M3 Junction 9 Improvements

Environmental Impact Assessment Scoping Report

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Contents

Acronyms and abbreviations

Acronyms / abbreviations	Definition
AADT	Average Annual Daily Traffic
AEP	Annual Exceedance Probability
ALC	Agricultural Land Classification
AONB	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Area
ARN	Affected Road Network
BAP	Biodiversity Action Plan
BCR	Benefit Cost Rating
BGS	British Geological Society
BSI	British Standards Institute
CDE	Construction, Demolition and Excavation
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CL:AIRE	Contaminated Land: Applications in Real Environments
CPRE	Campaign to Protect Rural England
CRTN	Calculation of Road Traffic Noise
CSM	Conceptual Site Model
DCO	Development Consent Order
Defra	Department for Environment Food And Rural Affairs
DMRB	Design Manual for Roads and Bridges
EAR	Environmental Assessment Report
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
EqIA	Equality Impact Assessment
ES	Environmental Statement
GHG	Greenhouse Gas
HABAP	Highways Agency Biodiversity Action Plan
HADDMS	Highways Agency Drainage Data Management System
HAGDMS	Highways Agency Geotechnical Data Management System
HCC	Hampshire County Council
HE MPI	Highways England Major Project Instruction
HIA	Hydrogeological Impact Appraisal

Acronyms / abbreviations	Definition
HPI	Habitats of Principal Importance
HRA	Habitats Regulations Assessment
IAN	Interim Advice Note
IAQM	Institute of Air Quality Management
IEMA	Institute of Environmental Management and Assessment
LAQM	Local Air Quality Management
LiDAR	Light Detection and Ranging
LOAEL	Lowest Observable Adverse Effect Level
MAGIC	Multi Agency Geographic Information for the Countryside
NERC (Act)	Natural Environment and Rural Communities
NEWP	Natural Environment White Paper
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NPS NN	National Policy Statement for National Networks
NPSE	Noise policy statement for England
NVC	National Vegetation Classification
ONS	Office for National Statistics
OS	Ordnance Survey
PA 2008	Planning Act 2008
PCF	Project Control Framework
PCM	Pollution Climate Mapping
PCSM	Preliminary Conceptual Site Model
PPG	Planning Practice Guidance
PPV	Peak Particle Velocity
PRoW	Public Rights of Way
RBMP	River Basin Management Plan
RIGS	Regionally Important Geological Sites
RIS	Road Investment Strategy
RVEI	Road Verge of Ecological Importance
SAC	Special Areas of Conservation
SDILCA	South Downs Integrated Landscape Character Assessment
SDNP	South Downs National Park
SDNPA	South Downs National Park Authority

Acronyms / abbreviations	Definition
SFRA	Strategic Flood Risk Assessment
SINC	Site of Importance for Nature Conservation
SOAEL	Significant Observed Adverse Effect Level
SPA	Special Protection Area
SPI	A Species of Principal Importance
SPZ	Source Protection Zones
SSSI	Sites of Special Scientific Interest
TRL	Transport Research Laboratory
WFD	Water Framework Directive
ZTV	Zone of Theoretical Visibility

1. Introduction

1.1 Purpose of the report

1.1.1 The purpose of this Environmental Impact Assessment (EIA) Scoping Report is to establish the scope of the Environmental Statement (ES) for the Nationally Significant Infrastructure Project (NSIP) scheme, the M3 Junction 9 project (hereafter referred to as 'the Proposed Scheme').

1.1.2 The EIA Scoping Report is set out in accordance with guidance provided in Volume 11 of the Design Manual for Roads and Bridges (DMRB) (DMRB, 1993), the Planning Inspectorate's Advice Note 7: Process, Preliminary Environmental Information, Screening and Scoping (December 2017) (Planning Inspectorate, 2017) and the latest Highways England guidance.

1.1.3 The ES will be prepared in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (hereafter referred to as the 'EIA Regulations') and will accompany Highways England's application for development consent.

1.1.4 Table 1-1 outlines the information required to be included in a scoping opinion request in accordance with Regulation 10 (3) of the EIA Regulations, and Table 1-2 outlines the information required to be included in a scoping opinion request in accordance with the Planning Inspectorate's Advice Note 7: Process, Preliminary Environmental Information, Screening and Scoping (Planning Inspectorate, 2017). Both tables outline where each element of information can be found within this EIA Scoping Report.

Table 1-1 Information required by Regulation 10(3) of the EIA Regulations

Information required by Regulation 10(3) of the EIA Regulations	Location in this Scoping Report
A plan sufficient to identify the land.	Appendix B
A description of the proposed development including its location and technical capacity.	Section 2.4
An explanation of the likely significant effects of the development on the environment.	Section 6.5 to 15.5

Table 1-2: Information requested by the Planning Inspectorate's Advice Note 7 (2017)

Information required by Advice Note 7	Location in this Scoping Report
An explanation of the approach to addressing uncertainty where it remains in relation to elements of the proposed development, for example, design parameters.	Section 2.6
Referenced plans presented at an appropriate scale to convey clearly the information and all known features associated with the proposed development.	Appendix B

Information required by Advice Note 7	Location in this Scoping Report
An outline of the reasonable alternatives considered and the reasons for selecting the preferred option.	Section 3
A summary table depicting each of the aspects and matters that are requested to be scoped out allowing for quick identification of issues.	Section 17.3
A detailed description of the aspects and matters proposed to be scoped out of further assessment with justification provided.	Section 6.8 to 15.8
Results of desktop and baseline studies where available and where relevant to the decision to scope in or out aspects or matters.	Section 6.2 to 15.2
Aspects and matters to be scoped in, the report should include details of the methods to be used to assess impacts and to determine significance of effect.	Section 6.6 to 15.6, Section 6.8 to 15.8
Any avoidance or mitigation measures proposed, how they may be secured and the anticipated residual effects.	Section 6.4 to 15.4
References to any guidance and best practice to be relied upon.	Section 6 to 15
Evidence of agreements reached with consultation bodies.	Section 4
An outline of the structure of the proposed ES.	Section 5.5

1.2 Overview of the project

1.2.1 M3 Junction 9 is a key transport interchange which connects South Hampshire (facilitating an intensive freight generating industry) and the wider sub-region, with London via the M3 and the Midlands/North via the A34 (which also links to the principal east-west A303 corridor).

1.2.2 A significant volume of traffic currently use the grade seperated, partially signalised gyratory (approximately 6,000 vehicles per hour during the peak periods) which acts as a bottleneck on the local highway network and causes significant delay throughout the day. Northbound and southbound movements between the M3 and A34 are particularly intensive, with downstream queues on the northbound off-slip of the M3 often resulting in safety concerns during peak periods.

1.2.3 To address this, the Proposed Scheme comprises the development and delivery of a scheme of works for increasing capacity, enhancing journey time reliability and supporting development in line with Local Plans. The Proposed Scheme includes the replacement of a circulatory roundabout with a dumbbell roundabout, conversion of the M3 south of Junction 9 to dual three lane motorway, realignment of slip roads, the addition of new structures, and improvements to safety features, signage and technology.

2. The Project

2.1 Need for the project

2.1.1 Hampshire County Council has identified that infrastructure improvements are necessary to reduce congestion levels and assist with the strategic movement of traffic at a key arterial intersection, to make sure that vehicular delay does not compromise the scale of potential future economic growth in the sub-region. It is believed that the introduction of free-flow movement between the A34 and the M3 is critical to achieving these goals.

2.1.2 To address this, the improvement to M3 Junction 9 was included in the Department for Transport's Road Investment Strategy (RIS). The improvement contributes to national transport objectives by:

- Providing additional capacity
- Enhancing journey time reliability
- Supporting the development of housing and the creation of jobs, as set out in the existing and emerging Local Plans

2.1.3 The strategic case for the Proposed Scheme is supported by the M25 to Solent Route Strategy (Highways England, 2017a) and the associated Options Assessment Report and Strategic Outline Business Case.

2.1.4 The M25 to Solent and Solent to Midlands Route Strategy Evidence Report (Highways Agency 2014 and 2014a) published April 2014 noted that:

- The A34 is the main corridor between the Midlands and north carrying freight traffic from Southampton and Portsmouth Docks.
- This length of the route connects with the M25 to Solent at the M3 Junction 9 and the South West Peninsula at A34/A303 junction.
- Substantial development of Southampton container port will increase HGV traffic on the A34 and M3 (which is expected to double between 2005 and 2020 with vehicular traffic increasing by 33%).
- There are plans to provide 2,000 dwellings in the Barton Farm area of Winchester adjacent to the M3 Junction 9 with the A34. The proposed construction period is between 2011 and 2031.

2.1.5 Collision data that has been obtained from Hampshire Constabulary for a five year period from March 2011 – February 2016 and is outlined in the PCF Stage 2 Scheme Assessment Report (Highways England, 2018). During this time a total of 82 accidents occurred, with approximately 50% on or on the approach to the junction roundabout. The remaining 50% of the collisions occur on the M3 slip roads or on the main line of the M3 and the A34.

2.2 Project objectives

2.2.1 The main objective of the Proposed Scheme is to introduce free-flow movement between the M3 and A34 at Junction 9. By providing an unconstrained link, vehicles will not be required to manoeuvre through a priority or signal controlled junction. This will reduce congestion and improve journey time reliability on the M3, A34 and local road network.

2.2.2 The Proposed Scheme's strategic objectives, in line with Highways England Delivery Plan 2015-2020 (Highways England, 2015b) are:

1. Supporting economic growth – unlocked development capacity for job, business and housing creation
2. A safe and serviceable network – safety improved as a consequence of a reduction in delays and queue lengths
3. A more free flowing network – reduced the amount of congestion and increase journey time reliability
4. An improved environment – endeavour to improve where possible the number of households adversely affected by noise, improve the air quality at sensitive receptors and no net loss in biodiversity by 2020.
5. A more accessible and integrated network – improvements at Junction 9 would also include improvements for non-motorised users. The Proposed Scheme would connect the National Cycle Network Route 23 which is severed by the current junction layout

2.3 Project location

Surrounding area

2.3.1 The site is located within the planning authority boundaries of Winchester City Council and the South Downs National Park (SDNP). The site and surrounding area are shown in Figure 1-1 in Appendix B.

2.3.2 The surrounding area is primarily urban to the west of the M3 and primarily rural to the east. There are large concentrations of residential receptors close to the A34 in the north of the study area (in Headbourne Worthy, Kings Worthy and Abbots Worthy) and close to the M3 to the south of the study area (on the eastern fringe of Winchester). A small number of isolated farm holdings or rural dwellings lie to the east of the Proposed Scheme. There are four schools and education facilities (including St Swithun's School north of the B3404 and east of the M3) within proximity to the junction.

2.3.3 Immediately west of the Proposed Scheme there is an area of commercial development. This includes Sun Valley Business Park, Tesco, Winnall Industrial Estate and Scylla Industrial Estate. Wykeham Trade Park and Highways England's maintenance depot are located to the northwest of the junction.

2.3.4 The SDNP extends beyond the area of the Proposed Scheme to the north, east, south and some areas to the west. The land to the east is generally green field. The River Itchen and associated floodplain are present within the north part of the Proposed Scheme. It lies along the River Itchen valley with the base of the valley to the west of the junction. The

River Itchen Special Areas of Conservation (SAC) and Sites of Special Scientific Interest (SSSI) also extend to the north-east and south-west.

Key designations

2.3.5 The River Itchen Special Area of Conservation (SAC) is located in part beneath the existing alignment of M3 Junction 9. The River Itchen SAC is a European designated site of international importance. The site is designated for its habitats and species (water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation, Atlantic salmon, brook lamprey, bullhead, otter, southern damselfly and white-clawed crayfish).

2.3.6 The River Itchen is also a designated SSSI, primarily due to the complex mosaic of habitats found within the riparian zone and the species which occur within them, including otter, water vole, and the white-clawed crayfish. The River Itchen SSSI is of nature conservation value at the national scale, and is of high environmental value.

2.3.7 There are no further UK statutory ecological designated sites within a 2km study area surrounding the Proposed Scheme.

2.3.8 South Downs National Park is a key designation within and adjacent to the Proposed Scheme.

2.3.9 Two Groundwater Source Protection Zones (SPZ) lie to the north of the Proposed Scheme. They are classified as Groundwater Source Protection Zone (SPZ) 1 (inner zone) and SPZ 2 (outer zone).

2.3.10 There are a number of scheduled monuments and listed buildings adjacent to the Proposed Scheme.

2.3.11 The environmental constraints for the Proposed Scheme are shown in Figure 1-1.

2.4 Project description

2.4.1 The existing M3 Junction 9 is formed of a grade-separated, partially signalised roundabout connecting multiple nationally and locally significant routes. The M3 here is joined with the A34 towards Newbury and Oxford, A272 towards Petersfield and southern Winchester, and Easton Lane towards Winnall and northern Winchester. Around 1km north of the roundabout, the A33 from Basingstoke connects with the A34, and the A31 from Alton connects to the A272 around 1km south of the roundabout.

2.4.2 The improvements proposed as part of the Proposed Scheme maintain this existing connectivity, whilst providing enhanced capacity, simplified routing and improved facilities for walkers, cyclists and horse-riders (WCHR). The PCF Stage 2 Scheme Assessment Report promoted Option 14 as the chosen option for Preferred Route Announcement. This option provides the following modifications:

- Traffic between the M3 to/from Southampton and the A33/A34 to/from Basingstoke and Newbury to be taken out of the roundabout junction by providing free-flow grade separated links

- Widening of the M3 from a dual 2 lane motorway (2 lane motorway and a hard shoulder) to a 4 lane motorway (no hard shoulder) between the south-facing roundabout slips and the new free-flow links
- A smaller grade-separated dumbbell roundabout arrangement within the footprint of the existing roundabout, incorporating a new bridge connection over the M3 including WCHR facilities
- New WCHR subways through the junction providing a continuous grade-separated route between the South Downs National Park, Winnall and Abbots Worthy
- Connector roads from the new free-flow links to the new dumbbell roundabout
- Improved slips to/from M3 and new dumbbell roundabout.

2.4.3 The Proposed Scheme extent, as defined by the order limits is approximately 93.9 hectares, approximately 28.9 hectares of this land is land that is outside of the existing highways boundary. This includes the proposed land required for gantries, signage, an indicative satellite compound area, areas for environmental mitigation and areas for drainage requirements. It is important to note that the current proposed draft Development Consent Order (DCO) order limits could be subject to change as the design progresses and becomes more detailed, but currently captures what is considered to be the land take required, based on the present design.

2.4.4 Further description is provided below.

M3 to A34 northbound

2.4.5 To account for the proposed smart motorway project (M3 Junction 9 to Junction 14) the existing M3 northbound will be converted to an all lane running motorway with 4 lanes northbound. South of Junction 9, in the northbound direction, the two nearside lanes would be signed and line marked for the A34 northbound and the two offside lanes for the M3. Access to Junction 9 would be provided via a reconstructed northbound off slip.

2.4.6 The two proposed northbound A34 lanes would pass under Junction 9 alongside the two M3 lanes, after which they split from the M3 to form the new A34 northbound link with the remaining two offside lanes continuing north as the M3.

2.4.7 After the split the A34 would continue north, passing over the proposed M3 northbound on slip before descending to tie into the existing A34 northbound carriageway prior to the existing River Itchen Bridge.

2.4.8 North of the existing River Itchen Bridge the existing A34/A33 diverge would be widened to allow two lanes to run continuously on the A34 with an offside diverge to the A33.

A34 southbound to M3

2.4.9 The A34 southbound link would leave the existing A34 alignment after the River Itchen Bridge. The Proposed Scheme has been specifically designed to avoid any impact on the River Itchen flood plain thus avoiding the requirement for flood compensation and potential increased environmental mitigation. The A34 would then pass under the M3 in a cutting, to reduce the visual impact on the wider SDNP and the surrounding area.

2.4.10 Beyond the M3 underpass, a diverge would lead to a slip road connecting to the revised Junction 9 roundabout junction. The two traffic lanes of the A34 southbound link road would proceed and join the M3 mainline southbound carriageway to the north of the revised Junction 9 layout.

M3 Junction 9 roundabout

2.4.11 The Junction 9 circulatory roundabout would be replaced with an offline dumbbell roundabout; all link roads that access the roundabout would require realignment to this new layout.

Slip roads

2.4.12 The existing M3 northbound on slip would be relocated to accommodate the new free-flowing A34 northbound link. The M3 northbound on slip would pass under the new A34 northbound link and over the new A34 southbound link before merging with the M3 approximately 500m downstream of the existing northbound on slip. The existing northbound A34 carriageway would be reused as a link from the Junction 9 roundabout merging with the A34 northbound just to the south of the River Itchen Bridge.

2.4.13 The existing M3 southbound off slip would be removed and replaced with a new off slip located approximately 600m upstream. The new southbound M3 off slip would then merge with the new A34 to roundabout link to maintain local access.

Structures

2.4.14 The Proposed Scheme has the following new structures (would be designed further as part of PCF Stage 3):

- Structure no.1 – Easton Lane M3 Junction 9 overbridge
- Structure no.2a –A34 southbound slip road underpass of M3 northbound on-slip road
- Structure no.2b – A34 southbound slip road underpass of M3 main line
- Structure no.3 – A34 northbound slip road overbridge of M3 northbound on-slip road
- three subways – under the new dumbbell roundabout
- two retaining walls – along the M3 northbound on slip to A34 link and adjacent to the proposed M3 northbound on slip underbridge
- seven portal or cantilever gantries
- two CCTV masts

Footpaths

2.4.15 A new foot and cycle path would connect the existing public rights of way on the south western and north western sides of the Proposed Scheme. It would pass under the

western roundabout, pass over the M3 and then pass under the link to the A34 on the eastern roundabout.

Signage and lighting

2.4.16 Signage and lighting will be designed as part of PCF Stage 3 but are anticipated to be in-line with guidance and design standards. It is not currently expected to light the junction or slip roads.

Construction activities

2.4.17 The current proposals allow for construction compounds, including an indicative satellite construction compound, haul roads, material stockpiles, temporary working and storage areas and temporary traffic management areas. These details are being developed in parallel with the design, with options being considered. Further details will be presented for statutory consultation prior to their refinement and assessment in the ES.

Mitigation requirements

2.4.18 The current proposals allow for a proposed drainage pond and access track and environmental mitigation, including land for landscape and ecological requirements and the provision of an artificial badger sett. These details are being developed as the design and the environmental assessment progresses. Further details will be presented for statutory consultation prior to their refinement in the ES.

2.5 Legislative context and need for Environmental Impact Assessment

2.5.1 The Proposed Scheme is defined as a Nationally Significant Infrastructure Project (NSIP) under Section 14(1)(h) and Section 22 of the Planning Act 2008 (PA 2008) (as amended by The Highways and Railway (Nationally Significant Infrastructure Project) Order 2013).

2.5.2 In accordance with the legislation, a Development Consent Order (DCO) is required to allow the construction and operation of the Proposed Scheme.

2.5.3 The Proposed Scheme will be subject to an Environmental Impact Assessment (EIA), and reported within an Environmental Statement (ES). This is on the basis that it is considered to be EIA development and specifically Schedule 2 (10) (f) development satisfying Clause 7 (3) of Schedule 1 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations) and the Proposed Scheme is likely to have significant environmental impacts. The Proposed Scheme is an ‘Infrastructure project – construction of roads’.

2.5.4 In accordance with Regulation 8(1)(b) of the EIA Regulations, Highways England will notify the Secretary of State for Transport in a letter to the Planning Inspectorate that an ES presenting the findings of the EIA will be submitted with the DCO Application.

2.5.5 The Localism Act 2011 appointed the Planning Inspectorate as the agency responsible for operating the DCO process for NSIPs. In its role, the Planning Inspectorate will examine the application for the Proposed Scheme and will make a recommendation to the Secretary of State who will make the decision on whether to grant or to refuse the DCO.

2.5.6 In accordance with Section 104(2) of the PA 2008, the Secretary of State is required to have regard to the relevant National Policy Statement (NPS), amongst other matters,

when deciding whether or not to grant a DCO. The relevant NPS for the Proposed Scheme is the National Policy Statement for National Networks (NPSNN) (DfT, 2014). This was designated in January 2015.

2.5.7 Other matters that the Secretary of State would consider both important and relevant, under Section 104(2) of the PA 2008, include national and local planning policy.

2.5.8 The revised National Planning Policy Framework (NPPF) (MHCLG, 2018) published in July 2018 is relevant to national planning policy. Alongside the NPPF is the National Planning Practice Guidance (PPG).

2.5.9 In terms of local planning policy, the statutory Development Plan relevant to the Proposed Scheme consists of the following adopted plans:

- The saved policies in the Winchester District Local Plan Review 2006 (Winchester City Council, 2006)
- The Winchester District Local Plan Part 1 – Joint Core Strategy 2013 (Winchester City Council, 2013)
- The Winchester District Local Plan Part 2 – Development Management and Allocations 2017 (Winchester City Council, 2017a)
- Policies Maps
- Hampshire Minerals and Waste Plan 2013 (Hampshire County Council, 2013)
- Hampshire Local Transport Plan 2011 – 2031 (Hampshire County Council, 2011)

2.5.10 The following are the emerging Development Plan policies:

- South Downs National Park Local Plan Submission (2018b) (SDNPA 2018)
- Winchester City Council Local Plan 2036 (Winchester City Council 2018)

2.5.11 Further information regarding the national and local planning policies can be found in Appendix A of this EIA Scoping Report.

2.5.12 Sections 6 to 16 of this EIA Scoping Report describe the national and local planning policies relevant to the assessment with a summary provided for each environmental topic.

2.5.13 The purpose of considering the above mentioned planning policy at the scoping stage of the EIA is twofold:

1) To identify policy that could influence the sensitivity of receptors (and therefore the signfiicance of effects) and any requirements for mitigation
2) To identify planning policy that could influence the methodology of the EIA. For example, a planning policy could require the assessment of a particular impact or the use of a particular methodology

2.6 The Rochdale Envelope

2.6.1 The Planning Inspectorate's Advice Note 9: Using the 'Rochdale Envelope' (Planning Inspectorate, 2018) provides guidance regarding the degree of flexibility that may be considered appropriate within an application for development consent under the PA 2008. The advice note acknowledges that there could be aspects of the Proposed Scheme design that are not yet fixed, and therefore, it could be necessary for the EIA to assess likely worst-case variations to ensure that all foreseeable significant environmental effects of the Proposed Scheme have been assessed.

2.6.2 This Scoping Report is based on the emerging preliminary design for the Proposed Scheme. The Proposed Scheme is to be developed further through a reference design stage which will form the basis for the DCO application.

2.6.3 Within the reference design there will need to be sufficient flexibility to provide scope for finalising the detailed design and construction methodology. Therefore, when presenting the Proposed Scheme design in the ES and the accompanying assessment, the requirements of Advice Note 9 will be complied with to ensure that the likely significant effects of the Proposed Scheme are assessed on a reasonable worst-case basis.

3. Assessment of Alternatives

3.1 Assessment methodology

3.1.1 The development of options followed Highways England Project Control Framework (PCF) methodology steps as follows:

- PCF Stage 0 - Strategy, Shaping & Prioritisation
- PCF Stage 1 - Option Identification
- PCF Stage 2 - Option Selection
- PCF Stage 3 – Preliminary Design

3.1.2 Each stage has been subject to a Stage Gate Review (SGAR) prior to commencing the next stage. This culminated in the preferred route announcement. The sections below set out the options considered, and the reasons for rejection.

3.2 Reasonable alternatives studied

3.2.1 Table 3-1 outlines the main options considered at PCF Stage 1 and 2.

Table 3-1: List of alternatives

Option	Description of option	Rejected or carried forward
Option 11	This option provides free-flow links between A34 and M3 with the A34 southbound link passing under the M3 with a 120kph design speed. The A34 Northbound Link also has a 120kph design speed. Junction 9 would be rebuilt with a dumbbell roundabout layout.	Rejected at PCF Stage 1
Option 12	This option provided free-flow links between A34 and M3 with the A34 Southbound Link passing under the M3 with a 120kph design speed with a two-step relaxation on horizontal geometry. The A34 Northbound Link has a 120kph design speed.	Rejected prior to PCF Stage 1
Option 13	This option provided free-flow links between A34 and M3 with the A34 Southbound Link passing over the M3 with a 120kph design speed. The A34 Northbound Link also has a 120kph design speed.	Rejected prior to PCF Stage 1
Option 14	This option provides free-flow links between A34 and M3 with the A34 southbound link passing under the M3 with a 100kph design speed with a three-step relaxation on horizontal geometry. The A34 Northbound Link has a 120kph design speed. Junction 9 would be rebuilt with a dumbbell roundabout layout.	Carried forward to PCF Stage 3

Option	Description of option	Rejected or carried forward
Option 15	This option provides a free flow links between M3 and A34. A34 southbound link passing over M3 design to 85kph with two step relaxation on horizontal geometry.	Rejected prior to PCF Stage 1
Option 16B	This option provides a free-flow for the A34 southbound with a 100kph design speed with a three-step relaxation on horizontal geometry. The northbound A34 would still use the existing A34 through the Junction 9 roundabout. This option is considered to facilitate potential scheme capital costs within the affordable budgets of RIS1.	Rejected at PCF Stage 2
Option 16C	This option provides a free-flow for the A34 northbound, which has a 120kph design speed. The southbound A34 would still use the existing A34 through the Junction 9 roundabout. This option is considered to facilitate potential scheme capital costs within the affordable budgets of RIS1.	Rejected at PCF Stage 2
Option 17	This option provided free-flowing links with a 75m loop for the A34 Southbound Link under the M3. The A34 Northbound Link also has a 120kph design speed.	Rejected prior to PCF Stage 1
Option 18	This option was developed, to consider a reduced cost option of converting the current Junction 9 roundabout to a through-about. This option is considered to facilitate potential scheme capital costs within the affordable budgets of RIS1.	Rejected at PCF Stage 1

3.2.2 Table 3-2 provides a summary of the reasons why those alternatives described in Table 3-1 were discarded where relevant.

Table 3-2: Reasons for discarding alternatives

Option	Reason discarded
Option 11	Option 11 was the most extensive in terms of the number and length of new and realigned roads and associated structures, and consequently was likely to have the greatest potential to generate significant noise and vibration effects during construction. Option 11 had the greatest adverse effect in relation to amenity over the short and medium term of all options considered at PCF Stage 1. Option 11 would potentially have a physical effect on nationally significant water meadows and therefore has the greatest potential for harm due to

Option	Reason discarded
	direct physical effects on nationally significant heritage assets. Option 11 would have the greatest ecological effects, as it would result in; damage to the integrity of Easton Down Site of Importance for Nature Conservation (SINC), fragmentation of retained calcareous grassland habitat and potential effects upon habitat hydraulically connected to the River Itchen Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI). Option 11 would have had the greatest level of disruption to People and Communities of all options considered at PCF Stage 1.
Option 12	Option 12 was discarded as it had similar disbenefits to Option 11, but also did not provide the full improved A33 access which Option 11 provided. Rejected on buildability grounds.
Option 13	Option 13 was discarded as it had similar disbenefits to Option 11 as well as being significantly more visually intrusive as the southbound A34 passed over the M3. Rejected on buildability grounds and visual impact.
Option 15	Option 15 was discarded as it would have been significantly more visually intrusive as the southbound A34 passed over the M3. Rejected on buildability grounds.
Option 16 (B and C)	Option 16 B and C were the incremental delivery of Option 14. They were dropped at PCF Stage 2 as funding for the full delivery of Option 14 was approved allowing for its complete implementation.
Option 17	Option 17 was discarded as it had greater disbenefits than Option 11 as well as requiring more land acquisition from the South Downs National Park and being more visually intrusive. Rejected due to impact on South Downs National Park.
Option 18	Option 18 did not comply with the Proposed Schemes' objectives as it does not provide a free flowing A34 link to the M3 in either direction. The provision of free flow links is a key requirement of Highways England Operations. It has:

Option	Reason discarded
	• Less significant adverse environmental effects than the other options as a consequence of its smaller footprint • A current scheme budget which is within the affordable budgets of RIS1 • A high Value for Money (VfM) rating • The second highest Benefit Cost Rating (BCR) of all the options. Although overall it has the second highest BCR, the benefits are all driven by the improvements to the A34/A33 diverge and not the through-about which would be over capacity and contributes a small disbenefit.

3.3 Development of the Proposed Scheme

3.3.1 Highways England announced the Preferred Route for the Proposed Scheme in July 2018.

3.3.2 Design development is ongoing, and is being informed by the iterative EIA process, consultation and evolving knowledge of the environment that would be affected by the Proposed Scheme. Elements of the design that will be developed through 2019 include, but are not limited to:

- Bridge designs
- Junction layout
- A33/A34 slip road design
- Site compounds
- Technology and signage
- Landscape/earthworks design
- Environmental mitigation
- Drainage strategy
- Lighting

3.3.3 The design development will take into consideration the principles of good design that are outlined in the NPSNN (DfT, 2014), as well as the design principles outlined in *The Road to Good Design* (Highways England, 2018).

4. Consultation

4.1 Consultation to date

4.1.1 Non-statutory public consultation on the preferred route option and three rejected route options took place between January and February 2018. The purpose of this consultation was to seek feedback from the stakeholders, including the local community, on the preferred route option and three rejected route options. The responses to this consultation were taken in to account in the identification of the preferred route option, as documented in the Preferred Route Announcement Brochure.

4.1.2 In addition to the non-statutory consultation, ongoing engagement has taken place between the project team and key stakeholders including local landowners, local authority and statutory consultees.

4.1.3 Working groups have been set up with the Statutory Environment Bodies and other key stakeholders associated with a number of the work areas including the following:

- Water environment
- Landscape and visual
- Biodiversity

4.1.4 These are advisory groups and allow the project to work closely with stakeholders as the design develops. Stakeholders include the Environment Agency, South Downs National Park Authority, Natural England, Hampshire County Council, Winchester City Council and Historic England.

4.2 Proposed consultation

4.2.1 This Scoping Report is for submission to the Planning Inspectorate and will then be subject to consultation. Views from consultees will be considered and used to inform the Scoping Opinion.

4.2.2 As required by Section 47 of the PA 2008 (as amended) Highways England will prepare a Statement of Community Consultation (SoCC) for publication in 2019. The SoCC will outline how Highways England intends to formally consult with the local community about the Proposed Scheme.

4.2.3 Highways England will first consult the relevant local authorities on the draft SoCC.

4.2.4 The local community and wider public will be consulted on the Proposed Scheme via a statutory consultation programme. This statutory consultation programme is expected to be undertaken in 2019 and will be carried out in accordance with the SoCC.

4.2.5 The approach to the statutory consultation is currently being developed, but it is likely to include (but not limited to):

- Exchanges of correspondence, meetings and workshops with local community groups and businesses
- Publication of leaflets, reports and other information made available in the local area and online
- Public exhibitions at which members of the community can meet with members of the project team

4.2.6 A Preliminary Environmental Information Report (PEIR) will be published during the statutory consultation period in 2019 and will present information to the public and stakeholders to comment on. The Environmental Statement (ES) will then be submitted as part of the application for Development Consent at which point there will also be a further opportunity to comment on the EIA.

4.2.7 Responses received during consultation will be carefully considered and taken into account in the development of the Proposed Scheme, in accordance with Section 49 of the PA 2008 (as amended), and this will be detailed in the Report on the Public Consultation submitted with the DCO application. The Report on the Public Consultation will demonstrate how Highways England has complied with the consultation requirements of the Planning Act 2008 (as amended).

5. Environmental Assessment Methodology

5.1 Surveys and predictive techniques and methods

The Design Manual for Roads and Bridges

5.1.1 Guidance published by the Government for the preparation of environmental assessments of proposed road schemes is contained in the Design Manual for Roads and Bridges (DMRB) Volume 11 (Highways Agency, 1993). This sets out both the general process and the methods for assessing individual environmental topics. This Scoping Report adheres to Interim Advice Note (IAN) 125/15 Environmental Assessment Update (Highways Agency, 2015a), which provides a new structure of DMRB Volume 11.

5.1.2 DMRB Volume 11 advises on the environmental topics to be included in an EIA, and the methods to be used in the assessment for each of those topics. The topics identified in Section 6-16 of this Scoping Report are those required by DMRB and the EIA Regulations.

5.1.3 The EIA will follow the most up-to-date, relevant guidance contained in DMRB and Highways England IANs. More details of the methods to be used for each individual topic are provided in Section 6-16 of this Scoping Report. Should any revisions to IANs or DMRB be issued between scoping and reporting of the EIA, they will be adopted where appropriate, provided that it is reasonable to do so within the programme and governance for the project.

The National Policy Statement for National Networks

5.1.4 Strategic roads have their own policy framework, with relevant policy objectives set out in the NPSNN (DfT, 2014). The NPSNN is framed in the context of the wider Government policies on environment, safety, technology, sustainable transport and accessibility. It provides planning guidance for promoters of NSIPs on the road network, and the basis for the examination by the Examination Authority and decisions by the Secretary of State. The Secretary of State will use the NPSNN as the primary basis for making decisions on development consent applications for national networks NSIPs in England. Given the importance of the NPSNN, the EIA approach adopted for the Proposed Scheme takes account of this key policy document. The EIA will have regard to the methodological advice within Chapter 5 of the NPSNN.

5.1.5 The surveys, predictive techniques and methods that are specific to each topic are outlined in Chapters 6-16.

5.1.6 To ensure compliance with the EU Directive 2014/52/EU (the EIA Directive), the following approach will be taken to environmental factors for which there is no consolidated methodology or practice within the current version of Volume 11 of the DMRB.

Risk of major accidents and/or disasters

5.1.7 The assessment of major accidents and disasters, hereafter referred to as “major events”, as required by the EIA Regulations should cover:

- Vulnerability of the project to risks of major accidents and or/disasters
- Any consequential changes in the predicted effects of that project on environmental topics

5.1.8 In the absence of a current industry definition of major events in the context of EIA, the following definitions have been used to inform the identification of potential major events related to the Proposed Scheme.

5.1.9 The Control of major accidents and hazards (COMAH) 2015 Regulations define major accidents as follows:

"Major accident" means an occurrence such as a major emission, fire, or explosion … leading to serious danger to human health or the environment;

Serious danger to human health means a risk of death, physical injury or harm to health, e.g.: (a) a substantial number requiring medical attention; (b) some people seriously injured, requiring prolonged treatment.

5.1.10 Serious danger to the environment includes accidents with the potential to result in:

- the death or adverse effects on local populations of species or organisms, with lower thresholds for high-value or protected species
- contamination of drinking water supplies, ground or groundwater
- damage to designated areas, habitats or populations of species within the areas
- damage to listed buildings
- damage to widespread habitats
- damage to the marine or aquatic environment

5.1.11 The United Nations Office for Disaster Risk Reduction (UNISDR, 2017) defines disaster as follows:

"A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources".

5.1.12 As such major accidents and disasters are very closely linked. They can be natural or man-made and could include:

- Severe weather e.g. floods; earthquakes, hurricanes, storms, drought, tsunamis, extremes of temperature – hot and cold
- transport accidents e.g. rail accidents, motorway pileups, plane crash
- industrial (for example explosions, pollution and fire)
- terrorism
- disease outbreaks

5.1.13 With regards to the Proposed Scheme, the following potential major events have been identified:

- Severe weather: storms, floods

- transport accidents: road and rail

5.1.14 These were identified based on the site location, nature of the Proposed Scheme, likelihood of occurrence and surrounding land uses. They have also been informed by the PCF Stage 2 EAR (WSP, 2017i), the PCF Stage 2 Safety Plan and the PCF Stage 2 Health and Safety Risk Register.

5.1.15 An assessment of significance will be carried out for the major events identified for the Proposed Scheme. In accordance with the latest Highways England guidance, a qualitative assessment will be carried out and reported within the relevant individual environment topics as detailed in Table 5-1 below.

Table 5-1: Major events and associated environmental assessment topics

Major event	Potential environmental impacts	Environmental assessment topic
Storms	Flood High winds causing damage to environmental receptors and structures	Climate Change Road Drainage and the Water Environment
Floods	Flooding	Road Drainage and the Water Environment
Transport accidents – road and rail	Environmental pollution incidents; emissions to air, ground and water	Air Quality Biodiversity Materials Geology and Soils Road Drainage and the Water Environment

Population and human health

5.1.16 An assessment of the potential significant effects on population will be considered as part of the ‘Population and Health’ assessment, in line with the latest Highways England guidance.

5.1.17 An assessment of the potential significant effects on human health will be considered as part of the ‘Air Quality’, ‘Noise and Vibration’, ‘Road Drainage and Water Environment’ and the ‘Population and Health’ assessments.

5.1.18 With no consolidated significance criteria, professional judgement shall be applied to the baseline information to establish qualitative population and health effects, including where effects result from more than one topic. These assessments will be reported under the topic of ‘Population and Health’.

Climate

5.1.19 In line with Schedule 4 of the EIA Regulations (HMSO, 2009a) and the latest Highways England guidance (Highways England, 2017b), a description of the likely effects on climate (from greenhouse gas emissions) and a description of the likely significant effects

of the Proposed Scheme on the environment, resulting from the vulnerability of the Proposed Scheme to climate change, will be provided and reported in a stand-alone chapter.

Heat and radiation

5.1.20 Schedule 4 of the EIA Regulations details the requirement for a description of the likely significant effects on the environment resulting from, amongst others, the emission of heat and radiation.

5.1.21 The Proposed Scheme is a major highways improvement project. Due to the scale and nature of the Proposed Scheme, it is not anticipated that there would be any significant sources of heat or radiation either during construction or operation of the road. The consideration of heat and radiation emissions has therefore been scoped out of the assessment and has not been considered further in this Scoping Report.

5.2 General assessment assumptions and limitations

5.2.1 In undertaking this scoping exercise, the following general assumptions have been made:

- The Scoping Report has been prepared based on the environmental baseline information available at the time of writing. Further information will become available as the iterative design and assessment process proceeds and the scope of assessment will be kept under review in light of this.
- Detailed construction methodologies are unknown at present (for example, location of site compounds are indicative, at this stage).

5.2.2 Topic specific assumptions and limitations are outlined in the technical chapters (Chapter 6- 16).

5.2.3 Elements of the design including; lighting, signage as well as required mitigation have not currently been designed. Assessment of these elements will be undertaken in the EIA.

5.2.4 It is considered highly unlikely that the Proposed Scheme would be demolished after its design life as the road is likely to have become an integral part of the infrastructure in the area. In the unlikely event of the Proposed Scheme demolition, this would be part of the relevant statutory process at that time, including EIA as appropriate. It is therefore proposed that demolition of the Proposed Scheme is scoped out of the EIA.

5.3 Significance criteria

5.3.1 The significance of effects will be assessed as per DMRB guidelines (i.e. by taking into account the value/ sensitivity of a receptor and assessing against the magnitude of change). The overall significance of effects will be assessed using the matrix in DMRB Volume 11, Section 2, Part 5 (Highways Agency, 1993a) (significance of effect categories reproduced in Table 5-2).

Table 5-2: Descriptors of significance of effect categories

Significance category	Typical descriptors of effect
Very Large	Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that would be likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance could also enter this category.
Large	These beneficial or adverse effects are considered to be very important considerations and would be likely to be material in the decision-making process.
Moderate	These beneficial or adverse effects could be important but are not likely to be key decision-making factors. The cumulative effects of such factors could influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
Slight	These beneficial or adverse effects could be raised as local factors. They are unlikely to be critical in the decision-making process but are important in enhancing the subsequent design of the project.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Source: DMRB Volume 11, Section 2, Part 5 (Highways Agency, 1993a)

5.3.2 Not all of the environmental topics will use the above criteria or approach. For example, some topics do not use a matrix-based approach but instead use numerical values to identify impacts (e.g. Noise and Vibration) and some topics do not have agreed methods of assessment (e.g. Geology and soils). Therefore, each environmental topic specialist will use the information provided above, their topic specific guidance as well as their professional judgement to assess the significance of effects. However, irrespective of the criteria or approach that a topic requires, the descriptors of significance listed in Table 5-2 will be used.

5.3.3 Effects determined to be slight or neutral are not deemed to be significant, whilst these will be reported in the ES, they will not be reported in detail and would not require specific mitigation. The exception to this is where the combination of multiple slight effects has the potential to lead to significant (i.e. moderate or above) cumulative effects.

5.3.4 Further details of the topic specific significance criteria that will be used in the ES are discussed in Sections 6 to 16 of this report.

5.4 Duplication of assessment

5.4.1 Standalone and supporting documents will be co-ordinated with the EIA to minimise duplication of information between the assessments. Examples include:

- Habitat Regulation Assessment
- Flood Risk Assessment
- Water Framework Directive Compliance Assessment
- Equality Impact Assessment
- Arboriculture Impact Assessment

5.5 Proposed Structure of Environment Statement (ES)

5.5.1 The ES for the Proposed Scheme is likely to comprise three volumes as follows:

- Volume 1: Non-Technical Summary
- Volume 2: Environmental Statement
- Volume 3: Figures and Technical Appendices

5.5.2 The main ES (Volume 2) will be a concise document proportionate to the Proposed Scheme. Technical or supporting documents will, where appropriate, be contained in Volume 3 so that the main ES provides clear and focused information.

5.5.3 It should be recognised that the final structure of the Environmental Statement may vary as result of decisions made or needs recognised in the course of implementing the work, however the indicative structure of the Environmental Statement will consist of the following chapters:

- Part 1: Introduction
  - Purpose of the report
  - Overview of the project
  - Legislative and policy framework
  - Competent expert evidence
- Part 2: The Project
  - Need for the project
  - Project objectives
  - Project location
  - Baseline scenario

- Project description
- Construction, operation and long term management

- Part 3: Assessment of Alternatives
  - Assessment methodology
  - Reasonable alternatives studied
  - Justification for chosen option
- Part 4: Environmental assessment methodology
  - Environmental scoping
  - Surveys and predictive techniques and methods
  - General assessment assumptions and limitations
  - Significance criteria
  - Duplication of assessment
- Part 5: Technical Assessments (below replicated for each topic)
  - Competent expert evidence
  - Legislative and policy framework
  - Assessment methodology
  - Assessment assumptions and limitations
  - Study area
  - Baseline conditions (including value/sensitivity of resources and receptors)
  - Potential impacts
  - Design, mitigation and enhancement measures
  - Assessment of likely significant effects
  - Monitoring
- Part 6: Assessment of Cumulative Effects
  - Cumulative assessment methodology
  - Assessment of interrelationship between topics
  - Assessment of cumulative effects
- Part 7: Summary

- Part 8: References and Glossary
- Part 9: Location and Design Plans

6. Air Quality

6.1 Study area

6.1.1 The study area for the air quality assessment will be determined by a screening assessment where traffic data is analysed against the HA207/07 (Highways Agency 2007a) screening criteria, as listed below. Road links that exceed the criteria will be classed as 'affected' and will create the assessment Affected Road Network (ARN). The criteria for defining affected roads are set out in HA207/07, and includes the following:

- Road alignment will change by 5m or more; or
- Daily traffic flows will change by 1,000 Average Annual Daily Traffic (AADT) or more; or
- Heavy Duty Vehicle (HDV) flows will change by 200 AADT or more; or
- Daily average speed will change by 10km/hr or more; or
- Peak hour speed will change by 20km/hr or more.

6.1.2 The study area consists of all relevant sensitive air quality receptors that are within 200m either side of the road links identified within the ARN and all roads within 200m of these receptors.

6.1.3 Based on the PCF Stage 2 assessment, the ARN could potentially include the M3 from Junction 7 in the north to Junction 14 in the south, but this will be dependent on the updated traffic modelling data. The study area is also likely to cover the A34 from the junction with the A303 in the north to where it joins the M3 at Junction 9. The A33 (Basingstoke Road), running parallel to the M3 and routes within Winchester are also affected.

6.1.4 The ARN at PCF Stage 2 included Winchester Town Centre Air Quality Management Area (AQMA) and also Eastleigh AQMAs No. 1 (A335) and No. 2 (M3).

6.2 Baseline conditions

6.2.1 Baseline air quality will be assessed with reference to a review of the following data sources:

- Local Air Quality Management (LAQM) published reports by Winchester City Council, Eastleigh Borough Council and Test Valley Borough Council
- Project-specific nitrogen dioxide diffusion tube monitoring under taken by Local Authorities, Highways England and WSP between 2013 and 2017
- Defra background mapping
- National modelling undertaken by Defra using the Pollution Climate Mapping (PCM) model
- Nitrogen deposition and nitrogen oxides modelling provided by the online Air Pollution Information System (APIS) for ecological sites

LAQM reporting

6.2.2 Whilst Winchester Town Centre AQMA and Eastleigh AQMAs No. 1 (A335) and No. 2 (M3) have both been declared as a consequence of annual mean exceedances of the NO_2 air quality objective, the Proposed Scheme itself is not located within an AQMA. However, several of the road links included within the PCF Stage 2 assessment were within AQMAs. There is therefore potential for the air quality study area to include AQMAs areas in the Stage 3 assessment.

6.2.3 As part of LAQM, local authorities undertake monitoring at various locations in the vicinity of the assessment area. As shown in Table 6-1, the majority of the monitoring sites, for both passive and continuous monitoring, are located within or in the vicinity of the AQMAs. No exceedances of the air quality objective occur at monitoring sites within the vicinity of the M3. In 2016, only 4 exceedances of the air quality objective for annual mean NO_2 occurred. These exceedances occurred within Winchester Town Centre AQMA.

Table 6-1 Local authority monitoring in the study area of annual mean nitrogen dioxide concentrations (µg/m^3)

Location	Local Authority	X (m)	Y (m)	Type	In AQMA?	2012	2013	2014	2015	2016
Continuous Monitoring										
Chestnut Close	Eastleigh	443055	118964	Roadside	No	34.5	31.0	33.5	26.5	29.9
Echo Offices	Winchester	448212	129510	Roadside	Winchester Town Centre	46.0	47.0	41.0	38.0	38.0
Godson House	Winchester	448509	129539	Urban Background	Winchester Town Centre	26.0	25.0	24.0	20.0	-
Passive (Diffusion Tube) Monitoring										
Ashdown Road	Eastleigh	443292	122481	Urban Background	No	12.3	12.9	13.1	10.5	11.6
Belmont Road	Eastleigh	443773	119300	Urban Background	Eastleigh AQMA No.2 (M3)	28.6	30.0	31.9	24.7	26.5
Leigh Road / J13	Eastleigh	443877	119526	Roadside	Eastleigh AQMA No.1 (A335)	50.9	47.8	50.0	38.0	43.6
Steele Close (A)	Eastleigh	443958	119676	Urban Background	No	-	-	-	25.2	25.8
Steele Close (B)	Eastleigh	443958	119676	Urban Background	No	-	-	-	24.3	25.2
Steele Close (C)	Eastleigh	443958	119676	Urban Background	No	-	-	-	25.0	26.0
Medina Close	Eastleigh	444231	120060	Urban Background	Eastleigh AQMA No.2 (M3)	31.3	31.1	33.2	24.7	27.6
Woodside Avenue	Eastleigh	444481	119429	Roadside	No	41.7	38.0	40.2	34.1	35.9

Location	Local Authority	X (m)	Y (m)	Type	In AQMA?	2012	2013	2014	2015	2016
Oxburgh Close	Eastleigh	444542	120188	Urban Background	No	25.8	23.8	24.2	19.9	22.0
Leigh Road / Pluto Road	Eastleigh	444864	119174	Roadside	Eastleigh AQMA No.1 (A335)	41.1	37.6	38.5	30.2	32.4
Hadleigh Gardens	Eastleigh	445347	120367	Urban Background	No	22.4	21.8	23.0	18.8	20.6
Mill Street	Eastleigh	445707	119619	Roadside	No	37.1	37.5	37.9	28.6	31.2
Twyford Road	Eastleigh	445716	119726	Roadside	No	34.0	30.1	34.7	25.2	28.3
Bishopstoke Road 2	Eastleigh	446051	119172	Roadside	No	-	34.2	38.3	33.3	33.0
Chilworth Road	Test Valley	441760	118091	Roadside	No	36.9	35.1	37.7	30.9	34.5
Winchester Road, Chilworth	Test Valley	442137	117670	Intermediate	No	25.2	26.0	24.9	23.5	23.3
Bracken Place	Test Valley	442264	117625	Intermediate	No	26.9	28.0	28.0	25.5	25.8
10 Eastgate St	Winchester	448563	129391	Roadside	No	41.5	44.6	37.6	35.1	36.8
Greyfriars 1	Winchester	448566	129560	Roadside	No	38.2	37.1	34.1	31.5	30.0
Friarsgate		448426	129523	Roadside	No	32.2	33.0	28.4	25.9	26.9
Upper Brook St	Winchester	448227	129504	Roadside	No	47.4	45.1	39.0	37.6	37.1
Roadside monitor	Winchester	448213	129504	Roadside	No	46.4	47.6	40.3	38.2	37.8
St Georges St TC	Winchester	448106	129541	Roadside	No	65.6	63.0	54.7	50.2	49.8
St Georges St Lad	Winchester	448163	129512	Roadside	No	67.5	62.1	57.1	52.6	48.9
Jewry St	Winchester	448046	129692	Roadside	No	53.7	52.5	47.1	40.6	41.7
Southgate St DV	Winchester	447918	129413	Roadside	No	38.3	44.8	38.0	37.7	37.0
Sussex St	Winchester	447804	129741	Roadside	No	42.4	40.6	36.1	33.9	37.3

Location	Local Authority	X (m)	Y (m)	Type	In AQMA?	2012	2013	2014	2015	2016
City Road	Winchester	447963	129875	Roadside	No	43.4	41.8	38.1	36.7	33.8
Northwalls	Winchester	448237	129794	Roadside	No	42.0	34.6	31.1	30.0	29.7
Wales St	Winchester	448842	129820	Roadside	No	27.8	37.5	31.2	30.5	31.5
Alresford Rd	Winchester	449563	129437	Motorway	No	42.5	43.1	41.3	37.0	38.4
Chesil St	Winchester	448679	129068	Roadside	No	46.2	44.1	42.8	36.4	39.9
Stockbridge Rd	Winchester	447534	130006	Roadside	No	34.0	28.2	25.0	21.2	24.8
Andover Rd	Winchester	447745	130456	Roadside	No	33.1	33.7	28.2	25.6	25.6
Worthy Rd	Winchester	448092	130411	Roadside	No	33.4	33.2	29.3	24.2	23.2
St Cross Rd	Winchester	447842	129050	Roadside	No	37.8	37.0	33.4	35.3	33.4
Romsey Road	Winchester	447495	129511	Roadside	No	66.8	65.9	57.2	48.8	56.6
Andover Rd	Winchester	447745	130456	Roadside	No	41.2	40.5	36.4	33.5	32.9
Bus Station	Winchester	448427	129401	Bus	No	44.6	41.8	35.9	33.7	30.4
High Street, Twyford	Winchester	449443	128927	Roadside	No	35.8	33.8	29.4	27.7	28.4
Southdown Road, Otterbourne	Winchester	446537	124704	M3	No	35.1	35.2	28.8	28.5	29.4
Church Green Close, Kings Worthy	Winchester	446659	124655	A34	No	31.8	28.0	24.3	25.5	25.5
West St/Broad Street, New Alresford	Winchester	446414	124279	Roadside	No	34.1	37.3	30.1	30.1	33.8
Hambledon Road, Denmead	Winchester	446030	123672	Roadside	No	29.4	21.7	20.6	18.4	19.9
Winchester Road, Wickham	Winchester	445920	123331	Roadside	No	34.5	33.2	29.3	28.8	30.6
Winchester Road, Bishops Waltham	Winchester	445505	122345	Roadside	No	34.3	34.4	29.6	29.6	32.5

Location	Local Authority	X (m)	Y (m)	Type	In AQMA?	2012	2013	2014	2015	2016
Whiteley Lane, Whiteley	Winchester	446694	124642	M27	No	30.1	29.9	23.7	21.8	22.6

Defra pollution climate mapping

6.2.4 The Pollution Climate Mapping (PCM) model is used by Defra (in combination with monitoring data) for the assessment of compliance with EU limit values.

6.2.5 PCM model projections are available for three scenarios, namely the “Baseline” scenario, a “with Clean Air Zone” scenario, and a “with Clean Air Zone + additional measures” scenario. Around 18,000 links are included in the model in the UK, 15 of which are within the study area. Defra provide roadside projections of pollutant concentrations at annual intervals between 2015 and 2030.

6.2.6 PCM data for 2015 are available from Defra's UK-Air website (Defra, 2017). The data indicates maximum roadside annual mean NO_2 concentrations for the M3 within the vicinity of the Proposed Scheme projected to 2018 is 34.9µg/m^3, which is below the EU limit value.

6.2.7 In the Proposed Scheme opening year (2023), the maximum annual mean NO_2 PCM concentration on the M3 is 26.4 µg/m^3, which complies with the EU limit value. These data do not take account of the implementation of any Clean Air Zones, as set out by Defra in the 2017 Air Quality Plan (Defra and DfT, 2017).

Defra background mapping

6.2.8 The pollutant concentration at any location has two components, namely a contribution from the local (modelled) sources and a contribution from more distant sources. Background pollutant concentrations for this assessment (those resulting from distant sources and pollutant transport) have been taken from the mapped PCM data provided by Defra on a 1km x 1km grid covering the UK, interpolated to the locations of the selected receptors.

6.2.9 The background data are provided by Defra as predictions for all years to 2030 from the output of their PCM Model. The background data for Winchester City Council have been downloaded and reviewed, including background sector removal (using the Defra Background Sector removal tool 6.0). Concentrations of NOx, NO_2, PM_{10} and $PM_{2.5}$ around the Proposed Scheme area are below the relevant Air Quality Objectives.

Ecological receptors

6.2.10 There are three designated sites within close proximity of the Proposed Scheme, St Catherine’s Hill SSSI and River Itchen SSSI and SAC. Table 6-2 presents the critical load and background deposition for the most sensitive habitats at each designated site. Background concentrations of NO_x at the designated areas are included below including consideration of the critical level (and air quality objective) of 30µg/m^3. Background nitrogen deposition is below the critical load within St Catherine’s Hill SSSI, but above within River Itchen SSSI and SAC.

Table 6-2 Background NO_x and nitrogen deposition rates for designated ecological sites in the study area

Site	Sensitive habitat	Critical load (kgN/ha/yr)	Background deposition (kgN/ha/yr)	Critical level (µg/m^3)	Background NO_x (µg/m^3)
St Catherine's Hill SSSI	Sub-Atlantic semi-dry calcareous grassland	25	18.2	30	25.5
River Itchen SSSI, SAC	Broadleaved deciduous woodland	20	28.2	30	23.4

Project specific air quality monitoring

Highways England

6.2.11 Project specific monitoring has been undertaken by Highways England using NO_2 diffusion tubes for the following two time periods:

- August 2013 and September 2014
- January to June 2016 (10 locations)

6.2.12 Monitoring undertaken in 2016 indicates that, within the vicinity of Junction 9, concentrations of NO_2 are below the air quality threshold. However, exceedances have been measured where the B3047 crosses under the A34 and the B3404 crosses over the M3.

6.2.13 A summary of the Highways England diffusion tube locations and the monitored concentrations used within the verification of the PCF Stage 2 assessment, undertaken by WSP (WSP, 2017i), are presented in Table 6-3.

Table 6-3 Monitoring NO_2 concentrations (annualised to 2015) used within the verification of the Stage 2 assessment

ID	Location	Local authority	X (m)	Y (m)	Type	In AQMA?	Monitored NO_2 (µg/m^3)
M3J9J13_001_0913	Mount Drive	Eastleigh	444172	119909	Roadside	Eastleigh AQMA No. 2 (M3)	34.1
M3J9J13_003_0913	Porteous Crescent	Eastleigh	444625	120709	Roadside	Eastleigh AQMA No. 2 (M3)	29.2

ID	Location	Local authority	X (m)	Y (m)	Type	In AQMA?	Monitored NO_2 ($\mu g/m^3$)
M3J9J13_004_0913	Harlaxton Close	Eastleigh	444647	120381	Roadside	No	22.4
M3J9J13_005_0913	Pantheon Rd	Eastleigh	444946	121559	Roadside	No	31.1
M3J9J13_012_0913	Poles Ln	Winchester	445958	123740	Roadside	No	23.7
M3J9J13_013_0913	Laura Cl	Winchester	446388	124287	Roadside	No	26.6
M3J9J13_014_0913	Tilden Rd	Winchester	446521	124459	Roadside	No	28.9
M3J9J13_015_0913	Shepherds Lane	Winchester	446631	124762	Roadside	No	32.7
M3J9J13_019_0913	Southdowns Way/Fivefields Close	Winchester	449500	128984	Roadside	No	23.5
M3J9J13_020_0913	Alresford Rd	Winchester	449582	129425	Roadside	No	30.6
M3J9J13_021_0913	Spitfire End	Winchester	449561	129596	Roadside	No	21.4
M3J9J13_024_0913	London Rd	Winchester	449008	132219	Roadside	No	33.2
M3J9J13_025_0913	Springvale Rd	Winchester	448770	132714	Roadside	No	21.6
M3J9J13_026_0913	Long Walk	Winchester	449945	131951	Roadside	No	19.8
M3J9J13_029_0913	Kockley Link 40m	Winchester	447816	126687	Roadside	No	27.9

6.2.14 To support the PCF Stage 2 air quality assessment, a further 12-month monitoring survey was undertaken at 20 locations between May 2017 and May 2018.

6.2.15 The bias-adjusted average data from this survey is provided in Table 6-4.

Table 6-4 Monitoring NO_2 concentrations (WSP, May 2017 – May 2018, adjusted annual average)

ID	Location	X (m)	Y (m)	Type	Monitored NO_2 ($\mu g/m^3$)
M3J9Im_006_0116	Chalk Ridge	449563	129243	Roadside	24.4
M3J9j13_019_0913	Southdowns Way/Fivefields Close	449500	128984	Roadside	21.8
M3J9J13_020_0913	Alresford Rd	449557	129422	Roadside	34.4
M3J9Im_008_0116	Winchester Masonic Centre on Alresford Rd (east side of the bridge over the M3)	449867	129436	Roadside	24.7
M3J9Im_005_0116	Willis Waye	449945	131951	Roadside	13.9
M3J9j13_027_0913	Firmstone Rd	449054	129558	Roadside	17.0
M3J9Im_004_0116	Spitfire Lane on the M3 side	449554	129574	Roadside	20.8
M3J9J13_022_0913	Longfield Rd	449524	129909	Roadside	23.7
M3J9Im_010_0116	Fiona Cl by the nw side of the junc of Fiona Cl and Easton Ln	449014	129959	Roadside	32.5
M3J9J13_024_0913	London Rd	449011	132216	Roadside	33.3
M3J9J13_025_0913	Springvale Rd	448770	132714	Roadside	27.5
M3J9Im_001_0116	Willis Waye	448959	132478	Roadside	23.1
M3J9_COLO A_0517	Winchester Chesil Street Monitor	448670	129257	Roadside	30.9
M3J9_COLO B_0517	Winchester Chesil Street Monitor	448670	129257	Roadside	31.5
M3J9_COLO C_0517	Winchester Chesil Street Monitor	448670	129257	Roadside	30.6
M3J9_ECO1_0517	St Catherine's Hill SSSI	448966	127657	Roadside	42.3
M3J9_ECO2_0517	edge of River Itchen SSSI	449820	132106	Background	15.1
M3J9_ECO3_0517	edge of River Itchen SSSI	449605	131784	Background	15.1
M3J9_ECO4_0517	edge of River Itchen SSSI along A34	449342	131775	Roadside	32.0
M3J9_ECO5_0517	edge of River Itchen SSSI	449162	131872	Roadside	23.1

6.2.16 The latest monitoring data indicates no exceedances of the NO_2 AQO (air quality objective), except for at the St. Catherine's Hill SSSI ecological site.

