Chalfont St Giles Vent Shaft – Design and Access Statement

ALIGN Consent Ref ALJ-TP-0143

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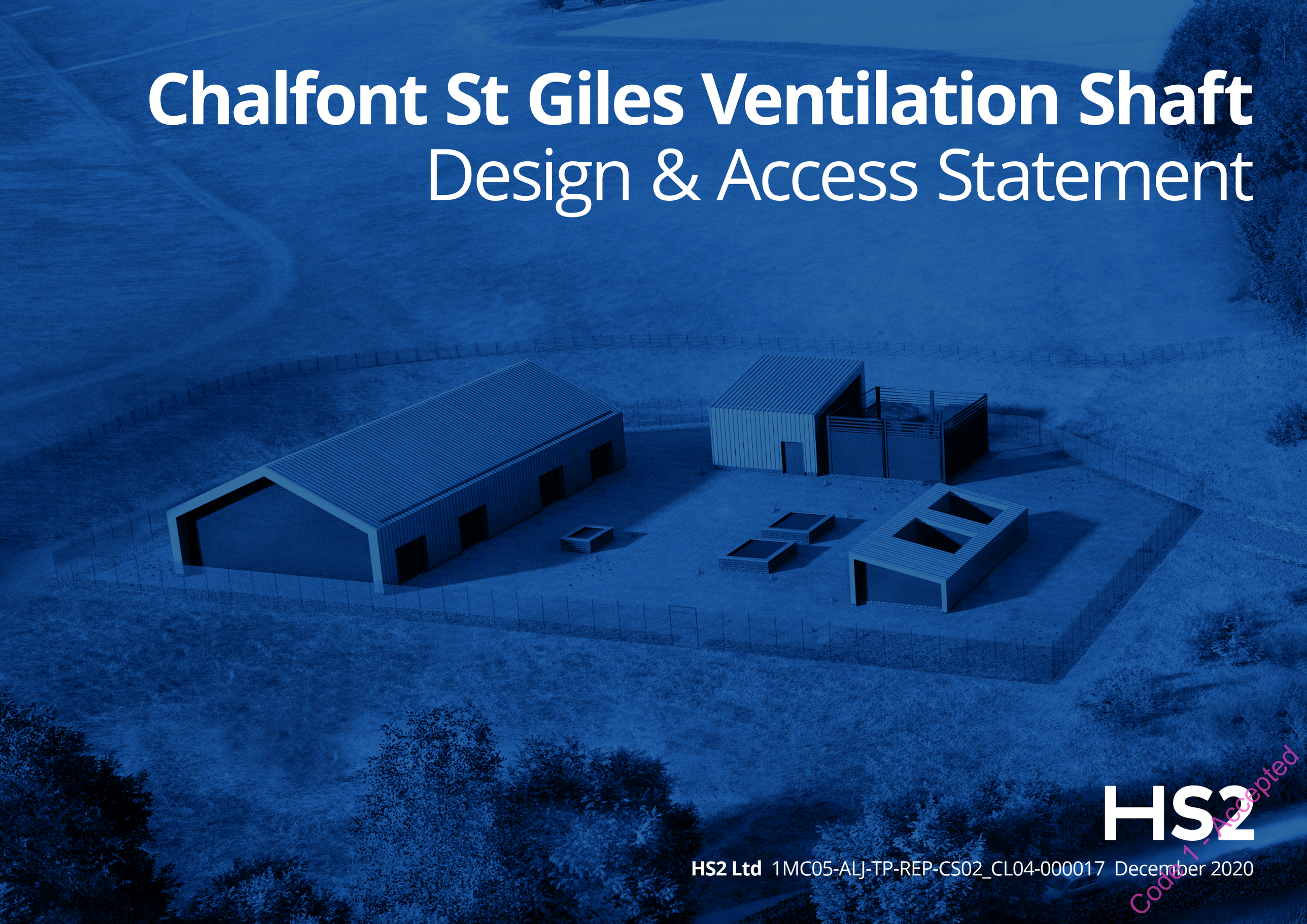
Chalfont St Giles Ventilation Shaft
Design & Access Statement



HS2

HS2 Ltd 1MC05-ALJ-TP-REP-CS02_CL04-000017 December 2020

Contents

1.0 Introduction

This section summarises the purpose and scope of the project and this Design and Access Statement, together with Schedule 17 requirements.

Executive Summary

1.1

1.1.1 Purpose

This Design and Access Statement has been prepared to support the submission of Schedule 17 request for approval of plans and specifications of the Chalfont St Giles Ventilation Shaft and associated landscaping, to Buckinghamshire Council.

The Chalfont St Giles Vent Shaft is one of five shafts (4 ventilation shafts and 1 intervention shaft) along the line of the route of High Speed Two (HS2) Phase One where it runs through the Chiltern twin-tunnels. This Design and Access Statement explains the context of the site and justifies the rationale for the design of the scheme. The document supports the Written Statement and provides key visualisations of the Vent Shaft Headhouse and its associated landscape works.

This Design and Access Statement expands upon the design decisions made, the key opportunities and constraints affecting design, and the contextual elements of the site that the design has responded to.

1.1.2 Team

ALIGN JV are working on behalf of HS2 Ltd to design and construct the CSG Vent Shaft. They are a consortium of three companies which comprise:

- Bouygues Travaux Publics
- Sir Robert McAlpine
- VolkerFitzpatrick

Their combined experience, both in the UK and worldwide, in delivering high-profile infrastructure projects safely, on time and on budget, has established their reputation. Therefore, their alliance was formed to deliver the CSG Vent Shaft to the highest standards of excellence.

1.1.3 Document structure

This report has been subdivided into the following sections:

- **Context:** An appraisal of the physical, environmental, social and cultural features of the local context.
- **Brief:** Summary of briefing material, from HS2 design requirements and guidelines, hybrid Bill requirements, technical requirements and stakeholder aspirations.
- **Design vision:** Encapsulates the overall design vision through a series of key design objectives and visualisations.
- **Headhouse design:** Summary and justification of the Chalfont St Glles Ventilation Shaft design proposals relating to the headhouse and ancillary buildings.
- **Landscape design:** A summary of the indicative landscape design proposals with reference to the overarching landscape vision and design considerations, covering habitat creation and management, access and water management.
- **Sustainability:** Summary of how environmental, social and economic considerations have influenced the design proposals.
- **Engagement:** Summary of the various methods and results of engagement with local authorities, stakeholders, the local community and the HS2 Independent Design Panel undertaken to date.
- **Summary:** Summary of the CSG Vent Shaft and landscape design proposals alongside the feedback from the HS2 Independent Design Panel.

HS2 Project

1.2

1.2.1 Project overview

HS2 is a new high speed railway network that will connect major cities in Britain. It will bring significant benefits for inter-urban rail travellers through increased capacity and improved connectivity between London, the Midlands and the North. It will release capacity on the existing rail network and so provide opportunities to improve existing commuter, regional passenger and freight services, particularly on the West Coast Main Line (WCML).

1.2.2 Phase one

Phase One of HS2 will provide a dedicated high speed rail service between London, Birmingham and the West Midlands. Phase Two of HS2 will extend the railway to the north-west and north-east: to Manchester with connections to the WCML at Crewe and Golborne; and to Leeds with a connection to the East Coast Main Line approaching York.

1.2.3 Central section C1

Central Section C1 comprises 22km of the high-speed rail line, running between the Colne Valley and the Chilterns. It includes the 3.4km long Colne Valley Viaduct and its approach embankments, the Chiltern twin-tunnels and five shafts (4 ventilation shafts and one intervention shaft) and headhouses.

Key

- Proposed HS2 route
- Phase one central station section C1
- Colne Valley Viaduct and its approach embankments
- Chilterns Area of Outstanding Natural Beauty
- Colne Valley Regional Park
- Proposed HS2 stations
- Chiltern tunnel portal site
- Chiltern tunnel headhouse site

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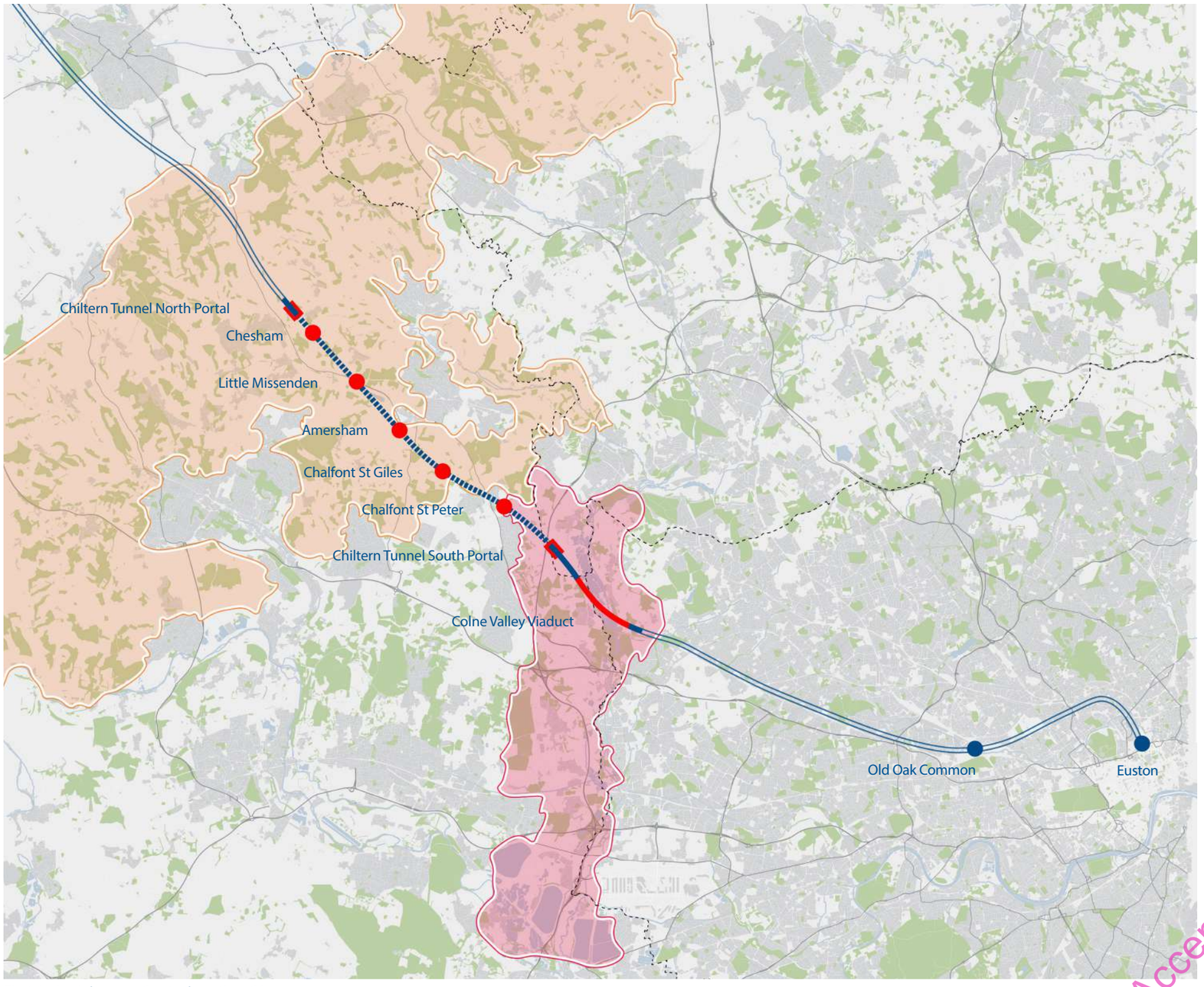

Fig.1.1_ Aerial map - Central section C1

1.2.4 Ventilation shaft location

The Chalfont St Giles Ventilation Shaft is located in Buckinghamshire Council. The Schedule 17 application boundary defines the consentable area for the ventilation shaft, its compound, access and landscaping. Please refer to Section 2 of this report for further information relating to the existing context of the local area.

Key

Schedule 17 application boundary

0 50 200 M

N

Fig.1.2_ Existing site plan - Schedule 17 application

1.2.5 Headhouse building & CSG vent shaft

The Chalfont St Giles Vent Shaft is an important element within the new high-speed rail line which has been through rigorous engagement with the local council. ALIGN JV's approach has been to create a headhouse building and compound arrangement which is visually recessive within its rural context and responds positively to its landscape setting.

The design is informed by a thorough understanding of the landscape and environmental context, as well as rigorous technical criteria. The design proposals have also been developed alongside the key HS2 Design Principles of:

- Contextual approach
- Functionality, maintainability and flexibility
- Safety and security
- Value for money
- Buildability
- Sustainability

In developing our proposals, the landscape design seeks to respond positively to the character of the surrounding area. The design has followed the general approaches (as applicable) in the HS2 Landscape Design Vision which are to:

- Conserve
- Enhance
- Restore
- Transform

Engagement with the Chilterns AONB Review Group and the HS2 Independent Design Panel has been a crucial part of the design process. As the design has developed, proposals were shared with local planning authorities, statutory consultees, environmental groups and local communities at public engagement events. Feedback from this engagement process has influenced and steered the design submitted as part of this Schedule 17 request for approval.

Fig.1.3_ Visualisation - Aerial view looking north north west

1.2.6 Key functional requirements

The primary functional requirements for Chalfont St Giles Ventilation Shaft are to:

- Provide a ventilation fan system to control the tunnel environment.
- Provide the necessary mechanical and electrical plant equipment to support the operation of the railway.
- Provide a dedicated and continuously available intervention access point for the emergency services to respond to an incident, such as a fire within the tunnels.
- Provide a route to the surface for drainage of the running tunnels.
- Provide Auto Transformer Feeder Station to service tunnels.

The ventilation and intervention shafts and associated infrastructure will provide for:

- A minimum of 1,900 sq m hard-standing for maintenance and emergency access and egress from the tunnel.
- Headhouse structures sympathetically designed to its surroundings housing MEPH plant and equipment, maintenance access, stairs and a dedicated fire-fighter's lift.
- Construction and operational access.
- Permanent maintenance access roads to the headhouse compound and to the infiltration basin including drainage.

Other key operational requirements that have been considered include:

- Weekly testing of the fan operation.
- External lighting to illuminate the compound in the case of unwanted intrusion or in an emergency situation. External lighting will be over doors and controlled by PIR sensors. The compounds will not be constantly illuminated.
- Provision of maintenance access for regular servicing and inspection with more infrequent replacement of heavy mechanical and electrical equipment also required (approximately 20 year cycles).
- Security of the compound preventing intruders and errant vehicles from entering the headhouse site.

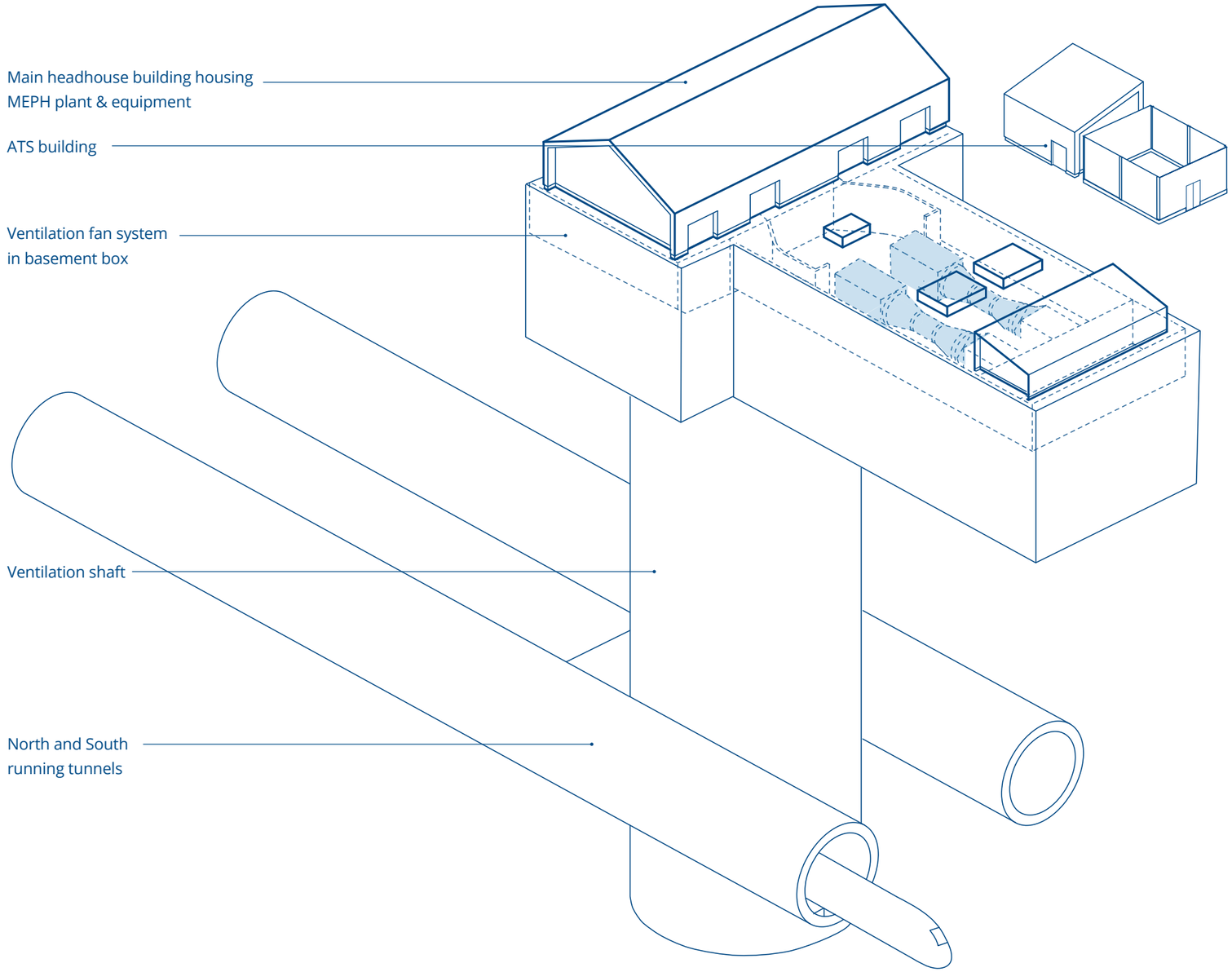

Fig.1.4_ Axonometric - Vent shaft and fans

1.2.7 Project development

The CSG Vent Shaft was granted deemed planning permission upon Royal Assent of the High Speed Rail (London - West Midlands) Act 2017 (referred to in this report as the HS2 Act) in February 2017. An initial preliminary design for the CSG Vent Shaft was prepared as part of the HS2 Act in order to define the location, together with broad design principles relating to the scale, massing and appearance.

Since that time, enabling works contractors and utility companies have been undertaking early works to prepare the line of the route for the main civil works required to construct the railway. Since the summer of 2017 Main Works Civil Contractors, including ALIGN JV, have developed the hybrid Bill design into a scheme design for Schedule 17 submission. The CSG Vent Shaft has now reached a level of design maturity whereby approvals can be sought.

The headhouse itself will be built in the later part of the vent shaft construction programme.

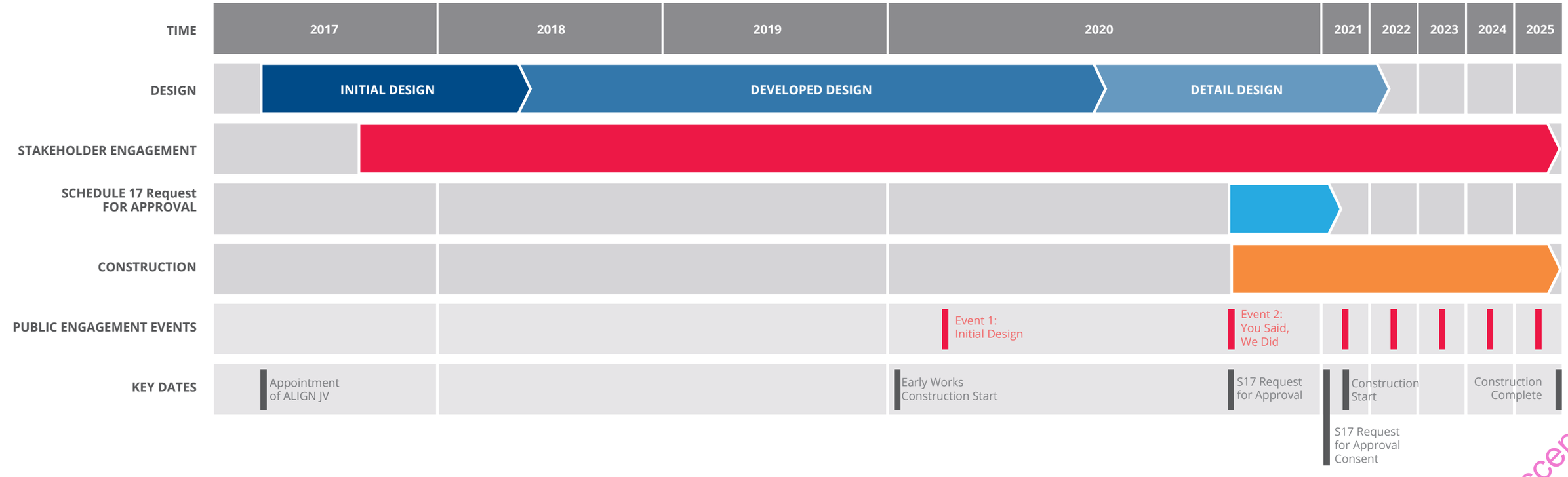

Fig.1.5_ Indicative project timeline

Schedule 17

1.3.1 Overview

The key documents, including Planning Forum Notes, that are relevant to this Design and Access Statement and Schedule 17 request for approval are:

- High Speed Rail (London-West Midlands) Environmental Minimum Requirements Annex 2: Planning Memorandum, HS2 Ltd
- High Speed Rail (London - West Midlands) Act 2017: Schedule 17 statutory guidance, Department for Transport
- HS2 Phase One Planning Forum Note 1: Content of Submissions and Standard Templates, HS2 Ltd
- HS2 Phase One Planning Forum Note 2: Drawings for Plans and Specifications Approvals, HS2 Ltd
- HS2 Phase One Planning Forum Note 3: Written Statements and Design and Access Statements, HS2 Ltd
- HS2 Phase One Planning Forum Note 10: Indicative Mitigation, HS2 Ltd
- Planning Forum Note 16 (PFN16): Operational Noise from the Railway & Altered Roads
- Planning Forum Note 11 (PFN11): Restoration schemes

1.3.2 Schedule 17 documentation

The Schedule 17 request for approval of plans and specifications for the design and external appearance of the CSG Ventilation Shaft headhouse and ancillary structure and other matters is supported by other documentation that sit alongside this Design and Access Statement, including:

- Written Statement (1MC05-ALJ-TP-REP-CS02_CL04-000018): This document sets out the rationale and detail of the complete Schedule 17 submission, including indicative landscaping proposals. The document cross refers to this Design and Access Statement in several places.
- Restoration Proposals (1MC05-ALJ-TP-REP-CS02_CL04-000019): a document setting out the proposed restoration within the outer post and rail fence at the CSP vent shaft site
- Schedule 17 Noise Demonstration Report (1MC05-ALJ-EV-REP-CS02_CL04-000034) setting out the predicted noise effects of the CSG vent shaft site.
- Indicative Mitigation Consultation (1MC05-ALJ-TP-CRO-CS02_CL04-000031) which updates on the proposed mitigation at Chalfont St Giles for the permanent design and consults on the noise demonstration report provided with this Schedule 17 plans and specifications submission. It should be noted that the landscape scheme witin the site boundary is subject to the restoration agreement submission.
- Drawings: A series of plans, elevations, sections and visualisations showing the proposed CSG Vent Shaft buildings, landscape proposals, boundary features and ecological/drainage ponds.

References

1.3

1.3.3 Document list

This Design and Access Statement should be read in conjunction with the documents listed opposite, submitted as part of this Schedule 17 request for approval. These documents also form a part of the concurrent consultation on Indicative Mitigation Details together with the site restoration submission for agreement, as set out in the document 1MC05-ALJ-TP-CRO-CS02_CL04-000031.

For Approval under plans and specifications

- 1MC05-ALJ-TP-DSE-CS02_CL04-321135 - Chalfont St Giles Headhouse Proposed Headhouse Sections - Sheet 1
- 1MC05-ALJ-TP-DSE-CS02_CL04-321136 - Chalfont St Giles Headhouse Proposed Headhouse Sections - Sheet 2
- 1MC05-ALJ-TP-DPP-CS02_CL04-321133 - Chalfont St Giles Headhouse Proposed Headhouse Elevations - Sheet 1
- 1MC05-ALJ-TP-DPP-CS02_CL04-321134 - Chalfont St Giles Headhouse Proposed Headhouse Elevations - Sheet 2
- 1MC05-ALJ-TP-DPL-CS02_CL04-321130 - Chalfont St Giles Headhouse Proposed Site Plan
- 1MC05-ALJ-TP-DPL-CS02_CL04-321131 - Chalfont St Giles Headhouse Proposed Roof Plan
- 1MC05-ALJ-TP-DPL-CS02_CL04-321132 - Chalfont St Giles Headhouse Proposed Ground Floor Plan
- 1MC05-ALJ-TP-DPL-CS02_CL04-324130 - Chalfont St Giles Headhouse Proposed earthworks levels
- 1MC05-ALJ-TP-DGA-CS02_CL04-324120 - Chalfont St Giles Ventilation Shaft Landscape General Arrangement (See legend for matters for approval)
- 1MC05-ALJ-TP-DSC-CS02_CL04-324121 - Chalfont St Giles Ventilation Shaft Landscape East/West Site Section (See legend for matters for approval)
- 1MC05-ALJ-TP-DSC-CS02_CL04-324122 - Chalfont St Giles Ventilation Shaft Landscape North/South Site Section (See legend for matters for approval)

For agreement as part of Site Restoration

- 1MC05-ALJ-TP-DSC-CS02_CL04-324121 - Chalfont St Giles Ventilation Shaft Landscape East/West Site Section
- 1MC05-ALJ-TP-DGA-CS02_CL04-324120 - Chalfont St Giles Ventilation Shaft Landscape General Arrangement
- 1MC05-ALJ-TP-DSC-CS02_CL04-324122 - Chalfont St Giles Ventilation Shaft Landscape North/South Site Section
- 1MC05-ALJ-TP-DPL-CS02_CL04-324122 - Chalfont St Giles Ventilation Shaft Landscape Planting Plan And Schedules
- 1MC05-ALJ-TP-DPL-CS02_CL04-324123 - Chalfont St Giles Ventilation Shaft Landscape Seeding Plan And Schedules
- 1MC05-ALJ-TP-REP-CS02_CL04-000019 - Restoration Proposals Report (Section 3 Only)

Drawings Provided for information

- 1MC05-ALJ-TP-DPL-CS02_CL04-321137 - Chalfont St Giles Headhouse Location Plan
- 1MC05-ALJ-TP-DPL-CS02_CL04-321138 - Chalfont St Giles Headhouse Existing Site Plan
- 1MC05-ALJ-TP-DPL-CS02_CL04-324131 - Chalfont St Giles Headhouse Existing earthworks levels

Documents provided for information

- 1MC05-ALJ-TP-REP-CS02_CL04-000017 - Chalfont St Giles Schedule 17 Design and Access Statement
- 1MC05-ALJ-TP-REP-CS02_CL04-000018 - Chalfont St Giles Schedule 17 Written Statement
- 1MC05-ALJ-TP-CRO-CS02_CL04-000012 - Chalfont St Giles Schedule 17 Covering Letter
- 1MC05-ALJ-TP-FRM-CS02_CL04-000007 - Chalfont St Giles Schedule 17 Application Form - plans and specs
- 1MC05-ALJ-TP-FRM-CS02_CL04-000008 - Chalfont St Giles Schedule 17 Proforma
- 1MC05-ALJ-TP-CRO-CS02_CL04-000030 - Chalfont St Giles Schedule 17 Restoration Cover Letter
- 1MC05-ALJ-TP-CRO-CS02_CL04-000031 - Chalfont St Giles Schedule 17 Indicative Mitigation Details
- 1MC05-ALJ-EV-REP-CS02_CL04-000034 - Chalfont St Giles Schedule 17 Noise Report
- 1MC05-ALJ-TP-REP-CS02_CL04-000019 - Restoration Proposals Report (Ssection 1, 2, 4 and 5 and appendix 1 for information and context).
- 1MC05-ALJ-TP-DPL-CS02_CL04-321137 - Chalfont St Giles Headhouse Location Plan
- 1MC05-ALJ-TP-DPL-CS02_CL04-321138 - Chalfont St Giles Headhouse Existing Site Plan

Illustrative Visualisations

1.4.1 Overview

Within this Design and Access Statement, a selection of computer generated visualisations of the CSG Vent Shaft have been included for illustrative purposes. Viewpoints have been selected to present key design features and the relationship of the CSG Vent Shaft with the surrounding site. Photography and imagery depict a range of different seasons, weather conditions and times of day to ensure the CSG Vent Shaft is presented as realistically as possible. The visuals are set in year 1 and year 15 of HS2 in operation.

