effects utilities infrastructure on the surrounding environment. These would be embedded in the Proposed Development design. The utility infrastructure would be routed underground with above ground equipment (substations etc.) located in naturally screened locations or including screening of equipment. Utility service installation will minimise waste during the construction, operational and decommissioning phases through the recycling and re-use of equipment.

27.51 The construction phase will involve the diversion of existing utilities infrastructure within the Order Limits, as well as the complete installation of the proposed utility works.

27.52 All construction effects would be short term, with the magnitude of effect on identified receptors generally assessed as negligible or minor. Significance was therefore generally neutral or slight. The Main SRFI Site, JBJ Business Park and users of the Towcester/ Northampton Road would experience a moderate significant effect, associated with potential traffic delays and network outages during construction. However, removal of the existing overhead lines to underground the connections would be beneficial.

27.53 The operational phase will involve general maintenance of the utility network. It is anticipated routine maintenance would be carried out and some equipment may need

replacing. In general though it is not expected any major works would be required during this phase. No significant effects on receptors were identified in the assessment.

27.54 Decommissioning of the utilities would not be expected to occur within the lifetime of the Proposed Development. Utility DNO's will generally aim to utilise existing infrastructure before suggesting that reinforcements and new requisitions are to be undertaken. However, a significance of effect similar to construction would be anticipated were they to be decommissioned.

27.55 Adaptive mitigation to be employed to minimise construction (and potential decommissioning) effects, and any effects apparent during operational maintenance would include following DNO good practice, including notification of nearby residents and service users and ensuring appropriate screening of development where these were not included in the site design. Residual effects would therefore be not-significant.

27.56 The cumulative effects assessment considers how the Proposed Development will combine and interact with the effects of other major developments in the context of utilities. These would be minimised through DNO design in order to safeguard the networks. In presenting an applicant with a formal connection offer the DNO confirms the requested connection can be physically achieved, the connection will not result in any long term adverse impacts to other network users and that adequate capacity will be available for the applicant's site. The key cumulative projects will be the grid connection to the Northampton West substation, and the adjacent Northampton Gateway SRFI. The latter project would be served from the Northampton East primary ring main so there is no foreseen significant cumulative capacity impact. The route of the proposed grid connection is currently unknown. However, it is assumed it will be routed underground along the routes of existing utilities within the highway boundary, so there will be minimal cumulative impact other than the potential for routine "roadwork" delays on the highway network, minimised through use of good practice measures.

**Table 27.8: Copy of residual effects table contained within Chapter 15**

| Description of impact | Significance of effect | Possible mitigation measures | Residual effect |
|---|---|---|---|
| **Construction** | | | |
| Visually obtrusive plant equipment. | Moderate, adverse | Natural or artificial screening. | Minor, adverse |
| **Operation** | | | |
| Maintenance works. | Moderate, adverse | Regular underground service access points. | Minor, adverse |
| **Decommissioning** | | | |

| | | | |
|---|---|---|---|
| Soil disturbance from retrieving underground service equipment. | Moderate, adverse | Abandon non-essential equipment. | Minor, adverse |
| **Cumulative** | | | |
| No effects | None | None | Neutral |

## Biodiversity (Chapter 16)

27.57 Preliminary ecological appraisal was based on desk-based searches for existing biological and ecological records and on Phase 1 Habitat Surveys, which mapped the habitat types and assessed their suitability for notable species, especially protected animal species (again following CIEEM guidelines for work of this kind). The results informed the design of further surveys.

27.58 Further surveys included botanical surveys of hedgerows and arable weeds, and vegetation surveys of swamp at J15a and the less strongly improved grasslands on the Main SRFI Site (using the methods of the National Vegetation Classification), and arable weeds. Veteran trees were also surveyed. Surveys for protected animal species included the following:

- presence-absence and Habitat Suitability Index surveys for Great Crested Newts;
- stream surveys for aquatic species (including invertebrates, fish and white-clawed crayfish);
- comprehensive surveys of bats including surveys to assess bat activity and surveys to investigate whether bat-roosts could be present in buildings or trees;
- surveys for birds including Barn Owls, Golden Plover and Lapwing potentially feeding or roosting on agricultural land, and for breeding birds generally; and
- surveys for Badgers, reptiles (all likely species), water vole, otter and terrestrial invertebrates (i.e. insects etc.).

27.59 The ecology assessment has been carried out in close collaboration with other disciplines including landscape and visual, water resources, noise and vibration, air quality and archaeology. Additional to the statutory consultation process, meetings have been held with Natural England, Northamptonshire County Council and South Northamptonshire Council, and the Wildlife Trust for Bedfordshire, Cambridgeshire and Northamptonshire. The Environment Agency was also consulted about the survey methods and assessment.

27.60 The important ecological features identified from the desk-based studies and surveys included:

- the habitat complex and associated species of the canal corridor;
- other local wildlife sites including Potential Wildlife Sites;
- individual hedges, and an extensive and more-or-less intact hedgerow network;
- ancient and veteran trees;
- neutral semi-improved agricultural grassland;
- the Milton Malsor Brook and connecting ditches with associated plants;
- tall-herb swamp (at the J15a Site) and associated wetland plant species;
- field-corner copses and ponds ;
- farmland birds, barn owls, and breeding birds generally;
- bats (all species) and other protected terrestrial vertebrates, e.g. otters; and
- terrestrial invertebrates (all sites).

27.61 Effects arising from the Proposed Development will arise from construction activity and during operation. The design of the Proposed Development aims to minimise these effects as far as possible through mitigation embedded into the site design. This includes:

- Retention of habitat, including certain buildings used by bats, the northern section of the Milton Malsor Brook, some ancient and veteran trees and other areas of woodland and habitat at the periphery of the Main SRFI Site and at J15a.
- Provision of green infrastructure, creating links through the site to the wider countryside and to locally designated sites. There is approximately 116.7 hectares of structural landscape shown on the Green Infrastructure Plan for the main site. Of this 13.8 hectares is retained farmland to the east of the Northampton Loop and 3.2 hectares will be developed as a new pocket park to the west of the A43. Except for ornamental planting around car parks and buildings, the majority of the planting will use native species in grassland, scrub and woodland planting. Stand-alone hedges will form an important part of the planting. In addition to this a further 26 hectares of land to the south of J15a will be developed as an ecological mitigation area.
- Ecological protection measures described in the Construction Environmental Management Plan (CEMP). These include good practice measures to protect habitats during construction, minimise noise and dust and lighting impacts.

27.62 Land-take will be the most important source of impact on the Main SRFI Site. It will cause loss of arable and agricultural grassland, some of which is important for farmland birds. There will be loss of a more-or-less intact hedgerow network totalling c.12.7 km of hedgerow over large parts of the site. There will be loss of mixed scrub, tall-herb vegetation and grassland on railway line-sides. Approximately 780m of the Milton Malsor Brook will be re-routed and some wet ditches connecting to it will be lost. There will be a permanent loss

of 44 veteran trees. Six roosts used by small numbers of Common Pipistrelle bats will be lost, as will some barn owl roosts in trees and farm buildings. There will also be a loss of hedgerows and trees that provide commuting and foraging links for bats and other species in the south of site. During construction, temporary effects such as noise, dust and lighting will be reduced to minimal levels acceptable for wider purposes (including health and safety) by measures set out in the CEMP.

27.63 At the J15a Works site there will be impacts on the Grand Union Canal corridor which is important for commuting and foraging bats and otters and is also a Local Wildlife Site. Additionally, there will be a small loss of habitat from an unnamed Potential Wildlife Site, where some locally rare and important invertebrates and plants uncommon in Northamptonshire were recorded.

27.64 During operation of the Proposed Development there may be some disturbance to animals on the site and in adjacent habitats, especially the canal corridor. This includes effects on flying routes for bats such as the Grand Union Canal, hedgerows and watercourses. Impacts of noise and disturbance may also affect animals and birds on site.

27.65 In order to reduce the impact of these identified effects, 'adaptive' mitigation is proposed. This includes:

- 39.2ha of scrub and woodland planting.
- c. 2,300 large stature trees will be incorporated into the scheme design.
- Creation of new grasslands using a native and locally appropriate seed mix which mimics typical wildflower meadows for Northamptonshire. To support populations of the Yellow-faced Bee, mixes will include Daucus carota ssp. carota (Wild Carrot).
- Veteran trees will be reused in measures such as such as tree resurrection (i.e. using large trunks or limbs of felled trees to provide high-elevated deadwood habitat by using existing trees as supports) and deadwood habitat piles will help to compensate for loss of ancient and veteran trees.
- Development of a Lighting scheme to ensure light on site during construction and operation of the site will avoid spill into ecologically important places.
- Specifications for new hedgerow planting to enhance 'embedded' retained foraging and commuting routes and create more.
- Renovation of barns at the Main SRFI Site and J15a site to provide bat and barn owl habitat.
- Milton Malsor brook diversion will be profiled to provide a variety of flow rates, depth and widths (allowing for Environment Agency specifications), and planted with water-margin species currently found there and in adjacent ditches. The detailed design of the watercourse will be undertaken in collaboration with

ecologists, and it is anticipated that the overall quality of the brook will be enhanced for otters, fish and aquatic invertebrates.

- The planting adjacent to the Grand Union Canal and The Arm Farm pocket park beside the Northampton Arm will improve the connectivity of the ecological corridor centred on the canal.

- Detailed design of the 26 ha ecological mitigation area at J15a. The area will be managed as farmland, ideally with livestock in some areas, but will also include a public access track. The site will be designed by ecologists in discussion with the Wildlife Trust, but will include a mixture of field sizes and shapes, new species rich native-species hedgerows with standard trees, wet scrapes and scrub, 'winter bird' fields, and field corner ponds.

- A post-construction Habitat Management Plan (HMP) will protect and promote biodiversity in areas retained for ecology and in newly created habitats. It will cover such matters as pond management, scrub control, hedgerow pruning, and retention of dead or felled trees among others. It will include provisions for monitoring retained and created habitats and key species.

27.66 Overall, although minor adverse effects will remain as a result of habitat loss, especially for farmyard birds and bats, loss of hedgerows and veteran trees, permanent beneficial effects will arise primarily from the provision of green infrastructure. Since a large percentage of both the Main SRFI Site and J15a site is arable, supporting very little biodiversity (on an amount per unit area basis), the green infrastructure and incorporation of ecological mitigation measures as adaptive mitigation will provide a net increase in biodiversity.

27.67 The assessment also considered cumulative ecological impacts. Given the impact assessments reached in respect of other nearby projects there are no cases where the impacts of this project could add to something identified as an impact in another project. There is, however, potential to add to cumulative impacts of hedgerow loss, particularly the integrity of hedgerow networks. There is also some potential for cumulative effects on commuting and foraging bats as a result of this habitat. Similarly there is potential to add to the cumulative impacts of farmland habitat loss on specialist farmland bird species, though overall habitat provided in compensation for the Rail Central project, and others, is likely to lead to a net gain in habitat for a broad spectrum of birds, especially garden birds.