6.2.17 The Stage 3 assessment will utilise the monitoring data from the previous surveys. Further monitoring is not required for Stage 3.

6.3 Potential impacts

6.3.1 The Proposed Scheme is expected to result in changes to emissions of oxides of nitrogen (NOx), nitrogen dioxide NO_2, and Particular Matter (PM_{10}) along the M3 and linked routes as a consequence of changes in traffic flows and speeds.

6.3.2 Improvements to the junction, whilst leading to an overall increase in traffic along the M3, are also expected to reduce congestion and provide a more consistent traffic speed. The latter impact could partially offset the impacts of increased flows on emissions. The predicted concentrations that will form part of the Stage 3 assessment will clarify whether this is the case.

6.3.3 Conversely, a reduction in traffic flows is expected on minor roads within Winchester and along the A33 (Basingstoke Road) which runs parallel to the M3.

6.3.4 Therefore, the Proposed Scheme is anticipated to result in both beneficial and adverse changes to local air quality concentrations at both human and ecological receptors, and these changes are dependent on the specific changes to emissions from road traffic in the vicinity of the relevant receptors.

6.3.5 Traffic management measures during construction could also lead to changes in vehicles emissions which could, in turn, result in impacts on local air quality. The extent to which these emissions can be included within the air quality assessment will be determined by whether traffic management scenarios are included within the provided traffic modelling data. If sufficient construction information is available, the potential impacts of construction dust will also be included in the assessment.

6.4 Design, mitigation and enhancement measures

6.4.1 No scheme specific mitigation or Scheme Air Quality Action Plans are likely to be required for the operation of the Proposed Scheme, although should there be a requirement, the Scheme Air Quality Action Plan will be produced in accordance with the guidance set out in IAN 175/13 (Highways Agency, 2013).

6.4.2 Best practice mitigation will be required to control dust and emissions from construction works and plant during the construction phase. These measures will be set out in the Scheme Construction Environmental Management Plan (CEMP).

6.5 Description of likely significant effects

6.5.1 The Proposed Scheme is not expected to give rise to significant effects on local or regional air quality.

6.5.2 Subject to updated traffic data and modelling, no significant residual air quality effects are anticipated as a consequence of the Proposed Scheme.

6.6 Assessment methodology

Policies and plans

6.6.1 Planning policies and guidance that are relevant to the Proposed Scheme include:

- National Policy Statement for National Networks (NPS NN) (DfT, 2014): Paragraph 3.8 (Emissions) and Air Quality paragraphs 5.3-5.15 (air quality), and 5.81-5.89 (dust)
- National Planning Policy Framework (NPPF) (2018) Paragraph 8 (Achieving sustainable development), Paragraphs 102 (Promoting sustainable transport), 170 (Conserving and enhancing the natural environment), 180 and 181 (Conserving and enhancing the natural environment – Ground conditions and pollution), and associated Planning Practice Guidance: Air Quality (2014)
- Winchester District Local Plan Review (Adopted 2006) – Saved Policies: Policy DP.3 (General design criteria) and Policy DP.10 (Pollution generating development)
- Winchester District Local Plan Part 1 – Joint Core Strategy: Policy CP13 (High Quality Design); Policy CP16 (Biodiversity); and, Policy DS1 Development Strategy and Principles
- Winchester District Local Plan Part 2 – Development Management and Site Allocations (2017): Policy WIN2 (Winchester Town); Policy DM17 Site Development Principles; and, Policy DM19 Development and Pollution
- South Downs National Park – Emerging: Core Policy SD1 (Sustainable Development); Core Policy SD2 (Ecosystems Services); Core Policy SD3 (Major Development); Strategic Policy SD9 (Biodiversity and Geodiversity); and, Policy SD54 (Pollution and Air Quality)

Methodology

6.6.2 Following the conclusions from the PCF Stage 2 assessment report, a detailed air quality dispersion modelling assessment is now required for the preferred design option. The detailed assessment will be carried out in accordance with DMRB HA207/07 (Highways Agency, 2007a), and in line with the requirements of National Policy Statement for National Networks (NPS NN). A detailed level assessment, wherein traffic data are specified for each peak period, is required due to the risk of exceedance of air quality objectives and the nature of the Proposed Scheme (peak hour congestion relief).

6.6.3 The assessment will be undertaken with regard for the following Interim Advice Notes (IANs):

- IAN 170/12v3 Updated Air Quality Advice on the Assessment of Future NOx and NO_2 Projections for Users of DMRB Volume 11, Section 3, Part 1 'Air Quality'
- IAN 175/13 Updated air quality advice on risk assessment related to compliance with EU Directive on ambient air quality and on the production of Scheme Air Quality Action Plans for user of DMRB Volume 11, Section 3, Part 1 'Air Quality'

- IAN 185/15 Updated Traffic, Air Quality and Noise Advice on the Assessment of Link Speeds and Generation of Vehicle Data into 'Speed bands' for Users of DMRB Volume 11, Section 3, Part 1 'Air Quality' and Volume 11, Section 3, Part 7 Noise. The IAN includes vehicle emission rates for NOx, PM_{10} and CO_2, for use in air quality assessments, which were updated by Highways England in December 2017. These updated factors reflect the latest available vehicle emissions testing data

- IAN 170/12 includes projection factors for annual mean NO_2 and NOx concentrations between 2008 and 2030, which were updated by Highways England in May 2015. These updated factors reflect the latest predicted long-term trends from the introduction of Euro 6/VI (termed LTTE6)

6.6.4 The local air quality assessment will consider the following scenarios:

- Baseline (2018)

- Opening Year (2023) Do Minimum (DM) and Do Something (DS)

6.6.5 In addition, emissions for the same study area as local air quality will be calculated for the following scenarios:

- Baseline (2018)

- Opening Year (2023) Do Minimum (DM) and Do Something (DS)

- Design Year (2038) Do Minimum (DM) and Do Something (DS)

6.6.6 For the construction phase the DMRB methodology will be followed and appropriate mitigation referred to. If appropriate, local air quality modelling of construction traffic will also be undertaken.

Health

6.6.7 The assessment of potential significant effects on human health in relation to air quality is inherent in the health-based objectives on which the assessment is based. These objectives have been established to protect individuals in a population, such that they define the standard below which health effects are unlikely to be experienced even by the most sensitive members of the population. Above these, worse health outcomes may be predicted.

6.6.8 Where human health effects are identified in this and any other topic, these effects will be incorporated into the population and human health assessment.

Ecological

6.6.9 The assessment of likely significant effects on ecological receptors will be undertaken in accordance with HA207/07 (Highways Agency, 2007a) and the associated interim advice notes, as appropriate.

6.7 Assessment assumptions and limitations

6.7.1 This Scoping Report is based on the data available during the PCF Stage 2 assessment for the Proposed Scheme. Where possible, the limitations of this assessment have been assessed.

6.7.2 As with any computer model that seeks to predict future conditions, there is inherent uncertainty in the predictions made. The dispersion models provide an estimate of concentrations arising from input emissions and historical meteorological data. The estimates produced, while appropriately representing the complex factors involved in atmospheric dispersion, are subject to uncertainty. In future years, one such uncertainty relates to the projection of vehicle emissions and, in particular, the rate at which emissions per vehicles would improve over time. The guidance set out in IAN 170/12 (Highways Agency, 2012) advises on the adjustment of modelled concentrations of NO_2 (and NO_x) to take account of recent trends on roadside pollution concentrations and evidence on future vehicle emissions.

6.8 Elements to be scoped in or out

6.8.1 The elements to be scoped in to the EIA for air quality are in Table 6-5.

Table 6-5 Elements to be scoped in to the EIA for air quality

Element scoped in	Justification
Further assessment of direct construction impacts.	Assessment of significant effects due to construction works and construction plant were not included within the PCF Stage 2 Assessment. Best practice mitigation measures would be required to ensure no significant effects. These will be set out in the CEMP. Given the proximity of some residential receptors to the Proposed Scheme and potential construction haulage routes, construction impacts will be considered.
The assessment of impacts due to traffic management measures during construction.	Since the construction period would extend beyond 6 months, following HA207/07 (para 3.6) the effects of the traffic management should be assessed.
The assessment of operational traffic on local air quality.	The operation of the Proposed Scheme has the potential to change traffic volumes and speeds on the public highway. No exceedance of the air quality objectives and EU limit values at human receptors have been identified during the PCF Stage 2 assessment. There is potential for significant effects to occur at designated ecological sites immediately adjacent to the A34 (within 10 to 20m).

Element scoped in	Justification
The assessment of impacts on emissions, including particulate matter for the local air quality study area.	Concentrations of particulate matter are below the air quality standards and at no risk of exceeding the standards. However, as modelling will be undertaken for NOx, particulate matter can be modelled at the same time and it has therefore been scoped in to the EIA. As there are likely to be limited scope for changes to emissions at the regional scale. These emissions will also be reported within the WebTAG appraisal.

6.8.2 There are no elements scoped out of the air quality assessment at this stage.

7. Cultural Heritage

7.1 Introduction and study area

7.1.1 Cultural heritage covers all aspects of the environment resulting from the interaction between people and places through time. This includes all surviving physical remains of past human activity and the changes that humans have had on the environment. Road schemes have the potential to have a physical effect on artefacts or features through the footprint of construction works and to change how a historic asset or feature is perceived in the historic landscape.

7.1.2 For the purposes of this assessment, cultural heritage comprises three sub-topics defined as:

- Archaeological remains: the material remains of human activity from the earliest periods of human evolution to the present. These could be buried traces of human activities, sites visible above ground, or moveable artefacts
- Historic buildings: architectural, designed or other structures with a significant historical value. These could include structures that have no aesthetic appeal or structures not usually thought of as buildings, such as milestones or bridges
- Historic landscapes: the current landscape, whose character is the consequence of the action and interaction of natural and/ or human factors

7.1.3 An inner study area of 300m extending out from the limits of the Proposed Scheme has been applied for the assessment of all heritage assets comprising all designated and undesignated assets to establish the potential impact of the Proposed Scheme on the immediate historic environment, and to establish the archaeological context of the Proposed Scheme. An outer study area of 1km from the boundary of the Proposed Scheme was applied for the assessment of designated cultural heritage assets (comprising Conservation Areas, Listed Buildings, Registered Parks and Gardens, Protected Wreck Sites, Registered Battlefields, World Heritage Sites, and Scheduled Monuments). As a Zone of Theoretical Visibility (ZTV) has not yet been produced, these study areas are based on industry standards for Desk Based Assessments and guidance outlined in DMRB (Highways Agency, 2007b). When a ZTV is produced in relation to the Proposed Scheme, Heritage Assets within its limits would be assessed in the course of further detailed assessment.

7.2 Baseline conditions

7.2.1 A Desk Based Assessment has been produced in support of the ES (Jacobs, 2018). The following sources were consulted during the data-gathering process:

- Winchester Historic Environment Record (WHER) (Winchester City Council 2017b)
- National Heritage List for England (NHLE) as maintained by Historic England (Historic England 2018)
- Historical maps including Ordnance Survey

- Online sources such as the Archaeology Data Service (University of York, 2018) and the Heritage Gateway maintained by Historic England (Historic England, 2012)
- Information on Conservation Areas from the Winchester City Council Website
- Archival material obtained from the Winchester Record Office (visited April 2018)
- A cultural heritage walkover survey (conducted May 2018)
- Desk Based Assessment (Jacobs, 2018)
- Archaeological Geophysical Survey (WSP, 2018a)

7.2.2 A total of 172 cultural heritage assets were identified within the study areas. The locations of designated heritage assets and non-designated heritage assets are shown on Figure 7-1, Figure 7-2 and Figure 7-3 in Appendix B with the cultural heritage gazetteer in Appendix C. The following heritage assets are of High value:

- 10 Scheduled Monuments (Site of St Gertrude's Chapel (Asset 54), Round Barrow Cemetery on Magdalen Hill Down (Asset 82), the Roman road east of St Catherine's Hill (Asset 84), the Anglo-Saxon Cemetery at Worthy Park (Asset 85), Late Iron Age Settlement north of Grace's Farm (Asset 86), Worthy Down ditch (Asset 87), Wolvesey Palace (Asset 88), Iron Age field system, banjo enclosure and Romano-British villa, 500m east of Woodham Farm (Asset 89), St Catherine's Hill hillfort (Asset 90) and City Bridge at the junction of High Street and Bridge Street (Asset 91))
- Four Grade I Listed Buildings (Church of St Swithin (Asset 42), Church of St Mary (Asset 106), City Bridge (Asset 133) and Church of St John The Baptist (Asset 138))
- 11 Grade II* Listed Buildings (Church of St Mary (Asset 30), St John's Croft (Asset 80), Dymoke House (Asset 93), Worthy Park House (Asset 103), 1, Water Lane (Asset 111), 24 and 24, St John's Street (Asset 114), Peter's Theatre (Asset 122), 42, Chesil Street (Asset 136), Church of St Swithun (Asset 146), 1, Chesil Street (Asset 153) and 12, Chesil Street (Asset 156))

7.2.3 The following assets are of Medium value:

- Six undesignated archaeological remains that have the potential to contribute to regional research objectives
- One Water Meadow (Undesignated Historic Landscape Type)
- 102 Grade II Listed Buildings
- Four Conservation Areas (Easton Conservation Area, Winchester Conservation Area, Abbots Worthy Conservation Area, Kings Worthy Conservation Area)

7.2.4 In addition, the following assets are of Low or Negligible value:

- 27 archaeological remains

- Seven historic landscape types

7.2.5 The archaeological remains are undesignated and are of low to negligible value. A large part of these remains have been removed by the original construction of the M3 and Easton Interchange and the excavations conducted preceding construction, and therefore have minimal surviving archaeological or historic landscape value.

7.2.6 There are several recorded archaeological interventions within the Proposed Scheme from the original M3 construction and construction of the Easton Lane interchange. This includes excavations and geophysical survey at Easton Lane which uncovered a middle Bronze Age ditch as part of a watching brief in light of development groundworks, and during trial trench evaluations at the Winnall Industrial estate where four trenches in advance of proposed redevelopment revealed Late Prehistoric to Early Roman enclosure ditches. The findings include settlements, enclosures and cemeteries, suggesting that the area was occupied from the Bronze Age to the Roman Period. Aerial photography has also revealed a series of hollow ways, likely to be of medieval date, climbing the sides of the Itchen Valley. Although the identified sites are likely to have been destroyed by the construction of the M3, there is the potential for associated, unknown archaeological remains.

7.2.7 The value of the heritage assets is defined in line with DMRB Volume 11, Section 3, Part 2, paragraph 5.30 (Highways Agency, 2007b).

7.3 Potential impacts

Construction

7.3.1 Any construction related intrusive groundworks have the potential to adversely impact upon heritage assets that survive within the footprint of the Proposed Scheme. Ground disturbance would be caused during the widening of existing highway boundary or the creation of new offline sections in addition to any service trenches and drainage features, topsoil stripping for compounds, the excavation of attenuation ponds and landscaping features for example.

7.3.2 The majority of archaeological remains within the baseline were recorded during archaeological investigations in advance of redevelopment meaning that a large portion of the area that would have been the focus of potential impact from the Proposed Scheme has already been subject to previous mitigation and impact, and have been largely removed, limiting their remaining archaeological value, resulting in their low to negligible value ascribed to them in this report. The potential for in situ archaeological remains is therefore limited and primarily located within the field to the east of the current M3 and, potentially, in the thin strip of land between the M3 and the A34.

7.3.3 There is the potential for construction activities to have a temporary impact on the setting of historic buildings through the intrusion of noise, vibration and dust, or through visual intrusion.

7.3.4 There is the potential for construction activities to have a temporary impact on the setting of historic landscapes through the intrusion of noise, vibration and dust, or through visual intrusion.

Operation

7.3.5 Impacts on settings could occur where new infrastructure is present in key views from, towards, through and across an asset, especially where the Proposed Scheme creates changes to the skyline. Other impacts on setting can arise from the introduction of movement, noise, vibration, light and dynamism caused by the Proposed Scheme. Impacts to setting could occur where new lengths of road cause physical divisions between previously related heritage assets causing a loss of identifiable relationship, or where there are impacts on key features of an asset. A ZTV has not yet been produced but will be assessed in terms of impact on Heritage assets as and when one is produced for the production of further detailed assessment.

7.3.6 The historic buildings are primarily grouped within nearby settlements. The value of these assets is related more to their village locations and localised setting than to their relationship with the surrounding landscape. However, there is the potential for the operation of the Proposed Scheme to have an impact on the setting of historic buildings through the intrusion of noise, vibration and dust, or through visual intrusion.

7.3.7 There is the potential for the operation of the Proposed Scheme to have an impact on the setting of historic buildings through the intrusion of noise, vibration and dust, or through visual intrusion.

7.4 Design, mitigation and enhancement measures

7.4.1 Historic England (2017) guidelines for mitigation of the impact of a development on the setting of a heritage asset suggest that in the first instance impacts are best mitigated either by relocation of the development or changes to its design. Where relocation of the development is not possible, good design alone could be capable of reducing the harm. High quality design will be particularly important for the junction options that could have an adverse effect on the setting of heritage assets. Enhancement of the assets and their settings could also be considered as an appropriate form of mitigation.

7.4.2 Current legislation draws a distinction between archaeological remains of national importance and other remains considered to be of lesser significance. Those perceived to be of international and national importance could require preservation in situ, whilst those of lesser significance could undergo archaeological recording, where they are of Regional/County or Local/Borough significance. Current design suggests there would be no physical impact on assets of national importance.

7.4.3 It is proposed that, where viable, archaeological trial trenching be undertaken within the area of the Proposed Scheme area to establish the nature, extent and survival of hitherto unknown below-ground archaeological remains. Additionally, an archaeological watching brief and potentially geoarchaeological work should be carried out during any geotechnical ground investigations. The results of this investigation will be used to devise a suitable programme of mitigation where applicable. Investigation and subsequent mitigation measures will be devised in consultation with Winchester City Council and Historic England as relevant.

7.4.4 Maintaining and incorporating appropriate mitigation through design in the form of screening (for example using cuttings, bunds and vegetation) would further reduce any potential effects on the setting of historic buildings and historic landscapes.

7.5 Description of likely significant effects

7.5.1 Following the construction phase no residual effect is predicted for buried archaeology and earthworks. Residual effects to the setting of heritage assets could occur in the operation phase where impacts could not be designed out and no appropriate mitigation could be implemented.

7.5.2 The Proposed Scheme is largely online or immediately adjacent to the existing roads and the overall setting of Historic Buildings within 300m would not be greatly modified. If an adverse effect is to be had on Listed Buildings, it is not likely to be significant. There is the potential for a temporary impact on Historic Buildings within the baseline during construction of the Proposed Scheme, through noise intrusion, and visual factors such as dust. Effects on further views will be assessed during further detailed assessment when a ZTV is produced.

7.5.3 The setting of the historic landscapes within the study area are also unlikely to be significantly affected due to the nature of the Proposed Scheme and the limited new land take. The Historic Landscape Types in the baseline, aside from the Medium Value Water Meadows, are of limited value due to lack of rarity, lack of surviving archaeological and historical value, and minimal contributions to regional and local research.

7.6 Assessment methodology

Policies and Plans

7.6.1 Planning policies and guidance that are relevant to the Proposed Scheme include:

- National Policy Statement for National Networks (NPS NN) (DfT, 2014): Historic Environment, paragraphs 5.120 to 5.142
- National Planning Policy Framework (NPPF) (2018): Paragraph 8 (Achieving sustainable development) and paragraphs 189 (Conserving and enhancing the historic environment) and 193, 194, 195, 196, 197, 199, 200 and 201 (Conserving and enhancing the historic environment – Considering potential impacts), and associated Planning Practice Guidance: ‘Conserving and Enhancing the Historic Environment’
- Winchester District Local Plan Review (Adopted 2006) – Saved Policies: DP.3 (General Design Criteria); Policy DP.4 (Landscape and the Built Environment); Policy HE.1 (Archaeological Site Preservation), Policy HE.2 (Archaeological Site Assessment), Policy HE.4 (Conservation Areas – Landscape Setting) and Policy HE.5 (Conservation Areas – Development Criteria)
- Winchester District Local Plan Part 1 – Joint Core Strategy (2013): Policy DS1 (Development Strategy and Principles); Policy CP13 (High Quality Design); Policy CP19 (South Downs National Park); and, Policy CP20 (Heritage and Landscape Character)

- Winchester District Local Plan Part 2 – Development Management and Site Allocations (2017): WIN1 (Winchester Town); WIN2 (Winchester Town – Views & Roofscape); Policy DM15 (Local Distinctiveness); Policy DM16 (Site Design Criteria); Policy DM17 (Site Development Principles); Policy DM25 (Historic Parks and Gardens); Policy DM26 (Archaeology); Policy DM27 (Development in Conservation Areas); Policy DM29 (Heritage Assets); and, Policy DM31 (Locally Listed Heritage Assets)

- South Downs Local Plan Pre-Submission (2017) –Core Policy SD1 (Sustainable Development); Core Policy SD3 (Major Development); Strategic Policy SD4 (Landscape Character); Strategic Policy SD5 (Design); Strategic Policy SD6 (Safeguarding Views); Strategic Policy SD12 (Historic Environment); Development Management Policy SD13: (Listed Buildings) Development Management Policy SD15 (Conservation Area) Development Management Policy SD16 (Archaeology)

7.6.2 There could be significant effects on known and unknown buried archaeological remains. Paragraphs 5.126 and 5.127 of the NPS NN set out the required content of assessment. It should include an assessment of any likely significant heritage impacts and describe these in the Environmental Statement.

7.6.3 The significance of any heritage assets affected should also be described including any contribution made by their setting. The NPS NN is clear that the detail should be proportionate to the asset's importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant Historic Environment Record should have been consulted and the heritage assets assessed

7.6.4 As the area of the Proposed Scheme is of archaeological significance, in accordance with NPS NN Paragraph 5.127, a desk-based assessment has been undertaken based on the Proposed Scheme corridor. This will be used, in conjunction with the archaeological investigation results, to provide a baseline assessment for the Proposed Scheme.

7.6.5 The proposed level of assessment is detailed in accordance with DMRB Volume 11, Section 3, Part 2 (Highways Agency, 2007b). A detailed assessment is proposed due to the potential for significant effects on archaeological remains and a simple assessment is proposed due to the potential for significant effects on the setting of historic buildings and historic landscapes.

Sensitivity or importance of a heritage asset

7.6.6 The NPPF defines significance as '*the value of a heritage asset to this and future generations because of its heritage interest*'. This significance could be related to archaeological, architectural and artistic or historic elements, and could also derive from the setting of the site (MHCLG, 2018). For the purposes of this report, the term 'value' has been employed in line with DMRB and order to avoid confusion with the terminology for impact assessment, and particularly with 'significance of impact' as commonly used in Environmental Impact Assessment.

7.6.7 An assessment of the value of cultural heritage assets within the study area has been undertaken on a six-point scale of Very High, High, Medium, Low, Negligible and Unknown. Assessment has been based on professional judgement guided by criteria provided in DMRB (Highways Agency, 2007). The assessment of the setting of cultural heritage assets, including its contribution to their historic legibility and capacity for change, will be undertaken based on the guidance contained in Historic Environment Good

Practice Advice in Planning Note 3: The Setting of Heritage Assets (2nd Edition) (Historic England 2017a). The criteria used to assess the value of cultural heritage assets is presented in Table 7-1.

Table 7-1 Criteria used to determine the importance of a heritage asset

Cultural importance/ sensitivity	Criteria
Very high	World Heritage Sites. Sites of International Importance.
High	Scheduled Monuments (including proposed sites). Undesignated archaeological remains of schedulable quality and importance. Archaeological remains that could contribute significantly to acknowledged national research objectives. Scheduled Monuments with standing remains. Grade I and Grade II* Listed Buildings. Other listed buildings that can be shown to have exceptional qualities in their fabric or historical associations not adequately reflected in the listing grade. Conservation Areas containing very important buildings (buildings with Grade I or II* listing). Undesignated structures of clear national importance. Designated historic landscapes of outstanding interest. Undesignated landscapes of outstanding interest. Undesignated landscapes of high quality and importance, and of demonstrable national value. Well preserved historic landscapes, exhibiting considerable coherence, time-depth or other critical factors.
Medium	Designated or undesignated archaeological remains contributing to regional research objectives. Grade II Listed Buildings. Historic (unlisted) buildings that can be shown to have exceptional qualities in their fabric or historical associations. Conservation Areas containing buildings that contribute significantly to its historic character. Historic Townscape or built-up areas with important historic integrity in their buildings or built settings (e.g. including street furniture and other structures). Designated special historic landscapes. Undesignated historic landscapes justifying special historic landscape designation, landscapes of regional value. Averagely well-preserved historic landscapes with reasonable coherence, time-depth or another critical factor(s).
Low	Designated and undesignated archaeological remains of local importance.

Cultural importance/ sensitivity	Criteria
	Archaeological remains compromised by poor preservation and/or poor survival of contextual associations. Archaeological remains of limited value, but with potential to contribute to local research objectives 'Locally Listed' buildings. Historic (unlisted) buildings of modest quality in their fabric or historical association. Historic Townscape or built-up areas of limited historic integrity in their buildings or built settings (e.g. including street furniture and other structures). Robust undesignated historic landscapes. Historic landscapes with importance to local interest groups. Historic landscapes whose value is limited by poor preservation and/or poor survival of contextual associations.
Negligible	Archaeological remains with very little or no surviving archaeological interest. Buildings of no architectural or historical note; buildings of an intrusive character. Landscapes with little or no significant historical interest.
Unknown	The sensitivity of the site not ascertained. Buildings with some hidden (i.e. inaccessible) potential for historic significance

Source – DMRB Volume 11, Section 3, Part 2 HA 208/07 (Highways Agency, 2007)

7.6.8 Table 7-1 is a general guide to the attributes of cultural heritage assets and it should be noted that not all the qualities listed need be present in every case and professional judgement is used in balancing the different criteria.

7.6.9 An assessment of cultural heritage significance of heritage assets should identify the potential impact of proposed or predicted changes on the significance of the asset and the opportunities for reducing that impact.

7.6.10 Magnitude of impact is the degree of change that would be experienced by a cultural heritage asset and its setting on completion of the Proposed Scheme, as compared with a 'do nothing' scenario. Magnitude of impact is assessed without reference to the value of the cultural heritage asset and could include physical impacts upon the cultural heritage asset or impacts on its setting or amenity value.

7.6.11 The magnitude of impact has been assessed using a five-point scale of, Major, Moderate, Minor, Negligible and No Change. The assessment has been based on professional judgement and follows criteria provided in DMRB (Highways England 2007) and is therefore compliant. Factors in the assessment of the magnitude of impact for all cultural heritage assets are presented in Table 7-2 unless otherwise stated, all impacts are adverse.

Table 7-2 Descriptors of the significance of effect categories

Magnitude	Criteria
Major	Change to most or all key archaeological materials, such that the resource is totally altered. Change to key historic building elements, such that the resource is totally altered. Change to most or all key historic landscape elements, parcels or components; extreme visual effects; gross change of noise or change to sound quality; fundamental changes to use or access; resulting in total change to historic landscape character unit. Comprehensive changes to setting.
Moderate	Changes to many key archaeological materials, such that the resource is clearly modified. Change to many key historic building elements, such that the resource is significantly modified. Changes to some key historic landscape elements, parcels or components, visual change to many key aspects of the historic landscape, noticeable differences in noise or sound quality, considerable changes to use or access; resulting in moderate changes to historic landscape character. Considerable changes to setting that affect the character of the asset. Changes to the setting of an historic building, such that it is significantly modified.
Minor	Changes to key archaeological materials, such that the asset is slightly altered. Change to key historic building elements, such that the asset is slightly different. Changes to few key historic landscape elements, parcels or components, slight visual changes to few key aspects of historic landscape, limited changes to noise levels or sound quality; slight changes to use or access: resulting in limited changes to historic landscape character. Slight changes to setting. Changes to setting of an historic building, such that it is noticeably changed.
Negligible	Very minor changes to archaeological materials or setting. Slight changes to historic buildings elements or setting that hardly affect it. Very minor changes to key historic landscape elements, parcels or components, virtually unchanged visual effects, very slight changes in noise levels or sound quality; very slight changes to use or access; resulting in a very small change to historic landscape character.
No Change	No change to elements, parcels or components; no visual or audible changes; no changes arising from amenity or community factors. No change to fabric or setting.

Source – DMRB Volume 11, Section 3, Part 2 HA 208/07 (Highways Agency, 2007)

Significance of the effect

7.6.12 For all three sub-topics the significance of effect has been determined as a combination of the assessment of the value of the asset and the magnitude of impact. This is achieved using professional judgement informed by the matrix illustrated below in Table 7-3. Five levels of significance (Very Large, Large, Moderate, Slight or Neutral) are defined which apply equally adverse and beneficial impacts. A significance of effect of Moderate or above is taken to be significant.

Table 7-3 Significance of effect matrix

		Magnitude of the effect				
		No Change	Negligible	Slight harm (minor)	Harm (moderate)	Substantial harm (major)
VALUE	Very High	Neutral	Slight	Moderate/ large	Large/very large	Very large
	High	Neutral	Slight	Slight/moderate	Moderate/large	Large/very large
	Medium	Neutral	Neutral/slight	Slight	Moderate	Moderate/large
	Low	Neutral	Neutral/slight	Neutral/slight	Slight	Slight/moderate
	Negligible	Neutral	Neutral	Neutral/slight	Neutral/slight	Slight

Source – DMRB Volume 11, Section 3, Part 2 HA 208/07 (Highways Agency, 2007)

7.7 Assessment assumptions and limitations

7.7.1 Until completion of the investigative fieldwork the level of impact to buried archaeology and earthworks can only be assessed for the known resource. The level of impact will be revised further to the completion of non-intrusive and intrusive archaeological survey, due to be completed in 2018.

7.8 Elements to be scoped in or out

7.8.1 The elements to be scoped in or out of the EIA for cultural heritage are in Table 7-4.

Table 7-4 Elements to be scoped in or out of the EIA for cultural heritage

Element scoped in	Element scoped out	Justification
Archaeological remains.	--	Intrusive groundworks have the potential to damage buried archaeological remains through their partial or total removal or through changes to soil chemistry and/or groundwater levels.
Historic buildings	--	There is the potential for the construction and operation of the Proposed Scheme to have an impact on the setting of historic buildings (including conservation areas) through the intrusion of noise, vibration and dust, or through visual intrusion.
Historic landscapes	--	There is the potential for the construction and operation of the Proposed Scheme to have an impact on the setting of historic landscapes through the intrusion or noise, vibration and dust, or through visual intrusion.

8. Landscape and Visual

8.1 Study area

8.1.1 The Preliminary assessment of the options in PCF Stage 1 and PCF Stage 2 indicated that significant effects would be unlikely to occur beyond 500m for landscape effects and 1km from the Proposed Scheme for visual effects. As a precautionary approach however, it is considered prudent to re-examine the Proposed Scheme in relation to a wider area including the settlements of Abbots Worthy and Kings Worthy beyond the River Itchen Valley to the north, the South Downs National Park (SDNP) to the east, St Catherine's Hill to the south and the town of Winchester and the River Itchen to the west. This gives a broad area of mapping approximately 6km north to south and 4km east to west. This will allow general issues of effects on the 'setting' of the South Downs National Park (SDNP) and the townscape of Winchester to be more fully assessed and provide a thorough baseline understanding of the relationship between the existing M3 motorway and the River Itchen valley and the surrounding topography. This also responds to concerns raised by stakeholders in relation to the landscape and visual effects identified at Stage 2.

8.1.2 For more detailed assessment of specific landscape and visual receptors the study area will be refined using updated Zone of Theoretical Visibility (ZTV) modelling, that is modelling which maps areas of land within which a development would be theoretically visible, based on 'bare earth' terrain. As part of this approach potential wider inter-visibility between the Proposed Scheme and the surrounding landscape/townscape, for example within longer distance views from St Catherine's Hill, will also be re-examined. The updated ZTV modelling will respond to design development of the Proposed Scheme post PCF Stage 2 and include elements such as light columns which are not currently detailed.

8.1.3 The study area includes parts of the town of Winchester and the Stage 3 assessment will consider potential effects resulting from the Proposed Scheme on the town in terms of its townscape setting. For the purposes of assessment, the term 'landscape' should however, be deemed to include 'townscape'.

8.1.4 The above approach to identifying the study area is based on the guidance in the Interim Advice Note (IAN) 135/10 Landscape and Visual Effects Assessment (Highways Agency, 2010) which states that the study area "… should contain all of the likely significant effects of the proposal on any component of the landscape and visual resource."

8.2 Baseline conditions

8.2.1 The existing highways estate comprising Highways England's land ownership, which includes the M3 corridor, the A34/Winchester Bypass and the A272/Spitfire Link, has resulted in severance between Winchester (including the River Itchen) to the north and west and the open downland (Winnall Down and Easton Down) to the east.

8.2.2 This highways estate has significantly altered the local landscape creating a fragmented and complicated landscape pattern which is dominated by the roads and associated infrastructure including bridges, cuttings, slips and signage. The width of the corridor is approximately 120m at its narrowest point at the southern extent of the area of the Proposed Scheme. It increases to approximately 400m around the Junction 9 roundabout and approximately 500m at its widest point at the northern extent of the area of the Proposed Scheme encompassing Easton Down and the River Itchen floodplain.

Landscape receptors and value

8.2.3 The key landscape elements and receptors have been described below in Table 8-1.

Table 8-1 Baseline description of key landscape elements and receptors

Landscape element/receptor	Description
Topography	At a local level the Junction 9 roundabout and highways infrastructure to the south including slip roads and the A272/Spitfire Link are lower than the surrounding land. There is a 10m, almost vertical, cut under the B3404 at the southern end of the area of the Proposed Scheme, which is the most notable engineered landform. The existing highways infrastructure of the A34/Winchester Bypass is slightly elevated to cross the River Itchen floodplain in the north-western extents of the area of the Proposed Scheme. To the north of Junction 9 the M3 rises gradually at an even gradient to pass over Easton Down. This is achieved by embankments through a small combe or hollow near the Highways England depot and then cuttings on the higher ground. There are numerous ditches, water bodies, streams and rivers in the area. The largest watercourse is the River Itchen and its tributaries, which run across a wide, flat floodplain to the north of the Proposed Scheme. Topography is a key characteristic of the rolling hills in the nationally designated SDNP and is fundamental to the distinctive landscape of the River Itchen valley. It is therefore considered to be a highly valued landscape element.
Land use of the site and surrounding area	Much of the area of the Proposed Scheme is occupied by the highway corridor of the M3, including embankments, cuttings, bridges, slip roads, and accompanying infrastructure such as signage, fencing, embankment planting, traffic lights and occasional lighting. The south-western length of the area of the Proposed Scheme also contains built elements, including two-storey office and construction blocks, and areas of car parking around the Highways England depots. The central and northern sections of the area of the Proposed Scheme contain areas of open farmland contrasting with a more intimate rural landscape of scattered tree and wetland where the Proposed Scheme area crosses the River Itchen floodplain. The landscape to the east, south-east and north-west of the area of the Proposed Scheme is largely one of open farmland containing large rectangular fields intersected by access tracks and bounded by hedgerows. There are regular clumps of mature trees, copses, hedgerow trees and hedgerows alongside lanes, tracks and field boundaries. To the south-west and west of the area of the Proposed Scheme is the built form of Winchester, with retail parks adjacent to the M3 corridor. This area retains a small-scale and intimate landscape through which the River Itchen passes. To the north of the area of the Proposed Scheme is the village of Kings Worthy, which is separated from the

Landscape element/receptor	Description
	built form of Winchester by woodland and the A34. The landscape to the north-east is dominated by the M3. Landuse in the study area varies from relatively prosaic infrastructure and urban development of low to moderate value to more highly valued rural land.
Vegetation	Trees, hedgerows and wooded areas associated with highway planting are located on embankments and roundabouts of the existing M3 corridor, as well as in the adjoining landscape along with lengths of semi-improved grassland and scrub. The surrounding landscape contains numerous copses, blocks of trees, hedgerow trees and hedgerows alongside lanes, tracks and field boundaries. The area of the Proposed Scheme contains fields of both arable and pastoral farmland, typically bounded by hedgerows, along with a more enclosed landscape to the north of lowland fen wetland and scattered trees around the River Itchen. An arboricultural survey to BS 5837: 2012 - Trees in relation to design, demolition and construction will describe and evaluate the existing arboricultural resource within the vicinity of the Proposed Scheme. Statutory designations relating to trees include two separate Tree Preservation Orders (TPOs) and the Kings Worthy Conservation Area, which is located at the northern end of the study area. Vegetation is a key characteristic of the nationally designated SDNP and is fundamental to the distinctive landscape of the River Itchen valley. It is an important part of the green infrastructure of the area and it is therefore considered to be a highly valued landscape element.
Heritage statutory designations	There are no registered parks and gardens located within 500m of the area of the Proposed Scheme, the nearest being Magdalen cemetery which is likely to be outside the ZTV and some 1.4km distant to the south east of the M3 Junction 9 on the south side of Alresford Road. There are three conservation areas within the landscape study area. At PCF Stage 2 it was considered that these do not have intervisibility with the site. This will be validated as part of the PCF Stage 3 assessment work. Other heritage assets such as Listed Buildings and historic landscapes are assessed in Section 7 – Cultural Heritage.
Landscape statutory designations (Primary receptor)	The SDNP covers around 13.6ha of the area of the Proposed Scheme, principally around its northern and eastern lengths. It incorporates the more intimate local landscape of the River Itchen to the north-west and north-east of the area of the Proposed Scheme and also covers the downland to the east. Consideration will be given to both the direct and indirect effects upon this designated landscape and in particular the effect upon its special qualities and representative views. Special qualities of the SDNP are set out by the South Downs National Park Authority (SDNPA); those special qualities that have the potential to be affected by the Proposed Scheme are as follows:

Landscape element/receptor	Description
	Diverse, inspirational landscapes and breath-taking views. This is in part a function of the downland topography. Tranquil and unspoilt places. The SDNP is a nationally designated landscape resource of the highest value.
Public rights of way	The main long-distance footpath likely to be located within the ZTV is the St Swithun's Way long distance path - a 34 mile long-distance walk from Winchester to Farnham following lengths of the original route of the Pilgrim's Way. The Itchen Way long distance footpath - a 32 mile long-distance footpath following the River Itchen in Hampshire from its source near Hinton Ampner House to its mouth at Woolston – would be likely to be largely outside the ZTV but a length passes directly through the area of the Proposed Scheme and would therefore be directly affected. The South Downs Way would be outside the ZTV. Part of Sustrans Regional Route 23 would fall within the ZTV. This is an 80-mile route with a mixture of off and on road cycling from Reading to Southampton via Basingstoke, Alresford, Winchester and Eastleigh. The route crosses the area of the Proposed Scheme at the M3 Junction 9 roundabout in a north-east to south-west direction along Easton Lane underpass. A number of footpaths, cyclepaths and bridleways cross the area of the Proposed Scheme or are located adjacent to it, with many others connecting these to the wider countryside. The footpaths, cyclepaths and bridleways enable good connectivity between the urban and rural areas, with bridges and underpasses allowing access across the M3 and A31, although railways and highways typically sever many connections east-west. Where paths are located on elevated ground or across open fields, their users could have clear views of lengths of the area of the Proposed Scheme. Public rights of way are important recreational resources and are highly valued.
Perceptual aspects	Noise, lighting, vehicle movement and the presence of infrastructure, all associated with the urban fringe of Winchester and the transport routes including the M3, A34/Winchester bypass and A272/Spitfire Link all erode tranquility in the area. Built development and transport corridors have also affected the pattern and texture of the landscape over time. Tranquility and a sense of remoteness are important aspects of the nationally designated SDNP and the River Itchen valley and are highly valued. The SDNP became an International Dark Skies Reserve in 2016, although the darkest areas are not in the immediate vicinity of Winchester and the M3 corridor.
Landscape character (Primary receptor)	At a national level the area of the Proposed Scheme falls within both the Hampshire Downs and South Downs National Character Areas

Landscape element/receptor	Description
	(NCAs) and these will be used to provide an overall landscape character context. As part of the area of the Proposed Scheme is located within the SDNP, the South Downs Integrated Landscape Character Assessment (SDILCA – 2005, updated 2011) (SDNPA, 2011) will also be examined. Within the SDILCA, the area of the Proposed Scheme falls into the following two landscape character areas: Landscape Type A: Open Downland sub-area A5: East Winchester Open Downs, whose key sensitivities with the potential to be affected by the Proposed Scheme are remoteness, tranquility, and open, undeveloped skylines. Landscape Type E: Chalk Valley Systems sub-area E4: Itchen Valley, whose key relevant sensitivities are panoramic viewpoints from St Catherine's Hill. *SDILCA states (para E4.14): 'ensure that any future traffic regulation and road upgrades associated with the M3, A34 and A31 are integrated into the rural valley landscape and ensure any signage is sensitively detailed'.* Hampshire County Council has produced an Integrated Landscape Character Assessment (Hampshire County Council, 2012), within which the area of the Proposed Scheme falls, in part, within Character Area 3c: Itchen Valley. The only key characteristics of Character Area 3c with the potential to be affected by the Proposed Scheme is that it provides a setting to Winchester. The Proposed Scheme also falls within the Winchester District Landscape Character Assessment (Winchester City Council, 2004) landscape character areas 9. Upper Itchen Valley and 12 East Winchester Downs and these will also be examined. The landscape character areas of the nationally designated SDNP and locally important landscape of the River Itchen valley are highly valued.

8.2.4 Landscape character is an expression of the landscape elements such as topography, landuse and vegetation and landscape character areas will be considered as primary overarching landscape receptors. The SDNP is a statutory landscape designation of national importance and this will also be considered as a primary landscape receptor.

Extent of visibility, visual receptors and value

8.2.5 Visual receptors within the study area include people occupying residential properties (notably White Hill Cottage and Winnall Cottage Farm) and users of PRoW (notably Sustrans 2 and St. Swithun's Way and the Itchen Way Recreational Paths).

8.2.6 The overall visibility of the area of the Proposed Scheme is limited by the presence of built form, cuttings and the screening provided by the vegetated landscape surrounding the highways estate. The areas with visual receptors affected would generally be confined to two main locations, as described below:

- The east-facing slopes of the River Itchen valley and parts of the valley floor to the west between Abbotts Barton and Headbourne Worthy/School Lane – in terms of specific receptors this includes a short length of the B3047 Worthy Road, the fringes of a recent residential development, St Swithun's Way, and the PRoW on elevated ground alongside the railway

- The elevated downland to the south and east, specifically west and north facing slopes of Easton Down, Winnall Down and Magdalen Down – this includes a short section of the Sustrans 23 route, residential receptors along Easton Lane, parts of the B3404, St Swithun's School and Leigh House Hospital

8.2.7 Visibility of the area of the Proposed Scheme would gradually reduce post construction as mitigation planting becomes established.

8.2.8 Views are a key characteristic of the nationally designated SDNP and fundamental to the recreational amenity of PRoW within the study area. These are therefore highly valued.

8.3 Potential impacts

8.3.1 Section 2 describes aspects of the Proposed Scheme which could have an impact on the surrounding landscape and visual receptors. Potential significant landscape effects include removal of or damage to landscape elements and the resulting effects on landscape character. Potential significant visual effects include changes to views currently experienced by visual receptors as a consequence of the construction or operation of the proposed development.

8.3.2 Key impacts predicted to arise include:

- The introduction of new highway infrastructure and traffic
- Loss of vegetation cover and green infrastructure
- Changes to local landscape character
- Changes impacting on the composition of views
- Changes in tranquillity
- Changes to the night-time environment due to lighting

8.4 Design, mitigation and enhancement

Potential mitigation – overview

8.4.1 The principal objective of landscape mitigation is to integrate the Proposed Scheme into the local landscape to minimise adverse landscape and visual impacts. Development of the landscape mitigation will be an iterative process, working closely with the engineering design team, responding to the findings of ongoing assessment and scheme design requirements. It will ultimately form part of an over-arching environmental design for the Proposed Scheme.

8.4.2 Landscape mitigation would address both construction effects and operational effects.

Construction mitigation

8.4.3 Mitigation of effects on the landscape and visual resource during construction is integral to the 'Considerate Contractors' Scheme which would be adopted. This includes measures such as: tidy site management to reduce visual clutter associated with the works and carefully controlling construction lighting in accordance with best practice to minimise light spill and nuisance caused by glare.

8.4.4 An element of vegetation removal as part of the construction of the Proposed Scheme would be unavoidable. The existing vegetation is however, a highly valued landscape and green infrastructure resource and provides important screening to the existing highway corridor in the study area and as much of it would be retained as practicable. The vegetation between the M3 and the A34 for example, currently screens views of the highways from receptors to the west and the retention of as much of this vegetation as possible will be a key design objective.

8.4.5 A tree survey will be conducted to determine the arboricultural constraints relevant to the Proposed Scheme. This survey will be based upon the BS5837:2012 methodology and will enable an assessment (Arboricultural Impact Assessment, as per SDNP policy SD11) to be made as to which trees are retainable within and adjacent to the proposed boundary of the Proposed Scheme (potentially any tree within a 15m buffer of the boundary). Trees will be surveyed as individuals, groups and woodlands where appropriate. Part of the survey scope will be to identify notable trees due to quality, age, third party status and designation and to determine where retention is possible and where tree protection is likely to be required. Further arboricultural input will be required at later stages of the programme when a tree protection strategy will be produced, (in line with BS5837:2012 and SDNP policy SD11) in the form of a generic arboricultural method statement and Preliminary Tree Protection Plan. Any design developments will also need to be considered in terms of a change in impacts to trees

8.4.6 Advance planting as mitigation to screen views of construction activities for particular receptors will be considered. Temporary works to facilitate construction such as site compounds, access roads, borrow pits, traffic management and storage areas, will be located away from the elevated parts of the area of the Proposed Scheme where practicable, particularly in relation to Easton Down where there is a risk of the works being seen on the skyline when viewed from the River Itchen Valley.

Mitigation for operation

8.4.7 During the preliminary and detailed design, landscape mitigation and enhancement measures will follow the guidance in the Highways England publication The Road to Good Design (Highways England, 2018b) together with Highways Agency DMRB, Volume 10: Environmental Design and Management, Section 0: Environmental Objectives (Highways Agency, 2001a).

8.4.8 Earthworks will be designed, where possible, to help integration into the gently undulating topography of the study area. Any proposed embankments and cuttings would be graded to respect existing local landforms and reduce disruption to major topographical features. The use of false cuttings and land-raising with a return to chalk grassland, sensitively graded to seamlessly marry in with the existing adjacent downland, will be considered on the east side of the M3, north of Easton Lane. This would provide screening to the Proposed Scheme at the sensitive interface with the SDNP.

8.4.9 New planting would be carried out to replace the vegetation resource and green infrastructure removed as a consequence of the Proposed Scheme. Planting would also be carefully located to screen the new highway and its associated traffic and infrastructure in views experienced by visual receptors from key viewpoints. The planting of copses in field corners adjacent to the highway infrastructure would complement existing vegetation patters in the SDNP and help to integrate the Proposed Scheme in to the landscape.

8.4.10 Some areas that become 'landlocked' by new highway elements as part of the Proposed Scheme would be planted as new woodlands that would make an important contribution to the green infrastructure in the local area. New and upgraded road embankments and cuttings also offer additional opportunities for tree planting although consideration must be given to gradients as planting and seeding on steeper slopes (greater than 1:2) is generally costlier and more impractical to implement and maintain.

8.4.11 The design of new planting would comprise native species of local provenance where practicable and reflect the character of the local landscape. For example, reinforcement of the riparian character of the River Itchen Valley would be achieved through the use of willow, poplar and alder species. The use of beech in proposed field corner copses would complement the 'Hampshire beech hangers' which occur in local parts of the SDNP. Consideration would also be given to reinforcing the visually open character of the chalk downland by creating breaks in the roadside planting or leaving the chalk unplanted and exposed on the steepest embankments or cuttings. Planting that blends with the existing valley woodlands and hedgerows (including wet woodland where relevant) would increase the perception of tranquillity.

8.4.12 Offsite planting in the River Itchen Valley would be considered as this increases the perception of tranquillity along St Swithun's Way long-distance footpath. Any works affecting offsite planting will require the consent of the landowner and the relevant statutory authorities.

8.4.13 Opportunities for landscape enhancement or improvement through the management of any retained areas of vegetation will also be explored.

8.4.14 The planting design (particularly that proposed within the SDNP) will be agreed with key stakeholders, including the SDNPA and residents of White Hill Cottage and Winnall Cottage Farm, during the consultation process. The planting design will also be agreed with the project ecologists who will advise on the ecological requirements, particularly in relation to sensitive habitats such as chalk grassland.

8.4.15 Design proposals will reflect local design characteristics and use materials commonplace in the local area. For example, the use of flint would be considered as a facing material to retaining walls and bridge abutments. There would be a number of drainage attenuation features within the Proposed Scheme offering potential for some landscape enhancement through the creation of a range of habitats.

Monitoring

8.4.16 Long term monitoring of mature trees within the Highway boundary would take place following construction and a fifteen-year woodland management plan drawn up. Thinning, coppicing and replanting of newly planted woodlands would be carried out particularly when densely planted smaller nursery stock is used. This would maintain a structurally diverse and species rich woodland.

8.5 Description of likely significant effects

Landscape receptors

8.5.1 The option selected at the previous design stage will require the removal of approximately 5ha of trees and approximately 1000m of hedgerow, with an approximate land take of 12ha outside of the current highways estate. There would be major earthworks and the introduction of new largescale highway infrastructure including carriageways, bridges, gantries, signage and lighting. Landscape vegetation and topography patterns would be impacted and tranquillity eroded. There would therefore be some significant residual effects on landscape character, including that of a localised part of the SDNP.

8.5.2 The effects during the construction stage would generally be more adverse than during operation due to the extended works area involved and the use of machinery including cranes. However, these effects would be temporary.

Visual receptors

8.5.3 There would inevitably be some significant residual effects on views experienced by some local residents and users of PRoW in the area.

8.6 Assessment methodology

Policies and plans

8.6.1 Planning policies and guidance that are relevant to the Proposed Scheme include:

- National Policy Statement for National Networks (NPS NN) (DfT, 2014): Landscape and Visual Impacts paragraphs 5.81-5.89 (Artificial Light) 5.143 to 5.161 (Landscape and Visual Impacts including Tranquillity) and 5.188 (Tranquillity).

- National Planning Policy Framework (NPPF) (2018): Paragraph 8 (Achieving sustainable development), 124, 127 and 130 (Achieving well-designed places), 170 and 172 (Conserving and enhancing the natural environment) and 180 (Conserving and enhancing the natural environment: Ground conditions and pollution) and the associated Planning Practice Guidance: Natural Environment (2016), Noise (2014) and Light pollution (2014).

- Winchester District Local Plan Review (Adopted 2006) – Saved Policies: Policy DP.3 (General design criteria); Policy DP.4 (Landscape and the built environment); Policy DP.10 (Pollution generating development); and, Policy DP.11 (Unneighbourly uses).

- Winchester District Local Plan Part 1 – Joint Core Strategy (2013): Policy DS1 (Development Strategy and Principles); Policy MTRA4 (Development in the Countryside); Policy CP13 (High Quality Design); Policy CP15 (Green Infrastructure); Policy CP19 (South Downs National Park); and, Policy CP20 (Heritage and Landscape Character).

- Winchester District Local Plan Part 2 – Development Management and Site Allocations (2017): Policy WIN1 (Winchester Town); Policy WIN3 (Winchester Town – Views & Roofscape); Policy DM10 (Essential Facilities & Services in the Countryside); Policy DM15 (Local Distinctiveness); Policy DM16 (Site Design

Criteria); Policy DM17 (Site Development Principles); Policy DM19 (Development and Pollution); Policy DM23 (Rural Character); Policy DM24 (Special Trees, Important Hedgerows and Ancient Woodlands); Policy DM25 (Historic Parks and Gardens); and, Policy DM29 Heritage Assets.

- South Downs Local Plan Pre-Submission (2017) – Emerging: Core Policy SD1 (Sustainable Development); Core Policy SD3 (Major Development); Strategic Policy SD4 (Landscape Character); Strategic Policy SD5 (Design); Strategic Policy SD6 (Safeguarding Views); Strategic Policy SD7 (Relative Tranquillity); Strategic Policy SD 8 (Dark Night Skies); Development Management Policy SD11 (Trees, Woodland and Hedgerows); Development Management Policy SD21 (Public Realm, Highway Design and Public Art); Strategic Policy SD42 (Infrastructure); Strategic Policy SD45 (Green Infrastructure); and, Development Management Policy SD54 (Pollution and Air Quality).

8.6.2 Local community level plans such as Village Design Statements, Parish Plans and Neighbourhood Development Plans will also be reviewed in relation to the potential effects of the Proposed Scheme.

Methodology

8.6.3 The assessment will be undertaken using the following guidance:

- Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 5, Landscape Effects (Highways Agency, 1993c)
- Interim Advice Note (IAN) 135/10 Landscape and Visual Effects Assessment (Highways England, 2010b)
- Guidelines for Landscape and Visual Impact Assessment (3rd Edition) published jointly by The Landscape Institute and Institute of Environmental Management and Assessment (Landscape Institute, 2013)

8.6.4 Landscape and visual effects are related but distinct topics, so are considered and assessed separately. Effects on the landscape arise from a development causing direct changes to the physical elements of the landscape, affecting its features, character and quality, and more widely, from indirect effects of the development on the character and quality of the surrounding landscape and townscape. Visual effects arise where a development changes the character and quality of the views that people (visual receptors) may enjoy.

8.6.5 The PCF Stage 2 EAR (Highways England, 2018a) identified that potentially moderate to large adverse landscape and visual impacts could arise as a consequence of the Proposed Scheme. The assessment at PCF Stage 3 will therefore be Detailed, in accordance with IAN 135/10.

8.6.6 The landscape assessment will follow the following process:

- Baseline; identification of landscape character areas, characteristics, features and elements. Establish the key landscape receptors to be assessed (normally landscape character areas and landscape designations)

- Assessment of the sensitivity of landscape receptors with reference to the value that is attached to them by society and their susceptibility, that is their capacity to accommodate change arising from the Proposed Scheme

- Assessment of the magnitude of impacts on landscape receptors with reference to Scheme design, including bridges, approach roads, cuttings and embankments, drainage, signage, lighting, scale of change, nature of change etc.

- Development of mitigation to reduce potential adverse landscape effects and contribute to the green infrastructure in the local area as part of an over-arching environmental design for the Proposed Scheme

- Evaluation of the significance of landscape effects, as a function of landscape sensitivity and magnitude of landscape impact

- Reporting of residual landscape effects for each landscape receptor

8.6.7 The key landscape elements and receptors to be considered are described in Table 8-1 above, with landscape character areas and the SDNP considered as the primary landscape receptors to be assessed. The relevant landscape character areas include the following:

- SDILCA Landscape Character Area A5: East Winchester Open Downs

- SDILCA Landscape Character Area E4: Itchen Valley

8.6.8 The landscape character areas identified in the Hampshire County Council Integrated Landscape Character Assessment and Winchester District Landscape Character Assessment will also be examined, although these overlap in part with those of the SDILCA and care will be taken to avoid ‘double counting’.

8.6.9 A landscape classification identifying smaller subtypes of landscape character could also be undertaken where it is considered that a finer grained approach will assist in understanding landscape effects, particularly in relation to the SDNP and the townscape of Winchester.

8.6.10 The visual assessment will follow the following process:

- Baseline; identification of visual receptors (people) and their sensitivity to change based on the importance attached to the views they currently experience and the activity in which they are engaged in

- Assessment of the magnitude of visual impacts, that is the degree of change to the views currently experienced, with reference to scheme design, including bridges, approach roads, cuttings and embankments, drainage, signage, lighting, scale of change, nature of change etc.

- Development of mitigation to reduce potential adverse visual effects as part of an over-arching environmental design for the Proposed Scheme

- Evaluation of the significance of visual effects, as a function of the sensitivity of the visual receptor and magnitude of visual impact

- Reporting of residual visual effects for each visual receptor

8.6.11 The representative viewpoints to be assessed in the EIA in relation to the Proposed Scheme include those outlined in Table 8-2 below. These have been discussed and agreed with SDNPA, Winchester City Council and Hampshire County Council. The approximate locations of the representative viewpoints are shown in Figure 8-1 in Appendix B.

Table 8-2 Assessment viewpoints scoped in for further assessment

Viewpoint name and number	Approximate distance from Proposed Scheme Boundary	Reason for selection
1. Easton Lane / Sustrans 23	175m to the east	Residents at White Hill Cottage and Winnall Cottage Farm. Also represents recreational users of the Sustrans route within the SDNP.
2. Church Green	357m to the north	Residential Receptors in the Kings Worthy Conservation Area to the north.
3. Itchen Valley St Swithun's Way	420m to the west	Recreational receptors using the St Swithun's Way Recreational Path on the valley floor. Representative viewpoint in SDNP viewshed analysis. Also represents views from Site of St Gertrude's Chapel Scheduled Monument.
4. Abbots Barton	650m to the west	Residential receptors within new housing development on the far side of the River Itchen Valley to the west
5. Turnpike Down	520m to the south west	Residential receptors on the north-facing hillside to the south-west
6. B3404/M3 road bridge	550m to the south	Road users in an elevated area to the south.
7. PRoW adjacent to railway near Well House Lane	1km to the west	Recreational receptors on elevated ground on the far side of the River Itchen Valley to the west – local use
8. B3404 near Magdalen Hill Cemetery and PRoW on crown of Magdalen Hill	1.1km and 1 km respectively to the south east	Road users on an elevated area of ground to the south-east, and recreational receptors using PRoW on Magdalen Hill, within the SDNP.
9. St Catherine's Hill	2.6km to the south	Recreational receptors. Representative viewpoint in the SDNP viewshed analysis.
10. Whiteshute Lane/Bushfield Camp	3.8km to the south-east	Recreational and residential receptors. Distant viewpoint.
11. Itchen Way north of Easton Down	1.6km to the north-east	Recreational receptors using the Itchen Way Recreational Path.

Viewpoint name and number	Approximate distance from Proposed Scheme Boundary	Reason for selection
12. Local Winchester townscape – Winnall Manor Road	280m to the west	Town receptors in Winchester, local to the Proposed Scheme.
13. Long Walk	800m to the east	Road users in an elevated area to the east in SDNP.
14. Chapel Lane	1.5km to the east	Road users in an elevated area to the east in SDNP.
15. Down Farm Lane	1.4km to the north-west	Road users in an elevated area to the north-west.
16. St Swithun's School	280m to the south	Receptors at the school and associated playing fields.
17. Winchester Cathedral	1.6km to the south-west	Receptors (tourists) experiencing historic panoramic views from the cathedral tower while on walking tours of the cathedral.