Key

- Site
- Public Right of Way
- Existing buildings
- Compound

0 50 200 M

N

Fig.1.6_ Site plan - Viewpoint locations

1.4.2 Viewpoint schedule

The viewpoint locations, time of year and time of day are listed and numbered below:

1. PRoW to south of site looking north north east (Year 1) - April / 8am (Chapter 4 pages 46-47)
2. PRoW to south of site looking north north east (Year 15) - April / 8am (Chapter 4 pages 48-49)
3. PRoW to south of site looking north north east (Pre-development) - April / 8am
4. PRoW to south of site looking north (Pre-development) - October / 11am
5. PRoW to south of site looking north (Year 15) - October / 11am (Chapter 9 pages 107)
6. Bottom House Farm Lane looking west (Pre-development) - October / 11am
7. Bottom House Farm Lane looking west (Year 1) - October / 11am (Chapter 4 pages 50-51)
8. Aerial view looking north north west (Year 15) (Chapter 4 pages 44-45)

3 Fig.1.7_ Photograph - View from PRoW to south of site looking north north east (Pre-development) - April / 8am

4 Fig.1.8_ Photograph - View from PRoW to south of site looking north (Pre-development) - October / 11am

6 Fig.1.9_ Photograph - View from Bottom House Farm Lane looking west (Pre-development) - April / 8am

Acronyms

1.6

1.5.1 Acronyms

- CSG - Chalfont St Giles
- DAS - Design and Access Statement
- EA - Environment Agency
- EMR - Environmental Minimum Requirements
- ES - Environmental Statement
- HS2 - High Speed Two (the project)
- HS2 Ltd - High Speed Two Ltd (the nominated undertaker)
- HS2 IDP - HS2 Independent Design Panel
- LLAU - Limits of Land to be Acquired or Used
- LOD - Limits of Deviation
- LPA - Local Planning Authority
- MWCC - Main Works Civils Contract
- SSSI - Site of Special Scientific Interest
- WFD - Water Framework Directives
- PRoW - Public Right of Way
- LCA - Landscape Character Area

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2.0
Context

An appraisal of the physical, environmental, recreational, social and cultural features of Chalfont St Giles.

Regional Context

2.1.1 Overview

The site lies within the former Chilterns District to the south east of the county of Buckinghamshire. The landscapes within this district are some of the most valued in the country with much of the area (including the site) within the Chilterns Area of Outstanding Natural Beauty.

The character is largely defined by the underlying chalk strata and 'dip slope', which gradually falls south eastwards towards Greater London. It is largely overlain by clay with flints, which typically give rise to acidic soils with calcareous soils on chalk. Steep-sided valleys have eroded the landscape and flow south east; in the context of the site this includes the Misbourne Valley and associated branching tributaries.

The chalk geology creates a rolling and sweeping landform, supporting areas of arable cultivation and pasture with some pockets of chalk grasslands. The District has a wooded character with woodland occurring on valley tops and interspersed with farmland. There are significant areas of ancient woodland and beech is a dominant species. Ancient sunken lanes are an important feature traversing valleys sides and a range of archaeological features contribute to a rich cultural and historic landscape. Farmsteads are scattered throughout. The District retains a relatively rural and peaceful character with remote areas of rolling farmland and tranquillity in river valleys. Amersham and Chesham are the principal towns, with other settlements, including, Chalfont St Peter, Chalfont St Giles and Great Missenden providing important local centres..

2.1.2 Chilterns AONB

The Chilterns AONB forms the contextual setting for the Chalfont St Giles ventilation shaft and is a key consideration which has informed the design approach and narrative for the site.

The Chilterns AONB is a nationally protected landscape and represents one of the most important and finest landscapes in the UK. The single purpose of AONB designation is 'to conserve and enhance the natural beauty of the area'.

Its distinctive qualities and characteristics are informed by a mosaic of ancient woodland, chalk streams, farmland, chalk downland and features of cultural and historic importance, shaped by natural processes and generations of human activity. Many of the features which define the Special Qualities of the AONB are evident within the site and its immediate setting and include:

- Panoramic views;
- River valleys;
- Woodland cover including Ancient Woodland;
- Relative tranquillity; and
- Regional footpaths and routes including the Chilterns Way

2.1.3 Landscape character

The site lies wholly within the Penn landscape character area (LCA) and to the west of the Misbourne Upper LCA according to the Chiltern District Landscape Character Assessment (Land Use Consultants on behalf of Buckinghamshire County Council, October 2011).

The Chiltern District LCA, 2011 describes this area as:

"A large-scale landscape with a varied geology, giving rise to a rolling landform. A mosaic of farmland and woodland, dominated by large arable fields, and substantial amounts of ancient woodland. A landscape with contrasting degrees of enclosure, with open fields and dense intimate woodland area. The variety of woodland creates a highly textured character and a rich seasonal interest, providing important ecological and recreational resources. Settlement density is low, comprising highly dispersed isolated farmsteads, and two small villages, namely Winchmore Hill and Coleshill. Small winding and enclosed rural roads connect areas of settlement, with the exception of the busy A404 and A355. A variety of historical and archaeological remnants reveal the varying layers of history within this landscape, including large areas of assart field enclosures, several earthworks, kilns and medieval manor house. The sweeping landform, prominence of woodland cover and limited settlement, creates a tranquil landscape, with a uniform and balanced character."

The key characteristics are summarised as:

- A large-scale landscape with a varied geology, which gives rise to a rolling topography.
- Large arable fields delineated by an intact network of hedgerows with some smaller fields of rough grazing, pasture, paddock, pig farms located closer to settlement.
- Woodland often provides a backdrop to open fields, interlinked with farmland. There is a significant amount of ancient woodland.
- A low density of well dispersed settlement, largely comprising individual farmsteads/ properties and occasional small villages.
- Archaeological interest includes several manor houses, earthworks, and numerous kiln artefacts.
- Small winding rural roads and lanes with little traffic and an intimate character.
- Varying levels of enclosure, with open fields contrasting with dense woodland cover. Views are often confined by woodland, which often forms the backdrop to many vistas. Some long views across open farmland.
- The sweeping topography and farmland land cover with limited settlement contributes to a well-balanced and uniform landscape.
- Away from the busy roads a remote and tranquil character prevails, with a strong sense of rural character.

2.1

Fig.2.1_ Photograph - View north east from Footpath CSG/48/1

Fig.2.2_ Photograph - View east along Bottom House Farm Lane

Fig.2.3_ Photograph - View west from Footpath CSG/48/1

Local Context

2.2.1 Location

The proposed shaft is located north of Chalfont St Giles. The site is at a level of 96m AOD at the southern edge of an open field immediately north of Bottom House Farm Lane near residential plots, Hobbs Hole Cottage located 150 m west and Upper Bottom House Farm 300 m east of the site. The village of Chalfont St. Giles is located around 1km to the south-east.

The site lies within the distinctive rolling landform of the Chiltern Hills and sits at the bottom of a dry valley, which extends northwards approximately 600 m and is itself a tributary of the Misbourne valley to the east. To the north-east and west of the site there are linear belts of plantation and broadleaf woodland, whilst approximately 300m to the south west is the Larches, an area of Ancient Woodland.

The site is substantially screened from Bottom House Farm Lane by a combination of existing hedgerows and the sunken nature of the lane.

Public rights of way cut across the top of the hills located to the north of the site (Footpath AMS/18/3) and on hill slopes to the south and south west (CSG/48/1).

The site is located wholly within the Chilterns AONB which is an important consideration in design terms.

2.2.2 Ecology

The site (pre-construction) contains an improved grassland field, with similar grassland to the north and adjacent to arable fields to the south. There is a linear belt of broad-leaved plantation woodland on the eastern boundary of the site. The site also includes part of the Bottom House Farm Lane, which has mature hedges. There are no statutory or non-statutory designated sites of nature conservation importance within the site.

The Environmental Statement prepared for the Hybrid Bill identified the following features close to the site:

- Bow Wood and High Wood are both ancient semi-natural woodlands that lie in proximity to Bottom House Farm Lane. While not affected by the vent shaft itself, the temporary haul road to construct the shaft will run adjacent to the northern boundary of Bow Wood.
- Hales Wood is a plantation woodland qualifying as ancient replanted woodland adjacent to Bottom House Farm Lane to the south of the vent shaft site. It is unlikely to be directly affected by construction or operation of the vent shaft.
- The larches Biological Notification Site to the West of the shaft location. Again, this is some distance from the proposed works and was not included in the overall ES assessment.

Protected and notable species

Badgers – badger Meles meles surveys undertaken by HS2s Enabling Works contractor in 2020 identified two active outlier setts on the western edge of the woodland belt to the east of the site.

Bats – ground-level tree assessment (BT1) surveys carried out by HS2s Enabling Works contractor in 2020 have confirmed the presence of a small number of trees that have potential to support roosting bats along the southern edge of the belt of woodland to the east of the site and a single tree in a hedgerow in the south-east corner of the site.

2.2.3 Environmental constraints

The key environmental constraints relevant to the site include:

- The proximity of the site and construction works to existing mature vegetation (tree belts and hedgerows) which are to be retained as far as practicable as part of the landscape strategy
- Proximity of dwellings to the site which has implications for noise attenuation during construction and operational stages;
- Relative proximity of the public right of way to the south; likely significant visual effects at construction and early operational stages;
- Relative tranquility associated with this landscape which places constraints on noise, lorry and traffic movements particularly during the construction phase
- Ecology and habitats – notably the presence of outlier badger setts and potential for bat roosts
- Proximity of the site boundary to Grade 3 (Good - Moderate) Agricultural land – with expectation that land not needed for the operation of the railway will be returned to at least an equivalent agricultural quality once construction works are completed
- The presence of the Grade II listed Lower Bottom House Farm grouping (4 buildings) approximately 1 kilometre to the east of the vent shaft site.

2.2.4 Geology

The site lies over Superficial deposits (predominantly Clay-with-Flints but may contain Beaconsfield Gravel deposits) with chalk beneath that.

Soil sampling reveals mainly topsoil and upper subsoil of alkaline pH, and with low available phosphorous and moderate-high calcium carbonate in both horizons. Results from these locations suggest that both topsoil and upper subsoil in most areas of the site would be suitable seeding media for calcareous grassland.

2.2.5 Hydrology

The permanent structure of the Chalfont St. Giles vent shaft will be located within a dry valley that is at low risk of surface water flooding. This dry valley is one of a number that converge immediately down-gradient of the shaft headhouse. The shaft and its associated access hardstanding will intersect the dry valley and natural overland flow.

The Chalk is a Principal Aquifer and is used extensively as a water supply. The Chalfont St Giles vent shaft location is within groundwater Source Protection Zone (SPZ) 2. No private licensed or unlicensed abstractions have been identified within 1 km of the shaft location.

2.2

Key

- Site
- Public Right of Way
- Building
- Road
- Grass
- Garden
- Woodland

0 100 250 M

N

Fig.2.4_ Site plan - Environmental and landscape context

Local Context

2.2.6 Pre-development site photography

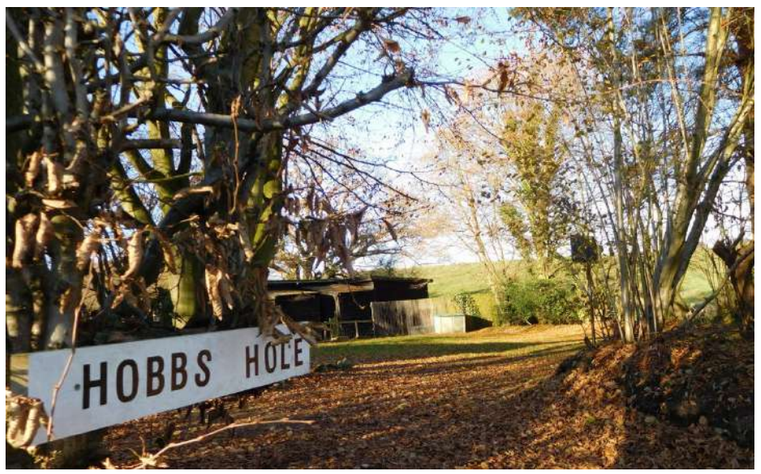
A Fig.2.6_ Photograph - View looking West along Bottom House Farm Lane

Fig.2.5_ Key plan

E Fig.2.7_ Photograph - Panoramic view of the shaft site looking North towards the dry valley from Bottom House Farm Lane

2.2

B Fig.2.8_ Photograph - View East towards the site on Bottom House farm Lane



C Fig.2.9_ Photograph - Hobbs Hole Cottage

D Fig.2.10_ Photograph - View looking East towards the site over hedgerow

Local Context

2.2.7 Built environment - Heritage buildings

The Chalfont St Giles Conservation Area is located 2.2km to the east of the Chalfont St Giles vent site. The village of Chalfont St Giles is located at the bottom of the Misbourne Valley and the village green as the centrepiece of the area. It encompasses the old core of the village and including 33 listed buildings. The principal Listed Buildings are the Grade I listed Milton's Cottage, Grade I listed Church of St Giles and the Grade II* listed The Old Rectory.

The southern part of the Chalfont St Giles Conservation Area includes part of the High Street and the lower part of Dean Way. The High Street buildings feature a continuous façade and together with linking walls forming a narrow corridor connecting The Green and open land adjoining Milton's Cottage

Adjacent to the southern extent of the Chalfont St Giles Conservation Area is the 'Milton's Cottage' Grade II* Registered Park and Garden. This includes Milton's Cottage, a Grade I Listed Building, where the poet John Milton finished his well-known poem 'Paradise Lost' in the 17th century.

Around 1km east of the Chalfont St Giles vent site is the Lower Bottom House Farm grouping (CHA031). This consists of a farmstead of four Grade II Listed Buildings centred on the 19th century Lower Bottom Farm House. The early 19th century, red brick farmhouse, possibly incorporating earlier fabric at the rear, is associated with several farm buildings including a late 18th century timber-framed barn, a late 18th century timber granary on stone saddles stones and a late 18th century brick stable building.

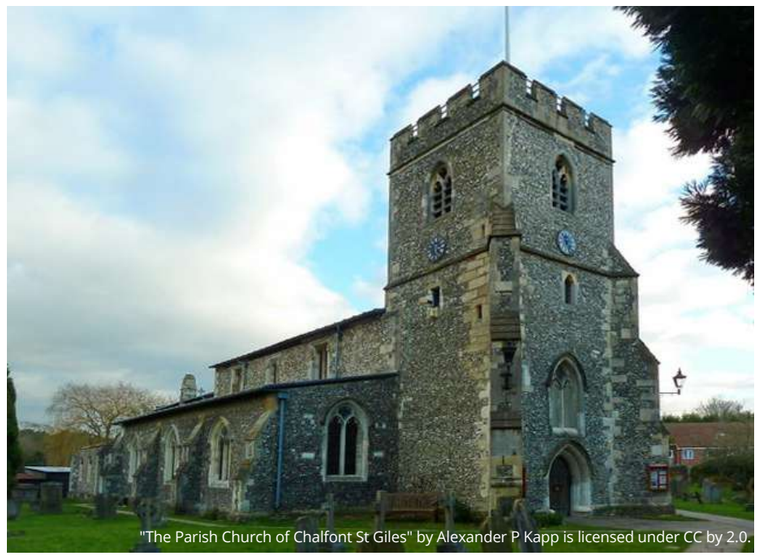
Around 300m east of the Chalfont St Giles vent site is Upper Bottom Farm House an unlisted farm complex, located to the north and east side of a medieval holloway.

Fig.2.11_ Site plan - Heritage buildings

2.2

A Fig.2.15_ Photograph - Stonewell Cottage, Chalfont St Giles

B Fig.2.16_ Photograph - The Old Bank House, Chalfont St Giles



C Fig.2.17_ Photograph - Parish Church, Chalfont St Giles

Local distinctive buildings

D Fig.2.12_ Photograph - Lower Bottom House Farm

E Fig.2.13_ Photograph - Lower Bottom House Farm

F Fig.2.14_ Photograph - Lower Bottom House Farm

Local Context

2.2.8 Built environment

The character of the local historic and current agricultural/industrial buildings follow consistent material and structural principles. The key features of these include a simple gabled form, timber cladding and brick plinth base,

Located at the Chiltern Open Air Museum, a grouping of historical Industrial/agricultural buildings offer precedent to the historical architectural character of the surrounding context. The Chiltern Open Air Museum is located 3.8km from the Chalfont St Giles ventilation shaft and contains multiple precedent buildings, many of which have origins in the 16th and 17th century.

Examples of these include the Skippings barn. Originally located on the Skippings Farm, Chalfont St Peter, Buckinghamshire (part of the Newland Park estate), the barn is believed to date from the 18th century and is a good example of the traditional 'Chilterns barn' typology. Probably originally used as a stable the oak framed structure of the barn divides the barn into three spaces with a pair of doors positioned centrally. Other historic precedent industrial/agricultural buildings present at the Chiltern Open Air Museum include the formerly grade II listed Northolt barn and the Didcot Cartshed. Both buildings follow similar structural principles demonstrated in the Skippings barn.

Modern precedents include a cluster of industrial/agricultural buildings present on the Lower Bottom House Farm, located 1km from the Chalfont St Giles ventilation shaft. The strong material and structural principles exhibited in the historical precedents still apply to the more modern precedents with horizontal timber cladding, gable roof, and brick plinth defining the architecture.

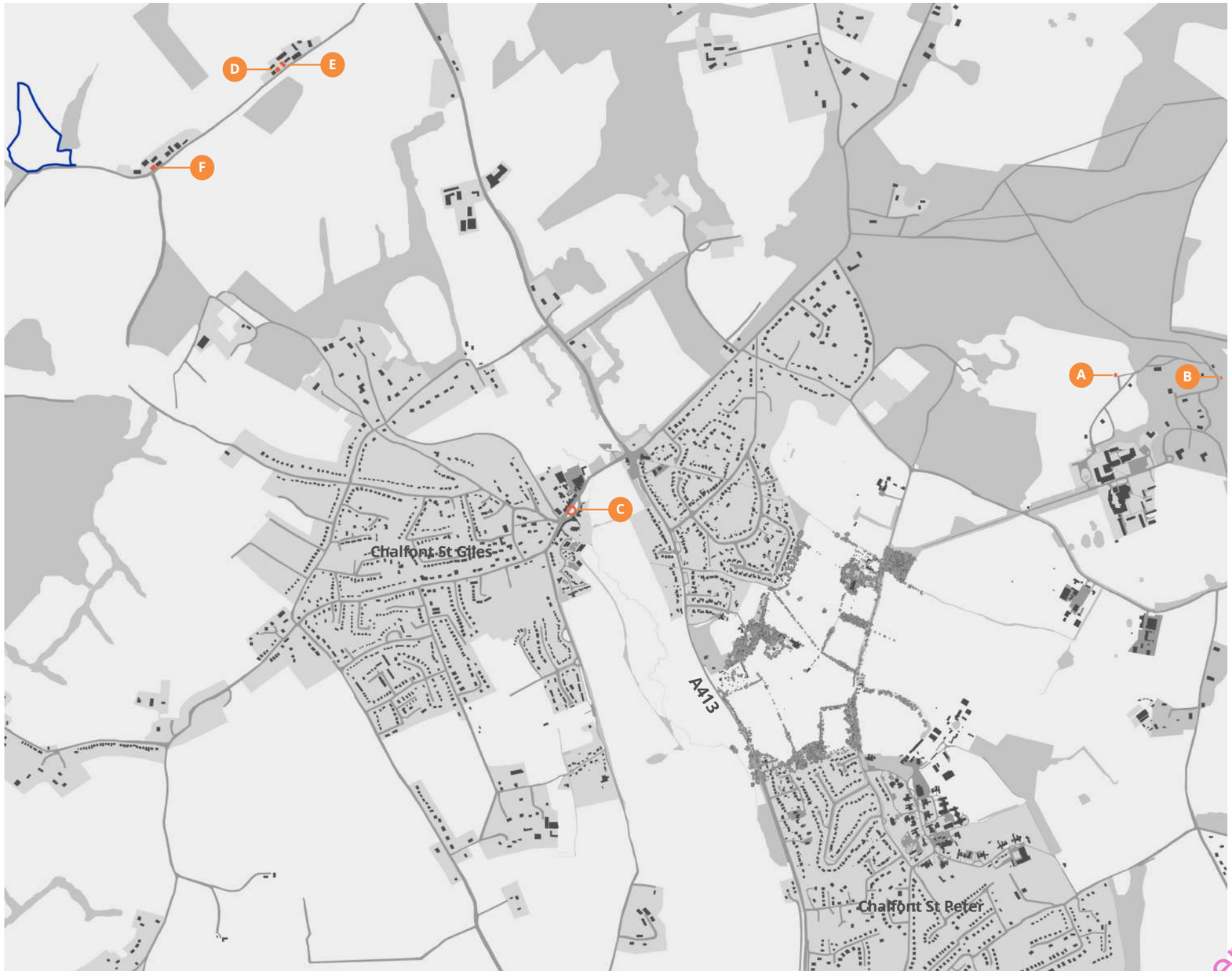


Fig.2.18_ Site plan - Industrial agricultural buildings

2.2

A Fig.2.19_ Photograph - Skippings barn

B Fig.2.21_ Photograph - Didcot cart shed

C Fig.2.20_ Photograph - Chalfont St Giles

D Fig.2.22_ Photograph - Lower Bottom House barn

E Fig.2.23_ Photograph - Lower Bottom House barn

F Fig.2.24_ Photograph - Bottom House farm

Social and Cultural Context

2.3

2.3.1 Historical

The Chalfonts and Amersham area lies on the dip-slope of the Chilterns, an area of chalk plateau land, dissected by valleys, such as the River Misbourne, draining eastward to the River Colne and on to the River Thames.

The Chiltern dip-slope has seen human activity throughout the Mesolithic period (circa 10,000 BC – circa 4,000 BC), the Neolithic and the Bronze Age, when human activity was largely concentrated in the principal valley systems specifically within the Misbourne Valley.

The area is predominantly rural and agricultural with the settlement characterised by farmsteads and small hamlets adjacent to the principal valleys set within a heavily wooded landscape, much of it ancient beechwood.

Around Chalfont St Giles are extensive, coaxial field systems and irregular fields of medieval and post-medieval date with small isolated pockets of highly degraded ridge and furrow earthworks, indicative of medieval open agriculture, identified to the south of Ashwell's Farm.

The broad pattern of landscape and settlement which exists in the area today was primarily laid out during the medieval and early medieval periods. Dispersed settlements and isolated farmsteads surrounded by an agricultural hinterland predominated, with scattered manors in the surrounding countryside. The landscape was likely to have been at least partially wooded. The exception to this characterisation is the medieval planned town of Amersham. This pattern of medieval settlement most probably continued through the post-medieval (AD 1540 – AD 1900) period as evidenced by extant post-medieval dwellings in the core of the three settlements of Chalfont St Peter, Chalfont St Giles and Amersham.

This pattern of landscape and settlement is likely to have remained unaltered until the expansion of the London suburbs aided by the building of the railways in the late 19th and early 20th centuries. The growth of the settlements of Chalfont St Peter and Amersham was further increased by the establishment of the 'Metrolands' during the mid-20th century. The Metroland suburbs were designed as an escape from the capital to an idyllic 'countryside' lifestyle, yet crucially connected to the city by rail.

Fig.2.25_ Aerial photograph - 1921 Austenwood Lane and Packhorse Road

Fig.2.26_ Aerial photograph - A413 in 1938

Fig.2.27_ Aerial photograph - Tunmers in 1949

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3.0
Brief

A summary of briefing material, from HS2 design vision and guidelines, hybrid bill requirements, technical requirements and stakeholder aspirations.

HS2 Design Drivers

3.1.1 HS2 core design principles

The Design Vision sets out the role that design can play in making High Speed Two a catalyst for growth across Britain. HS2 is based on three core design principles of people, place and time. These have informed the design process for the Chalfont St Giles Ventilation Shaft (CSG Vent Shaft) at every stage and provide a basis against which design solutions have been tested.

People

Design for everyone to benefit and enjoy

1. Design for the needs of our diverse audiences
2. Engage with communities over the life of the project
3. Inspire excellence through creative talent

Place

Design for a sense of place

4. Design places and spaces that support quality of life
5. Celebrate the local within a coherent national narrative
6. Demonstrate commitment to the natural world

Time

Design to stand the test of time

7. Design to adapt for future generations
8. Place a premium on the personal time of customers
9. Make the most of the time to design

Fig.3.1_ HS2 core design principles - People, place and time

3.1.2 Other key design principles

Other key aspects of the HS2 Design Vision that have influenced the design of the CSG Vent Shaft are;

Identity

The HS2 Arts Strategy is an opportunity to foster HS2's vision to enhance national and civic pride through one-off expression and local design stories.

Environment

The HS2 Sustainability Strategy promotes an environmental rationale to deliver imaginative, appropriate and environmentally sensitive solutions.

Innovation

HS2 Ltd has brokered partnerships with industry bodies and centres of excellence, to create an ecosystem of resources to encourage and support innovation across the programme of work.

3.1.3 HS2 strategic goals

From an early stage of the project, core strategic goals were established as key outcomes for the new high speed line. These goals have guided the design approach to the CSG Vent Shaft, with the following acting as key drivers for the design;

HS2 will create an environmentally sustainable solution and be a good neighbour to local communities:

- To design every part of HS2 and its service to be sympathetic to the people and places we affect and to stand the test of time
- To actively communicate with neighbours and interest groups to minimise the impact of HS2 construction and operation on people and the environment

HS2 will set new standards in passenger experience

- To deliver passenger experience and customer service that is recognised worldwide
- To place people at the heart of our design, setting new standards for travel

3.1.4 HS2 sustainability goals

Sustainability is an important component to making HS2 an exemplar project. Therefore designing out and reducing waste, minimising our carbon footprint and protecting Britain's heritage shall be key drivers for the CSG Vent Shaft. The HS2 sustainability goals are set out in Fig. 3.3.

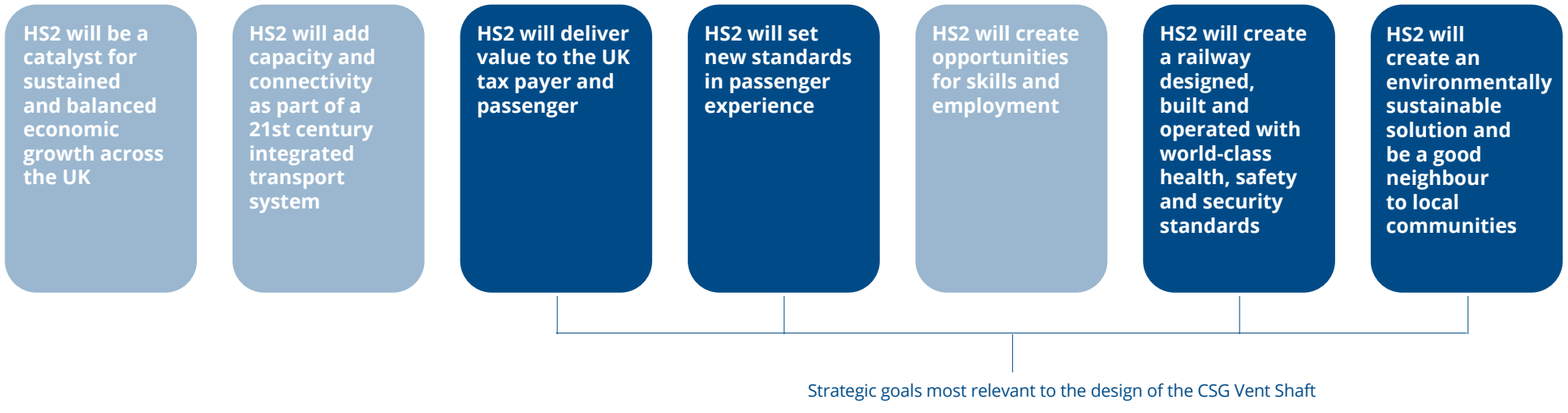


Fig.3.2_ HS2 strategic goals

Spreading the benefits

Economic growth and community regeneration

Being a catalyst for regeneration and economic growth across the UK, maximising the benefits to communities and individuals and minimising the negative impacts

Opportunities for all

Skills, employment and education

Providing rewarding jobs and careers that are open to all in society, setting new standards for equality, diversity and inclusion and providing a legacy of skills, learning, expertise and experience

Safe at heart

Health, safety and well-being

Creating a world-class 'safe at heart' culture where no one gets hurt, and which prioritises the health and well-being of those who build, operate, use and host HS2 services and infrastructure

Respecting our surroundings

Environmental protection and management

Being a catalyst for breaking new ground wherever possible on environmental standards including resource use, waste, carbon minimisation, the protection of the natural and historic environment and safeguarding communities.

Standing the test of time

Design that is future-proof

Designing a network that is resilient to climate change, adaptable to future trends and demands, and built around the needs of the people who will use it.

Fig.3.3_ HS2 sustainability goals

HS2 Act

3.2.1 Location

The purpose of the hybrid Bill is to secure the necessary powers to acquire land and construct the railway and other associated works.

The parliamentary plans and sections accompanying the HS2 Act show the centerline of works, the Limits of Deviation (LOD) and the Limits of Land Acquired or Used (LLAU). It is a requirement of hybrid Bills that some flexibility is provided to account for the fact that at the Parliamentary stage, the design is at an early level of maturity.

The LOD control the horizontal and vertical extents that the Scheduled Works contained in Schedule 1 of the HS2 Act can be constructed within. The CSG Vent Shaft form a part of Schedule Work number 2/1 as described in Schedule 1 to the HS2 Act.

Within the LLAU, ancillary works and other works incidental to the construction or operation of the railway, such as environmental mitigation, access creation, temporary construction compounds, may also take place.