27.68 Landscape mitigation at the adjacent proposed Northampton Gateway project has been designed to enhance biodiversity, and should lead to a beneficial intra-project effect. There is 13.8 ha of land that lies within both proposed Order Limits, which could be used for further ecological benefit for Rail Central should Northampton Gateway not proceed.

**Table 27.9: Copy of adverse residual effects table contained within Chapter 16**

| Important Ecological Feature | Value | Type of Effect | Extent<br>Duration<br>Reversibility<br>Timing<br>Frequency<br>Confidence | Summary of Effect and Proposed Avoidance/ Mitigation/ Compensation/ Enhancement Measures | Significance of Mitigated Impact |
|---|---|---|---|---|---|
| Bats – Commuting and Foraging | Local | Reduced total area for commuting and foraging arising from land take for development. | Permanent loss of foraging habitat. | Even with mitigation and compensation, there will be a loss of habitat.<br>It is important that hedgerows that remain through the centre of the site and along the eastern and western boundaries of the site are re-enforced with new planting prior to construction commencing. This will allow new planting to become established and enhance the hedgerows allowing bats to find these new routes through the site. These hedgerows will need to be monitored through the construction phase to ensure that bats are adopting these new routes. | Minor, adverse |
| Loss of up to 12 important or borderline important hedges | Local | Loss | Loss of 7 species-rich hedgerows (and 5 borderline species-rich hedgerows). permanent, irreversible | Hedgerow planting in the buffer and compensatory habitat zones will offset the loss, but because some of the character of Important hedges relates to their development over many decades there cannot quite be like for like replacement in under 100 years. | Minor, adverse |
| Loss of a hedgerow network | Local | Loss | Loss of 12.9km of hedge, permanent, irreversible | Planting of wildlife hedge (10.9km) in the buffer and compensatory habitat zones will offset the loss, but the patterns of the network will be different to those typical of enclosure act landscapes, and there cannot be like for like replacement, even though many biodiversity measures may not deteriorate or may even improve. | Minor, adverse |

| | | | | | |
|---|---|---|---|---|---|
| Veteran Trees (including notable and locally notable) | National | Loss | Permanent loss of 44 veteran/ notable/ locally notable trees plus one (locally notable) at J15a. | Veteran trees are an irreplaceable resource. Efforts have been made to avoid ancient and veteran trees wherever possible. Adaptive mitigation proposed will use important features of the trees (for example deadwood which is of value to invertebrates) in mitigation areas. | Minor, adverse |

**Landscape and Visual (Chapter 17)**

27.69 Mitigation measures identified and adopted as part of the evolution of the project design (embedded into the project design) to minimise landscape and visual effects include the use of landscape screening bunds and landscape planting. Additional measures over and above the proposed embedded mitigation that may assist with the screening and integration of the Proposed Development into the landscape will be considered at the detailed design stage and agreed with South Northamptonshire Council (SNC). Additional mitigation could include, for example, planting strategic groups of larger sized trees for instant visual impact, planting of new native species hedgerows, and infill planting and restoration of retained existing hedgerows.

27.70 The landscape and visual effects that are associated with the construction phase of the Main SRFI Site relate to the introduction of construction operations, related structures, equipment, landform alterations and stockpiling of materials for a temporary period (10 years). The alteration in land cover due to the construction of the Main SRFI Site relates to a loss of arable land and a direct loss of other landscape elements such as hedgerows, hedgerow trees including some notable and veteran trees. Visual effects during construction relate to the introduction of new features for a temporary period and a direct loss of other landscape elements such as hedgerows.

27.71 It is considered that the construction of the Main SRFI Site will give rise to highly significant adverse effects to local landscape character. Visual effects on residential receptors will be highly significant or significant adverse for a small number of residents in individual properties, groups of properties in close proximity to the Main SRFI Site or in more distant locations where views may be gained from elevated locations overlooking the Main SRFI Site. These include Blisworth Arm, Blisworth Lodge, 64-82 Courteenhall Road, Blisworth, Gayton Way, Copper Beeches, and Woodbury, Towcester Road, Nos 1 – 25 Barn Lane, Beech Croft and Beech Cottage, Collingtree Road, 63 Collingtree Road and Maple House, Milton House, Rectory Lane and Hill Farm.

27.72 In terms of recreational routes and Public Rights of Way (PRoW), highly significant and significant adverse construction phase visual effects will be limited to users of recreational

routes and PRoW in close proximity to the Main SRFI Site and from elevated ground overlooking the Main SRFI Site. Road users will also experience highly significant and significant adverse construction phase visual effects from roads running through the Main SRFI Site or close to it, including Barn Lane, Northampton Road/Towcester Road and Gayton Road.

27.73 During operation, the primary change at the Main SRFI Site will be the introduction of large-scale buildings that would form a highly prominent element within the local landscape. After 7 years it is considered that the mitigation such as screening bunds, woodland and hedgerow planting will begin to mature and will soften the Main SRFI Site and help to screen and integrate it with the receiving landscape. After 15 years of operation the planting will have established and reached a reasonable level of growth and maturity, which would further soften, screen and filter views of the Main SRFI Site reducing its prominence in the local landscape and provide some beneficial effects for both the landscape and ecological character of the Main SRFI Site. It is considered that at Year 15 the Main SRFI site will give rise to a significant beneficial effect to local landscape character.

27.74 At year 15 highly significant or significant visual effects will be limited to residents in individual properties in close proximity to the Main SRFI site or in more distant locations where views may be gained from elevated locations overlooking the site. These include Railway Cottages, Hill Farm, 63 Collingtree Road and Maple House, 64-82 Courteenhall Road, and Blisworth Lodge Farm. However the Applicant is providing a fund available to the local residents affected by the Proposed Development, to enable the purchase and planting of trees, or management of existing hedgerows at affected properties. If this fund is taken up by local residents, the introduction of this additional mitigation would have a significant benefit and would reduce adverse effects at these affected properties to 'not significant' at Year 15.

27.75 There will be no significant adverse visual effects on road users at Year 15. In terms of recreational routes and PRoW, highly significant and significant adverse operational phase visual effects will be limited to users of recreational routes and PRoW from elevated ground and in close proximity to the Main SRFI Site.

27.76 It is considered that the construction of the J15a Works site will not give rise to significant adverse effects on local landscape character. Highly significant and significant adverse construction phase visual effects would be limited to visual receptors in close proximity to the J15a Works site, to users of the Grand Union Canal recreational route, the Grand Union Canal Walk and PRoW KX2. It is considered that the operation of the J15a Works site will not give rise to significant effects on local landscape character. At Year 15 of operation the proposed structural planting is expected to have reached a level of maturity such that it will provide mitigation of operational visual effects.

27.77 Potential cumulative visual effects during the construction and operational phases considering the Proposed Development and Northampton Gateway are very limited. Highly

significant adverse visual cumulative effects have been identified for one viewpoint, Viewpoint 3, representative of views to users of PRoW's RD3, RD6, KZ14 and RD22 located to the east of Blisworth.

27.78 The cumulative assessment (for other cumulative developments) concludes that should all identified developments be constructed simultaneously, this would give rise to some adverse effects on landscape character particularly in the areas between Collingtree and Milton Malsor. Construction works such as the movement of materials and construction machinery, including the use of tall construction equipment would be expected to give rise to a highly significant adverse cumulative effect on the landscape during construction. No significant adverse cumulative visual or landscape effects are anticipated during the operation phase.

27.79 A 15-Year Soft Landscape Maintenance, Ecological Enhancement and Overall Management Plan has been prepared, which outlines the proposed establishment monitoring, maintenance and management programme. Post-construction monitoring of new planting and habitat creation will be undertaken to ensure the planting successfully establishes and can achieve its intended function.

**Table 27.10: Composite residual effects table in accordance with the assessment conclusions contained within Chapter 17**

| Description of Effect | Significance of Effect | Possible Mitigation Measures | Residual Effect |
|---|---|---|---|
| **Construction Phase** | | | |
| **Main SFRI Site** | | | |
| Landscape Effects | Major Adverse / Highly Significant | - | Major Adverse / Highly Significant |
| **Residential Receptors Visual Effects** | | | |
| **R1** (Railways Cottages), **R2** (Willow Lodge), **R8a** (No. 1, 17 to 29, & 33 Rectory Lane) and **R21** (Blisworth Arm) | Major Adverse / Highly Significant | - | Major Adverse / Highly Significant |

| Description of Effect | Significance of Effect | Possible Mitigation Measures | Residual Effect |
|---|---|---|---|
| **R5** (Hill Farm), **R8b** (Milton House, Rectory Lane), **R9** (No.1-25 Barn Lane), **R10** (Beech Croft and Beech Cottage, Collingtree Road), **R11** (63 Collingtree Road and Maple House), **R12b** (Gayton Way, Copper Beeches, and Woodbury, Towcester Road), **R18** (64-82 Courteenhall Road, Blisworth) and **R19** (Bilsworth Lodge) | Moderate Adverse / Significant | - | Moderate Adverse / Significant |
| **Public Rights of Way Visual Effects** | | | |
| KX5 and KX9 | Moderate Adverse / Significant | - | Moderate Adverse / Significant |
| KX7, KX8, KX13, KX15, KX16, RD1, RD22, RD3, RD6, KZ14 and RD12 | Major Adverse / Highly Significant | - | Major Adverse / Highly Significant |
| **Road Users** | | | |
| Barn Lane (BLn) and Northampton / Towcester Road (TRd) | Major Adverse / Highly Significant | - | Major Adverse / Highly Significant |
| **J15a Works Landscape Effects** | | | |
| Landscape Effects | Minor Adverse / Not Significant | - | Minor Adverse / Not Significant |
| **J15a Works Visual Effects** | | | |
| Grand Union Canal (C), KX2 (PRoW) | Major Adverse / Highly Significant | - | Major Adverse / Highly Significant |
| Grand Union Canal (E) | Moderate Adverse / Significant | - | Moderate Adverse / Significant |
| **Minor Highway Works Landscape and Visual Effects** | | | |

| Description of Effect | Significance of Effect | Possible Mitigation Measures | Residual Effect |
|---|---|---|---|
| Junction 6 A5076 / Hunsbury Hill Road Roundabout | Moderate Adverse / Significant | - | Moderate Adverse / Significant |
| **Operation Phase** | | | |
| **Main SFRI Site Landscape Effects** | | | |
| Year 15 | Moderate Adverse / Significant | Embedded and additional mitigation will begin to mature and soften the appearance of the Proposed Development. | Moderate Beneficial / Significant |
| **Residential Receptors Visual Effects** | | | |
| R1 (Railways Cottages) Year 15 | Moderate Adverse / Significant | Embedded and additional mitigation will begin to mature and soften the appearance of the Proposed Development. Further additional mitigation including detailed design of the mitigation planting located on the screening bunds. Targeted introduction of groups of large size feathered and semi mature deciduous and coniferous trees and other evergreen species. | Not Significant |
| R5 (Hill Farm) Year 15 | Moderate Adverse / Significant | Embedded mitigation will soften the appearance of the Main SRFI Site. | Moderate Adverse / Significant |
| | | Additional mitigation measures may be achieved by third party agreement to manage the existing garden boundary hedgerows to encourage top growth and maintain them at a taller height, and the provision of offsite planting within the gardens or its boundaries. | Not Significant |

