



The Sizewell C Project

8.3 Associated Development Design Principles - Tracked Changes Version

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EXECUTIVE SUMMARY

This report describes the Design Principles that relate to the design of the off-site associated development sites of the Sizewell C Project. The associated development on the main development site is dealt with in the **Sizewell C Main Development Site Design and Access Statement** [~~APP-585—APP-587~~]([Doc Ref. 8.1](#)).

The Design Principles will apply to the operational phase of each associated development site. They do not apply to the construction phase or the removal and reinstatement phase of the associated development sites. The Design Principles are secured by requirements in Schedule 2 of the **Draft DCO** (Doc Ref 3.1(~~C~~)).

The Design Principles were developed through consultation with the local authorities and other stakeholders as well as through ongoing design development.

The Design Principles have served and will serve a number of functions as outlined below.

- Set the design principles that will be used to develop detailed design proposals for buildings, structures and landscaped areas of the associated development sites.
- Describe the primary mitigation (embedded mitigation) that has informed the assessment of the likely significant environmental effects of the Sizewell C Project in the Environmental Impact Assessment (EIA) process.
- Define design commitments that reflect comments and feedback from interested parties' responses during the pre-application consultation process.
- Define the criteria for good design, as set out in the National Policy Statement (NPS) for Energy (EN-1) (Ref. 1.1) and the NPS for Nuclear Power Generation (EN-6) (Ref. 1.2), in order to ensure that the development is as attractive, durable and adaptable as it can be, taking account of regulatory and other constraints.

Section 2 of this document sets out the general Design Principles that apply to all associated development sites. **Section 3** of this document provides the site-specific Design Principles which apply to the off-site associated development sites.

~~1. INTRODUCTION~~

1. Introduction

1.1 Scope of this report

1.1.1 This report describes the Design Principles that relate to the design of the off-site associated development sites of the Sizewell C Project. The associated development on the main development site is dealt with in the **Sizewell C Main Development Site Design and Access Statement** ~~[APP-585 – APP-587]~~ [\(Doc Ref. 8.1\)](#).

1.1.2 The Design Principles will apply to the operational phase of each associated development site. They do not apply to the construction phase or the removal and reinstatement phase of the associated development sites. The Design Principles are secured by requirements in **Schedule 2 of the Draft DCO** (Doc Ref 3.1 ~~(C)~~).

1.1.3 The Design Principles were developed in consultation with the local authorities and other stakeholders and set the framework to which the final detailed design of the associated development sites will adhere. Where there is a requirement within the DCO to submit detailed designs for approval or where revised plans may be submitted for approval, the designs will need to accord with the relevant Design Principles as set out in this document.

1.1.4 The Design Principles serve a number of functions:

- Set the design principles that will be used to develop detailed design proposals for buildings, structures and landscaped areas of the associated development sites.
- Describe the primary mitigation (embedded mitigation) that has informed the assessment of the likely significant environmental effects of the Sizewell C Project in the Environmental Impact Assessment (EIA) process.
- Define design commitments that reflect comments and feedback from interested parties' responses during the pre-application consultation process.
- Define the criteria for good design, as set out in the National Policy Statement (NPS) for Energy (EN-1) (Ref. 1.1) and the NPS for Nuclear Power Generation (EN-6) (Ref. 1.2), in order to ensure that the development is as attractive, durable and adaptable as it can be, taking account of regulatory and other constraints.

1.1.5 NPS EN-1 recognises that the nature of energy infrastructure developments can limit the choice an applicant may have in respect of the visual appearance of buildings. The NPS recognises that the achievement of good design goes beyond visual aesthetics and that the functionality of infrastructure is equally as important (paragraph 4.5.1, NPS EN-1).

1.1.6 The Secretary of State needs to be satisfied that energy developments are functional and sustainable and, having regard to regulatory and other constraints, are as attractive, durable and adaptable as they can be (paragraph 4.5.3, NPS, EN-1). NPS EN-1 states that “whilst the applicant may not have any or very limited choice in the physical appearance of some energy infrastructure there may be opportunities for the applicant to demonstrate good design in terms of siting relative to existing landscape character, landform and vegetation” (NPS EN-1, Para 4.5.3).

1.2 Structure of this document

1.2.1 **Section 2** of this document outlines the general Design Principles that will apply across all of the Associated Development sites. **Section 3** of this report outlines the site-specific Design Principles.

~~2. GENERAL DESIGN PRINCIPLES~~

2. General Design Principles

Table 2.1: General Design Principles

Reference	General Design Principle
1.	Site layout has been optimised to reduce the overall land take for temporary land requirements.
2.	Energy efficient and low carbon designs for buildings/new assets will be developed.
3.	Existing vegetation will be retained whenever practicable and appropriate.
4.	Existing landscape features within site boundaries will be retained where practicable and buffer zones will be created where appropriate.
5.	Soft landscaping and new planting will be provided where practicable and buffer zones will be provided where appropriate.
6.	All proposed tree and shrub planting will use native species.
7.	Sustainable drainage system (SuDS) will be implemented to manage surface water run-off and minimise sediment generation. Surface water run-off will be contained within the site, with drainage to ground via infiltration, wherever feasible. Active management and maintenance of

Reference	General Design Principle
	the drainage infrastructure will be undertaken to ensure the continued efficacy of the surface water drainage system.
8.	Where infiltration basins are proposed they will be designed to cater for a 100 years flood event plus a 40% allowance for climate change.
9.	The on-site buildings at the northern and southern park and rides and the freight management facility will include water-efficient fittings which will help reduce water consumption.

~~3. SITE-SPECIFIC DESIGN PRINCIPLES~~

3. Site-specific design principles

3.1 Northern park and ride (Darsham)

Table 3.1: Northern Park and Ride (Darsham) Design Principles

Reference	Site-Specific Design Principle
General/Masterplanning Principles	
1.	There will be provision for up to 1,250 car parking spaces (of which up to 40 will be accessible spaces), up to 10 spaces for minibuses/vans/buses, up to 12 pick-up only spaces, up to 80 motorcycle spaces and cycle shelters for up to 20 bicycle spaces.
2.	Designated pedestrian routes will be provided within the site.
3.	Bus routes within the site will be designed as a one-way system in order to avoid the need for reversing buses. The layout will minimise conflicts between cars and buses.
4.	A secure fenced boundary up to 1.8m in height will be incorporated into the site design, to ensure the safety and security of the site, and to deter crime.
5.	Close-boarded fencing will be erected on the internal side of the security fencing where it abuts Little Nursery Wood to provide habitat protection from vehicle headlights and noise.
6.	Automatic access barriers will be provided at the entrance to the operational park and ride facility.
7.	CCTV will be provided at strategic locations within the site to be monitored from the on-site security facilities.