8.6.12 The representative viewpoints offer potentially important views which are experienced by various visual receptors. Updated ZTV modelling carried out as part of the EIA will be examined and validated by fieldwork to ensure that any key viewpoints from which the Proposed Scheme could be visible are included in the assessment. For example, while previous viewpoint assessment at PCF Stage 2 demonstrated that there is no view of the Proposed Scheme from St Catherine's Hill this will be re-examined as part of the EIA work. Intervisibility between much of the town of Winchester and the Proposed Scheme would be limited due to screening by built development. Overlooking views from the tower of Winchester Cathedral which can be experienced by visitors to the cathedral as part of guided tours will however, be verified in terms of potential visibility of the Proposed Scheme. The SDNP Viewshed Study Report (SDNPA 2015) will also be referred to.

8.6.13 The assessment will use the following scenarios:

- During the construction period, assuming a maximum visibility or maximum perceived change situation (i.e. with construction activity at its peak for any given view), and noting how long that period would be likely to last
- A winter's day in the year that the Proposed Scheme would open to traffic or be fully operational (i.e. with noise and visual screens and mounds in place but before any planted mitigation takes effect). This is usually a reflection of the operationally non-fully mitigated and maximum visibility scenario
- A summer's day in the fifteenth year after opening (i.e. when any planting mitigation measures can be assumed to be substantially effective). This is usually a reflection of the near fully mitigated scenario under normal conditions

8.6.14 The landscape assessment will be described in the ES using relevant landscape character assessments and associated studies, as a means of assessing landscape and take

account of any relevant local policies. Broader issues of effects on the 'setting' of the SDNP and the townscape of Winchester will be assessed.

8.6.15 The assessment of landscape effects will include an examination of impacts on perceptual qualities of the landscape resulting from the Proposed Scheme such as impacts on tranquillity and sense of remoteness which are important aspects of the SDNP. As part of this process changes in noise and lighting levels resulting from the Proposed Scheme will be considered. Reference will be made to the SDNP Authority Tranquillity Study 2017 and web-based CPRE tranquillity mapping.

8.6.16 There will also be an assessment of the effects on the night time environment and the SDNP's dark skies in relation to the SDNP's International Dark Skies Reserve status, resulting from the Proposed Scheme. This will include a visual appraisal of the existing night-time light sources and resulting sky glow and direct glare within the study area. Exterior lighting environmental zones will be identified in accordance with those set out in the Guidance Notes for the Reduction of Obtrusive Light GN01:2011 (Institution of Lighting Professionals, 2011). A judgement will then be made on the effects on these zones which would result from the Proposed Scheme. Reference will also be made to the SDNP Dark Skies Technical Advice Note 2018 (SDNPA, 2018) and web-based CPRE light pollution mapping.

8.6.17 A detailed programme of landscape fieldwork will be carried out as part of the assessment and a detailed photographic record taken recording landscape features and views. Night-time fieldwork will also be undertaken as part of the dark skies assessment. Photography will be carried out in accordance with Landscape Institute Advice Note 01/11 (Landscape Institute, 2011).

8.6.18 Receptor sensitivity, magnitude of impact and evaluation of the significance of landscape and visual effects arising from the Proposed Scheme will be categorised using typical criteria tables from IAN 135/10 (Highways Agency, 2010b) as indicated in Table 8-3 to Table 8-7 below.

Table 8-3 Landscape and visual sensitivity and typical descriptors

Sensitivity	Landscape – typical criteria descriptors	Visual – typical criteria descriptors
High	Landscapes which by nature of their character would be unable to accommodate change of the type proposed. Typically these would be; Of high quality with distinctive elements and features making a positive contribution to character and sense of place. Likely to be designated, but the aspects which underpin such value could also be present	Residential properties. Users of Public Rights of Way or other recreational trails (e.g. National Trails, footpaths, bridleways etc.). *Users of recreational facilities where the purpose of that recreation is enjoyment of the countryside (e.g. Country Parks, National Trust or other access land etc.).*

Sensitivity	Landscape – typical criteria descriptors	Visual – typical criteria descriptors
	outside designated areas, especially at the local scale. Areas of special recognised value through use, perception or historic and cultural associations. Likely to contain features and elements that are rare and could not be replaced.	
Moderate	Landscapes which by nature of their character would be partly able to accommodate change of the type proposed. Typically these would be; Comprised of commonplace elements and features creating generally unremarkable character but with some sense of place. Locally designated, or their value could be expressed through non-statutory local publications. Containing some features of value through use, perception or historic and cultural associations. Likely to contain some irreplaceable features and elements.	Outdoor workers. Users of scenic roads, railways or waterways or users of designated tourist routes. *Schools and other institutional buildings, and their outdoor areas.*
Low	Landscapes which by nature of their character would accommodate change of the type proposed. Typically these would be; Comprised of some features and elements that are discordant, derelict or in decline, resulting in indistinct character with little or no sense of place. Not designated. Contain few, if any, features of value through use, perception or historic and cultural associations.	Indoor workers. Users of main roads (e.g. trunk roads) or passengers in public transport on main arterial routes. *Users of recreational facilities where the purpose of that recreation is not related to the view (e.g. sports facilities).*

Sensitivity	Landscape – typical criteria descriptors	Visual – typical criteria descriptors
	Likely to contain few, if any, irreplaceable features and elements.	

Source - IAN 135/10 Table 2 page 31 and Table 1 page 41 (Highways Agency, 2010b)

Table 8-4 Magnitude and nature of landscape impact and typical descriptors

Magnitude of impact	Typical criteria descriptors
Major Adverse	Total loss or large scale damage to existing character or distinctive features and elements, and/or the addition of new but uncharacteristic conspicuous features and elements.
Moderate Adverse	Partial loss or noticeable damage to existing character or distinctive features and elements, and/or the addition of new but uncharacteristic noticeable features and elements.
Minor Adverse	Slight loss or damage to existing character or features and elements, and/or the addition of new but uncharacteristic noticeable features and elements.
Negligible Adverse	Barely noticeable loss or damage to existing character or features and elements, and/or the addition of new but uncharacteristic noticeable features and elements.
No Change	No noticeable loss, damage or alteration to character or features or elements.
Negligible Beneficial	Barely noticeable improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic features and elements, or by the addition of new characteristic elements.
Minor Beneficial	Slight improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic features and elements, or by the addition of new characteristic elements.
Moderate Beneficial	Partial or noticeable improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic and noticeable features and elements, or by the addition of new characteristic elements.
Major beneficial	Large scale improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic and conspicuous features and elements, or by the addition of new distinctive features.

Source - IAN 135/10 Table 1 page 30 (Highways Agency, 2010b)

Table 8-5 Magnitude of visual impact and typical descriptors

Magnitude of impact	Typical criteria descriptors
Major	The project, or a part of it, would become the dominant feature or focal point of the view
Moderate	The project, or a part of it, would form a noticeable feature or element of the view readily apparent to the receptor
Minor	The project, or a part of it, would be perceptible but not alter the overall balance of features and elements comprising the existing view
Negligible	Only a small part of the project would be discernible, or be at such a distance that it would form a barely noticeable feature or element of the view
No Change	No part of the project, or work or activity associated with it, is discernible

Source - IAN 135/10 Table 2 page 45 (Highways Agency, 2010b)

Table 8-6 Significance of effect categories (can be beneficial or adverse)

Landscape/visual receptor sensitivity	Magnitude of Impact				
	No Change	**Negligible**	**Minor**	**Moderate**	**Major**
High	Neutral	Slight	Slight/ Moderate	Moderate/ Large	Large/Very Large
Moderate	Neutral	Neutral/ Slight	Slight	Moderate	Moderate/ Large
Low	Neutral	Neutral/ Slight	Neutral/ Slight	Slight	Slight/ Moderate

Source - IAN 135/10 Table 3 page 32 and Table 3 page 46 (Highways Agency, 2010b)

Table 8-7 Typical descriptors of the significance of effect categories

Score	Comment
Very large beneficial	<u>Landscape:</u> The project would: Greatly enhance the character (including quality and value) of the Landscape. Creation of an iconic high quality feature and/or series of elements. Enabling a sense of place to be created or greatly enhanced. <u>Visual:</u> The project would create an iconic new feature greatly enhancing the view.
Large beneficial	<u>Landscape:</u> The project would:

Score	Comment
	Enhance the character (including quality and value) of the landscape. Enable restoration of characteristic features and elements lost as a consequence of changes resulting from inappropriate management or development. Enable a sense of place to be enhanced. Visual: The project would lead to a major improvement in a view from a highly sensitive receptor.
Moderate beneficial	Landscape: The project would: Improve the character (including quality and value) of the landscape. Enable restoration of characteristic features and elements partially lost or diminished as a consequence of changes resulting from inappropriate management or development. Enable a sense of place to be restored. Visual: The proposals would cause obvious improvement to a view from a moderately sensitive receptor, or perceptible improvement to a view from a more sensitive receptor.
Slight beneficial	Landscape: The project would: Complement the character (including quality and value) of the landscape. Maintain or enhance characteristic features and elements. Enable some sense of place to be restored. Visual: The project would cause limited improvement to a view from a receptor of medium sensitivity or cause greater improvement to a view from a receptor of low sensitivity.
Neutral	Landscape: The project would: Maintain the character (including quality and value) of the landscape. Blend in with characteristic features and elements. Enable a sense of place to be retained. Visual: No perceptible change in the view.
Slight adverse	Landscape: The project would: Not quite fit the character (including quality and value) of the landscape. Be at variance with characteristic features and elements. Detract from a sense of place. Visual:

Score	Comment
	The project would cause limited deterioration to a view from a receptor of medium sensitivity or cause greater deterioration to a view from a receptor of low sensitivity.
Moderate adverse	Landscape: The project would: Conflict with the character (including quality and value) of the landscape. Have an adverse impact on characteristic features or elements. Diminish a sense of place. Visual: The project would cause obvious deterioration to a view from a moderately sensitive receptor, or perceptible damage to a view from a more sensitive receptor.
Large adverse	Landscape: The project would: Be at considerable variance with the character (including quality and value) of the landscape. Degrade or diminish the integrity of a range of characteristic features and elements. Damage to a sense of place. Visual: The project would cause major deterioration to a view from a highly sensitive receptor and constitute a major discordant element in the view.
Very large adverse	Landscape: The project would: Be at complete variance with the character (including quality and value) of the landscape. Cause the integrity of characteristic features and elements to be lost. Cause a sense of place to be lost. Visual: The project would cause loss of views from a highly sensitive receptor and constitute a dominant discordant feature in the view.

Source - IAN 135/10 Table 4 page 33 and Table 4 page 46 (Highways Agency, 2010b)

8.6.19 The significant adverse landscape and visual effects remaining after mitigation at the design year (15 years after opening), the 'residual effects', will be summarised at the end of the assessment.

8.6.20 The landscape and visual effects that fall within the categories of moderate or greater are deemed to be significant. This is in line with DMRB guidance (DMRB Volume 11, Section 2, Part 5) (Highways Agency, 2008d), and is discussed further in Chapter 5.3.

8.6.21 Visualisations will be used during the EIA so that they become an integral part of the iterative design process. Preliminary 3D modelling showing the relationship between

existing and proposed built form and vegetation from key viewpoints will help determine how planting or changes to the engineering design can avoid, reduce or offset significant visual effects. Photomontages will show effects during construction, at year one winter and at year 15 summer for several of the most important viewpoints, which will be determined during the assessment process.

8.7 Assessment assumptions and limitations

8.7.1 Detailed design of the mitigation will be an outcome of the iterative design and assessment process. The detailed design of elements of the project, including heights of embankments and extent of cuttings, will be available during the EIA process, informing detailed mitigation.

8.7.2 It has not been possible to determine the full extents of vegetation removal. It is assumed that there would be a working area or corridor of approximately 5m width beyond the extent of earthworks and that this area would be cleared of all existing vegetation.

8.8 Elements to be scoped in or out

8.8.1 Elements to be scoped in to the EIA for landscape and visual are in Table 8-8 below.

Table 8-8 Elements to be scoped in to the EIA for landscape and visual

Element scoped in	Justification
Landscape character areas	Potential effects on the landscape character areas identified in the SDILCA, Hampshire County Council Integrated Landscape Character Assessment and Winchester District Landscape Character Assessment. This will include an assessment of the SDNP, its setting and its tranquility.
Setting of Winchester town	Potential effects on the setting of Winchester town will be scoped in although it is envisaged that these would be limited by the lack of intervisibility between much of the town and the Scheme due to screening by built development.
Views from Winchester Cathedral	Overlooking views from the tower of Winchester Cathedral, which can be experienced by visitors to the cathedral as part of guided tours will be verified in terms of potential visibility of the Scheme.
Visual receptors	Other visual receptors scoped in include those using the viewpoints outlined in Table 8-2 above, as modified during the course of PCF Stage 3 assessment work through analysis of updated ZTV modelling.
	Views from Church Green (Kings Worthy Conservation Area) and St Catherine's Hill, as identified in the SDNP Viewshed Study Report will be re-examined.
SDNP International Dark Skies Reserve	Effects on the night time environment and the SDNP's dark skies will be scoped in.

8.8.2 No elements are scoped out of the EIA for landscape and visual at this stage.

9. Biodiversity

9.1 Study area

9.1.1 For the purpose of the desk study exercise (undertaken at PCF stage 1 (WSP 2016)), the search radii have been selected following Assessment Methods in DMRB guidance (Highways Agency 1993) and Guidelines for Preliminary Ecological Appraisal (CIEEM 2013). The following search radii from the maximum extent of the Proposed Scheme were used:

- 2km radius for protected species records excluding bats
- 5km radius for bats
- 2km radius for statutory and non-statutory designated sites
- 2km radius for other notable habitats
- 10km radius for European designated sites
- 30km for SACs designated for bats

9.1.2 The survey area used for the Phase 1 habitat survey comprised land within 250m of the Proposed Scheme extent. This survey area is also used for all species surveys with the exception of great crested newts and entomological walkover surveys which used survey areas of 500m and 100m from the Proposed Scheme extent respectively.

9.2 Baseline conditions

9.2.1 Existing baseline information has been derived from the following ecological assessment work:

- M3 Junction 9 Improvement Scheme: Ecological Desk Study, June 2016 (WSP, 2016a)
- M3 Junction 9 Improvement Scheme: Phase 1 Habitat Survey Report, November 2017 (WSP, 2017j)
- M3 Junction 9 Improvement Scheme: Botanical Survey Report, November 2017 (WSP, 2017d)
- M3 Junction 9 Improvement Scheme: Badger Survey Report, November 2017 (WSP, 2017a)
- M3 Junction 9 Improvement Scheme: Bat Activity Survey Report, November 2017 (WSP, 2017b)
- M3 Junction 9 Improvement Scheme: Preliminary Bat Roost Assessment, January 2018 (WSP, 2017k)
- M3 Junction 9 Improvement Scheme: Hazel Dormouse Survey Report, January 2018 (WSP, 2017f)

- M3 Junction 9 Improvement Scheme: Otter Survey Report, October 2017 (WSP, 2017h)
- M3 Junction 9 Improvement Scheme: Water Vole Survey Report, November 2017 (WSP, 2017n)
- M3 Junction 9 Improvement Scheme: Breeding Bird Community Walkover Survey Report, September 2017 (WSP, 2017e)
- M3 Junction 9 Improvement Scheme: Reptile Survey Report, November 2017 (WSP, 2017l)
- M3 Junction 9 Improvement Scheme: Great Crested Newt Survey Report, November 2017 (WSP, 2017g)
- M3 Junction 9 Improvement Scheme: Terrestrial Entomological Walkover Survey Report, August 2017 (WSP, 2017m)
- M3 Junction 9 Improvement Scheme: Wintering Bird Community Survey Report, June 2018 (WSP, 2018c)

9.2.2 The following is a summary of the baseline information gathered.

Designated Sites

European Designated Sites

9.2.3 There is one European designated site, the River Itchen SAC, which passes under the existing A34, and lies within the Proposed Scheme extent (albeit below the carriageway).

9.2.4 The River Itchen SAC is designated primarily for the presence of the following habitats and species:

- watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation
- southern damselfly *Coenagrion mercurial*
- bullhead *Cottus gobio*

9.2.5 Qualifying features also include:

- White-clawed (or Atlantic stream) crayfish *Austropotamobius pallipes*
- brook lamprey *Lampetra planeri*
- Atlantic salmon *Salmo salar*
- otter *Lutra lutra*

Other Statutory Designated Sites

9.2.6 The River Itchen is also a designated SSSI, due to the complex mosaic of riparian habitats including the chalk stream and associated fen meadow, flood pasture and swamp habitats which support species such as otter, water vole *Arvicola amphibius*, and white-clawed crayfish. Unlike the SAC, the SSSI designation includes some of the habitats adjacent to the river channel.

9.2.7 There are no further UK statutory designated sites within a 2km study area surrounding the Proposed Scheme extent.

Non-statutory Designated Sites

9.2.8 There are seven Sites of Importance for Nature Conservation (SINC) and one SINC that is also a Road Verge of Ecological Importance (RVEI) within a 2km radius of the Proposed Scheme extent.

9.2.9 Of these sites, Easton Down SINC, designated for 'grasslands which have become impoverished through inappropriate management, but which retain sufficient elements of relic unimproved grassland to enable recovery' is the closest. This lies approximately 50m from the Proposed Scheme extent. Grassland within this site has been subject to botanical assessment.

9.2.10 All other non-statutory sites lie over 250m from the Proposed Scheme extent. Four of these sites (The Old Rectory Meadow Easton SINC, Magdalen Down North SINC, Magdalen Down South SINC and Deacon Hill SINC) contain important grassland communities. One of the sites, A31 Petersfield Road, Chilcomb SINC RVEI supports a rare and notable moth species and one of the sites, River Itchen Meadow Easton SINC, is designated for important water meadow habitat.

9.2.11 The national Ancient Woodland Inventory does not contain any parcels of Ancient Woodland within a 2km radius of the site.

9.2.12 The desk study details the presence of Easton Lane RVEI within the extent of the Proposed Scheme. However, subsequent correspondence from Hampshire Biodiversity Information Centre (HBIC) confirms that the RVEI was designated in error and has been formally de-notified.

Habitats

9.2.13 An extended Phase 1 habitat survey has been undertaken between March and August 2017 characterised and mapped the distinct habitat types.

9.2.14 To the east of the M3, the landscape is dominated by arable farmland, with associated hedgerows and small areas of woodland. The central area between the A34/A33 and the M3 contains a variety of habitats, including grazed semi-improved pastures and several small woodlands of various types. The River Itchen is a chalk river passing north-east to south-west through the north of the study area and characterised by a number of interconnected channels associated with the historic water meadow management of the surrounding grasslands. The south-western part of the study area is characterised by urban development, including industrial and commercial premises. Also of relevance to the habitats within the study area is the route of a historic railway line passing close to the A34

and is evidenced by cuttings and embankments, largely vegetated with semi natural broadleaved woodland.

9.2.15 Of the habitats within 250m of the Proposed Scheme extent, some could comprise Habitats of Principal Importance (HPI) for the conservation of biodiversity (as identified under the NERC Act (2006)). The following list details the Phase 1 habitat types (and associated HPI in brackets) of which some or all of the extent comprises or is likely to comprise HPI.

- Running water (rivers)
- standing water (ponds, eutrophic standing water)
- species rich and species poor hedgerow (hedgerows)
- margins of arable fields (arable field margins)
- mixed and broadleaved semi natural woodland (lowland mixed deciduous woodland)
- broadleaved plantation woodland (lowland mixed deciduous woodland)
- marshy grassland (lowland fens)
- swamp and marginal vegetation (reed beds)

9.2.16 Within the wider 2km search area, an additional four HPIs have been located from publicly accessible data sets (in addition to those listed above):

- Lowland calcareous grassland
- lowland meadow
- coastal and floodplain grazing marsh
- traditional orchard

9.2.17 Subsequent to the extended Phase 1 habitat survey, a detailed botanical survey has been undertaken of terrestrial habitats of potential value within the extent of the Proposed Scheme. The results of that survey are summarised within Table 9-1.

9.2.18 A preliminary biodiversity net-gain assessment (WSP 2017c) has been undertaken based upon the Defra metric (DEFRA 2012a) which calculates (based on preliminary designs) the amount of habitat creation required to compensate for habitat loss associated with the extent of the Proposed Scheme.

Results of further ecological surveys

9.2.19 Table 9-1 provides a summary of the outcome of ecological surveys undertaken for the Proposed Scheme during 2017.

Table 9-1 Existing baseline summary

Receptor	Status of survey	Summary of baseline data
Terrestrial habitats (including notable plant species)	Phase 1 habitat, hedgerow and National Vegetation Classification (NVC) surveys undertaken.	Four hedgerows classified as species-rich during the extended Phase 1 habitat survey and located within the Scheme extent were selected for further survey. Of these, two were found to qualify as important under wildlife and landscape criteria (as defined under the Hedgerow Regulations, 1997). Areas of grassland (excluding road verges) located within the extent of the Proposed Scheme have been subject to NVC survey. The grasslands were generally found to have a low-moderate level of botanical diversity not meeting criteria to qualify as a SINC or HPI. No notable plant species have been recorded. The verges of the M3 largely comprise semi-improved calcareous grasslands. A species list was compiled of grassland species present during multiple visits made under traffic management between May and August 2017. The species recorded are characteristic of infrequently managed coarse grassland on calcareous soils. One notable plant species has been recorded (greater butterfly-orchid *Platanthera chlorantha*[1]) in a location outside of the extent of the Proposed Scheme. Woodland habitats within the extent of the Proposed Scheme comprise secondary or plantation woodland and it is not considered that these woodland habitats warrant detailed botanical assessment. However, incidental records of a notable species, white helleborine *Cephalanthera damasonium*[2], were made during the course of ongoing survey work at locations within and close to the extent of the Proposed Scheme.

[1] Listed as Vulnerable on the national red data book
[2] A Species of Principal Importance (SPI) for the Conservation of Biodiversity as identified under the NERC Act 2006.

Receptor	Status of survey	Summary of baseline data
		Other notable terrestrial habitats recorded within the Phase 1 habitat survey (reedbed and fen) occur outside of the extent of the Proposed Scheme and as such have not been subject to further assessment.
Riparian habitats	No baseline survey has been undertaken with respect to riparian habitats beyond the Phase 1 habitat survey.	The river habitats are all likely to comprise HPI. The river habitats are likely to represent an example of the Annex I habitat *3260 Water courses of plain to montane levels with the Ranunculion fluitans and Callitricho-Batrachion vegetation* which form part of the River Itchen SAC designation.
Badgers	Badger survey of suitable habitat within 250m of the Scheme completed during May and October 2017.	The desk study identified multiple records of badger within the study area. Five badger setts are present within the extent of the Proposed Scheme, including a possible main sett.
Bats	Bat activity surveys undertaken between May and October 2017 Preliminary Bat Roost Assessment undertaken in May and November 2017	The desk study identified a number of bat records located within a 5km search area of the Proposed Scheme. However none of the records were within the Proposed Scheme boundary. The following seven bat species were recorded within the search radius: Daubenton's bat *Myotis daubentonii*, Natterer's bat *Myotis nattereri*, noctule bat *Nyctalus noctula*, brown long-eared bat *Plecotus auritus*, common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus* and serotine *Eptesicus serotinus*. The closest bat record to the Proposed Scheme is for a soprano pipistrelle, located 21m south east from the Proposed Scheme boundary. All other species were found over 350m away from the extent of the Proposed Scheme. The activity surveys established that habitats within the boundary of the Proposed Scheme are used by a range of species, including some rarer species. In particular, high level of activity from *Myotis* species bats was noted. This group, cannot easily be identified to species level based on call

Receptor	Status of survey	Summary of baseline data
		parameters but includes some rare species. In addition, greater horseshoe bat *Rhinolophus ferrumequinum* have been detected. Numerous trees and structures (including bridges and a culvert) with potential to support roosting bats occur within the Proposed Scheme boundary.
Hazel dormouse	Nest tube survey undertaken between May and November 2017	The desk study identified multiple records of dormouse within the study area. Dormouse presence has been confirmed in suitable habitat throughout the extent of the Proposed Scheme.
Otter	Otter surveys undertaken in June and August 2017	The desk study identified 18 otter records within a 2km search radius of the extent of the Proposed Scheme including locations that overlap. The field survey recorded signs of otter in a number of locations in the survey area including in close proximity to the extent of the Proposed Scheme.
Water vole	Water vole surveys undertaken in June and August 2017	The desk study identified 357 water vole records within a 2km radius of the Proposed Scheme. One of these records fell within the Scheme boundary and a large number located along the River Itchen immediately west. Water vole presence has been confirmed in habitats close to the Proposed Scheme. However no records have been found within the extent of the Proposed Scheme.
Other notable mammals	No specific survey undertaken	The desk study identified records of hedgehog, brown hare, harvest mouse and polecat within a 2km search radius of the extent of the Proposed Scheme. The Phase 1 habitat survey confirmed the presence of suitable habitat for all species within the extent of the Proposed Scheme.
Breeding bird	Breeding bird community walkover	The desk study highlighted a number of notable bird species records within a 2km radius of the extent of the Proposed Scheme. Some of these species are associated with wetland habitat, and

Receptor	Status of survey	Summary of baseline data
	survey during June and July 2017.	others associated with grassland and more urban habitats. Notable species include: kingfisher *Alcedo atthis*, bittern *Botaurus stellaris*, black redstart *Carduelis flammea* and hen harrier *Circus cyaneus*. Two survey visits were completed during June and July 2017. These surveys established that the habitats within and surrounding the Proposed Scheme extent supports a breeding bird community likely to include at least two declining farmland Species of Principal Importance under Section 41 of the Natural Environment and Rural Communities Act (2006) (SPI), skylark *Alauda arvensis* and yellowhammer *Emberiza citrinella*. Due to the intensively farmed nature of the arable habitats, and the limited number of registrations of these species, it is likely that only small populations are present within the survey area. Two Schedule 1 species, Cetti's warbler *Cettia cetti* and kingfisher, and a variety of other species of conservation concern have been recorded along the River Itchen corridor.
Wintering birds	Wintering bird surveys undertaken between October 2017 and March 2018.	The desk study retrieved records of bird species which could use habitats within the Proposed Scheme extent during winter such as lapwing *Vanellus vanellus*, redwing *Turdus iliacus* and starling *Sturnus vulgaris.* The surveys identified that the area supports a wintering bird community formed by 63 species. The Itchen corridor supports a more notable bird community than other land parcels within the Survey Area, especially where it passes through Winnal Moors Nature Reserve. Sixty-three species have been recorded, among them, four species are listed under Schedule.1 of the Wildlife and Countryside Act 1981: common kingfisher, Cetti's warbler, red kite, and redwing. Twelve additional species recorded during the surveys are featured in the Birds of Conservation Concern Amber list and eleven in the Red list. A further seven species considered as SPI have also been recorded.
Reptile	A reptile survey was undertaken across suitable habitat within the Proposed Scheme (where	The ecological desk study identified records of two species of reptiles within a 2km radius of the extent of the Proposed Scheme. The species recorded include slow worm and common lizard, located 0.9km and 0.8km away from the extent of the Proposed Scheme respectively.

Receptor	Status of survey	Summary of baseline data
	safe access could be arranged) between June and September 2017.	Two species of reptile have been recorded; slow worm and common lizard *Zootoca vivipara*. Reptile populations varied from 'exceptional' to 'low' within the Proposed Scheme extent.
Amphibians including great crested newt	Habitat Suitability Index (HSI) assessment of 12 waterbodies within 500m of the Proposed Scheme. Environmental DNA (eDNA) sampling has been undertaken simultaneously on eight of the above twelve water bodies selected based on professional judgement for sampling.	The desk study did not identify any amphibian records within 2km of the extent of the Proposed Scheme. Results of the laboratory analysis identified that none of the waterbodies included within the analysis contained great crested newt DNA and no inhibition or degradation has been identified within any of the samples. As such, great crested newt are considered to be absent from the study area and the extent of the Proposed Scheme. Common toad *Bufo bufo* and common frog *Rana temporaria* have been incidentally recorded on several occasions, associated with the flood meadow habitats to the north west of the Scheme extent.
Freshwater fish	No further survey undertaken to date.	The desk study did not identify any records of notable fish species. The River Itchen is known to support notable species including bullhead, Atlantic salmon and brook lamprey. Brook lamprey and bullhead are widely known to be present above and below the existing crossing and considered to be distributed throughout the Itchen catchment where optimal habitats are present. Salmon will utilise optimal habitats within the main stem of the River and adjacent tributaries where water quality and barriers to migration allow. Salmon have been reported in the

Receptor	Status of survey	Summary of baseline data
		Itchen around the existing crossing and are expected to move through this reach during migration periods to upstream spawning areas. It is likely that the River Itchen supports a diverse fish community as fish are classified at High quality under the Water Framework Directive, indicating a community demonstrating no, or very minor, deviation from reference condition.
Terrestrial invertebrates	A walkover survey of the Scheme extent and habitats within 100m was undertaken by an entomologist in June 2017.	The desk study identified 167 notable invertebrate species records within a 2km search radius of the Scheme. The majority of these records are from the Lepidoptera family, (butterflies and months). Three of the records fell within 1km grid squares that overlap with the Scheme, including the small heath butterfly *Coenonympha pamphillus*, the silver wash fritillary *Argynnis paphia* and the stag beetle *Lucanus cervus*. The walkover survey identified areas of high potential for important invertebrate assemblages including two wet meadows to the west of the Proposed Scheme and A34, two areas of dry grassland associated with woodland and scrub margins and verges of a lane (Easton Lane).
Aquatic invertebrates	No further survey undertaken to date.	Although the desk study did not detail any notable aquatic invertebrates, it is likely that the River Itchen supports a diverse aquatic invertebrate community as aquatic invertebrates are classified at High quality under the Water Framework Directive, indicating a community demonstrating no, or very minor, deviation from reference condition. Southern damselfly and white-clawed crayfish form part of the qualifying features of the River Itchen SAC. However, the absence of records for these species in the area (which can be considered well studied particularly in light of the nearby Wildlife Trust nature reserve) is taken as a strong indication that these species are absent from the extent of the Proposed Scheme.

9.2.20 The value of sites, populations of species, species assemblages and habitats will be evaluated with reference to their importance in terms of 'biodiversity conservation' value (relating to the need to conserve representative areas of different habitats and the genetic diversity of species populations).

9.2.21 IAN 130/10 (Highways Agency, 2010a) provides supplementary guidance further to that described within DMRB Volume 11 Section 2, Part 5 (Highways Agency, 2008d) on the determination of resource value and sensitivity (summarised in Table 9-2).

Table 9-2 Environmental value (sensitivity) descriptors for nature conservation summarised from Highways Agency (2010a)

Value (sensitivity)	Typical descriptors
International	An internationally important site, such as a SPA, SAC or Ramsar site (or a site considered worthy of such designation). A regularly occurring population of an internationally important species, where: the loss of these populations adversely affects the conservation status or distribution of the species at this geographic scale; or the population forms a critical part of a wider population at this scale; or the species is at a critical phase of its life cycle at this scale.
National	A nationally designated site, such as a SSSI, National Nature Reserve (NNR) or a site considered worthy of such designation. Areas listed as Ancient Woodland; priority BAP/Section 41 (NERC Act) habitat. A regularly occurring or resident population of a species which could be considered at an International, European, UK or National level where: the loss of these populations adversely affects the conservation status or distribution of the species at this scale; or the population forms a critical part of a wider population at this scale; or the species is at a critical phase of its life cycle at this scale.
Regional	Areas of priority UK BAP / HABAP habitat; of regional value in the appropriate Natural Area Profile (or equivalent). Resident, or regularly occurring, populations of species which could be considered at an International, European, UK or National level and key/priority species listed within the HABAP where: the loss of these populations adversely affects the conservation status or distribution of the species at this scale; or the population forms a critical part of a wider population; or the species is at a critical phase of its life cycle.
County	Sites designated in the county or unitary authority area context (or considered worthy of such designation). Areas of key/priority habitats

Value (sensitivity)	Typical descriptors
	identified in the Local BAP; and areas of habitat identified in the appropriate Natural Area Profile (or equivalent). Resident, or regularly occurring, populations of species which could be considered at an International, European, UK or National level where: the loss of these populations adversely affects the conservation status or distribution of the species across the County or Unitary Authority Area; or the population forms a critical part of a wider population; or the species is at a critical phase of its life cycle.
Local	Designated sites including: Local Nature Reserves (LNRs) designated in the local context. Areas of habitat; or populations/communities of species considered to appreciably enrich the habitat resource within the local context (such as veteran trees), including features of value for migration, dispersal or genetic exchange.

Source - IAN 130/10 Ecology and Nature Conservation: Criteria for Impact Assessment (Highways Agency, 2010a)

9.2.22 This guidance will be used in the valuation of resources for the Proposed Scheme.

9.2.23 Based on current baseline knowledge of the study area, Table 9-3 defines the likely valuation of the ecological resources and receptors identified as present in the study area based on the above guidance.

9.2.24 Where a receptor represents a qualifying feature of a European designated site, this receptor is considered to be of the same value as that site. Where a receptor is within the same group or order as a species which represents a qualifying feature of a European designated site (for example freshwater fish or bats) but is not considered to represent any qualifying feature, the value of the receptor is assessed independently from any value which is assigned to a designated site.

Table 9-3 Initial valuation of ecological receptors

Receptor	Resource Valuation
European designated sites	International
Nationally designated sites	National
Non-statutory designated sites	Up to County
Priority and Notable Habitats	County
Terrestrial habitats (notable plant species)	Local
Riparian habitats	County
Badgers	Local
Foraging and commuting bats - excluding Myotis spp.	Local
Foraging and commuting bats – Myotis spp.	Local

Receptor	Resource Valuation
Roosting bats	Local
Hazel dormouse	Local
Otter	Local
Water vole	Local
Other notable mammals	Local
Breeding bird	Local
Wintering birds	Local
Reptile	Local
Amphibians	Local
Freshwater fish	County
Terrestrial invertebrates	Local
Aquatic invertebrates	County

9.2.25 This is a preliminary assessment of value, which will be reviewed and refined if required, subject to further field surveys and consultation.

9.3 Potential impacts

9.3.1 The potential impacts anticipated as having the potential to arise without mitigation during construction and operation, are listed below.

Construction

- Disruption of ground water flows which lead to aquatic habitats.
- Permanent and temporary land-take within the Proposed Scheme footprint.
- Permanent manipulation of habitats, such as landscaping and ‘tidying-up’ of areas not within the footprint, felling of trees for Health and Safety reasons.
- Displacement, species loss and isolation.
- Temporary storage of construction materials within / adjacent to ecological resources with associated habitat contamination and compaction.
- Habitat loss and fragmentation disrupting species dispersal causing genetic isolation.
- Direct mortality during site clearance and construction.
- Disturbance from construction activities including visual, noise, vibration and lighting.
- Degradation through air borne and water borne pollution (water quality and sediment loading).

- Pollution caused by use of hazardous materials and incidental release of dust, chemicals, fuels or waste materials.

Operation

- Change in surface or groundwater flows which lead to aquatic habitats.
- Direct mortality during operational use.
- Habitat fragmentation disrupting species dispersal causing genetic isolation.
- Direct disturbance from operational use visual, noise, vibration and lighting.
- Degradation through air borne and water borne pollution (water quality and sediment loading).

9.4 Design, mitigation and enhancement measures

9.4.1 Where appropriate, recommendations have been made below with respect to design, mitigation and enhancement measures. It is important to note that these should be treated as preliminary and revisited and developed as designs and more survey data emerge. A preliminary, high level summary of mitigation measures is provided below.

- Design measures:
  - Drainage designs must make sure that there is no reasonable likelihood of operation phase pollution entering the River Itchen
  - Measures would need to be implemented to make sure that the design did not affect ground water flows leading to the River Itchen, or if this is not possible appropriate and robust mitigation measures should be employed
  - Impacts to habitats within approximately 10m of watercourses utilised by otter and water vole should be avoided. If this is not possible, further assessment will be necessary
  - Developing the Sustainable Drainage strategy (SuDs) in consultation with an ecologist to include measures beneficial to fauna such as amphibians and water vole
  - Where lighting is necessary it should be sensitively designed to avoid and minimise illumination of all habitats adjacent to the road. The River Itchen should be considered particularly sensitive to the effects of lighting. The lighting strategy should be developed in consultation with an ecologist
  - Make effort to minimise habitat fragmentation effects, with particular regard to hazel dormouse which occupies scrub, hedgerow and woodland habitats
  - Designing-in various measures to avoid or minimise effects upon badgers once the Proposed Scheme is operational; including inclusion of badger tunnels to minimise road mortality, creation of suitable alternative foraging habitat and ensuring the landscape remains permeable to badgers through providing access beneath any necessary fencing

- Proposals for landscaping and habitat creation should, where possible:
    - Be informed by the outcome of the biodiversity net gain report, which estimates the number of biodiversity units (that can be equated to different types of habitat creation) required for the Proposed Scheme to deliver biodiversity net gain in accordance with planning policy
    - Use native and locally sourced species as far as possible
    - Utilise nectar rich and fruiting species
    - Replace woodland and hedgerow habitat on at least a like for like basis
    - Allow new habitat time to bed in and become established suitable for species such as hazel dormouse prior to clearance
    - Include improvements to existing water bodies and/ or include the creation of new aquatic habitats
    - Include provision of replacement roosting and nesting opportunities for birds and bats in the form of nest and roost boxes
    - Include the creation of hibernacula suitable for invertebrates, amphibians and reptiles

9.4.2 Some construction phase mitigation measures are listed below.

- It will be necessary to devise a robust pollution prevention strategy to avoid accidental pollution events, with particular regard to the River Itchen
- Habitat clearance would need to be carefully programmed to avoid sensitive periods for fauna such as breeding birds, dormice, roosting bats and badgers
- It is likely the Natural England Protected Species Mitigation Licences will be required for species such as hazel dormouse, badger and roosting bats (if present). These will need to be informed by appropriate levels of survey to inform appropriate mitigation strategies, which may have implications for design
- Consideration of specific construction methods to minimise potential impacts such as soft start piling techniques
- Implementation of specific construction practices to minimise incidental harm to fauna such as badgers, reptiles and amphibians during the construction phase through use of measures such as fencing and sensitive habitat clearance methods. Dependent on the outcome of detailed design, reptile translocation could be necessary requiring an appropriate receptor site to be prepared in advance

9.5 Description of likely significant effects

9.5.1 It is likely that a number of protected and notable species would be impacted by the Proposed Scheme including badgers, bats, dormice, birds and reptiles through habitat loss, disturbance and direct mortality.

9.5.2 A hierarchical approach to mitigation will be adopted which seeks to avoid adverse impacts in the first instance through an iterative approach to design, e.g. informing alignment to avoid sensitive receptors where possible. In areas where avoidance is not possible, measures will be proposed to prevent or reduce potentially significant negative impacts. Measures to compensate the negative impacts may also be required, e.g. habitat creation to offset impacts associated with habitat loss and fragmentation.

9.5.3 Although all significant impacts to biodiversity would require mitigation, most will be addressed using generic mitigation including the application of best practice guidance, and specific mitigation will therefore only be developed where generic mitigation would be inappropriate, ineffective or insufficient. Where there would still be a significant impact after mitigation this will be reported as a residual impact.

9.5.4 Residual impacts on biodiversity will continue to be assessed and suitable enhancement measures recommended to make sure a minimum target of 'no-net loss' of biodiversity is achieved and where possible, provide a biodiversity gain.

9.6 Assessment methodology

Policies and Plans

9.6.1 Planning policies and guidance that are relevant to the Proposed Scheme include:

- National Policy Statement for National Networks (NPS NN) (DfT, 2014): Paragraphs 5.20 to 5.38 (Biodiversity and Ecological Conservation); Paragraphs 5.81-5.89 (Dust, odour, artificial light, smoke and steam); and, 5.192 (Noise and vibration)

- National Planning Policy Framework (NPPF) (2018): Paragraph 8 (Achieving sustainable development); Paragraphs 91 (Promoting health and safe communities); 102 (Promoting sustainable transport); 170 and 172 (Conserving and enhancing the natural environment); 175, 176 and 177 (Conserving and enhancing the natural environment – Habitats and biodiversity); 180 (Conserving and enhancing the natural environment: Ground conditions and pollution); and, associated Planning Practice Guidance: Natural Environment (2016), Noise (2014) Light pollution (2014)

- Winchester District Local Plan Review (Adopted 2006) – Saved Policies: Policy DP.3 (General Design Criteria) and Policy DP.4 (Landscape and the built environment)

- Winchester District Local Plan Part 1 – Joint Core Strategy (2013): Policy DS1 (Development Strategy and Principles); Policy CP13 (High Quality Design); Policy CP15 (Green Infrastructure); Policy CP16 (Biodiversity); CP17 (Flooding, Flood Risk and the Water Environment)

- Winchester District Local Plan Part 2 – Development Management and Site Allocations (2017): Policy WIN1 (Winchester Town); Policy DM16 (Site Design Criteria); Policy DM17 (Site Development Principles); Policy DM19 (Development and Pollution); Policy DM21 (Contaminated Land); and, Policy DM24 (Special Trees, Important Hedgerows and Ancient Woodlands)

- South Downs Local Plan Pre-Submission (2017) – Emerging: Core Policy SD1 (Sustainable Development); Core Policy SD2 (Ecosystems Services); Core Policy SD3 (Major Development); Strategic Policy SD4 (Landscape Character); Strategic Policy SD5 (Design); Strategic Policy SD9 (Biodiversity and Geodiversity); Development Management Policy SD11 (Trees, Woodland and Hedgerows); Policy SD42 (Infrastructure); Strategic Policy SD45 (Green Infrastructure); Policy SD54 (Pollution and Air Quality)

Methodology

9.6.2 The assessment will be at the detailed level and reported in accordance with DMRB Volume 11 Section 2, Part 5 (Highways Agency, 2008d) and IAN 130/10 (Highways Agency, 2010a). Detailed assessment is appropriate because potentially significant effects have been identified for the Proposed Scheme, which are above value and magnitude thresholds likely to be considered to preclude such assessment.

9.6.3 Since there may be significant effects on biodiversity, in accordance with the NPSNN Paragraph 5.22, the Environmental Statement will clearly set out any likely significant effects on internationally, nationally and locally designated sites of ecological or geological conservation importance, on protected species, and on habitats and other species identified as being of principal importance for the conservation of biodiversity.

9.6.4 The ES will also consider the full range of potential impacts on ecosystems and inform opportunities for enhancement. NPS NN Paragraph 5.23, requires applicants to show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests.

9.6.5 The scope of further assessment work has been determined based upon current baseline knowledge of the study area and a review of current best practice survey guidance, and nature conservation legislation and policy frameworks.

9.6.6 The ecological assessment will be undertaken using the Guidance for Ecological Impact Assessment in the United Kingdom Second (CIEEM 2018) and Highways England standards, including IAN Ecology and Nature Conservation: Criteria for Impact Assessment (IAN 130/10) (Highways Agency, 2010a) which supplements the earlier DMRB chapter in Volume 11, Section 3, Part 4 (Highways Agency, 1993).

9.6.7 IAN 130/10 (Highways Agency, 2010a) provides a methodology for the consideration of significance of effects (for those receptors identified as requiring detailed assessment). Potential impacts will be characterised through the:

- Probability of occurrence: certain, probable, unlikely

- Complexity: whether direct, indirect, cumulative

- Extent: area measures and percentage of total loss

- Size: description of level of severity of influence
- Duration: permanent or temporary in ecological terms
- Timing and frequency: important seasonal and/or life-cycle constraints and any relationship with frequency considered; and as being reversible or not reversible; and/or positive (beneficial) or negative (adverse)

9.6.8 Significance of effects will be deduced from assessing the value of the receptors against any residual impact (taking into account mitigation). In line with the guidelines set out within the DMRB, significance will be addressed as neutral, slight, moderate, large or very large (refer to Table 9-4).

Table 9-4 Significance of effects

Significance category	Typical descriptors
Very large	An impact on one or more receptor(s) of international, European, UK or national value
Large	An impact on one or more receptor(s) of regional value
Moderate	An impact on one or more receptor(s) of county value
Slight	An impact on one or more receptor(s) of local value
Neutral	No significant impacts on key nature conservation receptors

Source - IAN 130/10 Ecology and Nature Conservation: Criteria for Impact Assessment, Highways Agency (2010a).

Habitats Regulations Assessment

9.6.9 Two iterations of a Stage 1 Habitats Regulations Assessment (HRA) have been undertaken at the Option Identification stage (WSP, 2016b) and the Option Selection stage (WSP, 2018b) considering two SACs identified within the zone of influence (i.e. the River Itchen SAC and the Mottisfont Bats SAC). These have been produced with reference to the process set out in Volume 11 of the DMRB (Highways Agency, 2009) and IAN 141/11 (Highways Agency, 2011a) and summarised below.

- Stage 1 (Screening): to identify the likely significant effects of a project upon the integrity of a European Site, either alone or in combination with other plans and projects and consider whether the impacts are likely to be significant
- Stage 2: to ascertain the effect on site integrity, either alone or in combination with other plans and projects, by assessing the effects of the plan or project on the conservation objectives of any European Site. Where there are adverse effects, an assessment of mitigation options is carried out to determine adverse effects on the integrity of the site. If these mitigation options cannot avoid adverse effects, then development consent can only be given if Stages 3 and 4 are followed

- Stage 3: to examine alternative solutions to achieve the objectives of the project where adverse effects are identified

- Stage 4: where no alternative solution exists and where adverse impacts remain. The process to assess whether the development is necessary for imperative reasons of over-riding public interest (IROPI) and, if so, the potential compensatory measures needed to maintain the overall coherence of the site or integrity of the European site network

9.6.10 Current conclusions are that the Mottisfont Bats SAC is unlikely to be affected by the Proposed Scheme and the HRA will be likely to determine no likely significant effects on this site. Natural England will be consulted on this conclusion.

9.6.11 With respect to the River Itchen SAC, further information is required with respect to detailed design and groundwater conditions before the screening assessment needs to be revisited. If the potential for effects cannot be ruled out, the HRA assessment should progress to Stage 2. Natural England will be consulted with respect to the present findings of the HRA at the earliest opportunity.

Further Assessments Recommended

9.6.12 Table 9-5 below provides a summary of the recommended further assessments required to inform the ES. This list should be considered in conjunction with route selection and emerging designs.

9.6.13 The scope of further assessment work has been determined based upon current baseline knowledge of the study area and a review of current best practice survey guidance, and nature conservation legislation and policy frameworks (as described in Appendix A).

9.6.14 To ensure that subsequent detailed ecological assessment work is based on up-to-date baseline information, surveys will be undertaken at an appropriate time of year for the following receptors using appropriate methods.

Table 9-5 Recommendations for further ecological survey

Receptor	Further assessment advised	Notes
European designated sites	Habitats regulations assessment	Inputs required from other disciplines (notably ground water).
Nationally designated sites	N/A	None
Non-statutory designated sites	N/A	Provided proposals do not emerge to affect Easton Down SINC.
Priority and notable habitats within 250m of the Proposed Scheme	None	Further assessment could be required.

Receptor	Further assessment advised	Notes
Other habitats within the Proposed Scheme	Further Phase 1 habitat surveys of any areas within the Proposed Scheme where surveys have not been previously undertaken, for example areas that are required for construction.	Phase 1 habitat surveys will inform the need for further targeted surveys of ecological receptors.
Notable plant species within 250m of the Proposed Scheme	None	Further assessment could be required prior to the implementation of mitigation.
Riparian habitats	None	Assuming effects upon riparian habitats can be robustly avoided.
Badgers	Further survey is recommended as follows: Sett monitoring using motion sensitive cameras should be used to clarify that badgers are using the setts and to search for evidence of breeding. To observe young badgers, this should include the period in which young badgers are likely to emerge from setts (typically during April). Sampling at other times of the year should also be carried out to confirm whether setts are in current use as this will vary throughout the year (particularly in non-breeding setts).	N/A
Foraging and commuting bats	An updated desk study will be undertaken in order to further determine the species composition.	N/A
Roosting bats	Further survey is recommended as follows: Due to the potential for loss or significant effects upon trees, it is recommended that all trees with moderate-high potential are subject to a climbed inspection to clarify the potential of Potential Roosting Features (PRFs) identified. As a precautionary approach to suitability rating has been employed, it is not considered	N/A

Receptor	Further assessment advised	Notes
	necessary to climb low potential trees. Climbing inspections will either confirm the suitability rating or elevate/ demote the tree suitability rating. The climbing inspections could also identify confirmed roosts if bats were found to be present. Following this, further survey could be required in the form of additional climbing or dusk/ dawn surveys. For dusk/ dawn surveys, trees with moderate potential will require two survey visits (one dusk and one dawn) to be undertaken, whilst high potential trees will require three visits (one dusk and two dawn) in line with good practice guidelines (Collins 2016). These surveys should be undertaken between May and September. Trees with low potential will not require further survey but do require mitigation measures to be carried out.	
Hazel dormouse	None	N/A
Otter	None	Assuming effects upon riparian habitats can be robustly avoided.
Water vole	None	Assuming effects upon riparian habitats can be robustly avoided.
Other notable mammal species	None	N/A
Breeding birds	Three additional breeding bird survey visits will be undertaken between March and June 2019.	N/A
Wintering birds	None	N/A
Reptiles	None	N/A
Amphibians including great crested newts	None	N/A
Freshwater fish	None	It's considered that the River Itchen is well known enough that any further surveys won't add to the baseline

Receptor	Further assessment advised	Notes
Terrestrial invertebrates	An entomological walkover survey confirmed the presence of two areas likely to be directly affected by the Proposed Scheme with high potential to support important invertebrate assemblages (WSP, 2017m). To obtain a robust baseline and inform the impact assessment and requirements for mitigation, two surveys covering spring and summer 2019 will be undertaken utilising a combination of sweep netting / beating, pitfall traps and pan traps.	N/A
Aquatic invertebrates	None	It's considered that the River Itchen is well known enough that any further surveys won't add to the baseline

9.7 Assessment assumptions and limitations

9.7.1 The following presents a summary of limitations to the survey reports.

9.7.2 Some of the survey visits have been undertaken outside of the optimal period for Phase 1 habitat survey (generally considered to be April-September inclusive). Although botanical surveys are seasonally limited, and throughout spring and summer certain species will be more or less evident (dependent upon flowering season), it is considered that sufficient information has been gathered to enable robust categorisation of habitat types. This is therefore not considered to be a significant limitation to the assessment.

9.7.3 Some of the survey work (Phase 1 and PBRA) has been undertaken at night under traffic management. Whilst this is not considered to have affected habitat classification, lower numbers of plant species have been generally recorded in these areas and photographs of the habitat parcels have not been included. It is considered that sufficient information has been gathered to enable robust categorisation of habitat types and this is not considered to be a significant limitation to the assessment.

9.7.4 Urban areas within the Survey Area, but beyond the Site, not included within the Phase 1 habitat survey. As these areas are highly unlikely to support habitats or species of ecological interest and will not be directly affected by the Proposed Scheme. This is not considered to be a significant limitation.

9.7.5 Technical malfunctions and stolen equipment affected the otter and bat activity surveys. This is not thought to have significant implications to the findings of those reports.

9.7.6 Some areas of land were not accessible on occasion, either due to land access restrictions or issues relating to health and safety. These restrictions have not affected the robustness of the dataset but the implications of the land access restrictions should be considered in the EIA when detailed mitigation measures are devised.

9.7.7 The limitation of these surveys will be discussed with consultees as part of the EIA work. The survey limitations have not been deemed to affect the robustness of the scoping exercise.

9.7.8 A 'Detailed' level assessment will be carried out for the preferred option in the EIA in accordance with DMRB Volume 11, Section 3, Part 4, Paragraph 7.9 onwards (Highways Agency, 1993). Detailed design of mitigation will be an outcome of the iterative design and assessment process. The detailed design of elements of the project, including heights of embankments and extent of cuttings, will be available to inform the EIA and detailed mitigation.

9.8 Elements to be scoped in or out

9.8.1 The above presents a preliminary assessment based on available baseline data and design information on which elements are to be scoped in or out of the assessment. This should be revisited as more information becomes available. Table 9-6 below provides a list of the elements to be scoped in or out of the EIA for biodiversity.

Table 9-6 Elements scoped in or out of the EIA for biodiversity

Element scoped in	Element scoped out	Justification
European designated sites within 2km of the Proposed Scheme	--	A habitats regulations assessment will be undertaken.
Nationally designated sites	N/A	None
Non-statutory designated sites within 2km of the Proposed Scheme	--	There are several non-statutory designated sites within proximity to the Proposed Scheme.
Priority and notable habitats within 250m of the Proposed Scheme	--	Further assessment could be required.
Other habitats within the Proposed Scheme	--	Further assessment could be required.
Notable plant species within 250m of the Proposed Scheme	--	Further assessment could be required.
Riparian habitats	--	Further assessment could be required.
Badgers	--	Signs of badgers including setts have been recorded in a number of locations within the survey area.
Roosting bats	--	Further assessment is required to determine the presence of roosting bats.

Element scoped in	Element scoped out	Justification
Foraging and commuting bats	--	Surveys have recorded the presence of foraging and commuting bats.
Hazel dormouse	--	Dormouse has been recorded in a number of locations within the survey area.
Otter	--	Otter has been recorded in a number of locations within the survey area.
Water vole	--	Water vole has been recorded in a number of locations within the survey area.
Other notable mammal species	--	Suitable habitats for these species were recorded within the survey area.
Birds	--	A number of bird species have been recorded within the study area.
Reptiles	--	Reptiles have been recorded in a number of locations within the survey area.
Amphibians (excluding great crested newt)	--	Common toad *Bufo bufo* and common frog *Rana temporaria* have been incidentally recorded on several occasions.
Freshwater fish	--	The River Itchen is known to support notable species.
Terrestrial and aquatic invertebrates	--	The walkover survey identified areas of high potential for important invertebrate assemblages. It is likely that the River Itchen supports a diverse aquatic invertebrate community.
--	Great crested newt	Results of the laboratory analysis identified that none of the waterbodies included within the analysis contained great crested newt DNA. As such, great crested newt are considered to be absent from

Element scoped in	Element scoped out	Justification
		the study area and the extent of the Proposed Scheme.

10. Geology and Soils

10.1 Study area

10.1.1 The study area for the Geology and Soils assessment comprises the maximum physical extent of the development footprint plus a buffer zone of 250m. This distance is referenced in best practice documents, including Guidance for the Safe Development of Housing on Land Affected by Contamination (NHBC 2008), and is typical at the hazard identification stage of an assessment.

10.1.2 If there is potential for features outside of this buffer zone to be impacted or to constrain the development, then these will be included in the assessment. It is noted that Volume 11 Section 3 of the DMRB (Highways Agency, 1993f) does not specify a minimum study area distance for the assessment of impacts to geology and soils.

10.1.3 This scoping chapter has been prepared with reference to the Government's good practice guide to EIA (DCLG 2006) and European Commission EIA scoping guidance (European Commission 2001).

10.2 Baseline conditions

10.2.1 The baseline conditions at the area of the Proposed Scheme have been assessed with reference to the following main sources of information:

- Site walkover visit (undertaken by WSP, January 2017)
- Envirocheck Report, Landmark 2016 (Appendix 9.1 of the PCF Stage 1 Environmental Study Report) (WSP, 2016b)
- British Geological Society (BGS) 1:50,000 Series Geological Map Sheet No. 299 'Winchester' (Solid and Drift ed.), 2002 (British Geological Society 2018)
- BGS online Geology of Britain viewer (British Geological Society 2018a)
- BGS web-hosted Onshore Geoindex (British Geological Society 2018b)
- Environment Agency, Environmental Data (Environment Agency, 2018)
- Hampshire County Council - Minerals and Waste Planning Policy in Hampshire (Hampshire County Council, 2013)
- MAGIC map geographic information about the natural environment (Defra, 2018a)
- M3 Junction 9 Improvement Scheme, PCF Stage 2 Environmental Assessment Report (EAR) (WSP, 2017i). This includes reference to relevant Highways Agency Geotechnical Data Management System (HAGDMS) database information
- Natural England Agricultural Land Map (Natural England, 2010)

10.2.2 The Environmental Assessment Report (EAR) prepared at Stage 2 (WSP, 2017i) provides a detailed collation of baseline site conditions relevant to the Proposed Scheme. The key information within the EAR is summarised below.

10.2.3 It should be noted that where further data sources and assessment are required, for example where the order limits have been revised since Stage 2, a comment has been made in the relevant section below to indicate this.

Geology, hydrogeology and hydrology

10.2.4 Review of online geological mapping and historical borehole records indicates the following geological sequences to be present in the vicinity of the Proposed Scheme:

Table 10-1 Summary of anticipated ground conditions

	Type	Distribution	Aquifer status[3]
Made Ground	Not indicated on BGS mapping or recorded in previous intrusive ground investigations, however likely that it would be present along the existing alignment associated with the construction of the road. There could also be material associated with historical landfilling (as shown on historical mapping in the Envirocheck Report).	n/a	n/a
Alluvial and Superficial Deposits	Alluvium (principally soft to firm consolidated, compressible silty clay)	Present in the north / north east and north west of the development area in the vicinity of the River Itchen.	Secondary A
	Head deposits (clay, silt, sand and gravel, ± lenses of silt, clay, peat)	Two bands of Head deposits run perpendicular across the M3/A34/A272 in a west-east direction, located to the north and south of the existing M3 Junction 9, respectively	Secondary undifferentiated

[3] As classified by the Environment Agency.

	Type	Distribution	Aquifer status[3]
	River Terrace Deposits (sand and gravel)	Could encroach onto the north-west and northern extents of the area of the Proposed Scheme associated with the River Itchen.	Secondary undifferentiated
	Clay with flints (clay, silt, sand and gravel)	Present to the north east of the development area, adjacent to the M3.	-
	Peat deposits	Recorded in BGS borehole logs in the vicinity of Junction 9.	-
Bedrock	Seaford Chalk Formation (firm white chalk with nodular and tabular flint seams)	Underlies development area and proposed satellite compound area; mapping indicates that the Chalk is approximately 40 – 65m thick in this area.	Principal aquifer
	Lewes Nodular Chalk Formation	Underlies the Seaford Chalk Formation immediately south of the Scheme	Principal aquifer
	Newhaven Chalk Formation	Could be present along the eastern boundary of the Scheme	Principal aquifer

10.2.5 Mineral resources comprising sharp sand and gravel are located in the vicinity of the River Itchen in the northern part of the area of the Proposed Scheme, identified by Hampshire County Council's Mineral and Waste Plan. Mineral resources identified through the Plan are subject to potential safeguarding under Policy 15. Review of Hampshire County Council's Mineral and Waste Plan (Hampshire County Council, 2013) is required for the proposed satellite compound area. It is possible that further mineral resource areas may be identified in this location.