| Description of Effect | Significance of Effect | Possible Mitigation Measures | Residual Effect |
|---|---|---|---|
| R11 (63 Collingtree Road and Maple House) Year 15 | Moderate Adverse / Significant | Embedded mitigation will soften the appearance of the Main SRFI Site. | Moderate Adverse / Significant |
| | | Additional mitigation measures may be achieved by third party agreement to manage the existing garden boundary hedgerows, or other intervening field boundaries adjacent to Collingtree Road, to encourage top growth and maintain them at a taller height, and the provision of offsite planting within the gardens or its boundaries. | Not Significant |
| R18 (64-82 Courteenhall Road, Blisworth) Year 15 | Moderate Adverse / Significant | Embedded mitigation will soften the appearance of the Main SRFI Site. | Moderate Adverse / Significant |
| | | Additional mitigation measures may be achieved by third party agreement to manage the intervening field boundary to allow it to grow out, encourage top growth and maintain hedgerows at a taller height. | Not Significant |
| R19 (Blisworth Lodge) Year 15 | Major Adverse / Highly Significant | Embedded mitigation will soften the appearance of the Main SRFI Site. | Major Adverse / Highly Significant |
| | | Additional mitigation measures may be achieved by third party agreement to manage the existing garden boundary hedgerows to encourage top growth and maintain them at a taller height, and the provision of offsite planting within the gardens or its boundaries. | Not Significant |
| **Public Rights of Way Visual Effects** | | | |

| Description of Effect | Significance of Effect | Possible Mitigation Measures | Residual Effect |
|---|---|---|---|
| KX5<br>Year 15 | Major Adverse / Highly Significant | Embedded mitigation including screen bunding and planting. | Major Adverse / Highly Significant |
| | | Additional mitigation may be achieved by third party agreement to manage the existing intervening hedgerow field boundaries adjacent to Gayton Road. Hedgerows could be managed to grow out and tall, or targeted offsite planting adjacent to these field boundaries including the introduction of groups of large size feathered and semi mature deciduous trees. | Not Significant |
| KX10<br>Year 15 | Moderate Adverse / Significant | | Moderate Adverse / Significant |
| | | Additional mitigation may be achieved by third party agreement to manage the existing intervening hedgerow field boundaries adjacent to Collingtree Road and field boundaries to the south of the road. Hedgerows could be managed to grow out and tall, or targeted offsite planting adjacent to these field boundaries including the introduction of groups of large size feathered and semi mature deciduous trees. | Not Significant |
| KX13<br>Year 15 | Major Adverse / Highly Significant | | Major Adverse / Highly Significant |

| Description of Effect | Significance of Effect | Possible Mitigation Measures | Residual Effect |
|---|---|---|---|
| KX16<br>Year 15 | Moderate Adverse / Highly Significant | Embedded mitigation including screen bunding and planting. Additional mitigation including the targeted introduction of groups of large size feathered and semi mature deciduous and coniferous trees and other evergreen species | Not Significant |
| RD1 & RD22<br>Year 15 | Major Adverse / Highly Significant | | Major Adverse / Highly Significant |
| RD3, RD6 & KZ14<br>Year 15 | Major Adverse / Highly Significant | | Major Adverse / Highly Significant |
| | | Additional mitigation may be achieved by third party agreement to manage the existing intervening hedgerow field boundaries adjacent to Courtneehall Road and field boundaries to the south of the road. Hedgerows could be managed to grow out and tall, or targeted offsite planting adjacent to these field boundaries including the introduction of groups of large size feathered and semi mature deciduous trees. | Not Significant |
| RD12<br>Year 15 | Moderate Adverse / Highly Significant | Embedded mitigation including screen bunding and planting. Additional mitigation including screen bunding, planting, targeted introduction of groups of large size feathered and semi-mature deciduous and coniferous trees and other evergreen species. | Not Significant |
| **Road Users Visual Effects** | | | |
| Year 15 | Not Significant | Embedded mitigation including screen bunding and planting. | Not Significant |

| Description of Effect | Significance of Effect | Possible Mitigation Measures | Residual Effect |
|---|---|---|---|
| **J15a Works Landscape Effects** | | | |
| Year 15 | Negligible / Not Significant | | Negligible / Not Significant |
| **J15a Works Visual Effects** | | | |
| Year 15 | Minor Adverse to Negligible / Not Significant | Embedded mitigation including screen bunding and planting. | Minor Adverse to Negligible / Not Significant |
| **Minor Highway Works Landscape and Visual Effects** | | | |
| Year 15 | Negligible / Not Significant | Embedded mitigation including screen bunding and planting. | Negligible / Not Significant |
| **Decommissioning** | | | |
| Similar to construction | | | |
| **Cumulative** | | | |
| **Northampton Gateway** | | | |
| Landscape Effects Construction | Major Adverse / Highly Significant | | Major Adverse / Highly Significant |
| Landscape Effects Operation Year 15 | Moderate Adverse / Significant | Embedded mitigation including primary green infrastructure | Moderate Adverse / Significant |
| Visual Effects PROW (RD3, RD6, KZ14, RD22) Construction & Operation Year 15 | Major Adverse / Highly Significant | Embedded mitigation including primary green infrastructure | Major Adverse / Highly Significant |
| Visual Effects Residential Receptors Construction & Operation Year 15 | Not Significant | | Not Significant |
| **Other Projects** | | | |
| Landscape and visual effects | Not Significant | | Not Significant |

**Noise and Vibration (Chapter 18)**

27.80 The significance of any construction phase effects have been established for the both the Main SRFI Site and the J15a Works site based on calculations of impact at the nearest sensitive receptors. The calculations are based on a typical equipment list for each activity using noise data taken from measurements presented in Standards and manufacturers' specifications and assuming a typical worst case scenario where several activities are carried out simultaneously.

27.81 Various mitigation methods have been proposed to reduce the effects of construction noise as far as is reasonably practicable. These are set out in the Construction Environmental Management Plan (CEMP). The most effective of the proposed mitigation methods would be to restrict the hours of noisy construction activities to daytime periods only.

27.82 The results of the construction noise assessment indicate that the effects would generally be of Negligible significance at the majority of receptors. At receptors that would be close the boundary of the works, the effects during some of the phases of construction would be of Minor significance.

27.83 The potential for vibration impacts during construction have also been assessed. Vibration decays rapidly with distance. Most receptors are more than 100m from proposed work areas at which point vibration would be negligible. There are some receptors that may be potentially nearer than this and the significance of effect could rise to Minor. In any case, construction activities within 100m of a residential receptor should generally be accompanied by a programme of vibration monitoring. This would include notification of occupied affected residential NSRs advising the activity, its duration and likely effect and advising that monitoring will be undertaken.

27.84 The assessment of noise from operational activities considers noise generated by activities from within the Main SRFI Site as well as from off-site road and rail traffic movements.

27.85 A computer based 3D noise model has been created to predict the noise levels generated by operational activities from within the Main SRFI Site at nearby receptors. The number and type of noise sources input into the model represent a considered worst case scenario where the Proposed Development is operating at its full capacity. The noise output from each source has been based on manufacturers' data and measurements carried out of similar operational equipment at other similar sites.

27.86 The results of the model have indicated that mitigation would be required to reduce noise to acceptable levels at some receptors. The effectiveness of the proposed mitigation, which consists primarily of earth bunds and acoustic screens, has been tested in the model.

27.87 The results indicate that, with the proposed mitigation in place, there would be a Negligible to Minor Significance of Effect at the majority of residential receptors during the sensitive early night time period. At four residential receptors, noise levels during this period have

been predicted, with a series of worst case assumptions, to be approaching, at, or up to 1dB above, the threshold of Moderate Significance of Effect. During the daytime period, all residential receptors would be subject to a Negligible Significance of Effect.

27.88 At recreational receptors such as Gayton Mariner, the canal, and public footpaths near to the Proposed Development, the Significance of Effect is predicted to be Negligible to Minor at most locations. On the footpath that runs parallel and to the east of the proposed intermodal platform the Significance of Effect would rise to Moderate at locations in close proximity to an operating gantry crane.

27.89 It should be noted that the predicted noise impacts used in this assessment would be a worst case, based on robust assumptions relating to the extent of activity at the site, the number of noise sources and their respective sound outputs, and by testing a fully operational scenario that would not occur until at least 2031 against the 2016 baseline noise environment. In practice, the operational noise impact of the Proposed Development is likely to be lower, particularly during the night time period when activities are likely to be less intensive than they would be during the daytime. It is considered, therefore, that the Significance of Effect of the on-site operational activities as a whole would be Minor and thus not significant.

27.90 There is the potential for some vibration to be generated by operational activities within the Main SRFI Site, particularly on the Intermodal Platform. Such activities may include, for example, the stacking of containers and slow moving shunters on on-site lines. However, vibration decays rapidly with distance. Receptors are generally located far from the Intermodal Platform. Additionally, these activities are not considered to be significant sources of vibration. Consequently, the significance of effect is considered to be Negligible.

27.91 The effect of additional road traffic movements on local roads and the wider network as a result of the operation of the Proposed Development has been assessed. The significance of effect has been determined by establishing both the short term and long term noise level changes in road traffic noise as compared to the baseline condition in the opening year. The results of the assessment indicate that the significance of effect is typically expected to be Negligible to Minor.

27.92 The effect of additional rail traffic movements on the West Coast Main Line (WCML) as a result of the operation of the Proposed Development has been assessed. The significance of effect has been determined by establishing both the short term and long term noise level changes in rail traffic noise as compared to the baseline condition in the opening year. The results of the assessment indicate that the significance of effect is Negligible.

27.93 Freight trains travelling on the rail network have the potential for generating vibration. Baseline vibration monitoring of the existing high speed passenger and rail freight traffic indicates very low existing vibration levels. Slower moving freight trains arriving and departing the Proposed Development would generate less vibration than the existing faster moving freight trains on the WCML. Given the anticipated increases in rail traffic

movements on the WCML resulting from the operation of the Proposed Development, the significance of effect of rail vibration is considered to be Negligible.

27.94 With regard to decommissioning, it is considered that in the worst case the effects of decommissioning noise would be similar to or less than that of construction. The equipment and machinery used for decommissioning would be similar to that of construction and it is likely that manufacturers of equipment and machinery in the future will have to meet more onerous noise limits than currently required as noise policy is updated in line with technological advancements in noise control. The assessment of construction noise and vibration is therefore considered to provide a reasonable worst case indication of the likely effects that may arise as a result of decommissioning.