Reference	Site-Specific Design Principle
8.	The design of the access road and car parking areas will be in accordance with the Design Manual for Roads and Bridges (DMRB), British Standards and best practice guidance at the time of the design.
9.	The design will include the construction of a proposed new three-arm roundabout, approximately 125m to the north of the existing Willow Marsh Lane junction, to provide the entry and exit point for all vehicles accessing the operational park and ride facility. The A12 will be temporarily realigned via the roundabout. The roundabout will be designed to DMRB standards for a 40 miles per hour (mph) design speed.
10.	The access road will cross the existing Willow Marsh Lane to enter the northern end of the operational park and ride facility. A new T-junction will connect the existing Willow Marsh Lane alignment to the access road. Willow Marsh Lane will be closed for vehicular traffic from the A12 but retained for use by non-motorised users and as a private vehicular access for White House Farm. A dropped kerb would be provided where Willow Marsh Lane meets the A12 to facilitate access for cycles and pedestrians only.
11.	A separate agricultural track on the west side of the proposed roundabout, north of Willow Marsh Lane, will be provided to maintain access from White House Farm to an existing private agricultural track to the north.
12.	The site layout will be designed to minimise the impact on agricultural land as far as reasonably practicable.
Building Design Principles	
1.	The architectural design will use simple building forms to recognise the function of the facility whilst still complementing its surroundings.
2.	All buildings on-site will be temporary pre-fabricated modular buildings. Off-site modular construction will be used where practicable and the buildings will be removed as part of the removal and reinstatement phase.
3.	Buildings will be screened as far as possible. Where visible from public viewpoints, buildings will adopt natural colours to allow their appearance to harmonise with the surroundings.
4.	The long-term appearance, including exterior finishes, of the buildings will be maintained until removed.
5.	Gas mitigation measures will be provided in the buildings on-site and other relevant structures where required; the design of which be dependent on the risk profile and the nature/usage of the building/structure.

Reference	Site-Specific Design Principle
6.	All mechanical services plant (such as air conditioning condenser units and air handling units) will be selected to ensure that noise emissions are reduced to within acceptable limits.
7.	The maximum size parameters in metres (height x width x length) for the proposed temporary buildings are as follows: — Amenity and welfare building — 4 x 7 x 14 m — Security building — 4 x 5 x 12 m — Shelters (smoking/cycle/bus) — 3 x 5 x 10 m — Security booth — 4 x 5 x 12 m
Landscape Design Principles	
1.	Existing woodland and hedgerows will be retained where practicable and appropriate in order to maintain landscape character.
2.	A simple hard landscaping palette will be used to fulfil the functional requirements of the temporary development.
3.	A buffer zone of 20m will be provided to separate the parking area from Little Nursery Wood, which lies outside but adjacent to the western boundary of the site. A 10m buffer will be maintained along the north-east boundary (along the rear of the existing houses), and south-west boundary (adjacent to the railway line south of Little Nursery Wood) to provide protection to existing hedgerows. With the exception of fencing, there would be no above ground buildings or structures within these buffer zones to assist in minimising any indirect impacts (e.g. from noise, lighting and human disturbance) on species using those habitats within and adjacent to the site.
4.	The existing pond (Pond 78) will be excluded from the main parking area, within the 10m buffer zone, in order to retain this existing habitat and maintain connectivity with existing, suitable great crested newt habitats.
5.	Soft landscaping, comprising grassed areas and suitably sited tree and shrub planting, will be provided within the car parking areas while the park and ride is operational.
6.	Supplementary hedgerows will be planted along the eastern and northern site boundaries to infill existing gaps.
7.	A new hedgerow will be created along the southern side of Willow Marsh Lane to provide ecological mitigation and visual screening.
8.	New boundary tree and shrub screen planting is proposed around the proposed roundabout. These would be removed and the existing hedgerow alignments replanted during removal and reinstatement.

Reference	Site-Specific Design Principle
9.	Landscape bunds of 3m in height will be provided north of the main parking area and along the eastern boundary (and part of the southern boundary) to provide visual and acoustic screening for nearby residential dwellings and users of Willow Marsh Lane. Soil stripped as part of the works and materials generated from the earthworks and excavation will be re-used in landscape bunds where suitable, in line with the Outline Soil Management Plan , see Volume 2, Appendix 17C of the ES [APP-278] .
10.	Ecological fencing will be installed to include one-way directional newt fencing around the perimeter of the car parking areas, swales and landscape bunds where required, as well as badger fencing around the landscape bunds to prevent colonisation by this species.
11.	Two small pipes or culverts will be placed beneath the new access road at Willow Marsh land junction to allow the passage of great crested newts underneath the road.
12.	The landscape planting will be maintained and managed as appropriate throughout the operation of the proposed development.
Sustainability Principles	
1.	A low energy design will generally be adopted, based on the hierarchy of minimising use, reducing waste, recycling and on-site generation.
2.	It is anticipated that 5% of the car parking spaces will include 63 active electric vehicle charging points and 5% of the car parking spaces will include and 63 passive electric vehicle charging points. The final number will be agreed with the local authorities at the detailed design stage based on up-to-date guidance.
3.	The lighting <u>Lighting</u> design for the proposed development will <u>comply with the lighting strategy</u> ; use light fittings chosen to limit stray light; and, follow guidance within the latest Institution of Lighting Professionals Guidance Note (Ref. 1.3) as far as possible. The design would minimise light spill onto Little Nursery Wood and other habitats, and light levels will not exceed 0.1 lux along the eastern side of this wood.
4.	Lighting will utilise LED-based light fittings to ensure energy efficiency with zero-degree tilt, and the lighting columns along the access road, roundabout and security fencing will be fitted with demountable shields to reduce the backward spill of light.
5.	The height of lighting columns within the operational park and ride facility will be restricted to 6m including lanterns to minimise their visibility.