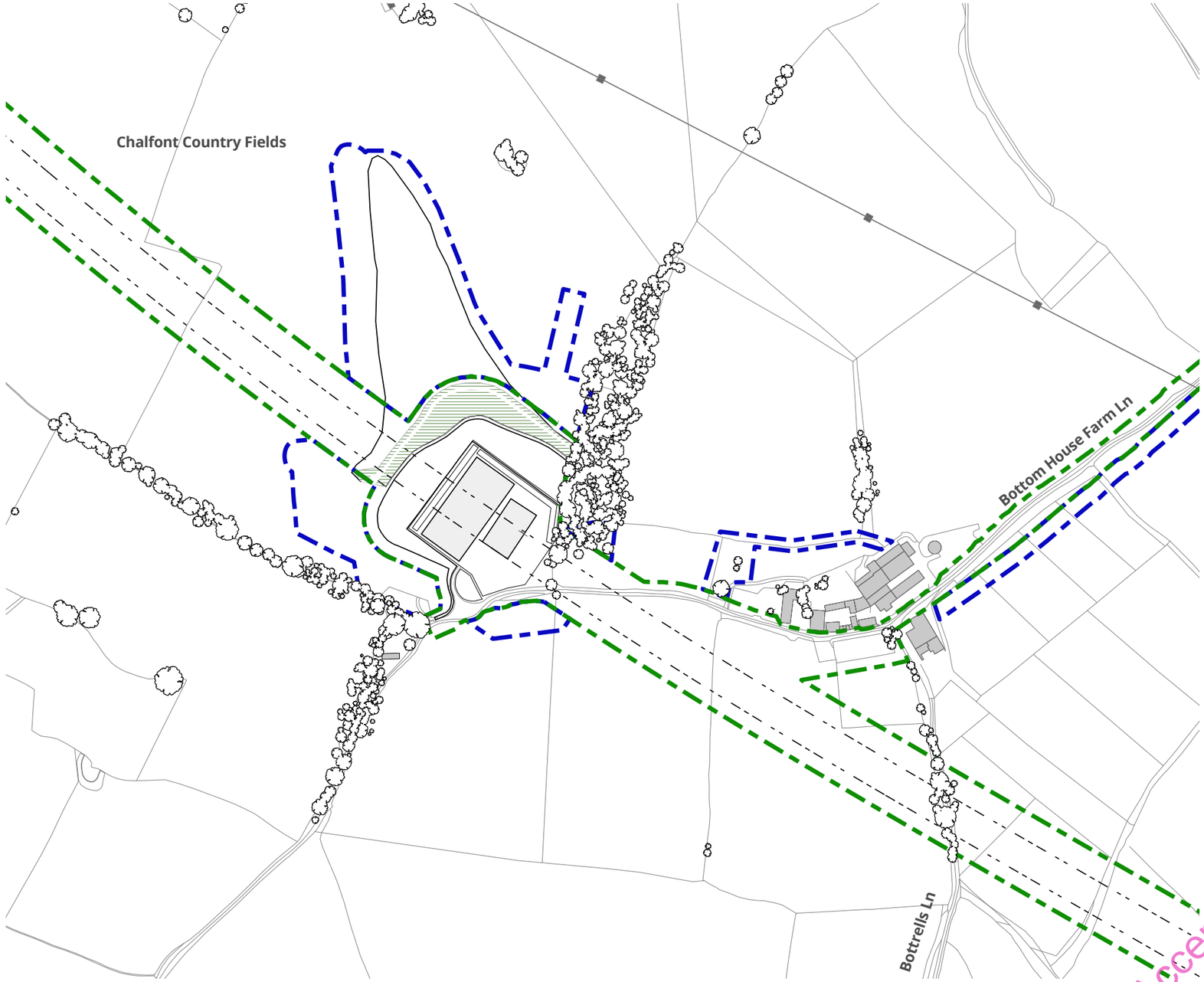


Fig.3.4_ Site Plan - HS2 Act land limits

3.2.2 Design

A plan of the hybrid Bill design for Chalfont St Giles is presented in the adjacent image.

The HS2 Hybrid Bill design incorporated two separate buildings, one large proposed new electricity substation and a smaller headhouse structure. A maintenance access road is provided to the west of the site, close to the nearest residential receptor Hobbs Hole cottage. Areas of land drainage are located on the north-east and north-west edge of the compound.

The landscape design proposed to substantially infill the dry valley to the north of the compound area (assumed to comprise excavated material from the vent shaft and compound), with additional areas of cut at the toe of the in-filled valley to provide the platform for the compound.

Woodland planting was proposed around much of the compound boundary, tying into existing mature belts, whilst new hedgerows followed the southern edge of the widened Bottom House Farm Lane.

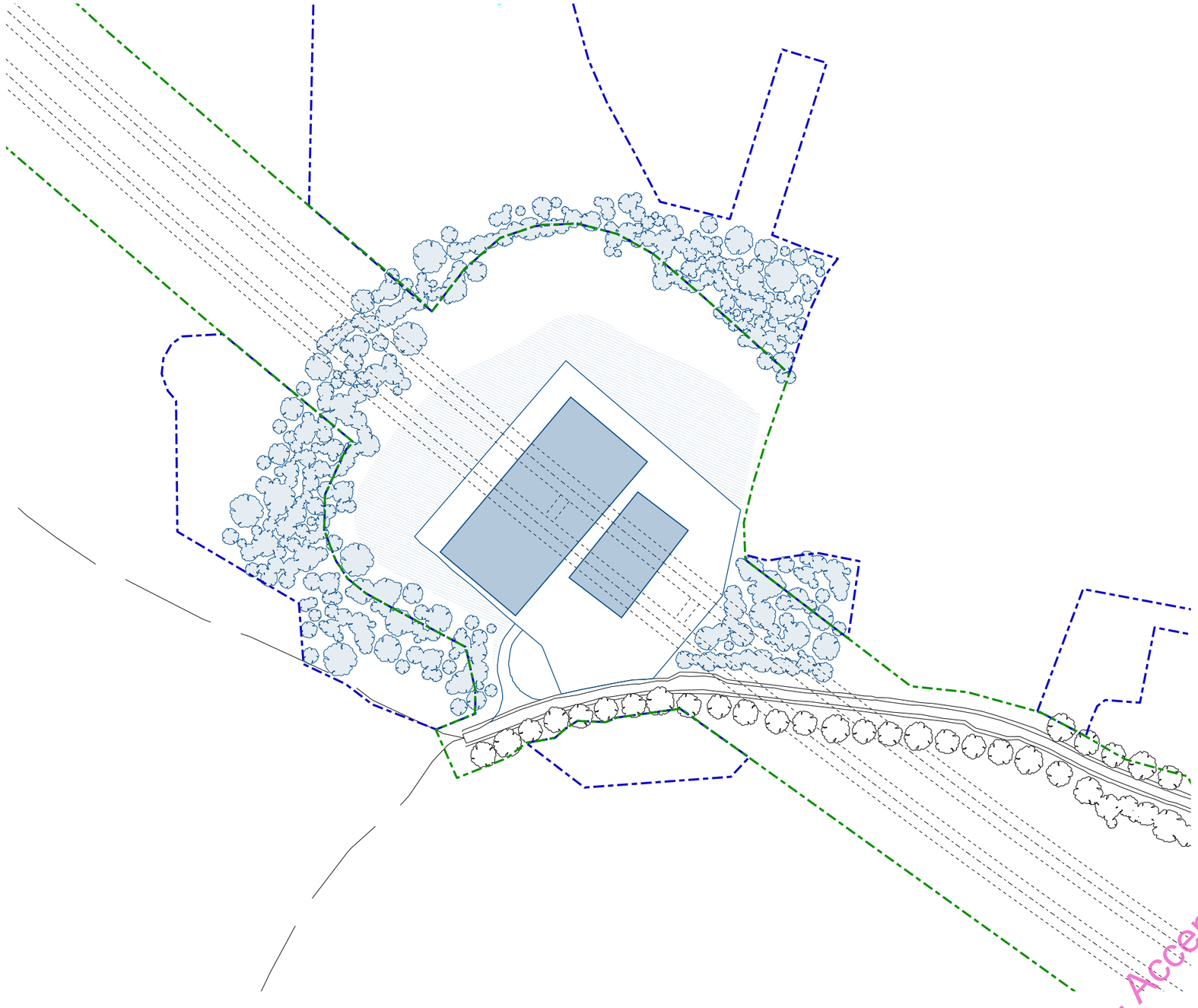


Fig.3.5_ Site plan - Hybrid Bill

Reference Documents

3.3

3.3.1 Overview

Reference Documents have been provided to ALIGN JV as key approaches to follow when developing the design. Some of these reference documents were developed with input from statutory bodies, either through consultation or engagement at relevant forums, such as the HS2 Phase One Planning Forum.

3.3.2 HS2 design approach documents

These documents provide design guidance and cover all key areas of programme work. The Design Approach documents do not prescribe what is required but are intended as a resource to help the team deliver the design of the railway to the standard that HS2 expects. The following approach documents have informed the developing design proposals for the CSG Vent Shaft;

- HS2-HS2-AR-GDE-000-000004 - P01 - Headhouse Buildings and Portals Design Approach
- HS2-HS2-EV-STR-000-000010: HS2 Landscape Design Approach
- HS2-HS2-AR-GDE-000-000015: HS2 Art Approach

3.3.3 HS2 technical standards

Technical standards provide the technical requirements and associated guidance for the design basis of the structural elements. Adoption of technical standards will help ensure a consistent approach to design across the whole project, minimising the assumptions that designers need to make to achieve the level of design quality demanded by a high speed railway.

3.3.4 Additional design documentation

Other documents that have informed the design include:

- 1D032-EDP-AR-REP-C000-000001 - P01- Architectural Definition for Headhouses in a Rural Environment
- HS2 Chilterns Enhancement and Integration Plan: Detailed Design Principles HS2 DDP

Fig.3.6_ Reference documents - HS2 design approach documents

Fig.3.7_ Reference documents - HS2 Chilterns Enhancement and Integration Plan

Undertakings and Assurances

3.4

3.4.1 Overview

The HS2 Act included a number of commitments made in relation to the development and delivery of the new high speed line. Recorded in a register accompanying the Environmental Minimum Requirements, a number of these Undertakings and Assurances (U&As) relate to the CSG Vent Shaft, ranging from noise attenuation to mitigating effects on ancient woodland located within the proximity of the railway. These U&As must be complied with. The full register of U&As can be found online:

https://www.gov.uk/government/publications/high-speed-rail-london-west-midlands-bill-register-of-undertakings-and-assurances

A concise summary of requirements relevant to Chalftont St Giles shaft can be found below:

- **U&A 34 -** Shafts to designed to be safe, efficient, and consistent with the requirements of whole-life operation and maintenance alongside initial buildability; sympathetic to their context, environment and social setting.
- **U&A 90 -** Design, construct, operate and maintain the stationary systems so that the rating level of the fixed installations in normal operation at the worst affected residential receptor, minus the background level, is not more than -5 dB
- **U&A 2118 -** Ensure that key design elements are designed to maintain the local environment and local amenity. The local community engagement process will be a key element in realising this objective.
- **U&A 37 -** Consider common designs – discussions with local planning authority to determine appropriateness of the common designs to the local environment
- **U&A 39 -** Ensure that designs complement local aspirations and contribute to the natural and built environment.

3.5.1 Visual impact

Two key receptor viewpoints have been identified in the Environmental statement. These viewpoints have been assessed and given consideration throughout the design process.

Winter photographs and descriptions of these viewpoints are extracted from the Environmental Statement Vol 5 - CFA8 Chalfonts and Amersham - Landscape and Visual Assessment report.

Viewpoint 1 (072.2.001) is representative of the typical view from Bottom House Farm. In winter, foreground views are available over the properties garden and grazing land from Bottom House Farm Lane looking west. To the west there is a small woodland belt within the middle ground of the view. The background view comprises gently rising agricultural fields separated by dense vegetated field boundaries.

Viewpoint 3 (071.3.002) is representative of views from the PRoW (Footpath Col/2/2). In winter, open foreground and middle ground views are available across agricultural fields from this location. Upper Bottom House Farm and associated agricultural buildings are also evident within the middle ground of the view. In the distance views are of gently rising hills with woodland blocks and field boundary vegetation.

A Fig.3.9_ Photograph - Viewpoint 1_ 072-2-001

Fig.3.8_ Key plan - Environmental views

B Fig.3.10_ Photograph - Viewpoint 3_071.3.002

3.5.2 Sound and noise

The compound is set within largely open countryside, with the settlement of Chalfont St Giles located approximately 2km to the south-east.

In addition to the settlement of Chalfont St Giles, a number of isolated properties are located nearby. The nearest of these are Hobbs Hole Cottage, approximately 130m to the south-west of the compound, and Upper Bottom House Farm, approximately 250m to the east of the compound. Therefore, the introduction of sources of operational airborne noise and ground-borne noise and vibration could potentially impact on the residential properties in the area. The assessments of operational airborne and ground-borne noise and vibration has concluded that there would be no significant effects for noise and vibration based on the current detailed design.

Fig.3.11_ Site plan - Sound and noise

Specimen Design

3.6.1 Overview

The Chalfont St Giles Specimen Design layout improved the site arrangement from the Hybrid Bill and reduced both the compound area and headhouse footprint. The headhouse footprint was reduced significantly to two headhouse structures of approx. 32x18m and approx. 37x20m.

The location of the access road was retained in the same place as the Hybrid bill, although the visibility splays appear very large on the Specimen design and a section of the existing lane is shown to be in-filled.

The quantity and areas of proposed new embankments/ earthworks were significantly reduced. Small/ narrow embankments were proposed along Bottom House Farm Lane in order to mitigate views from the country lane however no earthworks were shown at the back of the compound and the existing dry valley was retained.

3.6.2 AONB response

The site is in the Chiltern's AONB. The Chilterns Enhancement and Integration Plan (CEIP) document offers a number of location specific design development principles (DDP) for Chalfont St Giles vent shaft. The following requirements have been given consideration during the design process.

- Particular care is required to minimise damage to the long approach track (Bottom House Farm Lane) and consequent loss of local landscape character through appropriate and full protective fencing and the use of an alternative parallel alignment if and where possible. Careful consideration should be given to the crossing of the River Misbourne to avoid further damage and , if possible, to include suitable remediation works.
- The lane should be made good on completion avoiding unessential 'improvements' such as the provision of macadam surfacing or kerbs.
- Any permanent widening of the lane for essential subsequent access should avoid the introduction of kerbs and have replacement native screening hedgerows and a recreated appearance informed by existing landscape character.
- Key viewpoints should be identified and the orientation of the building adjusted to minimise visual impacts and to take advantage of its siting on the floor of a shallow side valley.
- Extend existing copses to the east (to meet the lane) and the south west (to screen the access) using both within and outside Act Limits land and minimise up slope views from the main valley floor. Bench buildings and hardstanding into the valley floor keeping openness of areas up slope of the facility, but avoid excessive cut which would be obtrusive in itself. Augment with native planting.
- The building form and its roof in particular should be sensitive to views from the lane (with and without backdrop of existing copse dependent on viewpoint); and from footpaths on higher ground.
- Protection of the building from potential flooding from overland flows in extreme rainfall events should not result in infilling of the valley floor or bunds, both of which would be intrusive.
- Any temporary construction access routes and off site works (such as soak-aways) to be made good promptly and in a manner fully sympathetic to local landscape character. Specific proposals required for the protection of the listed Granary structure.

Fig.3.12_ Visualisation - Specimen Design View from lower Bottom House Farm Lanee

3.6

Key

1. Proposed new headhouse
2. Proposed new access road
3. Proposed new secured compound
4. Proposed new mitigation planting
5. Proposed new embankments

Existing trees

Proposed trees

0 200 500 M N

Fig.3.13_ Site plan - Specimen design site arrangement

4.0
Design Vision

Encapsulates the overall design vision for the Chalford St Giles Ventilation Shaft and associated landscape through a series of key design objectives and visualisations.

Fig.1.1_ Visualisation - Aerial view (Year 15 of HS2 in operation)

4.1

Contextual and Responsive

The Chalfont St Giles Ventilation Shaft is highly responsive to local agricultural and industrial buildings and its surrounding landscape. The farmyard compound arrangement and pitched roof building forms are designed to complement the local context. The buildings are located and orientated to conceal them as far as possible from public view.

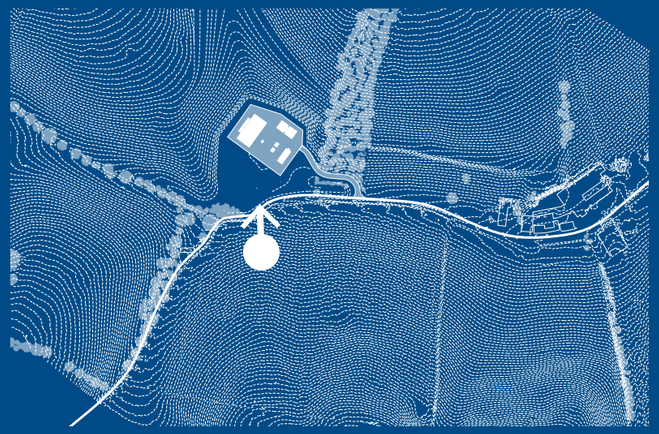


Fig.1.2_ Visualisation - PRoW to south of site looking north north east (Year 1 of HS2 in operation)

4.2

Cohesive and Enduring

A coherent and common design language has been applied to the Chalfont St Giles Ventilation Shaft buildings. The buildings are wrapped in a simple, continuous zinc 'skin', while door and ventilation openings are recessed and treated in a different material. Robust and enduring building materials have been carefully selected to reflect the local context, reduce long-term maintenance and maximise design life. This design language is common to the other headhouses serving the Chiltern tunnels.

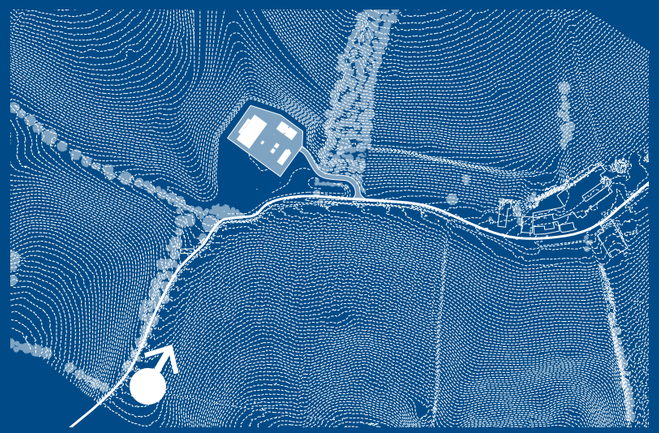


Fig.1.3_ Visualisation - PRoW to south of site looking north north east (Year 15 of HS2 in operation)

Fig.1.4_ Visualisation - Bottom House Farm Lane looking west (Year 1 of HS2 in operation)

4.3

Recessive and Integrated

The landscape design is fundamental to the sensitive integration of the Chalfont St Giles Ventilation Shaft into its site and local context. Together with the existing landscape, proposed planting has been designed to partially screen the compound from public view. The buildings use a simple and robust material palette, informed by local agricultural and industrial buildings.

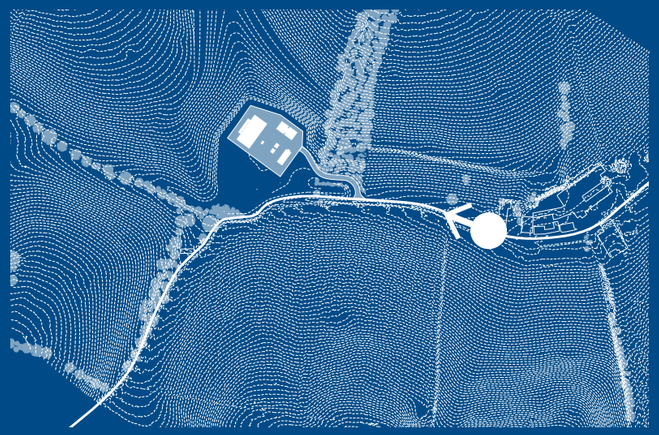


Fig.1.5_ Visualisation - Bottom House Farm Lane looking west (Year 15 of HS2 in operation)

5.0 Headhouse Design

Summary and justification of the Chalfont St Giles Ventilation Shaft design proposals relating to the overall design strategies.

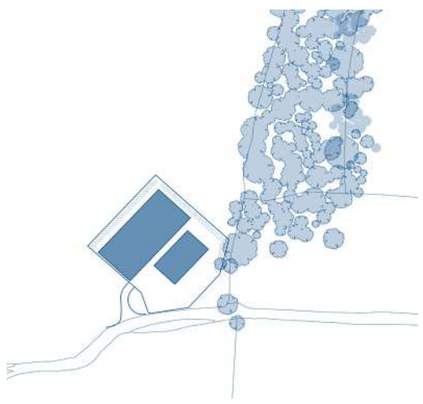
Key Considerations

5.1.1 Initial design development - Site compound

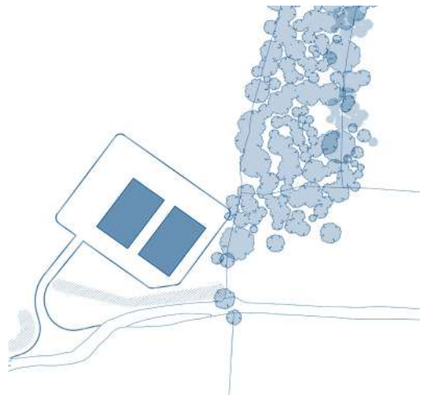
This series of diagrams illustrates the development of the site compound design which are described in more detail below:

- **Hybrid Bill design:** A Large compound area with one larger building and a secondary building. The access is close to Hobbs Hole Cottage.
- **Specimen design:** The Compound is increased in size but moved away from Bottom House Farm Lane. There are two equally sized buildings in the compound. The access is kept close to Hobbs Hole cottage.
- **Schedule 17 scheme:** The access is moved away from Hobbs Hole cottage. The main headhouse building is moved further away from Chesham Lane and the ventilation outlet & inlet building is positioned at the furthest point from Hobbs Hole cottage.

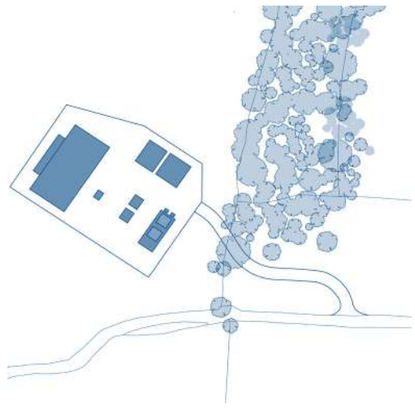
Hybrid bill design



Specimen design



Schedule 17 Scheme

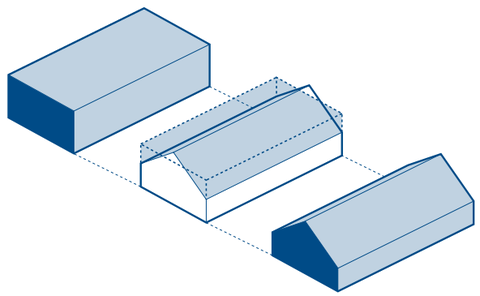


5.1.2 Initial design development - Headhouse

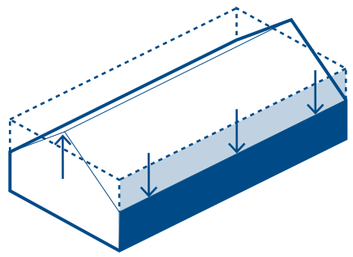
Following the appraisal of the hybrid bill and Specimen Design, the following key design strategies were identified for the headhouse design:

- Flat roof to pitched: Changes the face of the building from rectangle to a form that is smaller and more in line with existing contextual buildings.
- Reduce eaves height: A reduced pitch on the larger building facades allow for the volume of the main headhouse to appear smaller.
- Agricultural building context: The scale and proportions of the building is designed to be more in line with local industrial / agricultural buildings.

Flat roof to pitched



Reduce eave height



Agricultural barn context

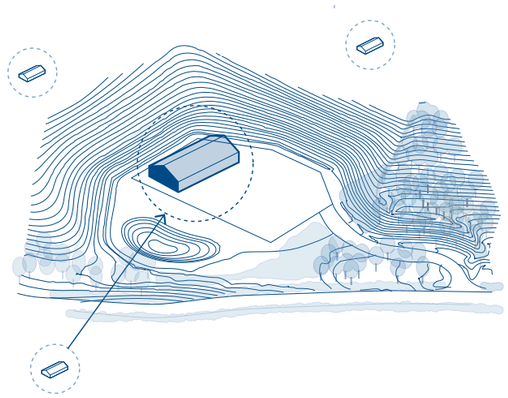


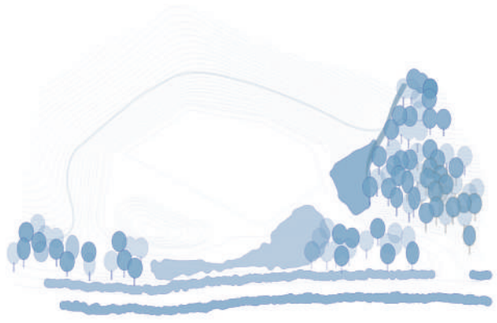
Fig.5.1_ Diagrams - Key design development

5.1.3 Key design principles - Site compound

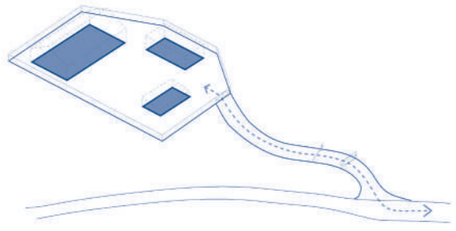
The key design principles for the site compound and surround landscape design are as follows:

- **Integration within landscape:** Lower the compound into the hillside and planting of additional trees and hedgerows
- **Agricultural courtyard arrangement:** Based on typical agricultural courtyard and the overall footprint kept as small as possible.
- **Visual Screening:** Concealing the external transformer substation in a louvred screen to inimise visual clutter within the compound

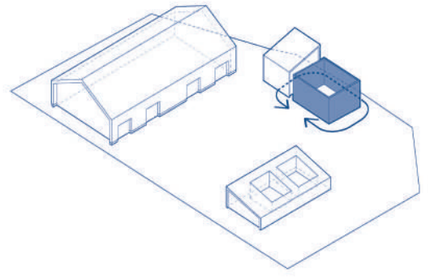
Integration within landscape



Agricultural courtyard arrangement



Visual screening

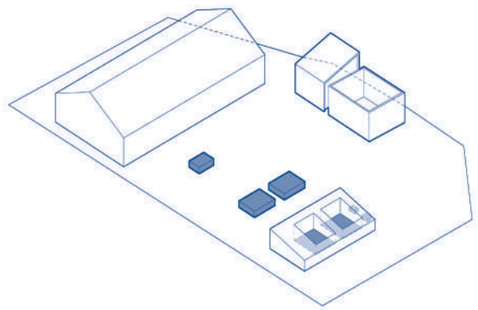


5.1.4 Key design principles - Headhouse

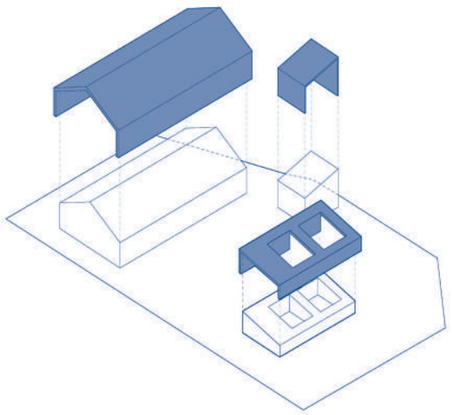
The key design principles for the headhouse and ancillary buildings are as follows:

- **Form and scale:** Reduce building height where possible and keeping ancilliary structures low and discrete in order to maintain a familiar scale and form to local agricultural buildings.
- **Roof wrap around:** The roof of the main headhouse building wraps around the building creating a simple agricultural barn shape
- **Door and ventilation openings:** Door and ventilation openings are pushed in and treated in a different material to create simplicity and elegance.

Form and scale



Roof wrap around



Door and ventilation openings

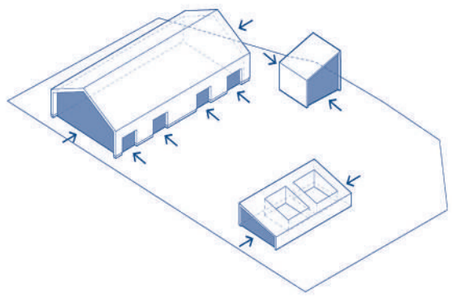


Fig.5.2_ Diagrams - Key design principles

Use

5.2.1 Key functional requirements

The functional requirements for Chalfont St Giles Vent Shaft have been accommodated by:

- Providing a tunnel ventilation fan system oriented horizontally within the basement box, reducing the excavation required relative to positioning the fans within the shaft.
- Providing the necessary space for mechanical and electrical plant equipment to support the operation of the railway. In positioning some of the equipment below ground, the above ground structures can be reduced in scale and designed more sympathetically to their surroundings.
- Providing intervention access for the emergency services to respond to an incident and a separate means of escape from the basement box.
- Providing an Transformer Substation in a seperate building and enclosure.

The following key operational requirements will also be implemented:

- Weekly testing of the operation of the fans will be controlled remotely, so access to the compound will not be required.
- External lighting will be on a PIR sensor which will illuminate the compound in the case of unwanted intrusion or in an emergency situation.
- There will be no permanent lighting of the headhouse building or compound.
- Security of the compound from errant vehicles is achieved with a discreet errant vehicle ditch positioned behind the hedge adjacent to Bottom House Farm Lane. The secure vehicle gate is positioned behind an agricultural style timber gate.