**Table 27.11: Copy of residual effects table contained within Chapter 18**

| Description of impact | Potential significance of effect | Possible additional mitigation measures | Residual effect |
|---|---|---|---|
| Main SRFI Site | | | |
| **Construction** | | | |
| Noise impacting receptors | Negligible to minor | CEMP; BS 5228 compliance; hierarchy of piling rig use | Negligible to minor, adverse |
| Vibration impacting receptors | Negligible to minor | CEMP; BS 5228 compliance; hierarchy of piling rig use; vibration monitoring | Negligible to minor, adverse |
| **Operation** | | | |
| Noise impacting receptors | From negligible to major depending on receptor location. | As described in section on Operational Site Noise Mitigation on Main SRFI Site | From negligible to minor depending on receptor location. Adverse |
| Vibration impacting receptors | Negligible | - | Negligible |
| Decommissioning | | | |
| Noise impacting receptors | Negligible to minor | BS 5228 compliance | Negligible to minor, adverse |
| Vibration impacting receptors | Negligible to minor | BS 5228 compliance | Negligible to minor, adverse |
| **Cumulative (inter-project)** | | | |
| Construction noise | Minor | None proposed | Minor, adverse |
| Construction vibration | Minor | None proposed | Minor, adverse |
| Operational noise | Minor | None proposed | Minor, adverse |
| Operational vibration | Minor | None proposed | Minor, adverse |

| | | | |
|---|---|---|---|
| J15a Works | | | |
| **Construction** | | | |
| Noise impacting receptors | Minor | CEMP | Minor, adverse |
| Vibration impacting receptors | Minor | CEMP | Minor, adverse |
| **Operation** | | | |
| Road traffic noise impacting receptors | TBC - Assessment work ongoing | | |
| Vibration impacting receptors | Negligible | None proposed | Negligible |
| **Decommissioning** | | | |
| Noise impacting receptors | Minor | | Minor, adverse |
| Vibration impacting receptors | Minor | | Minor, adverse |
| **Cumulative (Inter-projects)** | | | |
| Construction noise | Minor | None proposed | Minor, adverse |
| Construction vibration | Minor | None proposed | Minor, adverse |
| Operational noise | TBC - Assessment work ongoing | | |
| Operational vibration | Negligible | None proposed | Negligible |
| Minor Highways Works | | | |
| **Construction** | | | |
| Noise impacting receptors | Minor | CEMP | Minor, adverse |
| Vibration impacting receptors | Minor | CEMP | Minor, adverse |
| **Operation** | | | |
| Road traffic noise impacting receptors | TBC - Assessment work ongoing | | |
| Vibration impacting receptors | Negligible | None proposed | Negligible |
| **Decommissioning** | | | |
| Noise impacting receptors | Minor | | Minor, adverse |
| Vibration impacting receptors | Minor | | Minor, adverse |
| **Cumulative (Inter-projects)** | | | |
| Construction noise | Minor | None proposed | Minor, adverse |
| Construction vibration | Minor | None proposed | Minor, adverse |
| Operational noise | TBC - Assessment work ongoing | | |
| Operational vibration | Negligible | None proposed | Negligible |

**Highways and Transportation (Chapter 19)**

27.95 The Highways and Transportation assessment within the PEIR has been informed through consultation with stakeholders on an on-going basis, including the Secretary of State, local interested parties, Highways England and Northamptonshire County Council. The feedback from stakeholders forms the evidence for the assessment methodology adopted in the PEIR. In addition, this discussion and ongoing modelling has informed the design of the Proposed Development, as potential impact on the local highway network informed the need for modification of constrained junctions as part of the works proposed. This work has been progressing alongside the evolution of the site since 2014.

27.96 The study area for transport assessment work was also subject of extensive discussions and subsequently agreed with Highways England and Northamptonshire County Council.

27.97 The PEIR sets out a review of the baseline conditions for the Main SRFI Site, the J15a Works and Minor Highway Works. Baseline data was obtained, including traffic flows, highway records, personal injury accident data, signal timing information, public transport information, walking and cycling information, base mapping and topographical surveys. The summary of baseline conditions includes a review of the surrounding highway network, pedestrian and cycle network, bus network, rail network, baseline traffic flows and accident and safety data.

27.98 Baseline traffic flows were assessed for 2015 (as the modelled base year), 2021 (as the forecast opening year of the SRFI), and 2031 (the end of the local plan period and assuming full operation of the SRFI). The 2021 and 2031 flows have been derived using the Northamptonshire Strategic Transport Model (NSTM) including traffic growth associated with committed and allocated developments and committed infrastructure improvements set out in the Joint Core Strategy that are reasonably expected to be delivered by either 2021 or 2031.

27.99 The assessment was undertaken with reference to the IEA document 'Guidelines for the Environmental Assessment of Road Traffic' and was carried out for the 2021 and 2031 forecast years. This had regard for the forecast changes in traffic flows (magnitude of the impact) and the sensitivity of the various junctions. Potential environmental effects could include:

- severance;
- driver delay;
- pedestrian delay;
- pedestrian amenity;
- accidents and safety;

- hazardous loads.

27.100 Effects on noise; vibration; dust and dirt; visual impact; air pollution; ecological impact; and heritage and conservation areas as a result of traffic changes are considered in the relevant chapters in the PEIR.

27.101 The assessment of effects was undertaken with consideration of embedded mitigation. This accounts for any physical mitigation measures provided within the proposed Order Limits and therefore included the proposed works at J15a and the 14 additional minor highways works at identified junctions (Safety schemes and the proposed Cycleway are considered as adaptive mitigation in the PEIR, but will form embedded mitigation for the final DCO submission).

27.102 An assessment of the construction, operational and decommission phase effects was made, assuming embedded mitigation in place. This identified there could be some short term adverse effects on the highway network during construction of the Main SRFI Site, but they would not be significant in EIA terms due to their temporary nature. Construction effects during the J15a works and Minor Highways Works will be assessed for the final DCO application submission.

27.103 At the Operational phase, traffic flows were assessed as having an increase of >30% traffic flows (or >10% in sensitive areas, including residential areas) at:

- The Main SRFI Site (A43)
- J15a
- Junction 4 - A5076 / A5123 / Upton Way
- Junction 6 - A5076 / Hunsbury Hill Avenue / Hunsbarrow Road / Hunsbury Hill Road
- Junction 11 - A45 / A43(T) Ferris Row
- Junction 12 – M1 Junction 15 – M1 / A45 / Saxon Avenue / A508
- Junction 14 - A43 / Towcester Road / A5 (Tove roundabout)
- Junction 19 – A5076 / Telford Way / Walter Trull Way / Duston Mill
- Junction 20 – A5076 / High Street / Duston Mill

27.104 However, an assessment of the six measures listed above (severance, driver delay etc.) indicated that no impacts greater than minor adverse would occur on any measure other than traffic flow. However, given the forecast increases in traffic flow, further adaptive mitigation would be introduced, which would also apply to the other junctions. These would include a Construction Traffic Management Plan (CTMP), a Framework Travel Plan (FTP), an

Operational Traffic Management Plan (OTMP), a public transport strategy, pedestrian and cycle improvements and proposed road safety schemes (these latter two will form part of the embedded mitigation/ Order Limits in the final DCO application). Residual effects were assessed as being negligible at the above junctions, with some beneficial effects arising from introduction of the additional adaptive mitigation.

27.105 The assessment demonstrates that the adaptive mitigation measures reduce the significance of the effect of the Proposed Development in the construction, operational and decommissioning phases, ranging from a minor adverse effect to a minor beneficial effect.

27.106 Traffic arising from other potential cumulative sites was included in the model used to calculate the future baseline. However, a cumulative assessment will be undertaken of the significance of effects including traffic from the 'Northampton Gateway' site providing a comparison with the 2031 baseline. This will include the Rail Central mitigation, Northampton Gateway mitigation and any mitigation schemes required to address the cumulative impact of Rail Central and Northampton Gateway, not provided by either development in isolation. At this stage, the relevant information for the Northampton Gateway development which is required for the assessment is not available. Therefore, it is not possible to carry out a cumulative assessment for the purpose of this PEIR. However, initial NSTM runs have been carried out including the Rail Central development and the proposed mitigation scheme at J15a and the Northampton Gateway development and the associated mitigation schemes at M1 Junction 15 and the Roade Bypass. This suggested that some additional mitigation would be required to fully mitigate cumulative effects on the highway network.

Copies of the residual effects tables contained within Chapter 19 are provided below

**Table 27.12: Copy of residual effects table for Main SRFI Site– A43(T)**

| Description of Impact | Significance of Effect | Possible Mitigation Measures | Residual Effect |
|---|---|---|---|
| **Construction** | | | |
| Traffic flows | Moderate Adverse (Short-term) | Implementation of CTMP | Minor Adverse (Short-term) |
| **Operation** | | | |
| Traffic flows | Moderate Adverse | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Minor Adverse |
| Accidents and Safety | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |

| | | | |
|---|---|---|---|
| Hazardous Loads | Negligible | Implementation of OTMP | Negligible |
| Severance | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Driver Delay | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Pedestrian Delay | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Pedestrian Amenity | Negligible | Implementation of FTP, and Pedestrian and Cycling Infrastructure | Negligible |
| **Decommissioning** | | | |
| Traffic flows | Moderate Adverse (Short-term) | Implementation of TMP | Minor Adverse (Short-term) |
| **Cumulative** | | | |
| TBC in advance of application submission | TBC in advance of application submission | TBC in advance of application submission | TBC in advance of application submission |

**Table 27.13: Copy of residual effects table for Junction Five - M1 Junction 15a - M1 / A43 / A5123**

| Description of Impact | Significance of Effect | Possible Mitigation Measures | Residual Effect |
|---|---|---|---|
| **Construction** | | | |
| Traffic flows | TBC following detailed design | Implementation of CTMP | TBC following detailed design |
| **Operation** | | | |
| Traffic flows | Major Adverse | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Moderate Adverse (though not an environmental effect in itself) |
| Accidents and Safety | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |

| | | | |
|---|---|---|---|
| Hazardous Loads | Negligible | Implementation of OTMP | Negligible |
| Severance | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Driver Delay | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Minor Beneficial |
| Pedestrian Delay | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Pedestrian Amenity | Negligible | Implementation of FTP, and Pedestrian and Cycling Infrastructure | Negligible |
| **Decommissioning** | | | |
| Traffic flows | TBC following detailed design | Implementation of TMP | TBC following detailed design |
| **Cumulative** | | | |
| TBC in advance of application submission | TBC in advance of application submission | TBC in advance of application submission | TBC in advance of application submission |

**Table 27.14: Copy of residual effects table for Junction 4 - A5076 / A5123 / Upton Way**

| Description of Impact | Significance of Effect | Possible Mitigation Measures | Residual Effect |
|---|---|---|---|
| **Construction** | | | |
| Traffic flows | TBC following detailed design | Implementation of CTMP | TBC following detailed design |
| **Operation** | | | |
| Traffic Flows | Minor Adverse | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Accidents and Safety | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Hazardous Loads | Negligible | Implementation of OTMP | Negligible |

| | | | |
|---|---|---|---|
| Severance | Minor Adverse | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Driver Delay | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Minor Beneficial |
| Pedestrian Delay | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Pedestrian Amenity | Negligible | Implementation of FTP, and Pedestrian and Cycling Infrastructure | Negligible |
| **Decommissioning** | | | |
| Traffic flows | TBC following detailed design | Implementation of TMP | TBC following detailed design |
| **Cumulative** | | | |
| TBC in advance of application submission | TBC in advance of application submission | TBC in advance of application submission | TBC in advance of application submission |