Reference	Site-Specific Design Principle
6.	A Central Management System (CMS) for the lighting will be incorporated, which will be capable of dimming parts of the site independently from other parts (with the site envisaged to be divided in 6-8 main sections), as usage changes through the day and to allow for seasonal variations in the operation of external lighting.
7.	The surface water drainage design will include SuDS to attenuate surface water run-off and minimise sediment generation. SuDS, including swales and infiltration basins, will be incorporated within the site (including the proposed roundabout) to allow for surface water run-off to be returned to ground, ensuring there will be no changes to the local hydrology regimes. Permeable surfaces will be used where feasible in the main car parking area to minimise surface water run-off. A package treatment plant and septic tank with field drain infiltration will be used to manage foul waste. Active management and maintenance of the drainage infrastructure will be undertaken to ensure the continued efficacy.
8.	Water falling onto impermeable surfaces from the access roads will pass through bypass separators, which would be incorporated into the drainage design where necessary, before being channelled into the SuDS. This will protect both the underlying groundwater and surface water receptors, and to maintain the efficacy of the SuDS measures.

3.2 Southern park and ride (Wickham Market)

Table 3.2: Southern Park and Ride (Wickham Market) Design Principles

Reference	Site-Specific Design Principles
General/Masterplanning Principles	
1.	There will be provision for up to 1,250 car parking spaces (of which up to 40 will be accessible spaces), up to 10 spaces for minibuses/vans/buses, up to 12 pick-up only spaces, up to 80 motorcycle spaces and cycle shelters for up to 20 bicycle spaces.
2.	Designated pedestrian routes will be provided within the site.
3.	Bus routes within the site will be designed as a one-way system in order to avoid the need for reversing buses. The layout will minimise conflicts between cars and buses.
4.	A secure fenced boundary up to 1.8m in height will be incorporated into the site design, to ensure the safety and security of the site, and to deter crime.

Reference	Site-Specific Design Principles
5.	Close-boarded fencing, up to 1.8m in height, will be erected on the internal side of the security fence where it abuts woodland blocks to provide habitat protection from vehicle headlights and noise.
6.	Automatic access barriers will be provided at the entrance to the operational park and ride facility.
7.	CCTV will be provided at strategic locations within the site, to be monitored from the on-site security facilities.
8.	The design of the access road and car parking areas and the selection of construction materials will be in accordance with the DMRB, British Standards and best practice guidance at the time of the design.
9.	The design will include an access point to the site from the existing slip road (from the B1078) which leads to the northbound A12. This access point will act as the entry and exit point for the southern park and ride for all vehicles. The access point will be designed to minimise the potential for queueing outside the site.
10.	An existing footway along the slip road from the B1078 will be extended into the site to facilitate journeys on foot.
11.	The site layout will be designed to minimise the impact on agricultural land as far as reasonably practicable.
12.	The site layout will, where practicable, maximise the benefit of existing screening provided by Whin Belt.
Building Design Principles	
1.	The architectural design will use simple building forms to recognise the function of the facility whilst still complementing its surroundings.
2.	All buildings on-site will be temporary pre-fabricated modular buildings. Off-site modular construction will be used where practicable and the buildings will be removed as part of the removal and reinstatement phase.
3.	Buildings will be screened as far as possible. Where visible from public viewpoints, buildings will adopt natural colours to allow their appearance to harmonise with the surroundings.
4.	The long-term appearance, including exterior finishes, of the buildings will be maintained until removed.
5.	Gas mitigation measures will be provided in the buildings on-site and other relevant structures where required; the design of which be dependent on the risk profile and the nature/usage of the building/structure.

Reference	Site-Specific Design Principles
6.	All mechanical services plant (such as air conditioning condenser units and air handling units) will be selected to ensure that noise emissions are reduced to within acceptable limits.
7.	The maximum size parameters in metres (height x width x length) for the proposed temporary buildings are as follows: Amenity and welfare building – 4 x 7 x 14 m Security building – 4 x 5 x 12 m Shelters (smoking/cycle/bus) – 3 x 5 x 10 m Postal consolidation building – 4 x 12 x 19 m Security booth – 4 x 5 x 12 m
Landscape Design Principles	
1.	Existing woodland and hedgerows will be retained where practicable and appropriate in order to maintain landscape character.
2.	A simple hard landscaping palette will be used to fulfil the functional requirements of the temporary development.
3.	10m buffer zones will be provided to separate the parking area from hedgerows along sections of the boundary to the south, east and around the woodland blocks to the west. With the exception of fencing, there would be no above ground buildings or structures within these buffer areas to assist in minimising any indirect impacts (e.g. from noise, lighting and human disturbance) on species using those habitats within and adjacent to the site.
4.	The existing pond located within the site, west of the woodland and abutting the western boundary, will be retained to prevent direct loss of this habitat and its associated species. The pond would be further protected by the 10m buffer zone around the woodland, within which, with the exception of fencing, there would be no above ground buildings or structures.
5.	Soft landscaping, comprising grassed areas and suitably sited tree and shrub planting, will be provided within the car parking areas while the park and ride is operational.
6.	Hedgerow planting will be provided along the access road whilst the park and ride is operational. These would be removed and the existing hedgerow alignments replanted during removal and reinstatement.
7.	Supplementary hedgerows will be planted along the southern and eastern boundaries of the site to infill gaps and screen views from Footpaths E-387/008/0 and E-288/007/0, which will be retained as permanent where agreed with the landowner.
8.	Landscape bunds, up to 3m in height, will be provided along the northern, eastern and southern boundary and along part of the western boundary,