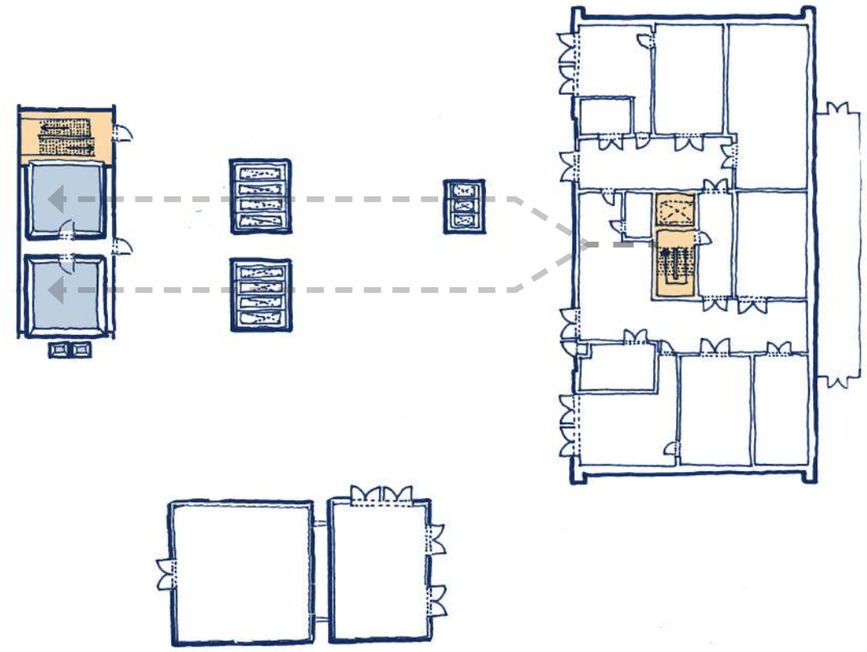


Fig.5.3_ Ground floor plan

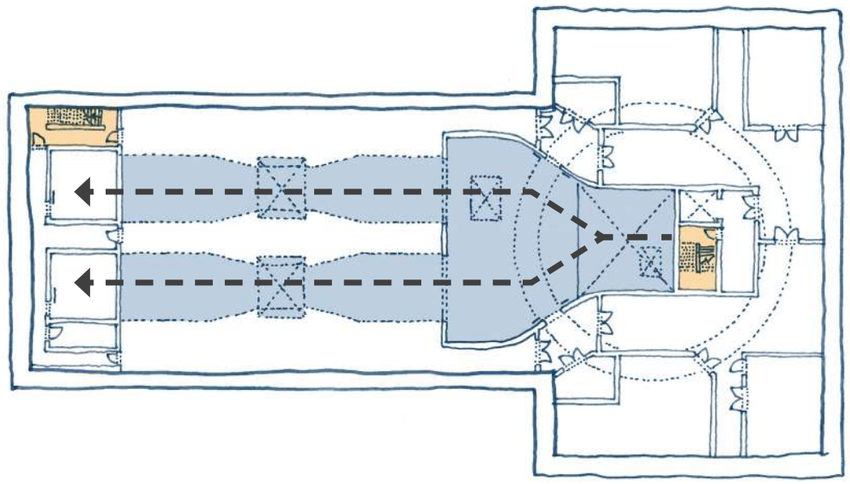


Fig.5.4_ Basement plan

Key

Ventilation route

Vertical Circulation - Intervention/ escape route

5.2.2 Headhouse

For operational and maintenance purposes a number of plant and operation rooms will need to be located above ground level within the headhouse building, including:

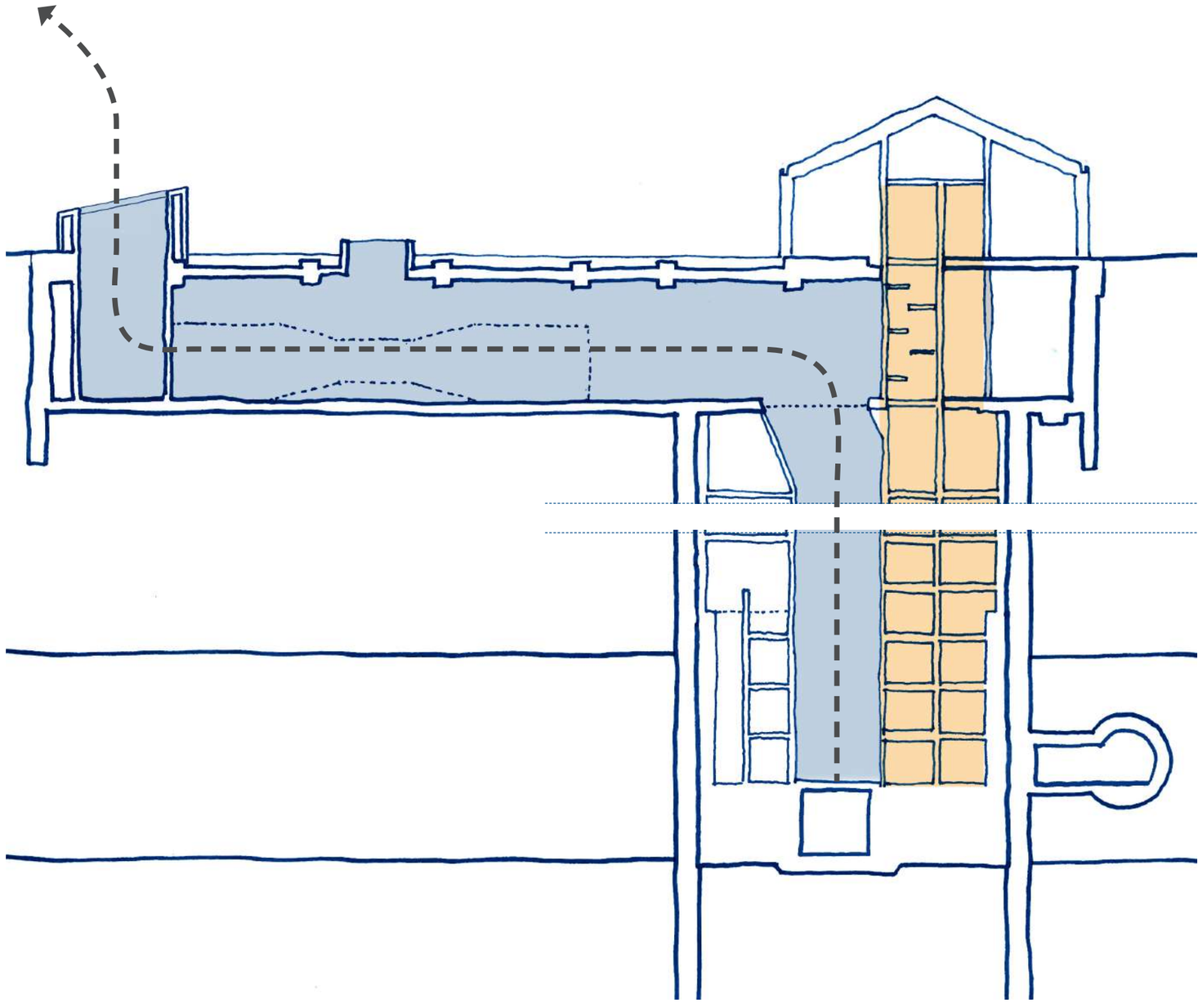
- Transformer rooms
- Mechanical ventilation rooms
- Intervention stairwell and lift
- Escape staircase

Given the shaft configuration, the buildings comprise a headhouse building and collection of ancillary structures. The headhouse building will accommodate the intervention lift and stairwell and plant/operational rooms linked to the shaft. The ancillary structures will facilitate extract and supply to the ventilation fans. This arrangement avoids a monolithic structure and represents a courtyard like compound arrangement which is considered to be in keeping with the local context.

The building situated over the shaft has a footprint of approximately 18m x 36m. The developed configuration locates plant rooms adjacent to external walls to facilitate access and natural ventilation. The rooms will be serviced by two internal corridors. To minimise the height of the headhouse building, room heights have been reduced to a minimum.

A smaller monopitch building is positioned above the eastern end of the basement box. This building has a footprint of approximately 7.5m x 18m and a ridge height of 4.2m. It contains the escape stair from the basement box and two tunnel ventilation openings. The vents need a minimum opening height of 3m to ensure that, in the event of a fire in the tunnels, smoke is able to clear above head height of the emergency services.

A third building and external enclosure is positioned perpedicular to the main headhouse containing the transformer substation and assocated plant.



Key

Ventilation route

Vertical Circulation - Intervention/ escape route

Fig.5.5_ Long section

Layout

5.3.1 Compound arrangement

The Chalfont St GIles Vent Shaft buildings are arranged around a compound, making reference to agricultural compounds found in the local rural context. The compound buildings are positioned away from Bottom House Farm Lane and the Public Rights of Way.

The smaller, ancillary structures (access hatches, ventilation and stair building) are placed in front of the headhouse when viewed from Bottom House Farm Lane, and follow the length of the ventilation plenum and fan room in the basement box below. The transformer substation building is oriented perpendicular to the main headhouse facing into the courtyard.

The proposed landscaping and strengthening of existing planting will create a visual buffer between the site and it's surroundings.

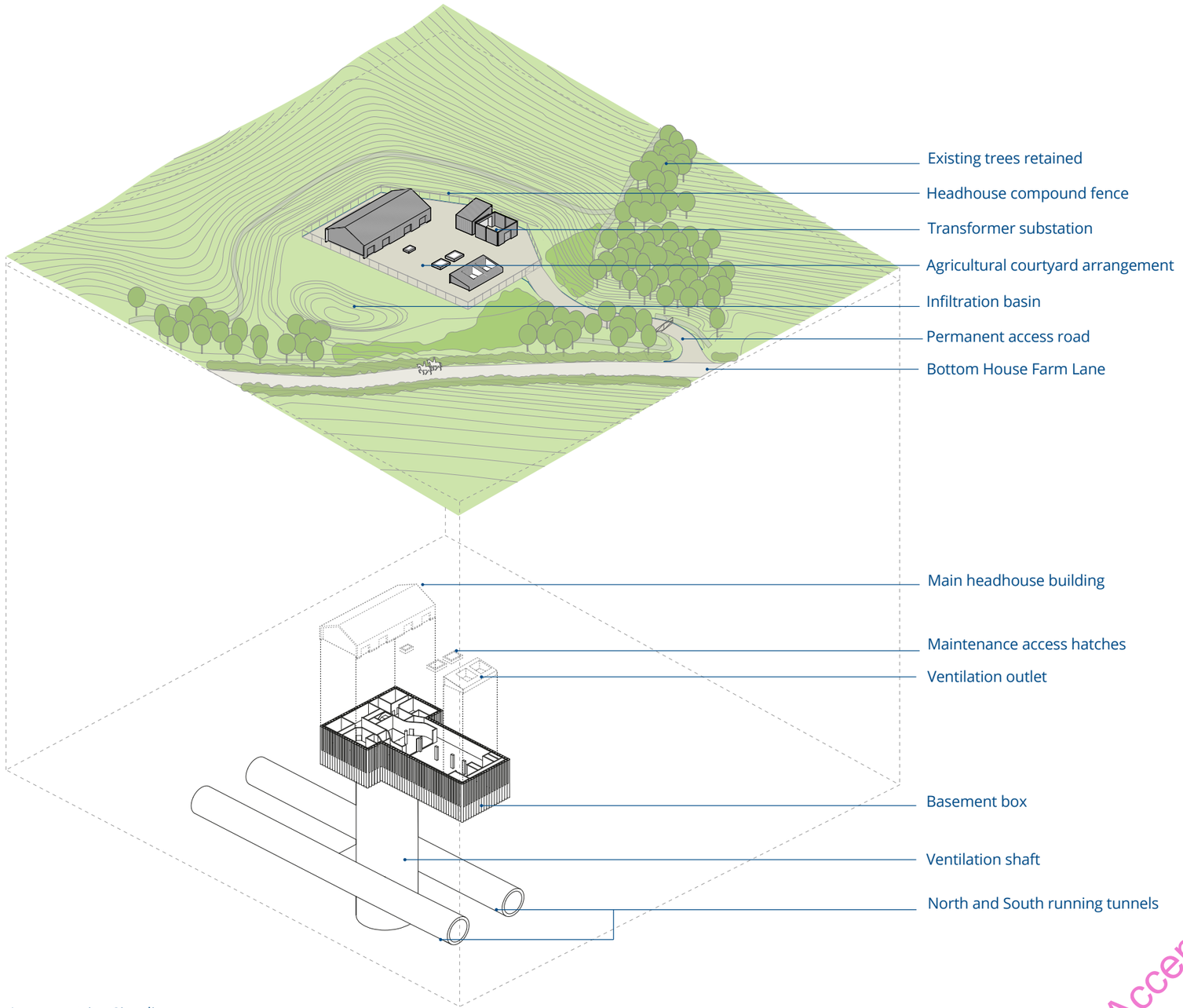


Fig.5.6_ Axonometric - Site diagram

5.3.2 Building arrangement

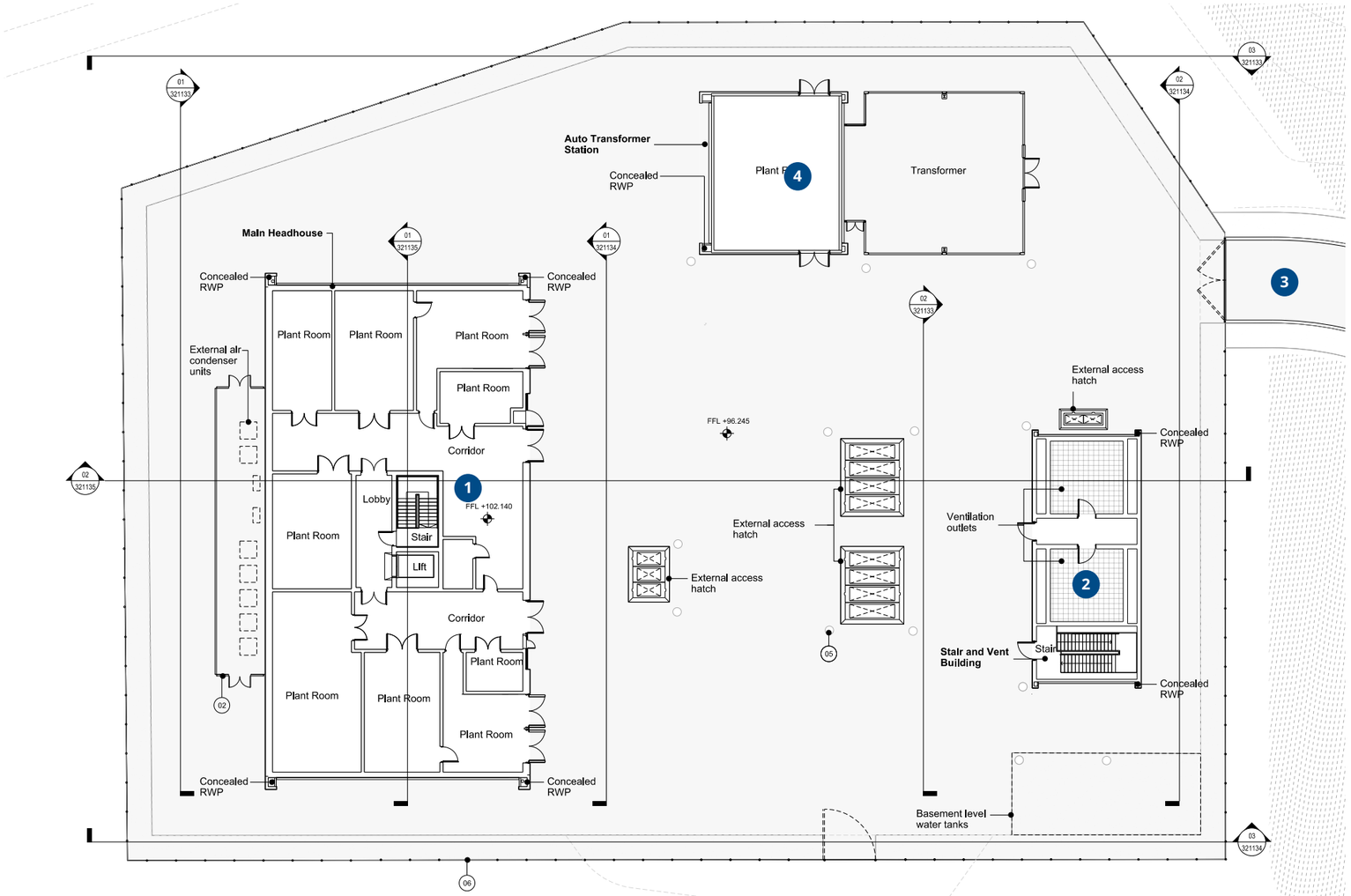
The headhouse building is positioned centrally over the shaft and is oriented perpendicular to the direction of the running tunnels. All building entrances face into the courtyard, which is typical of agricultural style buildings. At the rear of the headhouse there is an area for the external air condenser units, this is an open top louvred enclosure providing visual screening.

The location and orientation of other structures on the site is determinated by the basement box below, which is oriented parallel to the running tunnels.

At the centre of the compound there are three external access hatches over the basement box. The two larger access hatches are positioned over the fans to enable maintenance and replacement of fans.

On the opposite side of the compound to the headhouse is the stair and ventilation building. The stair provides a secondary means of escape from the basement box and the ventilation openings act as inlet and outlet for the ventilation fan system. Either side of these structures there are below ground water tanks protected from heavy vehicle loadings by bollards.

On the north side of the compound and perpendicular to the main headhouse is the transformer substation building, this consists of an enclosed building housing plant for the transformer and an external open top louvred enclosure area for the auto transformer providing visual screening.



Key

1. Main headhouse
2. Stair and vents building
3. Main access road
4. Tranformer substation

0 4 10 20 M

N

Fig.5.7_ Ground floor plan - Compound arrangement

Scale

5.4.1 Headhouse

The main building is 18.2 m wide, 35.5 m long and 9.4 m tall. These dimensions, including the size of the entry points into the building and key heights, are illustrated in Fig. 5.8 on the right.

A number of different building forms have been tested for the main headhouse. These options included variants on both flat and pitched roof structures. Pitched roof forms are preferable from a long-term operation and maintenance point of view due to the perception that flat roof structures are more likely to leak. The design team reviewed different pitch roof arrangements and concluded the preferred solution is a gable ended pitch roof. This form of structure is common among agricultural and industrial buildings in the Chiltern context. The doors and access points into the building have been enlarged in order to make the headhouse appear smaller in scale and closer to look more like an agricultrual building.

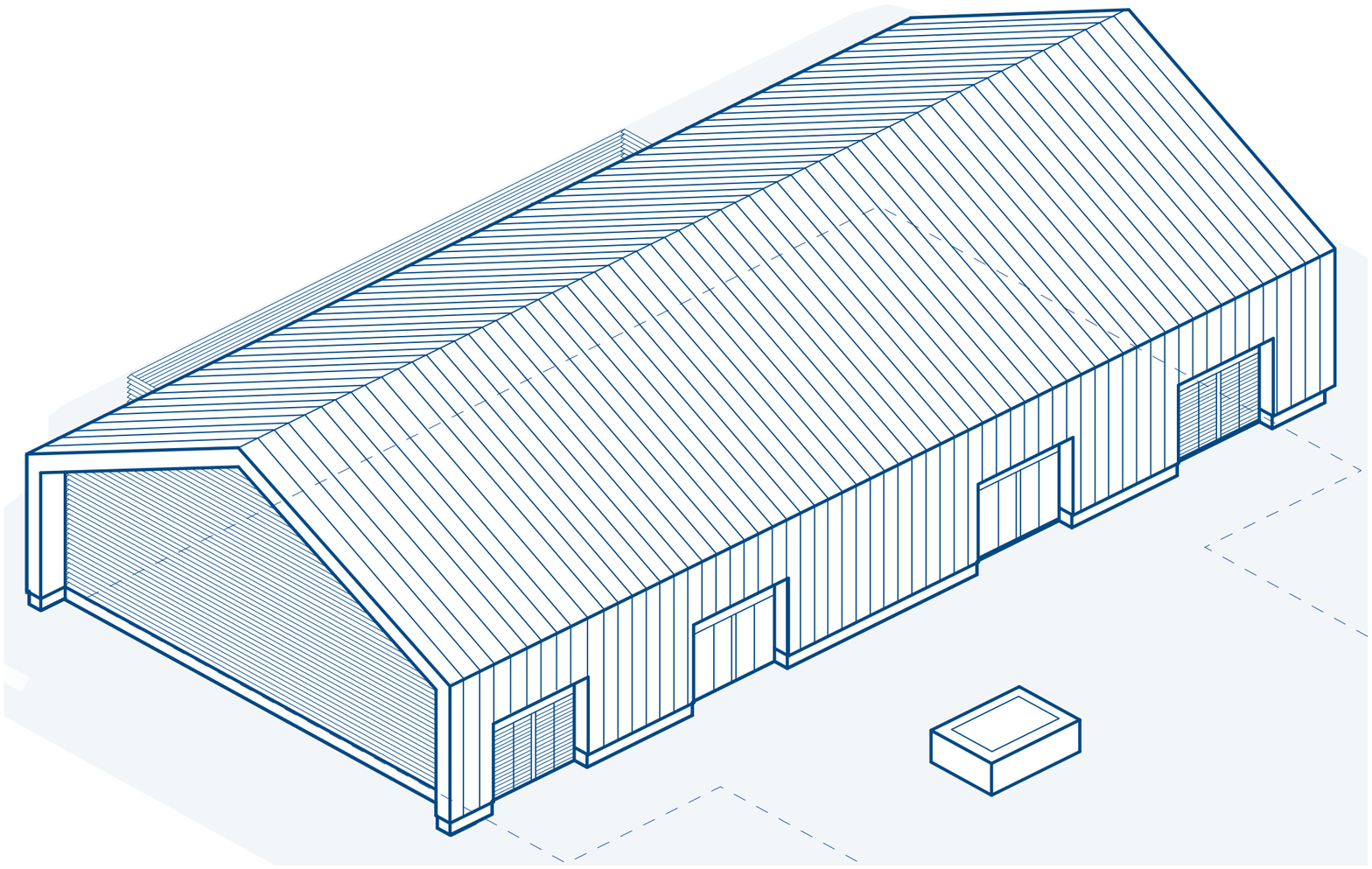


Fig.5.8_ Axonometric - Headhouse building

5.4.2 Stair and vents building

The stair and vents building contains a second means of escape stair from the basement box and two tunnel ventilation fan outlets. A single building encases the staircase and ventilation outlets under one simple, mono-pitched roof - a form sympathetic to the rural agricultural context. The building is clad in a zinc roof wrap with recessed louvred openings at either end. Using the same architectural approach as the headhouse helps to achieve a simple and coherent appearance to buildings with varying functional requirements. The footprint of the building has been kept as small as possible whilst maintaining a simple well-proportioned form and providing ventilation openings at the minimum required height of 3m.

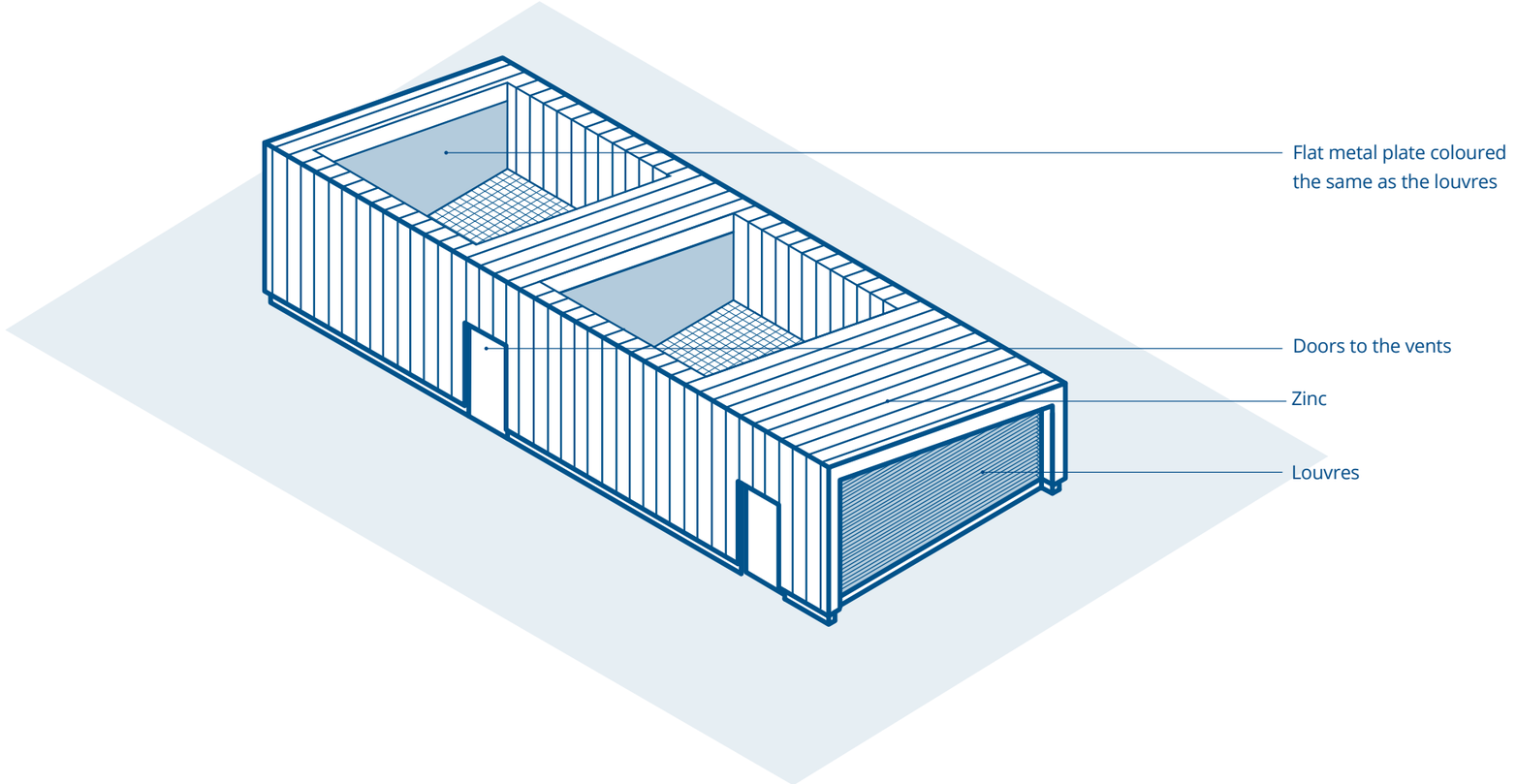


Fig.5.9_ Axonometric - Stair and vents building

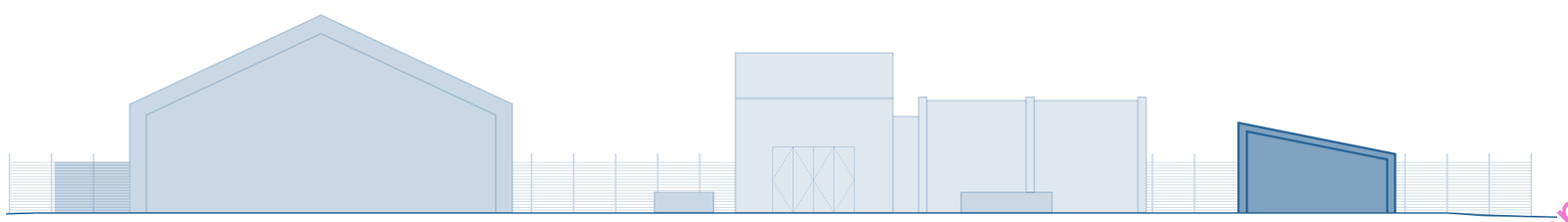


Fig.5.10_ Diagrammatic South-West elevation

5.4.3 Transformer substation

The Transformer substation building consists of two parts, a building and a screened off open top louvre enclosure

The building is clad in a zinc roof wrap with recessed louvred openings at either end. It has a footprint of 10m by 11m, it is 8.1m high at the ridge and is 5.8m high at the eaves. Using the same architectural approach as the headhouse and the stair and vents building helps to achieve a simple and coherent appearance to buildings which have varying functional requirements. The footprint of the building has been kept as small as possible and the eaves of the building at the same height as the main headhouse whilst maintaining a simple well-proportioned form and providing the required operational space for the plant contained within.

A number of options were tested for the design of the ATS building, as shown opposite. These consisted of: flat roofed options as a single rectangular box, as 2 seperate boxes or as a box enclosed within a fence; and pitched roof options perpendicular or parralell to the main headhouse, in monopitch a dual pitched forms. The preferred option was for a monopitch roof orientated perpendicular to main headhouse. The design follows a clear hierarchy of forms within the compound, where the main headhouse uses a dual pitch roof while ancillary buildings use monopitch roof forms. All roof forms are oriented side-on to the courtyard, with access doors facing the central space.

The open top louvre enclosure with a footprint of 11m by 11m and is 5.8m high provides screening for the auto transformer whilst allowing required airflow around the equipment. The screening is formed of horizontal louvre panels fitted between posts to break up the visual mass of the enclosure. The louvres match those on the gable ends of the zinc clad buildings on the site and the gaps between the louvres increases towards the top of the screen to lighten the top edge of the enclosure.