**Table 27.15: Copy of residual effects table for Junction 6 - A5076 / Hunsbury Hill Avenue / Hunsbarrow Road / Hunsbury Hill Road**

| Description of Impact | Significance of Effect | Possible Mitigation Measures | Residual Effect |
|---|---|---|---|
| **Construction** | | | |
| Traffic flows | TBC following detailed design | Implementation of CTMP | TBC following detailed design |
| **Operation** | | | |
| Traffic Flows | Minor Adverse | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Accidents and Safety | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Hazardous Loads | Negligible | Implementation of OTMP | Negligible |
| Severance | Negligible | Implementation of OTMP, | Negligible |

| | | | |
|---|---|---|---|
| | | FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | |
| Driver Delay | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Minor Beneficial |
| Pedestrian Delay | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Pedestrian Amenity | Negligible | Implementation of FTP, and Pedestrian and Cycling Infrastructure | Negligible |
| **Decommissioning** | | | |
| Traffic flows | TBC following detailed design | Implementation of TMP | TBC following detailed design |
| **Cumulative** | | | |
| TBC in advance of application submission | TBC in advance of application submission | TBC in advance of application submission | TBC in advance of application submission |

**Table 27.16: Copy of residual effects table for Junction 11 - A45 / A43 / Ferris Row**

| Description of Impact | Significance of Effect | Possible Mitigation Measures | Residual Effect |
|---|---|---|---|
| **Construction** | | | |
| Traffic flows | TBC following detailed design | Implementation of CTMP | TBC following detailed design |
| **Operation** | | | |
| Traffic Flows | Moderate to minor beneficial | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Moderate beneficial |
| Accidents and Safety | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Hazardous Loads | Negligible | Implementation of OTMP | Negligible |
| Severance | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian | Negligible |

| | | | |
|---|---|---|---|
| | | and Cycling Infrastructure | |
| Driver Delay | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Minor Beneficial |
| Pedestrian Delay | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Pedestrian Amenity | Negligible | Implementation of FTP, and Pedestrian and Cycling Infrastructure | Negligible |
| **Decommissioning** | | | |
| Traffic flows | TBC following detailed design | Implementation of TMP | TBC following detailed design |
| **Cumulative** | | | |
| TBC in advance of application submission | TBC in advance of application submission | TBC in advance of application submission | TBC in advance of application submission |

**Table 27.17: Copy of residual effects table for Junction 12 - M1 Junction 15 – M1 / A45 Saxon Avenue / A508**

| Description of Impact | Significance of Effect | Possible Mitigation Measures | Residual Effect |
|---|---|---|---|
| **Construction** | | | |
| Traffic flows | TBC following detailed design | Implementation of CTMP | TBC following detailed design |
| **Operation** | | | |
| Traffic Flows | Minor Beneficial to Minor Adverse | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Minor Beneficial to Negligible |
| Accidents and Safety | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Hazardous Loads | Negligible | Implementation of OTMP | Negligible |
| Severance | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |

| | | | |
|---|---|---|---|
| Driver Delay | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Minor Beneficial |
| Pedestrian Delay | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Pedestrian Amenity | Negligible | Implementation of FTP, and Pedestrian and Cycling Infrastructure | Negligible |
| **Decommissioning** | | | |
| Traffic flows | TBC following detailed design | Implementation of TMP | TBC following detailed design |
| **Cumulative** | | | |
| TBC in advance of application submission | TBC in advance of application submission | TBC in advance of application submission | TBC in advance of application submission |

**Table 27.18: Copy of residual effects table for Junction 14 – Tove Roundabout - A43 / Towcester Road / A5**

| Description of Impact | Significance of Effect | Possible Mitigation Measures | Residual Effect |
|---|---|---|---|
| **Construction** | | | |
| Traffic flows | TBC following detailed design | Implementation of CTMP | TBC following detailed design |
| **Operation** | | | |
| Traffic Flows | Minor Adverse | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Accidents and Safety | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Hazardous Loads | Negligible | Implementation of OTMP | Negligible |
| Severance | Minor Adverse | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Driver Delay | Negligible | Implementation of OTMP, | Minor Beneficial |

| | | | |
|---|---|---|---|
| | | FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | |
| Pedestrian Delay | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Pedestrian Amenity | Negligible | Implementation of FTP, and Pedestrian and Cycling Infrastructure | Negligible |
| **Decommissioning** | | | |
| Traffic flows | TBC following detailed design | Implementation of TMP | TBC following detailed design |
| **Cumulative** | | | |
| TBC in advance of application submission | TBC in advance of application submission | TBC in advance of application submission | TBC in advance of application submission |

**Table 27.19: Copy of residual effects table for Junction 19 – A5076 / Telford Way / Walter Trull Way / Duston Mill Lane**

| Description of Impact | Significance of Effect | Possible Mitigation Measures | Residual Effect |
|---|---|---|---|
| **Construction** | | | |
| Traffic flows | TBC following detailed design | Implementation of CTMP | TBC following detailed design |
| **Operation** | | | |
| Traffic Flows | Negligible to Minor Adverse | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Minor Beneficial to Negligible |
| Accidents and Safety | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Hazardous Loads | Negligible | Implementation of OTMP | Negligible |
| Severance | Minor Adverse | Implementation of OTMP, FTP, Public Transport Strategy and | Negligible |

| | | | |
|---|---|---|---|
| | | Pedestrian and Cycling Infrastructure | |
| Driver Delay | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Minor Beneficial |
| Pedestrian Delay | Minor Adverse | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Pedestrian Amenity | Minor Adverse | Implementation of FTP, and Pedestrian and Cycling Infrastructure | Negligible |
| **Decommissioning** | | | |
| Traffic flows | TBC following detailed design | Implementation of TMP | TBC following detailed design |
| **Cumulative** | | | |
| TBC in advance of application submission | TBC in advance of application submission | TBC in advance of application submission | TBC in advance of application submission |

**Table 27.20: Copy of residual effects table for Junction 20 – A5076 / High Street / Duston Mill**

| Description of Impact | Significance of Effect | Possible Mitigation Measures | Residual Effect |
|---|---|---|---|
| **Construction** | | | |
| Traffic flows | TBC following detailed design | Implementation of CTMP | TBC following detailed design |
| **Operation** | | | |
| Traffic Flows | Negligible to Minor Adverse | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Minor Beneficial to Negligible |
| Accidents and Safety | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Hazardous Loads | Negligible | Implementation of OTMP | Negligible |
| Severance | Negligible | Implementation of OTMP, | Negligible |

| | | | |
|---|---|---|---|
| | | FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | |
| Driver Delay | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Minor Beneficial |
| Pedestrian Delay | Negligible | Implementation of OTMP, FTP, Public Transport Strategy and Pedestrian and Cycling Infrastructure | Negligible |
| Pedestrian Amenity | Negligible | Implementation of FTP, and Pedestrian and Cycling Infrastructure | Negligible |
| **Decommissioning** | | | |
| Traffic flows | TBC following detailed design | Implementation of TMP | TBC following detailed design |
| **Cumulative** | | | |
| TBC in advance of application submission | TBC in advance of application submission | TBC in advance of application submission | TBC in advance of application submission |

## Socio Economics (Chapter 20)

27.107 Socio-economic effects are assessed at various spatial scales, based on an understanding of relevant local and wider economic geographies and the extent to which socio-economic effects are likely to be contained within these geographies. For the purposes of the assessment, socio-economic effects are established within the following study areas:

- A local impact area (the district of South Northamptonshire);
- A wider impact area (comprising Coventry, Daventry, Milton Keynes, Northampton, South Northamptonshire and Wellingborough); and
- A National impact area (England).

27.108 Within these impact areas, it is envisaged that construction of the Proposed Development is likely to generate significant socio-economic effects that are beneficial in nature, resulting from the creation of jobs and increase in productivity in the local economy. There are therefore no significant adverse socio-economic effects arising during construction that require mitigation. Beneficial effects generated during the construction phase include:

- An estimated 410 full time equivalent (FTE) jobs every year over a construction period of ten years; and

- An estimated £20.4 million in gross value added (GVA) to the national economy each year.

27.109 Once completed, operational and fully occupied, significant beneficial effects relating to jobs, productivity and business rate revenue are likely to be generated. No significant adverse effects are identified through the assessment that require mitigation.

27.110 Beneficial effects generated during the operational phase include:

- 8,100 gross FTE jobs;
- An estimated 12,400 FTE jobs in the national economy when including those which are indirectly generated or induced;
- £555.6 million in GVA nationally; and
- £14.8 million in business rate revenue each year.

27.111 The Applicant is committed to ensuring that a skilled workforce is available to serve the Proposed Development and the labour force requirements of occupiers. As part of its commitment the Applicant proposes to establish a training "spoke" based at the Proposed Development. This would provide an onsite facility for delivery of training and the development of a skilled workforce to service the Proposed Development.

27.112 A Local Employment Scheme will also be developed, which will ensure that employment, skills and training benefits are delivered at key milestones, inclusive of investment in a training "spoke" facility. The Local Employment Scheme will include measures occurring at the construction and operational stages of the Proposed Development.

27.113 With regards to cumulative effects of the Proposed Development, no significant adverse effects are identified in the assessment that would require mitigation.

**Table 27.13: Copy of residual effects table contained within Chapter 20**

| Description of impact | Significance of effect | Possible mitigation measures | Residual effect |
|---|---|---|---|
| **Construction** | | | |
| Jobs | Minor to moderate beneficial | None required | Minor to moderate, beneficial |
| Labour force | Minor beneficial | None required | Minor, beneficial |
| Economic productivity | Minor to moderate beneficial | None required | Minor to moderate, beneficial |
| Unemployment | Negligible to minor beneficial | None required | Negligible to minor beneficial |
| Skills | Negligible | None required | Negligible |
| **Operation** | | | |

| | | | |
|---|---|---|---|
| Jobs | Negligible to major beneficial | None required | Negligible to major beneficial |
| Labour force | Minor beneficial to minor adverse | None required | Minor, beneficial, to minor, adverse |
| Economic productivity | Minor to major beneficial | None required | Minor to major, beneficial |
| Unemployment | Negligible to minor beneficial | None required | Negligible to minor, beneficial |
| Skills | Negligible | None required | Negligible |
| Business rate revenue | Negligible to major beneficial | None required | Negligible to major, beneficial |
| Crime | Negligible | None required | Negligible |
| **Cumulative** | | | |
| Jobs | Beneficial | None required | Beneficial |
| Labour force | No significant adverse effect | None required | No significant adverse effect |
| Skills | No significant adverse effect | None required | No significant adverse effect |

## Lighting (Chapter 21)

27.114 An Operational Lighting Parameters external lighting scheme was modelled, using industry recognised software, with luminaires positioned across the site to ensure that recommended lighting levels associated with the various working aspects of the site (as defined by a number of British Standards and Industry Guidance documents), such as road lighting, loading/unloading etc. were met. At the same time measuring planes where placed at the various sensitive receptor locations so that lighting levels (lux) readings could be calculated to qualify any post development magnitude of change. Finally an Illumination Impact Profile was undertaken to compare the magnitude of change between the pre-development baseline condition and the post development Operational impact. Such an assessment also takes into account a range of other light pollution factors such as potential Direct Sky Glow, point source glare limits and potential light encroachment and trespass beyond the site boundary.