Reference	Site-Specific Design Principles
	to provide visual and acoustic screening. Soil stripped as part of the works and materials generated from the earthworks and excavation will be re-used in landscaping bunds where suitable, in line with the Outline Soil Management Plan , see Volume 2, Appendix 17C of the ES [APP-278](Doc Ref. Book 6) .
9.	Ecological fencing will be installed to include badger fencing around the landscape bunds and SuDS infrastructure (refer to sustainability principles below) to prevent colonisation by this species within these features.
10.	The landscape planting will be maintained and managed as appropriate throughout the operation of the proposed development.
Sustainability Principles	
1.	A low energy design will generally be adopted, based on the hierarchy of minimising use, reducing waste, recycling and on-site generation.
2.	It is anticipated that 5% of the car parking spaces will include 63 active electric vehicle charging points and 5% of the car parking spaces will include and 63 passive electric vehicle charging points. However, the final number will be agreed with the local authorities at the detailed design stage based on up-to-date guidance.
3.	The lighting <u>Lighting</u> design for the proposed development will <u>comply with the lighting strategy</u> ; use light fittings chosen to limit stray light; and, follow guidance within the latest Institution of Lighting Professionals Guidance Note (Ref. 1.3) as far as possible. The design would minimise light spill onto adjacent habitats, and light spill beyond the site boundary would not exceed 1 lux.
4.	Lighting during the operational stage of the park and ride will ensure that lightspill onto hedges and watercourses are avoided wherever practicable.
5.	Lighting will utilise LED-based light fittings to ensure energy efficiency with zero-degree tilt, and the lighting columns along the access road and security fencing will be fitted with demountable shields to reduce the backward spill of light.
6.	The height of lighting columns within the operational park and ride facility will be restricted to 6m including lanterns to minimise their visibility.
7.	A CMS for the lighting will be incorporated, which will be capable of dimming parts of the site independently from other parts (with the site envisaged to be divided in 6–8 main sections), as usage changes through the day and to allow for seasonal variations in the operation of external lighting.
8.	The surface water drainage design will include SuDS to attenuate surface water run-off and minimise sediment generation. SuDs measures,

Reference	Site-Specific Design Principles
	including swales, geo-cellular storage within the landscape bunds and infiltration basins, will be incorporated within the site to allow for surface water run-off to be returned to ground, ensuring there will be no changes to the local hydrology regimes. Permeable surfaces will be used where feasible in the main car parking area to minimise surface water run-off. A package treatment plant and septic tank with field drain infiltration will be used to manage foul waste. Active management and maintenance of the drainage infrastructure will be undertaken to ensure the continued efficacy of the SuDS.
9.	Water falling onto impermeable surfaces from the access roads will pass through bypass separators, which would be incorporated into the drainage design where necessary, before being channelled into the SuDS. This will protect both the underlying groundwater and surface water receptors, and to maintain the efficacy of the SuDS measures.

3.3 Freight management facility

Table 3.3: Freight management facility design principles

Reference	Site-Specific Design Principles
General/Masterplanning Principles	
1.	There will be provision for approximately 150 Heavy Goods Vehicles (HGV) parking spaces, up to 12 car parking spaces, up to one accessible space, up to 10 spaces for minibuses/vans, up to four motorcycle spaces, up to six covered HGV spaces for screen and search activities, and cycle shelters for up to 10 bicycle spaces.
2.	Designated pedestrian routes will be provided within the site. To avoid blind spots directly in front of parked vehicles, the pedestrian routes across the parking bays will be positioned to the rear of the vehicles.
3.	A secure fenced boundary up to 1.8m in height will be incorporated into the site design, to ensure the safety and security of the site, and to deter crime.
4.	Automatic access barriers will be provided at the entrance to the operational park and ride facility.
5.	CCTV will be provided at strategic locations within the site to be monitored from on-site security facilities.
6.	The design of the access road and parking areas and the selection of construction materials will be in accordance with the DMRB, British Standards and best practice guidance at the time of the design.
7.	The design will include a ghost island junction on Felixstowe Road to allow right-turning traffic from the east to enter the site without blocking

Reference	Site-Specific Design Principles
	westbound traffic using Felixstowe Road. The access point will be designed to minimise the potential for queueing outside the site.
8.	The site layout will be designed to minimise the impact on agricultural land as far as reasonably practicable.
Building Design Principles	
1.	The architectural design will use simple building forms to recognise the function of the facility whilst still complementing its surroundings.
2.	All buildings on-site will be temporary pre-fabricated modular buildings. Off-site modular construction will be used where practicable
3.	Buildings will be screened as far as possible. Where visible from public viewpoints, buildings will adopt natural colours to allow their appearance to harmonise with the surroundings.
4.	The canopy over the covered screen and search HGV spaces would have a maximum height of 6m and would be open sided, with the width of columns and the roof structure minimised to reduce the visual impact.
5.	The long-term appearance, including exterior finishes, of the buildings will be maintained until removed.
6.	Gas mitigation measures will be provided in the buildings on-site and other relevant structures where required; the design of which be dependent on the risk profile and the nature/usage of the building/structure.
7.	The maximum size parameters in metres (height x width x length) for the proposed temporary buildings are as follows: • Amenity and welfare building – 4 x 7 x 14 m • Security building – 4 x 5 x 12 m • Shelters (smoking/cycle) – 3 x 5 x 10 m • HGV screen and search area – 6 x 15 x 80 m • Security booth – 4 x 5 x 12 m
Landscape Design Principles	
1.	Existing vegetation on site will be retained where practicable and appropriate in order to maintain landscape character.
2.	A simple hard landscaping palette will be used to fulfil the functional requirements of the temporary development.
3.	A buffer zone up to 10m will be incorporated around the north, east and west boundaries of the site to enhance existing vegetation in these areas.