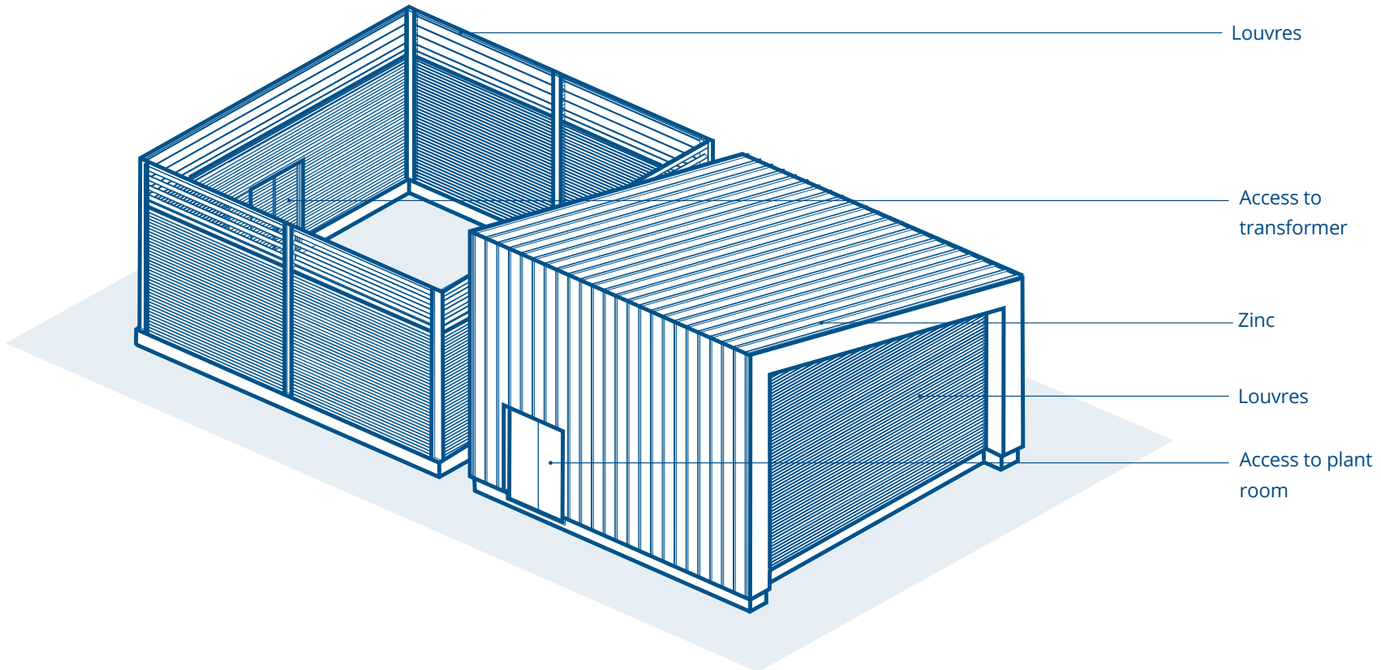


Fig.5.11_ Axonometric - ATS building

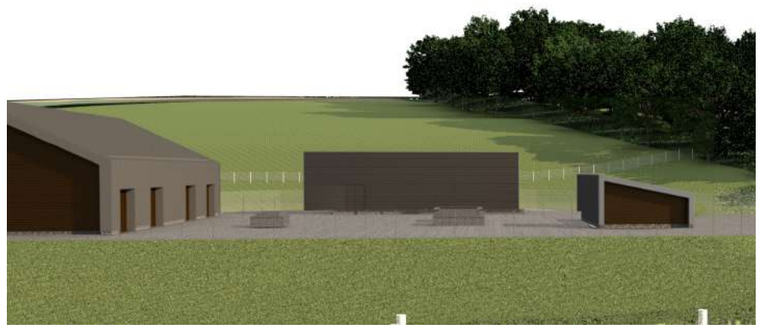


Fig.5.12_ Visualisation - ATS option: louvered box

Fig.5.13_ Visualisation - ATS option: 2 seperate boxes

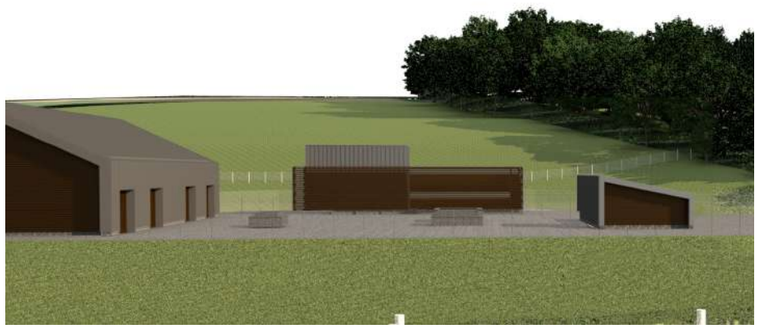


Fig.5.14_ Visualisation - ATS option: zinc box within louvered enclosure

Fig.5.15_ Visualisation - ATS option: monopitch parallel to headhouse

Fig.5.16_ Visualisation - ATS option: dual pitch roof perpendicular to headhouse

Fig.5.17_ Visualisation - ATS option: monopitch roof perpendicular to headhouse

Appearance

5.5.1 Headhouse envelope design

As well as building form, a variety of different material solutions have been tested. The material selection will play an important role in ensuring that the headhouse buildings are sympathetic to the sensitive AONB context.

In addition to an integrated landscape design, a carefully detailed and considered building envelope will ensure that designs complement local aspirations and contribute to the natural and built environment.

For the main headhouse a pitched roof form is considered the most appropriate. Whilst the overall ridge height is higher than the top of a flat roofed building the perceived scale of the building is lessened by lowering the eaves.

The outcome of the envelope options appraisal was a gable ended building with a standing seam zinc wrap-around roof and louvred gable ends. This option was taken forward and developed into the proposal.

This option was considered the best balance of the considerations that needed to be made. It references agricultural barns in form and composition but also makes use of more industrial materials to ensure robustness and durability. This choice of materials makes it clear that the building is part of an infrastructure project, rather than a copy of an agricultural or residential building.

Fig.5.18_ Visualisation - Horizontal ceramic cladding with louvred gable ends

Fig.5.19_ Visualisation - Standing seam cladding with louvred gable ends (preferred option)

5.5.2 Historic precedents

A study was done of historic agricultural buildings in the surrounding area. There were a few key features that applied in most cases:

- A simple roof form, usually gable ended and sometimes with a small hipped section of roof
- Horizontal timber cladding
- A brick plinth on which the structural frame sits, for robustness at low level and to raise the timber frame off of the ground

5.5.3 Industrial agricultural precedents

Also included on this page are some more contemporary examples of agricultural/industrial barns in the surrounding area. Generally the same principles apply but the scale is larger and the structural spans are longer with a shallower pitch on the roof.

5.5.4 Material precedents

Applying the lessons learnt from looking at the historic and contemporary local precedents a simple material palette is proposed:

- Pre-patinated standing seam zinc cladding a roof-wrap which emphasises the simple gable ended form of the building.
- Painted steel louvres which make reference to the horizontal timber siding of the historical precedents.
- An engineering brick plinth to raise the headhouse off the ground.

The materials chave been chosen for their simple appearance, durability, robustness and sustainability. Zinc is a naturally occuring material and both steel and zinc are readily recyclable and reusable at end of life.

Fig.5.20_ Photograph - Skippings barn

Fig.5.21_ Photograph - Northolt barn

Fig.5.22_ Photograph - Didcot cart shed

Fig.5.23_ Photograph - Lower bottom house barn

Fig.5.24_ Photograph - Lower bottom house barn

Fig.5.25_ Photograph - Lower bottom house barn

Fig.5.26_ Roof wrap - Pre-patinated zinc

Fig.5.27_ Louvred gable - Painted Steel

Fig.5.28_ Plinth - Blue Engineering brick

Appearance

5.5.5 Louvres colours

An study of different colour options for the louvered areas and openings was undertaken. The colouring of these elements can be something unique to each of the headhouse whilst retaining some consistency of material and form.

At the CSG vent shaft site it was decided that the best approach was to use colour to help embed the headhouse into it's surroundings particularly in the winter months when the vegetation around the site is less dense and the headhouse compound is more visible.

The proposed louvre colour is a red brown which picks up the colour of the adjacent Hobbs Hole Cottage.

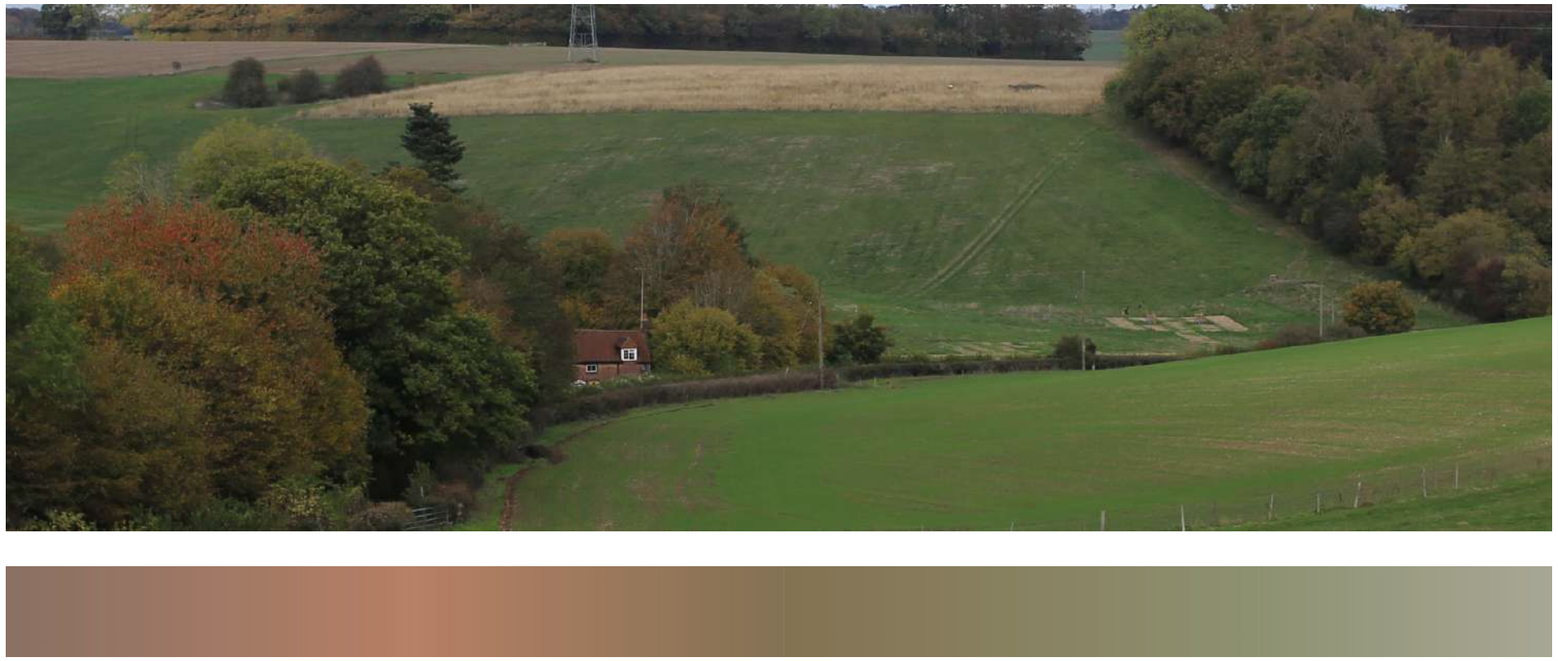


Fig.5.29_ Colour palette

Fig.5.30_ Visualisation - Dark grey louvre

Fig.5.31_ Visualisation - Dark bronze louvre

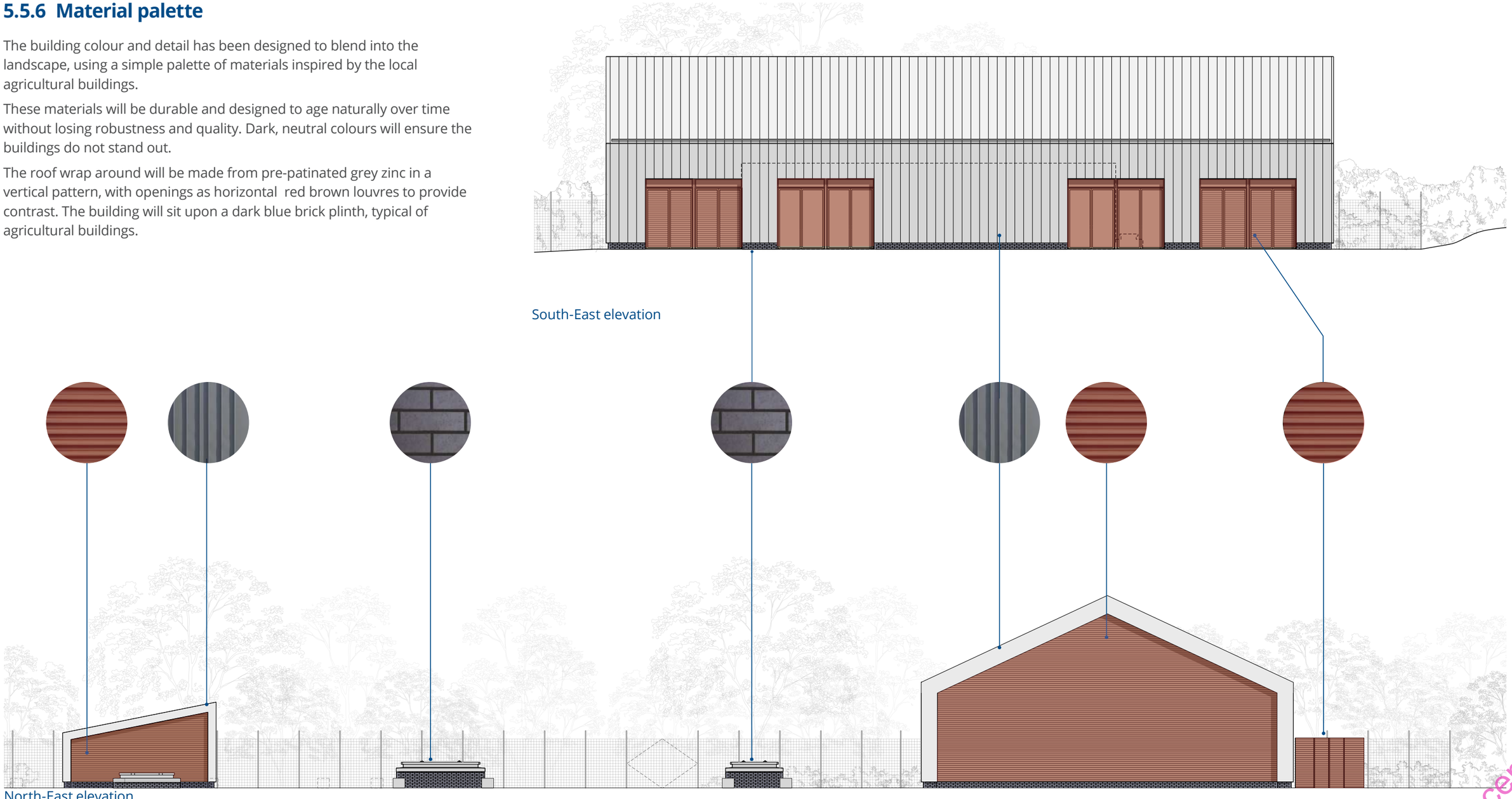
Fig.5.32_ Visualisation - Red brown louvre

5.5.6 Material palette

The building colour and detail has been designed to blend into the landscape, using a simple palette of materials inspired by the local agricultural buildings.

These materials will be durable and designed to age naturally over time without losing robustness and quality. Dark, neutral colours will ensure the buildings do not stand out.

The roof wrap around will be made from pre-patinated grey zinc in a vertical pattern, with openings as horizontal red brown louvres to provide contrast. The building will sit upon a dark blue brick plinth, typical of agricultural buildings.



South-East elevation

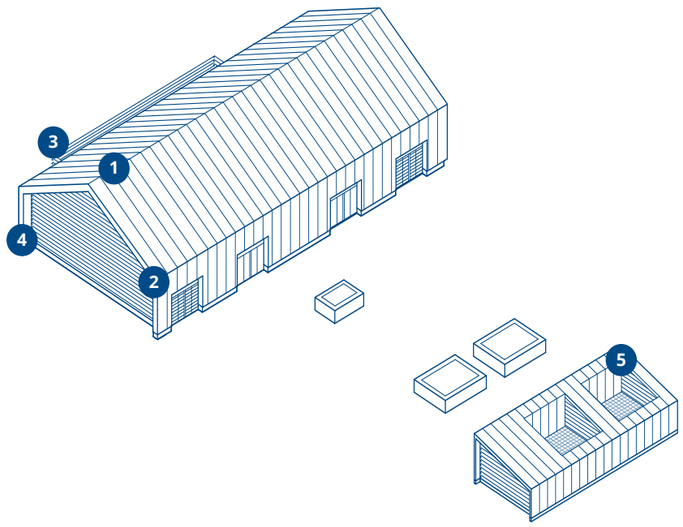
North-East elevation

Fig.5.33_ Elevation materials

Appearance - Key Details

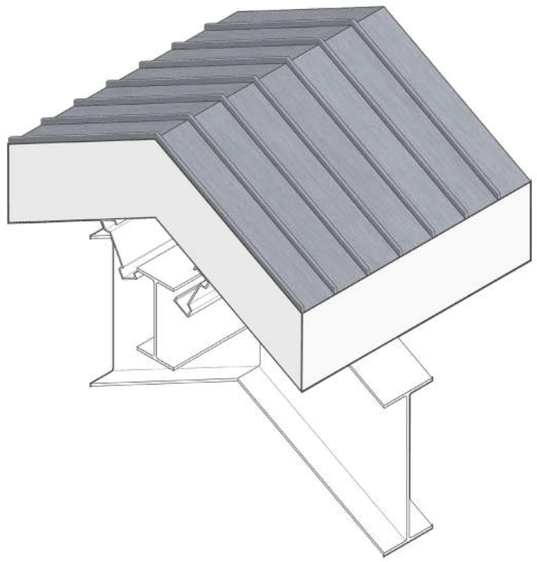
5.6.1 Building design key details

All buildings and ancillary structures have been designed using a common design language to ensure they appear consistent, coherent and sympathetic to the rural agricultural context.



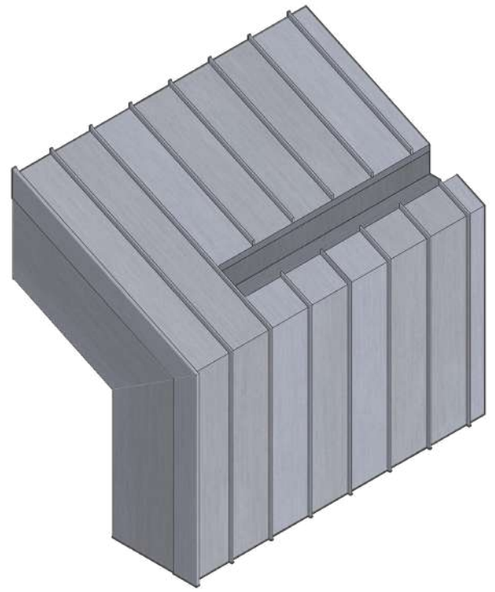
1. Roof ridge
2. Zinc roof eave and gutter
3. Louvered fence corner
4. Brick plinth and recessed louvre
5. Vent Openings

Fig.5.34_ Design key details



5.6.2 Roof ridge

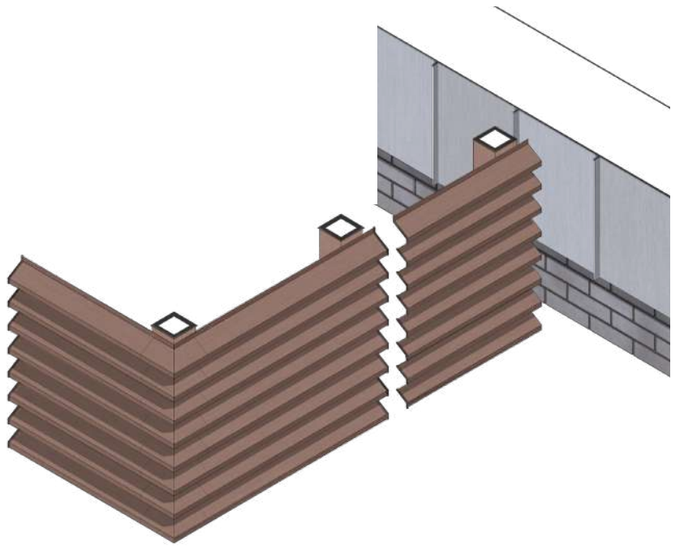
The standing seam zinc cladding will appear to wrap continuously over the roof ridge. There will be no additional ridge capping piece. It is important that the roof wrap is expressed as a simply detailed, continuous element to emphasise the barn form.



5.6.3 Zinc roof eave and gutter

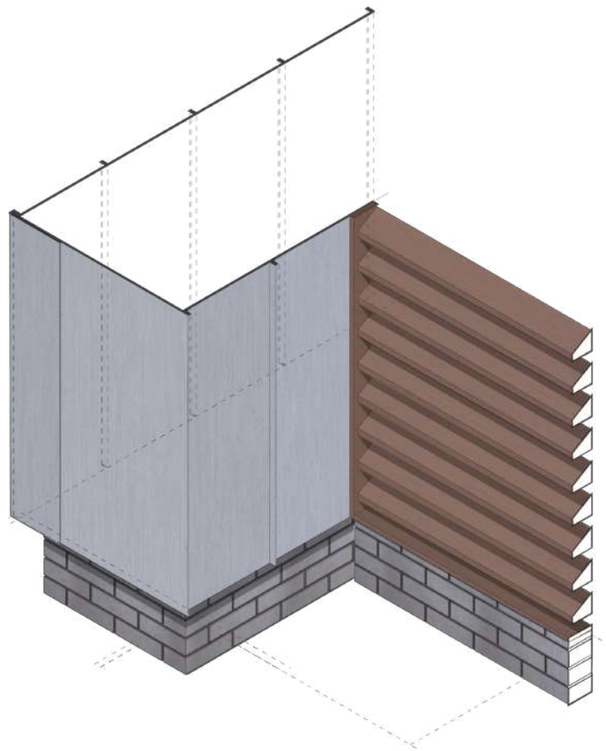
The reveal depth at the end of the main Head Houses will be treated as an end piece to the larger volume. This has two detailed design implications; The final standing seam of the roof wrap will be at the edge of the roof and form the end profile of the roof wrap, the end profile of the roof wrap will join at the eaves and the ridge with a flat welt joint and otherwise be continuous.

The gutter will be concealed within the roof pitch and the standing seam wraps over the eaves and continues down the wall to help articulate the roof wrap as a simply detailed continuous element.



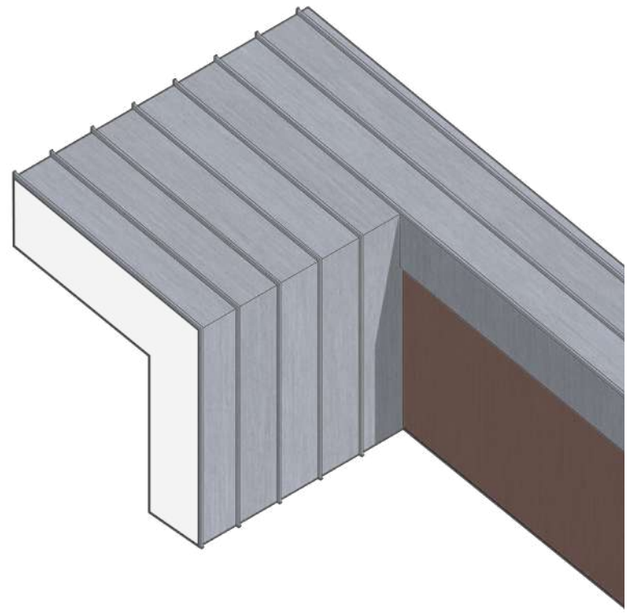
5.6.4 Louvred fence corner

The fence enclosure will have louvred corners and not a separate corner capping piece. A corner piece will be used and fitted into the straight horizontal louvres to ensure the louvres appear as continuous horizontal elements.



5.6.5 Brick plinth and recessed louvre

The brick plinth accommodate the dimensions of a full brick where possible. The louvred gable end is set within a slim steel frame and typically recessed by 1m from the zinc cladding.



5.6.6 Vent openings

The zinc will wrap down into the ventilation openings in the direction of the standing seams. The side walls of the ventilation openings will have the same profile of the roof-wrap at the gable ends of the building, with an inset painted steel plate cladding to match the colour and finish of the louvered panels.

Access

5.7.1 Access strategy

Access to the site is via a permanent access road off Bottom House Farm Lane which enters the East side of the compound. The compound is surrounded by a security fence with barbed wire.

Adjacent to Bottom House Farm Lane there is an errant vehicle ditch behind the hedgerow and this aligns with a secure vehicle gate on the access road into the site. In front of this gate there is an agricultural style timber gate and fence to assist in making the compound sit more sympathetically within it's surroundings.

Various types of vehicles require access to the site and these are detailed on the opposite page. The size of the compound has been designed as efficiently as possible to accommodate the tracking of all vehicles requiring access to the site whilst minimising the overall compound footprint. Bell bollards are used within the compound to prevent vehicle damage to the various structures within the compound.

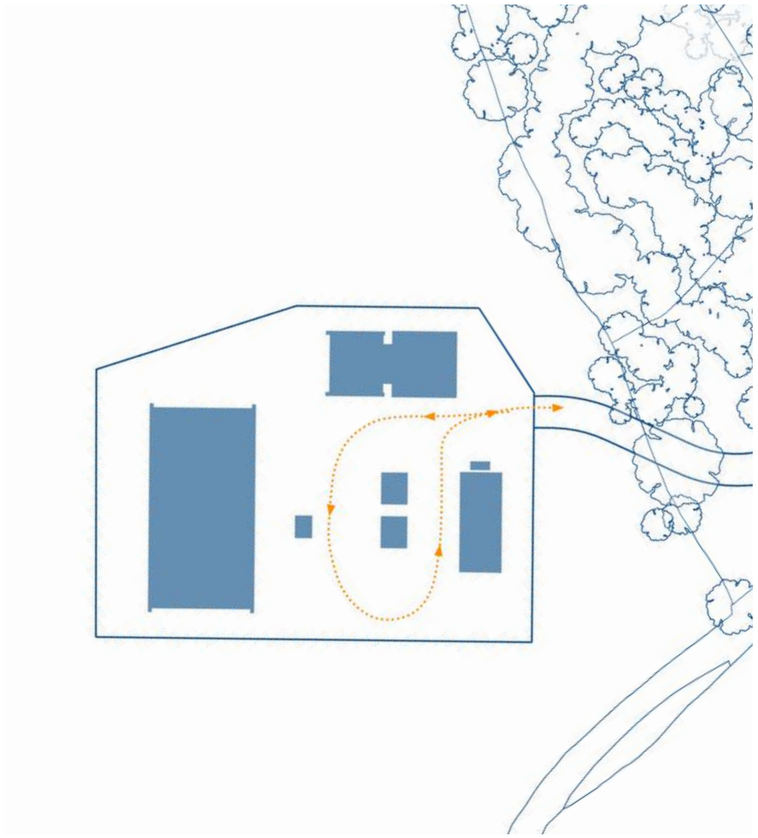
Key

- Existing planting
- Proposed planting
- Proposed planting
- Access point to building
- Access point to compound

0 10 50 M

N

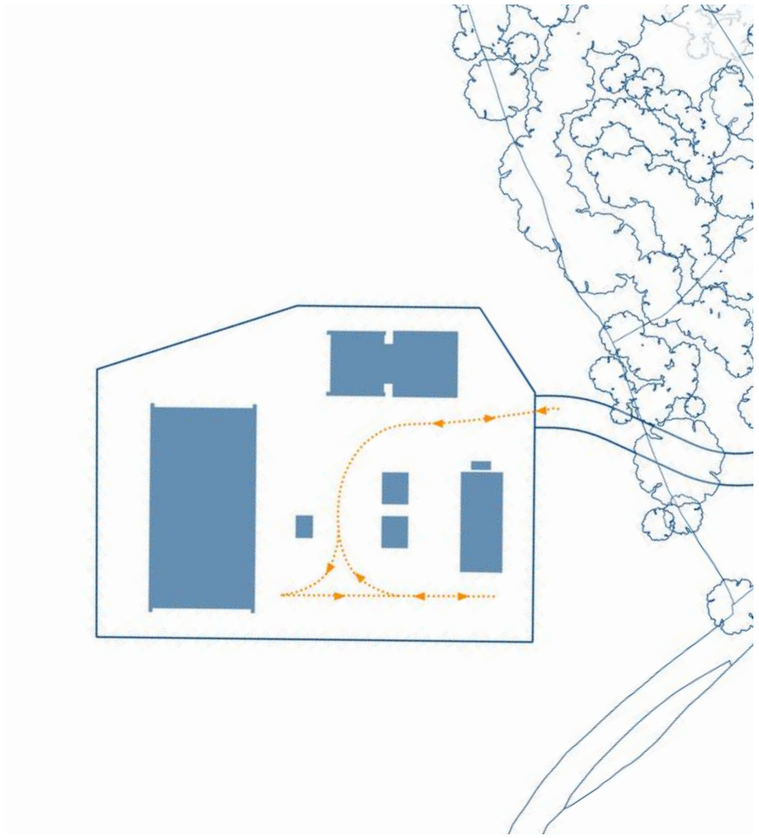
Fig.5.35_ Site plan - Proposed



5.7.2 16.5m Articulated vehicle tracking path

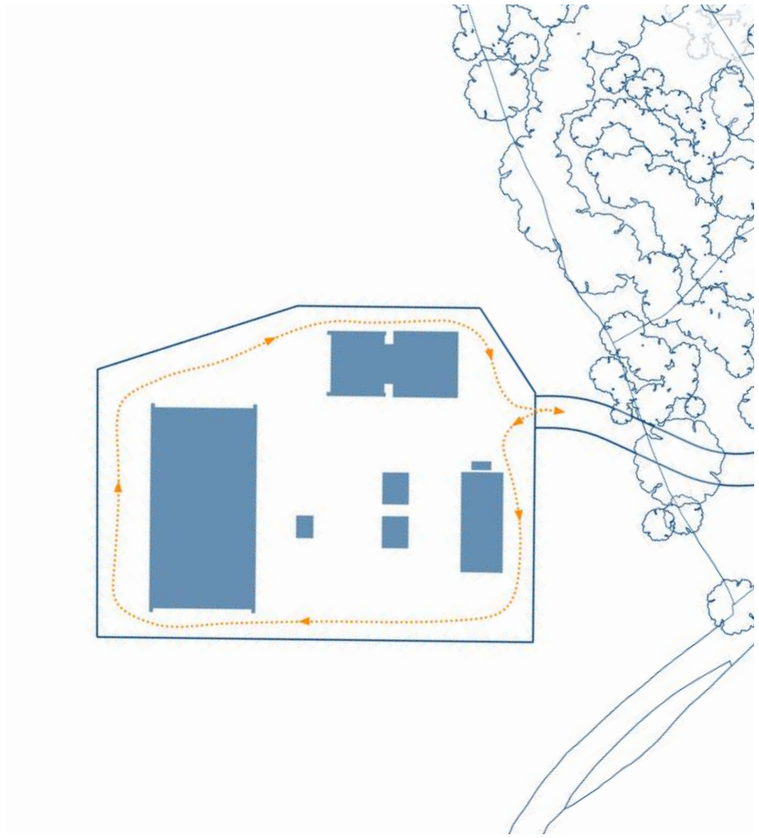
This worst-case FTA Design Articulated Vehicle (1998) was tracked right-turning into the access road from Bottom House Farm Lane and entering the compound. The vehicle then described a path around the building hatches to exit onto the access road without the need for a reversing manoeuvre.