Geological hazards

10.2.6 Potential stability hazards at the site as described in the Envirocheck Report are presented in Table 10-2 below.

Table 10-2 Summary of potential ground stability hazards

Type of instability	Potential risk level[4]
Compressible ground	No hazard – moderate risk
Ground dissolution	Very low – low risk
Landslide / running sand	No hazard – low risk
Shrinking or swelling clay / collapsible ground	No hazard – very low risk

10.2.7 Multiple solution features are recorded approximately 190m north-west of the study area associated with the underlying chalk strata. The HAGDMS records one natural cavity (dissolution) within 250m of the study area.

Groundwater

10.2.8 Figure 10-1 indicates the presence of numerous groundwater source protection zones (SPZ) associated with aquifer status and occurrence of abstraction locations.

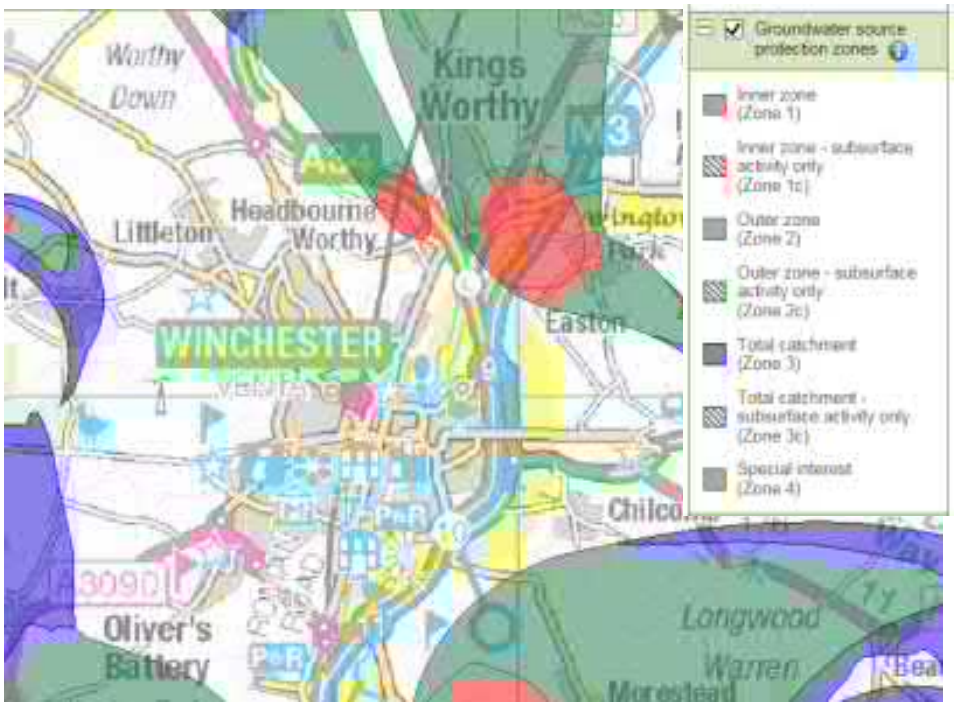

Figure 10-1 Environment Agency groundwater source protection zones (SPZ)

10.2.9 The groundwater body underlying the Proposed Scheme area (River Itchen Chalk) is classified as having poor chemical and quantitative quality; and is considered to be at risk.

Agricultural land

10.2.10 An Agricultural Land Classification (ALC) survey has been conducted and is included as an appendix (Appendix B12-2) in the People and Communities Chapter 12 of the PCF

[4] As listed in the Envirocheck report

Stage 2 EAR (WSP, 2017i). The agricultural land within the site is classified as 5.7ha of Subgrade 3a (good quality) land and 4.8ha of Subgrade 3b (moderate quality) land. The Agricultural Land Classification Survey does not include the extent of the current order limits or the proposed satellite compound. Natural England's Agricultural Land Classification Maps indicate that the land within the proposed satellite compound area is classified as Grade 3 (Good to Moderate). This will require updating during the next stage of work.

Potential for existing contamination

10.2.11 Where land has been contaminated as a consequence of former industrial or agricultural processes, this has the potential to be a constraint. Consideration must be given to the potential for any post construction impacts and effects due to the potential for remobilisation of contamination within ground disturbed by construction processes. The following sections of the report summarise previous activities and land uses which could potentially have resulted in contamination that could affect or be affected by the Proposed Scheme.

10.2.12 Historical maps would need to be obtained and reviewed for the next stage of work and to include the proposed satellite compound area.

10.2.13 According to the earliest publicly available historical map (dated 1870), the study area comprises agricultural fields with the village of Headbourne Worthy located to the north-west, Kings Worthy to the north and the City of Winchester located to the south-west. A summary of the historical land use within the area of the Proposed Scheme and the surrounding 250m study area is provided in Table 10-3 below.

Table 10-3 Summary of historical land uses in and within 250m of the Proposed Scheme

Map dates	Former use	Comment
1874 – 1898	Smithy	A small smithy is located approximately 400m west of the north-western extent of the Scheme area.
1874 – 1960s	Chalk Pits	A number of open chalk pits are located in the vicinity of the Scheme area. The closest is shown approximately 450m to the north-east of the north-eastern extent of the Scheme area.
1897 -1969	Didcot Newbury & Southampton Railway Line	A railway line crosses the north-west length of the Proposed Scheme area and continues to run along the western Scheme area boundary. By 1969 the railway is shown as dismantled, although embankments are still present.
1897 – Present	Vulcan Iron Works and Factory	A small iron works is shown approximately 400m north of the north-western extent of the Scheme area. By 1962 the works have extended to approximately 300m north of the north-western Scheme area extent.
1947 – Present	Winchester By Pass (A34)	A new road runs across the Scheme area from south-east to north-west on a 1947 aerial photo and is subsequently shown on later OS mapping. By 1977 the existing bypass has been expanded with a new spur

Map dates	Former use	Comment
		(A33) running to the north-west along the route of the former railway line.
1910 – 1966 (Gasometer remained until 1989)	Gas Works	A small gas works is shown approximately 100m west of the western boundary of the Scheme area extent from 1910. The Gas Works consisted of nine buildings or structures. By 1931 the works had expanded with two additional gasometers and buildings. A gasometer was located approximately 50m west of the Scheme area.
1969 – Present	Engineering Works and Saw Mills, and Industrial Estate	By 1969, a saw mill and engineering works are present adjacent to the gas works site. The buildings remain to present day.
1931 – Present	Abattoir, Works and Warehouses	A triangular parcel of land to the south-west of the Scheme area is shown as an allotments / storage area from 1931. By 1962 the area is occupied by a number of large warehouse / factory buildings. These are later labelled as Winchester Abattoir, works, warehouses, garages and depot. By 1977 the industrial estate / warehouse to the south-west has expanded to the north, along the route of the A33/A34 to join up with the former gas works complex.
1980s to Present	M3	The M3 is first shown from 1983 running south to north through the Scheme area.
1990s to Present	Depot	A depot comprising two large industrial buildings and associated storage areas is present on the south-western portion of the site off the A33.

10.2.14 Two landfills have been identified within the immediate area of the Proposed Scheme; these are summarised in the table below. Details of other sites within 250m are given in the PCF Stage 2 Environmental Assessment Report (WSP, 2017i).

Table 10-4 Summary of landfill sites within 250m of the Proposed Scheme

Landfill name	Location	Additional information
Spitfire Link Landfill	Beneath the existing M3/A34 interchange	No further details of waste accepted or operational dates available
Land adjacent to Winchester bypass	Adjacent to the A34	Active between 1967 and 1968, accepting Inert waste

10.2.15 A summary of potentially contaminative land uses is shown in Table 10-5 below.

Table 10-5 Potential contaminative land uses and activities on and within 250m of the Proposed Scheme

Process / land use	Location	Potential contaminants
Use as a motorway. Potential Made Ground associated with construction of existing roads, spills and leaks from vehicles using roads.	Along the route alignment in areas of existing road and surrounding the Scheme area in various locations	Metals and metalloids, polycyclic aromatic hydrocarbons (PAHs), oil/fuel hydrocarbons, sulphates, asbestos, landfill gas, acids, ammonia.
Agricultural land	Along the route alignment	Hydrocarbons and lubricating oils associated with machinery and nitrates from fertilisers. Potential pesticides and herbicides. Asbestos (e.g on farm tracks due to possible use of demolition rubble for surfacing).
Landfills (inert, industrial, commercial, household, special waste, liquids or sludge wastes)	Historically in the south of the area of the Proposed Scheme by the roundabout and in the north. Adjacent to the route alignment at various locations	Metals and metalloids, polycyclic aromatic hydrocarbons (PAHs), oil/fuel hydrocarbons, sulphates, asbestos, landfill gas, leachate, acids, ammonia.
Industrial land uses	Adjacent to the area of the Proposed Scheme	Metals and organo-metals, polycyclic aromatic hydrocarbons (PAHs), oil/fuel hydrocarbons, sulphates; asbestos.
The historic railway line	To the north-west of the area of the Proposed Scheme	Metals and metalloids, polycyclic aromatic hydrocarbons (PAHs), oil/fuel hydrocarbons, lubricating oils, creosotes, sulphates, asbestos.

10.2.16 It is possible that further potential contaminative land uses may be identified following the additional information and historical map review for the proposed satellite compound area.

Identification of sensitive receptors

10.2.17 Table 10-6 below summarises sensitive receptors which could be affected by the Proposed Scheme during the construction and operation phases. The sensitivity of each has been determined according to the descriptors given in Table 10-6. It is possible that further sensitive receptors or potentially different categories of a receptor may be identified following review of additional data obtained at the next stage of work. This table will require update following the review.

Table 10-6 Summary of receptor sensitivity

Receptor	Detail	Sensitivity
Geology & geomorphology	The Proposed Scheme area does not lie within an area where nationally important geological or geomorphological features have been recorded (geological SSSIs) and there are no regionally important geological sites within the area.	Low
Soils	The Proposed Scheme is associated with ALC Grade 3 (moderate to good) agricultural land	Medium
Groundwater in Secondary A and Principal aquifers, SPZ	Aquifers beneath the Proposed Scheme area have been classified as Principal and Secondary A aquifers. Also, the northernmost part of the Proposed Scheme area lies within a Zone 1 SPZ, and the northern part of the proposed satellite compound lies within a Zone 2 SPZ. Two abstraction points for potable drinking supply are also located in the north of the Scheme area.	High
Surface waters (River Itchen & Nun's Walk Stream)	The River Itchen flows through the north and along the west of the Proposed Scheme area with several associated water courses. The River Itchen is designated a SSSI and a SAC. Nun's Walk Stream flows in a channel roughly parallel to the Itchen and is classified by the Environment Agency as a Main River.	High
Ecological and environmental receptors	The nearest environmentally sensitive area is the River Itchen valley designated as a SSSI and a SAC. The Proposed Scheme area lies partly within the South Downs National Park.	Very High
Built environment receptors	Residential, school and commercial properties. Immediately west of the Proposed Scheme there is a commercial zone which includes Sun Valley Business Park, Tesco, Winnall Industrial Estate, Scylla Industrial Estate. Wykeham Trade Park and Highways England's maintenance depot. All of these are located to the northwest of the junction. Agricultural buildings and leisure activity area borders the south of the proposed satellite compound area.	Medium
Construction workers	The Proposed Scheme is considered likely to potentially include extensive earthworks which could contain contamination. However, best practice and appropriate health and safety controls would be implemented during construction.	Medium
Residents of adjacent properties	Surrounding land uses comprise residential developments in Headbourne Worthy, Kings Worthy,	Low

Receptor	Detail	Sensitivity
	Abbots Worthy and the outskirts of Winchester. A small number of isolated farm holdings or rural dwellings lie to the east of the Proposed Scheme. There are also local schools within the study area.	
Existing and proposed end users	The Proposed Scheme is to remain predominantly a 'hard end use' and there would be little exposure to the underlying soils and geology / contamination.	Low

10.2.18 Construction and operation processes for road developments have the potential to give rise to contamination of the ground through, for example, the following:

- Causing new ground contamination due to the failure to adequately control the storage, transfer and use of polluting substances, for example spills of oils/fuels used for construction vehicles and equipment
- Introducing new pathways such that existing ground contamination becomes connected to a receptor where there was no connection before, for example as can happen when drilling or piling through contaminated land

10.2.19 Human health receptors such as construction workers, workers and visitors in the nearby commercial zone, as well as residents of adjacent properties and users of the public open space could be affected by existing contaminated land.

10.2.20 Property receptors could include structures, services or other infrastructure constructed in areas affected by contamination.

10.2.21 Based on the available desk study information, a Preliminary Conceptual Site Model (PCSM) has been prepared summarising baseline site features and also taking in to account the construction and operation phases of the Proposed Scheme. This is given in Table 10-7 below. The PCSM will require updating in the next stage of work once the additional review of documents and information for the current order limits and satellite compound area is complete.

Table 10-7 Preliminary Conceptual Site Model (PCSM)

Sources of contamination	Receptor	Exposure pathways
Localised areas of Made Ground associated with construction of existing road infrastructure; areas of historical landfill	Residents of adjacent properties	Direct contact, ingestion and inhalation of soil and soil-derived dust
	Workers in adjacent commercial premises	
	Users of public open spaces	
	Construction / maintenance workers	Direct contact, ingestion and inhalation of soil and soil-derived dust and groundwater

Sources of contamination	Receptor	Exposure pathways
	Surface waters (River Itchen, Nun's Walk Stream)	Lateral migration of aqueous and dissolved contamination via surface flow or preferential pathways
	Groundwater (Principal bedrock aquifer)	Vertical migration of aqueous and dissolved contaminants via groundwater flow or preferential pathways
	Built environment, e.g. structures	Chemical attack and degradation
Localised hydrocarbon contamination associated with leaks and spills of fuels and oils on the existing roads network	Construction / maintenance workers	Direct contact, ingestion and inhalation of soil and soil-derived dust and groundwater
Localised contamination from adjacent commercial premises	Construction / maintenance workers	Direct contact, ingestion and inhalation of soil and soil-derived dust and groundwater
Localised contamination from adjacent agricultural land, e.g. pesticides / fertilisers	Construction / maintenance workers	Direct contact, ingestion and inhalation of soil and soil-derived dust and groundwater

10.2.22 The potential relationship between off-site contamination sources and off-site receptors is not considered within this PCSM and is beyond the scope of assessment, except where the Proposed Scheme has the potential to affect interactions between the two.

10.3 Potential impacts

10.3.1 In accordance with the Government's good practice guide for EIA (DCLG, 2006), the Geology and Soils chapter of the Environmental Statement will cover the potential impacts of the Proposed Scheme on both soil and the underlying rocks, with a particular emphasis on land stability, land contamination, land designations and agricultural resource of soils. More specifically, the following will be considered:

- Physical effects of the development, e.g. changes in topography, soil compaction, ground stability
- Effects on geology as a valuable resource, e.g. mineral resources or geological Special Sites of Scientific Interest (SSSI) and Regionally Important Geological Sites (RIGS)
- Effects associated with ground contamination that may already exist on site, e.g. introducing/changing pathways and receptors

- Effects associated with the potential for polluting substances to cause new ground contamination issues, e.g. contaminants introduced to the site during construction/operation

- Effects associated with agricultural soils as a resource

10.3.2 Potential impacts on groundwater associated with drainage and surface water discharge proposals will be considered within Chapter 14 - Road Drainage and the Water Environment. Waste and management of materials, including re-use and importation, will be considered in Chapter 11 – Material Assets and Waste.

10.4 Design, mitigation and enhancement measures

10.4.1 Detailed design and mitigation measures are not available at this stage of the design, however where mitigation is considered to be standard practice, e.g. required by law, it will be assumed to be embedded in the design of the construction and operation phases of the Proposed Scheme. These will be taken into account in the impact assessment. A preliminary indication of intended design and embedded mitigation measures is given below (Table 10-8). Additional measures will be included as the Proposed Scheme design emerges.

Table 10-8 Minimum design and embedded mitigation measures

Design measures	Embedded mitigation
The potential 'aggressivity' of ground conditions to concrete should be investigated during the ground investigation. The concrete type used across the Scheme will be tailored to the ground conditions present to prevent the risk of future attack.	Health and safety of construction and maintenance workers would be protected by adherence to the requirements of legislation such as the Construction (Design and Management) (2015) Regulations (HSE, 2015) and Control of Substances Hazardous to Health (COSHH) Regulations (2002) (HSE, 2002).
The construction of all earthworks and rock cuttings along the alignment of the Proposed Scheme will be designed to an appropriate factor of safety to minimise the potential for slope instability. These profiles should maintain long term slope stability and obviate the need for direct, active slope stabilisation measures during construction	Members of the public in adjacent properties and open spaces would be protected by Health and Safety Executive (1991). Protection of workers and the general public during the development of contaminated land. Guidance Note HS (G) 66-HMSO
There would be the potential for soils to be retained and re-used, either as part of the Scheme options, landscaping works or other design requirements. The Construction Environmental Management Plan will specify measures relating to the earthworks machinery used, methods of handling, and storage conditions, to reduce the level of damage and deterioration in soil quality during storage and transit.	A CEMP will be prepared to outline the mitigation, control and monitoring measures to be put in place to minimise the effects of the Proposed Scheme options on ground conditions, land quality and water resources during the construction process.

10.5 Description of likely significant effects

10.5.1 Identification of likely significant effects comprises consideration of receptor/feature sensitivity and the probability of an adverse effect associated with either the construction or operation of the Proposed Scheme being realised.

10.5.2 Following implementation of mitigation measures (outlined above) it is considered that significant effects would be unlikely. However, further measures could be required following the ground investigation works and associated updates to the assessment.

10.6 Assessment methodology

Policies and Plans

10.6.1 Planning policies and guidance that are relevant to the Proposed Scheme include:

- National Policy Statement for National Networks (NPS NN) ((DfT, 2014): Paragraphs 5.116 to 5.119 (Land Stability) and 5.168 (Agricultural Land, and Contamination)
- The National Planning Policy Framework (NPPF) (2018): Paragraph 8 (Achieving sustainable development), paragraphs 170 (Conserving and enhancing the natural environment), 178 (Conserving and enhancing the natural environment) and 179 (Conserving and enhancing the natural environment – Ground conditions and pollution); and the associated Planning Practice Guidance for NPPF, Land Affected by Contamination, June 2014; Land Stability, March 2014; Natural Environment, January 2016
- Winchester District Local Plan, Review (2006): Policy DP.3 (General Design Criteria); Policy DP.10 (Pollution Generating Development); and, Policy DP.13 (Contaminated Land)
- Winchester District Local Plan Part 1: Policy DS1 (Development Strategy and Principles)
- Winchester District Local Plan Part 2 (2017): Policy DM.17 (Site Development Principles); Policy DM19 (Development and Pollution); and, Policy DM21 (Contaminated Land)
- South Downs Local Plan Pre-Submission (2017): Emerging - Core Policy SD2 (Ecosystems Services); Strategic Policy SD9 (Biodiversity and Geodiversity); Development Management Policy SD54 (Pollution and Air Quality); and, Development Management Policy SD55 (Contaminated Land)

10.6.2 The impact assessment will be undertaken with due consideration of the following relevant legislation, regulations and directives:

- Part 2A of the Environmental Protection Act 1990, as amended by the Environment Act 1995
- The Contaminated Land (England) (Amendment) Regulations 2012
- Water Framework Directive (2000/60/EC)

- The Waste (England and Wales) Regulations 2011
- The Environmental Damage (Prevention and Remediation) Regulations 2009
- Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009

10.6.3 Statutory (Regulatory) guidance on the application of legislative requirements and restrictions will be obtained from:

- Contaminated Land Statutory Guidance (Defra, 2012b)
- The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (SI 2009/2263)

10.6.4 Further non-statutory guidance which will be referred to during preparation of the ES chapter includes:

- National Planning Practice Guidance web pages, prepared by the government to provide additional information and support for implementation of the NPPF, principally: Land Affected by Contamination
- National Policy Statement for National Networks (DfT, 2014) (pursuant to Section 9(8) and Section 5(4) of the Planning Act 2008)
- Model Procedures for the Management of Land Contamination (CLR11) (Defra and Environment Agency, 2004)
- CIRIA 552: Contaminated Land Risk Assessment, A guide to good practice (CIRIA, 2001)
- Planning Practice Guidance: Land Stability (DCLG, 2014b)
- Planning Practice Guidance: Land Affected by Contamination (DCLG, 2014a)
- DMRB Volume 4, Section 1, Part 2 HD22/08. Geotechnics and Drainage, Earthworks, Managing Geotechnical Risks. (Highways Agency, 2008a)
- DMRB Volume 11, Section 2, Part 5. Assessment and Management of Environmental Effects & Section 3, Part 11 Geology and Soils, Environmental Assessment, Environmental Assessment Techniques. (Highways Agency, 1993a)

Methodology for defining significant effects

10.6.5 The methodology adopted in the Environmental Statement for identifying significant effects for this chapter will be as outlined below. The significance of effect categories will follow the methodology detailed in Section 5.3 using the sensitivity of receptors detailed above:

- Preparation of an updated Conceptual Site Model (CSM) for the baseline site condition, applying the principles of hazard identification, assessment and risk evaluation to establish a current site condition
- Undertake an impact assessment whereby the baseline CSM is compared to construction and operation phases CSMs and the relative change in status during

each stage to be identified as either an adverse or beneficial, major / moderate / minor or neutral effect

- An effect classified as moderate or major is considered to be a significant effect; minor and neutral effects not considered to be significant

10.7 Assessment assumptions and limitations

10.7.1 To carry out the identification of effects and impact assessment in the ES it will be necessary to make a series of assumptions based on the level of detail available regarding ground conditions and design. These assumptions will result in some limitations of the assessment. The extent of these limitations will be confirmed in the ES chapter but are anticipated to include factors such as detailed design information and/or proposed piling options.

10.7.2 Assumptions made at this Scoping stage comprise:

- Where no data are available, a qualitative land contamination risk assessment is necessary, applying a 'matrix approach' to account for the probability and consequence associated with the contaminant linkages

- Data has been obtained from various statutory and non-statutory bodies and external sources, however the ground conditions underlying the Proposed Scheme are not known in detail and there are gaps in information, which will be addressed with the intrusive ground investigation in early 2019

- The ground investigation is scheduled to include 47 exploratory locations comprising trial pits, windowless samples and dynamic/rotary boreholes up to a depth of 30 m. The investigation comprises geotechnical and geo-environmental testing as well as gas and groundwater monitoring from standpipes installed in selected boreholes

- The design, construction and post-construction phases of the Proposed Scheme will satisfy minimum environmental standards, consistent with contemporary legislation, practice and knowledge

- The assessment in the Scoping Report assumes that the baseline conditions at the time of ES preparation will not have changed. It could be necessary to update the baseline information prior to completion of the ES.

10.8 Elements to be scoped in or out

10.8.1 In accordance with guidance provided in DMRB HA 201/08 (Highways Agency, 2008b) a Detailed Assessment comprising field surveys and quantified modelling or risk assessment will be required to 'gain an in-depth appreciation of the beneficial and adverse environmental consequences of the project and to inform project decisions'.

10.8.2 There is currently no scheme-specific ground investigation data available for the study area, however an investigation is currently scheduled for early 2019, as discussed above. Once this data is available it will be possible to apply both qualitative and quantitative assessment. A qualitative assessment depends upon professional judgement and is carried out by an experienced professional; a quantitative assessment is based on site-specific data and enables a more detailed review of the Proposed Scheme within the environmental setting of the site.

10.8.3 The scope of the assessment is outlined above; these elements and those excluded are summarised below (Table 10-9), along with an explanation for each decision made.

Table 10-9 Elements scoped in or out of the EIA for geology and soils

Element scoped in	Element scoped out	Justification
Physical effects of the development, e.g. changes in topography, soil compaction, ground stability	--	Compressible ground and dissolution features may be present in the Scheme area
Effects on geology as a valuable resource, e.g. sterilisation of mineral resources, loss of / damage to SSSI or RIGS	--	Potential mineral resources have been identified in Hampshire County Council's Mineral and Waste Plan in the northern Scheme area
Effects associated with ground contamination that could already exist on site, e.g. introduction of, or change to, pathways and / or receptors	--	Contamination could be present as a consequence of existing on and off-site activities
Effects associated with the potential for polluting substances to cause new ground contamination issues, e.g. contaminants introduced to the site during construction / operation	--	Sensitive receptors have been identified at and adjacent to the site which could have the potential to be impacted by contaminants arising from the Scheme construction and / or operation
Quality and quantity of agricultural land to be lost	--	The quality and quantity of agricultural land to be lost has not yet been established due to uncertainty on the required land take, therefore further assessment would be required.
--	Waste disposal	Waste and materials management is considered in the Materials Chapter 11
--	Physical effects on hydrology and hydrogeology are scoped out of this chapter. The pollution risk to surface water and groundwater from	Covered in the Road Drainage and the Water Environment Chapter 14

Element scoped in	Element scoped out	Justification
	the disturbance of contaminated ground is scoped in.	
--	Effects on surrounding land uses e.g. industry, commerce, community facilities, tourism	Covered in the Landscape and Visual Effects Chapter 8

11. Material Assets and Waste

11.1 Study area

11.1.1 Study areas are defined with reference to Highways Agency (2011b) Interim Advice Note (IAN) 153/11 Guidance on the Environmental Assessment of Material Resources (IAN/153) and latest Highways England guidance. The assessment defines two geographically different study areas, used to examine the use of primary/secondary/recycled/manufactured materials and the generation and management of waste.

11.1.2 The first study area comprises all land contained within the boundary of the Proposed Scheme, within which materials would be contained and waste generated and managed, including any areas identified for temporary uses. Such temporary land could include temporary storage areas for soils and other materials, construction compounds, haul-roads and land for temporary construction site drainage.

11.1.3 To allow determination of the significance of effects in line with latest Highways England guidance, the second study area has been defined using professional judgement as being sufficient to identify:

- suitable waste management facilities that could accept arisings and/or waste generated by the Proposed Scheme
- feasible sources and availability of construction materials

11.1.4 Study area two, provides the area for appreciation of raw materials availability and relevant waste management facilities capacity This is considered on a regional basis (South East England) in line with the latest Highways England guidance. In the context of this chapter, the South East of England is the Region comprising Berkshire, Oxfordshire, Buckinghamshire, East Sussex, West Sussex, Hampshire, Surrey and Kent.

11.2 Baseline conditions

11.2.1 Receptor types likely to be at risk of impact under this topic heading are presented in Table 11-1.

Table 11-1 Value or sensitivity of receptors

Element	Value or sensitivity
Material resources	Primary materials and non-renewable resources should – in accordance with the principles of resource efficiency and the waste hierarchy – be protected wherever possible. The consumption of primary materials depletes natural resources which in turn degrades the natural environment. Mechanisms to reduce the volume of primary materials consumed and increase sustainability benefits of materials

Element	Value or sensitivity
	used, should be deployed across a project lifecycle.
Mineral Safeguarding Areas	Any mineral safeguarding areas and peat resources located in the first study area could be potentially at risk of being sterilised.
Production and management of waste	Waste needs to be managed appropriately to limit the impact on waste management capacity in a region. Also, landfill capacity is an increasingly scarce (sensitive) resource in England. Where potential exists to reduce the generation of waste and use best practice methods to divert it from landfill, associated opportunities should be taken.

Material resources

Availability of construction materials in the South East and UK

11.2.2 Table 11-2 (Defra 2016, South East Aggregates Working Party 2013, Mineral Products Association 2016, World Steel Organisation) provides a summary of the availability of the main construction materials in South East England and the UK required to deliver typical highways schemes. Table 11-2 provides a context in which the assessment of impacts and significant effects from the consumption of materials on the Proposed Scheme can be undertaken.

Table 11-2 Materials availability in the South East of England and the UK

Material type		Availability (2015 data unless otherwise stated)	
		South East of England	UK
Aggregate	Sand and gravel *	18.8Mt	58.1Mt (to Q3 2015)
	Permitted crushed rock *	1.0Mt	98.5Mt
Recycled and secondary aggregate (as part of 'Aggregate', above) *		3.7Mt (2013, consumption)	63Mt
Ready-mix concrete +		5.9Mm^3	25.2Mm^3
Asphalt *		3.6Mm^3	26.3Mt
Concrete blocks #		5.8Mm^2	67.0Mm^2
Steel +		(no data)	11Mt
# stocks + production * sales			

11.2.3 The sensitivity of specific construction materials (as determined by their regional and national availability) cannot be accurately determined without long-term trend information, the latter being unavailable at the time this Chapter was drafted. Once a Bill of Quantities (BoQ) is established for the Proposed Scheme (and associated data can be used in conjunction with cumulative information) the sensitivity of current stocks, production and sales of construction material types can be more precisely established.

11.2.4 2015 data on the general availability of construction materials in the South East of England and across the UK indicate that the Proposed Scheme should be delivered without serious detriment to stocks/production/sales as there is plenty material availability.

Transfer, treatment and metal recycling in England and the South East

11.2.5 Department of Environment, Food and Rural Affairs (Defra, 2016) data (Table 11-3) show that within England, the recovery rate for non-hazardous construction and demolition arisings have remained above 90% since 2010. This exceeds the EU target of 70%, which the UK must meet by 2020.

Table 11-3 Non-hazardous construction and demolition arisings recovery in England

Year	Generation (Mt)	Recovery (Mt)	Recovery rate (%)
2010	43.9	39.7	90.5%
2011	44.1	39.9	90.6%
2012	45.3	41.3	91.1%
2013	46.3	42.1	91.1%
2014	49.1	44.9	91.4%

11.2.6 No regional data for Construction, Demolition and Excavation (CDE) production or recovery rates are currently available for the South East of England (see Section 1.1.8 – Assumptions and limitations).

11.2.7 Figure 11-1 shows that rates of material recovery within the South East of England have risen steadily over the past 16 years. Metal recycling shows a consistent, and relatively flat profile. Trends for transfer data are, however, more variable, and no clear profile is discernible. Data provided include all waste types in the region and hence include, but are not specific to, CDE arisings.

11.2.8 Data show that regional infrastructure and capacity for the transfer and recovery for CDE arisings from the Scheme is likely to be viable in this region. Non-hazardous construction and demolition recovery trends across England (Table 11-3) demonstrate further capacity in this context.

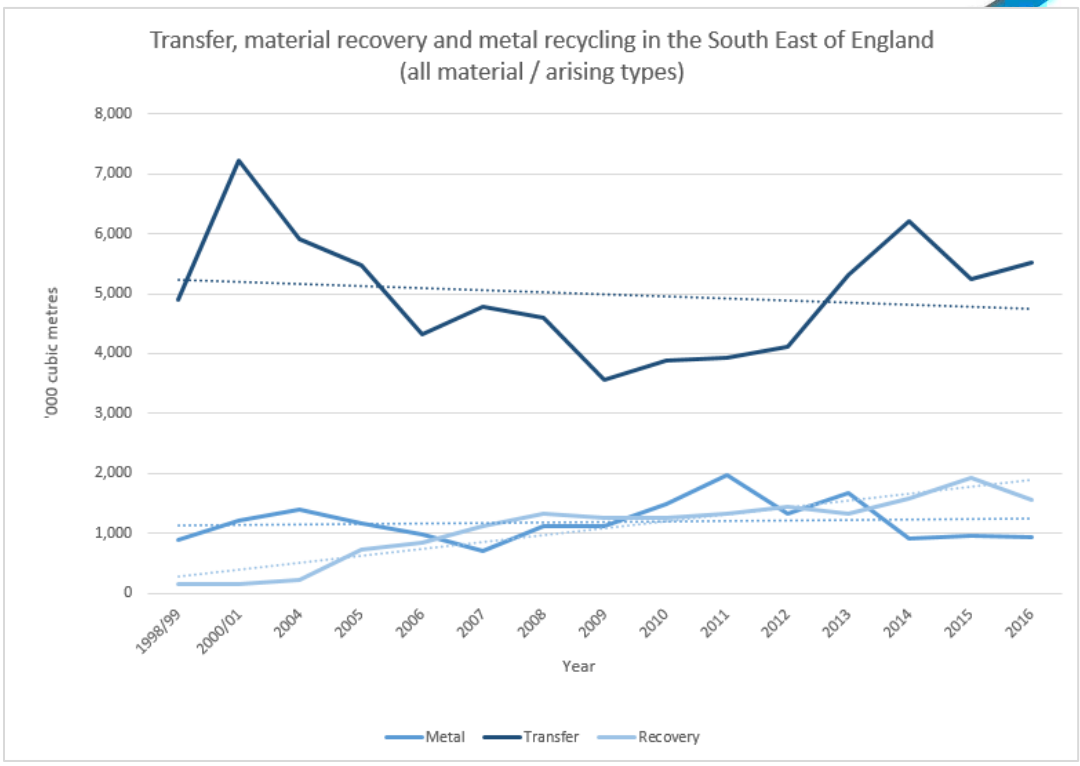

Figure 11-1 Transfer, material recovery and metal recycling in the South East of England

11.2.9 Trends for materials recovery infrastructure in the South East suggests that there is strong potential to divert site arisings generated by the Proposed Scheme from landfill. These data are supported by the number of licensed recovery facilities (all waste, not just CDE) in the South East in 2016, as follows:

- 405 transfer facilities (334 accepted inputs in 2016)
- 394 treatment facilities (309 accepted inputs in 2016)
- 202 metal recovery facilities (121 accepted inputs in 2016)
- 18 use of waste facilities (6 accepted inputs in 2016

Waste

National, regional and local landfill context

11.2.10 Environment Agency data demonstrate an increasing shortage of landfill capacity in England: 723Mm^3 of capacity was recorded in 1998/99, and 464Mm^3 in 2016, representing a 36% reduction over a period of 16 years.

11.2.11 At the end of 2016, 94 licensed landfill sites in the South East have been recorded as having 77.0Mm^3 of remaining capacity (Table 11-4).

Table 11-4 Remaining landfill capacity, South East England

Landfill type	Remaining capacity '000m^3 (2016)
Hazardous (merchant and restricted)	560
Inert	29,795
Non-hazardous (including stable hazardous waste cells)	46,624
Total	*76,979*

11.2.12 Table 11-2 shows the remaining landfill capacity in the South East of England and uses simple extrapolation in MS Excel to indicate how this trend may continue in the absence of future recovery provision to the first full year of operation (2020).

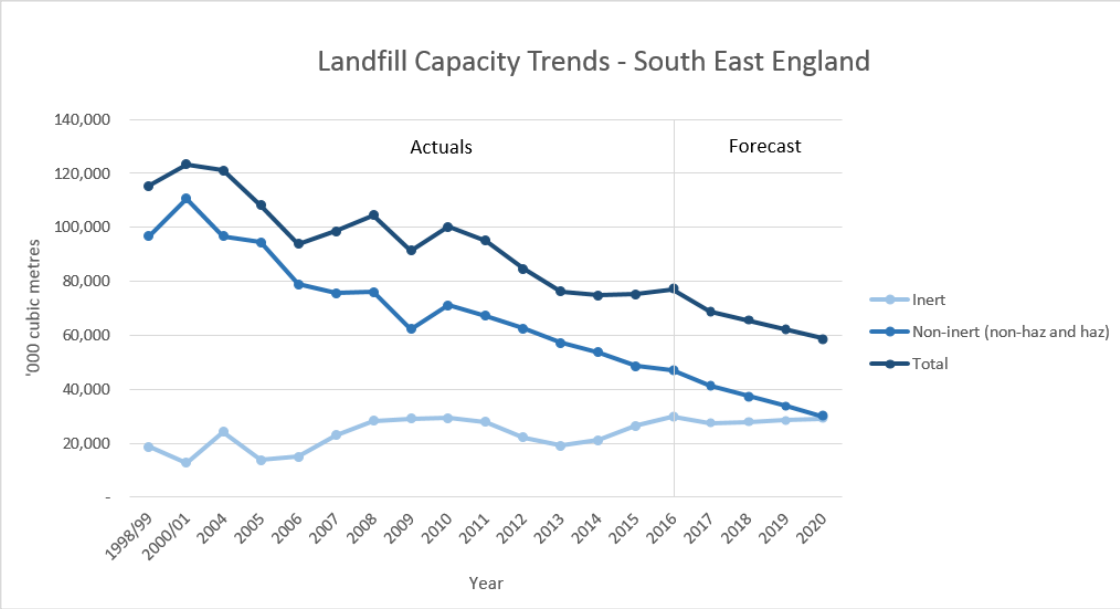

Figure 11-2 Landfill capacity trends in the South East of England

11.2.13 Baseline data indicates that total and non-inert landfill capacity in the South East of England is likely to become an increasingly sensitive receptor over the life of the Proposed Scheme to the first full year of operation (2020). Simple extrapolation indicates that, by comparison with 2016 data and in the absence of future provision, non-inert capacity could fall as much by 37%, and total capacity by 23%.

11.2.14 Inert landfill capacity in South East England increased by over 3.3Mt between 2015 and 2016. Simple extrapolation indicates that inert landfill capacity is therefore likely to reduce only by 3% to the first full year of operation.

11.2.15 Sections 11.2.5 - 11.2.9 provide commentary on the transfer and recovery trends for non-hazardous construction and demolition arisings in South East England and the UK.

11.3 Potential impacts

11.3.1 The Proposed Scheme has the potential to consume material resources (including those recovered from site arisings) and produce and manage waste during the construction of the carriageway and its supporting infrastructure.

11.3.2 Table 11-5 describes the potential impacts of consuming material resources, including recovering site arisings, on mineral safeguarding areas and peat resources and through the generation and management of waste.

Table 11-5 Impacts from material assets and waste

Element	Timing	Impacts	Effect	Type
Material resources	Demolition, site preparation and construction	The direct impact of using primary materials is the consumption of non-renewable environmental resources. Associated indirect impacts include the release of greenhouse gas emissions, water consumption and scarcity, environmental degradation and pollution, and nuisance to communities (visual, noise, dust. It is not anticipated that material consumption would be required during demolition. During site preparation works, timber, steel and other products would be required for the erection of perimeter fencing, and aggregate and stone would be likely to be needed for ground improvement at the site, prior to use by heavy plant. During construction, a wide range of material resources would be required to deliver the Proposed Scheme, including: bulk materials for earthworks (volumes will be dependent on the cut and fill balance) road paving materials, including sub-base and bituminous products steel – for structures and sheet piling concrete including for pre-cast or prefabricated elements bricks and aggregate timber for fencing and formwork new street furniture and signage	Depletion of natural resources Degradation of the natural environment	Adverse

Element	Timing	Impacts	Effect	Type
		cabling other general construction materials. Most non-contaminated site arisings generated during demolition, site preparation and construction (including any surplus from materials required to deliver the Proposed Scheme) would have the potential for diversion from landfill and be re-used on site where possible. In particular, bulk materials for earthworks, road paving materials, steel, concrete, bricks, aggregate, timber and cabling would be readily recoverable.		
Mineral safeguarding areas and peat resources	Demolition, site preparation and construction	If the Proposed Scheme transected mineral safeguarding areas or peat resources, there would be potential for this resource to be impacted. For example, if a road scheme were to be built over a mineral safeguarded area it could mean that the resource could no longer be accessed, and any future extraction compromised. If peat resources are within the Proposed Scheme they would be likely to be damaged.	Protection of mineral safeguarding areas and peat resources	Adverse
Production and management of waste	Demolition, site preparation and construction	The generation and management of waste directly impacts on the capacity of waste management facilities within the Region. Disposal to landfill has a range of indirect impacts, including the release of greenhouse gas emissions, environmental pollution and nuisance to communities (visual, noise, dust). Wastes generated during demolition would be likely to include: broken out concrete, cut steel and road surface planings. hazardous or contaminated material found on or at the surface of the site. other demolition wastes. Wastes likely to be generated during site preparation would include:	Reduction in the capacity of waste management facilities in the region Reduction in the remaining capacity of landfill facilities in the region	Adverse

Element	Timing	Impacts	Effect	Type
		vegetation and other above ground materials produced by site clearance (potentially including invasive weeds). surplus topsoil or subsoil materials. hazardous or contaminated material found on or beneath the site. It is anticipated that the following wastes would be generated during construction: green waste timber concrete, bricks and aggregate waste road paving materials including sub-base and bituminous products hazardous or contaminated material found or generated on site cabling redundant street furniture and signage steel waste e.g. safety barriers general construction waste e.g. packaging, ducting.		
Material resources, site arisings and waste	Operation	During future maintenance, renewal, or improvement works of the Proposed Scheme, the potential to consume material resources and produce and treat / dispose of waste could be required. The scale of any future maintenance, renewal, or improvement works is not currently known. However, given the scale of the Proposed Scheme it is unlikely that consumption of material resources and generation of waste would have the potential to result in significant adverse effects	As above	None

Operation material use and waste

11.3.3 It is not anticipated that there would be large quantities of material resource use or waste generation associated with operation and maintenance of the Proposed Scheme. Therefore, the effect of material use and waste generation from the Proposed Scheme is considered unlikely to have significant operation environmental impact and has therefore been scoped out of any further environmental assessment.

11.4 Design, mitigation and monitoring measures

11.4.1 Potential design, enhancement and other mitigation measures that could be adopted by the Proposed Scheme, are set out in Table 11-6.

Table 11-6 Design, enhancement and other mitigation measures

Project activity	Mitigation and enhancement measures	Lifecycle stages
Material resources	Identification and specification of materials that can be acquired responsibly, in accordance with BES 6001 Responsible Sourcing of Construction Products	Design, construction
	Design for resource optimisation: simplifying layout and form, using standard sizes, balancing cut and fill, maximising the use of renewable materials and materials with recycled or secondary content, and setting material balance as a goal	Design
	Design for off-site construction: maximising the use of pre-fabricated structures and components	Design
	Design for the future: considering how materials can be designed to be more easily adapted over an asset's lifetime, and how deconstruction and demounting of elements can be maximised at end-of-first-life	Design
	Design for recovery and re-use: identifying, securing and using materials at their highest value, whether they already exist on site, or are sourced from other locations.	Design
	Identify opportunities to minimise the export and import of materials	Design, construction
	Working to a proximity principle, ensuring arisings generated are handled, stored, managed and re-used or recycled as close as possible to the point of origin	Design, construction
	Identify areas for stockpiling and storing arisings in a manner minimising quality	Design, construction

Project activity	Mitigation and enhancement measures	Lifecycle stages
	degradation and leachate, and damage and loss	
	Making sure potential arisings and waste are properly characterised before or during design, to maximise the potential for highest value reuse	Design
	Capture information and data on site arisings recovered and diverted from landfill, by developing a Design Site Waste Management Plan once a preferred option has been selected	Design
	Implement a Materials Management Plan in accordance with the CL:AIRE Definition of Waste: Code of Practice	Construction
Production and management of waste	Engage early with contractors to identify possible mitigation measures, and to identify opportunities to reduce waste through collaboration and regional synergies	Design, Procurement
	Capture information and data on waste sent to landfill, by developing a Design Site Waste Management Plan once a preferred option has been selected	Design

11.5 Description of likely significant effects

11.5.1 Table 11-7 provides a description of the likely significance of effects from material assets and waste.

Table 11-7 Likely significance of effects

Element	Description of likely significance of effect
Material resources	The consumption of material resources has the adverse effect of depleting natural resources and degrading the natural environment. The latest Highways England guidance defines a significant effect as more than 50% of the primary material needing to be sourced internationally, given the size of the Proposed Scheme and based on professional judgement an adverse significant effect from materials would be unlikely. However, until the Proposed Scheme's material quantities have been determined the effect on material resources cannot be confirmed
	Based on the scale and nature of the Proposed Scheme, there is a potential to generate value by recovering site arisings and diverting them from landfill.
Mineral Safeguarding Areas	If the Proposed Scheme transects mineral safeguarding areas or peat resources, there is potential for this resource to be impacted. The latest Highways England guidance defines a significant effect as sterilizes ≥ mineral safeguarding site and/or peat resource. Mineral resources comprising of sharp sand and gravel are located in the vicinity of the River Itchen in the northern part of the Proposed Scheme. Therefore there is the potential for the Proposed Scheme to have an adverse impact on a mineral safeguarding area.
Production and management of waste	For the generation and management of waste a potential impact is the risk of reduction of waste management or disposal facilities capacity. For the effect to be significant the latest Highways England guidance defines that the waste generated would need to reduce or alter the regional capacity by more than 1% and require disposal outside of the region of more than 1% of the project waste. Given the size of the Proposed Scheme, and based on professional judgement, it is considered unlikely that there would be any significant effects with respect to impact on waste management capacity within the South East of England. However, until the Proposed Scheme's waste quantities have been determined the effect of waste generation cannot be confirmed

11.5.2 Residual operational effects would not be expected to be significant for material resources and waste, therefore will not be considered any further in the assessment.

11.5.3 The extent to which effects (including residual effects) are significant will be further determined during the EIA.

11.6 Assessment methodology

Policies and Plans

11.6.1 Planning policies and guidance that are relevant to the Proposed Scheme include:

- National Policy Statement for National Networks (NPSNN) (DfT, 2014): Paragraphs 5.39-5.45 (Waste) and 5.169 (Mineral Resources) and 5.182 (Mineral Safeguarding Areas)
- National Planning Policy Framework (NPPF) (2018): Paragraph 8 (Achieving sustainable development); paragraphs 203, 205 and 206 (Facilitating the sustainable use of minerals); and the associated Planning Practice Guidance: Waste (2015)
- National Planning Policy for Waste (2014) Paragraph 8 (non-waste development)
- Winchester District Local Plan Part 1 – Joint Core Strategy (2013): Policy DS1 (Development Strategy and Principles)
- Hampshire Minerals and Waste Plan (2013): Policy 1 (Sustainable mineral and waste development), Policy 15 (Safeguarding – mineral resources), Policy 18 (Recycled and secondary aggregates development)
- South Downs Local Plan Pre-Submission (2017) – Emerging: Core Policy SD2 (Ecosystems Services)
- Waste Management Plan for England (Defra, 2013b)
- National Policy Statement for Hazardous Waste (Defra, 2013a)

Guidance to be used

11.6.2 The material requirements and level of waste generated by construction of the Proposed Scheme is not known due to the limited design information available at this stage in the design process. Therefore, there could potentially be environmental impacts from the use and consumption of materials and the production and management of waste during construction.

11.6.3 Based on the initial review at this stage, it is recommended that the materials and wastes from the construction phase of the Proposed Scheme are assessed in the first instance at the ‘simple’ level of assessment.

11.6.4 IAN 153/11 (Highways Agency, 2011b) states that “Simple Assessment should assemble data and information that is readily available to address potential effects identified at the scoping level, to reach an understanding of the likely environmental effects to inform the final design or to reach an understanding of the likely environmental effects that identifies the need for “Detailed Assessment”.

11.6.5 The assessment will primarily focus on the environmental impacts and effects arising from construction in the form of depletion of natural resources, the generation and management of waste on site, potential impacts on the available waste management infrastructure, and

the alignment of the Proposed Scheme with the legislative and policy framework for sustainable development, material resources and waste.

11.6.6 The simple assessment is largely a desk-based exercise and, for the purposes of the materials and waste topic, is mainly qualitative. The following issues will be identified and assessed:

- the materials required for the project and, where information is available, the quantities
- the anticipated waste arisings from the project and, where information is available, the quantities and type (e.g. hazardous)
- impacts arising from the issues identified in the scoping exercise in relation to materials and waste
- the results of any consultation
- a conclusion about whether this level of assessment is sufficient to understand the effects of the project or whether Detailed Assessment is necessary

11.6.7 The method of assessment will depend on the level of detail on the Proposed Scheme at the time of the assessment. Where detailed information about the types and quantities of materials and waste is available (i.e. in the form of a detailed bill of quantities for example), the simple assessment may be carried forward to the 'Detailed Level' of assessment as per IAN/153 if the quantities identified indicate the likelihood of a significant effect.

11.6.8 Detailed Assessment is a qualitative and quantitative exercise using available forecast data and information (as provided by the appointed designer and other Scheme delivery partners) which will aim to identify the following:

- The types and quantities of materials required for the project
- Details of the source or origin of materials
- The cut and fill balance
- The types and quantities of forecast waste arisings from the project
- Surplus materials and waste falling under regulatory controls
- Site arisings that require storage on site prior to re-use, recycling or disposal
- Contaminated site arisings to be pre-treated on site for re-use within the project
- Wastes requiring treatment and/or disposal off site
- Impacts arising from materials consumption, and waste generation and disposal
- A conclusion about the magnitude and nature of the impacts
- The identification of measures to eliminate or mitigate identified impacts

Assessment methodology: material resources and mineral safeguarding sites

11.6.9 An assessment of the impacts of consuming material resources required during site construction will be undertaken by considering the origins and sources of materials, including their general availability (production, stock, sales) and the proportion of re-used or recycled materials they contain.

11.6.10 The assessment will take the relative volume of material resources that need to be consumed for the Proposed Scheme into account. The assessment will evaluate the impacts and effects of the Proposed Scheme understanding that – typically - the larger a development footprint and associated groundworks, the greater the requirement to consume materials.

11.6.11 The assessment will identify and assess the potential impact of the Proposed Scheme on mineral safeguarding areas.

11.6.12 Site arisings (from demolition/remediation/preparation/excavation/construction activities) will be evaluated as part of the assessment of material resources, to determine the volume of excavations that can be retained for re-use or (as a last resort) be sent to landfill as waste. The assessment will take into account the nature of impacts (adverse/beneficial, permanent/temporary, direct/indirect) from material resources and site arisings and if a Detailed Assessment is carried out the effects on material resources and mineral safeguarding areas shall be assessed in accordance with Table 11-8. The significance of effects on material resources and mineral safeguarding areas will be reported in accordance with the criteria set out in Table 11-9.

Assessment methodology: waste

11.6.13 An assessment of the remaining landfill capacity in the South East will be used to determine the impacts of waste generated during Scheme delivery and the first full year of operation.

11.6.14 The assessment will consider the volume of waste generated by the Proposed Scheme and its potential impact on remaining landfill capacity. This will be completed for inert and non-inert (non-hazardous and hazardous) waste types.

11.6.15 The assessment will take the nature of impacts (adverse/beneficial, permanent/temporary, direct/indirect) from waste generated and treated/disposed of into account and if a Detailed Assessment is carried out the effects on the generation of waste will be assessed in accordance with Table 11-8. The significance of effects from the generation of waste from the Proposed Scheme will be reported in accordance with the criteria set out in Table 11-9.

Assessing the significance of effect

11.6.16 The latest Highways England guidance sets out how effects associated with material assets and waste should be assessed. The descriptions provided in Table 11-8 will be used to assess the effects of material assets and waste on the Proposed Scheme.

11.6.17 Where required professional judgement will be used to determine the significance of effects.

Table 11-8 Impacts and effects from material assets and waste

Significance category	Descriptor of effect
Neutral	Material Assets • No reduction or alteration in the availability of material assets at a regional scale (relating to the resources the project has used) Waste • No reduction or alteration in the capacity of waste infrastructure at a regional scale
Slight	Material Assets • Requires ≤50% of primary materials to be sourced nationally (with other primary materials sourced at a lower geographic scale) • Comprises re-used/recycled aggregate (alternative materials) above the higher of the relevant regional or national percentage target Waste • ≤ 1% reduction or alteration in the regional capacity of waste infrastructure • Waste infrastructure has sufficient capacity to accommodate waste from a project, without compromising the integrity of the receiving infrastructure (design life or capacity) within the region
Moderate	Material Assets • >50% of primary materials to be sourced nationally (with other primary materials sourced at a lower geographic scale) • Comprises re-used/recycle aggregate (alternative materials) below the lover of the relevant regional or national percentage target Waste • >1% reduction or alteration in the regional capacity of waste infrastructure as a result of accommodating the waste from the project • 1-50% of project waste requires disposal outside of the region
Large	Material Assets • >50% of primary materials to be sourced internationally • Sterilises ≥1 mineral safeguarding site and/or peat resource • Comprises no re-used/recycled aggregate (alternative materials) Waste • >1% reduction or alteration in the regional capacity of waste infrastructure as a result of accommodating waste from the project • >50% of project waste requires disposal outside of the region
Very Large	Material Assets • No criteria: use criteria for large category Waste

Significance category	Descriptor of effect
	• >1% reduction or alteration in national capacity of waste infrastructure, as a result of accommodating waste from the project • The project would require new (permanent) waste infrastructure to be constructed to accommodate waste

Source - Latest Highways England guidance

11.6.18 Significance of effects on material assets and waste will be reported in accordance with the criteria set out in Table 11-9.

Table 11-9 Significance criteria for material assets and waste

Significance	Description
Not significant	Material assets • Category description met for neutral, slight or moderate effect Waste • Category description met for neutral or slight effect
Significant (one or more criteria met)	Material assets • Category description met for large effect Waste • Category description met for moderate, large or very large effect

Source - Latest Highways England guidance

11.6.19 Assessment results will be presented using the tables as set out in IAN 153/11.

11.7 Assessment assumptions and limitations

11.7.1 Baseline data and information for the assessment are (unless otherwise stated) only available up until 2016.

11.7.2 Waste management operators can claim commercial confidentiality for their data at the time of submission. Data for sites with commercial confidentiality in place are therefore unavailable for the analyses presented in this chapter.

11.7.3 Defra has been consulted by email to determine whether generation and recovery rates for CDE arisings are available by region. Defra confirmed that it does not publish CDE figures at a regional level, and only national (England) data is accessible through the publicly available Waste Data Interrogator Database (EA, 2016b). This database is held and operated by the Environment Agency.

11.7.4 Until such a time that CDE generation and recovery rates by region are available, transfer (non-civic), recovery and metal recycling data (available through the Waste Data Interrogator Database) will be used as the closest possible proxy.

11.7.5 The absence of the above data is not expected to materially influence the outcome of the assessment of material assets and waste. Where new data to fill the stated gaps is identified, they will be used during the assessment process.

11.8 Elements to be scoped in or out

11.8.1 Table 11-10 below outlines the elements currently scoped in or out of the EIA for material assets and waste.

Table 11-10 Elements scoped in or out of the EIA for material assets and waste

Element scoped in	Element scoped out	Justification
The consumption of materials and products (from primary, recycled or secondary, and renewable sources, and including material resources offering sustainability benefits) including the generation and use of arisings recovered from site	--	Until the Proposed Scheme's material quantities have been determined the effect on material resources cannot be confirmed
The production and management of waste to regional waste management facilities	--	Until the Proposed Scheme's waste quantities have been determined the effect of waste generation cannot be confirmed
--	Materials consumption and waste generation and management during operation	Impacts and associated effects have been deemed not to be potentially significant
The impact on mineral safeguarding areas and peat resources	--	Until the impact of the Proposed Scheme on mineral safeguarding areas can be determined, the effect on mineral safeguarding areas cannot be confirmed

12. Noise and Vibration

12.1 Study area

12.1.1 The study area for operational road traffic effects will be defined in accordance with the guidance in DMRB, Volume 11, Section 3, Part 7 (HD 213/11 - Revision 1) (Highways Agency, 2011c), as follows:

- 1) Identify the start and end points of the physical works associated with the road project
- 2) Identify existing routes that are proposed to be bypassed or improved, and any proposed routes, between the start and end points
- 3) Define a boundary one kilometre from the carriageway edge of the routes identified in (2) above
- 4) Define a boundary 600m from the carriageway edge around each of the routes identified in (2) above and also 600m from any other affected routes within the boundary defined in (3) above. This area is called the 'calculation area'
- 5) Identify any affected routes beyond the boundary defined in (4) above
- 6) Define a boundary 50m from the carriageway edge of the routes identified in (5) above

12.1.2 Affected roads are defined in HD 213/11 as any roads that undergo a change in traffic noise level of 1 dB $L_{A10,18h}$ or more in the short term (year of opening do-minimum versus year of opening do-something) or 3 dB $L_{A10,18h}$ or more in the long term (year of opening do-minimum versus future year (worst affected year 15 years after opening) do-something).

12.1.3 The calculation area for operation road traffic will ultimately be defined through a combination of the Proposed Scheme footprint and the predicted change in traffic flows to determine affected links, whether those lie within the main 1km study area or within the wider road network (outside the main 1km study area).

12.1.4 Construction noise and vibration is expected to affect a reduced study area which would, itself, be within the area defined for the operation noise effects. This is because at distances beyond 300m other factors, such as meteorological conditions, have increasing influence and construction noise level predictions are considered less robust. Nevertheless, where necessary (and where relevant details are available) the study area for construction phase effects would be widened to include other temporary sources such as construction traffic haul routes or diversion routes, should any need to be put in place during the works.

12.1.5 The study area for the assessment of vibration traffic nuisance is defined as being within 40m of any roads identified in the study area described above.

12.2 Baseline conditions

Noise sensitive receptors

12.2.1 In accordance with the HD 213/11, examples of sensitive receptors include dwellings, hospitals, schools, community facilities, designated areas (e.g. AONB, National Park, SAC, SPA, SSSI, SAM), and Public Rights of Way (PRoW).

12.2.2 The study area encompasses residential properties to the north and east of Winchester, including Headborne Worthy to the north (west of the A31), Kings Worthy to the north (east of the A31) and the eastern fringes of Winchester including the following neighbourhoods, which lie immediately west of the M3 and to the south of M3 J9 (from north to south): Winnall, St Giles Hill and Highcliffe.

12.2.3 A summary of potentially sensitive receptors identified during the PCF Stage 2 assessment as lying within the calculation area is provided in Table 12-1. The calculation area, study area and sensitive receptors will be re-visited during the EIA.

Table 12-1 Potentially sensitive receptors

Potentially Sensitive Receptors	
Residential Areas	Headborne Worthy
	Kings Worthy
	Eastern fringes of Winchester, including (from north to south) Winnall, St Giles Hill and Highcliffe
Nursery Schools	Springvale Playgroup, St Marys Church, Kingsworthy, SO23 7QL
	Sparklers Sure Start Children's Centre, Winnall Community Centre, Winchester SO23 0NY
	Yellow Dot Nursery, Wales Street, Winchester, SO23 0ET
	Stepping Stones Preschool, Winnall Community Centre, Winchester SO23 0NY
Primary Schools	Winnall Primary School, Winchester SO23 0NY
	St Swithuns Junior School, Winchester SO23 1HA
Secondary Schools, Colleges and Further Education (FE)	St Swithuns Senior School, Winchester SO23 1HA
Places of Worship	Kingdom Hall, Winchester SO23 0NY
	St Swithuns Church, Headborne Worthy SO23 7JX
	St Marys Church, Kings Worthy SO23 7QL
Scheduled Monuments	Round barrow cemetery on Magdalen Hill Down

Potentially Sensitive Receptors	
	Site of St Gertrudes Chapel
Designated Areas	South Downs National Park (SDNP)
	River Itchen SSSI
	River Itchen SAC
Public Rights of Way	Itchen Way
	St Swithuns Way
	Three Castles Path
	Allen King Way
	South Downs Way

Noise Important Areas (NIAs)

12.2.4 The current Noise Action Plan for major roads (Defra, 2014) outlines a number of Noise Important Areas (NIA's) at Round 2 of the UK noise mapping project, identified in accordance with the requirements of the EU Environmental Noise Directive and associated English regulations. The Round 2 NIA's include the top 1% of the population, in terms of exposure to road traffic noise ($L_{A10, 18h}$).

12.2.5 The Round 2 NIAs for both Highways England and local authority maintained roads are available under the Open Government Licence (Defra, 2015). The Round 2 NIAs within (whether partially or wholly) the calculation area defined for the PCF Stage 2 assessment are set out below. Note that this list will be updated once the calculation area has been confirmed.