Reference	Site-Specific Design Principles
4.	Soft landscaping, comprising grassed areas and suitably sited tree and shrub planting will be provided where feasible while the freight management facility is operational.
5.	Supplementary hedgerows will be planted around all site boundaries. The new hedgerows will be retained as permanent where agreed with the landowner.
6.	Landscape bunds of 3m in height will be incorporated into the design within the site boundaries to the east and west to create a visual buffer between the site and the surrounding roads and Public Rights of Way (PRoWs). Soil stripped as part of the works and materials generated from the earthworks and excavation will be re-used in landscaping bunds where suitable, in line with the Outline Soil Management Plan , see Volume 2, Appendix 17C of the ES [APP-278] (Doc Ref. Book 6).
7.	Ecological fencing will be installed to include badger fencing around the landscape bunds and SuDS infrastructure (refer to sustainability principles below) to prevent colonisation by this species within these features.
8.	The landscape planting will be maintained and managed as appropriate throughout the operation of the proposed development.
Sustainability Principles	
1.	A low energy design will generally be adopted, based on the hierarchy of minimising use, reducing waste, recycling and on-site generation.
2.	It is anticipated that 5% of the car parking spaces would include 3 active electric vehicle charging points and 5% of the car parking spaces will include and 3 passive electric vehicle charging points. However, the final number will be agreed with the local authorities at the detailed design stage based on the latest guidance.
3.	The lighting <u>Lighting</u> design for the proposed development will <u>comply with the lighting strategy</u> ; use light fittings chosen to limit stray light; and, follow guidance within the latest Institution of Lighting Professionals Guidance Note (Ref 1.3) as far as possible.
4.	Lighting during the operational stage of the freight management facility will minimise impacts on nocturnal species, such as bats, that use the nearby tree lines or habitats for roosting or foraging.
5.	Lighting will utilise LED-based light fittings to ensure energy efficiency with zero-degree tilt, and the lighting columns along the access road and security fencing will be fitted with demountable shields to reduce the backward spill of light.
6.	The height of lighting columns within will be a maximum of 8m to minimise their visibility during day and night time.

Reference	Site-Specific Design Principles
7.	A CMS for the lighting will be incorporated, which will be capable of dimming parts of the site independently from other parts (with the site envisaged to be divided in 6–8 main sections), as usage changes through the day and to allow for seasonal variations in the operation of external lighting.
8.	The surface water drainage design will include measures to prevent pollution of local watercourses and include measures to control the peak run-off rate from the site.
9.	SuDS measures, including swales and geo-cellular storage within the landscape bunds, will be incorporated within the site to allow for surface water run-off to be returned to ground at green field rates, ensuring there will be no changes to the local hydrology regimes. A package treatment plant will be used to manage foul waste. Active management and maintenance of the drainage infrastructure will be undertaken to ensure the continued efficacy of the SuDS.
10.	Water falling onto impermeable surfaces from the access roads and parking area will pass through bypass separators, which would be incorporated into the drainage design where necessary, before being channelled into the SuDS. This will protect both the underlying groundwater and surface water receptors, and to maintain the efficacy of the SuDS measures.

3.4 Two village bypass

Table 3.4: Two village bypass Design Principles

Reference	Site-Specific Design Principles
General/Masterplanning Principles	
1.	Measures will be incorporated in the design such as agricultural underpasses, bridges, trackways, private means of access and cattle handling facilities (termed accommodation works) to maintain access for farm vehicles and animals.
2.	Existing access for residential properties and local businesses will be retained where possible, and incorporation of replacement points of access will be provided, where necessary.
3.	Lighting will be provided at the A12 western roundabout and the A12/A1094 eastern roundabout extending north for road safety reasons. The rest of the route of the road will be unlit. The lighting columns will be up to 10m in height.
4.	Operational phase lighting would be designed to achieve a balance between providing lighting appropriate for all road users whilst applying suitable mitigation measures in keeping with the local environment.

NOT PROTECTIVELY MARKED

Reference	Site-Specific Design Principles
5.	Guidance within the latest Institution of Lighting Professionals Guidance Note: Bats and artificial lighting in the UK (Ref 1.3) will be followed as far as possible.
6.	The two village bypass will be a single carriageway and will be designed in accordance with the DMRB standards and best practice guidance at the time of design. The design would be required to take into account the ground conditions including the potential for ground movement, compaction, ground gas and ground aggressivity.
7.	The two village bypass will be in cutting where it passes Farnham Hall and Farnham Hall Farmhouse.
8.	Excess water on the river Alde floodplain will be routed through the embankment via flood relief culverts. The size of the culverts will allow ecological connectivity across the route in times of normal flows.
9.	Signage and road markings will be provided where required in accordance with highway standard.
10.	Fence lines along the bypass will be positioned approximately 5m back from the top of any cutting or toe of an embankment, to provide forward visibility in accordance with standard technical requirements and to provide space for maintenance.
11.	The abutments of the River Alde bridge will include otter ledges to allow passage at times of high flows. Fencing will be provided along the base of the embankment to help prevent otters from accessing the road and to guide them to crossing points.
12.	If flood compensation areas are required, they will be designed to minimise impacts to ditches and watercourses.
13.	Public Rights of Way will be permanently diverted where the existing Rights of Way cannot remain in situ as a result of the proposed route of the two village bypass, and diversion routes will be kept as short as possible. Breaks or gates in the fence lines will be provided for PRoW crossing points.
Landscape Design Principles	
1.	The general strategy for the landscape proposals associated with the proposed development will be to minimise potential effects on ecological, heritage and landscape and visual receptors through provision of appropriate planting.
2.	Native hedgerows will be planted along the route of the proposed two village bypass, where appropriate, to integrate the road with the

Reference	Site-Specific Design Principles
	surrounding landscape, compensating for the loss of hedgerows severed by the route. The hedgerows will connect into the existing network where possible. At least 4,800m of new hedgerow planting will be provided.
3.	Native tree and shrub woodland planting will be provided along the western side of the cutting as the route of the proposed two village bypass passes Farnham Hall and residential properties, as well as along the western side of the proposed embankment up to the proposed overbridge, to provide visual screening. Native tree and shrub planting will also be incorporated on the east side of the overbridge, adjacent to Foxburrow Wood and Farnham Hall Farmhouse to provide visual screening and ecological connectivity. At least 1.59ha of broadleaved woodland planting will be provided.
4.	Ponds will provide additional pond habitat in the area and contribute to biodiversity net gain.
5.	Foxburrow Wood county wildlife site ancient woodland will be retained in its entirety and a 15m distance will be maintained from it to the road and earthworks to avoid damage to the trees.
6.	Bat boxes will be installed on retained trees in suitable locations within the site boundary. One bat box will be installed per tree with medium or high bat roost potential that is due to be lost, whether or not a roost has been identified. A variety of bat boxes will be used to support different species.
7.	Where the proposed route is on an embankment, safe crossing points for bats and other mammal species (such as badgers) will be provided, including the use of oversized culverts.
8.	Crossing points (bat hop-overs) to facilitate the passage of bats across the road alignment will be incorporated if key foraging or commuting routes are identified. Bat hop-overs will comprise tall hedgerow planting where the hedgerow meets the road to encourage bat to pass up and over the newly constructed road.
Sustainability Principles	
1.	Swales will be provided along the route of the bypass where required to collect surface water run-off from the highway and remove it by infiltration to ground. Additional storage capacity will be provided by use of infiltration basins. Infiltration is not possible within the river Alde floodplain and the section of road on the embankment within the floodplain to the east of the River Alde overbridge will discharge to the river at greenfield runoff rates.
2.	Surface water run off from the highway at the roundabouts will be collected in a traditional underground drainage network which will discharge into an infiltration basin for removal to ground.