The articulated vehicle tracking path is also used for mobile cranes. A 13.6m long Liebherr LTM 1100-5.1 mobile crane was tracked describing the movement above. This vehicle is expected to be required for very occasional replacement of major mechanical/electrical components.



5.7.3 10m Rigid vehicle tracking path

This vehicle followed the same track as the 16.5m articulated vehicle. An additional path down the western side of the main building was tracked to allow accss to the below ground water tank. To exit this location, the vehicle would need to reverse most of the length of the compound prior to right turning back onto the access road.



5.7.4 4 x 4 Vehicle tracking path

The filter drain and security fence that run around the compound perimeter will need to be periodically accessed for maintenance. A smaller 4 x 4 vehicle tracks a path clockwise around the inside of the compound perimeter to exit onto the access road without the need for a reversing manouvre.

6.0 Landscape

A summary of the indicative landscape design proposals with reference to the overarching landscape vision and design considerations, covering habitat creation and management, access and recreation, water management, and the visitor experience.

Landscape Design

6.1.1 Introduction and overview

This chapter sets out the landscape design approach for Chalfont St Giles Ventilation Shaft. This includes broader components which are complementary to the planting and earthworks design, including ecological and habitat creation proposals, the overground drainage strategy and the landscape led site security strategy.

The proposals have been developed by a multi-disciplinary environmental team working in close collaboration with the architectural and engineering designs to ensure there is an integrated scheme which meets overarching HS2 design objectives, whilst delivering a landscape and ecological masterplan which is responsive to its local context.

The proposals have been consulted on as part of the Schedule 17 pre-application process including several discussion events with the local planning authority (Bucks Council); the HS2 AONB Review Group; and the HS2 Independent Design Review Panel. The design set out in this chapter should be read in conjunction with the accompanying landscape design drawing set and restoration proposals document.

6.1.2 Design narrative

Chalfont St Giles Ventilation Shaft is the second most southerly of five ventilation shafts in Contract C1, located between the Chalfont St Peter Ventilation Shaft to the south and Amersham Ventilation Shaft to the north. Whilst each of the five sites are isolated in spatial terms, the landscape and ecological design narrative provides a unifying framework - based around HS2's Green Corridor concept - which allows expression of some common themes and ideas, with proposals adapted for each shaft site to respond to local conditions such as soils, community, planting typologies and landform.

Maximising biodiversity gain within the Chilterns AONB is the common thread which connects the five shaft sites. In conceptual terms, each site is considered to be a stepping stone through the AONB with each stepping stone creating a pocket of 'species rich' grassland habitat supported by native planting and other habitat features which are stitched into their local setting. These 'islands' of similar habitat are continued at a much larger scale and with greater diversity of habitat types into the more physically connected HS2 landscapes within the Colne Valley.

The following sections expand upon this concept and also explain the strategic relevance of the biodiversity focussed approach and narrative.

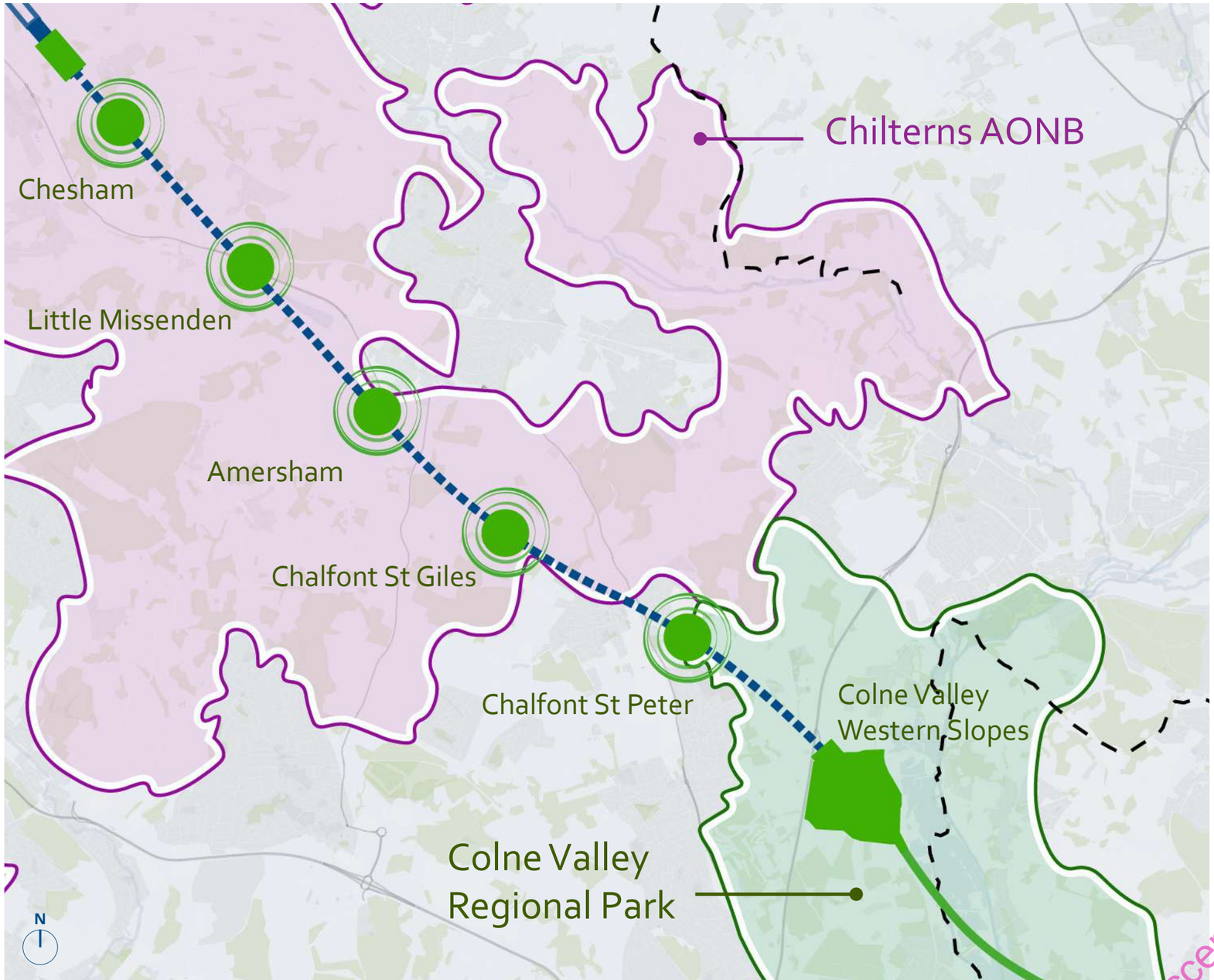


Fig.6.1_ Diagram - Ecological Stepping Stones concept

"A chain of 'ecological stepping stones', part of HS2's Green Corridor threading lightly through the Chilterns – each site a small but rich space for biodiversity, shaped by context and woven into the natural landscape.

These are quiet spaces, revealing slow shifts in colour and texture; people pass and pause briefly, curiosity stirred by subtle clues that hint at the drama of the railway which charges beneath their feet."

6.1.3 Design principles

A set of high level landscape and ecological design principles have been developed for the five shaft sites. These are framed within the overarching narrative of biodiversity optimisation and enhancement within the context of the Chilterns AONB and cover key topics and themes which are common considerations at each of the sites. The table opposite sets out the six principles and describes the high-level design response.

This framework is however sufficiently flexible to allow the crafting of a 'local' design response for each location and this is expanded on in the following section of this chapter.

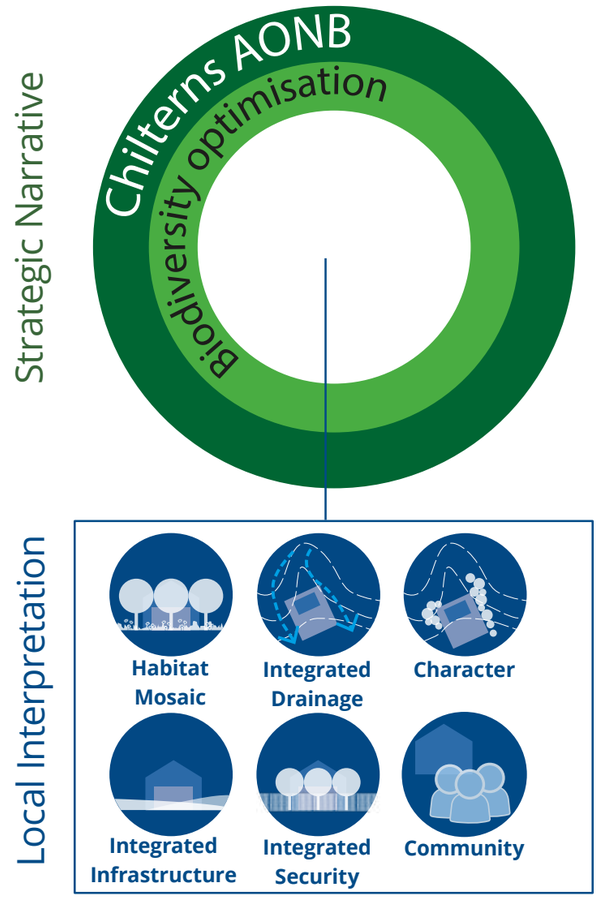


Fig.6.2_ Design principles

Principle	Design Response
Habitat Mosaic	Maximise biodiversity value through establishment of a connected and 'contextually appropriate' habitat mosaic - seeking opportunity to create scarce and/ or locally important landscapes with appropriate aftercare ensuring their long-term viability and benefit
Character	Respond positively and sympathetically to site character as applicable at the local level including response to landform; soils and geology; planting character; and cultural and heritage features.
Integrated Drainage	Design efficient and integrated drainage systems which respond to natural hydrological and hydro-geological processes as far as practicable and; conform to standards and guidelines.
Integrated In-frastructure	Use landscape features to sensitively integrate buildings, boundaries and access roads within their contextual setting – this includes curation of screening and opening of views depending on context and purpose.
Integrated Security	Design a proportionate security response which is landscape led and as conspicuous as possible.
Community	Where appropriate, and not conflicting with operational/ security considerations, facilitate forms of public interaction and engagement with the site.

Masterplan

6.2.1 Chalfont St Giles Landscape Masterplan

The landscape masterplan for Chalfont St Giles is informed at the macro level by the special qualities of the Chilterns AONB, and at a more local scale by the intimate character of chalk valley landscape which is described in Chapter 3.

The masterplan seeks to provide an appropriate design response which positively addresses several important contextual elements. These include:

- Utilisation of chalky soils which give rise to the some of the most important and depleted habitats in the Chilterns AONB;
- Maintaining as far as possible the landform and character of the pronounced dry valley;
- Retaining the function of the flanking woodlands in respect to screening/ sheltering neighbouring properties; and promoting biodiversity and habitat connectivity;
- Reflecting and utilising drainage patterns which are strongly influenced by the landform and geology; and
- Maintaining the relative visual isolation, albeit recognising that more elevated views are available from the right of way to the south on higher ground

The approach is predicated on both retaining key landscape features and fabric as far as is practicable and, where possible, enhancing habitats and biodiversity, with specific opportunity to create calcareous grassland using site won materials and construction aggregates.

The principal components of the masterplan are set out in Figure 6.4 and Figure 6.5 opposite. An assessment of the key design elements follows in the subsequent sections.

Fig.6.3_ Photographs - Site images

Fig.6.4_ Site plan - Landscape masterplan

6.2

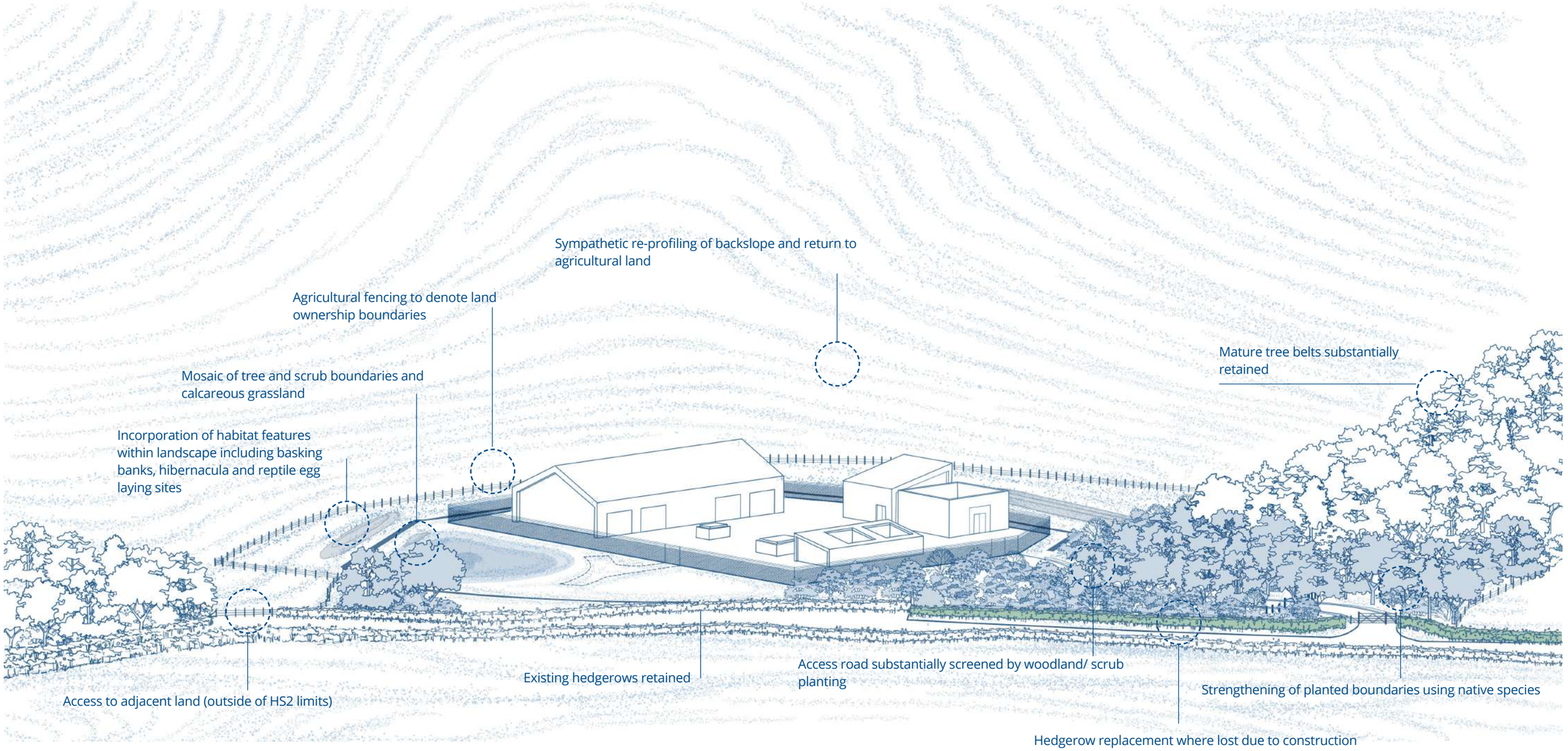


Fig.6.5_ Axonometric - Landscape

Habitat Creation and Optimisation

6.3.1 Overview

The landscape design will maximise biodiversity value through establishment of a connected and contextually appropriate habitat mosaic, seeking opportunities to create a locally important landscape. Habitats will be created and managed within the site to reflect and enhance the existing landscape and ecological character of the Chilterns Hills.

New habitats will be connected to existing semi-natural habitats in the surrounding landscape to enable organisms to disperse into and out of the site. The site is intended to be one of five 'stepping stones' of wildlife habitat, provided through similar habitat creation at each of the other shaft sites along the Chiltern Tunnel at Chalfont St Giles, Amersham, Little Missenden and Chesham.

6.3.2 Objectives/ Principles

The overall target is establishment of habitats that conform with the priority habitat types referred to in Section 41 of the NERC Act 2006. The site is intended to be a small but diverse and functional mosaic of semi-natural habitats, providing multiple benefits for wildlife and landscape. Habitats will be varied in structure and function to enable them to achieve their biodiversity potential for as wide a range of flora and fauna as possible. Although a relatively small area, the proposed habitat creation within the site contributes toward the HS2 No Net Loss (NNL) commitment and follows Code of Construction Practice and other related requirements such as BREEAM.

Fig.6.6_ Photograph - Pipistrelle bat (target species)

6.3.3 Maximising opportunities for habitat creation

The key habitats that will be targeted are wildflower and invertebrate-rich calcareous grassland, and boundary woodland and scrub planting. Habitat creation opportunities will focus on:

- Creation of species-rich grassland, informed by soil and substrate reflective of Chilterns grasslands;
- Gap-planting including grading tree/scrub planting into irregular diverse margins, providing transitional 'edge' habitats;
- Planting of a new/ replacement hedge along the eastern site boundary - set back from its original alignment (to improve sight-lines and management issues);
- Retention of mature trees as key habitat within field boundaries; and
- Habitat features such as reptile/amphibian hibernacula, basking banks for invertebrates and reptiles, bat and bird boxes - providing a resource to targeted species or species groups.

Fig.6.7_ Photograph - Grass snake (Target species)

Fig.6.8_ Photograph - Species rich grassland (target habitat)

Fig.6.9_ Photograph - Woodland edge (target habitat)

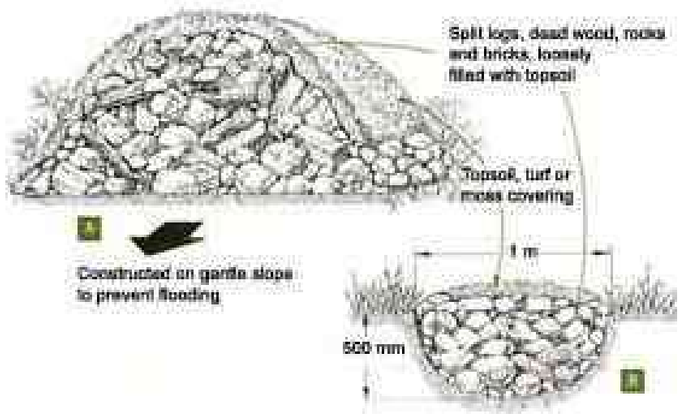


Fig.6.10_ HIbernaculum (illustrative detail)

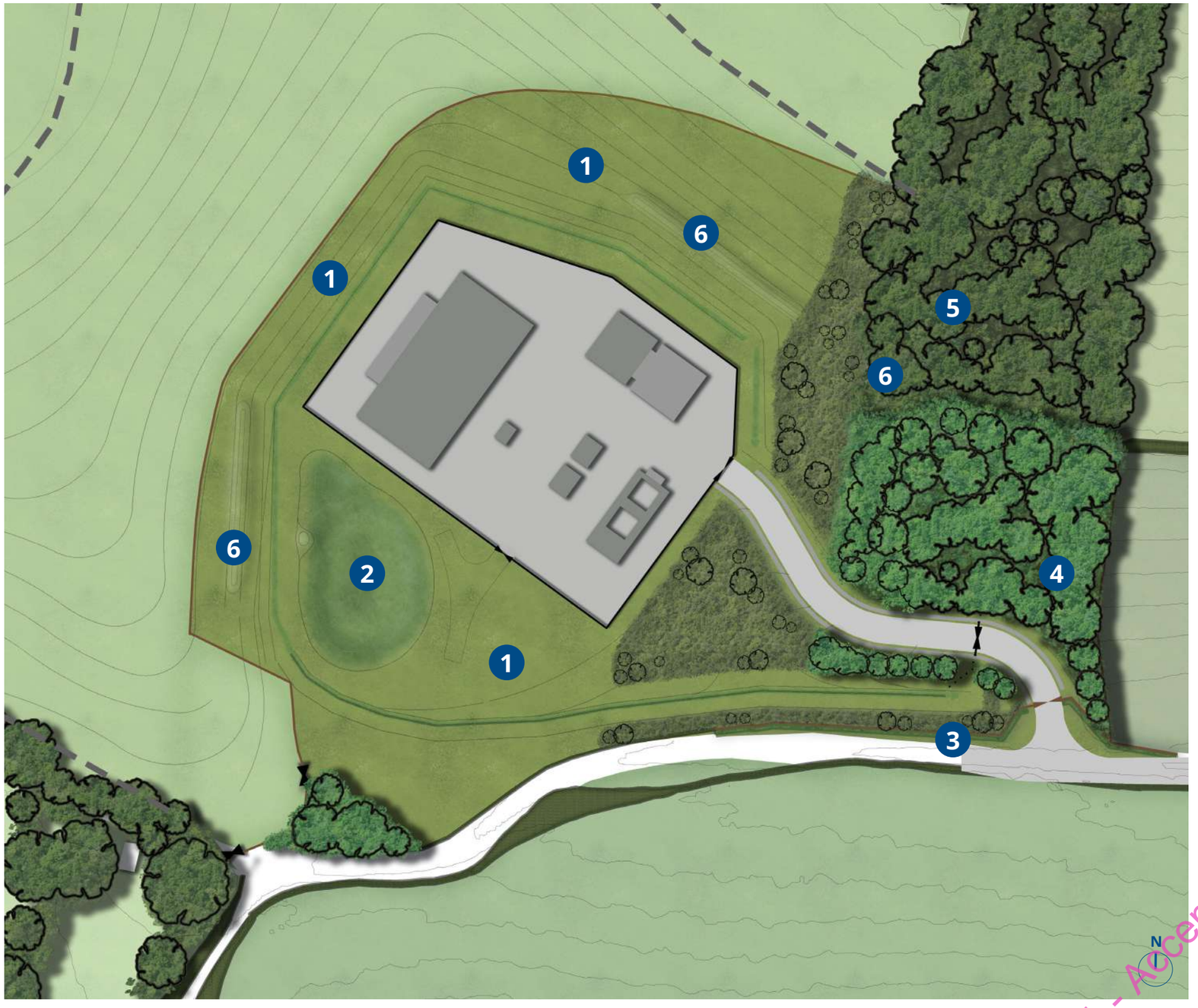


Fig.6.11_ Site plan - Habitat features

Key

1. Creation of calcareous grassland habitat informed by soil and substrate – reflective of Chilterns grassland.
2. New wetland habitat and ephemeral water bodies to diversify habitat mosaic.
3. Gap planting including grading tree/scrub planting into irregular diverse margins.
4. Extension of wider habitat corridors – foraging and movement corridors.
5. Retention of mature trees as key habitat within field boundaries.
6. Incorporation of incidental habitat features – hibernacula (see Figure 6.10), basking banks, bat and bird boxes etc.

Habitat Creation and Optimisation

6.3.4 Habitat management and establishment

Developing a comprehensive landscape design, fully integrated with ecological design, is only the first step to creating extensive areas of new and restored habitat that merges seamlessly into the existing landscapes. To achieve the desired high-quality habitats, clear principles will be established, to be applied during the construction and future management phases of the scheme. This will be critical to maximising the ecological potential of the new and restored habitats.

6.3.5 General principles

General principles to ensure effective construction and establishment of new habitats, will include:

- Designs will minimise future maintenance as far as possible. Future maintenance will be planned on a rotational basis, so that the extent of ecological management of newly established habitats is minimised.
- A Site-Specific Environmental Management Plan (SS-EMP) will be in place, identifying all sensitive environmental features, and clearly detailing mitigation/ compensation necessary to avoid impacts/ ensure no net loss during the construction period.
- Timing of the construction works, and future management will be planned to minimise ecological impacts to new habitats and the species they support. Autumn is often the best time for maintenance work since least disturbance to wildlife will be caused at this time of year.
- The use of artificial lighting during the construction work will be avoided/ minimised to avoid disturbance to light-sensitive populations of animals.
- An Ecological Clerk of Works (ECoW) will be appointed to assess the need for ecological supervision of the various component parts of the scheme, and to oversee any works in sensitive areas.

Habitat type	Construction	Management
Calcareous grassland 	Soils required for grassland planting areas will be made up from stripped/ retained low-fertility subsoil arising from within the site itself. No additional soils will be imported. Seed mixes will be planted directly onto the low-fertility subsoil layer, which will result in less growth of coarse grass species and a greater diversity of flowering plants due to reduced competition.	Grassland habitats are likely to be managed by cutting/mowing, which will aim to maintain and support the development of a structurally complex, flower-rich and species-rich sward. This will include shorter and longer areas of grass, and scrub of various ages and extents, to create complex edges and micro habitats for a diversity of invertebrates. Arisings will be removed to reduce nutrients within the soil and encourage flowering plants to thrive. Management shall be required to prevent weeds or early grasses from suppressing the flowers.
Hedgerow, woodland, scrub and woodland edge/ scrub planting 	Hedgerow and woodland reinstatement planting and enhancement planting will take place around the site boundaries. Excess topsoil removed from grassland areas will be used in areas of hedgerow, woodland and scrub planting. Planting will aim to replicate the species composition of woodland and scrub in the local area. The planting mix will also include a small number of fruiting shrubs and trees to add diversity. Layout of planting will replicate a natural landscape, ensuring spacings and patterns of planting are random rather than uniform.	Rabbit fences or guards will be provided and maintained whilst plants become established. They will be removed once plants are less sensitive to attack by animals. Planted trees and shrubs will be maintained to ensure their long-term survival and development of wooded habitats. This will comprise checks for tree mortality and replacement of dead plants, and watering and weeding as required. Fallen trees and standing deadwood will be retained where possible to maximise biodiversity of new woodlands.
Micro habitats for protected species 	Reptile and invertebrate 'basking' banks, hibernacula and a reptile egg-laying heap will be installed during the habitat creation phase. Bat and bird boxes (including a barn owl nesting box) will be installed in mature trees around the site margins. If available following site clearance, any dead wood, coppice stools and saplings will be salvaged and re-used in created woodland to provide additional habitat.	Habitat features will be subject to annual checks to control any dense growth of invasive plants and to cut back vegetation growth to maintain open south-facing sides of basking banks and the hibernaculum and to assess condition and make repairs as required. A licensed bat ecologist will inspect and maintain boxes at least once a year to ensure that they do not fill with material or become blocked. Bird nest boxes will be subject to annual checks and maintenance.

6.3.6 Planting and seeding schedules

Planting Schedule

Species Schedule		Woodland Mix	Woodland Edge and Scrub Mix	Hedgerow
Acer campestre	Field maple	x		x
Carpinus betulus	Hornbeam	x		
Cornus sanguinea	Dogwood		x	x
Corylus avellana	Hazel	x	x	x
Crataegus monogyna	Hawthorn	x	x	x
Euonymus europaeus	Spindle		x	x
Fagus sylvatica	Beech	x		
Ilex aquifolium	Holly	x	x	
Ligustrum vulgare	Common privet		x	x
Lonicera periclymenum	Honeysuckle			x
Malus sylvestris	Crab apple		x	x
Prunus avium	Wild Cherry	x	x	
Prunus spinosa	Blackthorn		x	
Rhamnus cathartica	Purging buckthorn		x	
Rosa canina	Dog rose		x	x
Rosa rubiginosa	Sweet briar		x	x
Quercus robur	Common Oak	x		
Salix caprea	Goat willow		x	
Sambucus nigra	Elder	x	x	x
Sorbus aucuparia	Rowan	x		
Taxus baccata	Yew	x		
Tilia cordata	Small-leaved lime	x		
Viburnum opulus	Guelder rose		x	

Planted as transplants and feathers (25% of Oak and Beech as feathers); planted areas undersown with shade tolerant grass mix.

Seeding Schedule

Grassland species	Wet	Species Rich	Shady
Achillea millefolium	x	x	x
Achillea ptarmica	x		
Agrimonia eupatoria			x
Agrostis capillaris	x	x	x
Alliaria petiolata			x
Alopecurus pratensis	x		
Anthoxantheum odoratum	x		x
Betonica officinalis	x		
Brachypodium sylvaticum			x
Briza media	x		
Centaurea nigra	x	x	x
Clinopodium vulgare			x
Cynosurus cristatus	x	x	x
Deschampsia cespitosa	x		x
Digitalis purpurea			x
Festuca rubra	x	x	x
Festuca rubra juncea			
Filipendula ulmaria	x		
Galium mollugo			x
Gallum verum	x	x	
Geum urbanum			x
Geum rivale	x		
Hordeum secalinum	x		
Hypericum perforatum			x
Leucanthemum vulgare	x	x	x
Lotus pedunculatus	x		
Lotus corniculatus		x	

Seeding Schedule (continued)

Grassland species	Wet	Species Rich	Shady
Phleum bertollini		x	
Plantago lanceolata	x	x	x
Plantago media		x	
Poa nemoralis			x
Primula veris	x		x
Primula vulgaris	x		x
Prunella vulgaris	x		x
Ranuncula acris	x	x	
Rhianthus minor	x	x	
Rumex acetosa	x	x	
Sangulsorba officinalis	x		
Schedonorus pratensis	x		
Silene dioica			x
Silene flos-cuculi	x		
Stachys officinalis			x
Succissa pratensis	x		
Torilis japonica			x
Trifolium pratense	x	x	x
Vicia cracca	x		x
Viola cracca			
Vicia sativa ssp. segetalis			x

Landscape Character

6.4.1 Overview

The design principles set out a requirement to restore the site(s) in a manner which responds to key character drivers. In the case of Chalfont St Giles the components of character which are most relevant include:

- Sympathetic ground modelling to retain the form and character of the chalk valley – whilst retaining a proportion of excavated materials on site to meet sustainability objectives;
- Retention and strengthening of linear vegetated boundaries – reflecting local pattern of woodland belts and boundary hedgerows;
- Maintaining as far as practicable the enclosed and 'sunken' character of Bottom House Farm Lane;
- Consideration of more distant views and how site 'stitches ' back into its setting of the Chilterns AONB particularly in views from higher ground to the south; and
- Maintaining visual (and noise) screening from Hobbs Cottage

These are discussed in more detail in the following section.