- NIA4006, M3, north of Junction 9 – owned by Highways England
- NIA4007, A34, north of Junction 9 – owned by Highways England
- NIA4008, M3, south of Junction 9 – owned by Highways England

12.2.6 In accordance with the provisions of the Round 2 Noise Action Plan for Roads and the objectives of the RIS, it is understood that the aim should be to bring about improvements to the noise environment in these areas. The NIAs can be seen in Figure 1.1.

Existing Noise Climate

12.2.7 The existing noise climate varies across the study area. The noise climate across much of the study area is dominated by road traffic noise, particularly the areas close to the M3, but also the A34 and A33. However, the study area includes relatively large areas where there are no major roads and, as such, these areas are exposed to lower noise levels.

12.2.8 In addition to road traffic noise, there will be localised noise from commercial areas clustered around the west side of Junction 9, as well as some limited noise associated with aircraft arriving at and departing from Southampton Airport. The train line running

from Winchester, northwards to Basingstoke lies in excess of 1km to the west of the motorway junction; consequently it is considered unlikely that rail noise will significantly affect the existing noise climate in the calculation area. These assumptions will be revisited once the model calculation area has been defined.

12.2.9 The existing road traffic noise climate within the calculation area has been determined at PCF Stage 2 using a 3D noise model, populated with traffic flow data.

12.2.10 For this Proposed Scheme, at PCF Stage 3, it is anticipated that baseline noise monitoring will be undertaken at locations close to the M3 and A34. The M3 and A34 is the main corridor between the Midlands and north carrying freight traffic from Southampton and Portsmouth Docks. Substantial volumes of HGV traffic are likely, particularly at night. Evaluation of daytime and night-time noise levels from measured data, will be used to assist in the accuracy of predictions for the night-time period using the TRL methods within DMRB HD 213/11 guidance.

12.2.11 The extent of and locations for baseline noise monitoring will be agreed with the Environmental Health Officer (EHO) at Hampshire Council in advance.

12.3 Potential impacts

Construction effects

12.3.1 Temporary noise and vibration effects can be defined as those that would occur between the start of advance works and end of the construction period. Although temporary, construction-related effects could nevertheless require mitigation. Typical construction effects might include a localised increase in noise and/or vibration and a loss of amenity due to the presence of construction traffic.

12.3.2 The following are generally applicable to temporary construction related effects:

- The area where construction disruption tends to be more localised than the effects of the Proposed Scheme once it has opened to traffic
- It has been shown that disturbance arising from construction diminishes rapidly with distance
- The duration of the effects is important when considering the potential for disturbance

12.3.3 Construction activities such as piling, breaking and demolition, could cause high levels of noise and vibration. Whether such levels might cause significant effects would depend on other factors such as the time of day, duration and proximity of receptors.

Operation effects

12.3.4 The level of road traffic noise affecting any receptor is dependent on a number of variables, all of which are accounted for within the road traffic noise prediction methodology. In summary these are:

- Traffic related factors: volume, speed and composition of vehicles
- Road related factors: surface (e.g. concrete or bituminous) and gradient

- Propagation factors: distance, the presence screening and type of ground cover intervening between the road and any receptor

- Receptor specific factors: view of the road and reflections

12.3.5 Therefore, should any of these factors alter, such as changes along an existing road, or with the introduction of a new length of carriageway, then noise levels would also be likely to change. Individually, these variables could cause noise levels to increase or decrease for any particular receptor.

12.4 Design, mitigation and enhancement measures

12.4.1 A mitigation strategy will be developed during the EIA to minimise any residual noise and vibration impacts during construction and these will be set out in a CEMP. This will include a requirement on the Contractor to apply Best Practicable Means (BPM).

12.4.2 Mitigation measures will need to be considered in the EIA to minimise any noise impact arising from the operation of the Proposed Scheme. A new low noise road surface on all Highways England roads within the site boundary are assumed to be integral to the Proposed Scheme. Environmental noise barriers will also be considered; however, it should be noted that these will need to be informed by other topics/constraints such as ecology, engineering and landscape.

12.4.3 In accordance with Infrastructure Planning (EIA) Regulations 2017, the Handover Environmental Management Plan (HEMP) may contain a requirement for noise monitoring to be undertaken once the Proposed Scheme is open to traffic. If required, the methodology will be agreed with the Environmental Health Officer (EHO) at Hampshire Council including appropriate actions to be taken depending on the results of the monitoring.

12.5 Description of likely significant effects

12.5.1 Given the proximity of sensitive receptors to the Proposed Scheme, allied to the scale and complexity of the works, it is considered that there would be potential for adverse effects to occur during the construction phase. This conclusion will be reinforced should any night-time or Sunday/Bank Holiday working be required.

12.5.2 It is understood that a length of the M3 will be temporarily closed for a number of nights on occasions throughout the construction phase. During these motorway closures, diversion routes will be in operation leading to a temporary increase in noise levels at receptors along these routes. A qualitative assessment will be undertaken, based on the duration criteria in BS 5228-1 (BSI, 2008), to determine whether the number of times the diversion routes are in operation would cause a significant effect. Where feasible, mitigation measures to minimise any adverse effects will also be identified.

12.5.3 Given the proximity of sensitive receptors to the Proposed Scheme, it is considered likely that some sensitive receptors would experience adverse impacts during operation, particularly those located to the north on Easton Lane. However, it is considered unlikely that any receptor would be exposed to significant adverse effects.

12.5.4 Residual effects will be determined following the completion of the EIA.

12.5.5 The EIA will determine whether the Proposed Scheme meets the aims of the NPSE:

- "Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development
- Avoid significant adverse impacts on health and quality of life
- Mitigate and minimise adverse impacts on health and quality of life
- Where possible, contribute to the improvement of health and quality of life."

12.6 Assessment methodology

Policies and plans

12.6.1 Planning policies and guidance that are relevant to the Proposed Scheme include:

- National Policy Statement for National Networks (NPS NN) (DfT, 2014)**:** Paragraphs 5.186 to 5.200 (Noise and Vibration).
- National Planning Policy Framework (NPPF) (2018)**:** Paragraphs: 170 (Conserving and enhancing the natural environment) and 180 and 182. (Conserving and enhancing the natural environment – Ground conditions and pollution); and associated Planning Practice Guidance for 'Noise' (2014).
- Noise policy statement for England (NPSE)**:** The NPSE was published in March 2010 by the Department for Environment Food and Rural Affairs (DEFRA) and is the overarching statement of noise policy for England.
- Noise Action Plan (outside first round agglomerations), Environmental Noise (England) regulations 2006 as amended, 2010, Defra – Defra produced the Noise Action Plan in March 2010 to address the effects of noise from major roads in England under the terms of the Environmental Noise (England) Regulations 2006.
- Winchester Local Plan Review (adopted 2006) - Saved Policies: Policy DP.3 General design criteria, Policy DP.11 Unneighbourly uses.
- Winchester District Local Plan Part 1 – Joint Core Strategy (2013): Policy DS1 (Development Strategy and Principles) and Policy MTRA4 Development in the Countryside.
- Winchester District Local Plan Part 2 – Development Management and Site Allocations (2017): Policy DM17 (Site Development Principles); Policy DM19 (Development and Pollution); Policy DM20 (Development and Noise); and, Policy DM23 (Rural Character).
- South Downs Local Plan Pre-Submission (2017) – Emerging: Strategic Policy SD1 (Sustainable Development); Strategic Policy SD3 (Major Development); Strategic Policy SD5 (Design); Strategic Policy SD7 (Relative Tranquillity); and, SD54 (Pollution and Air Quality).

12.6.2 The following policy and guidance will underpin the assessment and be described in the EIA. Where any document has particular relevance to this Scoping Report, details are set out in the following paragraphs:

- National Planning Policy Framework (NPPF)
- Noise Policy Statement for England (NPSE)
- Planning Practice Guidance (PPG)
- National Policy Statement for National Networks (NPS NN) (DfT, 2014)
- Road Investment Strategy (RIS): for the 2015/16 - 2019/20 Road Period
- Highways England: Licence

12.6.3 The NPSE was published in March 2010 by the Department for Environment Food and Rural Affairs (Defra) and is the overarching statement of noise policy for England.

12.6.4 The Explanatory Note to the NPSE introduces three concepts to the assessment of noise in England:

- NOEL - No Observed Effect Level - This is the level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise
- LOAEL - Lowest Observable Adverse Effect Level - This is the level above which adverse effects on health and quality of life can be detected
- SOAEL - Significant Observed Adverse Effect Level - This is the level above which significant adverse effects on health and quality of life occur

12.6.5 None of these three levels are defined numerically in the NPSE and for the SOAEL the NPSE makes it clear that the noise level is likely to vary depending upon the noise source, the receptor and the time of day/day of the week. The need for more research to investigate what may represent a SOAEL for noise is acknowledged and the NPSE asserts that not stating specific SOAEL values provides policy flexibility in the period until further evidence and guidance is published.

12.6.6 The Department for Transport's RIS was published in March 2015 and sets out policies relating to the strategic planning and funding of the road network. The RIS identifies a capacity to improve noise levels through the management and redevelopment of Highways England assets, via low noise road surfacing, noise barriers etc. It is expected that Highways England will deliver mitigation measures to at least 1,150 NIAs, helping to improve the quality of life of around 250,000 people by the end of the first road period.

Methodology

12.6.7 HD 213/11 requires that the determination of appropriate levels of assessment for operational road traffic and noise and vibration effects with reference to the following thresholds, where upon a 'detailed' assessment should be undertaken:

- A permanent change in daytime road traffic noise of ±1 dB $L_{A10,18h}$ in the short term (i.e. on opening)
- A permanent change in daytime road traffic noise of ±3 dB $L_{A10,18h}$ in the long term (typically 15 year after project opening)

- A permanent change in night-time road traffic noise of ±3 dB $L_{A10,18h}$ in the long term, where the predicted level also exceeds 55 dB $L_{A10,18h}$

- A rise in vibration levels to above 0.3 mm.s^{-1} PPV or any increase above an existing level of 0.3 mm.s^{-1} PPV

12.6.8 The assessment of noise and vibration will be undertaken in accordance with the requirements of HD 213/11. Based on the outcomes of the PCF Stage 2 assessment, it is proposed that a 'Detailed' assessment will be undertaken in the EIA.

12.6.9 One of the outcomes of the EIA will be a commentary setting out the significance of effect of the Proposed Scheme on relevant policy objectives.

Construction noise and vibration

12.6.10 HD 213/11 states when determining the need for assessment of potential noise and vibration effects during the construction phase that the potential for exceeding the criteria provided in BS 5228 should be considered. This will also include the effects of any road closures resulting from construction works.

12.6.11 BS 5228 Part 1 refers to two methods for assessing construction noise based on the level of pre-construction ambient noise at the receptor. Method 1, the ABC method, uses the pre-construction ambient noise level to determine an appropriate threshold value, with a significant effect being indicated if the LAeq,T noise level arising from the site exceeds the pre-determined threshold value. Method 2, the 5 dB(A) change method, indicates a potentially significant effect if the total noise (pre-construction ambient plus site noise) exceeds the pre-construction ambient noise by 5 dB or more, subject to lower cut-off values, which are dependent on the time of day. BS 5228 Part 1 also mentions that potentially significant effects could be indicated if a fixed noise level, which depends on the nature of area in which the works are occurring, is exceeded.

12.6.12 The guidance in BS 5228 Part 1 has been used in the derivation of LOAELs and SOAELs for construction noise, as detailed in Table 12-2 below.

Table 12-2 Effect levels for construction noise

Period	LOAEL	SOAEL
Daytime weekday (07:00-19:00) and Saturdays (07:00-12:00)	Exceeds existing $L_{Aeq,T}$ noise level	Threshold level determined as per BS 5228-1: 2009 + A1: 2014 Section E3.2
Evenings weekday (19:00-23:00), Saturdays (12:00-23:00) and Sundays (07:00-23:00)	Exceeds existing $L_{Aeq,T}$ noise level	Threshold level determined as per BS 5228-1: 2009 + A1: 2014 Section E3.2
Night-time weekday and weekend (23:00-07:00)	Exceeds existing $L_{Aeq,T}$ noise level	Threshold level determined as per BS 5228-1: 2009 + A1: 2014 Section E3.2

Source – based on guidance in BS 5228 Part 1 (BSI, 2008)

12.6.13 The LOAEL is set at a noise level where construction noise becomes the dominant noise source whereas the SOAEL is set at a level where construction noise exceeds BS5228-1 thresholds.

12.6.14 Existing noise levels shall be determined based on ambient noise monitoring, noise model prediction or estimation based on published noise level datasets. At the time of writing, the only data available to inform this would be from the Defra noise mapping exercise undertaken in 2015. However, a noise survey exercise is to be undertaken along with noise model predictions for the Do Minimum opening year scenario, which can be used to inform the selection of appropriate LOAEL and SOAEL values as this data is likely to be more accurate than the Defra noise mapping.

12.6.15 An impact may be significant when the noise level at sensitive receptors during construction works exceeds the SOAEL values listed in Table 12-2. A significant effect would be determined if this noise level is exceeded for a period of 10 or more days of working in any 15 consecutive days or for a total number of days exceeding 40 in any 6 consecutive months, unless works of a shorter duration are likely to result in a significant effect (e.g. very high noise events). Similarly, adverse effects might be expected where noise levels exceed the LOAEL. Other factors would also be considered in determining if there is the potential for adverse and significant adverse effects, such as the number of receptors affected and the duration and character of the impact.

12.6.16 Consideration would be given to the potential need for working outside of the typical working hours (typically Monday to Friday from 07:00 to 19:00 and 07:00 to 12:00 on Saturdays), in particular at night.

12.6.17 It is not anticipated that a construction contractor would have been appointed at this stage in the project. As such, detailed information regarding the construction programme and the likely plant and equipment that might be used for the worst-case phases, may not be available. The assessment would be based on reasonable assumptions as to the likely construction programme, construction methods and typical plant and equipment that would be used. The assessment would also consider the likely need for construction works outside of typical daytime working hours and highlight potential noise mitigation measures that are likely to be required.

12.6.18 BS 5228 Part 2 (BSI, 2008a) contains guidance on vibration levels in structures from construction works. It provides a prediction methodology for some mechanised construction works, such as compaction and piling works. The standard also presents guidance for the control of vibration from construction works.

12.6.19 For building structure response, BS 5228 Part 2 reproduces the advice given in BS 7385-2: 1993 - Evaluation and measurement for vibration in buildings: guide to damage levels from ground borne vibration (BS 7385-2). The response of a building to ground borne vibration is affected by the type of foundation, underlying ground conditions, the building construction and the state of repair of the building. Table 12-3 reproduces the guidance detailed on building classification and guide values for cosmetic building damage.

Table 12-3 Construction vibration limits – potential for cosmetic building damage

Receptor	PPV in frequency range of predominant pulse	
	4 Hz to 15 Hz	**15 Hz and above**
Reinforced or framed structures	50 mm/s	50 mm/s
Industrial and heavy commercial buildings		
Un-reinforced or light framed structures	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above
Residential or light commercial buildings		
Values referred to are at the base of the building. At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded.		

Source – BS 5228 Part 2 (BSI, 2008a)

12.6.20 Minor damage is possible at vibration magnitudes which are greater than twice those given in Table 12-3, with major damage at values greater than four times the values in the table. BS 7385-2 also notes that the probability of cosmetic damage tends towards zero at 12.5 mm/s peak component particle velocity. Significant adverse effects are expected at levels where vibration can cause cosmetic damage to structures.

12.6.21 However, some adverse effects may occur at lower levels of vibration than this.

12.6.22 Table 12-4 (reproduced from BS 5228 Part 2) shows potential adverse effect levels for the human response to vibration in terms of peak particle velocity (PPV).

Table 12-4 Guidance on effects of vibration levels – potential for disturbance

PPV vibration	Effect
0.14 mm.s-1	Vibration might be just perceptible in most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3 mm.s-1	Vibration might just be perceptible in residential environments.
1.0 mm.s-1	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
> 10 mm.s-1	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.

Source – BS 5228 Part 2 (BSI, 2008a)

12.6.23 The following effect levels for vibration on humans have been derived from the above. Table 12-5 provides the effect levels for construction vibration works.

Table 12-5 Effect levels for vibration on humans

Effect level	Peak particle velocity (PPV)
SOAEL	1.0 mm.s-1
LOAEL	0.3 mm.s-1

Source – Derived from guidance as outlined above

12.6.24 If the predicted vibration level at a sensitive receptor is above the SOAEL, then there is the potential for a significant effect to occur and mitigation should be proposed. However, the duration of the works, the number of receptors affected and the duration and character of the impact should also be considered in determining the significance of effect.

12.6.25 If necessary, the potential impact on structures should also be considered.

12.6.26 Similar to construction noise, in the absence of a construction contractor, the assessment of construction vibration impacts would be based on reasonable assumptions as to the likely construction programme, construction methods and typical plant and equipment that would be used. The assessment would also consider the likely need for construction works outside of typical daytime working hours and highlight potential vibration mitigation measures that are likely to be required.

Operational Road Traffic Noise and Vibration

12.6.27 The EIA will include the usual range of assessments specified in HD 213/11. The assessment of permanent road traffic noise impacts arising from the M3 Junction 9 improvements will involve predictions for all sensitive receptors in the calculation area, as well as a Basic Noise Level (BNL) assessment for routes outside the calculation area (i.e. the wider road network).

12.6.28 This aspect of the assessment will consider the following scenarios:

- Opening year – Do-minimum (i.e. without the M3 J9 improvements)
- Opening year – Scheme do-something (i.e. with the M3 J9 Scheme)
- Future year – Do minimum
- Future year – Scheme do-something

12.6.29 The assessment will make the following comparisons, as specified in DMRB HD 213/11:

- Do-minimum in the opening year versus do-minimum in the future year (long-term)
- Do minimum in the opening year versus scheme do-something in the opening year (short-term)

- Do minimum in the opening year versus scheme do-something in the future year (long-term)

12.6.30 All road traffic noise predictions will be undertaken in accordance with the calculation methodology presented in the former Department of Transport/Welsh Office technical memorandum Calculation of Road Traffic Noise (CRTN) and the advice contained in Annex 4 of HD 213/11. Traffic speed bands will be derived in accordance with IAN 185/15 (Highways Agency, 2015).

12.6.31 The classification of magnitude of noise impacts associated with short and long term changes in noise levels will be determined in accordance with the criteria presented in Table 12-6 below, which are taken from HD 213/11. Both adverse and beneficial changes will be considered in the assessment. For the assessment of night-time noise impacts, HD 213/11 advises that, until further research is available, only noise impacts in the long-term should be considered.

Table 12-6 Classification of magnitude of noise impacts

Magnitude of impact	Noise change, dB (LA10,18h)	
	Short-term	**Long-term**
No change	0	0
Negligible	0.1 – 0.9	0.1 – 2.9
Minor	1.0 – 2.9	3.0 – 4.9
Moderate	3.0 – 4.9	5.0 – 9.9
Major	+5.0	+10.0

Source – DMRB HD 213/11 (Highways Agency, 2011c)

12.6.32 A noise nuisance and airborne traffic vibration nuisance assessment will be undertaken in accordance with the approach described in DMRB HD 213/11.

12.6.33 Particular consideration will be given to both noise change and noise levels within NIAs along the Scheme (three NIAs have been identified).

12.6.34 An assessment of likely eligibility for sound insulation measures under the Noise Insulation Regulations 1975 (as amended 1988) will be carried out to identify residential dwellings that may potentially qualify under the Regulations.

12.6.35 Operation road traffic groundborne vibration will be addressed qualitatively and will reference the DMRB HD 213/11 whereby a level above 0.3 mm.s-1 PPV or any increase above an existing level of 0.3 mm.s-1 PPV could result in a significant effect, depending on the sensitivity of the receptor.

12.6.36 In addition to the requirements of the DMRB, consideration of the Proposed Scheme with respect to national policy is needed.

Road traffic noise - significant environmental effects

12.6.37 For the operation noise assessment, appropriate noise level criteria have been defined for the purposes of identifying potential significant environmental effects arising from the operation phase of the proposed Scheme. The criteria have been defined based on the guidance provided in the NPSE and PPG.

12.6.38 For the operational noise assessment, the noise levels detailed in Table 12-7 will be considered as the LOAEL and SOAEL in this assessment:

Table 12-7 SOAEL and LOAEL values for operational noise

Parameter	Value for daytime (06:00 – 24:00) [1]	Value for night-time (23:00 – 07:00) [2]
SOAEL	68 dB $L_{A10,18h}$ (façade) 63 dB $L_{Aeq,16h}$ (free-field)	55 dB $L_{night,outside}$ (free-field)
LOAEL	55 dB LA10,18h (façade) 50 dB LAeq,16h (free-field)	40 dB Lnight,outside (free-field)
[1] The daytime LOAEL is based on the Onset of Moderate Community Annoyance, and the daytime SOAEL is based on the onset of cardiovascular health effects (WHO, 1999) and the Noise Insulation Regulation Threshold. The slightly lower Noise Insulation Threshold should be used for consistency with other parts of the DMRB HD 213/11 methodology		
[2] The night time LOAEL is defined using the WHO Night Noise Guidelines, and the night-time SOAEL is equivalent to the levels above which cardio vascular health effects become the major public health concern (WHO, 2009).		

Source – Derived from guidance outlined in table above

12.6.39 For the operation road traffic noise assessment, groups of receptors, or individual receptors where appropriate, will be assessed. A noise change of 3 dB or more in the short-term (i.e. a moderate increase in noise level) for any receptor or receptor group is likely to be significant; however other factors should be considered in determining whether the impact would be significant or not. Other such factors include, but are not limited to:

- The actual short-term change, i.e. a change of 2.9 dB or less (in the short-term) may still be considered a significant environmental effect
- The predicted long-term change in noise, i.e. comparison of the Do Minimum scenario in baseline year against Do Something in the future assessment year
- Absolute noise level with reference to the LOAEL and SOAEL values provided in Table 12-7
- Circumstances of the receptor or receptor group, e.g. locations of windows, outdoor spaces, use of receptor
- Existing acoustic character of the area
- Changes to the landscape or setting of the receptor or receptor group

12.6.40 In terms of complying with Government policy on noise, the assessment at PCF Stage 3 will demonstrate how the project intends on complying with the three aims of the NPSE, which are repeated below with a description of how the aim has been interpreted.

12.6.41 The assessment will make the following comparisons, as specified in DMRB HD 213/11:

- Aim 1: To avoid significant adverse noise effects (significant adverse noise effects occur when noise levels are above SOAEL):
  - Set out the mitigation measures used to reduce noise exposure to below SOAEL at each receptor or group of receptors
  - Where it has not been possible to reduce noise levels below the SOAEL, clearly state the reasons why, in terms of government policy on sustainable development
- Aim 2: To mitigate and minimise adverse noise effects (adverse noise effects occur when noise levels are between LOAEL and SOAEL):
  - Set out mitigation measures used to minimise adverse noise effects at all receptors or groups of receptors above LOAEL (including those also above SOAEL). Refer to the mitigation set out in response to Aim 1 as appropriate
  - Set out measures considered to reduce noise levels further but not ultimately included within the Proposed Scheme and explain why they were not ultimately included
- Aim 3: To improve the noise environment where possible (this applies to all noise levels):
  - Set out mitigation measures used to improve the noise environment, including reference to mitigation measures listed under Aims 1 and 2 as appropriate

12.6.42 Mitigation measures set out for all three aims shall include the following measures:

- Measures incorporated into schemes to reduce overall environmental impact, which can include, but are not limited to, scheme alignment and scheme design
- Measures used solely to mitigate noise, which can include, but are not limited to, noise barriers or quieter road surfaces

12.6.43 To put the aims of the NPSE into context, the following will be reported:

- For daytime and night-time periods, count and report the number of properties in the following categories:
  - Above the SOAEL
  - Between the SOAEL and LOAEL
  - Below the LOAEL

- Determine the change, in terms of the number of properties in each category above, over the short-term (DM Opening Year vs DS Opening Year) and the long-term (DM Opening Year vs DS Design Year) with the Proposed Scheme.

Human Health

12.6.44 As set out in DMRB HD 213/11, a link has been identified between noise impacts and effects on both mental and physiological health. Further research is required to define exposure parameters for a quantitative analysis of such symptoms. Therefore, this assessment will consider noise levels with respect to the Noise Policy Statement for England and in particular its aims, as detailed above

Data sources

12.6.45 The following data sources will inform the noise and vibration assessment:

- Ordnance Survey (OS) MasterMap base mapping layer
- OS AddressBase Plus mapping layer
- 3D engineering drawings to the Proposed Scheme topography and road alignments
- LiDAR or OS Terrain 5 to derive a topographical layer for the study area
- Traffic flow data
- Construction phase information (e.g. construction plant lists and methodologies)
- Road surface information
- Open Government Licence (Defra, 2015) for Noise Important Areas

12.6.46 A baseline noise survey will be undertaken to establish existing noise levels at a representative sample of receptors likely to be impacted by the Proposed Scheme and to aid in the accurate prediction of night-time noise levels. The methodology used during the survey will follow the procedures contained in BS 7445-1:2003 and BS 7445-2:1991 '*Description and Measurement of Environmental Noise*', and CRTN Section III '*The Measurement Method*'. The survey will comprise a combination of short-term attended and long-term unattended measurements within the study area, subject to agreement with the EHO at Hampshire Council.

12.7 Assessment assumptions and limitations

12.7.1 The study area for the EIA cannot be determined until detailed traffic data is received allowing for affected road links to be identified.

12.7.2 The assessment of operation noise impacts will be based on the traffic data provided by the transportation team. Vehicle flows and the proportion of heavy vehicles in the form of Average Annual Weekday Traffic (AAWT) will be used. Traffic speeds will be determined by the transportation team in accordance with IAN 185/15.

12.7.3 The noise modelling incorporates many different data sources. Therefore, the outcome of the modelling is reliant on the quality of these data. Any limitations of these data sources

will be reported in the noise and vibration assessment, along with any associated implications.

12.7.4 The BS 5228 calculation methods enable the level of noise during various construction activities to be determined. However, the precision of any such predictions is necessarily limited by the number of assumptions made regarding the number and type of plant proposed to be utilised, their location and detailed operating arrangements. Some of this information will be clarified as the Proposed Scheme design progresses and later when a contractor is appointed and resources are mobilised, but other information (such as exactly where the plant operates and for how long) would remain uncertain, even after works had commenced.

12.7.5 It is anticipated that night-time noise levels will be estimated using the guidance within TRL document '*Converting the UK traffic noise index $L_{A10,18h}$ to EU noise indices for noise mapping*'. The availability of appropriate traffic data will influence the prediction methodology adopted.

12.8 Elements to be scoped in or out

12.8.1 Table 12-8 outlines the elements to be scoped in to the noise and vibration assessment.

Table 12-8 Elements to be scoped in or out of the EIA for noise and vibration

Element scoped in	Justification
Construction noise	Given the proximity of sensitive receptors to the Proposed Scheme, allied to the scale and complexity of the works, it is considered that there would be potential for adverse effects to occur during the construction phase
Construction vibration	Given the proximity of sensitive receptors to the Proposed Scheme, allied to the scale and complexity of the works, it is considered that there would be potential for adverse effects to occur during the construction phase
Operational road traffic noise	Given the proximity of sensitive receptors to the Proposed Scheme, it is considered likely that some sensitive receptors would experience adverse impacts, particularly those located to the north on Easton Lane
Operational road traffic vibration	Given the proximity of sensitive receptors to the Proposed Scheme, it is considered likely that some sensitive receptors would experience adverse impacts, particularly those located to the north on Easton Lane

12.8.2 No topics have been scoped out of the noise and vibration assessment.

13. Population and Health

13.1 Introduction and study area

13.1.1 This chapter identifies the potential impacts on 'Population and Health'. Whilst access to road transport and car ownership provides valuable independence, access to services and employment for a large proportion of the population, there are also many adverse impacts on health associated with busy roads and traffic, particularly in urban areas, as illustrated by Figure 13-1 below. The assessment will consider how the Proposed Scheme would affect land use, local travel patterns and access to local amenities. It will also consider human health in relation to potential effects on levels of walking and cycling, use of outdoor space, stress and community severance.

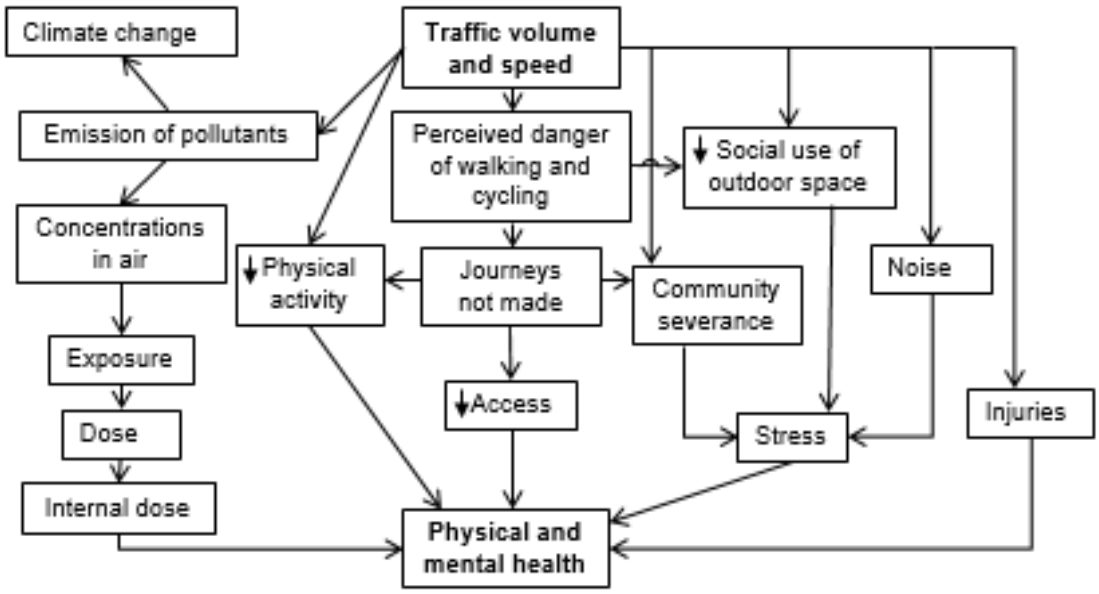

Figure 13-1 Links between traffic volume and speed on health (Adapted from: Williams and Fisher (2007))

13.1.2 Dahlgren and Whitehead's model of determinants of health (Figure 13-2) illustrates that health is determined by a complex interaction between individual characteristics, lifestyle and the physical, social and economic environment. The 'social determinants of health' are the broad social and economic circumstances that influence health. The broad socio-economic profile of the Winchester District has therefore been considered as part of the baseline study, before a smaller study area for the assessment of potential impacts has been applied. This is because there is limited socio-economic data available at a more local level.

13.1.3 The study area for the assessment takes account of the likely pathways through which the Proposed Scheme could influence social determinants of health.

13.1.4 The assessment will take into consideration the footprint of the Proposed Scheme including the land needed for construction and permanent works plus a 2km buffer zone (Figure 13.3). This study area could be expanded to consider the study areas set out for

the assessment of Air Quality (see chapter 6) and Noise (see chapter 12) to capture how potential changes in traffic flows on the wider road network could affect access to, and amenity of, community resources.

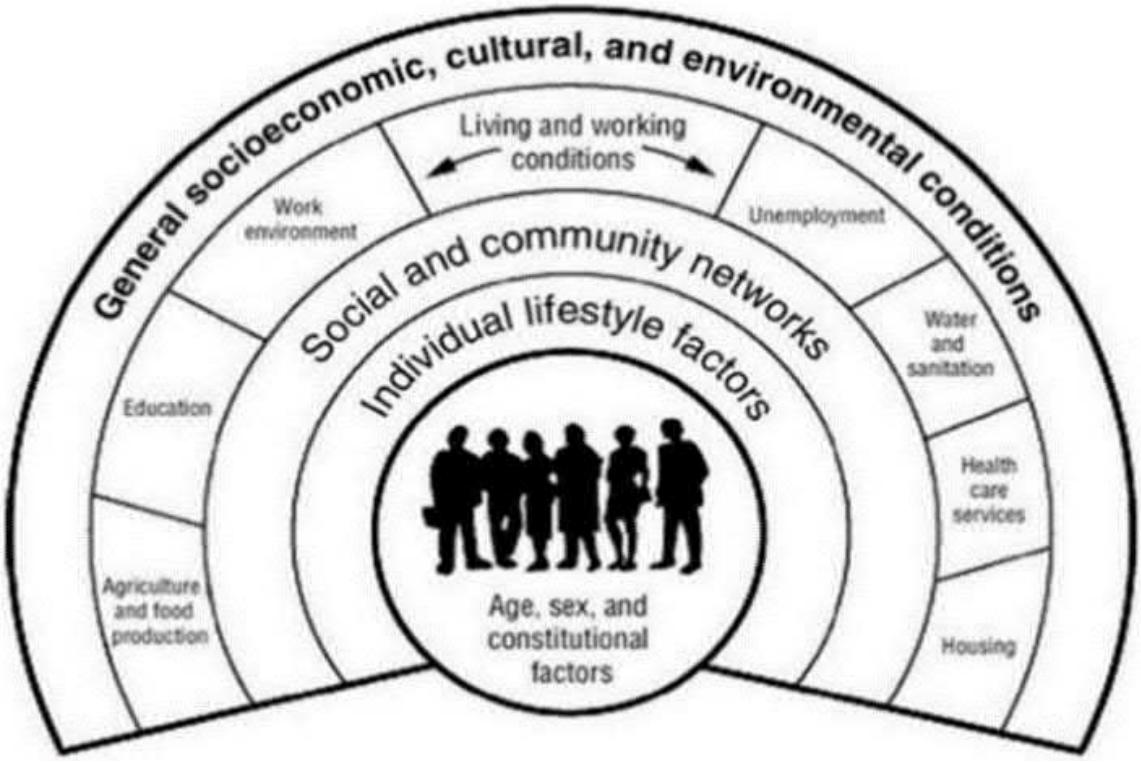

Figure 13-2 The Dahlgren and Whitehead Model of Health Determinants (Source - Dahlgren and Whitehead (1991))

13.1.5 This study area is considered sufficient to identify the key communities, land use, origins and destinations for people that could be affected by the Proposed Scheme. The distance of 2 km represents the journey distance that can be reasonably undertaken by most people on foot (Department for Transport April 2017). Hence the study area is considered reasonable to capture potential impacts on people's sustainable access to local facilities and ability to make local journeys by active travel modes (i.e. walking or cycling). The National Policy Statement for National Networks states that there is a 'direct role for the national road network to play in helping pedestrians and cyclists. The Government expects applicants to use reasonable endeavours to address the needs of cyclists and pedestrians in the design of new schemes.' Therefore, potential impacts on walking and cycling is a key issue for this assessment.

13.2 Baseline conditions

Demographic Profile

13.2.1 The 2011 National Census has been used to inform the broad demographic profile of the Winchester District, in which the Proposed Scheme is wholly located, compared with the South East Region. Table 13-1 sets out this profile. The data indicate that the population of Winchester District is broadly in line with the average age profile for the South East, has a lower rate of people with very limiting health conditions and is comparatively less diverse than the South East as a whole in terms of ethnicity and religion.

Table 13-1 Social profile: key indicators

	Winchester District	South East
Population	116,595	8,634,750
All Persons Aged 0-15	18.4%	18.9%
All Persons 65 and over	18.7%	19.8%
Ethnicity	White British (91.8%), White Irish (0.6%), White Traveller (0.2%), Other White (3.0%), Mixed (1.4%), Asian British (2.3%), Black or Black British (0.4%), Other Ethnic Group (0.3%)	White British (79.8%), White Irish (1.0%), %), White Traveller (0.1%), Other White (4.6%), Mixed (2.2%), Asian British (7.7%), Black or Black British (3.4%), Other Ethnic Group (0.6%)
Long-Term Health Problem / Disability	Day to day activities limited a lot (5.89%), Day to day activities limited a little (8.63%), Day to day activities not limited (85.5%)	Day to day activities limited a lot (8.3%), Day to day activities limited a little (9.3%), Day to day activities not limited (82.4%)
Religion	Christian (63.2%), Buddhist (0.5%), Hindu (0.4%), Jewish (0.2%), Muslim (0.5%), Sikh (0.1%), Other (0.4%), No Religion (27.3%), Not Stated (7.5%)	Christian (59.3%), Buddhist (0.4%), Hindu (1.5%), Jewish (0.5%), Muslim (5%), Sikh (0.8%), Other (0.4%), No religion (24.7%), Not stated (7.1%)

Health Profile

13.2.2 The key health indicators, including wider social determinants of health such as income and employment, are set out below in Table 13-2. These have been taken for the population of Winchester District and compared to the average for England using the most up to date data available. The table only presents those health issues deemed relevant to transport.

13.2.3 In summary the health of people in Winchester is generally better than the England average and life expectancy for both men and women is higher than the England average. The employment rate for Winchester is better than average for England (Table 13-2) and Winchester is one of the 20% least deprived districts/unitary authorities in England, however about 8% (1,500) of children live in low income families. In Year 6, 11.3% of children are classified as obese, better than the average for England (which is 20%). Estimated levels of adult excess weight and physical activity are better than the England average.

13.2.4 The rate of people killed and seriously injured on roads is substantially worse than average (more than double the rate per 100,000 than the national average – see Table 13-2). Further information is required to better understand the reasons behind this high rate and if there is any link with the influence of the M3 Junction 9.

Table 13-2 Health profile: key indicators

Indicator	Time period	Winchester district	England
Life expectancy at birth (male) (years)	2014-2016	82.0	79.5
Life expectancy at birth (female) (years)	2014-2016	84.9	83.1
Killed and seriously injured on roads (crude rate per 100,000 population)	2014-2016	81.7	39.7
Physically active adults (aged 19+) (%)	2016/2017	74.7	66.0
Excess weight in adults (aged 18+) (%)	2016/2017	53.2	61.3
Obese children (aged 10-11) (%)	2016/2017	11.3	20.0
Children in low income families (%)	2015/16	7.5	16.8
Economically Active (16-64) (%)	2017/2018	82.7	78.4
In Employment (16-64) (%)	2017/2018	80.5	75.0
Unemployed (16-64) (%)	2017/2018	2.5	4.2
Source - Public Health England (2018) Office for National Statistics (2018)			

Land use, community and local access

13.2.5 The land to the west of the Proposed Scheme is mainly residential and urban. The Proposed Scheme location is on the eastern edge of Winnall, a northern suburb of Winchester (Figure 13.3). There is a residential area in the southern part of Winnall, which abuts the very southern extreme of the location of the Proposed Scheme. Situated within Northern Winnall there is an industrial estate, this sits alongside the western arms of the M3 Junction 9. A highways maintenance depot is sited on the north-western side of the interchange on land between the M3 and A34 Winchester bypass. Other nearby residential areas include Abbott's Barton (approximately 70 m west of the northern extents of the proposed Scheme); Kings Worthy and Headbourne Worthy, villages which abut the A34 within the northernmost extents of the Proposed Scheme and Easton, a village approximately 1 km north-east of the Proposed Scheme location. The main settlements within 2 km of the Proposed Scheme location are listed below in Table 13-3 and labelled on Figure 13.3.

13.2.6 The land to the east of the Proposed Scheme is predominantly rural, comprising arable fields, interspersed with some isolated properties. These properties include a number of farms e.g. Winnall Cottage Farm and Shoulder of Mutton Farm. This land, together with the Itchen valley located between the Winnall industrial estate and Abbott's Barton, is within the South Downs National Park.

Table 13-3 Settlements within the study area

Name	Type of Settlement	Distance from Proposed Scheme	Population [2011 Census]	Percentage of population under 16	Percentage of population over 65
Winchester	City	1.7 km south west	45,184	17.7%	17.5%
St John and All Saints Ward (includes Winnall)	Suburb of Winchester	Abuts western scheme boundary	6285	18.2%	13.8%
St Bartholemew Ward (includes Abbott's Barton)	Suburb of Winchester	1.1 km west	6407	14.9%	21.6%
Itchen Valley Ward (includes Easton and Chilcomb hamlets)	Suburb of Winchester	Abuts eastern scheme boundary	1896	18.8%	22.3%
Headbourne Worthy	Village	Abuts eastern scheme boundary	466	12.9%	41%
Kings Worthy	Village	Abuts eastern scheme boundary	4435	19%	16.5%

Winchester

13.2.7 Winchester is a historic city and provides a vast range of services including a hospital, a university and a large number of retail outlets, and is a large local centre.

13.2.8 A large proportion of journeys to and from Winchester to access the above services are via the A34 and M3, by vehicle.

Winnall

13.2.9 Winnall lies west of the existing M3 J9. Immediately west of the junction, via access off the Easton Lane arm of the interchange, lies the Sun Valley Business Park and the Wykeham Trade Park (in Winnall Industrial Estate). Located within these are businesses which include several retail and light industrial units, a fuel station, coffee shop and a Tesco Extra superstore, which also contains a pharmacy. To the south of this area lies a residential area, within which is the Winnall Primary School, Winnall Community Centre and a convenience store. It is likely that local residents to Winnall and employees of the businesses utilise the pedestrian and cycle route access within this area to access the Tesco superstore, and local residents will be serviced by the smaller convenience store and the primary school. Other local facilities are likely to be accessed from Winchester city centre.

13.2.10 Leigh House Hospital and St Swithun's School are located east of the M3 from Alresford Road (B3404). They may be accessed on foot by residents of Winnall as there is a footway on either side of the carriageway, however most journeys are expected to be made by vehicle.

13.2.11 The majority of journeys from Winnall into Winchester will be via Easton Lane or Alresford Road. Access to the M3 or the A34 is from Easton Lane.

Kings Worthy

13.2.12 Kings Worthy is a small residential area which lies between the fork of the A34 and the A33. Within this local settlement are a food convenience store, a primary school, a post office, a church, a sports and social club and a pharmacy. In addition to these community facilities, there are shops, restaurants and a pub.

13.2.13 It is likely that some of the local trips to the facilities listed above are made by non-motorised means by local residents. For access to other services, it is likely that these will currently be sought in the centre of Winchester, via vehicular means by the B3047 (London and Worthy Roads), or Flowerdown to the west by Wellhouse Lane.

Abbots Worthy

13.2.14 Abbots Worthy lies to the south east of Kings Worthy, in between the A33 Basingstoke Road and the M3. There are a small number of residential properties accessed from the B3047. There are no community facilities within Abbots Worthy, other than Princesmead School.

13.2.15 There is no off-road pedestrian provision along the B3047, so it is likely that the majority of journeys from Abbots Worthy are made by vehicle to local facilities in Kings Worthy, or into Winchester by the A33/A34 or the B3047.

Headbourne Worthy

13.2.16 Headbourne Worthy is located west of Kings Worthy, separated by the A34. There are no community facilities located within this small residential area.

13.2.17 There is no pedestrian provision on the B3047 to Kings Worthy, but there is a pedestrian footway on Springvale Road into Kings Worthy. Some residents from Headbourne Worthy could access facilities in Kings Worthy on foot, but it is more likely that the majority of journeys are made by vehicle into Kings Worthy (via London Road or Springvale Road), Flowerdown (via Wellhouse Lane) or Winchester (via the B3047).

Community Facilities

13.2.18 The key community facilities identified within close proximity to the Proposed Scheme are set out in Table 13-4 and shown on Figure 13.3. These include some facilities likely to be used by groups such as children, the elderly or disabled, who would potentially be more sensitive to impacts of the Proposed Scheme.

Table 13-4 Community facilities

Facility	Type of facility	Location from Proposed Scheme
Schools (within 2 km to allow for routes to schools)		
Kings Worthy Primary School	Mixed government school for children ages 4 - 11	368m east
Osbourne School	Maintained special school for pupils with learning disabilities aged 11-19.	1600m west
St. Bede Church of England Primary School	Church of England school for pupils aged 4-11.	1190m west
St Swithun's School	Independent school for girls aged 3 – 18.	270m east
Winnall Primary School	Mixed public community school	430m west
Nurseries and Playgroups (within 1 km)		
Hartley House Montessori Ltd	Montessori style nursery for children aged 6 months to 5 years.	1310m west
Riverside Nursery School	Private nursery with some government funding for children aged 2 – 5	1010m west
Spingvale Playgroup	Playgroup	240m east
Stepping Stones Pre-School	Private nursery with some government funding for children aged 2 to 4/5	450m west
Yellow Dot Nursery	Private nursery for children of 'baby to kindergarten age'.	900m west
Care Homes and Nursing Homes (within 1 km)		
Leonard Cheshire	Provides support for disabled people	310m west
Hospitals (within 2 km)		
Leigh Hospital	Specialist mental health unit for young people	620m east
Places of Worship, Churchyards and Cemeteries (within 2 km)		
All Saints Church	Place of worship with churchyard	700m west
Holy Trinity Church	Place of worship with churchyard	1400m west
Kingdom Hall	Place of worship	350m south west

Facility	Type of facility	Location from Proposed Scheme
Magdalen Hill Cemetery	Cemetery	1450m east
St Bartholomew's Church	Place of worship with churchyard	1340m west
St Giles's Hill Cemetery	Cemetery	470m west
St Marys Church	Place of worship with churchyard	1380m north
St Swithuns	Place of worship with churchyard	960m east
Winchester Cathedral	Place of worship with churchyard	1300m west
Sports Pitches, Playgrounds and Allotments (within 1 km)		
Highcliffe Allotments	Allotments	220m west
Imber Road Play Area	Play area that also has outdoor gym facilities	600m west
King George V Playing Field	Playing fields with children's playground	Abuts western scheme boundary
North Walls Recreational Ground	Recreational ground used for both cricket and rugby during the different playing seasons	600m west
Winchester Sports Stadium	Athletics track	310m west
Winnall Manor Road	Small park and recreational field	330m west
Other Recreational/Tourist Assets (within 2 km)		
Hyde Abbey Garden	Garden open to public	1270m west
South Downs National Park	National Park	Coincides with Proposed Scheme boundaries
Winchester City Museum	Museum	960m west
Winchester Science Centre & Planetarium	Museum	2km east
Winnall Moors Wildlife Reserve	Nature reserve with walks	360m west

Land Allocations

13.2.19 The Winchester District Local Plan Part 1 – Joint Core Strategy was adopted in March 2013 and sets out the overall vision, objectives, spatial strategy and strategic policies for the district.

13.2.20 The development strategy for the District (excluding the South Downs National Park) is the identification of three spatial areas within accompanying vision and objectives, along with development requirements for – Winchester Town, Market Towns and Rural Area and South Hampshire Urban Area. The Local Plan Part 1 states that the principal focus for new development across the District will be within the urban areas of Winchester Town and the South Hampshire Urban Area. The development strategy (Policy DS1) sets out that over the plan period a total of around 12,500 new dwellings and 20 hectares of employment land will be delivered in the following way:

Winchester Town

- Around 4000 new homes, of which 2000 of the new homes will be in a new neighbourhood to the north of Winchester at Barton Farm as a strategic housing allocation
- Retention of existing employment land and premises (including exploring opportunities at the employment site of Bushfield Camp), along with the provision of additional retail floorspace

South Hampshire Urban Area

- Around 6000 new homes, of which 2500 of the new homes, which already have planning permissions, will be to the West of Waterlooville and 3500 new homes in North Whiteley
- The allocations at West of Waterlooville will provide new employment floorspace

Market Towns and Rural Area

- 2500 new homes in the Market Towns and Rural Area across Bishops Waltham, New Alresford, Colden Common, Denmead, Kings Worthy, Swanmore, Waltham Chase, and Wickham.
- New employment uses through development and redevelopment opportunities within existing settlement boundaries in the first instance, along with retention of major commercial establishments in the countryside.

13.2.21 The Winchester District Local Plan Part 2 follows on from the Local Plan Part 1 and makes further land allocations at the non-strategic level to help deliver the overall development requirements for the district over the plan period, particularly for the Market Towns and Rural Areas outside the South Downs National Park that are expected to provide around 2,500 new homes between 2011 and 2031. Within these allocations there is a recognised settlement gap within Kings Worthy lying within 880m of the Proposed Scheme (Figure 13.3). There are plans to construct 250 new dwellings within this area and construction was underway by 2017.

Recreation and Public Rights of Way

13.2.22 The key roads and public rights of way that interact with, or are in close proximity to, the Proposed Scheme are shown on Figure 13.3.

13.2.23 The highways associated with the M3 Junction 9 are the M3 motorway itself, the A34 Winchester Bypass, the A272 and Easton Lane. The B3404 (Alresford Road) crosses the M3 east-west via a bridge approximately 570 m south of Junction 9 and accommodates bus routes between Winchester and settlements to the east. Vehicle travellers on the M3 north of junction 9 would have intermittent views of the surrounding countryside since the motorway is on embankment. However, to the south of the junction, the motorway drops into cutting restricting views for vehicular travellers. There is a footway along the eastern edge of the A34 dual carriageway. There are footways on both sides of Easton Lane within industrial estate.

13.2.24 The National Cycle Network Route 23, linking Reading to Southampton, crosses Junction 9 via some at-grade crossings. The cycleway is routed onto Easton Lane in the industrial estate from the south, crossing the motorway junction via two at-grade crossings, before continuing along Easton Lane to the east. Easton Lane at this point is bridleway 502 as it crosses the junction and for approximately 200 m until it becomes a small, single carriageway metalled track from which some isolated residential properties/farms may be accessed. There is no through-route for motorised traffic across the junction via Easton Lane.

13.2.25 There are four distance paths (regional trails) following the Itchen valley. The Allan King Way and St Swithun Way follow the same route on the west side of the valley, crossing the A34 immediately north of the proposed Scheme location via an underpass into Kingsworthy. The Itchen Way and Three Castles Path follow another route on the east side of the valley, crossing under the A34 where the river Itchen crosses, within the footprint of the Proposed Scheme. The two distance paths diverge approximately 600 m east of the A34, with the Three Castles Path crossing the M3 via a subway approximately 740 m north of the Proposed Scheme, whilst the Itchen Way joins St Swithuns Way and crosses the M3 approximately 380 m further along. These are the main public rights of way within close proximity to the Proposed Scheme, although there are several shorter public footpaths and bridleways in the wider area.

13.2.26 The location of the Proposed Scheme on the edge of settlement with the National Park to the east means that the majority of pedestrian and cycling journeys across the footprint of the Proposed Scheme would be likely to be for recreational purposes. However, it is possible that some residents from the villages and properties east of the M3 would access services within Winchester via the cycleway or Alresford Road.

13.2.27 The small routes identified above are likely to be heavily used as the M3 acts as a barrier between Winchester and the South Downs National Park and these represent the only crossing points available in the vicinity of the Proposed Scheme location.

Value of environmental resources and receptors

13.2.28 For this assessment, the receptors are people, whilst the resources are the facilities, services and land uses that those people use or depend upon. The receptors (people) are considered in terms of their sensitivity to potential changes from the Proposed Scheme, whilst the resources are considered in terms of their value to the population (receptors) who use them. There is no standard guidance on the valuation of resources and receptors for this topic. The proposed criteria for assigning sensitivity and value are set out below in Table 13-5. These criteria have been developed using professional judgement and experience from similar projects. In developing the criteria set out in Table 13-5 consideration has been given to relevant national health policy priorities, such as tackling low levels of physical activity, as well as guidance in the DMRB Volume 11, Section 2, Part 5 (HA 205/08) (Highways Agency, 2008d).

13.2.29 In summary, it is considered that the M3 Junction 9 is of high value for economic reasons. The M3, being part of the strategic road network, is a key route to the south coast including the cross-channel and Isle of Wight ferry ports at Portsmouth, the Isle of Wight ferry ports and cruise ports at Southampton, the New Forest National Park, and westward towards Poole and Bournemouth from the north via the A34 and from M25 connections, London and Basingstoke. The other ‘A’ roads stemming from M3 Junction 9 are also of value in linking Winchester to other towns, areas and the wider road network.

13.2.30 It is likely that the public rights of way and cycleway (National Cycle Network Route 23) that cross the Proposed Scheme location are of high value in terms of access to recreation and open space/countryside. The Proposed Scheme is on the edge of the settlement and therefore the majority of journeys would be likely to be from Winchester towards the countryside (National Park etc.). It is possible that some residents of the villages and rural areas east of the M3 use these routes to access the industrial estate and services within Winchester (therefore making the routes of utility value as well as recreational) but it is expected these are relatively few due to the sparsely populated nature of the surrounding area away from Winchester itself.

13.2.31 Alresford Road, being one of relatively few routes across the M3, is likely to be of value to local traffic, including pedestrians and cyclists, to access some of the facilities on the east side of the M3.

13.2.32 The city of Winchester is of value to communities in the surrounding area, providing a variety of services (for example retail, schools, healthcare facilities and employment).

13.2.33 As set out in Table 13-4, there are several facilities in the surrounding area that are likely to provide for vulnerable people who would potentially be sensitive to potential impacts of the Proposed Scheme.

Table 13-5 Value/sensitivity criteria for population and health resources and receptors

Value/sensitivity	Description	Rationale for criteria applied
Very High	Routes used by high numbers of pedestrians and cyclists for utility journeys such as commuting to large employment sites, for which there are limited alternative routes. These are the main routes which connect communities with employment land uses and other services with a direct and convenient active travel route.	These routes are important since they offer opportunities to meet sustainable transport and public health objectives through active travel modes rather than private car use. Any interruption of these would inconvenience many people and could cause people to switch from active modes to private car use.
	Key community facilities, services and routes regularly used by vulnerable groups such as the elderly, school children and people with disabilities. Examples of such facilities include schools, primary healthcare facilities, places of worship and cemeteries.	These facilities would be used by groups who could be disproportionately affected by small changes in the baseline due to different needs and/or more limited choices.
High	Footways, cycleways and local roads that provide a means of active travel to local destinations, or the main route for local journeys by car.	Routes and community facilities such as these are valued as highly sensitive on the basis that disruption of access or loss of the resource could undermine the ability of the community to support its health, social and cultural wellbeing and/or affect community cohesion.
	Key community facilities that provide local services, employment and/or meeting points for the local community such as community centres, public houses, convenience stores, allotments and post offices.	
	Recreational facilities and land of importance to the local community including open space, sports and recreational buildings and land including playing fields and designated Local Green Space.	Access to high quality open spaces and opportunities for sport and recreation can make an important contribution to the health and well-being of communities and therefore these facilities, and the means to access them, are considered to be of high value and protected under the NN NPS.
	National or regional trails and key routes (including Public Rights of Way) that are well connected, provide good access to the	

Value/sensitivity	Description	Rationale for criteria applied
	countryside or other popular recreational destinations, are likely to be well-used by the community and for which there is limited alternative provision.	
Medium	Public Rights of Way and other routes, as well as informal green space (not designated as Local Green Space), used mainly for informal recreational purposes (for example dog walking) but for which alternative routes and sites could be used.	It is judged that people using these facilities are not seeking formal recreation or an efficient journey and would therefore be more tolerant of temporary disruptions and diversions but would nevertheless be sensitive to changes to the amenity and character of the overall route/site.
	Private properties and land use (commercial and residential) not providing public facilities or key community services.	It is considered that these properties would be of medium sensitivity since impacts on them would affect individuals but not affect the whole local community.
Low	Routes that have fallen into disuse, such as through past severance, or which are scarcely used because they do not currently offer a meaningful route for either utility or recreational purposes.	Whilst these routes would not be sensitive in terms of disruption from the Proposed Scheme, they could present opportunities for enhancement if existing barriers or poor amenity could be overcome through the Scheme proposals.
	Land allocated for development. It is considered that this land is of low sensitivity since proposed development is yet to be incorporated into the community.	Whilst the Proposed Scheme would affect individual developers, there is opportunity to compensate or alter proposals to accommodate the Proposed Scheme.
Negligible	Informal routes such as desire lines or land such as derelict sites that may attract use but which are not designed for public use.	These resources are considered to have negligible sensitivity to disruption from the Proposed Scheme since they have no formal designation or status. However, they could present opportunities for community enhancement by addressing a need or addressing sites attracting antisocial behaviour.

13.3 Potential impacts

Construction

13.3.1 During construction the main potential impacts would relate to temporary changes in traffic flows as a consequence of traffic management measures, as well as temporary disruption such as noise, vibration, visual intrusion and dust from construction activities. The main potential impacts identified are set out below.

Potential impacts on motorised travellers

13.3.2 There is potential for driver stress caused by frustration, route uncertainty and/or fear of accidents as a consequence of temporary changes in traffic flows and any route diversions needed to construct the Proposed Scheme. This would potentially affect drivers on the M3 Junction 9 and wider affected highway network.

13.3.3 During construction, the presence of construction plant and potential removal of vegetation could affect views from the road but this is anticipated to be negligible for vehicular travellers given the relatively short stretch of road and context of a junction.

Potential impacts on people using the Cycle Ways and Rights of Way Network

13.3.4 There is potential for physical disruption and loss of amenity to the length of National Cycle Network Route 23 (and bridleway 502) within the footprint of the Proposed Scheme, providing access between Winchester and the South Downs National Park. This could have consequential potential effects on health and wellbeing of the receptors using this route.

13.3.5 There is also potential for temporary disruption and loss of amenity to the Itchen Way and Three Castles Path where they cross under the A34 within the footprint of the Proposed Scheme (footpaths 749 and 21). For the other Public Rights of Way in the area, including the Allan King Way and St Swithun Way, the potential impacts would be likely to be a temporary loss of amenity from potential construction noise, visual intrusion and dust since they are outside the footprint of the Proposed Scheme.

Potential impacts on land use (including land allocated for development)

13.3.6 It is unlikely that there would be any potentially significant impacts on land-use as the footprint of the Proposed Scheme is largely confined to the existing transport corridors and therefore only slight encroachment on the edges of neighbouring land uses is anticipated. However there could be a requirement for some temporary occupation of further land to accommodate a construction compound and storage of construction plant and materials.

Potential community impacts

13.3.7 The potential combination of construction noise, vibration, dust and visual intrusion has the potential to cause disturbance and affect the wellbeing of local residents in nearby residential areas, particularly Winnall but also potentially residents in Abbotts Barton, Headbourne Worthy, Kings Worthy, nearby farms and boarders at St Swithun's School. The impacts would be potentially more significant should night-time construction be required, since impacts could result in sleep disturbance and associated health issues.

13.3.8 No potential impacts are anticipated on the demographic profile of the community from the nature and scale of this Proposed Scheme, as it is a highway project.

13.3.9 Any changes to traffic flows and diversions to the linked local highway network could also affect local access to facilities and services for the local community. There would be a potential for community severance which is defined as the separation of residents from facilities and services used within their community. Severance could be physical, such as that caused by the closure of a route or introduction of an obstacle hindering access, or it could be psychological, such as being deterred by the presence of traffic noise or perceived risk. Since the Proposed Scheme is at the edge of a settlement, the main potential risk of community severance would be likely to be within the Winnall area, particularly the industrial estate, and most likely as a result of changes in traffic flows.

Potential impacts on local economy

13.3.10 Construction activities could potentially cause temporary disturbance to workers and customers associated with the Winnall Industrial Estate and other local community services which are within close proximity to the Proposed Scheme footprint. The potential impacts would be likely to be worse during daytime on the assumption that the majority of businesses and services would operate and hence be occupied during typical working hours.