Reference	Site-Specific Design Principles
3.	Design of the SuDS (swales and infiltration ponds) will consider the ground conditions including the permeability of the strata and the level of contamination present on-site with lined drainage incorporated into the design, where necessary, to reduce the potential for contamination to migrate and impact on the ground, groundwaters and surface waters.
4.	Water draining from the road infrastructure will pass through appropriate drainage, including the incorporation of SuDS (e.g. swales), and bypass separators for the removal of hydrocarbon contaminants as necessary (following assessment using the Highways England Water Risk Assessment Tool) as part of detailed design). This will allow infiltration to the superficial aquifer, whilst also protecting the underlying groundwater from hydrocarbon contamination.
5.	Where required, infiltration would be designed to cater for a 100 years flood event plus allowance for climate change.
6.	Existing local drainage from the adjacent fields would be culverted so that their use would continue unchanged. Field drains located at the western end of the bypass, either side of the proposed River Alde embankment, would be diverted along the base of the embankment to the River Alde where possible.
7.	Connections will also be made to existing local utility services (such as electricity for lighting) in the public highway, where practicable.

3.5 Sizewell link road

Table 3.5: Sizewell link road design principles

Reference	Site-Specific Design Principles
General/Masterplanning Principles	
1.	Measures will be incorporated in the design such as agricultural underpasses, bridges, trackways, private means of access and cattle handling facilities (termed accommodation works) to maintain access for farm vehicles and animals.
2.	Existing access for residential properties and local businesses will be retained where possible, and incorporation of replacement points of access will be provided, where necessary.
3.	Lighting will be provided at the A12 western roundabout, and the B1122 northern roundabout. The rest of the route of the road will be unlit. The lighting columns will be up to 10m in height.
4.	Operational phase lighting would be designed to achieve a balance between providing lighting appropriate for all road users whilst applying suitable mitigation measures in keeping with the local environment.

Reference	Site-Specific Design Principles
5.	Guidance within the latest Institution of Lighting Professionals Guidance Note: Bats and artificial lighting in the UK (Ref. 1.3) will be followed as far as possible.
6.	The bypass will be a single carriageway and will be designed in accordance with the DMRB, British Standards and best practice guidance at the time of design. The design would be required to take into account the ground conditions including the potential for ground movement, compaction, ground gas and ground aggressivity.
7.	Signage and road markings will be provided where required, in accordance with Highway Standards.
8.	Fence lines along the bypass will be positioned approximately 5m back from the top of any cutting or toe of an embankment, to provide forward visibility in accordance with standard technical requirements and to provide space for maintenance.
9.	PRoWs will be permanently diverted where the existing Rights of Way cannot remain in situ as a result of the proposed route of the Sizewell link road, and diversion routes will be kept as short as possible. Breaks or gates in the fence lines will be provided for ProW crossing points.
10.	Where the proposed development crosses existing watercourses, culverts of varying lengths and dimensions (including the use of portal culverts which would straddle the watercourse channel to reduce the disturbance of the bank), and flood relief culverts where required, will be installed to maintain hydrological connectivity and minimise afflux (increased level of flood water, to below a threshold of 30mm). Portal culverts will be provided where the proposed development would cross two main rivers (referred to as Middleton Watercourse and Theberton Watercourse) as well as three unnamed watercourses; A section of the Middleton Watercourse will be diverted to accommodate the local realignment of Fordley Road and its junction with the link road. This diversion is required to avoid the need for a second crossing of the watercourse. There will also be portal culvert provided where the realigned Hawthorn road crosses one of these unnamed watercourses, before joining the link road.
11.	An existing 600mm culvert crossing of the B1122 will be extended to cross beneath the Sizewell link road.
12.	Measures will be installed into the road design to maintain connectivity for great crested newts, where required. Where the road is at grade, measures will be incorporated into the proposed development design such as no kerbing or features that would inhibit the movement of newts to cross the road. In the event of gully pots (which could become traps for amphibians) being identified as a requirement, the design will ensure that amphibian friendly gully

Reference	Site-Specific Design Principles
	pot designs are used so that a means of egress is provided to ensure that any amphibians do not get trapped within them. Where the road is on an embankment and in areas of greatest importance to great crested newts, culverts or underpasses will be considered, where practicable and depending upon the further survey results, to enable great crested newt movement across the road. These culverts or underpasses will be at least 1m in width, and newt fencing and appropriate green infrastructure will be installed along the length of the embankment to a distance of approximately 100m either side to the culvert/underpass to guide newts towards the culvert.
13.	The grade II Listed Gate and Gate Piers at junction of Leiston Road and Onner's Lane (LB 1287303), though within the site boundary, will be retained in its entirety.
Landscape Design Principles	
1.	Existing woodland and hedgerows will be retained where possible. Where vegetation is with the land required to facilitate construction and is temporarily lost it would be replanted at the end of construction.
2.	Hedgerows will be planted along the route of the proposed Sizewell link road to integrate the road with the surrounding landscape and compensate for the loss of hedgerows due to construction of the Sizewell link road. The hedgerows will connect into the existing network where possible. At least 12,800m of new hedgerow planting will be provided. Hedgerow planting will include Elm hedgerows to compensate for loss during construction.
3.	Trees and shrubs will be planted at various locations including: in field corners severed by the proposed development; and, around infiltration and flood relief basins to integrate such features into the surrounding landscape.
4.	Woodland planting will be provided along the route of the proposed Sizewell link road at strategic locations, to reduce visual amenity impacts and impacts on setting, compensate for the loss of woodland during construction of the proposed development and to help maintain potential bat corridors. This will include woodland planting: - adjacent to the proposed Middleton Moor link road to replicate the pattern of small woodland blocks in the surrounding landscape; - in areas adjacent to the East Suffolk Line; - in areas to the north and south of the route in the vicinity of Fordley Road; - to the south of the route of the proposed Sizewell link road in the vicinity of Trust Farm to Hawthorn Road to minimise visibility from nearby residential properties; - west of the route of the proposed Sizewell link road in the vicinity of Dovehouse Farm, to compensate for the loss of woodland in the belt