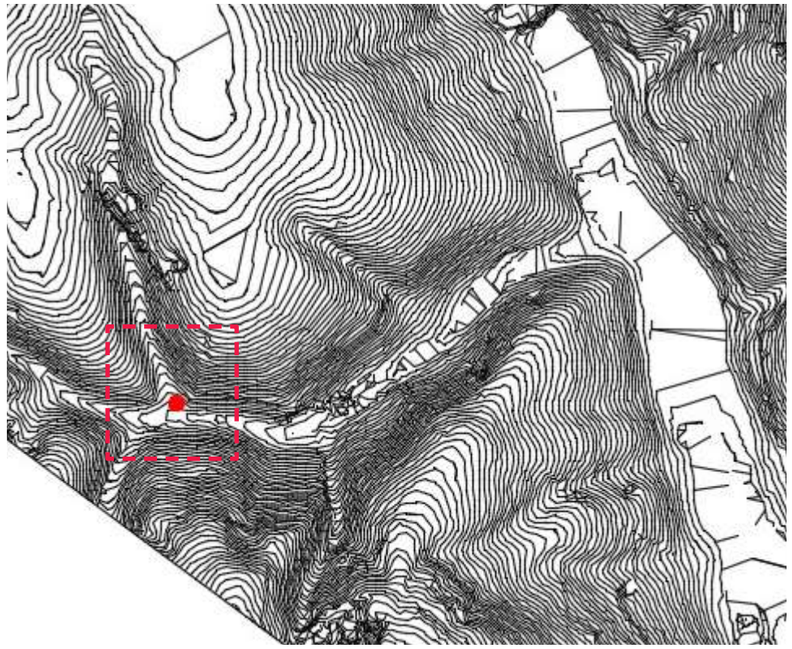


Fig.6.12_ Contour map - Existing topography

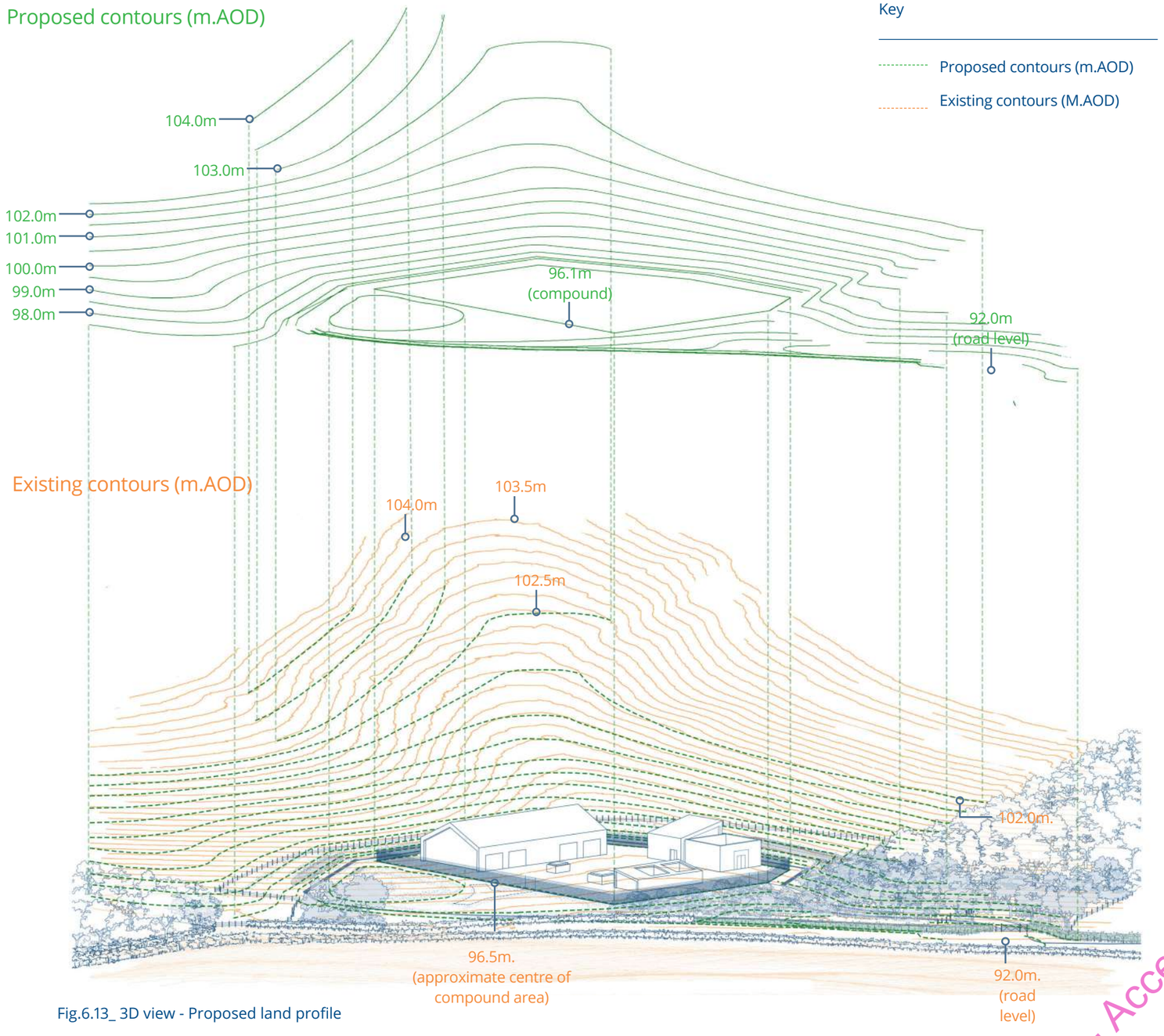


Fig.6.13_ 3D view - Proposed land profile

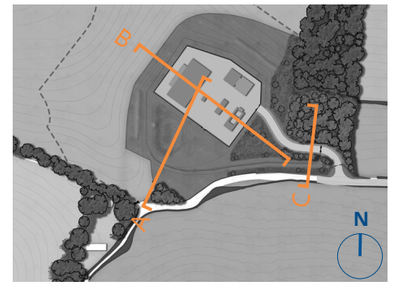
6.4.2 Topography

The site itself is steeply sloping and the intervention of the Headhouse and level compound area will inevitably create localised alteration to the topography. In developing the proposed ground model the design has had to be cognisant of several demands/ requirements, including but not limited to:

- ensuring appropriate conveyance of surface water to (a) avoid conflict with HS2 infrastructure which may disrupt the safe operation of the railway; and (b) to maintain appropriate surface and subsurface flow patterns on land outside of the operational HS2 footprint;
- being capable of achieving suitable grade access for vehicles from Bottom House Farm Lane; and
- contributing to HS2 sustainability objectives relating to the reuse of site won materials (soils) to obviate need for transporting off site.

The proposed ground model is illustrated opposite in Figures 6.13 and Sections A-C opposite (Figure 6.14). The key components are as follows:

- the general form of the dry valley has been retained. Site won material will be placed on the back slope with some slight realignment of the crests of the 'u-shaped' valley;
- a back slope with a maximum gradient of 1:3 within the boundary fence with an incrementally shallower slope outside of the fence typically between 1:6 and 1:10 gradient before tieing back into existing ground levels;
- the compound sits on a level plateau and is perched above the road. The position of this is governed by the below ground track alignment however some micrositing and optimisation of the compound footprint has reduced the need to cut into the hillside and/ or build up land at the lower level;
- By setting the compound at the level shown, this allows vehicles to access the site at acceptable gradients from Bottom House Farm Lane and to traverse the side slope rather than cutting more 'aggressively' into the embankment which runs parallel to Bottom House Farm Lane;
- A shallow ditch feature wraps around the compound to capture and convey surface water flows from the wider catchment (and also on its southern edge provides a security ditch). This is perched above the road and set behind hedgerows and planting and will not be visible from publicly accessible areas.
- A shallow depression is also provided in the centre of the site to deal with water discharge from the shaft and compound areas.



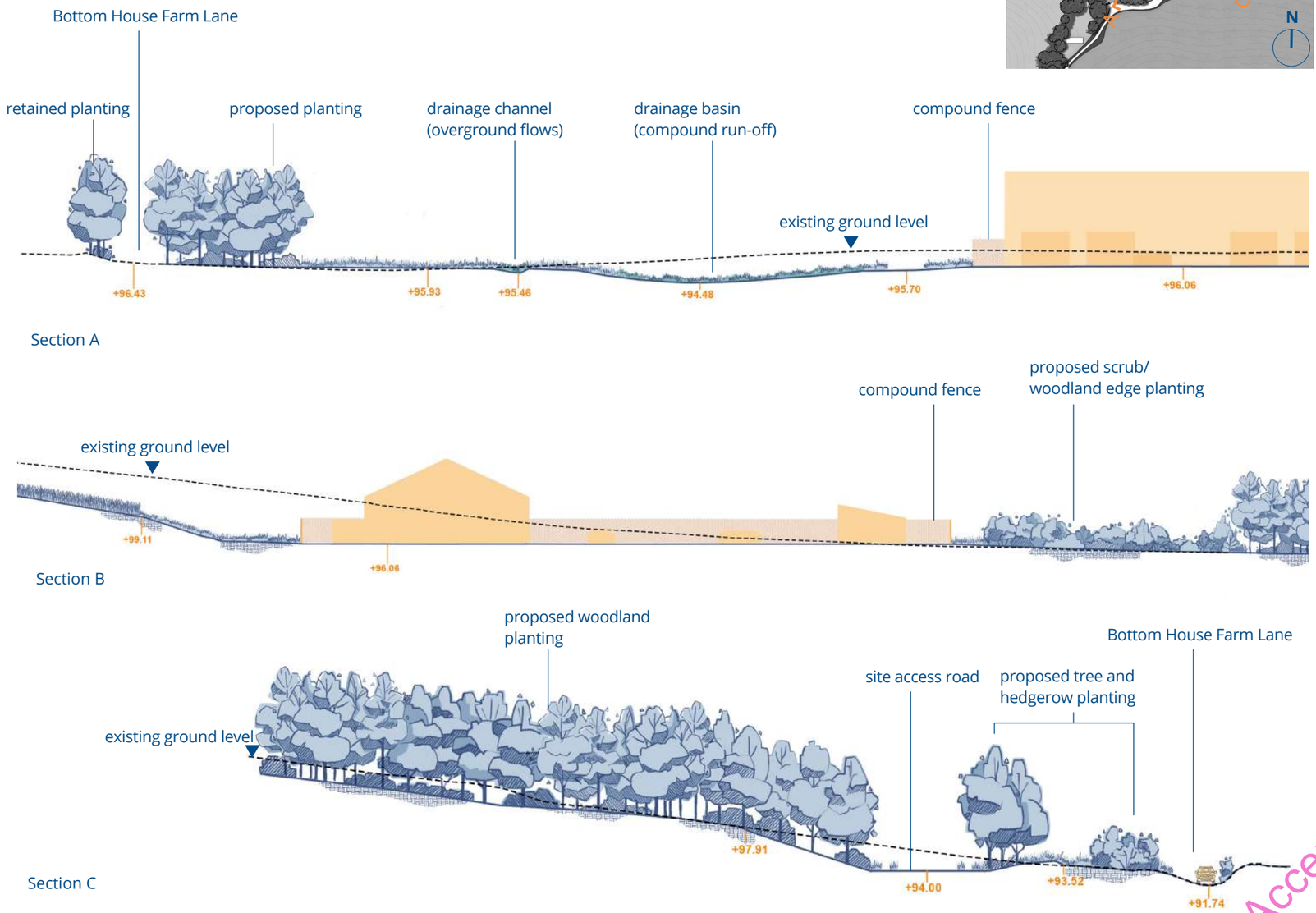


Fig.6.14_ Site sections - Proposed

6.4.3 Accessibility and community

Opportunity for public interaction with the site is limited, particularly in terms of physical access due to the need to provide a secure site for operational purposes. The site is also very isolated and detached from main settlements and is not directly on, or adjacent to, public rights of way.

The primary design objective for the site is to optimise biodiversity through establishment of appropriate flora and provision of suitable habitat. This approach is in part predicated on restricting formal public access which may create adverse disturbance to habitats and plant communities.

Notwithstanding the above, there are opportunities to create some interaction and aid public understanding of the visible features; the greatest value is likely to be derived through provision of interpretation and information. This could be delivered by installations on public rights of way and adjacent to the site on Bottom House Farm Lane using devices such as panels and/ or QR codes which link to an information database. These elements are identified in this DAS as opportunities and would require agreement with third party land owners. Further detail will be developed in due course.

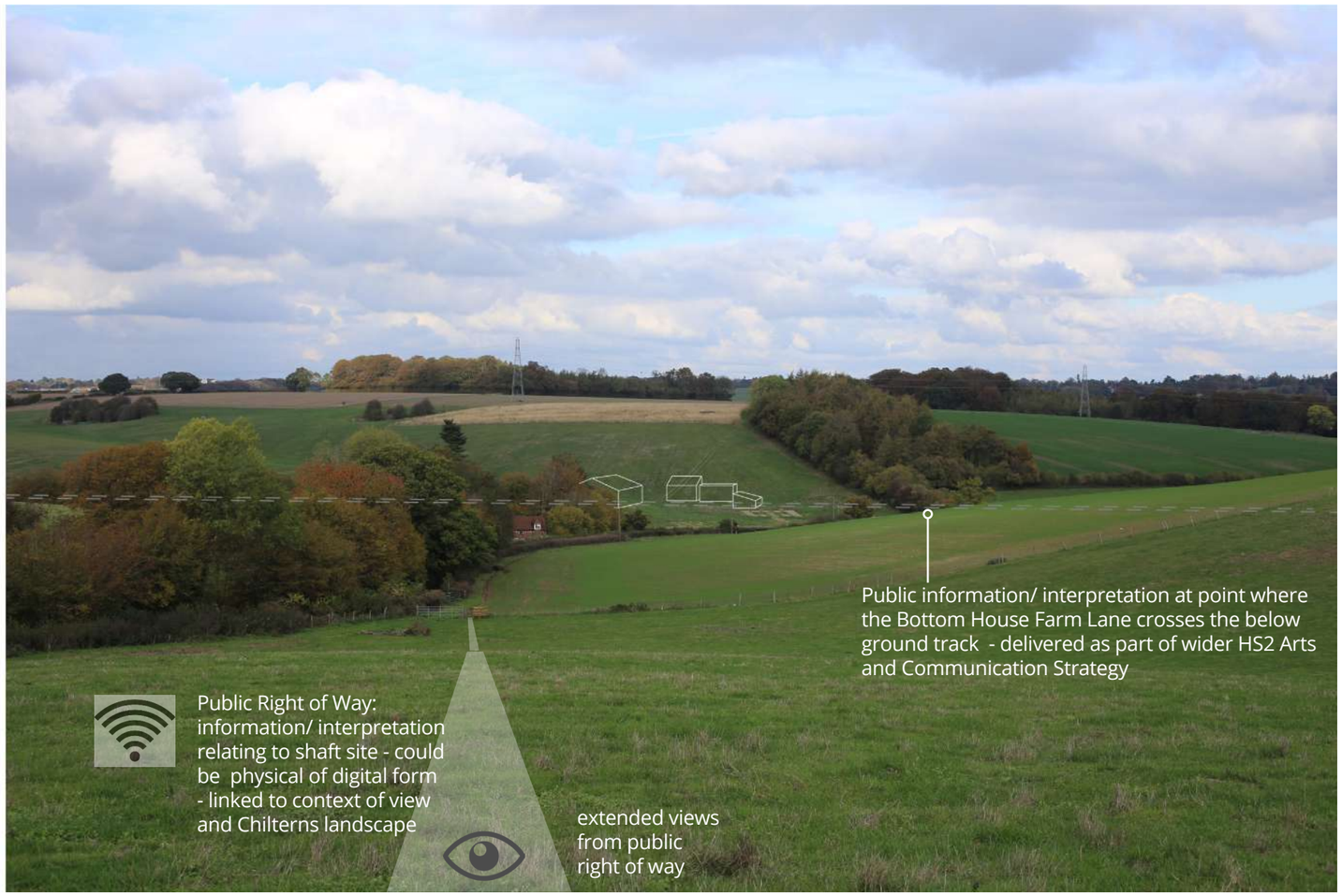


Fig.6.15_ Diagram - Access and interaction

Site Security

6.5

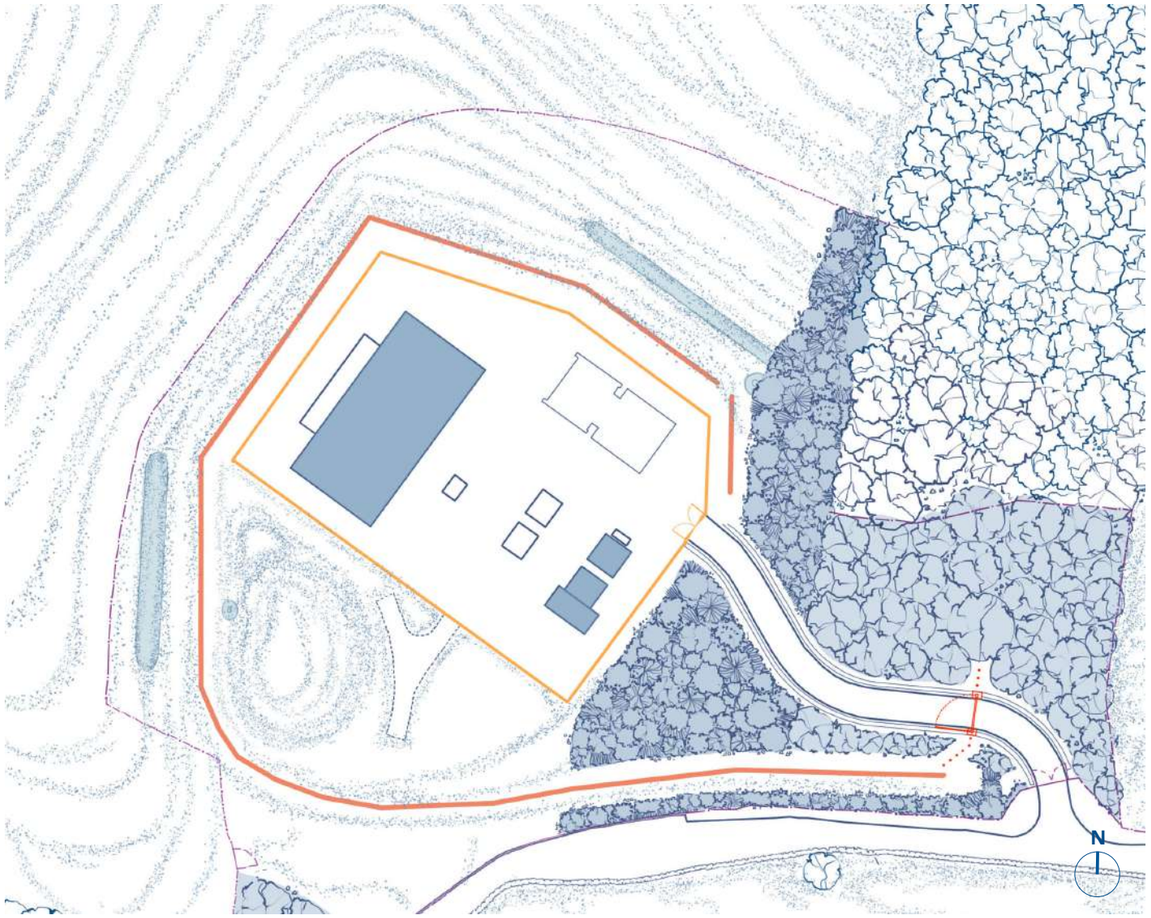
6.5.1 Security strategy

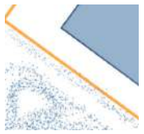
HS2 facilities need to have adequate security, which meets the HS2 security guidelines. The main elements of the security design include:

- A high level of protection around the compound and ventilation infrastructure;
- Secure fencing around the compound to prevent public access to the site - whist allow access for maintenance purposes;
- Gated access from the junction with Bottom House Farm Lane which, in part is to prevent unauthorised vehicle access to the compound, and also to deter fly-tipping; and
- The site boundary fencing which serves to delineate ownership boundaries and functions as a very low level deterrent to trespassing onto land.

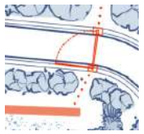
The design approach aims to integrate the different levels of security in a manner which is as recessive as possible and largely landscape led. This comprises the features which are set out in Figure 6.16, comprising:

- A weldmesh fence topped with three strands of barbed wire around the site compound. The colour of the fence is flexible and at this stage we are proposing a black finish as this tends to be more recessive when viewed against the backdrop of darker buildings and planting.
- The outer 'wrap' of the field will include timber post and wire fencing reflecting the agricultural nature of the landscape and, over time this will blend with proposed and existing planting. At the site entrance the fenceline will join with a timber field gate.

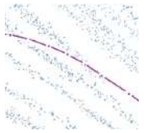




Compound Edge – black weld mesh fencing with three strands of barbed wire



Earthwork and secure entrance gate



Site Boundary – Post and wire, timber gate & hedging

Fig.6.16_ Site plan - Proposed site security and boundary

Highways

6.6

6.6.1 Highways infrastructure

The site is served by a single access road with connection to Bottom House Farm Lane. The general arrangement of this is illustrated in Figure 6.17 with technical details including swept paths, visibility splays and geometry shown in Figures 6.18 - 6.20.

The permanent vehicle route into the site has been designed to a minimum width to allow suitable access by the largest anticipated maintenance vehicle.

This road is equivalent to the dimensions of the enhanced Bottom House Farm Lane carriageway (delivered as part of the early works contract) and would be an asphalt construction. Grassed verges to either side will be allowed to grow 'tall' to help to integrate the road within its rural setting with the verge also accommodating filter drains.

The location of the access has been moved further to the east compared with the Hybrid Bill Design which has resulted in retention of more vegetation, reduced the extent of hard surfacing and has created a smaller and more optimised overall site footprint. The 'dog leg' alignment from Bottom House Farm Lane also helps to screen direct views of the headhouse and compound from the lane. The bellmouth is designed to force vehicles into a 'right turn in' and 'left turn out' movement to reduce likelihood of vehicles accessing and exiting from/to the west where the road is very narrow.

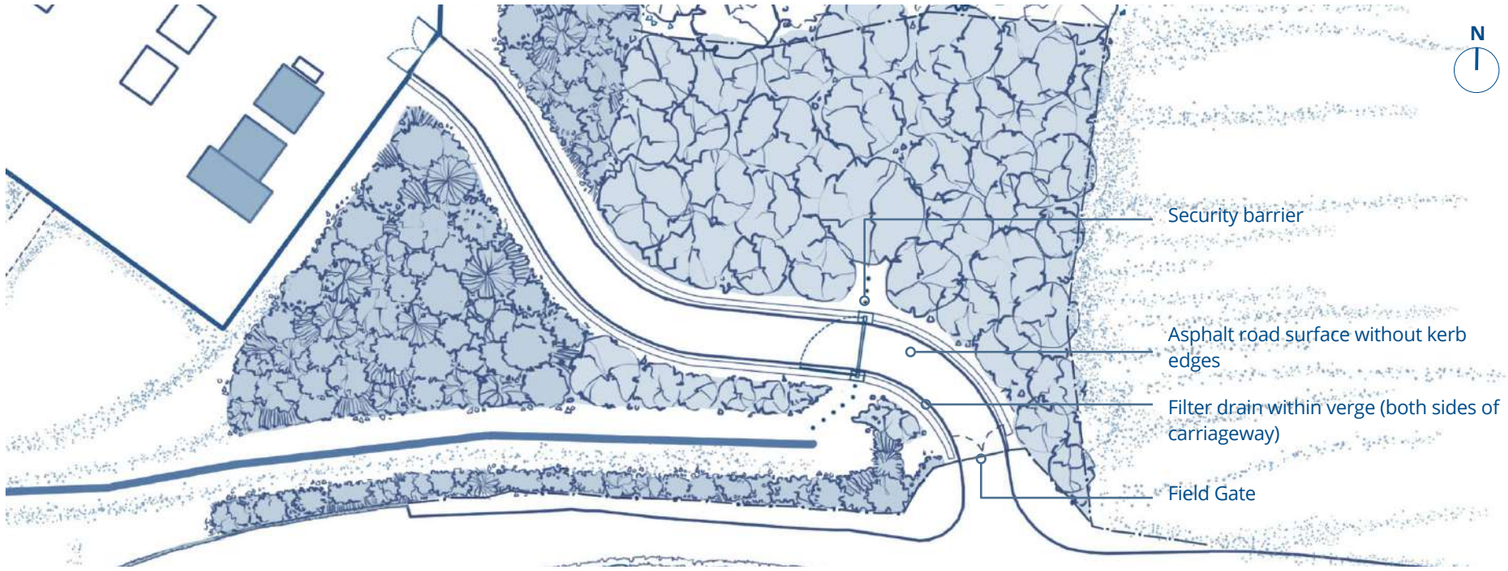


Fig.6.17_ Plan - Access road general arrangement

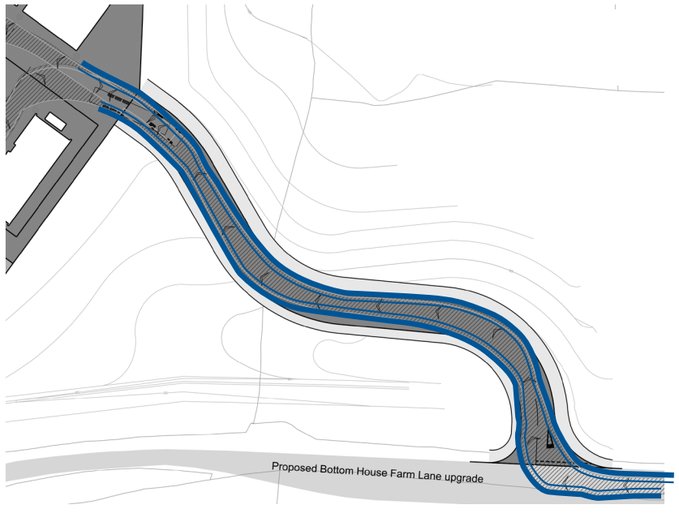


Fig.6.18_ Plan - Access road swept path for articulated vehicle

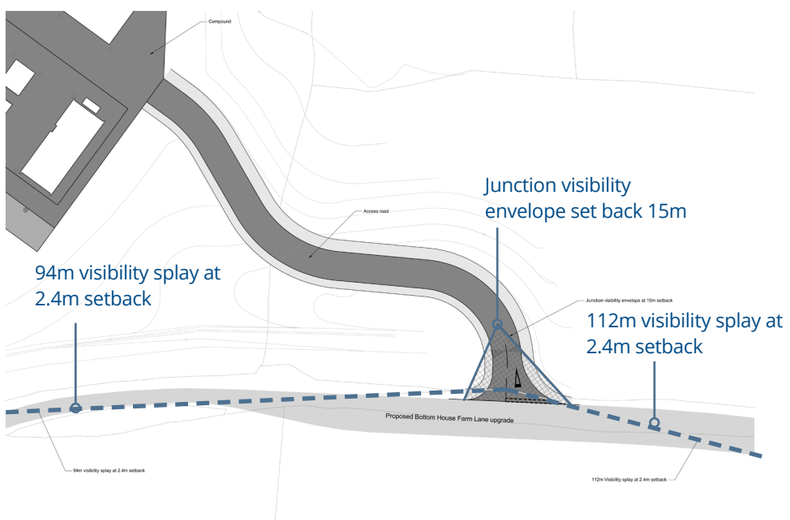


Fig.6.19_ Plan - Access road visibility splays

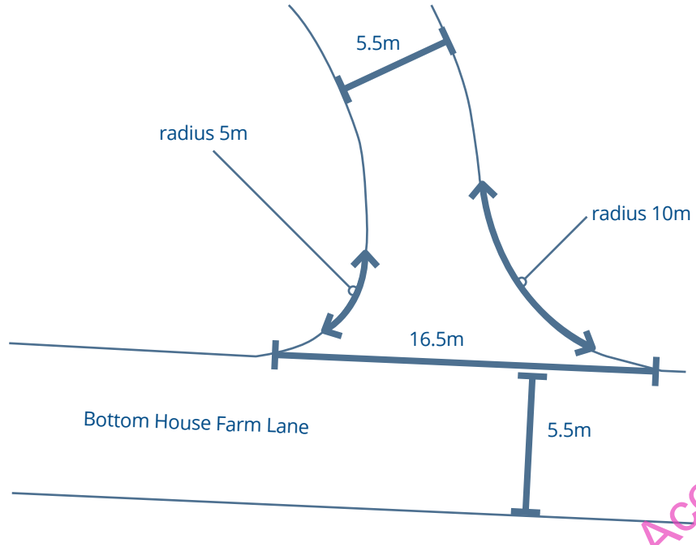


Fig.6.20_ Plan - Access road geometry

Drainage

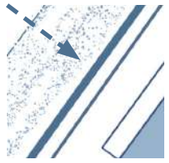
6.7

6.7.1 Drainage infrastructure

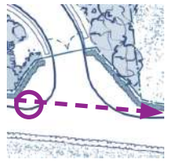
The drainage strategy for the shaft site is a combined system to both capture and convey overground flows from adjacent land and greenfield areas within the site as well as collect and convey rainfall which falls within the compound.