27.115 Following the conclusion of the above 3 elements (Baseline Survey, Operational Lighting Parameter and IIP), the results showed that across a large number and range of sensitive receptors, stringent embedded mitigation methods written into any future lighting design guidance for the detailed design stage of the sites' construction and operation will ensure that light pollution would be 'negligible adverse' in 24 of the 31 residential and transport sensitive receptors, and only 'minor adverse' in the case of the remaining 7. In terms of

Direct Sky Glow, again this was calculated as being only 'negligible adverse' once embedded mitigation measures are taken into consideration. This is 'not significant' in EIA terms.

**Table 27.14: Copy of residual effects tables contained within Chapter 21**

| Sensitive Receptor | Description of Effect | Pre Mitigation Significance | Mitigation | Residual Effect |
|---|---|---|---|---|
| Construction and Decommissioning | | | | |
| **Residential** | | | | |
| R1: Properties on Barn Lane<br>R8: Gaytonway / Spring Gardens / Parley Pole / Woodbury<br>R10: Property adjacent to James King Plant<br>R13: Terraced properties | T, D, ST to MT & LL<br>Potential light trespass and glare from poorly aimed floodlighting | Major, Adverse | Implementation of best practice construction lighting mitigation measures as part of the Construction Environmental Management Plan (CEMP). | Minor, Adverse |
| R9: Deveron House<br>R11: Property adjacent to J B J Business Park<br>R12: Property within Youngs Nursery<br>R21: Properties adjacent to The Old Toll House – Blisworth Arm | T, D, ST to MT & LL<br>Potential glare from poorly aimed floodlighting | Moderate, Adverse | As above | Negligible, Adverse |
| R2: Properties on Rectory Lane<br>R17: Properties on Rectory Lane<br>R21: Blisworth Marina<br>R23: Gayton Marina | T, D, ST to MT & LL<br>Potential glare from poorly aimed floodlighting | Minor, Adverse | As above | Negligible, Adverse |
| **Natural – Direct Sky Glow** | | | | |
| SG1: Direct Sky Glow | T, D, ST to MT & LL<br>Potential direct upwards light spill from poorly aimed floodlighting | Minor, Adverse | As above | Negligible, Adverse |

| | | | | |
|---|---|---|---|---|
| **Rail** | | | | |
| T1: The West Coast Mainline<br>T2: Northampton Loop | T, D, ST to MT & LL<br><br>Potential light trespass and glare and from poorly aimed floodlighting | Moderate, Adverse | As above | Minor, Adverse |
| **Highway** | | | | |
| T3: A43 Highway | T, D, ST to MT & LL<br><br>Potential glare from poorly aimed floodlighting | Moderate Adverse | As above | Minor, Adverse |
| T4: Northampton Road | T, D, ST to MT & LL<br><br>Potential glare from poorly aimed floodlighting | Minor Adverse | As above | Negligible, Adverse |
| Completed development (Operational) | | | | |
| **Residential – Post Curfew** | | | | |
| R1: Properties on Barn Lane<br>R2: Properties on Rectory Lane<br>R3: Mortimers / The Old Rectory<br>R8: Gaytonway / Spring Gardens / Parley Pole / Woodbury<br>R9: Deveron House<br>R10: Property adjacent to James King Plant<br>R11: Property adjacent to J B J Business Park<br>R12: Property within Youngs Nursery<br>R13: Terraced properties<br>R14: Properties on Station Rd | P, D, LT & LL<br><br>An increase in potential glare but compliant to post curfew limits. | Minor Adverse | Detailed design consideration for considered luminaire positions, heights, orientation, shielding and distribution. | Negligible, Adverse |

**Waste (Chapter 22)**

27.116 Following the establishment of the baseline, the assessment identifies the significant waste streams that result from the various phases of the development.

27.117 As part of the construction phase, waste will be generated as a result of a number of specific activities such as site clearance and excavation but also as a result of generic construction waste from onsite personnel and from building materials waste.

27.118 Generic construction waste has been estimated using benchmarking data based on type and extent of the proposed land use classes within the development. However with respect to excavation data, the proposed design is such that all excavated material will be used for fill material elsewhere within the confines of the development where possible, with the result that no surplus material is planned as requiring offsite management.

27.119 It is intended to produce a Site Waste Management Plan (SWMP), within which a number of mitigation measures will be detailed which will seek to minimise and manage all construction wastes. Therefore all construction waste has been planned to be managed at the highest level of the waste hierarchy achievable.

27.120 Based on a review undertaken within the assessment, when construction waste is removed from site, there are considered to be sufficient facilities within the local area and region to recycle, recover or dispose of it, and therefore, the effects of the construction waste generated from the Project have been assessed as minor adverse to negligible.

27.121 The assessment of the effects of the proposed development with respect to operational waste seeks to determine what significant changes to current waste arisings are anticipated as a result of the development, propose mitigation measures and assess the regional capacity for handling the likely operational waste streams.

27.122 Operational waste associated with the proposed land use at the site has been estimated through a benchmarking exercise undertaken with British Standards documentation. Much of the anticipated waste generated is likely to be similar in composition to Municipal Solid Waste (MSW) which is a non-hazardous waste stream. Based on the volumes and anticipated regional waste capacity available to deal with this type of waste stream, the effects of this operational waste generated from the Project have been assessed as minor adverse to negligible.

27.123 In terms of mitigation, the developer will promote sustainable waste management practices within their proposed developments to reduce the amount of waste generated and the significance of any effects from its disposal.

27.124 Cumulative effects as a result of the proposed development interacting with other development projects in the vicinity have also been assessed.

27.125 Potentially cumulative effects from construction waste generated by surrounding projects have been assessed as negligible based on the local waste management authority forecasting no growth in construction waste based on anticipated improved management due to increasing costs for disposal. Also the future calculated waste arisings for the local authority area will have included an allowance for new developments, and waste infrastructure has been planned accordingly. Finally it has been assumed that these new schemes will be required to follow the requirements of the local and national legislation and waste planning, including the maximisation of reuse and recycling of construction wastes through a site waste management plans and meeting targets for recycling of waste. Therefore, collectively, these developments are unlikely to significantly deplete the existing and planned waste capacity of Northamptonshire.

27.126 Similarly the potential cumulative effects of operational waste from other proposed development site in the region will have been accounted for in the waste forecasts and waste infrastructure planning. Also it is anticipated that similar mitigation measures will be required for other developments ensuring that the waste hierarchy (prevention, preparation for reuse, recycling, other recovery and disposal) and disposal to one of the nearest appropriate facilities are observed wherever practical and commercially viable. It is reasonable to conclude that other schemes would effectively mitigate the impact of their waste arising during their operation.

27.127 Given the current and predicted waste production levels within Northamptonshire, it is reasonable to anticipate that there shall be suitable capacity to effectively manage the wastes associated with all current and proposed schemes.

27.128 No significant residual effects have been defined following the implementation of mitigation measures.

**Table 27.15: Copy of residual effects table contained within Chapter 22**

| Description of Impact | Significance of Effect | Possible Mitigation Measures | Residual Effect |
|---|---|---|---|
| **Construction** | | | |
| **Main SRFI Site** | | | |
| Site Clearance – Vegetation | Moderate Temporary | Retained on-site for use as mulch; or sent for recycling at a local composting facility.<br>No landfilling.<br>Vegetation removed from site progressively, i.e. the entirety of the anticipated vegetation will not be stockpiled before removal | Minor, adverse |
| Excavation Material | Negligible (given embedded | Cut and fill balance designed to produce no surplus (see proposed Earthworks Strategy in Chapter 5 Appendix 5.3) | Negligible |

| | | | |
|---|---|---|---|
| | mitigation) | Use of CLAIRE Code of Practice (COP) (Ref 22.21) to use excavated material in the development | |
| Contaminated Excavation Material | Moderate Temporary | Use of CLAIRE COP<br>Off-site soil treatment facility | Minor, adverse. Temporary |
| Contractor Waste | Moderate Temporary | Segregation into dry-recyclable streams (e.g. paper, plastic bottles and metal cans).<br>All receptacles for contractor waste clearly labelled with lids to prevent wind-blown litter.<br>Frequent collections of waste to ensure that quantities are not retained on-site for long periods<br>Contractor waste take home policy | Minor, adverse. Temporary |
| Excess / Out of Specification Waste | Negligible | Timely procurement and buying the required amount of material.<br>Perishable materials stored so that they are protected from the local climate.<br>All damaged or off-specification material returned to supplier where possible, | Negligible |
| Packaging Waste | Negligible | Suppliers required to take back any packaging associated with their products.<br>Re-use on-site<br>Segregation into dry recyclable streams | Negligible |
| Waste Oil & Empty Drums | Minor Temporary | Empty fuel or oil drums retained for re-use on-site.<br>Those that cannot be retained sent to a drum reconditioning facility to be prepared for re-use.<br>Damaged drums sent for recycling. | Negligible |
| Waste from Spillages | Moderate Temporary | Use of an active maintenance regime on plant and equipment to reduce potential for leaks.<br>Valves, stopcocks and pipes regularly checked for leakages.<br>Fuelling activities carried out in bunded areas, or off-site.<br>The storage of fuels and liquids will be in accordance with the Control of Pollution (Oil Storage) (England) Regulations 2001 | Minor, adverse. Temporary |

| | | | |
|---|---|---|---|
| Miscellaneous Hazardous Waste | Moderate Temporary | Hazardous materials stored securely, away from non-hazardous or incompatible materials.<br>Small items of hazardous waste not disposed of in general waste skips to avoid contamination.<br>Frequent collection of hazardous material to minimise total volume on-site at any one time. | Minor adverse. Temporary |
| **J15a / Minor Highway Works** | | | |
| Site Clearance – Vegetation | Moderate Temporary | Sent for recycling at a local composting facility.<br>No landfilling.<br>Vegetation removed from site progressively, i.e. the entirety of the anticipated vegetation will not be stockpiled before removal | Minor, adverse. Temporary |
| Excavation Material | Minor Temporary | Use of CLAIRE Code of Practice (COP) to use excavated material in the development | Negligible |
| Contaminated Excavation Material | Moderate Temporary | Use of CLAIRE COP<br>Off-site soil treatment facility | Minor, adverse. Temporary |
| Contractor Waste | Minor Temporary | Segregation into dry-recyclable streams (e.g. paper, plastic bottles and metal cans).<br>All receptacles for contractor waste clearly labelled with lids to prevent wind-blown litter.<br>Frequent collections of waste to ensure that quantities are not retained on-site for long periods<br>Contractor waste take home policy | Negligible |
| Excess / Out of Specification Waste | Negligible | Timely procurement and buying the required amount of material.<br>Perishable materials stored so that they are protected from the local climate.<br>All damaged or off-specification material returned to the supplier where possible. | Negligible |
| Waste Oil & Empty Drums | Negligible | Empty fuel or oil drums retained for re-use on-site.<br>Those that cannot be retained sent to be prepared for re-use.<br>Damaged drums will be sent for recycling. | Negligible |