Reference	Site-Specific Design Principles
	west of Theberton Hall and to infill field corners severed by the proposed route. Further woodland planting is proposed east of the route of the proposed Sizewell link road in this area;and • north and south of the route of the proposed Sizewell link road between Theberton and Theberton Grange. At least 13.1ha of broadleaved woodland planting will be provided.
5.	Replacement great crested breeding ponds will be included to compensate for the loss of existing ponds. Replacement ponds for great crested newts will be created prior to destruction of the original ponds (at a 2:1 ratio) and appropriate terrestrial habitat will be created around the ponds, subject to agreement with Natural England.
6.	Ponds will provide additional pond habitat in the area and contribute to biodiversity net gain.
7.	Bat boxes will be installed on retained trees in suitable locations within the site boundary. One bat box will be installed per tree with medium or high bat roost potential that is due to be lost, whether or not a roost has been identified. A variety of bat boxes will be used to support different species.
8.	Crossing points (bat hop-overs) to facilitate the passage of bats across the road alignment would be incorporated if key foraging or commuting routes are identified. Bat hop-overs will comprise tall hedgerow planting where the hedgerow meets the road to encourage bat to pass up and over the newly constructed road.
Sustainability Design Principles	
1.	SuDS infrastructure (proposed as swales) will be provided along the length of the proposed route of the Sizewell link road. They will collect surface water run-off from the highway and dispose by infiltration to ground. This will mitigate diffuse pollution from sediment and other pollutants arising which could adversely affect ecological habitat..
2.	The design of the SuDS (swales and infiltration ponds) will consider the ground conditions including the permeability of the strata and the level of contamination present on-site with lined drainage incorporated into the design, where necessary, to reduce the potential for contamination to migrate and impact on the ground, groundwaters and surface waters.
3.	Where required, infiltration basins will be designed to cater for a 100 years flood event plus a 40% allowance for climate change.
4.	Where required, flood relief basins will be designed to cater for a 100 years flood event plus a 40% allowance for climate change.
5.	Water draining from the road infrastructure will pass through appropriate drainage, including the incorporation of SuDS (e.g. swales), and bypass separators for the removal of hydrocarbon contaminants as necessary (following assesment using the Highways England Water Risk

Reference	Site-Specific Design Principles
	Assessment Tool) as part of detailed design). This will allow infiltration to the superficial aquifer, whilst also protecting the underlying groundwater from hydrocarbon contamination.
6.	Connections will also be made to existing local utility services (such as electricity for lighting) in the public highway, where practicable.

3.6 Yoxford roundabout

Table 3.6: Yoxford roundabout design principles

Reference	Site-Specific Design Principles
General/Masterplanning Principles	
1.	The design of the Yoxford roundabout will be in accordance with the DMRB, British Standards and best practice guidance at the time of the design, and would take into account the ground conditions including the potential for ground movement, compaction, ground gas and ground aggressivity.
2.	A partially demountable section will be provided across the proposed Yoxford roundabout central island allowing for Abnormal Indivisible Loads to pass through.
3.	Access will be retained to the row of houses south of the junction located immediately to the south of the A12.
4.	Pedestrian walkways and dropped kerbs will be provided at the A12 and A144 junction and to the east of the A12 near to the A12 and A144 junction, to allow for the safe crossing of pedestrians across the roads.
5.	Improvements will be made to visibility splays and signage, and road markings will be provided, where necessary, to improve road safety.
6.	Fence lines will be positioned approximately 5m back from the top of any cutting or toe of an embankment, to provide forward visibility in accordance with standard technical requirements and to provide space for maintenance.
7.	The Roadside Nature Reserve 197 will be retained in its entirety and there will be no habitat loss to the Roadside Nature Reserve.
8.	A 5m buffer will be maintained, between the proposed Yoxford roundabout and the adjacent River Yox to protect the integrity of the banks as well as the associated ecological features.
9.	Lighting will be designed to limit stray light and guidance within the latest Institution of Lighting Professionals Guidance Note: Bats and Artificial Lighting in the UK (Ref 1.3) will be followed as far as possible.

Reference	Site-Specific Design Principles
Landscape Design Principles	
1.	Existing trees and hedgerows adjoining the Yoxford roundabout site will be retained where possible, including the tree belt to the north-west of the site, along the boundary of Satis House and along the southern edge of the B1122 (Middleton Road).
2.	New tree and hedgerow planting will be provided along the eastern edge of the realigned roads (A12 and B1122) and around the inductive infiltration basin south of A12.
3.	Grassed areas will be provided on slopes of earthworks and around infiltration basins.
4.	Street lighting will line the proposed Yoxford roundabout and will be up to 10m in height and in compliance with adoptable standards. The lighting will seek to provide lighting appropriate for all road users whilst minimise light-spill into adjacent habitats and reduce impacts on the Yoxford Conservation Area.
Sustainability Principles	
1.	The proposed Yoxford roundabout drainage system will incorporate channels, kerb drains or gullies to remove surface water run-off into underground drains.
2.	An infiltration basin, located between the proposed Yoxford roundabout and the proposed access road to the south, will be provided, to hold the run-off from the underground drains and discharge the run-off via infiltration to ground.
3.	Bypass separators and silt traps will be incorporated into the drainage design of Yoxford roundabout, where considered necessary, to protect the underlying groundwater and surface water receptors.
4.	The drainage will be designed and constructed in accordance with highway authority standards for adoption.
5.	Drainage design will consider the ground conditions including the permeability of the strata and the level of contamination present on site, with lined drainage where necessary to reduce potential for contamination to migrate and impact on the ground, groundwaters and surface waters.