13.3.11 Any disruption to traffic flows could also affect access and cause delay for HGVs and other delivery vehicles as well as people working at or using businesses on the industrial estate or other services close to the affected road network. This could temporarily discourage custom or affect the efficiency of business operations should traffic congestion be severe.

Operation

Potential impacts on motorised travellers

13.3.12 Once operational, the improved junction layout and highway standards would be likely to reduce driver stress as a consequence of reduced incidences of frustration associated with delays.

13.3.13 It is anticipated that there would be no notable change to views from the road for the Proposed Scheme (and therefore no likely significant effects). On the M3 there would still be no view through the cutting beneath the junction, and a mixture of restricted and intermittent along the alignment alterations, depending on the topography and vegetation screening.

Potential impacts on people using the cycle ways and Rights of Way network

13.3.14 During operation it is proposed that a new shared use pedestrian footway/cycleway would be provided alongside the A34 between M3 J9 and Footpath 749 (The Itchen Way). The National Cycle Network Route 23 (which incorporates bridleway 502) through the junction (Easton Lane) would also be improved for pedestrians, cyclists (and potentially horse riders), providing better amenity and an improved experience for users. These proposed improvements to pedestrian/cycle routes on and around Junction 9 would contribute to improved opportunity for active travel within the neighbourhood, with potential to improve rates of physical activity and associated health benefits.

13.3.15 No potential impacts on amenity of the wider public rights of way network (including the regional distance trails) is anticipated once the proposed Scheme is operational. This is because these routes already experience traffic noise and visual impacts of the existing M3 and road network, and the alteration to the junction design would not make a noticeable difference from the baseline context.

Potential impacts on land use (including land allocated for development)

13.3.16 It is unlikely that there would be any potentially significant impacts on land-use as the proposed footprint of the Proposed Scheme is largely confined to the existing transport corridors and therefore only slight encroachment on the edges of neighbouring land uses is anticipated. This includes some land take from the South Downs National Park which is likely to be required, which would be permanently lost. This area of the national park is urban fringe, directly adjacent to the M3 and near the urban fringe of Winchester so the overall effect in terms of availability and amenity of green space for the local community would be limited.

13.3.17 It is not likely there would be any direct impacts on areas of strategic growth and employment land allocations within Winchester.

Potential community impacts

13.3.18 No significant potential impacts on the local community are anticipated once the Proposed Scheme is operational. This is because the Proposed Scheme is on the edge of the settlement within the existing transport corridor, and therefore no notable change from the baseline situation would be likely.

13.3.19 No impact on community severance is anticipated, although as identified above, there would be potential improvements to access for those few people who may regularly cross the junction 9 area for access to services or employment within Winchester.

Potential impacts on local economy and community services

13.3.20 The improved junction layout would improve local access between businesses in Winchester and the strategic road network. However no noticeable long term impacts on the composition of the local economy or services are anticipated from this proposed improvement.

13.4 Design, mitigation and enhancement measures

Motorised travellers

13.4.1 The preferred design solution would aim to improve the experience of drivers using the route and connecting roads. The following mitigation and enhancement measures would contribute to an improved experience for motorised travellers and minimise the potential for driver stress:

- Where overriding landscape or design constraints do not restrict this, the views from the road for motorised travellers should not be further obscured by new structures(s)

- Signage and layout would be clear to understand and avoid creation of route uncertainty. Any diversions or closures undertaken during construction would be clearly advertised, and any diversionary routes would not lead to uncertainty

- The design will include safety measures to reduce fear of accidents

13.4.2 These issues will be addressed through design and the construction management proposals.

Active travellers (pedestrians and cyclists) and Public Rights of Way

13.4.3 The Proposed Scheme would address the needs of cyclists and pedestrians in the design, and either retain or improve existing access arrangements. For example, the existing Public Rights of Way would be retained and a proper means of access provided to prevent severance. Any diversionary works or closure of pedestrian or cycle routes required to facilitate construction, would be undertaken following consultation with affected groups or individuals, and the required consent obtained. The overall connectivity of pedestrian and cycle routes would be maintained and, where feasible enhanced, in the permanent design.

13.4.4 Use of best practice design concerning the safety of pedestrians and cyclists, including appropriate lighting, would improve the amenity of users of the footpaths in the surrounding areas. Additionally, landscaping would provide screening of the road where possible and reduce noise level for the wider network of Public Rights of Way would also improve amenity for people.

13.4.5 Existing footways, cycleways and Public Rights of Way should be retained, and where crossed by the route, provided with adequate means of access to prevent severance. The types of access would be considered, for example, by not introducing new barriers such as stiles to Public Rights of Way, which could restrict certain users.

13.4.6 There is potential to enhance the opportunities for access to recreation by providing further crossing points across the M3. This could reduce the impact of the existing barrier caused by the M3 and reduce recreational pressure on the existing Public Rights of Way.

13.4.7 Existing roads should be incorporated into the Proposed Scheme, allowing for crossing points within the design to help ensure against community severance.

Community impacts

13.4.8 Residents would be informed of construction activities in advance, particularly if there was night-time working. Any lighting associated with the works would be directional and avoid light spill onto neighbouring land uses such as residential areas.

13.4.9 Construction haul routes and traffic should be carefully planned to try to avoid undue impacts on sensitive receptors, such as school routes. Construction traffic management proposals would be designed to limit disruption to the wider road network.

Local Economy

13.4.10 Where practicable, the workforce and project supply chain would be locally sourced. Best practice measures would be employed to limit effects to journey times and amenity for customers and local businesses within Winnall industrial estate.

13.5 Description of likely significant effects

13.5.1 It is anticipated that there would be no permanent adverse significant effects on motorised travellers, pedestrians or cyclists during operation of the Proposed Scheme. It is expected that there would be a beneficial effect on driver stress for motorised travellers.

13.5.2 It is anticipated that there would not be any new community severance during operation. All pedestrian and cycle routes, including Public Rights of Way would remain open during operation and in some cases improved. There is potential for a beneficial effect for pedestrians and cyclists from improved provisions and amenity, which could lead to beneficial effects on human health should physical activity levels increase.

13.5.3 Although there would be some private land take required for temporary (during construction) and permanent works (during construction and operation), it is not anticipated that there would be significant adverse effects on land-use.

13.5.4 With mitigation in place it is not expected that there would not be any significant effects on the local economy during construction or operation. There could be a slight adverse effect on local businesses during construction and the local economy due to delays on the road network. There would likely be a slight beneficial effect to the local economy in the long term due to reductions in delays on the local and strategic road network.

13.6 Assessment methodology

Policies and plans

13.6.1 Planning policies and guidance that are relevant to the Proposed Scheme include:

- National Policy Statement for National Networks (NPS NN) (DfT, 2014) Paragraphs: 3.2-3.5 (Environmental and Social Impacts); 3.10 (Safety); 3.15-3.17 (Sustainable Transport); 3.19-3.22 (Accessibility);.4.81-4.82 (Health); 5.162, 5.175, 5.180, 5.184 (Land use Including Open Space, Green Infrastructure and Green Belt); and, 5.202-5.214 (Impacts on Transport Networks)

- The National Planning Policy Framework (NPPF) (2018): Paragraphs 91 (Promoting healthy and safe communities); 98 (Open space and recreation), 102 (Promoting sustainable transport), 110 (Considering development proposals), 124, 127 and 130 (Achieving well-designed places); and, 172 (Conserving and enhancing the natural environment), and the associated Planning Practice Guidance: Natural Environment (2016) and Open space, sports and recreation facilities, public rights of way and local green space (2014)

- Winchester District Local Plan Review (2006) Saved Policies – DP.3 (General Design Criteria)

- Winchester District Local Plan Part 1 – Joint Core Strategy (2013): MTRA4 (Development in the Countryside); Policy CP13 (High Quality Design), Policy CP15 Green Infrastructure, Policy CP19 (National Park), Policy CP20 (Heritage and Landscape Character)

- Winchester District Local Plan Part 2 – Development Management and Site Allocations (2017): Policy WIN1 (Winchester Town); Policy DM16 (Site Design Criteria); Policy DM17 (Site Development Principles); Policy DM18 (Access and

Parking); Policy DM20 (Development and Noise); and, Policy DM23 Rural Character

- South Downs Local Plan Pre-Submission (2017) – Emerging: Core Policy SD1 (Sustainable Development); Core Policy SD2 (Ecosystem Services); Core Policy SD3 (Major Development); Strategic Policy SD5 (Design); Strategic Policy SD6 (Safeguarding Views); Strategic Policy SD7 (Relative Tranquillity); Strategic Policy SD8 (Dark Night Skies); Strategic Policy SD19 (Transport and Accessibility); Strategic Policy SD20 (Walking, Cycling and Equestrian Routes); Development Management Policy SD21 (Public Realm, Highway Design and Public Art); Strategic Policy SD42 (Infrastructure); and, Strategic Policy SD45 (Green Infrastructure)

Guidance

13.6.2 The assessment will follow the updated DMRB interim guidance contained within IAN 125/15, combining published guidance in DMRB Volume 11, Section 3, Parts 6 (Land Use), 8 (Pedestrians, Cyclists, Equestrians and Community Effects) and 9 (Vehicle Travellers) into one assessment of Population and Health. This is in accordance with the latest Highways England guidance. It should be noted that some of the DMRB guidance is somewhat dated and has limitations in relation to guidance on the assessment of health effects and active travel. Therefore, some more recent guidance from the Department for Transport (DfT) will be used and professional judgement applied in determining sensitivity and significance of issues against national and local policy priorities.

Assessment of Driver Stress

13.6.3 Driver Stress is defined in Volume 11 of the DMRB as the adverse mental and psychological effects experienced by a driver traversing a road network. Stress can induce in driver's feelings of discomfort, annoyance, frustration, or fear culminating in physical or emotional tension that detracts from the value and safety of the journey. Volume 11 of the DMRB indicates that with increased driver stress, a lowering of driving standards occurs, which could be expressed as an increase in aggression towards other road users, or a diminished response to visual and other stimuli.

13.6.4 The level of stress experienced by a driver could be affected by a number of factors including: road layout and geometry; surface riding characteristics; junction frequency and speed; and flow per lane. There are three main components of driver stress as follows:

- Driver frustration - Caused by an inability to drive at a speed consistent with the standard of the road and increases as speed falls in relation to expectations.

- Driver fear - The main factors are the presence of other vehicles, inadequate sight distances and the likelihood of pedestrians, particularly children, stepping into the road. Fear is highest when speeds, flows and the proportion of heavy vehicles are all high, becoming more important in adverse weather conditions.

- Driver uncertainty - caused primarily by signing that is inadequate for the individual's purposes.

13.6.5 The measurable aspect of driver stress is associated with frustration due to delays. However, no detailed modelling of the performance of M3 Junction 9 has been undertaken at this stage of assessment. The level of Driver Stress will be determined through a

qualitative assessment of the above factors, under a three point descriptive scale, as recommended under DMRB guidance, as Low, Moderate or High.

Assessment of impacts on active travellers, Public Rights of Way, access to recreation and community facilities

13.6.6 The proposed methodology will be based on the procedures set out in the DMRB Volume 11, Section 3, Part 8 and 9 and the application of DMRB Volume 5, Section 2, Part 5, HD42/05 and will consider:

- The Proposed Scheme's impact on the journeys that pedestrians, cyclists and equestrians make in its locality;
- The impact on existing usage of the community facilities and routes by pedestrians and others;
- Changes in safety and amenity value of routes which could be affected by the proposed route; and
- The effects of the Proposed Scheme on community severance.

13.6.7 The assessment will involve a desk study to identify likely pedestrian, cyclist and equestrian activity, as well as how local community facilities would be likely to be affected by the construction and operation of the Proposed Scheme in both adverse and beneficial senses. It will draw on the Public Rights of Way condition report compiled following site work undertaken at PCF Stage 2 in 2017. Information will also be taken from other assessments such as the Air Quality, Noise and Landscape and Visual Impact Assessments being undertaken as part of the EIA, the Equality Impact Assessment and the Walkers, Cyclists and Horse Rider Assessments being undertaken as standard requirements of a highway project.

13.6.8 The assessment will be supplemented with information gathered during site visits. Site visits will be undertaken by the assessor to verify the desk study information with on-the-ground observations of the amenity of routes. Site visits will be undertaken during a typical weekday to capture utility journeys (such as people travelling to work or school) as well as a weekend in good weather to capture recreational use. The site visit will record signs of use (for example if the route is well-trodden, presence of footprints and hoofprints) and any obstacles that might discourage use. The assessment will also draw on the usage surveys to be undertaken for the Walkers, Cyclists and Horse Rider Assessments to provide an indication as to how many people use the routes in the study area.

13.6.9 There is no guidance on magnitude or significance criteria for ‘Population and Health’. Therefore, criteria have been developed bespoke to this assessment taking into account the principles in the guidance outlines in section 13.6.2 and developed further using professional judgement.

Table 13-6 People and communities – magnitude of effect criteria

Magnitude Category	Criteria descriptors	
	Adverse	**Beneficial**
Major	Permanent loss of a route or access to an extent sufficient to deter people from making active travel journeys. In some cases, this could lead to a change in the location of centres of activity or to a permanent loss of access to certain facilities for a particular community. Those who do make journeys on foot or by bicycle would experience considerable hindrance. Demolition of properties or loss of land to an extent likely to result in a permanent change to the demographics of a community such as residential profile, employment opportunities or the range of services available to the community is severely compromised.	Substantial improvement to the pedestrian, cyclist and equestrian infrastructure within the study area through provision of new routes connecting communities and services where none previously existed or substantial relief from existing severance through removal of busy traffic conditions from a community. Provision of new community facilities, employment or community land of a type not currently available to communities within the study area.
Moderate	Degradation of community infrastructure through a reduction in amenity or increase in journey length to the extent that some people are deterred from using it (including making active travel journeys). Temporary or permanent loss or land-take from community facilities or local property resulting in a reduction in amenity that would dissuade, or reduce the use or the availability of, services offered.	Some improvement to the community resource within the study area through upgrading of existing facilities likely to increase use or provide relief from existing severance within a community.
Minor	Limited loss or degradation of community resources and property to an extent that is not likely to affect patterns of movement, demographics or use within the community but where the amenity, and/or range of services offered to the community area become slightly reduced.	Limited improvement to existing community facilities within the study area such as an isolated improvement to local access or enhancement of an existing community facility that improves amenity.
Negligible	No appreciable permanent alteration to community resources or local property. Existing infrastructure is maintained or replaced with equivalent provision.	

Source – bespoke method as outlined above

13.6.10 The determination of significance will be judged taking into account the sensitivity of the receptor or resource and the magnitude of change. However, for beneficial effects on this topic there is not necessarily a direct function between the sensitivity of a resource and the

magnitude of effect when determining significance. This is because a resource could be currently valued as having low sensitivity because it is not currently useful or has been obstructed in the past. A small modification could have a large significant beneficial effect because the resource could be transformed into one which becomes highly useful to people and the community. The judgement of significance also takes account of whether the effect would be likely to be permanent or temporary.

Health impacts

13.6.11 The links between the assessed effects on community, access and recreation and human health will be presented. Information will be drawn from the air quality, noise and landscape assessments undertaken as part of the EIA to identify any populations that would potentially experience a combination of impacts. Since the rate of people killed and seriously injured within the district is higher than average, information from the Walking, Cycling and Horse Riding Assessment (HD42/17) and Road Safety Audit (HD19/15) will also be drawn upon to identify if there are areas of concern within the context of the Proposed Scheme, and what proposals would be in place to address safety. Consultation is proposed with the Director of Public Health for Hampshire and the Winchester District Health & Wellbeing Partnership Board to obtain further information about local health priorities relevant to the project and the proposed assessment.

13.7 Assessment assumptions and limitations

13.7.1 The assessment of the route amenity will rely on qualitative descriptions by the assessor which is subjective. There will also be a degree of subjectivity in the assessment of views. Where subjective assessments are presented, attempts to reconcile against evidence will be made throughout.

13.7.2 The latest Highways England guidance refers to the DMRB Volume 11, Section 3, Part 8 methodology, which is over 20 years old (published in 1993) and some aspects may not be as relevant to the assessment of road schemes today. The guidance is currently being revised.

13.7.3 Vulnerable groups have been assumed to be present throughout the study area, though where specific areas of concern are identified as part of the Equality Impact Assessment (EqIA), these areas will be taken into account.

13.7.4 The assessment will apply population impacts down to the lowest defined population group according to ONS survey outputs (lower super output areas).

13.7.5 The assessment will rely, in part, on data provided by third parties (for example Ordnance Survey Mapping, Local Authorities, Office of National Statistics and Public Health England) which are the most up-to-date, available at the time of the assessment. No significant changes or limitations in these datasets have been identified that will affect the robustness of the assessment for EIA purposes.

13.7.6 Any limitations experienced or assumptions used in the final assessment will be highlighted within the EIA.

13.8 Elements to be scoped in or out

13.8.1 Elements to be scoped in or out of the EIA for population and health are outlined in Table 13-7 below.

Table 13-7 Elements scoped in or out of the EIA for population and health

Element scoped in	Element scoped out	Justification
Impacts on access to the countryside/recreational journeys	--	There is a large residential population with access to the countryside and National Park via footpaths, bridleways and cycleways that cross the M3. The Proposed Scheme would be situated between this population and the countryside, so has the potential to disrupt access or affect the amenity of the public rights of way network. There is also potential for the Proposed Scheme to improve access to recreation. Access to the countryside is an important issue for health and wellbeing.
Impacts on opportunities for active travel journeys (utility journeys on foot or by bicycle)	--	There are education and employment sites in the wider study area that could be accessed by pedestrians or cyclists. The Proposed Scheme could alter opportunities for active travel by creating new routes or changing existing routes through physical modification or changes to traffic conditions. Maintaining and improving opportunities for active travel journeys is important for health, wellbeing and sustainable transport and is a local and national policy priority.
Community severance	--	Access to services or around the community could be impeded during construction of the Proposed Scheme. This could be through physical disruption, or by creating inconvenience through changes in traffic flows. The level of severance experienced would have implications for community cohesion.

Element scoped in	Element scoped out	Justification
Driver Stress	--	During construction the temporary traffic management or changes in traffic conditions could increase driver stress. Once completed, the added convenience of the new junction layout would be likely to alleviate driver stress.
--	Views from the Road	The Proposed Scheme would be approximately 1.5 km in length and therefore form a relatively short part of a vehicle journey. Reconfiguration of the junction would be unlikely to make a noticeable difference in terms of views from the road and vehicle travellers would be unlikely to be sensitive to the issue over such a short distance. It is therefore not considered to be a key issue for this EIA.
--	Land Use	The Proposed Scheme would be likely to involve temporary land-take to accommodate construction activities and permanent land-take for the proposed new highway infrastructure. However the degree of land-take would not affect the community beyond the individual landowners concerned and would not affect land use patterns since the land-take would be close to the existing transport corridor. It is therefore not considered to be a key issue for this EIA.
Health impacts	--	Changes to air quality, noise, access to recreation, access to services and opportunities for active travel are linked to health impacts. The likely location, size and profile of the population exposed to these potential changes has implications for whether priorities for public heath could

Element scoped in	Element scoped out	Justification
		be supported or undermined by the proposals.

14. Road Drainage and the Water Environment

14.1 Introduction and study area

14.1.1 The following section of the report provides an overview of the proposed scope and initial baseline assessment for the Road Drainage and Water Environment (RDWE). This is in line with the requirements set out in the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 10 (HD45/09). This encompasses the potential for flood risk, geomorphology (including the Water Framework Directive (WFD)), water quality and most groundwater impacts associated with the Proposed Scheme. Consideration is given to potential effects during the construction and operation phase.

14.1.2 The groundwater pollution risks associated with historical contamination are scoped separately in Chapter 10 - Geology and Soils. The groundwater risks associated with habitats and designated sites are scoped separately in Chapter 9 – Biodiversity.

14.1.3 The overall study area includes a 500m buffer surrounding the maximum Proposed Scheme extent. This buffer is considered a suitable extent to assess direct potential impacts as well as encompassing indirect pathways, such as the migration of surface-borne pollutants, and the effects of any prolonged interception of groundwater flows. The study area will be adapted during the EIA to cover receptors beyond 500m if needed.

14.1.4 The study area also encompasses surface water features, groundwater features and abstractions, located up to a distance of approximately 1km from the site, that are considered to be in hydraulic connectivity with the Proposed Scheme, to assess potential indirect effects. If individual sensitive features located further than 1km from the site are identified at risk, they will also be considered within the assessment.

14.2 Baseline conditions

14.2.1 The following key data sources have been used to inform a description of the existing water environment baseline conditions:

- British Geological Society mapping (BGS, 2018c)
- Environment Agency ‘Flood Map for Planning’ (EA, 2018a)
- Environment Agency ‘Long term flood risk information’ (EA, 2018b)
- Environment Agency ‘Historic Flood Map’ (EA, 2016a)
- South East River Basin District River Basin Management Plan (EA, 2015)
- Test and Itchen Catchment Flood Management Plan (EA, 2009)
- The Highways Agency Drainage Data Management System (HADDMS) (Highways England, 2018)
- South Downs National Park Authority Water Cycle Study and SFRA Level 1 (Amec, 2015)
- Winchester City Council Strategic Flood Risk Assessment (Halcrow, 2007)

14.2.2 The baseline source also includes the consultation and meeting undertaken with the Environment Agency on the 12th July 2018 and 16th July 2018.

Surface water features

14.2.3 The Proposed Scheme alignment crosses the River Itchen at three locations, along the A34, A33 and M3. The Proposed Scheme also crosses one of the River Itchen's tributaries, the Nun's Walk Stream, which is crossed by the A34.

14.2.4 The River Itchen and the Nun's Walk Stream are classified as 'Main Rivers' and therefore under the jurisdiction of the Environment Agency.

14.2.5 The River Itchen flows in a channel in a south-westerly direction and comprises several tributaries and land drains. There are also a number of ditches, ponds and ordinary watercourses associated with its floodplain.

14.2.6 The River Itchen also has a separate arm called the Itchen Navigation. The Itchen Navigation has been heavily modified and forms part of the floodplain of the Itchen.

14.2.7 All watercourses within the study area form part of the Test and Itchen Catchment Flood Management Plan (CFMP) and the South East River Basin District River Basin Management Plan (RBMP).

Environmental designations and Water Framework Directive classifications

14.2.8 The River Itchen catchment area has European and National designations, namely the River Itchen SAC and the River Itchen SSSI, both of which are situated within the study area.

14.2.9 The River Itchen also flows into the Southampton and Solent Water Special Protection Area (SPA) and Ramsar site, located approximately 16km downstream of the site, where the River Itchen discharges into the Solent.

14.2.10 The River Itchen also flows through the South Downs National Park. The River Itchen floodplain forms part of the River Itchen SSSI, and the floodplain is anticipated to protect in excess of 100 properties in Winchester and Kings Worthy from flooding.

14.2.11 The quality of the River Itchen and Nun's Walk Stream is monitored by the Environment Agency against the objectives of the Water Framework Directive (WFD). A summary of current WFD classifications for the 2016 cycle, obtained through the Environment Agency's Catchment Data Explorer (EA, 2017), is provided within Table 14-1.

Table 14-1 WFD Classification - 2016 Cycle 2

Watercourse	Overall quality	Ecological quality	Chemical quality
River Itchen	Good	Good	Good
Itchen Navigation	Good	Good	Good
Nun's Walk Stream	Good	Good	Good

Existing drainage

14.2.12 The Highways Agency Drainage Data Management System (HADDMS) has Priority Asset Registers that identify existing outfalls, culverts and soakaways that potentially pose a risk of pollution or flooding. At the time of writing there are 17 Priority Outfalls from the Highways England network to the River Itchen catchment within the study area and numerous soakaway chambers and soakaway trenches. The database also identifies four surface water Priority Culverts. The risk posed by these existing drainage assets will be considered within the overall assessment. The assets that have been assessed in detail are concluded to pose an overall low to no risk status.

14.2.13 Using the HADDMS database, the following will be reviewed as part of preparing the Environmental Statement (ES):

- The receiving water bodies of the Priority Outfalls and soakaways (and mitigation measures already in place, if any)
- The existing drainage system of the M3, the junction 9 roundabout, and the A34 approach

Surface water abstractions

14.2.14 The Environment Agency Water Abstractions Licence map indicates that there are no surface water abstractions at the site or within the 1.5km study area; however, this map is no longer maintained or updated with new information. Medium and large abstractions are indicated to be present approximately 3km to the south west of the Proposed Scheme, near St Catherine's Hill. Consultation with the Environment Agency will be undertaken in the preparation of the ES, to confirm the abstractions indicated on the map. Hampshire County Council (HCC), the Lead Local Flood Authority (LLFA) and Winchester City Council will also be consulted, to confirm the presence of any private (unlicensed) abstractions that are too small to be listed by the Environment Agency.

Groundwater features

Geology

14.2.15 Review of British Geological Survey (BGS, 2018c) mapping indicates that the Proposed Scheme is underlain by bedrock geology of the Seaford Chalk Formation, which is described as 'firm white chalk with conspicuous semi-continuous nodular and tabular flint seams' on the BGS online viewer. This chalk is itself underlain by the Lewes Nodular Chalk Formation, which is described as 'composed of hard to very hard nodular chalks and hardgrounds, with interbedded soft to medium hard chalks' on the BGS online viewer.

14.2.16 Superficial deposits are limited across the study area. Superficial Alluvium, River Terrace and Head Deposits (comprising clay, silt, sand and gravel) are present in close proximity to the River Itchen, within the extent of the river floodplain and adjacent river banks.

Hydrogeology

14.2.17 Review of the British Geological Society (BGS, 2018c) map indicates that both the Seaford Chalk and the Lewes Chalk strata are classified as Principal Aquifers. A Principal Aquifer is defined by the BGS as 'layers of rock or drift deposits that have high intergranular and/or fracture permeability, meaning they usually provide a high level of water storage. These layers of rock or drift deposits may support water supply and/or river base flow on a strategic scale'.

14.2.18 The Alluvium and River Terrace Deposits are classified as a Secondary A Aquifer by the Environment Agency. A Secondary A Aquifer is defined as permeable layers of rock capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. The Head Deposits are classified as Secondary Aquifer (undifferentiated).

14.2.19 BGS borehole records (accessed via the BGS GeoIndex tool (BGS, 2018b)) indicate variable groundwater levels across the study area, from 51m to 11m below ground level (bgl). No formal groundwater monitoring has been completed to validate groundwater levels as part of this project to date, notably during the winter period when groundwater levels are expected to be at their highest.

14.2.20 Continuous groundwater monitoring is to be undertaken in a number of borehole locations across the Proposed Scheme to gain a clear understanding of baseline groundwater levels, fluctuations and quality across the Proposed Scheme in accordance with guidance in CIRIA 753 (CIRIA, 2015), BRE 365 (BRE, 2016) and the ICE Earthworks Guidance, 2nd Edition, 2015 (ICE, 2015). The work is planned as part of the Ground Investigation work and will inform the groundwater assessment.

14.2.21 The local groundwater may be connected (either directly or indirectly) to surface water courses within the River Itchen valley and changes to quality and level beneath the Proposed Scheme area may therefore influence the SSSI/SAC.

14.2.22 The Proposed Scheme also lies within a Groundwater Vulnerability Zone of 'High'. These areas are typically vulnerable and easily able to transmit pollution to groundwater. They are characterised by high leaching soils and the absence of low permeability superficial deposits.

WFD Classifications

14.2.23 Groundwater in the study area has been assessed against the objectives of the WFD. The Environment Agency Catchment Data Explorer and Environment Agency South East River Basin District RBMP (Defra and EA, 2015) identifies the groundwater body underlying the Scheme to be the River Itchen Chalk. A summary of current WFD classification for the 2016 cycle, obtained through the Environment Agency's Catchment Data Explorer, is provided within Table 14-2. The reasons for the River Itchen Chalk achieving a Poor status include local agriculture and rural land management practices, and local water industry practices.

Groundwater abstractions

Table 14-2 WFD Classification - 2016 Cycle 2

Groundwater body	Overall quality	Quantitative quality	Chemical quality
River Itchen Chalk	Poor	Poor	Poor
Central Hants Lambeth Group	Good	Good	Good

14.2.24 Review of the Environment Agency's Groundwater map shows that the northern parts of the M3 and the A34 traverse areas classified as Groundwater Source Protection Zone (SPZ) 1 (inner zone) and SPZ 2 (outer zone). The proposed satellite construction compound is also underlain by a SPZ 2.

14.2.25 The SPZs are used by the Environment Agency as screening tools to identify those areas where it would object in principle to certain potentially polluting activities, or other activities that could damage groundwater and/or where additional controls or restrictions on activities may be needed to protect water intended for human consumption. Zone 1 is the most sensitive of these protective areas and indicates the zone in which contamination released to the ground could reach the point of abstraction within 50 days. Zone 2 similarly defines a travel time of 400 days. Typically discharges of road drainage should be outside SPZ 1 and should be avoided within SPZ 2.

14.2.26 The records below were obtained using the Environment Agency's Water Abstraction Licences map; however, this is no longer maintained or updated with new information. The Environment Agency has confirmed the following abstractions are still active and extract groundwater from the Chalk aquifer which may be potentially impacted by the Proposed Scheme. Therefore, despite being beyond a 1km study area, these groundwater abstractions, listed below, are considered to be sensitive features and are therefore considered for assessment.

- A medium abstraction used for spray irrigation at Winnall Down Farm, approximately 1km to the southeast of the site.
- A large Southern Water public water supply abstraction, 1.5km to the northeast of the site
- A large Southern Water public water supply abstraction, 1.7km to the northwest of the site

- Four large abstractions used for plant aquaculture, approximately 2km to the northwest of the site
- A small abstraction used for farming and domestic, approximately 2.2km to the northwest of the site
- A medium abstraction used for fish aquaculture approximately 3km to the south west of the site

14.2.27 Further information regarding local and non-licensed abstractions was unavailable at the time of preparing this Scoping Report. This information will be obtained through consultation with the Environment Agency, Hampshire County Council and Winchester City Council during preparation of the ES.

14.2.28 Groundwater users may be particularly vulnerable to any disruptions of groundwater flow, provision and quality, and could therefore require consideration in the assessment of impacts due to the Proposed Scheme.

Flood risk

Fluvial

14.2.29 The Environment Agency's Flood Map for Planning (EA, 2017) indicates that the northern and western parts of the study area, particularly the A34 Winchester Bypass (and M3 north of Long Walk), extend into an area designated as Flood Zone 3: area with a 1% (1 in 100) Annual Exceedance Probability (AEP) risk or greater of fluvial flooding. The designated Flood Zone 3 area extends between the existing A34 and M3 alignments further north of the Proposed Scheme; associated with the River Itchen and its tributaries. This is shown in Figure 1-1.

14.2.30 The northern and western part of the Study Area also extends into a Flood Zone 2 area: risk between a 0.1% (1 in 1000) and 1% (1 in 100) AEP of fluvial flooding. The remainder of the study area is situated within Flood Zone 1: less than 0.1% (1 in 1000) AEP risk of flooding. It is anticipated that climate change would cause these flood zone extents to increase in the future. In addition, the area north-west of the M3 Junction 9 extends into designated Flood Zone 2 area at close proximity to the River Itchen.

Tidal

14.2.31 The Proposed Scheme is not located within an area at risk of tidal flooding.

Surface Water (Pluvial)

14.2.32 The Risk of Flooding from Surface Water (RoFSW) map (EA, 2017) details that the study area is predominantly within an area at very low risk: less than 0.1% (1 in 1000) AEP of surface water flooding.

14.2.33 The RoFSW map identifies that parts of the M3 and slips roads at junction 9 have a high: greater than 3.3% (1 in 30) AEP surface water flood risk.

14.2.34 The RoFSW mapping also identifies that there are several overland flow routes and isolated areas of ponding within the study area with a high: greater than 3.3% (1 in 30) AEP, to low: between 0.1% (1 in 1000) and 1% (1 in 100) AEP, risk of surface water flooding. These areas of flood risk are generally associated with topographic depressions within the fields to the east or where existing infrastructure (highways and residential development) causes an obstruction to natural overland flow paths.

14.2.35 There are several low-lying areas adjacent to watercourses to the west of the proposed Scheme that are also shown to be at risk of surface water flooding. The risk associated with these areas are captured in the Fluvial Flood Risk Section above.

Groundwater

14.2.36 The South Downs National Park Authority Water Cycle Study and SFRA Level 1 (Amec, 2015) Groundwater Flood Risk Map indicates a variable susceptibility to groundwater flooding within the study area. The level of risk ranges from high (>75% based on a 1km square grid area) to low (25 – 50% based on a 1km square grid area) susceptibility; from south (M3/A34 crossing) to north of the Proposed Scheme. There are areas identified to be of high groundwater flood risk within the study area to the south-west and north-east of the Proposed Scheme. The areas of greatest risk are generally at close proximity to the River Itchen and its tributaries.

14.2.37 Winchester City Council SFRA (HALCROW Group, 2007) states that there is a high proportion of chalk within the Winchester District. These geological conditions and the high-water table increase susceptibility to groundwater flooding. The SFRA details that flooding from a combination of sources; including groundwater has occurred in Winchester, however there are no records of flooding occurring from groundwater only.

14.2.38 The current data indicates that there is a risk of groundwater flooding in the Winchester area. The Hampshire Groundwater Management Plan (Hampshire County Council, 2013a) identified areas throughout the county at risk of groundwater flooding. Kings Worthy village, located north of the A34, showed a significant history of groundwater flooding (21 properties flooded in 2000/2001) and continued susceptibility to this flood risk.

14.2.39 The risk of flooding from groundwater will need to be further investigated as part of later assessment stages.

Reservoir

14.2.40 The Environment Agency provides mapping that gives an indication of the areas at risk of flooding due to reservoir failure. The northern extent of the study area is identified to be at risk of flooding, likely to be in the event of a failure of Old Alresford Pond. The mapped reservoir flood extents are indicated to be similar to the fluvial flood extents associated with the River Itchen.

Historic flood events

14.2.41 The Environment Agency's Historic Flood Map (EA, 2016a) identifies maximum extent of recorded flood outlines from the rivers, sea and groundwater springs. A review of the map identifies no recorded historic flood events within the study area, although there are areas of historic flooding recorded.

14.2.42 Winchester City Council SFRA (Halcrow, 2007) identifies that there are historic flood records dating from 1997 to 2006 within the area of Winchester; the source is identified to be a combination of groundwater, fluvial flooding and foul/combined systems. The nearest recorded flood report to the Proposed Scheme is approximately 750m south-west on Wales Street; flooding is reported to have occurred from sewer flooding.

Other flood sources

14.2.43 The Environment Agency Flood Map for Planning highlights that there are no areas benefiting from flood defences within the vicinity of the Proposed Scheme and therefore no flood risk due to defence failure has been identified.

Value of Receptors

14.2.44 An initial assessment of the importance (sensitivity) of the water environment including consideration of flood risk, geomorphology (and WFD), water quality and groundwater has been made using desk-based information.

14.2.45 The receptors have been assigned a sensitivity attribute based on DMRB simple assessment guidelines and professional judgement. Table A4.3 in DMRB HD45/09 defines the values and sensitivity classification used to assess the importance of the receptors identified within the Proposed Scheme. The initial assessment of the importance of the receptors has been outlined in Table 14-3.

14.2.46 It should be noted that the sensitivity of the receptors are subject to change following more detailed assessment and site visits, and in consultation with the relevant authorities (i.e. the Environment Agency, Hampshire County Council and Winchester City Council).

Table 14-3 Value of receptors for road drainage and the water environment

Value / sensitivity	Definition of value/sensitivity from DMRB	Examples within the study area
Very High	Attribute has a high quality and rarity on regional or national scale	Flood Risk: River Itchen (Main River), Nun Walk's Stream. Geomorphology: None identified Surface water and groundwater quality: Principal Aquifer sections with substantial contribution to the SAC
High	Attribute has a high quality and rarity on a local scale	Flood risk: None identified Geomorphology: River Itchen and River Itchen navigation – Good status under WFD Surface water and groundwater quality: Principal Aquifers, providing locally important resource

Value / sensitivity	Definition of value/sensitivity from DMRB	Examples within the study area
Medium	Attribute has a medium quality and rarity on local scale	Flood risk: None identified Geomorphology: None identified Surface water and groundwater quality: Secondary Aquifers
Low	Attribute has a low quality and rarity on local scale	Flood risk: Ordinary watercourses (and Main River where not identified as very high value) fluvial flood risk receptors; surface water flood risk receptors; groundwater flood risk receptors; reservoir flood risk receptors Geomorphology: None identified Surface water and groundwater quality: None identified

14.3 Potential impacts

14.3.1 The Proposed Scheme has the potential to impact the water environment arising from a number of direct and indirect sources, during both the construction and operation phases.

Construction phase

14.3.2 During construction, it is considered likely that potential impacts to surface water features, groundwater features and flood risk could arise from:

Groundwater, Geomorphology and the Water Framework Directive

- Increased physical contamination of surface water runoff from ground disturbance, leading to the potential for increased sediment in surface water runoff reaching drainage features and surface water features. The pollution risk to surface water bodies, from the disturbance of contaminated ground specifically, will be covered in Chapter 10 ‘Geology and Soils’

- Increased pollution risks from runoff during construction activities, including the accidental spillage of fuels, lubricants, cements, hydraulic fluids or other harmful substances, which may be stored on Site during the construction phase, and could migrate into surface water and groundwater bodies

- Impacts to the hydromorphological and ecological quality of watercourses associated with works in close proximity to them

- Local groundwater drawdown as a result of temporary de-watering construction control measures. These measures may be required to construct any sub-surface structures, such as cuttings. Drawdown impacts may be experienced in areas outside of the Site (or area(s) requiring the hydraulic control) as a consequence of temporary de-watering activities. Discharges from dewatering may also impact on receiving surface water or groundwater.

Flood Risk

- Construction activities that take place within the floodplain could result in a loss of floodplain storage
- Temporary introduction of impermeable surfaces due to haul routes and temporary site compounds could result in an increase in run off and increased risk of surface water flooding
- Interception of overland flows through the introduction of impervious structures and the movement and storage of earth materials within the study area, potentially disrupting local flow routes and increasing surface water flood risk
- Potential blocking of drainage systems with construction debris, potentially resulting in overflowing drains and increased surface water flood risk
- Interception of the groundwater table by cutting activities, including the excavation of materials and construction of below ground structures, potentially altering groundwater flow and increasing local groundwater flood risk

Operation Phase

14.3.3 During operation, it is considered likely that the potential impacts to surface water features, groundwater features and flood risk could arise from:

Groundwater, Geomorphology and the Water Framework Directive

- Increased pollution risks from routine runoff during the operational life of the Scheme, primarily consisting of silts, hydrocarbons and dissolved heavy metals, which may migrate to surface water and groundwater bodies
- Increased groundwater pollution risks from specific surface water drainage features such as soakaways, notably those installed and operating in the near vicinity of SPZ designated areas and/or dewatering catchment areas of licensed and unlicensed groundwater abstractors
- Increased pollution risks from accidental spillages; during the operational phase, road collisions involving HGVs and the potential spillage of fuels pose the greatest risk
- Permanent impact to the hydromorphological and ecological quality of water features associated with works within or in close proximity to water features
- Potential de-watering effects from cuttings may cause the groundwater table to reduce, impacting on water dependent sensitive habitats (i.e. the River Itchen SSSI), floodplain and water users

Flood Risk

- Loss of floodplain storage due to infrastructure located within the floodplain of the watercourses identified, resulting in increased flood risk
- Introduction of new impermeable surfaces, leading to increased runoff and increased flood risk elsewhere

- Interception of overland flows through the introduction of impervious structures in the study area, potentially disrupting local flow routes and increasing surface water flood risk

- Prolonged interception of the groundwater table by below-ground features (i.e. cuttings), resulting in permanent alterations to the groundwater table, including flow patterns and baseflow to rivers and increasing local groundwater flood risk

14.4 Design, mitigation and enhancement measures

Construction phase

Pollution

14.4.1 During the construction phase, several actions can be taken to mitigate against potential pollution and accidental spillages. Such measures could include, but not limited to, the following:

- Provision of site worker awareness of environmental best practice

- Installation of systems such as silt traps, swales and basins, designed to trap silty/polluted water

- Mixing of cement to be conducted away from watercourses and/or drainage lines to prevent wet cement coming into contact with surface water

- Controlled and covered waste storage areas

- On-site availability of oil spill clean-up equipment including absorbent material and inflatable booms for use in the event of an oil spill or leak

- Preparation of incident response plans, prior to construction, which should be present on site throughout construction to inform contractors of required actions in the event of a pollution incident

14.4.2 The position and extent of working areas during the construction stage should reflect the sensitivity of surrounding areas and works being carried out. The contractor should appraise the suitability of such working areas in this respect as part of working method statements.

14.4.3 Best practice recommendations for the prevention of contamination should be outlined in detail in a Construction Environment Management Plan (CEMP) and agreed with relevant statutory consultees prior to commencement of construction works. This should include measures to comply with relevant legislation, guidance and best practice measures, in line with the Considerate Contractors Scheme and ‘Site Handbook for the Construction of SuDS’ (CIRIA C698).

14.4.4 The CEMP should include an erosion prevention and sediment control plan to reduce the quantity of sediment entrained in runoff and to prevent hydromorphological changes to surface water features. It should also describe the procedures in the event of an environmental emergency such as a fuel or chemical spillage and outline measures to minimise the risk of flooding during construction.

14.4.5 A temporary drainage strategy will be prepared for the construction phase. Runoff should be collected and directed through the temporary drainage system, to ensure protection of water quality in receiving waterbodies from increased sediment and contaminant load.

14.4.6 Movement of materials around the site would be managed under an appropriate Materials Management Plan, to minimise any hydromorphological disturbances and minimise flood risk.

Flood Risk

14.4.7 During the construction phase, several actions can be taken to mitigate against increased flood risk. Such measures may include, but are not limited to, the following:

- Site work areas should be located outside of the floodplain where possible, where this is not possible temporary floodplain compensation could be required to offset storage losses
- Site runoff should be controlled through the implementation of an appropriate temporary drainage strategy and attenuated onsite prior to discharge, to mitigate flood risk
- Best practice construction measures should be adopted in line with the Considerate Contractors Scheme and CIRIA SuDS Manual (C753) (CIRIA, 2015) to minimise the risk of flooding during construction

Groundwater

14.4.8 If temporary de-watering is required in order for construction activities to take place, a de-watering risk assessment should be performed as per the guidance titled Hydrogeological impact appraisal (HIA) for dewatering abstractions (EA, 2007).

14.4.9 The local area, including the study area, is considered to be a sensitive water-rich environment, which could be subjected to the impacts from de-watering activities, albeit temporary in nature. If the HIA suggests significant impacts could be experienced away from the site area being de-watered, then temporary mitigation, could be required.

14.4.10 During construction, several actions can be taken to mitigate the potential impacts to groundwater water users. These measures could include, but are not limited to, the following:

- Water user pump lowering; whereby local groundwater abstraction pumps would need to be lowered below the revised groundwater table
- Re-drilling of water well(s); where water user abstraction wells were not deep enough to accommodate pump lowering, needing to be re-drilled
- Water recycling practices; whereby dewatered groundwater was recycled into the aquifer, maintaining groundwater contributions to groundwater users
- The provision of water during completion of the construction phase

14.4.11 Potential de-watering impacts of the floodplain must be assessed in terms of potential impacts on the specific watercourses that interact with the floodplain, notably the potential for low-flow impacts.

14.4.12 If Sustainable Drainage Systems (SuDS) that discharge to ground are proposed during the construction stage, groundwater level information should be used to inform drainage design as high groundwater levels could undermine the performance of drainage features or discharges could lead to increased risk from groundwater flooding.

Operation Phase

Pollution Risks

14.4.13 During the operation phase, mitigation for the effects of routine runoff would be managed by the implementation of a robust surface water drainage strategy (SWDS), appropriately designed against the potential for pollution and considering the proximity of the Proposed Scheme to sensitive receptors and following impact assessment in accordance with the HEWRAT tool within HD/45.

14.4.14 It is currently envisaged that discharge to ground would be likely to be the main drainage mechanism. Any discharge to surface water bodies that did occur would directly or ultimately be received by the River Itchen.

14.4.15 All surface water discharges would drain through effective SuDS, thereby mitigating the risk of pollution. SuDS design should be subject to a range of factors including the thickness of the unsaturated zone (notably in the winter period when groundwater levels are highest), ground permeability, the presence of sensitive receptors and the predicted degree of contaminant loading.

14.4.16 Oil interceptors and oil containment structures would be considered to minimise the potential linkage between free-phase fuels, which may arise from a catastrophic spill, and local sensitive receptors, principally the River Itchen and Principal Chalk Aquifers.

14.4.17 In addition to the likely need for containment control features for spilled oils and fuels that could arise from a major accident/spillage, it is recommended that the emergency services and Highways England should hold copies of incident response plans and be aware of the procedure to minimise pollution entering the watercourses.

Flood Risk

14.4.18 Structures to be designed outside of the floodplain where possible; where this is not possible, open span structures would be considered to minimise effects. Floodplain compensation could be required to offset floodplain losses.

14.4.19 Mitigation for the effects of increased surface water flood risk should be managed by the implementation of a robust surface water drainage strategy and appropriate drainage design. The strategy should be designed to ensure discharge from the proposed Scheme does not increase flood risk elsewhere up to and including the 1% Annual Exceedance Probability (AEP) rainfall event, with allowances for climate change as detailed in the Environment Agency's Flood risk assessments: climate change allowances (EA 2018b). Surface water from the new high catchment area would then be discharged in accordance with the drainage hierarchy to achieve greenfield runoff rates and ensure that surface water is managed as close to its source as possible.

14.4.20 The Proposed Scheme could provide an opportunity to provide betterment to the existing system and to reduce existing flood risk. Multi-stage proposals that maximise passive treatment through the use of SuDS should be considered.

Groundwater

14.4.21 The potential effects of groundwater should be considered when designing the surface water drainage. Surface water discharge points could act as point sources for the discharge of contaminated road runoff, eventually migrating into the Itchen system. An appropriate groundwater risk assessment (in accordance with guidance in HD/45) would inform mitigation to be incorporated into the drainage design. Water quality attenuation facilities would be required (as described for surface water receptors previously), where this risk was judged to be significant.

14.4.22 It is recommended that winter hydrometric monitoring data should be obtained where possible, notably if SuDS features such as soakaways are likely to be installed within the study area or SPZ areas. Winter monitoring data should be used to determine the unsaturated zone thickness between the base of the soakaway and highest groundwater levels (the minimum unsaturated zone thickness typically acceptable to the Environment Agency under similar constraints is 5m). Groundwater monitoring will take place in early 2019 as part of the Ground Investigation works.

14.4.23 For the passive discharge of surface water to chalk bedrock, there are engineering considerations and guidelines which should be considered. These guidelines help to ensure that sufficient offsets away from proposed road structures are implemented, depending upon the nature of the local chalk bedrock. Numerous factors should be carefully considered when identifying potential passive surface water soakage locations.

14.4.24 The collection of site specific groundwater level monitoring data will determine if the Proposed Scheme cuttings will permanently or seasonally intercept groundwater. If groundwater intercepted the base of the proposed cuttings, then permanent passive or active groundwater management control mitigation measures will be required. These measures could include but not be limited to the installation of perimeter drains and dewatering pumping wells.

14.4.25 It is therefore recommended that continuous groundwater level monitoring data and ground permeability data be collected prior to the preliminary design phase as this will ensure that appropriate time is given to collect the data required for detail design, as further data could be required, i.e. additional winter data, if dry winter encountered during data collection for preliminary design. This groundwater level monitoring will take place in early 2019 as part of the Ground Investigation works. As groundwater levels are seasonally changeable, a number of winters may be required to collect ‘wet winter’ groundwater conditions. This data should then be used to inform the groundwater control mitigation methodology.

14.4.26 If groundwater controls were to be required there is the possibility that the local groundwater receptors could be impacted upon. This scoping report therefore assumes all groundwater receptors would be impacted upon until further data is released to confirm either wet winter groundwater would be located below the proposed cuttings invert levels or that the groundwater receptor would be unlikely to be substantially affected. If impacts were determined to be significant, then mitigation measures could include but are not limited to the following:

- Water user pump lowering; whereby local groundwater abstraction pumps were lowered below the revised groundwater table

- Re-drilling of water well(s); where water user abstraction wells were not deep enough to accommodate pump lowering, needing to be re-drilled

- Water recycling practices; whereby dewatered groundwater was recycled into the aquifer, maintaining groundwater contributions to groundwater users

- The provision of water during completion of the construction phase

14.5 Description of the likely significant effects

14.5.1 The Proposed Scheme has the potential to significantly affect the water environment if appropriate and adequate mitigation (as outlined in in the previous section of this Chapter) is not implemented during both the construction and operational phases. However, it is anticipated that with these mitigation measures in place (including undertaking consultation) the Proposed Scheme would not have a significant residual effect on the water environment.

14.5.2 The Nun's Walk Stream, listed above in the Water Attributes section, is considered to be of Very High importance. Although the stream may not receive any surface water flows or discharges from the Proposed Scheme, considering its position and that of the proposed satellite construction compound on the A34, it will be scoped into the assessment, even if no significant effects are envisaged. This will, however, be further confirmed when the drainage strategy has been developed.

14.5.3 Given the sensitivity and importance of the environmental attributes in the study area, including the River Itchen, the River Itchen Chalk, water users of the Chalk and the SSSI and SAC, the potential impacts from pollution, changes to groundwater resources, accidental spillages and flood risk are all considered to be potentially significant. Potential impacts on the River Itchen SAC will be assessed through the Habitat Regulations Assessment.

14.5.4 It is anticipated that with appropriate mitigation measures in place (including undertaking consultation) the Proposed Scheme would not have a significant residual effect on the water environment.

14.6 Assessment methodology

Policies and plans

14.6.1 Planning policies and guidance that are relevant to the Proposed Scheme include:

- National Policy Statement for National Networks (NPS NN) (DfT, 2014): Paragraphs 4.36-4.47 (Climate Change adaptation), paragraphs 4.48 to 4.56 (Pollution Control and other environmental protection regimes); 5.90-5.115 (Flood Risk); and, 5.219-5.231 (Water quality and resources).

- National Planning Policy Framework (NPPF) (2018): Paragraph 8 (Achieving Sustainable Development); and, Paragraph 148, 150, 155 158 159 160 and 161, 163 and 165 (Meeting the challenge of climate change, flooding and coastal change), and the associated Planning Practice Guidance: Flood risk and coastal

change (2014), climate change (2014), land affected by contamination (DCLG, 2014a), natural environment (2016), and Water supply, wastewater and water quality (2016).

- Winchester District Local Plan Review (Adopted 2006) – Saved Policies: Policy DP.3 (General design criteria).
- Winchester District Local Plan Part 1 – Joint Core Strategy (2013): Policy DS1 (Development Strategy and Principles) and Policy CP17 (Flooding).
- Winchester District Local Plan Part 2 – Development Management and Site Allocations (2017): Policy DM17 (Site Development Principles) and Policy DM19 (Development and Pollution).
- South Downs Local Plan Pre-Submission (2017) – Strategic Policy SD17 (Protection of the water environment); Policy SD49 (Flood risk management), Policy SD50 (Sustainable drainage systems).
- Environment Agency (EA, 2018c) – The Environment Agency's approach to groundwater protection.

14.6.2 The following approach will be adopted during the preparation of the ES chapter and 'detailed' assessment:

- Review of international, national and local legislation, policies and guidelines in relation to water resources, water quality and flood risk. This will also include a review of the requirements of the WFD.
- Establish baseline conditions within the study area through review of desk based sources of information, and also through obtaining proportionate winter hydrometric data-logged monitoring data as recommended in CIRIA 753, the SuDS Design Manual, BRE 365 (2016), the SuDS Guidance and the ICE Earthworks Guide 2nd Edition, 2015. Important sources of information include an Envirocheck Report (or similar), consultation with relevant authorities (the Environment Agency, Hampshire County Council and Winchester City Council) and discipline specialists. A site walkover is recommended.
- Identify the importance of sensitive receptors and likely key issues.
- Identify potential risks to surface water quality, groundwater quality and all forms of flood risk from the Proposed Scheme and hence the likely significant impacts during both the construction and operation phases.
- Identify potential cumulative impacts associated with other planned schemes in the area.
- Recommend appropriate mitigation and assess residual effects.

14.6.3 The method of assessment and reporting of significant effects will be based on guidance contained in HD 45/09. The DMRB promotes the following approach:

- Estimation of the importance of the attribute.

- Estimation of the magnitude of the impact.
- Assessment of the significance of the impact based on the importance of the attribute and magnitude of the impact.

14.6.4 The findings of the assessment are expected to contribute to the assessment of potential ecological effects. It is proposed that this assessment is qualitative and informed by a desk-based study, site walkover and consultation with the project ecologist.

14.6.5 Paragraphs 5.221-5.223 of the NPSNN set out how water quality and resources should be assessed for nationally significant road schemes. In accordance with this policy, the ES will describe:

- The existing quality of waters affected by the Proposed Scheme
- Existing water resources affected by the Proposed Scheme and the impacts of the proposed project on water resources
- Existing physical characteristics of the water environment (including quantity and dynamics of flow) that may be affected by the Proposed Scheme, and any impact of physical modifications to these characteristics
- Any impacts of the Proposed Scheme on water bodies or protected areas under the Water Framework Directive and SPZs around potable groundwater abstractions
- Any cumulative effects

14.6.6 The assessment of potential effects to the water environment (surface water features, groundwater features and flood risk) during construction and operation will be undertaken in accordance with DMRB Volume 11, Section 3, Part 10 (HD 45/09). The assessment will involve a desk-based review of existing information and assessment of the potential Scheme effects, in relation to flood risk and water quality.

14.6.7 Temporary groundwater control activities that could be required to construct particular road features, such as cuttings, should be assessed against their potential to generate negative impacts on the local environment. A dewatering assessment will be undertaken at the ES stage if the level of risk from such activities was deemed high.

14.6.8 The assessment of potential effects that could arise during construction will consist of a qualitative assessment, which will consider risks to the chemical quality of surface and groundwater features associated with pollutants typically experienced during construction.

14.6.9 When assessing risks to groundwater resources during construction, particular attention will be given to assessing winter groundwater conditions, and any deep excavations or retaining features that could negatively interact with groundwater resources.

14.6.10 The significance of any identified groundwater abstractions will be further assessed against proposed soakaway or surface water drainage features, as these have the potential to act as preferential mechanisms for the transmission of road contaminants. Additionally, surface water discharge features can also facilitate the movement of chemicals arising from catastrophic spills. Spillage risk assessments and assessments of the effects of routine runoff will be carried out in accordance with the methods set out in HD 45/09 (see below).

14.6.11 The potential impacts from catastrophic spills, where SPZs exist and groundwater wells are currently operating, are given heightened significance and require due consideration. Particular emphasis should be placed on groundwater monitoring to be conducted in accordance with CIRIA 753, the SuDs Design Manual 2015 BRE 365, SuDs guidance 2016 and the ICE Earthworks Guidance, 2nd Edition, 2015. This will provide meaningful information with respect to the thickness and variability of the unsaturated zone over time between the base of soakage features and maximum groundwater levels.

14.6.12 When assessing risks to surface water features during construction, particular attention will be given to features located within close proximity of the works or proposed compound areas (c. 100m) that are most likely to experience direct impacts from flood risk, accidental spillages and pollution. Monitoring of water quality during the construction phase may be required for ecologically sensitive areas.

14.6.13 The assessment of potential effects that may arise during operation will also be undertaken in accordance with the methods outlined in the DMRB (HD 45/09). This includes Highways England Water Risk Assessment Tool (HEWRAT) For operational effects, the DMRB states the following impacts should be considered:

- Potential effects of routine runoff on surface water
- Potential effects of routine runoff on groundwater
- Pollution impacts from spillages
- Impacts from flooding

14.6.14 In addition to the core aspects of assessment as defined within DMRB (HD 45/09), the assessment of potential impacts to the water environment will also consider the potential impacts to the hydromorphological quality of surface water features. This would be likely to be associated with potential changes to catchment hydrology, associated with cuttings, which may affect baseflow to rivers.

14.6.15 A review of the existing drainage system will be conducted using the Highways Agency Drainage Data Management System (HADDMS). The status of priority drainage assets (outfalls, soakaways and culverts) identified on HADDMS (17 priority outfalls and four surface water priority culverts) and any associated risk to receiving water bodies (or flood risk) will be used to inform the ES.

14.6.16 Hydraulic modelling of the River Itchen has been undertaken as part of PCF Stage 2, the outcome of which indicated the proposed options do not change the flood risk profile within the Study Area and that there were no detectable effects offsite. The need for further, more detailed modelling of the preferred option will be discussed with the Environment Agency and Hampshire County Council. If required, hydrological assessment and hydraulic modelling will be carried out using software that is considered appropriate for use for this type of hydraulic modelling. The assessment and modelling methodology should be agreed with the Environment Agency and should account for any other proposed flood alleviation schemes (e.g. North Winchester Flooding Alleviation Scheme) either upstream or downstream of the Study Area, which could have a bearing on flood risk within the study area.

14.6.17 A Flood Risk Assessment (FRA) will be prepared to accompany the ES. The flood risk design criteria and approach for the FRA will be developed through consultation with the

Environment Agency, Lead Local Flood Authorities and other relevant stakeholders. The FRA will be carried out in accordance with the technical guidance provide by the National Planning Policy Framework (NPPF). As part of this assessment, and to comply with the NPPF, the FRA will seek to demonstrate compliance with the requirements of the NPPF, specifically that the proposed Scheme would:

- remain operational and safe for users in times of flood
- result in no net loss of floodplain storage
- not impede water flows
- not increase flood risk elsewhere

14.6.18 Requirements for the FRA will be confirmed through consultation with the Environment Agency and other relevant stakeholders and are anticipated to include:

- Assessment of flood risk to the Proposed Scheme due to fluvial, surface water and groundwater flood risk, as well as the potential for flooding from water retaining, water supply or drainage infrastructure
- Assessment of change in flood risk from all sources due to the Scheme
- Possible hydraulic modelling of main rivers where significant impacts are envisaged
- Design of mitigation measures to prevent adverse impact to flood risk
- The completion of the Sequential and Exception Tests (if required)

14.7 Assessment assumptions and limitations

14.7.1 The assessment of potential effects is currently based on indicative layout drawings. This is of particular importance when considering the potentially significant impacts of the Proposed Scheme. Details regarding the proposed design of drainage and mitigation measures, for instance, have not been available in advance of preparing this scoping report.

14.7.2 Many of the identified risks during construction and operation will be dependent on the existing and proposed surface water drainage systems and the findings from winter hydrometric monitoring. Limited information is currently known about the existing drainage system: however, it can be sourced from the HADDMS website. This information will be essential to the detailed assessment of risks associated with water quality and increased flood risk.

14.7.3 Information regarding baseline flood risks has been obtained from desk-based sources. Further analysis using site specific data must be undertaken to fully understand the potential risks posed by the proposed infrastructure including potential impacts to the environment, people and existing property and infrastructure.