| | | | |
|---|---|---|---|
| Waste from Spillages | Minor Temporary | Active maintenance regime on plant and equipment to reduce potential for leaks.<br>Valves, stopcocks and pipes regularly checked for leakages.<br>Fuelling activities carried out in bunded areas, or off-site.<br>Storage of fuels and liquids in accordance with the Control of Pollution (Oil Storage) (England) Regulations 2001 | Negligible |
| Miscellaneous Hazardous Waste | Minor Temporary | Hazardous materials stored securely, away from non-hazardous or incompatible materials.<br>Small items of hazardous waste not disposed of in general waste skips to avoid contamination.<br>Frequent collection of hazardous material to minimise total volume on-site at any one time. | Negligible |
| Carriageway Planings | Moderate Temporary | Upfront testing of any suspect material<br>Mitigation measures as per other hazardous materials<br>Onsite Treatment and re-use of material under an Environmental Permit is excavated volumes significant | Minor, adverse. Temporary |
| Concrete, bricks, metal rebar etc. from existing structures and drainage | Negligible | Anticipated that the majority of this material re-processed and recycled, either on-site as low grade infill across the development or off-site for use as a resource on other developments | Negligible |
| **Operation** | | | |
| Waste from Site Operatives | Major Long Term | Segregation into dry-recyclable streams (e.g. paper, plastic bottles and metal cans).<br>All receptacles for operational waste clearly labelled with lids to prevent wind-blown litter.<br>Frequent collections of waste to ensure that quantities are not retained on-site for long periods | Minor, adverse. Long Term |
| Waste Oil and Empty Drums | Moderate Long Term | Empty fuel or oil drums retained for re-use on-site.<br>Those that cannot be retained sent to a drum reconditioning facility to be prepared for re-use.<br>Damaged drums sent for recycling. | Minor, adverse. Long Term |

| | | | |
|---|---|---|---|
| Miscellaneous Hazardous Waste | Major Long Term | Hazardous materials stored securely, away from non-hazardous or incompatible materials.<br>Small items of hazardous waste not disposed of in general waste skips to avoid contamination.<br>Frequent collection of hazardous material to minimise total volume on-site at any one time. | Minor, adverse. Long Term |

## Climate Change (Chapter 23)

27.129 A climate change assessment has been undertaken to identify the effect of the Proposed Development upon the contribution of climate change and how climate change may impact the Proposed Development. The Assessment is structured into two specific categories:

(i) Climate Change Mitigation – How the Proposed Development contributes to the cause of climate change through the emission or reduction of greenhouse gases (GHG) as a result of the proposed development; and

(ii) Climate Change Adaptation – How the Proposed Development is affected by the projected changes to the future climate and whether measures are required to adapt to this changing climate.

### Climate Change Mitigation (GHG emissions)

27.130 The Proposed Development will result in GHG emissions from a range of sources such as the combustion and consumption of energy and materials and the movement of vehicles for commuting and the movement of freight. These will occur during the construction, operation and decommissioning phases.

27.131 It is also important to note that during the operational stages of the SRFI its strategic location and scale will provide the infrastructure to move freight from road to rail which has a number of environmental benefits including a reduction in carbon emissions, improved air quality and reduced congestion. A transport assessment has estimated that the SRFI will reduce road freight by approximately 20% through the transfer to rail.

27.132 A GHG assessment has been undertaken on the Proposed Development in accordance with the relevant legislation and guidance which demonstrates that the emissions during the construction phase are likely to result in a minor adverse impact upon climate change mitigation.

27.133 During the later parts of the construction phase and during the short and long term operational phases of the Proposed Development, GHG savings will occur as a result of this 'modal shift' and this will begin to offset GHG emissions from the operation of the buildings and infrastructure. The scale of GHG savings in the future will also be significantly affected

by the expected decarbonisation of the grid and transportation network. A separate assessment has been undertaken to estimate how this may impact GHG savings from the operation of the SRFI which concludes that decarbonisation is likely to result in proportionally lower emissions from rail freight in the future when compared to road transport.

27.134 During the construction stage, operational emissions are estimated to be negative with a reduction (GHG saving) of approximately 1,000 tonnes $CO_2e$. This increases during the short term operational phase (2029 -2038) as all of the SRFI is operational and more freight is moved from Road to Rail resulting in a GHG saving of 122,075 tonnes $CO_2e$.

27.135 Predicting GHG savings beyond 2038 is difficult given the uncertainties in decarbonisation of the network. However, a 'worst case' assessment has been undertaken whereby if no further decarbonisation of the network occurred, then for the period of 2039-2050 the SRFI would reduce GHG emissions by approximately 205,131 tonnes $CO_2e$.

27.136 One of the requirements of national policy is for SRFI's is to compare their GHG footprints with the Governments national carbon budgets to evaluate whether the project will affect the Government's ability to meet its carbon reduction budgets.

27.137 GHG emissions from the Proposed Development consist of a relatively small percentage of the carbon budget for the different phases. If total GHG emissions between 2019-2050 are calculated, the SRFI is making a positive contribution to the Governments carbon budget through a reduction in emissions.

27.138 The NPSNN also encourages the use of mitigation measures to reduce GHG emissions where possible and therefore additional mitigation measures have been recommended for the construction and operational phases which are likely to result in further reductions in GHG emissions.

27.139 An assessment of the GHG emissions from the Decommissioning of the Proposed Development was also undertaken which, through a range of assumptions, calculated that decommissioning could result in a reduction in GHG emissions of 1,895 tonnes $CO_2e$.

27.140 With regard to intra-project cumulative effects all relevant GHG emissions associated with other EIA topics have been considered within this chapter and no additional intra-project effects are considered likely.

27.141 With regard to inter-project cumulative effects the GHG emissions presented are based on circumstances specific to the Proposed Development and whilst external factors could have an impact on the quantity of estimated emissions, reasonable endeavours have been taken to ensure that likely scenarios are accounted for, for example in projections of future emission factors. Beyond this, there are no specific projects identified that are likely to have an inter-project effect on the quantity of GHG emissions.

**Climate Change Adaptation**

27.142 With regard to climate change adaptation, the assessment identified the potential future climate at the periods of 2020, 2050 and 2080. Qualitatively the future climate at 2020 within increasing variability to 2080 will consist of:

- An increase in annual average temperature in winter and summer;
- More very hot days particularly in long term operation with an increase in daily maximum temperature;
- More intense downpours of rain;
- Increase in winter rainfall with reduced snowfall and winter rainfall increasing by up to 25%; and
- An increase in dry spells particularly in summer months with summer rainfall dropping by up to 25%.

27.143 The potential impacts of these climatic factors have been considered for all phases of the Proposed Development with a number of embedded mitigation measures including the use of drainage systems and specific measures within the Construction Environmental Management Plan (CEMP) to manage potential impacts associated with flooding, drainage and dust.

27.144 The assessment identified a number of significant environmental effects that may occur during the construction and operational phases as a result of the future changes in seasonal temperature and rainfall. As a result the following adaptive mitigation measures have been proposed:

- Use of best practice design and construction practices for the construction of foundations in line with relevant guidance including consideration of climate change.
- The application of the cooling hierarchy during detailed design, prioritising passive design features over mechanical cooling to enable buildings to remain comfortable under projected temperature increases. ]
- The use of Sustainable Urban Drainage Systems (SuDS) to reduce the risk of surface water flooding.
- Provision of measures to reduce water use in the operation of the buildings, by targeting water efficiency targets and the development of a plan to utilise rainwater for irrigation if possible.

27.145 With the adaptive mitigation measures proposed above it is considered that there are no significant residual environmental effects and the Proposed Development has sufficient resilience to the projected future impacts of climate change.

27.146 The assessment also considered the potential for climate change to effect other topics of the PEIR and it was noted that interactions occurred between climate change and the following topics:

- Air Quality- through the emission of dust in hotter drier summers;
- Ground Conditions – through the movement of ground as a result of temperature and rainfall;
- Hydrology, Drainage and Flood Risk – through the increase in rainfall resulting in a greater probability of flooding events;
- Utilities – higher temperatures may cause impacts to on-site electrical equipment; and
- Biodiversity – it is envisaged that climate change will result in some positive and negative impacts to on-site biodiversity which will result in negligible overall impacts.

27.147 Through the embedded and adaptive mitigation measures proposed all cumulative impacts have been addressed.

27.148 With regard to inter-project cumulative effects, the effects of Climate Change predominantly impact on the development rather than the development impacting on Climate Change, with the exception of flooding whereby other major development such as Northampton Gateway could result in greater flooding episodes. However it has been assumed that this development would be designed to reduce flooding impacts in a similar manner to this Proposed Development and therefore there are no inter-project cumulative effects.

27.149 The climate change assessment has concluded that the Proposed Development has a high resilience to the projected future impacts of climate change. An estimation of the GHG emissions from the Proposed Development has concluded that over the long term operation phase, there will be a positive contribution to the UK Governments carbon budget as a result of the SRFI moving freight from road to rail thereby reducing GHG emissions.

**Table 27.16: Copy of residual effects tables contained within Chapter 23**

| Description of impact | Significance of effect | Possible mitigation measures | Residual effect | Climate change resilience |
|---|---|---|---|---|
| Main SRFI Site | | | | |
| **Construction** | | | | |

| | | | | |
|---|---|---|---|---|
| During construction increase in annual temperatures and changes in rainfall may impact on ground conditions and infrastructure foundations | Moderate negative | Use of best practice design and construction measures taking into account relevant design guidance including consideration of the effects climate change and ground movement. | Minor, negative | High |
| **Operation** | | | | |
| The increase in summer mean and daily maximum temperature may increase cooling requirements increasing energy use and GHG emissions | Moderate negative | Design of cooling systems in accordance with the cooling hierarchy | Minor Negative | High |
| Increase in winter rainfall may increase surface water flood risk. | Moderate negative | Provision of measures as set out in the Hydrology Chapter which include an allowance for future climate change | Minor negative | High |
| The impact of reduced rainfall in the summer may lead to issues with water availability | Moderate negative | Assessment of buildings against BREEAM, in particular ensuring buildings achieve the required water reduction in line with BREEAM Excellent. | Minor negative | High |
| J15a Works | | | | |
| **Construction** | | | | |
| During construction increase in annual temperatures and changes in rainfall may impact on ground conditions and infrastructure foundations | Moderate negative | Use of best practice design and construction measures taking into account relevant design guidance including consideration of the effects climate change and ground movement. | Minor, negative | High |
| **Operation** | | | | |
| Increase in winter rainfall may increase surface water run-off and flood risk. | Moderate negative | Provision of measures as set out in the Flood Risk and Drainage assessment which includes an allowance | Minor, negative | High |

| | | | | |
|---|---|---|---|---|
| | | for future climate change | | |
| Other Highways Works | | | | |
| **Construction** | | | | |
| During construction increase in annual temperatures and changes in rainfall may impact on ground conditions and infrastructure foundations | Moderate negative | Use of best practice design and construction measures taking into account relevant design guidance including consideration of the effects climate change and ground movement. | Minor, negative | High |
| **Operation** | | | | |
| Increase in winter rainfall may increase surface water run-off and flood risk. | Moderate negative | Provision of measures as set out in the Flood Risk and Drainage assessment which includes an allowance for future climate change | Minor, negative | High |