3.7 Other highway improvements

3.7.1 This section refers to the following highway improvements:

- A1094/B1069 junction south of Knodishall;

- A12/A144 junction south of Bramfield; and,
- A12/B1119 junction at Saxmundham.

Table 3.7: Other highways improvements Design Principles

Reference	Site-Specific Design Principles
General/Masterplanning Principles	
1	Improvements will be made to visibility splays and signage, and road markings will be provided, where necessary, to improve road safety.
2	Fence lines, where required, will be positioned approximately 5m back from the top of any cutting or toe of an embankment, to provide forward visibility in accordance with standard technical requirements and to provide space for maintenance.
3	Lighting will be designed to limit stray light and guidance within the latest Institution of Lighting Professionals Guidance Note: Bats and artificial lighting in the UK (Ref. 1.3) will be followed as far as possible.
Sustainability Principles	
4	Proposed drainage systems, where being provided or altered as part of the proposed works, will incorporate channels, kerb drains or gullies to remove surface water run-off into underground drains.
5	Bypass separators and silt traps will be incorporated into the drainage design, where considered necessary.
6	The drainage will be designed and constructed in accordance with highway authority standards for adoption.
7	Drainage design will consider the ground conditions including the permeability of the strata and the level of contamination present on site, with lined drainage where necessary to reduce potential for contamination to migrate and impact on the ground, groundwaters and surface waters.

3.8 Rail improvements

Table 3.8: Rail improvements design principles

Reference	Site-Specific Design Principles
General/Masterplanning Principles	
1.	The design of the proposed rail extension route and associated level crossings proposed on Buckleswood Road and the B1122 (Abbey Road) will be in accordance with the suite of Network Rail standards and the Governance for Rail Investment Projects (GRIP) process, and best practice guidance at the time of the design.

Reference	Site-Specific Design Principles
2.	The proposed rail improvement works will be completed in accordance to the relevant Network Rail standards including NR/L3/ENV/044: Track maintenance, renewal or alteration- used ballast handling.
3.	The design of the temporary and permanent road diversions and junctions will be in accordance with the DMRB, British Standards and best practice guidance at the time of the design.
4.	The rail extension route will be bounded by security fencing 1.8m to 2.4m in height to ensure the safety and security of the site, and to deter crime.
5.	CCTV will be provided at the temporary level crossings on Buckleswood Road and the B1122 (Abbey Road).
6.	The proposed rail extension route and the Saxmundham to Leiston branch line upgrades will comprise continuously welded rail in order to reduce noise at source.
7.	Where possible, level crossing upgrades on the Saxmundham to Leiston branch line will use automatic methods of control.
8.	The site layout of the proposed rail extension route will be designed to minimise the impact on agricultural land as far as reasonably practicable.
Landscape Design Principles	
1.	Existing features such as walls, fences, woodland, scrub and hedgerows, including hedgerows along Abbey Lane and the current alignment of Footpath E-363/003/0, will be retained where possible and where they are not constrained by highway or railway safety.
2.	A landscape bund, approximately 2m in height, will run along the northern side of the proposed rail extension route and a further landscape bund, approximately 2m in height will be created to the south of the proposed rail extension route towards its eastern end. All landscape bunds would be within the security fencing. The bunds would provide screening for visual, acoustic and ecological receptors. Soil stripped as part of the works and materials generated from the earthworks and excavation for the green rail route will be re-used in landscaping bunds where suitable, in line with the Outline Soil Management Plan , see Volume 2, Appendix 17C of the ES [APP-278] (Doc Ref. Book 6).
3.	To the south-east of the second landscape bund detailed above, an area will be kept available for the potential provision of an infiltration basin if required.
4.	The 1.8-2.4m high security fencing around the proposed rail extension route would be sufficient to resist damage by livestock and would include a buried return to prevent access to the site and the establishment of setts within the landscape bunds by badgers.

Reference	Site-Specific Design Principles
5.	Hedgerow planting will be provided along the B1122 (Abbey Road) which is proposed to be retained following the removal of the proposed rail extension route. Soft landscaping would be maintained during the operational lifetime of the proposed rail extension route. Existing hedgerow alignments will be replanted during removal and reinstatement.
Sustainability Principles	
1.	For the proposed rail extension route, lighting will be provided at the two level crossings only and will be in compliance with the Network Rail standard. The lighting columns will be up to 10m high and will be designed to avoid substantial levels of glare to road users, train drivers or signallers and others operating the crossing.
2.	The proposed rail extension route would be unlit other than at the Buckleswood Road and B1122 (Abbey Road) level crossings. The lighting design would use light fittings chosen to limit stray light. These measures would minimise impacts on nocturnal species such as bats that may use the nearby tree lines or habitats for roosting or foraging.
3.	SuDS will be implemented for the operation of the proposed rail extension route to collect and hold surface water run-off on a temporary basis, allowing infiltration to ground over time in order to ensure track stability and durability throughout operation and also to ensure that there will be no flooding which could prevent operation.
4.	The SuDS will include one or more swale to be provided trackside with the potential for a larger infiltration pond at low points or adjacent to the cuttings if required. The base of the swale will be approximately 200 millimetres below the base of the sub-ballast if the track is on the level or at the toe of the embankment. Run-off which does not infiltrate will pass through the sub-ballast to the swale.
5.	An infiltration basin will be provided if required, at the eastern end of the site, to hold the run-off from the swales and discharge the run-off through infiltration to ground.
6.	Rail track drainage systems will comply with the Network Rail NR/L2/CIV/005/01 Drainage Systems Manual. This Network Rail standard includes mandatory requirements for track drainage design.
7.	Active management and maintenance of the drainage infrastructure will be undertaken to ensure the continued efficacy of the SuDS.

REFERENCES

References

- 1.1 Department of Energy and Climate Change, Overarching National Policy Statement for Energy (EN-1) (London: The Stationery Office, 2011).
- 1.2 Department of Energy and Climate Change, National Policy Statement for Nuclear Power Generation (EN-6) (London: The Stationery Office, 2011).
- 1.3 Institution of Lighting Professionals, Bats and artificial lighting in the UK (Guidance Note 08/18) (Rugby: Institution of Lighting Professionals).