14.7.4 At present fluvial flood risk is based on the EA's Flood Map for Planning (EA, 2018a). Whilst this provides flood risk associated with Main Rivers, the risk of flooding from ordinary watercourses has not been accounted for. Such risks are unlikely to be determined without specific modelling by the local authority, however the Risk of Flooding

from Surface Water Map (EA, 2018a) is considered to give a reasonable representation of the risk and is assumed to be sufficient given the limited impact of the proposed Scheme on the minor watercourses.

14.7.5 Whilst groundwater monitoring will be undertaken as part of the ground investigation works for the Proposed Scheme, it should be noted that the DCO application programme does not allow for a full programme of groundwater monitoring to be undertaken in time for the preparation of the ES. This could present a higher level of uncertainty to the groundwater assessment; however, data will be available, consultation with the Environment Agency, Winchester City Council and Hampshire County Council will be undertaken and a precautionary approach will be adopted. Further groundwater monitoring, particularly in the winter, will be recommended ahead of detailed design.

14.8 Elements to be scoped in or out

14.8.1 Table 14-4 below outlines the elements to be scoped in or out of the EIA for road drainage and the water environment.

Table 14-4 Elements to be scoped in or out of the EIA for road drainage and the water environment

Element scoped in	Justification
Potential impacts on surface water, flooding and groundwater resources, due to construction activities	Potential for increased physical contamination of surface water runoff from ground disturbance
	Potential for increased pollution risks from runoff during construction activities, including the risk of accidental spillages, which may migrate into surface water and groundwater bodies
	Impacts to the hydromorphological and ecological quality of watercourses associated with works in close proximity to them
	Local groundwater level changes as a result of temporary groundwater control and/or below ground structures
	Increased flood risk within the study area due to the introduction of new impermeable surfaces; reduction in floodplain area, the interception of overland flows, the potential blocking of drainage systems with construction debris, and the interception of the groundwater table by cutting activities
Potential impacts on surface water resources, groundwater resources and flood risk, during	Increased pollution risks from routine runoff, including silts, hydrocarbons and dissolved heavy metals

Element scoped in	Justification
the operational lifetime of the Proposed Scheme	Increased groundwater pollution risks from new/modified drainage features such as soakaways
	Increased pollution risks from accidental spillages, primarily from road collisions involving HGVs and subsequent fuel spillages
	Permanent impacts to the hydromorphological and ecological quality of water features associated with works within or in close proximity to water features
	Permanent alterations to catchment hydrology and the existing drainage regime
	Potential increases in flood risk within the study area, as a consequence of the introduction of new impermeable surfaces, reduction in floodplain area, the interception of overland flows, and the prolonged interception of the groundwater table by below-ground features (i.e. cuttings)
	Potential changes to groundwater levels/resource due to the presence of below ground structures/drainage, that may affect water dependent sensitive habitats (i.e. the River Itchen SSSI), and local water abstractors

14.8.2 No topics have been scoped out of the road drainage and water environment assessment at this stage.

15. Climate

15.1 Study area

15.1.1 The climate assessment will cover the following two elements as required by the EIA Directive and the latest Highways England guidance:

- Effects on climate (from greenhouse gas emissions)
- Vulnerability of the project to climate change (and impacts relevant to adaptation)

15.1.2 There is no readily defined study area for the effects of the Proposed Scheme on climate regarding Greenhouse Gas (GHG) emissions as the effects of GHG emissions from all projects contribute towards global climate change. Assessment of the Proposed Scheme's impacts on climate change will be carried out in life cycles in accordance to Section 7 of PAS 2080:2016 (BSI 2016). The study area and specific life cycle assessed for the Proposed Scheme are as follows:

- Construction (use of materials for temporary and permanent construction activities and associated transport) – footprint of the Proposed Scheme
- Operation (operation of lighting and controls, maintenance and replacement of original materials, as well as emissions (or avoided emissions) from end-user vehicles) – air quality study area of affected roads (see Chapter 6 – Air Quality)

15.1.3 Emissions associated with the end of life stage will not be considered due to the long design life of the asset (i.e. there is no date for decommissioning) and that there is insufficient certainty about the likelihood, type or scale of emissions activity.

15.1.4 The study area used to assess vulnerability of the Proposed Scheme to climate change comprises the order limits.

15.2 Baseline Conditions

Effects on climate

15.2.1 The Government has set out a legally binding framework to cut GHG emissions by at least 80% by 2050 in the Climate Change Act 2008. The UK total provisional GHG emissions for 2017 is 456 million tonnes of CO_2e with transport being the largest emitting sector (DBEIS 2018). To meet the fifth carbon budget, transport emissions would need to be reduced by an average of 4% per year until 2030 nationally (Committee on Climate Change 2017).

15.2.2 In the baseline (do nothing) scenario, greenhouse gas emissions occur constantly and widely as a consequence of human and natural activity including energy consumption (fuel, power), industrial processes, land use and land use change. The greenhouse gas assessment will only consider situations where the Proposed Scheme results in additional or avoided emissions in comparison to the baseline scenario and its assumed evolution. As there is no construction currently taking place on the site, this is considered to be the baseline position. The baseline position for construction phase greenhouse gas emissions is therefore considered to be zero.

15.2.3 The operation and management of the current scheme assets is likely to require a small number of specialist components (for example, light bulbs and signage) as well as some bulk material (cement, concrete, sand and gravel) for minor works and repairs of the highway and ancillary infrastructure. These materials will have embodied emissions associated with them. Due to the small materials quantities required, however, emissions would be assessed to be of minor significance.

15.2.4 The total end-user GHG emissions from traffic flows in the baseline scenario will be modelled as part of the air quality assessments (in accordance with the Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1 Air Quality; HA 207/07) (Highways Agency, 2007a). The modelling includes the total GHG emissions for all traffic using the strategic and local road network (covered by the traffic model) in the vicinity of the Proposed Scheme and its surrounding region. At present, however, data for the end-user emissions is not available for inclusion in the baseline conditions.

Vulnerability of the Proposed Scheme to climate change

15.2.5 Winchester experiences average maximum and minimum temperatures of around 22ºC and 11ºC in the summer and around 7ºC and 1ºC in the winter (Met Office, 2018). The South England Region has a milder climate than most areas of the UK due to its southern location and proximity to the sea. This has a climate stabilising effect protecting against the more extreme weather of the Atlantic coast. The Region experiences an annual average amount rainfall of approximately 750mm to 850mm, with October being the wettest month with an average of 90mm to 100mm amount of rainfall (Met Office, 2018).

15.2.6 Across England as a whole, average land temperatures have risen by approximately 1ºC over the last decade (Defra, 2017). England is seeing a trend towards warmer winters and hotter summers with sea levels rising by approximate 3mm a year (Defra, 2017).

15.2.7 Current trends and forecasts predict that the South East of England will experience the following potential effects due to climate change (Defra, 2012):

- increased frequency of flooding
- hotter summers (with an increased number of heat wave events)
- water scarcity, particularly during the summer

15.2.8 The baseline for the vulnerability of the Proposed Scheme to climate change, as shown in Table 15-1, comprises recent historical information (1961 to 1990) as well as future projections for key climate parameters within the vicinity. All figures are taken from the UK Climate Projections 2009 projections (UKCP, 2009) which cover the UK split into a grid of 25 kilometre squares. Future projections are provided for the 2020s (corresponding to the construction period) and the 2080s (during the operation design life of the Proposed Scheme). The grid reference for the projections used in this assessment is Area 1663 which contains the area occupied by the Proposed Scheme. Information in Table 15-1 would be updated following the publication of UKCP18 in the ES.

Table 15-1 Baseline (historical and future) climate data for the study area

Climate Category	Climate parameter With recent baseline (1961-1990)		Projection for 2020s (2010-2039)			Projection for 2050s (2040-2069)			Projection for 2080s (2070-2099)		
			Medium (50%)	High (50%)	Range	Medium (50%)	High (50%)	Range	High (50%)	Medium (50%)	Range
Temperature [°C]	Mean daily winter min	1.2	2.5	2.6	1.6 to 3.5	3.4	3.8	1.9 - 5.5	4.4	5.1	2.3 to 7.8
	Mean winter daily	4.1	5.4	5.4	4.6 to 6.3	6.3	6.5	5.0 - 7.9	7.1	7.7	5.4 to 9.7
	Change on coldest winter day	N/A	+1.3	+1.3	-0.2 to +2.9	+1.7	+2.0	-0.2 to +4.3	+2.0	+2.4	+0.1 to +5.6
	Mean daily summer max	20.7	22.7	22.7	21.5 to 24.3	24.3	24.9	22.0 - 27.9	25.8	27.3	22.0 to 31.9
	Mean summer daily	15.6	17.2	17.2	16.3 to 18.4	18.5	18.8	16.8 - 21.0	19.7	20.7	17.0 to 24.1
	Change on warmest summer day	N/A	+1.2	+1.5	-2.2 to +5.1	+2.5	+2.9	-1.9 to +8.8	+3.2	+4.3	-2.7 to +12.8
Rainfall [mm/day]	Winter mean daily	2.6	2.6	2.6	2.4 to 3.0	2.9	2.9	2.5 - 3.5	3.0	3.2	2.6 to 4.1
	Summer mean daily	1.7	1.6	1.7	1.3 to 2.1	1.4	1.4	1.1 - 1.9	1.3	1.2	1.0 to 1.8

Climate Category	Climate parameter With recent baseline (1961-1990)		Projection for 2020s (2010-2039)			Projection for 2050s (2040-2069)			Projection for 2080s (2070-2099)		
			Medium (50%)	High (50%)	Range	Medium (50%)	High (50%)	Range	High (50%)	Medium (50%)	Range
	% change on wettest winter day	N/A	+6.1%	+8.0%	-6.1% to 22.6%	+15.7%	+16.7%	-1.4% to +37.8%	+22.4%	+28.2%	+1.4% to 60.9%

15.2.9 Baseline climate projections show an increasing trend of temperatures both in terms of average daily conditions (during summer and winter) and the daily minimum and maximum temperature extremes. UKCP09 projections are probabilistic. However, focussing on the mid-point projections for the medium emissions scenario, the mean daily minimum temperature over winter months is projected to increase from 1.2°C for the recent historical baseline period to 4.4°C by the 2080s. The mean daily maximum over summer months is projected to increase from 20.7°C to 25.8°C for the same period.

15.2.10 The baseline projections for average daily rainfall suggest wetter conditions over winter months, increasing from 2.6mm to 3.0mm per day (medium emission scenario, mid-point projection). The projections for summer months suggest a trend towards drier conditions, within average daily rainfall reducing from 1.7mm to 1.3mm per day.

15.3 Potential impacts

Effects on climate

15.3.1 The Proposed Scheme would be likely to impact on carbon dioxide levels in two ways. Firstly, carbon would be generated during the construction phase as a consequence of extracting raw materials, processing materials for use in construction, operation of the construction plant and the movement of vehicles during the construction phase. Secondly, carbon would be generated from vehicle movements during the operation phase as a consequence of driving along the new route.

15.3.2 There would also be carbon emissions associated with energy use and maintenance of the Proposed Scheme in terms of lighting and signages during the operation phase.

Vulnerability of the Proposed Scheme to climate change

15.3.3 Impacts in relation to climate resilience relate to how the changing climate could affect the Proposed Scheme itself, in terms of the construction and operation of infrastructure, its ability to function and the end-users.

15.3.4 Due to the temporary short-term nature of the construction phase, it is anticipated that changes in climate would not significantly affect the workforce, location of construction compounds or type of machinery. Therefore, vulnerability of the Proposed scheme to climate change during construction will be scoped out of the assessment for the ES.

15.3.5 Changes in climate variables (and impacts associated with extreme weather) could potentially impact on the road itself and supporting infrastructure including bridges, earthworks and drainage. However, not all climate related impacts would be threats. There would most likely be opportunities brought about by climate change.

15.3.6 A simple assessment has been undertaken in PCF Stage 2 to identify key potential impacts of climate change and its effect on the Proposed Scheme, outlined in Table 15-2. Further details on flooding and surface water impacts on the Proposed Scheme can be found in Chapter 14 – Road Drainage and Water Environment.

Table 15-2 Potential impacts during construction and operation

Phase of Proposed Scheme	Climate variable	Impact (hazards or benefits)
Construction	Increased temperatures, prolonged periods of hot weather	Warm and dry conditions exacerbate dust generation and dispersion, health risks to construction workers
	Increased precipitation, and intense periods of rainfall	Flooding of works and soil erosion Increased risk of contamination of waterbodies Disruption to supply of materials and goods
Operation	Increased precipitation, especially in Winter and extreme rainfall events	Flooding Water scour causing structural damage Weakening or wash-out of structural soils Change in groundwater level and soil moisture
	Temperature extremes	Stress on structures Stress on surfaces e.g. difficulties with maintaining required texture depth during construction and operation. Challenges for maintenance regimes

15.4 Design, mitigation and enhancement measures

Effects on climate

15.4.1 Mitigation measures for effects on carbon footprint would be similar to the materials and waste hierarchy and consist of strategic approaches driving reduction across all lifecycle stages of the Proposed Scheme. Strategically, emissions are mitigated by applying the carbon reduction hierarchy PAS 2080:2016 (BSI, 2016) which cover:

- build nothing – challenge the root cause of the need; explore alternative approaches to achieve the desired outcome
- build less – maximise the use of existing assets; optimise asset operation and management to reduce the extent of new construction required
- build clever – design in the use of low carbon materials, streamline delivery processes, minimise resources consumption
- build efficiently – embrace new construction technologies; eliminate waste

15.4.2 It should be acknowledged that application of the hierarchy will be part of the inherent outcome of good design practice and therefore embedded within the design of the Proposed Scheme.

15.4.3 Structures, drainage, road restraint systems, street lighting and signage products would be procured with consideration of the environmental impacts associated with their manufacture such as carbon footprint, energy consumption and long-life performance. Where possible, the availability of responsibly sourced local and recycled materials would be considered to reduce carbon footprint from transport and manufacture of these materials.

15.4.4 Mitigation measures for the Proposed Scheme's lifecycle stages are provided in Table 15-3.

Table 15-3 Carbon emissions mitigation opportunities/enhancement

Proposed Scheme lifecycle stage	Mitigation opportunities
Temporary and permanent construction materials	Reduction of materials consumption would be carried out in accordance with mitigation measures outlined in Chapter 11 – Material Assets and Waste
Construction/installation process	Construction plant emissions would be managed via the CEMP, specifying plant operator efficiency requirements
In-use traffic on the Proposed Scheme	No mitigation measures would be likely to be required

Vulnerability of the Proposed Scheme to climate change

15.4.5 To address vulnerability of the Proposed Scheme to climate change, specifically those impacts outlined in Table 15-2, the drainage design will consider the impact of both an increased impermeable area and climate change for the collection and conveyance system. The risks of water pollution and surface water flooding would be reduced or made equivalent to the current levels of risk. Furthermore, landscape mitigation planting would be limited to native species not requiring a large quantity of water to maintain. Further detail on flood mitigation has been provided in Chapter 14 – Road Drainage and Water Environment.

15.4.6 Vulnerability of the Proposed Scheme's structures to hot weather, high speed winds and heavy rainfall, will be mitigated by the following industry guidance:

- material densities: BS EN 1991-1-1:2002
- load factors: BS EN 1990:2002+A1:2005
- wind actions: BS EN 1991-1-4
- thermal actions: BS EN 1991-1-5
- traffic and accidental actions: BS EN 1991-2

15.5 Description of likely significant effects

Effects on climate

15.5.1 Effects of the Proposed Scheme on climate change would be unlikely to be significant according to the statement from the NPS NN that '*the impact of road development on aggregate levels of emissions is likely to be very small*'. However, IEMA guidance (2017) states that all projects create GHG emissions contributing to climate change and therefore significant. Thus, effects of the Proposed Scheme on climate change during the construction and operation phases will be scoped in for further assessment. Carbon calculation will be undertaken in the PCF Stage 3 assessment as described in Section 12.6 to draw definitive conclusions regarding the significance of the Proposed Scheme's effects on climate change.

Vulnerability of the Proposed Scheme to climate change

15.5.2 With the above mitigation measures in place, and a milder climate than most areas of the UK, it is considered that vulnerability of the Proposed Scheme to climate change effects would not be significant and this topic has therefore been scoped out of further environmental assessment. This is with the exception of flood risk which has been scoped in and would be covered separately in the Road Drainage and Water Environment chapter of the ES and the accompanying Flood Risk Assessment.

15.6 Assessment Methodology

Policies and plans

15.6.1 Planning policies and guidance that are relevant to the Proposed Scheme include:

- National Policy Statement for National Networks (NPSNN) (DfT, 2014): Paragraphs 5.16 to 5.19 (Carbon emissions).
- National Planning Policy Framework (NPPF) (2018): Paragraph 8 (Achieving sustainable development), Paragraphs 148 and 150 (Meeting the challenge of climate change, flooding and coastal change), and the associated Planning Practice Guidance: Climate change (2014) and Renewable and low carbon energy (2015).
- Winchester District Local Plan Part 1 – Joint Core Strategy (2013): Policy DS1 (Development Strategy and Principles) and Policy CP13 (High Quality Design).
- Winchester District Local Plan Part 2 – Development Management and Site Allocations (2017): Policy WIN1 (Winchester Town).
- South Downs Local Plan Pre-Submission (2017) – Emerging: Policy SD2 (Ecosystem Services); Policy SD45 (Green Infrastructure); and, Policy SD48 (Climate Change and Sustainable Use of Resources).

Effects on climate

15.6.2 The greenhouse gas assessment will be based on the following guidance:

- The latest Highways England guidance, and in particular, the details regarding assessment of climate impacts in line with the Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment

- IEMA's Environmental Impact Assessment guide to assessing greenhouse gas emissions and evaluating their significance (IEMA, 2017)

- TAG Unit A3 Environmental Impact Appraisal Chapter 4 Greenhouse Gases (DfT, 2015)

- PAS 2080:2016 Carbon management in Infrastructure (BSI 2016)

- Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1 Air Quality; HA 207/07 (Highways Agency 2007)

- Highways England's Carbon emissions calculation tool (Highways England, 2016)

15.6.3 The assessment approach will consider likely magnitude of greenhouse gas emissions (or avoided emissions) in comparison to the baseline scenario with no scheme development. It will consider emissions throughout the lifecycle of the Proposed Scheme including:

- Construction stage, for example embodied emissions associated with materials, transportation of materials to site and waste/arisings from site, and the construction process

- Operation stage, for example operation of lighting and controls, maintenance and replacement of original materials, as well as emissions (or avoided emissions) from end-user vehicles

15.6.4 Emissions associated with the end of life stage will not be considered due to the long design life of the asset (i.e. there is no date for decommissioning) and that there is insufficient certainty about the likelihood, type or scale of emissions activity.

15.6.5 The design of each option at PCF Stage 2 was only advanced far enough to complete a simple assessment of greenhouse gas emissions during construction. For example, a materials bill of quantities was not available, and therefore a simple assessment only has been completed using the information available on emissions sources as set out in Table 15-4.

Table 15-4 Key information on greenhouse gas emissions sources for the Proposed Scheme

Construction	Lifestyle stage	Potential sources of emissions (not exhaustive)	Indicative assessment of key GHG sources
Construction	Product stage (manufacture and transport of raw materials to suppliers)	Embodied emissions associated with the required raw materials. For example: • Pavement: asphalt, aggregate • New roundabout construction at junction 9; steel concrete • New bridge connecting the roundabout above M3; steel, concrete. • New bridges under M3 carrying A34 Southbound Link; steel, concrete	• 10.43 hectares of new road surface (1,286 tCO2e) • Earth fill 18,418 m3 (751 tCO2e) • Manufacturing and supply of drainage, barriers, signs – data not available but assumed not significant
	Construction process stage (transport of materials and arisings to/from site; construction process, earth movements)	Activities for organisations conducting construction work (i.e. fuel/electricity construction) Delivery of materials for new bridge and three grade-separated junctions • Export and disposal of site excavations • Delivery of materials for new roundabout and bridges. • Installation of major structures	• Delivery of materials for carriageway (499tCO2e) • 18,418 m3 of fill import and 143,035 m3 of onsite earth movement (190 tCO2e) • Delivery and installation of drainage, barriers, signs and lighting – data not available but assumed not significant.
	Land use, land use change and forestry	Change in emissions associated with loss of agricultural grassland.	
Operation	End-user emissions (regional traffic flows)	Vehicles using highways infrastructure	Increased: +8.9 kTCO2e per year +535 kTC02e (2023 -2082)
	Operation and maintenance	Lighting	Negligible change in emissions (energy) for lighting and controls.

15.6.6 Greenhouse gas emissions have been calculated using the Highways England carbon calculator which multiplies emissions activity by the relevant emissions factors reported in tonnes carbon dioxide equivalents (tCO2e).

15.6.7 The total operation stage end-user greenhouse gas emissions from traffic, with each of the scheme proposals in place, have been modelled in accordance with the DMRB HA 207/07 (Highways Agency, 2007a). The modelling includes total greenhouse gas emissions for all vehicles covered by the traffic model covering the strategic and local road network in the area of the Proposed Scheme and its surrounding region.

15.6.8 Total end user emissions are presented in Table 15-5 for the year 2023 (the first year of operation for the Proposed Scheme) and the year 2038 (15 years after commissioning the Proposed Scheme). In addition, the average annual and total emissions for the 60 year assumed operation period of 2023 to 2082 are presented. The baseline figures (without the Proposed Scheme) are included for comparison.

Table 15-5 End user greenhouse gas emissions data for traffic in the region of the proposed Scheme.

Scenario	**Total greenhouse gas emissions for all traffic in the traffic model area [Absolute and % change from baseline in brackets] (thousand tonnes of carbon dioxide equivalent; kTCO2e)**			
	2023	**2038**	**Average per year (2023-2082)**	**Total (2023-2082)**
Baseline (‘do minimum’)	513.5	599.1	587.7	35,262
The proposed Scheme	520.7 [+7.2, +1.4%]	608.3 [+9.2, +1.8%]	596.6 [+8.9, +1.5%]	35,797 [+535, +1.5%]

15.6.9 Table 15-5 shows that the total regional traffic emissions for the operational lifespan of the Proposed Scheme (2023-2082) are 535 kTCO2e (thousand tonnes of carbon dioxide equivalent) higher (+1.5%) than the baseline (do minimum) scenario.

15.6.10 No emissions (or avoided emissions) have been assessed in relation to the ‘beyond system boundary’ category. While the construction of the Proposed Scheme will use materials that could be recycled at the end of their operational life, the likelihood, timescales and process for this are not sufficiently certain to assume anything other than ‘standard industry practices’.

15.6.11 In line with the National Policy Statement for National Networks (DfT, 2014), significance of impacts is assessed by comparing estimated GHG emissions arising from the scheme with the respective UK carbon budgets (see Table 15-6 – taken from UK Government Carbon budgets (Committee on Climate Change, 2017) set by the UK government covering 2018 to 2032.

15.6.12 GHG emissions result in the same global climate change effects wherever and whenever they occur and therefore the sensitivity of different human and natural receptors is not considered. There are currently no agreed thresholds for what level of GHG emissions is considered significant in an EIA context.

Table 15-6 UK Government Carbon budgets (Committee on Climate Change)

Carbon budget period	UK carbon budget
Third: 2018-2022	2,544 MtCO2e
Fourth: 2023-2027	1,950 MtCO2e
Fifth: 2028-2032	1,725 MtCO2e

15.6.13 A significant effect would occur where the increase in carbon emissions resulting from the Proposed Scheme were large enough to have a material impact on the ability of Government to meet its carbon reduction targets.

15.7 Assessment assumptions and limitations

15.7.1 A simple assessment of greenhouse gas emissions has been completed at PCF Stage 2 on the basis of limited information regarding the Proposed Scheme design. It has not been possible to quantify the magnitude of emissions.

15.7.2 Climate impact associated with carbon emissions from the extraction and transport of primary raw materials and manufactured products would occur off-site. The source and manufacture of materials cannot be determined at this time, and the production of these materials would be likely to have previously been the subject of separate consent procedures (such as applications for planning permission and environmental permits) including environmental assessment. Therefore, climate impacts associated with extraction of raw materials, the manufacture of products and transport of raw materials will not form part of the assessment for the Proposed Scheme.

15.7.3 No information is available on the quantities of materials in other construction elements such as major structures (e.g. roundabouts and bridges). However, these are considered to be of significance. No information is available to estimate the emissions from the construction process (for example from vehicles and construction plant).

15.8 Elements to be scoped in or out

15.8.1 There are multiple GHG emissions associated with each lifecycle stage of the Proposed Scheme. Emissions sources included within the scope of this assessment, and the reasons why they have been scoped in are presented in Table 15-7.

Table 15-7 Elements to be scoped in or out of the EIA for climate

Element scoped in	Element scoped out	Justification
--	Construction - Product stage; including raw material supply, transport and manufacture	Production of these materials would be likely to have previously been subject to separate consent procedures.
Construction process stage; including transport to/from works site and construction/installation processes.	--	Emissions from the construction stage typically form a large proportion of a scheme's emissions and would include such emissions sources as fuel/energy consumption.
Operation - Use of the infrastructure by the end-user	--	Total regional traffic emissions for the operational lifespan of the Proposed Scheme (2023-2082) would be higher (+1.5%) than the baseline (do minimum) scenario (see discussed within Section 15.5).
Operation - Repair and refurbishment	--	The Proposed Scheme is anticipated to be resurfaced twice (assuming a 20 year design life).
--	Operation and maintenance	Replacement of lighting technology would lead to an improvement in the energy efficiency therefore contribution to climate change would be expected to be minor positive
--	Replacement	Cross over with repair
--	Deconstruction	Decommissioning would happen several decades into the future and well beyond the period for which the UK Government has set agreed carbon budgets. Uncertainty about the future decommissioning process and associated emissions is sufficient to scope this lifecycle stage out of the emissions assessment.
--	Vulnerability of the Proposed Scheme to climate change	With mitigation measures and a milder climate than most areas of the UK, vulnerability of the Proposed Scheme to climate

Element scoped in	Element scoped out	Justification
		change is considered it would not be significant.

16. Cumulative Effects

16.1 Cumulative assessment methodology

16.1.1 The National Policy Statement for National Networks states at Paragraph 4.16 that when considering significant cumulative effects, any ES should provide information on how the effects of the proposal would combine and interact with the effects of other development (including projects for which consent has been granted, as well as those already in existence).

16.1.2 Cumulative effects occur either as a result of changes caused by other reasonably foreseeable developments acting cumulatively with the effects of the Proposed Scheme ('inter-project cumulative effects'); or from the combined effect of several different impacts, acting together on a single receptor, such that the combined effect would be more significant than the sum of the individual effects.

16.1.3 Cumulative effects could therefore arise from multiple projects (inter-project) or from within the same project. For two impacts to have a cumulative effect, the impacts would need to have a temporal relationship (i.e. arise at broadly the same time) and a spatial relationship (i.e. occur in broadly the same geographic area).

16.1.4 As cumulative effects would arise from two or more impacts acting together, an impact without a significance on its own could combine with another to result in a significant cumulative effect.

16.1.5 This chapter has been prepared with reference to the Planning Inspectorate's Advice Note 17: Cumulative Effects Assessment (Planning Inspectorate, 2015) and guidance on cumulative effects contained in DMRB Volume 11 Section 2 Part 5(HA 205/08) (Highways Agency, 2008d). This assessment is also informed by the National Policy Statement for National Networks (DfT, 2014) and by the findings of the assessment carried out at PCF Stage 2.

16.2 Assessment of interrelationships between topics

16.2.1 Assessment of interrelationship between topics addresses the ways in which a single receptor, group of receptors or receptor type is affected in more than one different way by a project.

16.2.2 Each technical chapter will assess the categories of receptors and specific named receptors relevant to that topic's methodology. In some instances, the same receptor or resource could be assessed in more than one technical chapter or more than once within the same technical chapter. In these cases there is the possibility that several individual effects on the same receptor could add up to create a significant cumulative effect.

16.2.3 The approach to identify likely cumulative effects arising from the Proposed Scheme and its interaction with other schemes will be based upon guidance contained within DMRB. However, this guidance will be adapted to make it relevant to each environmental topic.

16.2.4 Once the EIA has been drafted an assessment of interrelationships between topics will be undertaken. The results of the assessment will be presented within the cumulative chapter of the EIA.

16.2.5 Potential interrelationships between topics occurring during construction (C) and operation (O) are outlined below in Table 16-1. These will be reviewed during the EIA to ensure all common receptors are assessed.

Table 16-1 Potential interrelationships between topics

Potential receptors	Air Quality and Carbon Emissions		Cultural Heritage		Landscape and arboriculture		Biodiversity		Geology and Soils		Materials		Noise and Vibration		Population and Health		Road Drainage and the Water environment		Climate	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Residents along the existing Road Network	✓	✓			✓	✓							✓	✓	✓	✓				
Residents close to the proposed Scheme					✓	✓			✓	✓			✓	✓	✓	✓				
Archaeological Remains			✓																	
Listed Buildings			✓	✓																
Scheduled Monuments			✓										✓	✓						
Registered Parks and Gardens			✓	✓																
Conservation Areas			✓	✓	✓	✓														
Landscape Character			✓	✓	✓	✓														

Potential receptors	Air Quality and Carbon Emissions		Cultural Heritage		Landscape and arboriculture		Biodiversity		Geology and Soils		Materials		Noise and Vibration		Population and Health		Road Drainage and the Water environment		Climate	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Statutory Designated Sites	✓	✓			✓	✓	✓	✓	✓	✓			✓	✓						
Non-statutory Designated Sites	✓	✓					✓	✓	✓	✓										
Habitats of Principal Importance	✓	✓					✓	✓												
Protected Species	✓	✓					✓	✓												
Designated Geological Sites									✓	✓										
Soil Quality									✓						✓					
Groundwater and Surface Water									✓	✓							✓	✓		
Land Contamination									✓	✓										
Mineral Resources									✓		✓									
Waste											✓									
Flood Risk																	✓	✓		
All travellers (inc. users of PRoWs)	✓	✓			✓	✓							✓	✓	✓	✓				

Potential receptors	Air Quality and Carbon Emissions		Cultural Heritage		Landscape and arboriculture		Biodiversity		Geology and Soils		Materials		Noise and Vibration		Population and Health		Road Drainage and the Water environment		Climate	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Community and Private Assets	✓	✓							✓				✓	✓	✓	✓				
Workers and visitors to the area	✓	✓			✓	✓			✓				✓	✓	✓	✓				
Human Health	✓	✓							✓				✓	✓	✓	✓				
Road Drainage and the Water Environment																				
Climate	✓	✓									✓							✓	✓	✓

16.3 Assessment of cumulative effects

Policies and plans

16.3.1 Planning policies and guidance relevant to the Proposed Scheme include:

- National Policy Statement for National Networks (NPSNN) (DfT, 2014): Paragraphs 5.16 to 5.19 (Carbon emissions).
- National Planning Policy Framework (NPPF) (2018): Paragraph 8 (Achieving sustainable development), Paragraphs 148 and 150 (Meeting the challenge of climate change, flooding and coastal change), and the associated Planning Practice Guidance: Climate change (2014) and Renewable and low carbon energy (2015).
- Winchester District Local Plan Part 1 – Joint Core Strategy (2013): Policy DS1 (Development Strategy and Principles) and Policy CP13 (High Quality Design).

- Winchester District Local Plan Part 2 – Development Management and Site Allocations (2017): Policy WIN1 (Winchester Town).

- South Downs Local Plan Pre-Submission (2017) – Emerging: Policy SD2 (Ecosystem Services); Policy SD45 (Green Infrastructure); and, Policy SD48 (Climate Change and Sustainable Use of Resources).

16.3.2 Where other major improvement and construction projects are delivered at the same time as, and in proximity to the Proposed Scheme, a potential for cumulative adverse impacts and effects would exist. Conversely, beneficial opportunities to maximise synergies between major projects (balancing cut and fill across different schemes, for example) could also present themselves.

16.3.3 Inter-project cumulative effects require a separate scoping procedure and assessment method. It is therefore necessary to address these separately from other impacts and this will be done a part of the cumulative effects chapter within the EIA

16.3.4 Assessment of inter-project effects will follow the step-by-step approach outlined in the PINS Advice Note 17 (Planning Inspectorate, 2015). Guidance from DMRB Volume 11 Section 2 Part 5 (HA 205/08) (Highways Agency, 2008d) will also be taken into consideration.

Traffic related effects

16.3.5 Several environmental topics will base all or part of their impact assessment on information about the quantity of traffic on the road network in areas adjacent to the Proposed Scheme including its distribution, speed and movement. This information is derived from a computer-based model.

16.3.6 Topics basing their impact assessment primarily or entirely on traffic-based modelling or calculations are air quality and noise and vibration.

16.3.7 Other topics basing their assessment on traffic-based calculations include road drainage and the water environment (calculations of risk to water quality from run-off, calculations of accidental spillage risk); and population and human health (community severance).

16.3.8 In accordance with standard guidelines the traffic model relies on assumptions about traffic growth over time. The model takes into account proposed development and infrastructure projects in the region. This means that inter-project cumulative effects are already built into these assessments and will not need to be covered again in the cumulative effects chapter.

Establishing the proposed Scheme's Zone of Influence

16.3.9 The first stage of the assessment of inter-project effects will be to establish a likely spatial Zone of Influence (ZoI) for each topic area within the ES. The ZoI will be defined using professional judgement and be based on guidance specific to each topic. The ZoI will be mapped and appended to the ES.

Identification of a long list of "other developments"

16.3.10 At the next stage of assessment searches for "other developments" will be undertaken. Information will be gathered using the Planning Inspectorate website, Local Authority Planning websites and other relevant sources.

16.3.11 Guidance on the identification of other projects that should be taken into account in the consideration of cumulative effects is available in DMRB and from PINS Advice Note 17 (Table 3), which is reproduced here as Table 16-2, with some expansion to take more account of projects going through consenting regimes other than the National Infrastructure Planning system.

16.3.12 Where other past projects are already complete or are expected to be completed before construction of the Proposed Scheme, and the effects of those projects are fully determined, effects arising from them should be considered as part of the baseline. These could be considered as part of both the construction and operation assessment. The ES will clearly distinguish between projects forming part of the baseline and those included in the cumulative impact assessment

16.3.13 The cumulative effects assessment will, therefore, focus primarily on interaction between the Proposed Scheme and other developments whose construction will not have commenced, or will not be complete, before construction of the Proposed Scheme. Relevant other developments will be identified through a staged process.

16.3.14 Table 16-2 below is taken from PINS Advice Note 17 and shows "other development" types to be considered in the assessment. The level of details likely to be available for the cumulative assessment are based on tier (from high likelihood of detail to low).

Table 16-2 Development types and NSIP Note 17 Tiers

Tier	Type of development
1	Developments under construction Permitted applications Submitted applications
2	Projects on the Planning Inspectorate's Programme of Projects where a scoping report has been submitted
3	Projects on the Planning Inspectorate's Programme of Projects where a scoping report has not been submitted Identified in the relevant Development Plan (and emerging Development Plans) Identified in other plans and programmes (as appropriate) which set the framework for future development

16.3.15 An initial 'long list' of potentially relevant other developments has been developed using information from Stage 2. The long list has been built up in line with the criteria set out in Table 16-2 through searches of the Planning Inspectorate and Local Planning Authority websites and other relevant sources.

16.3.16 In addition to Table 16-2, the following will also be considered from within the long list;

- Any transport infrastructure or other development on the 'traffic uncertainty log' that was deemed sufficiently certain to be included in the 'core scenario' for traffic modelling will be included in the long list.
- Refused applications subject to appeal procedures not yet determined
- Any other relevant developments identified through consultation with developers and stakeholders.

16.3.17 At the next stage of assessment, the long list will be reviewed, and developments listed in Table 16-2 (Tier 1) and appeals will be searched for. However, to keep the assessment proportionate only developments categorised as 'major applications' will be included. As defined in the Town and Country Planning (Development Management Procedure) (England) Order 2015 (TCPO), 'major applications' include:

a) the winning and working of minerals or the use of land for mineral-working deposits

b) waste development

c) the provision of dwellings where

   i. the number of dwellings to be provided is 10 or more or

   ii. the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within sub-paragraph (c)(i)

d) the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more

e) development carried out on a site having an area of 1 hectare or more

16.3.18 For permitted applications not yet implemented the assessment will cover the past five years and will take account of those applications that received planning consent over three years ago and are still valid but have not yet been completed.

16.3.19 The long list will continue to be updated throughout the EIA process as appropriate when new developments are proposed to make sure that all potential relevant developments are included in the cumulative assessment.

16.3.20 When considering significance criteria, the assessment will take into account the requirements set out in the National Policy Statement for National Networks (NPSNN) (DfT, 2014) and PINS Advice Note 17 (Planning Inspectorate, 2015).

16.3.21 Once the design process has been finalised, it will be possible to identify the developments that are likely to have construction and operation interactions with the Proposed Scheme.

16.3.22 The long list of other developments provided as part of the Stage 2 EAR (WSP, 2017i) will be reviewed as part of the Stage 3 assessment.

Identification of a shortlist of "other development"

16.3.23 The final list of cumulative schemes will be agreed through consultation with the local authority and statutory bodies. It is likely that a proportion of the other developments in the long list will not be suitable for inclusion in the cumulative effects assessment, because:

- There is too much uncertainty about the project going ahead, and therefore of its impacts occurring, to justify its inclusion in the assessment; or
- There is too little information available about the project, and its environmental effects, to allow an assessment.

16.3.24 Therefore, the long list will be filtered down to a "short list of other developments that may act cumulatively with the Proposed Scheme and that can be included in the assessment. The factors to be taken into account in filtering down the long list to form the short list include:

- how certain it is that each development will go ahead;
- the availability of environmental information regarding the developments;
- potential temporal overlap between any of the effects of the Proposed Scheme and the effects of other developments
- potential spatial overlap between any of the effects of the Proposed Scheme and the effects of other developments.

16.3.25 Consideration of whether there is sufficient certainty of a project going ahead will be based on the 'tiers' identified in Table 16-2, as follows:

- Any Tier 1 and Tier 2 project will be deemed to have sufficient certainty to be taken into the short list.
- For Tier 3 projects, there could be a great deal of variation in the level of confidence that a project will go ahead. Some individual projects could have public commitments with a defined timescale and identified funding, whilst others remain policy or commercial aspirations. These projects will be considered on a case-by-case basis to determine whether there is sufficient confidence to carry them forward into a short list.

16.3.26 Cumulative impact assessment cannot be undertaken unless there is sufficient information about the other developments included. As a minimum, this must include an environmental Scoping Report or other environmental report that enables:

- identification of the environmental Zone of Influence of the other project, overall and on a topic-by-topic basis; and

- identification of the time period over which impacts of the other project could occur.

16.3.27 Any projects with sufficient confidence that they will proceed, and provide sufficient environmental information, will be included in a shortlist.

Gathering Information on the development in the short list

16.3.28 The following information will be sought for each of the developments included on the short list for assessment, to inform the cumulative effects assessment:

- the location and extent of the other development;

- information on the design of the other development;

- the proposed programme for obtaining consent (if relevant), construction, operation and decommissioning;

- environmental assessment information that will allow the identification of:

  - the environmental baseline;

  - the environmental effects of the development;

  - the environmental Zone of Influence of the development as a whole and on a topic by topic basis; and

  - the timescale over which effects would occur, overall and on a topic by topic basis.

16.3.29 It is recognised that the extent to which this information is available, and the level of detail of the information, is likely to vary between developments, even where the minimum requirement for inclusion in the short list has been met.

16.3.30 The starting point for data gathering will be the websites of the relevant competent authorities (i.e. the local authorities and the Planning Inspectorate). Where required, this could be supplemented by direct liaison with the competent authorities and consultation with other stakeholders and statutory bodies. In some cases, information could be made available from the developers themselves, either from their websites or directly.

Identification of potential impacts

16.3.31 The primary method for identification of potential impacts will be through the plotting of zones of influence on a topic-by-topic basis.

16.3.32 Where the geographic zone of influence of another development overlaps with the overall Zone of Influence of the Proposed Scheme, a check will be carried out for the presence of receptors relevant to that topic within the area of overlap. If such receptors are present, and there is also an overlap between the time periods in which the impacts would occur, then there is the potential for cumulative effects.

16.3.33 The likely occurrence of a cumulative effect will be confirmed, in the first instance, through the examination of the environmental reports for both schemes, to determine whether the receptor is identified in both as being affected. This will be supplemented by professional judgement to determine the likelihood of any additional effect in the context of the cumulative effects assessment.

The nature of potential cumulative effects

16.3.34 In identifying cumulative effects, consideration will be given to the various different ways in which cumulative effects could occur. In particular:

- Cumulative effects can be ‘additive’, e.g. one source of pollution can add to another source of pollution to create a higher concentration of pollutant than would otherwise occur, or an area of habitat could suffer loss of land from one development and then further loss of land from another development.
- Cumulative effects can also by ‘synergistic’, where, for instance, a habitat may be affected by loss of land from one development and pollution or noise from another, resulting in a combined significant impact.
- It is important to recognise whether either or both impacts giving rise to the cumulative effect are temporary or permanent, and if temporary over what timescale.
- What is the geographic extent of the cumulative effect relative to both the extent of the receptor and the extent of the individual effects.
- If the effect is intermittent, what is its frequency.
- What is the value/sensitivity of the receptor and how susceptible is the effect to being successfully mitigated.

16.3.35 Any cumulative impacts identified are further defined as 'construction' or 'operation' effects, 'short-term' or 'long-term' (based on whether they would still be felt 15 or more years after construction) and 'beneficial' or 'adverse'. DMRB sets out a specific methodology for the assessment of the significance of cumulative effects (see Table 16-3).

Table 16-3 Determining the significance of cumulative effects

Severe	**Effects that the decision-maker must take into account as the receptor/resource is irretrievably compromised.**
Major	Effects that may become a key decision-making issue.
Moderate	Effects that are unlikely to become issues on whether the Scheme design should be selected, but where future work may be necessary to improve on current performance.
Minor	Minor effects that are locally significant.
Not significant	Effects that are beyond the current forecasting ability or are within the ability of the resource to adapt to such change.

16.4 Baseline conditions

16.4.1 This section provides a summary of other nearby developments already identified as part of the Stage 2 assessment and discusses their relevance to the assessment of cumulative effects. This list of developments will be reviewed as part of the EIA.

Trunk Road Developments

16.4.2 The following schemes are trunk road developments likely to be delivered at the same time and in proximity to the Proposed Scheme:

- M3 Smart Motorways (Junctions 9-14)

16.4.3 The list of trunk road developments to be considered during the EIA will be determined by the traffic model in addition to review of comparable and common receptors.

16.4.4 It is considered unlikely that trunk road developments beyond those outlined above will have cumulative effects with the Proposed Scheme as the Zones of Influence are unlikely to overlap. Trunk road developments likely to be scoped out of further assessment include:

- M271 and A35 Redbridge roundabout upgrade
- M27 Southampton junctions
- A31 Ringwood Road Widening
- A27 Worthing Lancing

Local Developments

16.4.5 A high-level review of planned major developments has been undertaken for:

- Winchester
- Hampshire County Council
- South Downs National Park

16.4.6 Once the design process has been finalised, it will be possible to identify developments likely to have construction and operation interactions with the proposed options. This will need to be updated once the construction programme and anticipated year of operation is available.

16.4.7 The adopted Winchester District Local Plan (2013) allocates housing and employment sites in various towns within 40km. The closest are:

- Up to 2000 homes and supporting uses in North Winchester
- The provision of about 500 homes (each) In Bishop Waltham and New Alresford and provision for about 250 new homes in each of the following settlements: Colden Common, Denmead, Kings Worthy, Swanmore, Waltham Close, and Wickham

16.4.8 The cumulative impact of schemes in the vicinity of the Proposed Scheme will require assessment. The major cumulative impacts caused by these housing and employment developments are likely to be in relation to the intensification on the Scheme use and the wider road network, which are considered in the transport work undertaken as a separate assessment.

16.4.9 Within the Winchester District Local Plan (Appendix E – Infrastructure Delivery Summary) are listed a number of potential developments including waste water treatment, improved public transport, affordable workspace and local road network (LRN) improvements.

16.4.10 Once the design process has been finalised, it will be possible to identify the developments that are likely to have construction and operation interactions with the Proposed Scheme.

16.4.11 The final list of cumulative schemes will be agreed through consultation with the local authority and statutory bodies. The current draft short list is included in Table 16-4.

Table 16-4 Local developments – short list

Local Authority	Application Reference	Description	Distance and direction from the Scheme
Winchester City Council	09/02412/OUT (under construction) (also an allocated site in the Local Plan)	Development of approximately 93.1 hectares of land at Barton Farm to the east of Andover Road, Winchester to provide 2000 dwellings (to include 40% affordable housing); a local centre including: a new primary school, a children's pre-school nursery, a retail food store up to 2000 sq. m, a community building, a health centre, a district energy centre, car parking and other commercial, leisure and community floor space.	2km NW
	17/02147/FUL	Demolish existing garage and storage buildings that are beyond serviceable repair and replace with newly purpose built garaging bays for three winter service vehicles and welfare facilities to accommodate operational staff. The new facility will be erected on the existing footprint of the obsolete asset but will incorporate existing drainage and other services already installed.	Within scheme

16.5 National infrastructure

16.5.1 There are no schemes currently on the National Infrastructure Planning schedule in close proximity to the Proposed Scheme. The nearest is the A303 Stonehenge.

16.5.2 Consideration will be made to other Highways England schemes currently entering PCF Stage 3 – Preliminary Design.

17. Summary

17.1 Summary of assessment scope

Topics scoped in

17.1.1 The following topics have been scoped in to the PCF Stage 3 environmental assessment:

- Air quality
- Cultural heritage
- Landscape and visual
- Biodiversity
- Geology and soils
- Material assets and waste
- Noise and vibration
- Population and health
- Road drainage and the water environment
- Climate
- Cumulative effects
- Major accidents and disasters – reported within relevant topics

Topics scoped out

- Heat and radiation

17.2 Summary of DMRB assessment levels

17.2.1 The approach to the assessment of each of the scoped in topics is outlined below in Table 17-1.

Table 17-1 Assessment levels of topics scoped in to the assessment

Topic	DMRB assessment level	Justification
Air Quality	Detailed	Risk of exceedance of air quality standards and the nature of the Proposed Scheme (peak hour congestion relief)
Cultural Heritage	Detailed	Potential for significant effects on archaeological remains

Topic	DMRB assessment level	Justification
	Simple	Potential for adverse impacts on historic buildings and historic landscapes
Landscape and Visual	Detailed	IAN 135/10 states that a Detailed Landscape and Visual Impact Assessment is required where there is the potential for significant landscape and visual effects
Biodiversity	Detailed	Potentially significant effects have been identified for the Proposed Scheme including loss of habitat and impacts to designated sites
Geology and Soils	Detailed	Sensitive receptors have been identified at and adjacent to the Proposed Scheme. These could have the potential to be impacted by contaminants arising from the Proposed Scheme construction and/or operation
Material Assets and Waste	Simple	IAN 153/11 states that “Simple Assessment should assemble data and information that is readily available to address potential effects identified at the scoping level, to reach an understanding of the likely environmental effects to inform the final design or to reach an understanding of the likely environmental effects that identifies the need for “Detailed Assessment””
Noise and Vibration	Detailed	The PCF Stage 2 assessment of options for the Proposed Scheme showed that the threshold values contained in DMRB (HD 213/11) will be exceeded at some noise sensitive receptors
Population and Health	Detailed	Potential impacts to motorised users, people using cycle ways and PRoW, communities and health

Topic	DMRB assessment level	Justification
Road Drainage and the Water Environment	Detailed	Potentially significant effects to groundwater and nearby water resources
Climate	Quantitative	Potential effects on climate change
Major accidents and disasters	Qualitative	Potential effects from major events

17.3 Elements of topics to be scoped in or out

17.3.1 All DMRB topics are scoped in to the environmental assessment at PCF Stage 3, however certain elements of each DMRB topic have been scoped in or out of the assessment. Elements that have been scoped in or out are outlined in Table 17-2 and in the technical chapters above.

Table 17-2 Elements to be scoped in or out of the EIA

Topic	Elements scoped in	Elements scoped out
Air Quality	Given the proximity of some residential receptors to the Proposed Scheme, further assessment of direct construction impacts is scoped in. Assessment of impacts due to traffic management measures during construction is scoped in. Assessment of operational traffic on local air quality is scoped in. Assessment of impacts on emissions, including particulate matter for the local air quality study area.	--
Cultural Heritage	Potential effects to below-ground archaeological remains Potential effects on the setting of historic buildings, including conservation areas Potential effects on the setting of historic landscapes	--
Landscape and Visual	Landscape character areas	--

Topic	Elements scoped in	Elements scoped out
	Setting of Winchester town Views from Winchester Cathedral Visual receptors SDNP International Dark Skies Reserve	
Biodiversity	European designated sites within 2km of the Proposed Scheme Non-statutory designated sites within 2km of the Proposed Scheme Priority and notable habitats within 250m of the Proposed Scheme Other habitats within the area of the Proposed Scheme Notable plant species within 250m of the Proposed Scheme Roosting bats Foraging and commuting bats Badgers Hazel dormouse Otter Water vole Other notable mammal species Birds Reptiles Amphibians (excluding great crested newt) Freshwater fish Terrestrial and aquatic invertebrate	Great crested newt
Geology and Soils	Physical effects of the development Effects on geology as a valuable resource	Waste disposal Physical effects on hydrology and hydrogeology. The pollution risk to surface water

Topic	Elements scoped in	Elements scoped out
	Effects associated with ground contamination that could already exist on site Effects associated with the potential for polluting substances to cause new ground contamination issues Quality and quantity of agricultural land to be lost	and groundwater, from the disturbance of contaminated ground remains scoped in. Effects on surrounding land uses
Material Assets and Waste	Consumption of materials and products Production and management of waste to regional waste management facilities The potential impact on mineral safeguarding resources	Materials consumption and waste generation and management during operation
Noise and Vibration	Construction noise Construction vibration Operation road traffic noise Operation road traffic vibration	--
Population and Health	Potential impacts on access to the countryside/recreational journeys Potential impacts on opportunities for active travel journeys Community severance Driver stress Health impacts	Views from the road Land use
Road Drainage and the Water Environment	Potential impacts on surface water, flooding and groundwater resources due to construction activities Potential impacts on surface water resources, groundwater resources and flood risk during operation	--
Climate	Carbon emissions at construction process stage, operation – use of the	Carbon emissions at construction – Product stage Carbon emissions at operation and maintenance

Topic	Elements scoped in	Elements scoped out
	infrastructure by the end-user and repair and refurbishment	Carbon emissions at replacement and deconstruction Vulnerability of Proposed Scheme to climate change
Major accidents and disasters	Storms Floods Transport accidents	--

18. Glossary of Terms

Term	Definition
Agricultural Land Classification	A system used to grade agricultural land according to versatility, quality and suitability for growing crops as set out in the ALC for England and Wales issued by the Department for Environment, Food and Rural Affairs (Defra). The top three grades, Grades 1, 2 and Subgrade 3a, are referred to as “Best and Most Versatile” (BMV) land.
Air Quality Management Area	Areas within a local authority's boundary that are identified as areas where Air Quality Objectives are not likely to be achieved.
Air Quality Objective	Defined levels of air quality and maximum pollution limits as specified in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland, 2007.
Annual average daily traffic	Total volume of vehicle traffic on a road flowing past a certain point over a year divided by 365 days.
Annual Average Weekday Traffic	The average 24-hour traffic volume occurring on weekdays throughout a full year.
Annual Exceedance Probability	The likelihood that a particular flood discharge or stage is exceeded annually
Area of Outstanding Natural Beauty	Areas of countryside in England, Wales and Northern Ireland which have been designated under the Countryside and Rights of Way Act 2000 for the purpose of conserving and enhancing the natural beauty of the designated area.
Attenuation pond	A pond designed to slow the passage of water from surface run-off to the ground/drainage system.
Best Practicable Means	A term used by the Environment Agencies requiring operators to take all reasonably practicable measures in the design and management of their facilities to minimise charges and disposals of radio-active waste so as to achieve a high standard of environmental protection of the environment and the public.
Biodiversity Action Plan	An agreed plan for a habitat or species, which forms part of the UK’s commitment to biodiversity.
Calculation area	For road noise assessments, this term is defined in the Design Manual for Roads and Bridges (DMRB) (Highways Agency, 2011) as a zone extending 600m from the road scheme, and 600m from any existing roads within 2km of the road scheme which are subject to a change in basic noise levels greater than 1dB. Within the calculation area, noise levels are calculated at sensitive receptors.

Term	Definition
Contaminated Land: Applications in Real Environments	An independent not-for-profit organisation established in 1999 to stimulate the regeneration of contaminated land in the UK. It aims to raise awareness of, and confidence in, practical and sustainable remediation technologies.
Competent Authority	In relation to HRA, the body that determines if there are likely significant effects and carries out the Appropriate Assessment, if required, before a decision is made. The Competent Authority is also required to consult with the relevant statutory nature conservation bodies (and the public, if considered appropriate) before deciding to grant a consent. For the purposes of applications for a DCO, the SoS is the Competent Authority.
Conceptual site model	A tool which sets out the information gained gathered through a site investigation is and is used to characterise the physical, biological, and chemical systems existing at a site.
Conservation Area	An area designated under Section 69 of the Planning (Listed Buildings and Conservation Areas) Act 1990 as being an area of “special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance”.
Conservation Objectives	The specification of the overall target for the species and/or habitat types for which a European Designated Site is designated in order for it to contribute to maintaining or reaching favourable conservation status of the habitats and species concerned at the national, biogeographical or European level, and site-specific objectives to enable it to achieve conservation status at the appropriate level.
Critical level	An air quality standard or guideline for ambient concentrations of a pollutant which applies at ecological receptors.
Critical load	A quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge. This is used to assess modelled nitrogen and
Cumulative Effects Assessment	An assessment to identify the potential significant effects caused by the interactions of the effects on the environment from different aspects of the same project and from other projects.
Design Manual for Roads and Bridges	A comprehensive manual, prepared by the Highways Agency (now Highways England) that sets out all current standards, advice notes and other published documents relating to the design, assessment and operation road schemes. Volume 11 of the DMRB sets out the criteria for the environmental assessment of road schemes.

Term	Definition
Design Site Waste Management Plan	A plan describing how materials will be managed efficiently and disposed of legally during the construction of the works, explaining how the re-use and recycling of materials will be maximised.
Development Consent Order	The consent for a Nationally Significant Infrastructure Project required under the Planning Act 2008.
Air Quality Dispersion modelling	The mathematical simulation of how air pollutants disperse in the ambient atmosphere. A dispersion model is used to estimate or predict the downwind concentration of air pollutants emitted from sources such as industrial facilities or road traffic.
Ecological Quality Ratio	A ratio which incorporates the key WFD requirements for ecological classification: typology, reference conditions and class boundary settings.
Ecological Status	From the Water Framework Directive; ecological status is classified in all Water Bodies and expressed in terms of five classes (high, good, moderate, poor or bad). These classes are established on the basis of specific criteria and boundaries defined against biological, physico-chemical and hydromorphological elements.
Embedded mitigation	Measures to avoid or reduce environmental effects that are directly incorporated into the design of the development.
Energy Average Sound Level (or equivalent continuous sound level)	The sound level of a steady sound having the same energy as a fluctuating sound over the same period. It is possible to consider this level as the ambient noise encompassing all noise at a given time. LAeq is considered the best general purpose index for environmental noise.
Equality Impact Assessment	The assessment of the impact of new or revised policies, practices or services against a framework based on the public sector equality duty under the Equality Act 2010.
Free-field (noise)	An environment in which there are no reflective surfaces within the frequency region of interest.
Ground Investigation	An intrusive investigation undertaken to collect information relating to the ground conditions, normally for geotechnical or land contamination purposes.
Hampshire Biodiversity Information Centre	Hampshire Biodiversity Information Centre (HBIC) provides an independent and impartial data service. Data maintained by HBIC is comprehensive and covers designated sites, habitats and species.
Heavy duty vehicle	Heavy duty vehicles include a vehicle with a gross weight of more than 3.5 tonnes and buses.

Term	Definition
Heavy goods vehicle	A goods vehicle with a gross weight of more than 3.5 tonnes.
Heritage asset	A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions because of its heritage interest. Heritage assets include designated heritage assets and assets identified by the local planning authority (including local listing).
Historic Environment Record	The record of heritage assets which provides information to members of the public, statutory bodies and developers about the archaeological resource in an area.
Hollow way	A way, path or road through a cutting.
Imperative Reasons of Over-riding Public Interest	Known as Stage 4 of the Habitats Regulations Assessment process, IROPI ensures compensatory measures are implemented to maintain the coherence of the European site network in the face of adverse effects to site integrity.
Key characteristics (landscape)	The combination of elements that are particularly important to the current character of the landscape and help to give an area its particularly distinctive sense of place.
L_{A10}	The level exceeded for 10% of the measurement time. This has been shown to correlate well with human responses to road traffic noise.
$L_{Aeq\ T}$	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level. The suffix "T" represents the time period to which the noise level relates. For example, LAeq 1 hr is the LAeq level determined over a period of one hour.
Land Drainage Act	An Act that requires that a watercourse be maintained by its riparian owner in such a condition that the free flow of water is not impeded. The County and District councils have powers of enforcement.
Landscape and Visual Impact Assessment	An assessment to identify and assess the significance of change on the landscape including specific views and general visual amenity resulting from a proposed development.
Landscape Character Area	A discrete geographical area of a particular landscape type.
Landscape character assessment	The process of identifying and describing variation in the character of the landscape, and using this information to assist in managing change in the landscape. It seeks to identify and explain the unique combination of elements and features that make landscapes distinctive.

Term	Definition
Landscape Element	Landscape features found within the highway estate, which can encompass both hard landscape features and elements the soft estate.
Lead Local Flood Authorities	Unitary authorities or county councils who are responsible for developing, maintaining and applying a strategy for local flood risk management in their areas and for maintaining a register of flood risk assets.
Listed Building	A building or structure designated under the Planning (Listed Buildings and Conservation Areas) Act 1990 as being of 'special architectural or historic interest'.
Lowest Observable Adverse Effect Level (noise)	This is the level above which adverse effects on health and quality of life can be detected
Local Air Quality Management	A process that requires local authorities across the UK to review, assess and manage the air quality within their geographical areas.
Local Nature Reserves	Sites that are designated by the local authority under Section 21 of the National Parks and Access to the Countryside Act 1949 for nature conservation which have wildlife or geological features that are of special interest locally.
National Cycle Network	A series of traffic-free paths and quiet, on-road cycling and walking routes that connect to every major town and city. These routes are promoted for both recreational and active travel purposes.
National Nature Reserve	Sites that are dedicated by the statutory country conservation agencies, under the National Parks and Access to the Countryside Act 1949 and the Wildlife and Countryside Act 1981, for nature conservation and which have wildlife or geological features that are of special interest nationally.
National Trails	Long distance footpaths and bridleways in England and Wales. In Scotland the equivalent trails are called long distance routes.
National Vegetation Classification	A system of classifying natural habitat types in Great Britain according to the vegetation they contain.
No Observed Effect Level	This is the level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise
Open space	Land where the public have access either by legal right or by informal agreement.