## Human Health (Chapter 24)

27.150 Health has been assessed in order to address any significant public health impact, and to inform the development of a proportionate assessment, where appropriate. The scoping exercise included a review of construction, operational and decommissioning activities with the potential to influence health (both adversely/beneficially). Key health pathways with the opportunity to influence local health include changes in air quality, noise, road movements, and income and employment opportunities. However, each of these health pathways are already assessed and addressed through the following technical disciplines set to be protective of the environment and health:

- **Chapter 9: Air Quality;**
- **Chapter 18: Noise and Vibration;**
- **Chapter 19: Highways and Transportation; and**
- **Chapter 20: Socio-economics.**

27.151 The Human Health Scoping Statement (provided in Appendix 24.1 to the PEIR) identifies that it has been agreed with the Northamptonshire County Council Public Health Team that all of the potential material effects on human health associated with the Proposed Development

are already addressed through the wider technical disciplines to objective thresholds set to be protective of health (i.e. focus on precursors to health effects), and that no further health assessment is required. The consultation process, however, revealed that local communities are experiencing stress and anxiety from the DCO process itself. On this basis, and to aid transparency, a Human Health PEIR chapter has been provided to assist the reader of the PEIR by explaining how and where potential effects on human health are addressed through design and assessed through the wider technical disciplines within the PEIR.

27.152 During construction, any potential risk to human health from changes in local air quality, noise and traffic movements are considered to be adequately managed through a dedicated Construction Environmental Management Plan (which includes a Dust Management Plan), Construction Traffic Management Plan, Framework Travel Plan (FTP) and Public Transport Strategy (PTS).

27.153 During operation, air quality levels are predicted to remain within objective thresholds set to be protective of the environment and human health and noise at residential noise sensitive receptors are predicted at worst case to be minor. Therefore, no significant adverse effects on human health are likely to occur as a result of changes in air quality or noise exposure.

27.154 Effects on transport during operation are expected to lead to a net reduction in traffic on the national road network but will increase the amount of traffic on the local road network due to employee commuting. However, any impact on severance, pedestrian amenity and accidents and safety due to increased traffic on the local road network is managed through the FTP and PTS. Following mitigation, the potential impact to health is not considered significant.

27.155 The Proposed Development is expected to provide a significant amount of jobs during the construction and operational phase. As long-term employment and income security is a key determinant of health, the Proposed Development will have significant health and wellbeing benefits for employees.

27.156 Overall, no significant residual effects are anticipated in relation to population and health and no additional health-specific monitoring is required as air quality and noise monitoring (precursors to health effect) will be undertaken.

**Major Accidents and Disasters (Chapter 25)**

27.157 A structured risk assessment was undertaken to identify the Proposed Development's vulnerability to, and from, risks of major accidents and disasters. This assessment considered how the baseline environment (such as existing roads, utilities and rail infrastructure and natural risks such as flooding) could interact with the Proposed Development to generate a scenario where a potential major accident or natural disaster could arise.

27.158 For situations where the risk assessment identified potential risks for major accidents the embedded mitigation and management structure proposed was considered to include appropriate controls. The level of regulatory control and/or industry guidance in relation to the potential major accident situations was also considered. Where necessary, additional mitigation has been identified to reduce the accident/hazard risks to an acceptable level.

27.159 The objective of the assessment is to confirm that appropriate precautionary actions are taken, to avoid major accidents or disaster risks, which could have significant adverse effects on the environment (including people or infrastructure). The assessment identified potential risk events (including any embedded mitigation) related to utilities, rail infrastructure and the possibility that hazardous substances could be stored on site once operational. However, there are relevant embedded mitigation and risk management processes related to these potential events which reduce the risks. These include:

- Statutory compliance and adherence to common industry good practice and guidance is an appropriate minimum operational standard for the development.
- Establishment of roles, responsibilities, authorities and accountabilities in advance of the construction phase will be embedded within the construction contract performance requirements. The framework for construction phase management will be established by the code of construction practice (COCP).
- All relocation works of third party infrastructure will either be undertaken and contracted directly by the Statutory undertaker or undertaken by approved contractors to a standard appropriate for the Statutory undertaker and within the terms established by any protective provisions contained within any granted order.
- The contractors appointed to implement the construction will maintain a safe environment. Active risk management is considered to be standard industry approach as is implementing construction projects within an operational site. The framework for construction phase management will be established by the code of construction practice (COCP).
- Management of the SRFI with private rail freight train operators using the facilities (to move material on/off the rail network and for interim storage facilities) will be undertaken to Network Rail's requirements, as regulated by The Office of Rail Regulation (ORR).
- Freight services will be provided by suitably approved and regulated Freight Operating Company (FOCs).

27.160 All operators will be required to maintain statutory compliance within the Proposed Development with controls specific to the materials they are responsible for. Therefore, should hazardous substances or those that require regulation under COMAH be stored on

site, the appropriate permits, approvals and operating practices would have to be implemented by the relevant operator.

27.161 The assessment concludes that appropriate mitigation, management or regulatory controls are, or will be in place to minimise the risk of major accidents or natural disasters. As a result, it is considered that there will not be any expected significant environmental effects of the Proposed Development deriving from the vulnerability to risks of major accidents and/or disasters.

## Summary of Significant Residual Effects

27.162 A summary of the significant residual effects, both adverse and beneficial, is provided below as **Table 27.17.**

**Table 27.17: Summary of All Identified Significant Residual Effects**

| Topic / Type of Effect | Receptor | Phase of Development |
|---|---|---|
| SIGNIFICANT RESIDUAL BENEFICIAL EFFECTS | | |
| Moderate Beneficial | | |
| **Landscape and Visual** | | |
| Landscape Effects (Main SRFI Site) | Landscape Effects (Year 15) | Operation |
| **Highways & Transportation** | | |
| Traffic flows | Junction 11 - A45 / A43 / Ferris Row | Operation |
| **Socio-Economics** | | |
| Jobs | Jobs – Local Impact Area | Construction |
| Economic Productivity | Economic Productivity – Local Impact Area | Construction |
| | Economic Productivity – Wider Impact Area | Operation |
| Major Beneficial | | |
| **Socio-Economics** | | |
| Jobs | Jobs – Local Impact Area | Operation, Cumulative |
| | Jobs – Wider Impact Area | Operation, Cumulative |
| Economic Productivity | Economic Productivity – Local Impact Area | Operation |
| Business Rate Revenue | Business Rate Revenue – Local Impact Area | Operation |

| Topic / Type of Effect | Receptor | Phase of Development |
|---|---|---|
| SIGNIFICANT RESIDUAL ADVERSE EFFECTS | | |
| Moderate Adverse | | |
| **Agriculture** | | |
| | Loss of agricultural land | Construction (and Cumulative) |
| | Loss of or damage to soil resources | Construction |
| | Loss of farmable area and/or farm infrastructure | Construction |
| **Built Heritage** | | |
| Built Heritage | Receptors (properties, locks, conservation areas) MM9, MM10, MM36, GU18, HW12, HW13 | Construction |
| | Receptors (properties, locks, conservation areas) MM9, MM10, MM36, GU18/HW17, HW12, HW13 | Operation |
| | Receptors (properties) MM36, MM10 | Cumulative (in combination with Northampton Gateway) |
| **Landscape and Visual** | | |
| Landscape Effects (J15a works) | Landscape effects | Construction |
| Landscape Effects | Landscape effects (Year 15) | Cumulative, operation phase (in combination with Northampton Gateway) |
| Visual (Residential) | R5, R8b, R9, R10, R11, R12b, R18, R19 | Construction |
| | R18 (Year 15) (in the absence of a third party agreement to manage the intervening field boundary to allow it to grow out, encourage top growth and maintain hedgerows at a taller height). | Operation |
| | R5 (Year 15) (in the absence of a third party agreement to manage the existing garden boundary hedgerows to encourage top growth and maintain them at a taller height, and the provision of offsite planting within the gardens or its boundaries). | Operation |
| | R11 (Year 15) (in the absence of third party agreement to manage the existing garden boundary hedgerows, or other intervening | Operation |

| Topic / Type of Effect | Receptor | Phase of Development |
|---|---|---|
| | field boundaries adjacent to Collingtree Road, to encourage top growth and maintain them at a taller height, and the provision of offsite planting within the gardens or its boundaries). | |
| Visual (Public Rights of Way) | KX5 and KX9 | Construction |
| | KX10 (Year 15) (in the absence of a third party agreement to manage the existing intervening hedgerow field boundaries adjacent to Collingtree Road and field boundaries to the south of the road. Hedgerows could be managed to grow out and tall, or targeted offsite planting adjacent to these field boundaries including the introduction of groups of large size feathered and semi mature deciduous trees. | Operation |
| Visual (J15a works) | Grand Union Canal (E) | Construction |
| Visual (Minor Highways Works) | Junction 6 A5076 / Hunsbury Hill Road Roundabout (Minor Highways | Construction |
| **Highways & Transportation** | | |
| Traffic Flows | Junction Five - M1 Junction 15a - M1 / A43 / A5123<br>To note: the effect is in relation to additional traffic flows through the junction. The result of that increased traffic flow on all of the other factors is negligible and on driver delay (with adaptive mitigation measures) is beneficial. | Operation |
| Major Adverse | | |
| **Landscape and Visual** | | |
| Landscape | Landscape Effects | Construction, and Cumulative (in combination with Northampton Gateway) |
| Visual (Residential) | R1, R2, R8a, R21 | Construction |
| | R19 (Blisworth Lodge) Year 15<br>(in the absence of a third party agreement to manage the existing garden boundary hedgerows to encourage top growth and maintain them at a taller height, and the provision of offsite planting within the gardens or its boundaries) | Operation |

| Topic / Type of Effect | Receptor | Phase of Development |
|---|---|---|
| Visual (Public Rights of Way) | KX7, KX8, KX13, KX15, KX16, RD1, RD22, RD3, RD6, KZ14 and RD12 | Construction |
| | KX5 (Year 15) (in the absence of a third party agreement to manage the existing intervening hedgerow field boundaries adjacent to Gayton Road. Hedgerows could be managed to grow out and tall, or targeted offsite planting adjacent to these field boundaries including the introduction of groups of large size feathered and semi mature deciduous trees). | Operation |
| | KX13, RD1 & RD22, RD3, RD6 & KZ14 (Year 15) | Operation |
| | RD3, RD6, KZ14, RD22 (Year 15) | Cumulative (Construction and Operation, in combination with Northampton Gateway) |
| Visual (Road Users) | Barn Lane (BLn) and Northampton / Towcester Road (TRd) | Construction |
| Visual (J15a works) (Canal and Public Right of Way) | Grand Union Canal (C), KX2 (PRoW) | Construction |