Term	Definition
Particulate matter	Airborne particulate matter is made up of a collection of solid and/or liquid materials of various sizes that range from a few nanometres in diameter (about the size of a virus) to around 100 micrometres (about the thickness of a human hair).
Phase 1 habitat survey	A rapid system for the recording of semi-natural vegetation and other wildlife habitats first published by the Joint Nature Conservancy Council in 1990.
Point source	A specific location where pollutants are discharged into a receptor.
Preservation in situ	Conservation of an archaeological asset in its original location and condition.
Protected Species Mitigation Licence	The licence issued to permit an activity affecting protected species that would otherwise be an offence.
Public Right of Way	Highways such as footpaths, cycle ways and national trails that allow the public a legal right of passage.
Ramsar Site	Wetlands of international importance designated under the Ramsar Convention 1971.
Regionally Important Geological Sites	Locally designated sites of importance for geodiversity.
Reptile Receptor Site	Area of land which has been enhanced to provide alternative habitats for reptiles which have been displaced and translocated during works.
Residual effect	Residual effects are those effects that remain after all three forms of mitigation (embedded, good practice and additional) have been factored into the assessment of effects.
River Basin District	The area of land and sea, made up of one or more adjacent river basins together with their associated groundwaters and coastal waters.
Road Verge of Ecological Importance	A road verge that supports either a notable species and/or a species rich habitat. Selection of RVEI sites is undertaken by the Hampshire Biodiversity Information Centre. The County Council is responsible for the management of the verges on all roads in the county, except motorways, major trunk roads, and urban areas.
Run-off	Precipitation that flows as surface water from a site, catchment or region.
Scheduled Ancient Monument (SAM)	Scheduled monument within the meaning of the Ancient Monuments and Archaeological Areas Act 1979.

Term	Definition
Scheduled Monument	A heritage asset designated and protected under the Ancient Monuments and Archaeological Areas Act 1979.
Setting	The surroundings in which a place is experienced, whilst embracing an understanding of perceptible evidence of the past in the present landscape.
Site of Special Scientific Interest	Site designated as being of special interest for its flora, fauna or geological or physiographical features and protected under the Wildlife and Countryside Act 1981.
Significant Observed Adverse Effect Level (noise)	This is the level above which significant adverse effects on health and quality of life occur.
Special Area of Conservation	An area which has been identified as being important for a range of vulnerable habitats, plant and animal species within the EU and is designated under the Habitats Directive.
Special Protection Area	A site designated under the Birds Directive due to its international importance for the breeding, feeding, wintering, or the migration of, rare and vulnerable species of birds.
Source Protection Zone (groundwater)	Zones show the risk of contamination from any activities that might cause pollution in the area. The closer the activity, the greater the risk
Study area	The spatial area within which environmental effects are assessed (i.e. extending a distance from the development footprint in which significant environmental effects are anticipated to occur). This area varies between different environmental topic areas.
Sustainable Drainage Systems	A collective approach to manage surface water as close to source as possible and mimic natural drainage by taking into account water quantity (flooding), water quality (pollution), biodiversity (wildlife and plants) and amenity.
Sustrans	Registered British charity whose aim is to promote sustainable transport, i.e. walking, cycling and public transport.
Temporary Traffic Management	Measures, including directive barriers and signs, taken to ensure that road users can travel safely through or around the work site.
UK Biodiversity Action Plan	UK list of priority species and habitats compiled in response to Article 6 of the Biodiversity Convention.
Water Framework Directive	Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for community action in the field of water policy.

Term	Definition
Zone of Influence	The area(s) over which environmental features may be affected by the biophysical changes caused by the Proposed Scheme.
Zone of Theoretical Visibility	A map, usually digitally produced, showing areas of land within which a development is theoretically visible.

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WSP (2018b) M3 Junction 9 Improvement Scheme: PCF Stage 2 Habitats Regulations Assessment.

WSP (2018c) M3 Junction 9 Improvement Scheme: Wintering Bird Community Survey Report.

Appendix A. Relevant environmental legislation and planning policy

Planning Act 2008 (as amended)

19.1.1 The Planning Act 2008 Act created a new regime for granting planning and other consents for NSIPs. These are large scale developments, both onshore and offshore, such as new harbours, roads, railways, power stations, and electricity transmission lines. The 2008 Act was amended by the Localism Act 2011, which transferred responsibility for determining Development Consent Order (DCO) applications from an Infrastructure Planning Commission to the relevant Secretary of State.

National Policy Statement for National Networks

19.1.2 The National Policy for National Networks Statement (NPS NN) sets out the need for, and Government's policies to deliver, development of NSIPs on the national road and rail networks in England. It provides planning policy for promoters of NSIPs on the networks, and the primary policy basis for the examination by the Examining Authority and decisions by the Secretary of State.

19.1.3 The NPSNN contains background information on the need for national road and rail networks, the requirement for EIA, Habitats Regulations Assessment and other regulatory or policy assessments (including alternatives assessments), and criteria based policies in relation to the potential impacts of road and rail development and the requirement for good design.

National Planning Policy Framework (NPPF)

19.1.4 The revised NPPF was published in July 2018 and sets out the Government's planning policies for England and how these are expected to be applied. Development Plans should be consistent with its objectives, with Paragraph 2 stating that 'The National Planning Policy Framework must be taken into account in preparing the development plan and is a material consideration in planning decisions'.

19.1.5 The NPPF makes clear at paragraph 5 that it does not contain specific policies for NSIPs where specific considerations can apply. The NPS NN assumes that function and provides transport policy which guides individual development brought under it.

19.1.6 The NPPF is likely to be an important and relevant consideration in decisions on NSIPs, but only to the extent relevant to that project. Paragraph 7 of the NPPF states that the overall purpose of the planning system is to contribute to the achievement of sustainable development and at Paragraph 10 contains a 'presumption in favour of sustainable development', which should be seen as a 'golden thread' running through both plan-making and decision-taking. In terms of transport infrastructure

Planning Practice Guidance

19.1.7 The PPG sets out the planning guidance on various topics such as air quality, climate change, the historic environment, land stability and contamination, flooding, noise, natural environment, light pollution and water quality

Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

19.1.8 The EIA Regulations set out the procedures for determining whether a proposed development or scheme requires the applicant to undertake an Environmental Impact Assessment (EIA), and the process that must be followed.

19.1.9 Under Regulation 8(1) of the EIA Regulations, a party that proposes to apply for a DCO must, before carrying out consultations under Section 42 of the Planning Act 2008, either request an EIA Screening Opinion or notify the Secretary of State in writing that the applicant will provide an ES in respect of the proposed scheme. This EIA Scoping Report constitutes written confirmation under Regulation 8(1) (b) of the EIA Regulations that the applicant will provide an ES for the proposed scheme.

19.1.10 Regulation 10 of the EIA Regulations relates to requests for EIA Scoping Opinions. This report complies with Regulation 8(3) and 10(3), setting out the information that an EIA scoping report should contain, including the proposed scope of the EIA.

19.1.11 The following is a list of legislation that will be considered in the decision making process for the scheme and will inform the EIA. This list is not exhaustive.

- Planning (Listed Buildings and Conservation Area) Act 1990
- National Parks and Access to Countryside Act 1949
- Climate Change Act 2008
- The Natural Environment and Rural Communities Act 2006
- Conservation of Habitats and Species Regulations 2010
- Protection of Badgers Act (1992
- Environmental Protection Act 1990
- Environment Act 1995
- Countryside and Rights of Way Act 2000
- Air Quality Standards Regulations 2010
- The Noise Insulation Regulations 1988 (as amended)
- The UK Biodiversity Action Plan (UK BAP) 1994 (as amended)
- The Clean Neighbourhoods and Environment Act 2005
- The National Parks and Access to the Countryside Act 1949
- Water Framework Directive (Council Directive 2000/60/EC) (as amended)
- Air Quality Directives (Council Directive 2008/50/EC)
- The Wildlife and Countryside Act 1981 (as amended)
- Equality Act 2010
- Water Resources Act 1991 (SI 57) (as amended by the Water Act 2003)
- Flood and Water Management Act 2010
- Land Drainage Act 1994
- Environmental Permitting Regulations 2016
- The Control of Pollution (Amendment) Act 1989
- Waste Minimisation Act 1998
- The Waste and Emissions Trading Act 2003

Local planning policy

19.1.12 The following is a list of relevant local planning policy which will be taken into account in the EIA.

Winchester's District Development Framework

19.1.13 Winchester District Local Plan Part 1 – Joint Core Strategy. This is one of the principal documents in the Winchester District Development Framework and sets out the overall vision, objectives, spatial strategy and strategic policies. The statutory development plan also includes saved policies in the Winchester District Local Plan Review 2006.

19.1.14 Winchester District Local Plan Part 2 – Development Management and Site Allocations (adopted April 2017). This allocates land to help deliver the development strategy for new housing, economic growth and diversification set out in Local Plan Part 1.

19.1.15 Winchester City Council Local Plan 2036 – The City Council is at the early stages of preparing a new Local Plan. Consultation in the form of a questionnaire regarding the spatial strategy and othe matters to assist in the preparation of the draft Plan took place over the summer of 2018. The Council is currently reviewing the responses and a report will be considered by the Council's Cabinet (Local Plan) Committee on 3rd December 2018. The Local Development Scheme states that the draft plan will be consulted on at the end of 2019 and that the Examination will be carried out in Spring 2021. As the DCO progresses, the emerging Local Plan will be monitored and referred to where appropriate.

South Downs National Park Authority Local Plan

19.1.16 The South Downs National Park lies adjacent to the M3 Junction 9 to the north, east and west.

19.1.17 South Downs National Park Local Plan Submission (2018) – The emerging Local Plan is a landscape-led plan which sets out how the National Park Authority will manage development over the next 15 years. The SDNP Submission version was submitted to the Secretary of State for independent examination in April 2018, following consultation between 26th September to 21st November 2017 on the Pre-Submission Local Plan ('Regulation 19'). The Submission version of the Local Plan consists of the 'Pre-Submission Plan' and the 'Schedule of Proposed Changes'. On 18th October 2018, the Examination Inspector issued the programme of Hearings with the first one to be held on 13th November 2018. For the determination of planning applications, the Submission version of the Local Plan is a material consideration and the NPPF advises that Local Planning Authorities may give weight to relevant policies in emerging plans based on three factors. As the DCO progresses, the emerging Local Plan will be monitored and referred to where appropriate.

19.1.18 The South Downs National Park in the interim is covered by saved policies of 11 inherited Local Plans and 5 adopted Joint Core Strategies, including the relevant statutory development plan policies for Winchester District listed under paragraph 1.3.9.

19.1.19 Hampshire Minerals and Waste Plan 2013 This document sets of the strategy and detailed policies to enable the delivery of sustainable minerals and waste development for Hampshire up to the year 2030.

19.1.20 Hampshire Strategic Infrastructure Statement. This document is a position statement detailed the infrastructure requirements identified by HCC and its partners, shown for each of Hampshire's districts.

19.1.21 Biodiversity Action Plan for Hampshire – Volumes 1 and 2 These documents set out the strategy and objetives around biodiversity.

Strategic Transport plans and policies

19.1.22 Hampshire Local Transport Plan 2011-2031. This LTP identifies that HCC will work with Highways England to "explore scope for affordable and environmentally acceptable solutions to address congestion at Junction 9 of the M3".

19.1.23 Winchester Town Access Plan. Recognises that junction 9 of the M3 can be a serious bottleneck on the Strategic Road Network.

19.1.24 Winchester Transport Statement. Objective 1 is to work with Highways England to "develop capacity improvements at the M3 Junction 9".

Winchester City Council guidance and supplementary planning documents

19.1.25 The following is not an exhaustive list:

- High Quality Places Supplementary Planning Documents (adopted March 2015)
- Relevant Village Design Statements and Local Area Design Statements
- Conservation Area Appraisals and Management Plans
- Winchester District Landscape Character Assessment (adopted March 2004)
- Green Infrastructure Study (Winchester City Council, 2010)
- Green Infrastructure Study (PUSH, 2010)
- Council Strategy 2018-2020
- Walking Strategy for Winchester (2014)
- Winchester District Cycling Strategy (2012)

19.1.26 The following is not an exhaustive list:

- Heritage Statements for the South Downs National Park Authority: A Guide for Applicants
- South Downs Integrated Landscape Character Assessment (2011)
- Draft South Downs Green Infrastructure Framework (March, 2016)
- Access Network and Accessible Natural Green Space Study (2015)
- Conservation Area Character Appraisals and Management Plans
- Relevant Neighbourhood Plans
- South Downs Dark Night Skies Guidance Document (2017)
- South Downs National Park Traquility Study (2017) and Tranquility Map (2018)
- Habitat Connectivity and Habitat Opportunity Mapping Report (Thomson Ecology, 2015)
- South Downs National Park Corporate Plan 2018-19

Other policy, guidance and data sources

19.1.27 The following list includes other relevant policy and guidance documents that will inform the EIA:

- National Infrastructure Plan 2014,
- The Natural Choice: securing the value of nature (Natural Environment White Paper, “NEWP”) (Defra 2011),
- Biodiversity 2020: A strategy for England’s wildlife and ecosystem services (Natural England 2011),
- Noise Policy Statement for England (Department for Environment, Food and Rural Affairs 2010),
- Noise Action Plan: Roads (Including Major Roads) (Defra 2014),
- Environmental Noise (England) Regulations 2006, as amended,
- The National Adaptation Programme. Making the country resilient to a changing climate (Department for Environment, Food and Rural Affairs “Defra” 2013),
- UK Climate Change Risk Assessment (Defra 2017),
- Climate Resilient Infrastructure: Preparing for a Changing Climate (Defra 2011),

- The Carbon Plan: Delivering our low carbon future (Department of Energy and Climate Change 2011),
- Interim Advice Note (IAN) 195/16 Cycle Traffic and the Strategic Road Network,
- Guidelines for Landscape and Visual Impact Assessment (3rd Edition, Landscape Institute and Institute of Environmental Assessment and Management 2013),
- Handbook for Cycle Friendly Design (Sustrans 2014),
- Technical Standards for the design, maintenance and operation of Sustainable Drainage Systems (Defra).

Appendix B. Figures

Figure 1-1 Environmental Constraints

Figure 7-1 Historic Landscape Types

Figure 7-2 Designated Cultural Heritage Assets

Figure 7-3 Undesignated Cultural Heritage Assets

Figure 8-1 Landscape and Visual Representative Viewpoints

Figure 13-3 Population and Human Health Context

N

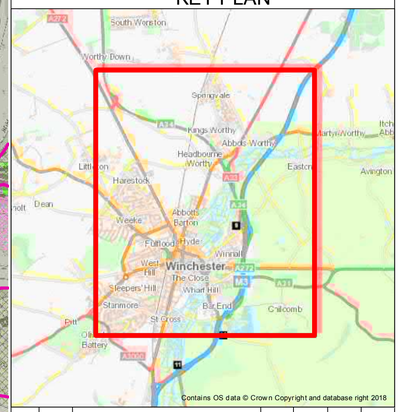
Kings Worthy
Abbots Worthy
Springvale
Headbourne Worthy
Abbotts Barton
Hyde
Fulflood
Weeke
Harestock
Littleton
West Hill
Sleepers Hill
Stanmore
Bar End
Highcliffe
Chilcomb
No Man's Land
Meadsen Hill Down
WINCHESTER

NOTES

LEGEND

- LISTED BUILDING
- PUBLIC RIGHT OF WAY
- MAXIMUM AREA OF WORKS
- NATIONAL TRAIL
- REGISTERED PARKS AND
- HISTORIC LANDFILL
- SCHEDULED MONUMENT
- AIR QUALITY MANAGEMENT AREA (2018)
- NOISE IMPORTANT AREA
- NATIONAL PARK
- SITE OF SPECIAL SCIENTIFIC INTEREST
- SPECIAL AREA OF CONSERVATION
- ZONE I - INNER PROTECTION ZONE
- ZONE II - OUTER PROTECTION ZONE
- ZONE III - TOTAL CATCHMENT
- FLOOD ZONE 3
- FLOOD ZONE 2

KEY PLAN



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P03	24/01/19	Final Issue	JS	LW	AB	GS/MZ

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FIGURE 1-1 – ENVIRONMENTAL CONSTRAINTS

DRAWING UNITS U.N.O.
ALL DIMENSIONS IN METERS UNLESS STATED OTHERWISE

SCALE AT A1 (841 x 594mm)
1:10000

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HLT7

HLT3

HLT8

HLT2

HLT8

HLT3

HLT1

HLT5

HLT6

HLT4

HLT6

HLT2

HLT3

WINCHESTER

NOTES

LEGEND

- Redline boundary
- 300m study area
- 1km study area

Historic Landscape Type

- Water meadows
- Miscellaneous valley bottom paddocks and pastures
- Post 1810 settlement (general)
- Medium regular fields with straight boundaries (parliamentary type enclosure)
- Downland
- Marsh and rough grazing
- Large regular fields with straight boundaries (parliamentary type enclosure)
- Village/hamlet 1810 extent

KEY PLAN

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FIGURE 7-1 –
HISTORIC LANDSCAPE TYPES

DRAWING UNITS U.N.O.
ALL DIMENSIONS IN METERS UNLESS STATED OTHERWISE

SCALE AT A1 (841 x 594mm)
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N

NOTES

LEGEND

- Redline boundary
- 300m study area
- 1km study area
- Grade I listed building
- Grade II* listed building
- Grade II listed building
- Scheduled Monument
- Conservation Area

KEY PLAN

Rev.	Date	Description of revision	Drawn	Checked	Review'd	Approv'd
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FIGURE 7-2 – DESIGNATED CULTURAL HERITAGE ASSETS

DRAWING UNITS U.N.O.
ALL DIMENSIONS IN METERS
UNLESS STATED OTHERWISE

SCALE AT A1 (841 x 594mm)
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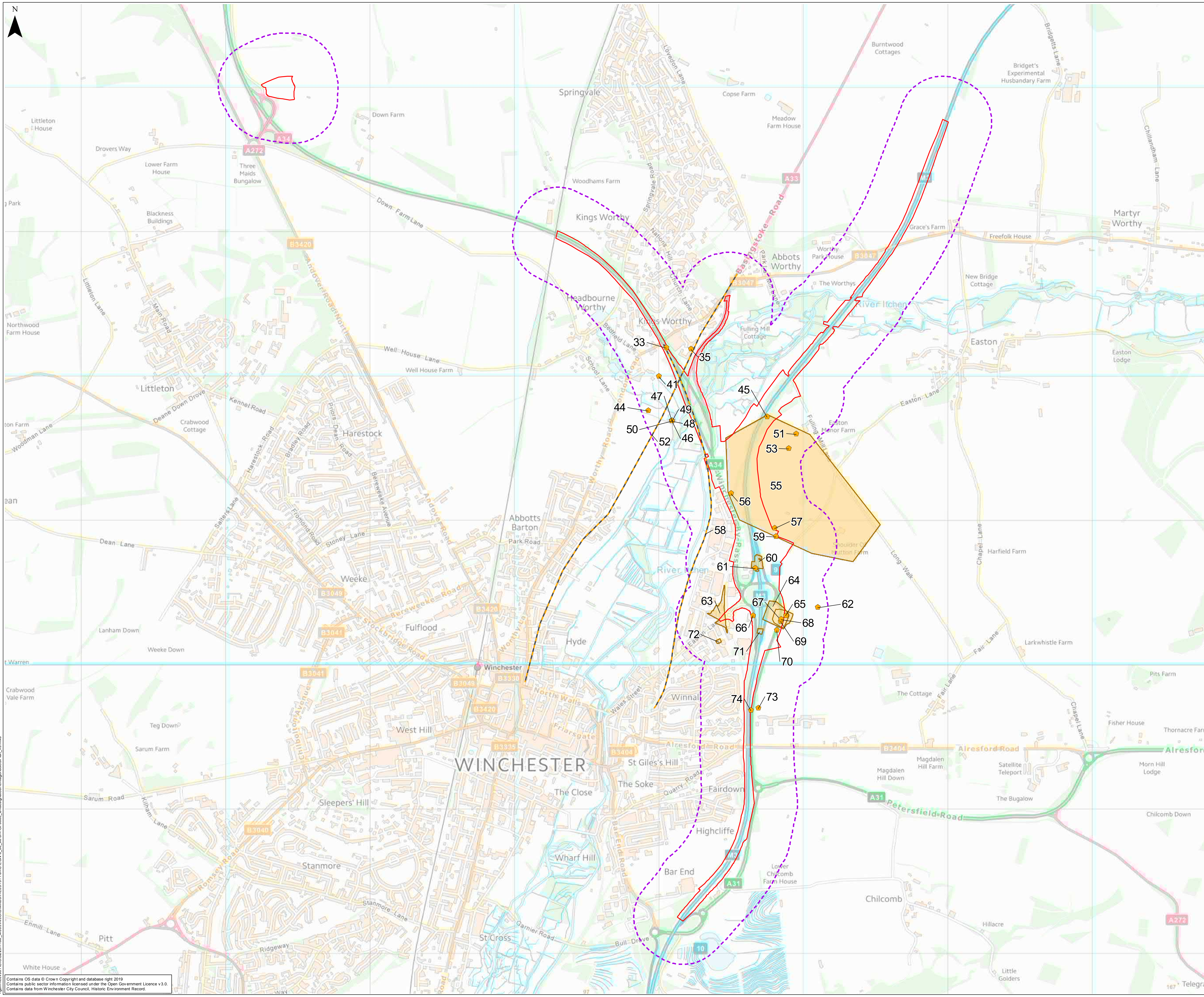

NOTES

LEGEND

- Redline boundary
- 300m study area
- Undesignated cultural heritage assets

KEY PLAN

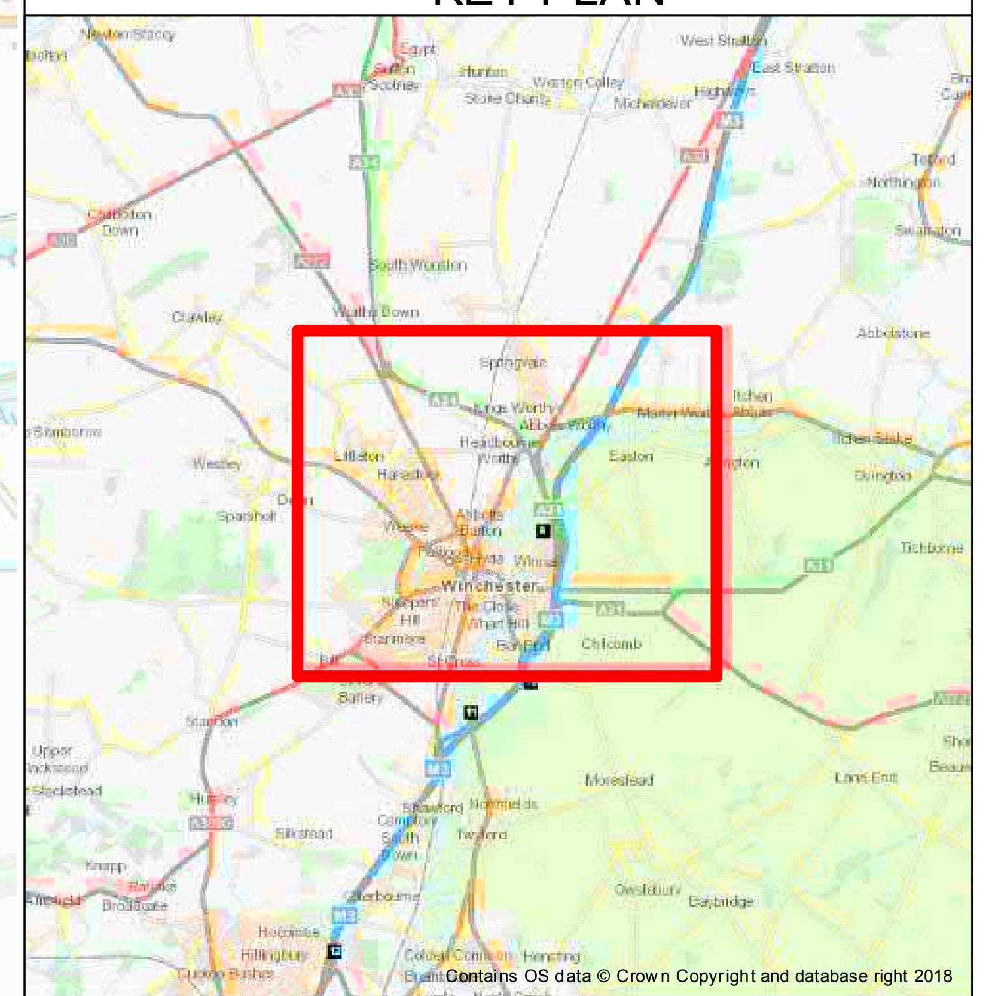

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FIGURE 7-3 – UNDESIGNATED CULTURAL HERITAGE ASSETS

DRAWING UNITS U.N.O.
ALL DIMENSIONS IN METERS UNLESS STATED OTHERWISE

SCALE AT A1 (841 x 594mm)
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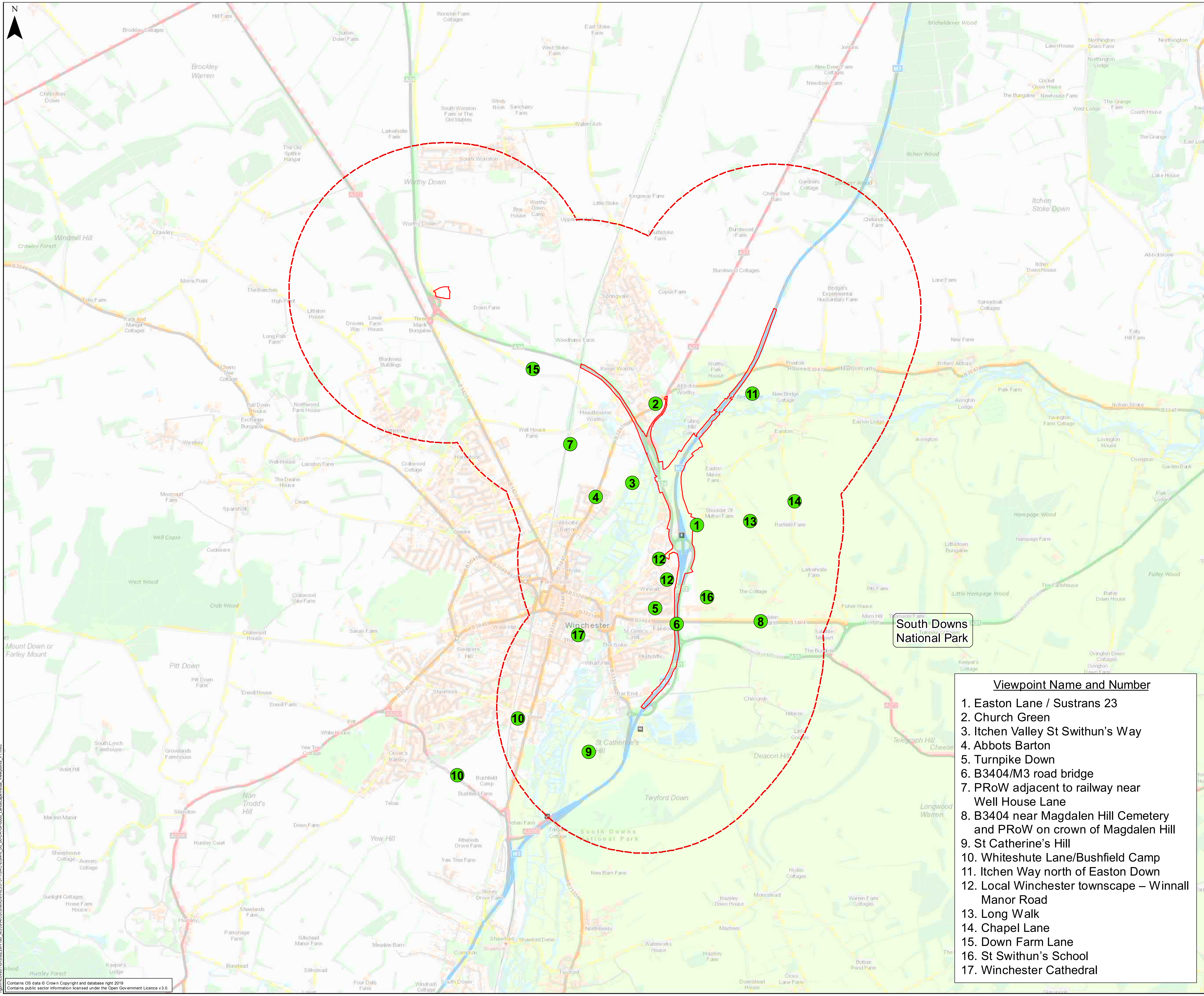

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Viewpoint Name and Number

1. Easton Lane / Sustrans 23
2. Church Green
3. Itchen Valley St Swithun's Way
4. Abbots Barton
5. Turnpike Down
6. B3404/M3 road bridge
7. PRoW adjacent to railway near Well House Lane
8. B3404 near Magdalen Hill Cemetery and PRoW on crown of Magdalen Hill
9. St Catherine's Hill
10. Whiteshute Lane/Bushfield Camp
11. Itchen Way north of Easton Down
12. Local Winchester townscape – Winnall Manor Road
13. Long Walk
14. Chapel Lane
15. Down Farm Lane
16. St Swithun's School
17. Winchester Cathedral

NOTES

Legend

- Draft Viewpoints
- Redline boundary
- 2km Study Area

KEY PLAN

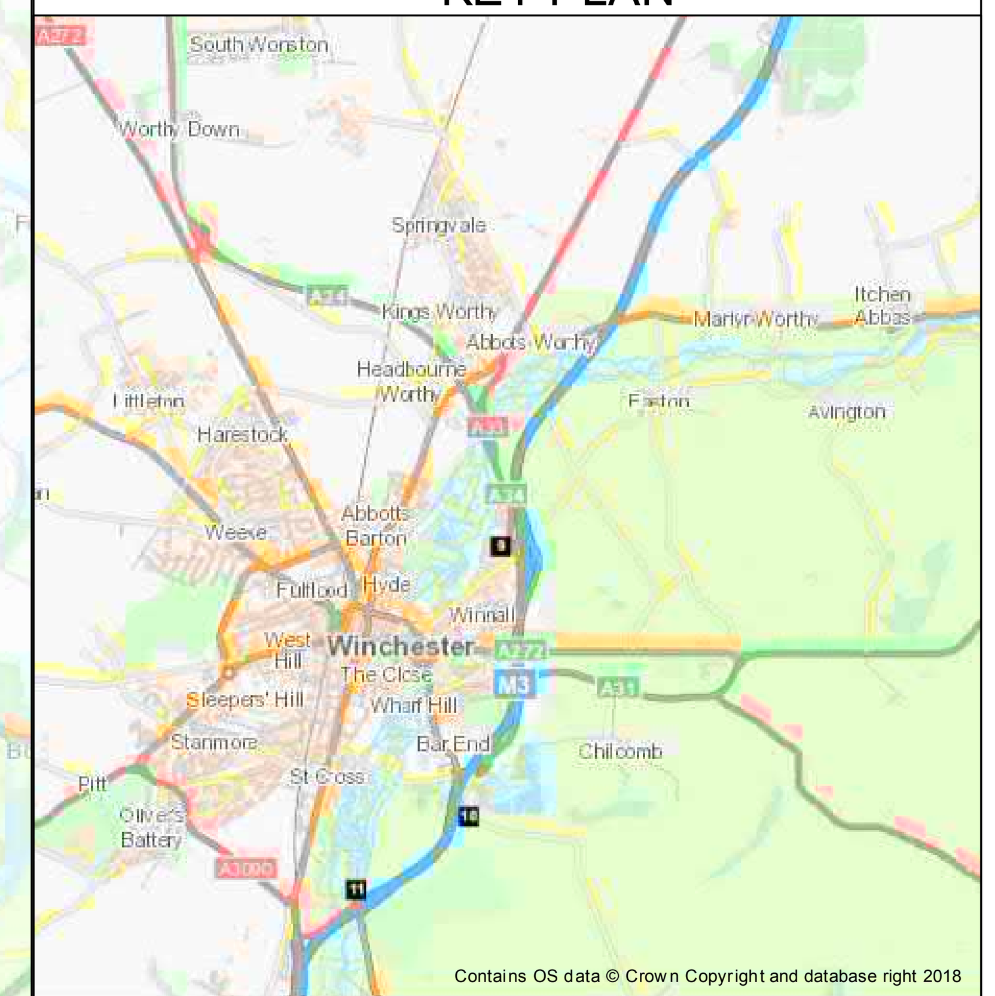

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FIGURE 8-1 –
LANDSCAPE AND VISUAL
REPRESENTATIVE VIEWPOINTS

DRAWING UNITS U.N.O.	SCALE AT A1 (841 x 594mm)
ALL DIMENSIONS IN METERS UNLESS STATED OTHERWISE	1:24000

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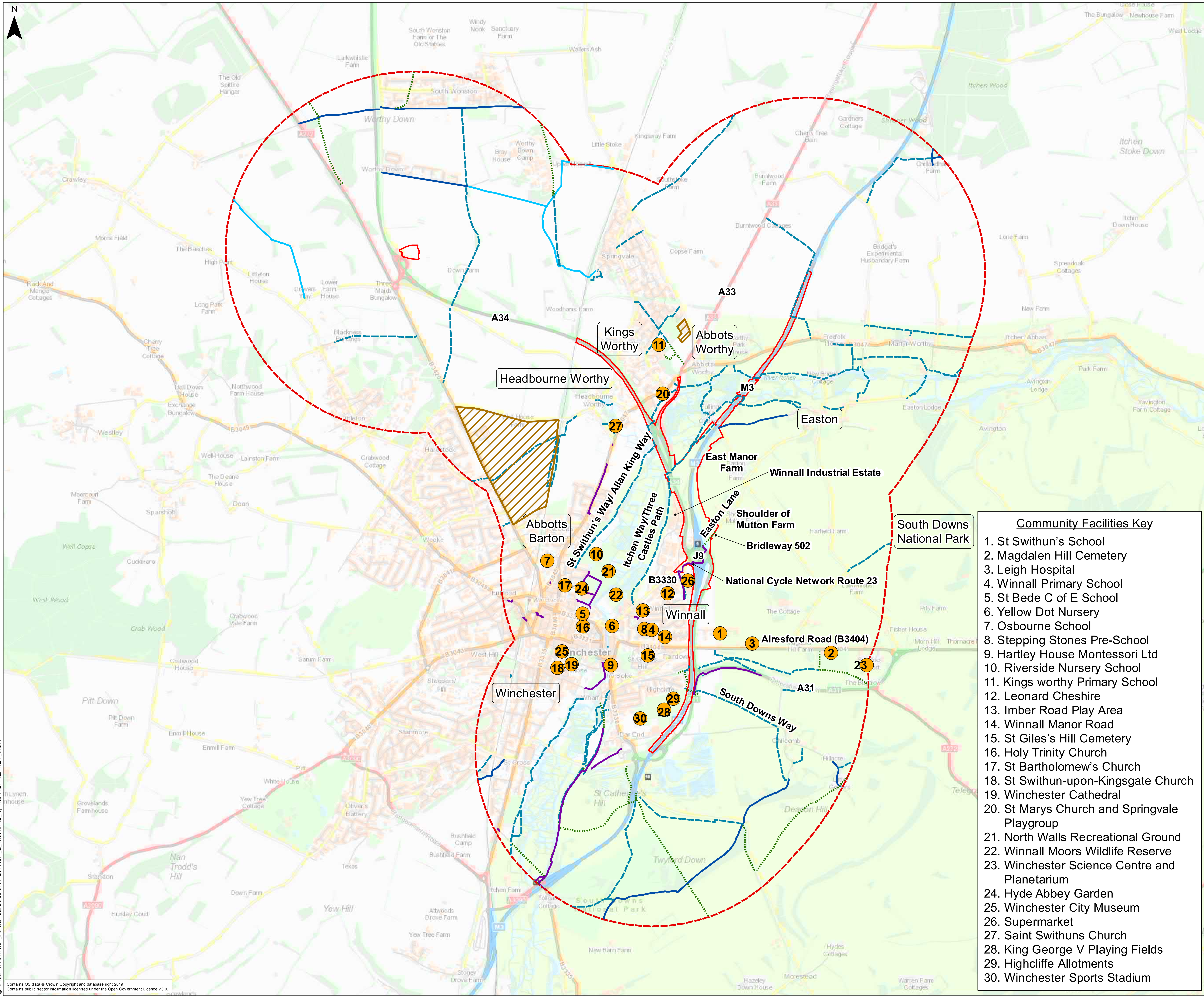
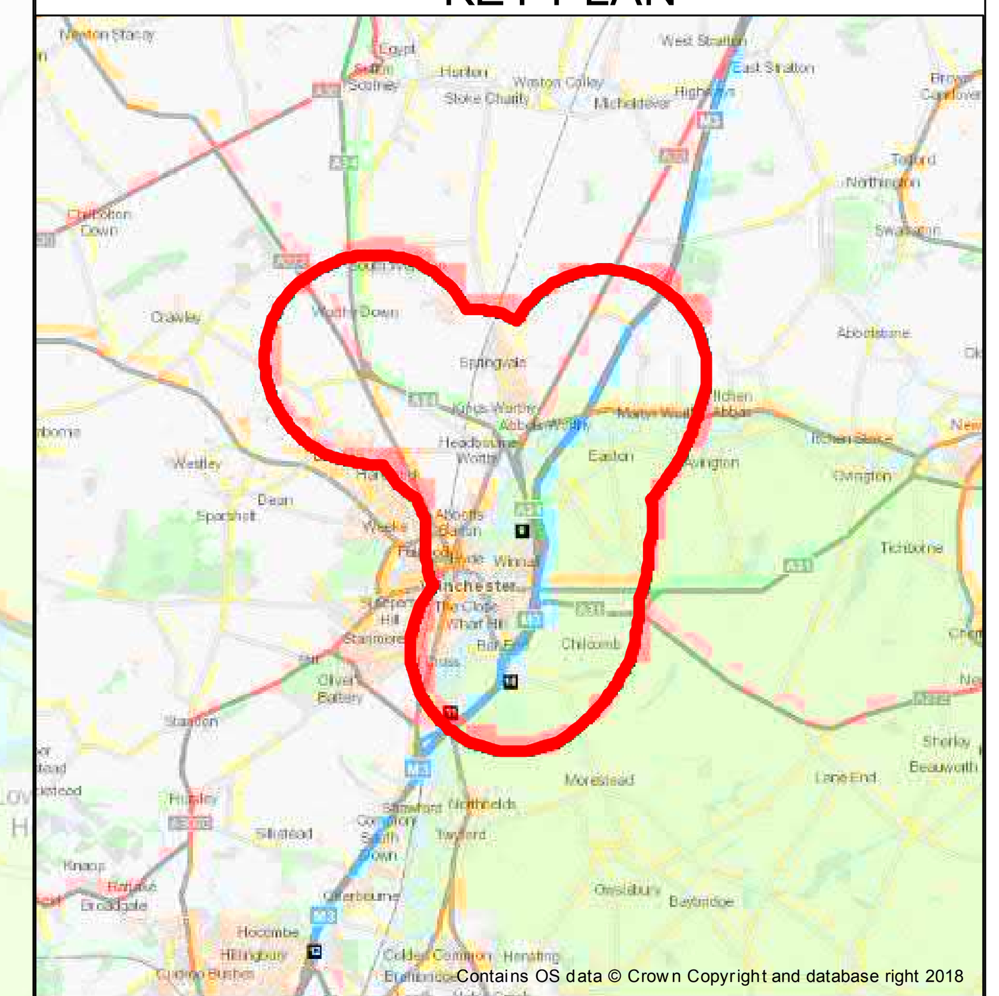


NOTES

Legend

- Redline boundary
- 2km Study Area
- Community Facilities
- Cycleways
- Bridleway
- Footpaths
- Itchen Valley Restricted Byway
- Byway
- Land Allocated for Housing

KEY PLAN



Community Facilities Key

1. St Swithun's School
2. Magdalen Hill Cemetery
3. Leigh Hospital
4. Winnall Primary School
5. St Bede C of E School
6. Yellow Dot Nursery
7. Osbourne School
8. Stepping Stones Pre-School
9. Hartley House Montessori Ltd
10. Riverside Nursery School
11. Kings worthy Primary School
12. Leonard Cheshire
13. Imber Road Play Area
14. Winnall Manor Road
15. St Giles's Hill Cemetery
16. Holy Trinity Church
17. St Bartholomew's Church
18. St Swithun-upon-Kingsgate Church
19. Winchester Cathedral
20. St Marys Church and Springvale Playgroup
21. North Walls Recreational Ground
22. Winnall Moors Wildlife Reserve
23. Winchester Science Centre and Planetarium
24. Hyde Abbey Garden
25. Winchester City Museum
26. Supermarket
27. Saint Swithuns Church
28. King George V Playing Fields
29. Highcliffe Allotments
30. Winchester Sports Stadium

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FIGURE 13-3 –
POPULATION AND HUMAN
HEALTH CONTEXT

DRAWING UNITS U.N.O.
ALL DIMENSIONS IN METERS UNLESS STATED OTHERWISE

SCALE AT A1 (841 x 594mm)
1:150000

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P02

Appendix C. Cultural Heritage Gazetteer

Asset Number	Asset Name	HER / NHLE Number	Sub-Topic	Designation	Value
1	Ramblers	1156431	Historic Building	Grade II Listed Building	Medium
2	Stable block 20m North West of Kings Worthy Grove	1350502	Historic Building	Grade II Listed Building	Medium
3	The Hurst	1350508	Historic Building	Grade II Listed Building	Medium
4	Old Farmhouse	1350503	Historic Building	Grade II Listed Building	Medium
5	Kings Worthy Grove	1095841	Historic Building	Grade II Listed Building	Medium
6	Kitchen garden wall and adjoining melon/mushroom house, formerly to Abbotsworthy House	1391965	Historic Building	Grade II Listed Building	Medium
7	Old School house	1095842	Historic Building	Grade II Listed Building	Medium
8	Well cottage	1095843	Historic Building	Grade II Listed Building	Medium
9	1 and 2 Mill Lane	1095848	Historic Building	Grade II Listed Building	Medium
10	North and North East boundary wall and gate piers at Abbots Worthy House	1061370	Historic Building	Grade II Listed Building	Medium
11	3 Mill Lane	1156413	Historic Building	Grade II Listed Building	Medium

Asset Number	Asset Name	HER / NHLE Number	Sub-Topic	Designation	Value
12	Keepers Cottage	1350507	Historic Building	Grade II Listed Building	Medium
13	Mill House	1095849	Historic Building	Grade II Listed Building	Medium
14	6 and 7 Mill Lane	1156421	Historic Building	Grade II Listed Building	Medium
15	Old Thatch	1350504	Historic Building	Grade II Listed Building	Medium
16	Tudor Cottage	1095844	Historic Building	Grade II Listed Building	Medium
17	The cart and horses public house	1156354	Historic Building	Grade II Listed Building	Medium
18	Abbots Worthy Mill	1095850	Historic Building	Grade II Listed Building	Medium
19	Vergers cottage	1302891	Historic Building	Grade II Listed Building	Medium
20	Abbots Worthy Conservation Area		Historic Building	Conservation Area	Medium
21	The old cottage and Kings Worthy Antiques	1095846	Historic Building	Grade II Listed Building	Medium
22	Briar Cottage	1095845	Historic Building	Grade II Listed Building	Medium
23	Wisteria	1156357	Historic Building	Grade II Listed Building	Medium
24	Upper farmhouse	1155579	Historic Building	Grade II Listed Building	Medium

Asset Number	Asset Name	HER / NHLE Number	Sub-Topic	Designation	Value
25	Kings Worthy Conservation Area		Historic Building	Conservation Area	Medium
26	The old post office	1350505	Historic Building	Grade II Listed Building	Medium
27	Tavern cottage	1156435	Historic Building	Grade II Listed Building	Medium
28	Kings Worthy War Memorial	1437417	Historic Building	Grade II Listed Building	Medium
29	3 tomb chests in St Mary's churchyard	1095847	Historic Building	Grade II Listed Building	Medium
30	Church of St Mary	1156360	Historic Building	Grade II* Listed Building	High
31	The Manor House	1155592	Historic Building	Grade II Listed Building	Medium
32	The old rectory	1095878	Historic Building	Grade II Listed Building	Medium
33	Kings Worthy railway station	MWC1882	Archaeological Remains	Undesignated	Negligible
34	Laundry Cottage	1095916	Historic Building	Grade II Listed Building	Medium
35	Prehistoric Features, Peek Management Site	MWC5934; MWC5935; MWC5936; MWC5937; MWC5938 and MWC6469	Archaeological Remains	Undesignated	Low
36	Granary 15m North of Lower Farmhouse	1095920	Historic Building	Grade II Listed Building	Medium

Asset Number	Asset Name	HER / NHLE Number	Sub-Topic	Designation	Value
37	Lower farmhouse	1303249	Historic Building	Grade II Listed Building	Medium
38	Thatched cottage	1155617	Historic Building	Grade II Listed Building	Medium
39	Barn 20m North East of Pudding Farmhouse	1095919	Historic Building	Grade II Listed Building	Medium
40	Pudding farmhouse	1155628	Historic Building	Grade II Listed Building	Medium
41	Findspots, Pudding House Farm	MWC2945	Archaeological Remains	Undesignated	Negligible
42	Church of St Swithin	1350461	Historic Building	Grade I Listed Building	High
43	The Elms	1095918	Historic Building	Grade II Listed Building	Medium
44	Possible Early Medieval Cemetery Site	MWC7209	Archaeological Remains	Undesignated	Medium
45	Possible Settlement Evidenced by Geophysical Anomalies	MWC2313	Archaeological Remains	Undesignated	Medium
46	Animal Bone Findspot, Nun's walk	MWC5477	Archaeological Remains	Undesignated	Negligible
47	Worked Flint Findspot, Nun's walk	MWC5478	Archaeological Remains	Undesignated	Negligible
48	Corroded Iron Objects Findspot, Nun's walk	MWC5480	Archaeological Remains	Undesignated	Negligible
49	Pot Sherd Findspots, Nun's Walk	MWC5474; MWC5475 and MWC5476	Archaeological Remains	Undesignated	Negligible
50	Slag Findspot, Nun's walk	MWC5479	Archaeological Remains	Undesignated	Negligible
51	Bronze Age Round Barrow, Manor Farm	MWC2315	Archaeological Remains	Undesignated	Medium

Asset Number	Asset Name	HER / NHLE Number	Sub-Topic	Designation	Value
52	Winchester Roman Road		Archaeological Remains	Undesignated	Medium
53	Linear Feature, Manor Farm	MWC2314	Archaeological Remains	Undesignated	Low
54	Site of St Gertrude's Chapel	1005518	Archaeological Remains	Scheduled Monument	High
55	Prehistoric Occupation Site, Easton Down	MWC2299; MWC2300; MWC2301; MWC2302; MWC2303; MWC2304; MWC2305; MWC2306; MWC2307; MWC2308; MWC2309; MWC2310; MWC2311; MWC2312 and MWC2313	Archaeological Remains	Undesignated	Medium
56	Bronze Age Linear Feature	MWC3058	Archaeological Remains	Undesignated	Negligible
57	Post Medieval Pottery Scatter	MWC2297	Archaeological Remains	Undesignated	Negligible
58	The Didcot, Newbury and Southampton Railway	MWC1876; MWC1877 and 2296	Archaeological Remains	Undesignated	Negligible
59	Flint and Dark Clay, White Hall Cottage Area	MWC2298	Archaeological Remains	Undesignated	Low
60	Multi-Period Activity, Winnall Industrial Estate North	MWC6497; MWC6745 and MWC6587	Archaeological Remains	Undesignated	Negligible
61	Lynchets, Easton Down	MWC552	Archaeological Remains	Undesignated	Negligible
62	Sub-Circular Crop Mark Enclosure on Winnall Down	MWC1167	Archaeological Remains	Undesignated	Medium

Asset Number	Asset Name	HER / NHLE Number	Sub-Topic	Designation	Value
63	Former WWII Military Site		Archaeological Remains	Undesignated	Negligible
64	Middle Iron Age Settlement, Winnall Industrial Estate	MWC6608	Archaeological Remains	Undesignated	Negligible
65	Roman settlement, Winnall Industrial Estate 1	MWC6691	Archaeological Remains	Undesignated	Negligible
66	Bronze Age Settlement, Winnall Industrial Estate 1	MWC6592	Archaeological Remains	Undesignated	Negligible
67	Bronze Age Settlement, Winnall Industrial Estate 2	MWC6593	Archaeological Remains	Undesignated	Negligible
68	Late Iron Age Settlement, Winnall Industrial Estate	MWC6609	Archaeological Remains	Undesignated	Negligible
69	Early Neolithic Ring Ditch, Winnall Industrial Estate	MWC6588	Archaeological Remains	Undesignated	Negligible
70	Roman settlement, Winnall Industrial Estate 2	MWC6504	Archaeological Remains	Undesignated	Negligible
71	Bronze Age Cemetery, Winnall Industrial Estate	MWC6591	Archaeological Remains	Undesignated	Negligible
72	Early Medieval Inhumation Cemetery, Winnall	MWC6625	Archaeological Remains	Undesignated	Negligible
73	Possible Long Barrow, St Swithun's School	MWC8013	Archaeological Remains	Undesignated	Negligible
74	Prehistoric Ring Ditch and Linear Feature, St Swithun's school	MWC7237	Archaeological Remains	Undesignated	Negligible
75	55-57 Wales Street	1295878	Historic Building	Grade II Listed Building	Medium
76	53 Wales Street	1350750	Historic Building	Grade II Listed Building	Medium

Asset Number	Asset Name	HER / NHLE Number	Sub-Topic	Designation	Value
77	The first in and last out public house	1095346	Historic Building	Grade II Listed Building	Medium
78	Garden house at St Johns croft	1173632	Historic Building	Grade II Listed Building	Medium
79	Garden wall of St Johns croft	1095388	Historic Building	Grade II Listed Building	Medium
80	St Johns croft	1095387	Historic Building	Grade II* Listed Building	High
81	Stable block of St Johns croft	1173628	Historic Building	Grade II Listed Building	Medium
82	Round Barrow Cemetery on Magdalen Hill Down	1016746	Archaeological Remains	Scheduled Monument	High
83	Winchester Conservation Area		Historic Building	Conservation Area	Medium
84	Roman road E of St Catherine's Hill	1001798	Archaeological Remains	Scheduled Monument	High
85	Anglo-Saxon cemetery in Worthy Park	1001817	Archaeological Remains	Scheduled Monument	High
86	Late Iron Age settlement site N of Grace's Farm	1001825	Archaeological Remains	Scheduled Monument	High
87	Worthy Down ditch	1001907	Archaeological Remains	Scheduled Monument	High
88	Wolvesey Palace	1005535	Archaeological Remains	Scheduled Monument	High
89	Iron Age field system, banjo enclosure and Romano-British villa, 500m east of Woodham Farm.	1013269	Archaeological Remains	Scheduled Monument	High
90	St Catherine's Hill hillfort	1016489	Archaeological Remains	Scheduled Monument	High

Asset Number	Asset Name	HER / NHLE Number	Sub-Topic	Designation	Value
91	City Bridge at the junction of High Street and Bridge Street	1021112	Archaeological Remains	Scheduled Monument	High
92	Wall Opposite Lych Gate Going E From 20m NW Of Dymoke House	1095856	Historic Building	Grade II Listed Building	Medium
93	Dymoke House	1095857	Historic Building	Grade II* Listed Building	High
94	The Cottage	1095858	Historic Building	Grade II Listed Building	Medium
95	East View	1095859	Historic Building	Grade II Listed Building	Medium
96	Rosebank	1095860	Historic Building	Grade II Listed Building	Medium
97	The Manor House	1095861	Historic Building	Grade II Listed Building	Medium
98	6 Tombchests in St Swithins Churchyard Re-Used Medieval Coffin Lid and Tombchests to 1 H Nevill 1795; 2 T Nevill 1836; 3 A Wharton And Family 1760; 4 B Wharton And Family 1786; 5 C Hill 1796	1095862	Historic Building	Grade II Listed Building	Medium
99	Church Cottage	1095863	Historic Building	Grade II Listed Building	Medium
100	Old Manor House	1095864	Historic Building	Grade II Listed Building	Medium
101	Stable Block 100m N of Manor Farm House	1095865	Historic Building	Grade II Listed Building	Medium

Asset Number	Asset Name	HER / NHLE Number	Sub-Topic	Designation	Value
102	Meadowside Cottages	1095866	Historic Building	Grade II Listed Building	Medium
103	Worthy Park House	1095892	Historic Building	Grade II* Listed Building	High
104	Barn at Graces Farm 50 Metres East of House	1095893	Historic Building	Grade II Listed Building	Medium
105	Clair Martin	1095897	Historic Building	Grade II Listed Building	Medium
106	Church of St Mary	1095898	Historic Building	Grade I Listed Building	High
107	Lych Gate 85m S of The Church of Our Lady	1095899	Historic Building	Grade II Listed Building	Medium
108	1, Bridge Street	1094709	Historic Building	Grade II Listed Building	Medium
109	4, Bridge Street	1094710	Historic Building	Grade II Listed Building	Medium
110	The Rising Sun Public House	1095315	Historic Building	Grade II Listed Building	Medium
111	1, Water Lane	1095347	Historic Building	Grade II* Listed Building	High
112	Wharf Mill	1095348	Historic Building	Grade II Listed Building	Medium
113	21, St John's Street	1095385	Historic Building	Grade II Listed Building	Medium
114	24 And 25, St John's Street	1095386	Historic Building	Grade II* Listed Building	High

Asset Number	Asset Name	HER / NHLE Number	Sub-Topic	Designation	Value
115	Tudor House	1095389	Historic Building	Grade II Listed Building	Medium
116	1 And 2, Rosemary Close	1095409	Historic Building	Grade II Listed Building	Medium
117	Pavement Adjoining the College Wall	1095454	Historic Building	Grade II Listed Building	Medium
118	3, Chesil Street	1095498	Historic Building	Grade II Listed Building	Medium
119	23-27, Chesil Street	1095499	Historic Building	Grade II Listed Building	Medium
120	4, Chesil Street	1095500	Historic Building	Grade II Listed Building	Medium
121	8 And 10, Chesil Street	1095501	Historic Building	Grade II Listed Building	Medium
122	Peter's Theatre	1095502	Historic Building	Grade II* Listed Building	High
123	54, Chesil Street	1095503	Historic Building	Grade II Listed Building	Medium
124	Gates and Screens of No 54	1095504	Historic Building	Grade II Listed Building	Medium
125	Barn 15 Metres North West of Upper Farmhouse	1095917	Historic Building	Grade II Listed Building	Medium
126	Stable Block 25m NE of Worthy Park	1155825	Historic Building	Grade II Listed Building	Medium
127	Martyr Worthy Place	1155843	Historic Building	Grade II Listed Building	Medium

Asset Number	Asset Name	HER / NHLE Number	Sub-Topic	Designation	Value
128	War Memorial	1155850	Historic Building	Grade II Listed Building	Medium
129	3 Tombchests S and E of St Mary's Church in Churchyard, to 1 C Augusta And Family 1836; 2 C White 1811; 3 J H White 1833	1155900	Historic Building	Grade II Listed Building	Medium
130	Hornton Cottage	1156088	Historic Building	Grade II Listed Building	Medium
131	Combed Wheat	1156101	Historic Building	Grade II Listed Building	Medium
132	North View, The Tiled Cottage and Alma	1156121	Historic Building	Grade II Listed Building	Medium
133	City Bridge	1167781	Historic Building	Grade I Listed Building	High
134	37 And 38, Wharf Hill	1174181	Historic Building	Grade II Listed Building	Medium
135	44-52, Chesil Street	1271526	Historic Building	Grade II Listed Building	Medium
136	42, Chesil Street	1271527	Historic Building	Grade II* Listed Building	High
137	22, St John's Street	1296126	Historic Building	Grade II Listed Building	Medium
138	Church of St John The Baptist	1296158	Historic Building	Grade I Listed Building	High
139	64, Chesil Street	1296992	Historic Building	Grade II Listed Building	Medium

Asset Number	Asset Name	HER / NHLE Number	Sub-Topic	Designation	Value
140	40, Chesil Street	1301010	Historic Building	Grade II Listed Building	Medium
141	Goffs Oak, Lee Cot and The Nook	1302969	Historic Building	Grade II Listed Building	Medium
142	Steps and Homer Cottages	1302994	Historic Building	Grade II Listed Building	Medium
143	Granary 100mm NE of Manor Farm House	1303039	Historic Building	Grade II Listed Building	Medium
144	Gazebo 25m N of Martyr Worthy Minor	1350450	Historic Building	Grade II Listed Building	Medium
145	The Cranny and Jessamine	1350470	Historic Building	Grade II Listed Building	Medium
146	Church of St Swithun	1350471	Historic Building	Grade II* Listed Building	High
147	3-5, Church Lane	1350472	Historic Building	Grade II Listed Building	Medium
148	Manor Farm House	1350473	Historic Building	Grade II Listed Building	Medium
149	Yew Tree Cottage	1350474	Historic Building	Grade II Listed Building	Medium
150	The Chestnut Horse Public House	1350476	Historic Building	Grade II Listed Building	Medium
151	The Farmery	1350477	Historic Building	Grade II Listed Building	Medium
152	Graces Farmhouse	1350488	Historic Building	Grade II Listed Building	Medium

Asset Number	Asset Name	HER / NHLE Number	Sub-Topic	Designation	Value
153	1, Chesil Street	1350648	Historic Building	Grade II* Listed Building	High
154	17-21, Chesil Street	1350649	Historic Building	Grade II Listed Building	Medium
155	6, Chesil Street	1350650	Historic Building	Grade II Listed Building	Medium
156	12, Chesil Street	1350651	Historic Building	Grade II* Listed Building	High
157	Wall on River Running Behind Nos 4 to 12	1350652	Historic Building	Grade II Listed Building	Medium
158	Kings Arms Public House	1350653	Historic Building	Grade II Listed Building	Medium
159	Blackbridge House	1350668	Historic Building	Grade II Listed Building	Medium
160	The Black Boy Public House	1350727	Historic Building	Grade II Listed Building	Medium
161	Black Bridge	1350749	Historic Building	Grade II Listed Building	Medium
162	2 and 3, Bridge Street	1351062	Historic Building	Grade II Listed Building	Medium
163	Headbourne Worthy War Memorial	1443709	Historic Building	Grade II Listed Building	Medium
HLT1	Water meadows		Historic Landscape	Undesignated	Medium
HLT2	Miscellaneous valley bottom paddocks and pastures		Historic Landscape	Undesignated	Low

Asset Number	Asset Name	HER / NHLE Number	Sub-Topic	Designation	Value
HLT3	Post 1810 settlement		Historic Landscape	Undesignated	Low
HLT4	Medium regular fields with straight boundaries		Historic Landscape	Undesignated	Low
HLT5	Downland		Historic Landscape	Undesignated	Low
HLT6	Marsh and rough grazing		Historic Landscape	Undesignated	Low
HLT7	Large regular fields with straight boundaries		Historic Landscape	Undesignated	Low
HLT8	Village/hamlet 1810 extent		Historic Landscape	Undesignated	Low