The perimeter drainage ditch, which will be seeded to establish a vegetated profile, captures runoff from external catchments (in this case mostly fields and woodland) and directs it around the outside of the buiding curtilage to prevent flooding of the HS2 compound. The drainage within the curtilage wraps around the external envelope of the compound inside the secure fenceline. This is required to intercept and convey runoff generated by the buildings and hardstanding. The hardstanding will be impermeable in order to prevent water seepage into the basement below.

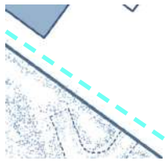
Figure 6.21 illustrates the general principles of the site drainage which comprises:



Landscape Drainage – Subtle use of landscape earthworks to 'push' and channel landscape run off around the compound and back into the surrounding natural drainage pattern.



Highways drainage - upgraded as part of Bottom House Farm Lane widening works



Railway Drainage – Water falling in the compound is collected via linear channel drains and directed to the perimeter filter drains, which is then piped into a basin. Water is attenuated in the basin and outfalls into the perimeter drainage ditch with a limited peak flow.

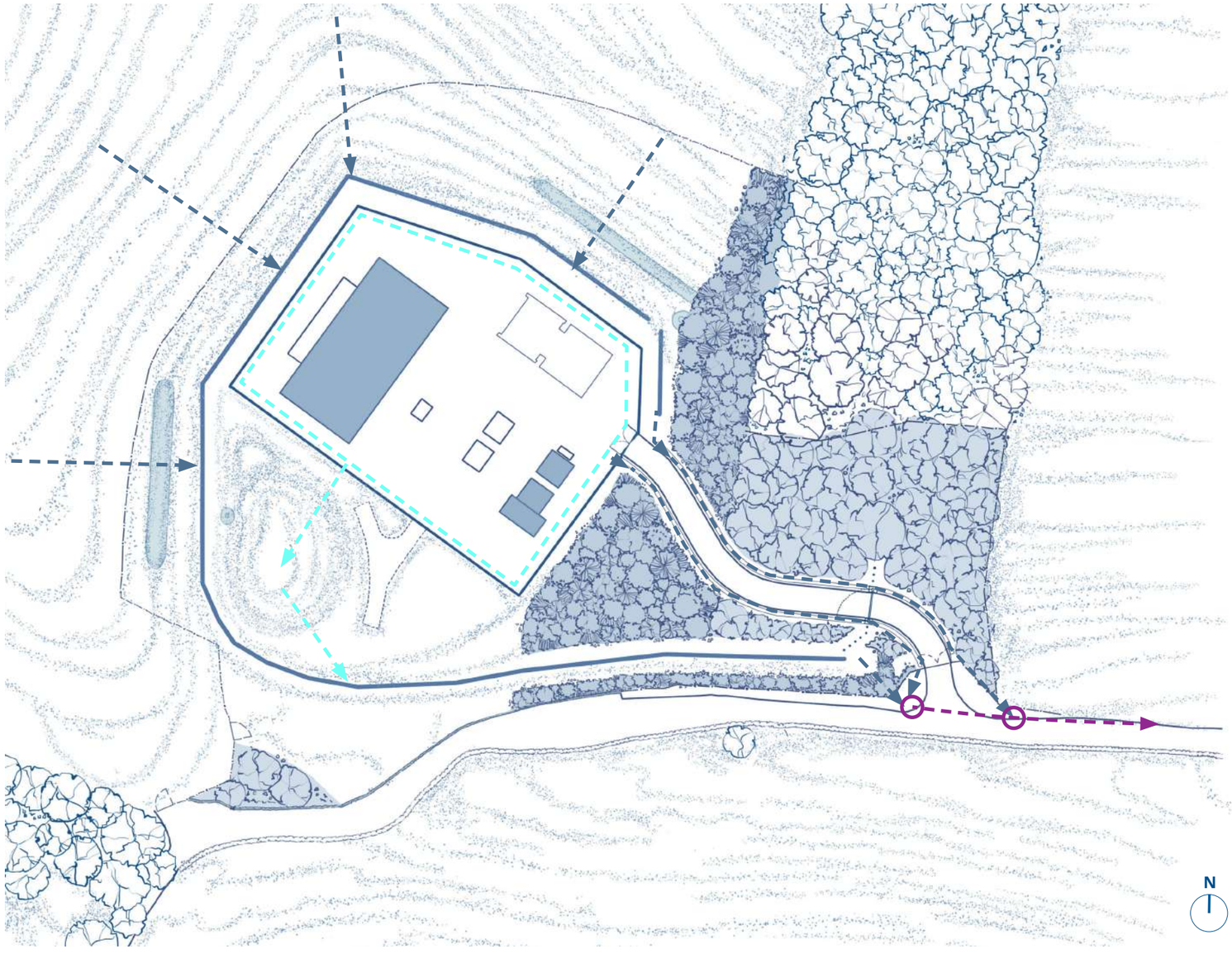


Fig.6.21_ Plan - Site and compound drainage

7.0
Sustainability

Summary of how environmental, social and economic considerations have influenced the design proposals.

Overview

7.1.1 Overview

HS2's ambition is to build the most sustainable high speed railway of its kind in the world. The HS2 sustainability policy identifies five themes reflecting the economic, environmental and social aspects of sustainability.

These are:

- Spreading the benefits: Economic growth and community regeneration
- Opportunities for all: Skills, employment and education
- Safe at heart: Health, safety and well-being
- Respecting our surroundings: Environmental protection and management
- Standing the test of time: Design that is future proof

7.1.2 Sustainability commitments

The Main Works Civil Contract (MWCC), ALIGN JV, has made sustainability related commitments as a part of their U&A's and meeting HS2 Technical Standards. These commitments include:

- The Infrastructure works will be designed and constructed to meet an aspirational rating of 'Excellent' under BREEAM Infrastructure (Pilot) scheme.
- Develop a carbon management strategy with a carbon reduction target of 50%. The sustainability criteria are applied to all stages of the project, through design, construction and operation.

7.1.3 BREEAM assessment

The HS2 Phase One development is being assessed against the BREEAM New Construction Infrastructure (Pilot) scheme. ALIGN JV is required by HS2 to ensure that all works under the MWCC C1 contract are fully compliant with the HS2 BREEAM requirements and that the C1 project aspires towards achieving a BREEAM rating of Excellent and a minimum target score of 70%.

The Chalfont St Giles Vent Shaft will be assessed as a part of the C1 assessment and its design and construction will aim to meet the target Excellent rating with a score in excess of 70%.

A BREEAM Infrastructure assessment is broken down into a Strategic Assessment and Project Detail Assessment, which includes the design/ interim stage and final/post construction stage.

A single Strategic Assessment has been undertaken by HS2 for the whole of the HS2 Phase One development. The Strategic credits awarded in this assessment total a score of 20.78%. This will be carried over to the Project Detail Assessment.

The assessment involves meeting best practice sustainability criteria (set out as a series of individual 'credits') across the following categories:

- Integrated Design
- Resilience
- Stakeholders
- Local Well-being
- Transport
- Land use and Ecology
- Landscape and Heritage
- Pollution
- Materials
- Carbon and Energy
- Waste
- Water
- Innovation

The development of this assessment is ongoing and is not required to be complete at the scheme design stage. However, where the scheme design has benefited the overall sustainability of the C1 section of HS2, some of these are referred to in the following sub-sections.

7.1.4 Resilience

A Climate Change Adaptation & Resilience report has been prepared identifying measures to mitigate and adapt for potential climate impacts.

All vent shafts structures are designed with consideration for the 1 in 1,000 year storm event; and all drainage in vent shaft compounds is sized for 1 in 1,000 year storm event. The 1 in 1,000 design of the shaft is sufficient to avoid flooding and has more critical flows than the 1 in 100 + 60% climate change scenario for both the vent shaft structures and the shaft compounds. The building on Chalfont St Giles is generally not designed to be occupied or heated and therefore, heating and cooling systems for human occupation are not subject to climate change impacts. However, some mechanical and electrical systems within the buildings will require mechanical heating.

The proposed compound will be situated near the convergence of three valleys. There is an existing risk of surface water flooding across the compound and along Bottom House Farm Lane, and from there, potentially to the River Misbourne. To mitigate this risk, sustainable drainage systems (SuDS) will be provided where possible with allowance for climate change, in accordance with current best practice planning guidance.

The surface water drainage system will provide suitable drainage to prevent ingress of off-site overland flows into the compound area; which will include discharge flows to a proposed infiltration basin. The system will also provide drainage to the access roads and discharge flows to a suitable receptor.

Flood mitigation measures will include raising the threshold of the vent house and any openings at least 300mm above the surrounding ground levels to ensure no ingress of surface water in a heavy rainfall event. Proposed landscaping will include altering surface water flowpaths, reprofiled bank in the form of swales and an infiltration basin. Surface water will also drain into a ditch along Bottom House Farm Lane.

The choice of planting species and procurement of planting stock will take into consideration climate change resilience; this is guided by HS2 Technical Standard HS2-HS2-SU-STD-000-000003 (Climate Change Adaptation and Resilience).

The Chalfont St. Giles Shaft includes the external concrete Diaphragm walls (D-walls), capping beams, concrete internal liner, the base slab, the primary and secondary linings of the intervention adits, including a crossing adit and a connection adit. All materials specified for the shaft are highly durable and robust, maximising the design life of the asset.

7.1.5 Stakeholder

There has been extensive stakeholder consultation and engagement, which has influenced the design of the structure and landscape. The design has been shared with the Local Planning Authority, Buckinghamshire Council, the HS2 Ltd Area of Outstanding Natural Beauty Review Group (which includes Natural England), key environmental groups, businesses and the local community. A public engagement event was held in Feburary 2020 where the designs were exhibited, and feedback received. A follow up public engagement event will be held in January 2021 to present to the public how the designs have developed following the first event. In addition to the above, regular engagement with the community throughout the construction programme, in accordance with the Code of Construction Practice (CoCP), will be undertaken.

7.1.6 Land Use and ecology

A biodiversity action plan (BAP) will be produced for the Chalfont St Giles site and will cover construction and in-use phases of the project. Provisions will be made to protect the local habitat and species of principal importance.

Measures have been taken in the landscape design to ensure no net loss (NNL) in biodiversity. These have included conserving as much of the most sensitive habitats as possible and introducing new habitats.

Areas of planting and seeding will aim to maximise biodiversity using species rich seed mixes and native species plant types. Overall, the present calculations for no net loss is showing a positive benefit which will be carried forward into the technical design stage. Areas around the Chalfont St Giles vent shaft and other shaft sites will include the creation of wildflower and invertebrate-rich calcareous grassland, and 'wood pasture' type habitats, the latter created through tree and scrub planting (with natural colonisation supplementing planting). These habitats are now rare and threatened both locally and across England. The habitat creation will contribute substantially to local nature conservation objectives.

Please refer to section 6.2 for more information on landscape and ecology.

7.1.7 Landscape and heritage

The landscape design will be fully integrated and maximises the biodiversity potential of new areas of landscape planning and habitat creation.

Extensive stakeholder engagement has helped to understand what is important to the local community. The landscape section of this Design and Access Statement includes full details of the proposed landscape design and the Indicative Mitigation Details (1MC05-ALJ-TP-REP-CS01_CL01-000007) sets out the proposed species mix and management regime associated with this.

The Chalfont St Giles shaft site is located in a predominantly rural and agricultural area with a broad pattern of landscape primarily laid out during the medieval and early medieval periods. Approximately 900m north-east of the shaft site is the Bottom House Lane grouping consisting of a farmstead of four Grade II Listed Buildings centred on the 19th century Lower Bottom Farmhouse. This is a red brick building, with associated farm buildings including a late 18th century timber-framed barn, a late 18th century timber granary on stone staddle stones and a late 18th century brick stable building.

A heritage specialist will be integrated into the project team to provide support with preservation and mitigation measures with respect to the heritage assets. The specialist will also undertake monitoring and reporting of the mitigation works during the construction process.

7.1.8 Pollution

Air quality mitigation measures for construction and operation will be identified and implemented.

All non-road mobile machinery engines will be required to comply with current versions of EU Directive Staged Emission Standards (97/68/EC).

A plan to minimise watercourse pollution will be developed for the construction of the Chalfont St GIles shaft and will include the reusing water on site.

The Chalfont St Giles Vent Shaft will aim for the operational noise and vibration to be less than the significant observed adverse effect level (SOAEL) through the use of best practicable means (BPM).

The temporary lighting on the Chalfont St Giles Vent Shaft will make sure that it will be directed onto the site, away from the sky, dwellings and areas containing wildlife.

7.1.9 Materials

A life cycle assessment has been undertaken to determine the impacts of the project over the course of its lifetime, from cradle to grave. Opportunities have been identified through the design process to use materials with lower embedded carbon. Materials that have significant carbon emissions will be specified with Environmental Product Declarations (EPDs).

A Sustainable Procurement Plan has been prepared to make sure all major materials including for the temporary works will be responsibly sourced. Discussions have taken place with suppliers to make sure both EPDs and BES 6001 certification can be provided.

The volume of concrete required for the construction of Chalfont St Giles has been reduced where possible through design optimisation. The specification for most concrete components will include a proportion of ground-granulated blast-furnace slag (GGBS), to achieve high levels of durability and strength. GGBS is obtained by quenching molten iron slag from a blast furnace in water or steam, to produce a granular product that is then dried and ground into a fine powder. As a by-product of the steel manufacturing process, the use of GGBS in concrete provides environmental benefits.

Zinc uses the least amount of ores out of all non-ferrous metal cladding, approximately 1/4 that of aluminium and 1/2 that of copper and steel. Additionally, zinc requires low levels of maintenance during its life cycle and is a self finish material that ages with beauty, avoiding the requirement for continuous redecoration.

Please refer to section 5.5 for more information on materials.

7.1.10 Carbon and energy

The carbon impact of the Chalfont St Giles Vent Shaft has been calculated over its expected lifetime. Opportunities have been identified to reduce the carbon by 32% from the baseline carbon footprint. Key reductions in carbon are attributed to the reduction in materials including concrete and steel based on design optimisation.

7.1.11 Waste

The project will aim to divert up to 95% (tonnage) of construction waste from landfill. All excavated materials generated on site will be reused on the scheme.

7.1.12 Water

Measures to reduce water consumption are being considered such as the use of water efficient fittings in all compounds and collecting surface water run off for reuse for dust suppression and wheel washing. The construction method of the shaft D-walls negates requirement for dewatering during the construction process and will result in a substantial reduction in water abstraction compared with other processes.

HS2 Sustainabilty Goals

Spreading the benefits

Economic growth and community regeneration

Being a catalyst for regeneration and economic growth across the UK, maximising the benefits to communities and individuals and minimising the negative impacts

Opportunities for all

Skills, employment and education

Providing rewarding jobs and careers that are open to all in society, setting new standards for equality, diversity and inclusion and providing a legacy of skills, learning, expertise and experience

Safe at heart

Health, safety and well-being

Creating a world-class 'safe at heart' culture where no one gets hurt, and which prioritises the health and well-being of those who build, operate, use and host HS2 services and infrastructure

Respecting our surroundings

Environmental protection and management

Being a catalyst for breaking new ground wherever possible on environmental standards including resource use, waste, carbon minimisation, the protection of the natural and historic environment and safeguarding communities.

Standing the test of time

Design that is future-proof

Designing a network that is resilient to climate change, adaptable to future trends and demands, and built around the needs of the people who will use it.

Fig.7.1_ HS2 sustainability goals

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8.0
Engagement

Summary of the various methods and results of engagement with local authorities, stakeholders, the local community and the HS2 Independent Design Panel undertaken to date.

Engagement Process

8.1

8.1.1 Overview

ALIGN JV has undertaken extensive engagement with the AONB Review Group and HS2 Independent Design Panel. Design proposals have also been shared with the Buckinghamshire Council (and the former Chiltern District and County Councils), statutory consultees, environmental groups and local communities through public engagement events. Engagement with these parties has informed the design proposals subject to these Schedule 17 requests.

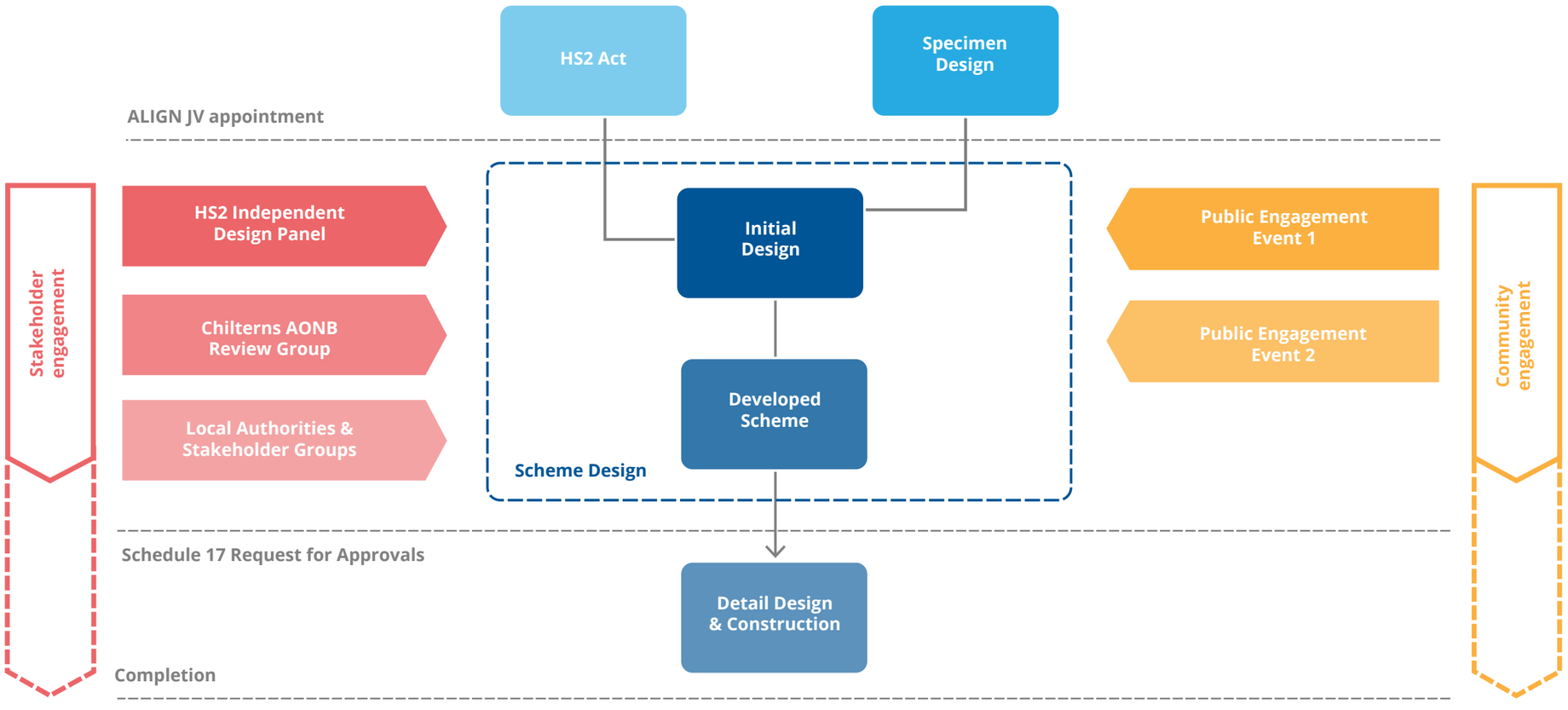


Fig.8.1_ Diagram - Engagement process

Stakeholder and Public Engagement

8.2

8.2.1 Stakeholder engagement overview

ALIGN JV has worked closely with key stakeholders to seek views and ideas to help develop the design of the CSG and associated landscaping. The key stakeholders engaged during the design process to date include:

- AONB Review Group
- Local Authorities including Chilterns and Buckinghamshire Council (and the former Chiltern District and County Councils) and Buckinghamshire County Council
- Local community
- Natural England and Environment Agency
- HS2 Independent Design Panel

For further information on stakeholder engagement please refer to the Written Statement 1MC05-ALJ-TP-REP-CS02_CL04-000018 and the HS2 Independent Design Panel Report submitted as part of this Design and Access Statement.

8.2.2 Public engagement overview

Seeking public views and ideas for Key Design Elements is a crucial part of the design development process. In accordance with the strategy utilised for the Colne Valley Viaduct, ALIGN JV ran two rounds of public events – an Initial design and a 'You said, we did' event. This approach allows stakeholders to view early design proposals, provide comments and then see how we have responded to the comments we received.

Feedback from the Initial design event in Febuary 2020 was gathered from freepost questionnaires, email, and an online survey. Respondents were also given the option to submit comments by phone to HS2 Enquiries. Respondents were asked to complete a questionnaire covering four topics and were asked to rank our objectives in order of priority and provide additional comments.

In early 2021, ALIGN JV will hold the 'You said, we did' event. The feedback gathered from the first event will be presented to the public along with the updated design identifying how ALIGN JV have responded to the feedback.

Public Engagement

8.2.3 Event 1: Initial design

Align JV together with HS2 Ltd presented initial design proposals for the CSG Vent Shaft in Febuary 2020 at Chalfont St Giles Town Hall. At the events the public were presented with 14 exhibition panels describing the following themes;

- Existing context
- Landscape design & Ecology of site
- Design proposal
- Building Principles and Materials
- Construction Site Layout and processes
- Views from Bottom House Farm Lane and Public Footpaths

The panels included sketches and early design options to reflect the initial stages of design.

Residents were provided with leaflets summarising the initial design proposals together with a questionnaire asking them to provide feedback on four design and construction topics and asked to rank a series of design objectives by rating them from 1 (high) to 6 (low), in order of priority and provide additional comments. Exhibition materials and the questionnaire were made available online.

The top-ranking objective in each category is shown below along with examples of some of the comments received.

Landscape

You said: Reflect the rural character of the site and its surrounding landscape

- "The natural view of the valley needs to be preserved"

Ecology

You said: Restore the area using planting of native or indigenous species

- "Please do more to encourage wildlife to return after construction"

Headhouse design

You said: Design structures that can be concealed or blend into the landscape

- "Can you conceal the outbuildings?"

Construction

You said: Reduce movements of earth and dirt by road

- "How many lorries a day will be using Bottom House Farm Lane?"
- "The access road is too narrow and shouldn't be used by Heavy Goods Vehicles (HGVs)

In addition to the feedback Align JV received through these formal channels, Align JV had many conversations at the event and through other engagement with community groups and stakeholders.

While this is not classed formally as feedback to be analysed, the discussions were very useful in understanding what the concerns and local priorities were for residents.

The list below summarises some of the main topics of conversation during the engagement period, including conversation between attendees and staff at the event.

Landscape

- Bottom House Farm Lane needs to be kept quiet and the site screened
- What are you doing to safeguard ancient buildings in the lane?
- The natural view of the valley needs to be preserved and the site hidden

Ecology

- Concerns about water abstraction throughout the Chiltern Tunnel and Colne Valley sections
- More wildlife conservation to be included in the design.

Design of the vent shaft and headhouse

- The new design is better (and reduced in size significantly) from the first plans that we saw
- Can outbuildings be concealed better in short term?
- Use of local materials such as flint walls in the build

Construction

- HGV movements and management of lorry numbers on the A413. In particular these questions related to access arrangements to Bottom House Farm Lane and traffic at the junction during construction
- Vibration from the Tunnel Boring Machine and impact on buildings and structures
- Concerns about dust and dirt and impact on health of residents
- Access to Amersham and Chalfont St Peter on the A413

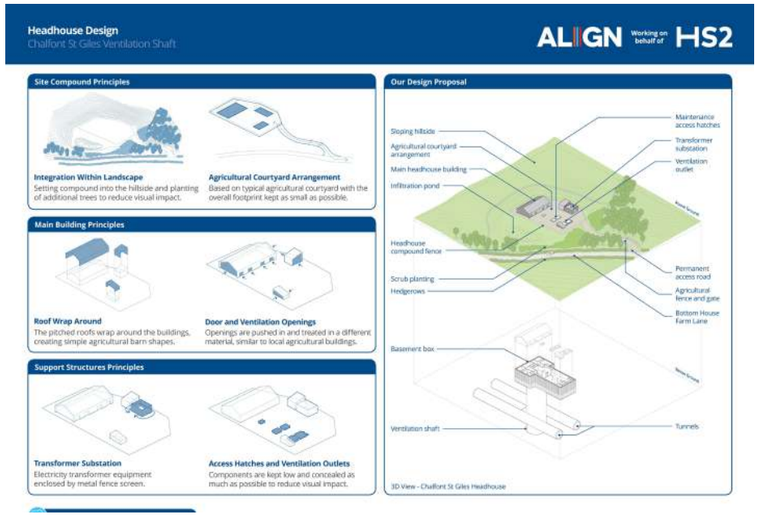
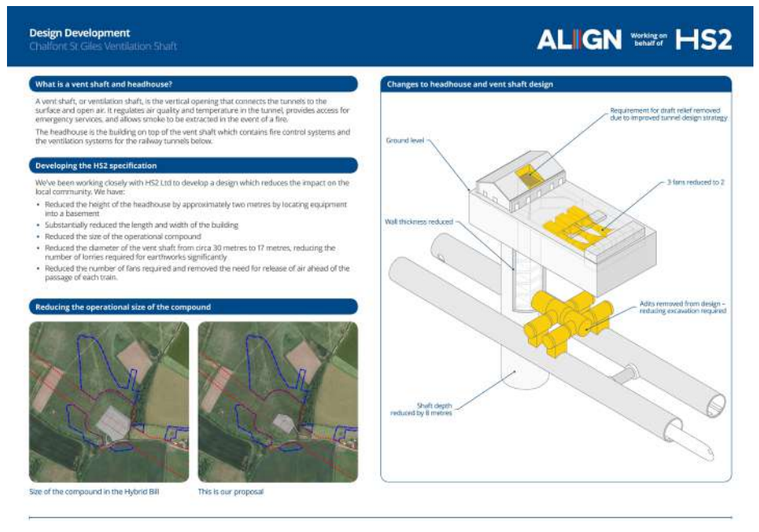
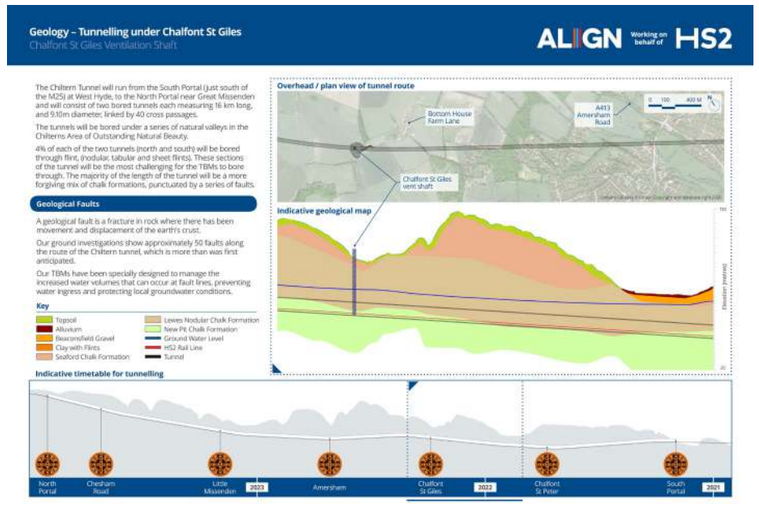
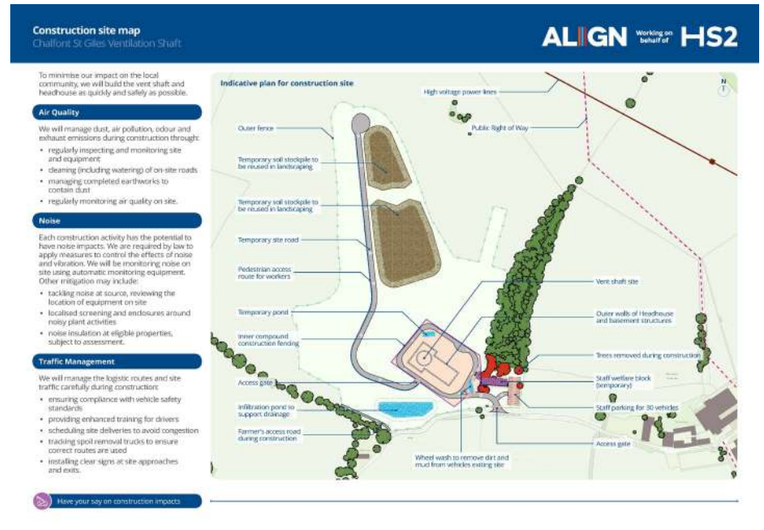


Fig.8.2_ Selected engagement panels







Public Engagement (continued)

8.2.4 Event 2: You said, we did

In accordance with the established engagement strategy, ALIGN JV will hold a 'You said, we did' exhibition in early 2021. Due to restrictions caused by COVID-19, ALIGN JV are unable to hold a face-to-face event. Local residents will be invited to visit the online virtual exhibition at which they will be presented with the feedback received from the public and updated designs describing the following themes:

- Landscape and ecological design
- Site compound
- Building principles
- Design proposal
- Building appearance
- Materials
- Visualisation from chesham lane and public footpath
- The construction site & traffic management

The exhibition will be hosted on the HS2 in Bucks and Oxfordshire Commonplace website and will be live for one month. PDF copies of the panels will also be made available.

Some of the 'You said, we did' statements relating to the design of the Chalfont St Giles Vent Shaft are as follows:

You said...

Reflect the rural character of the site and its surrounding landscape

We did...

Retain mature trees and habitat within field boundaries

Preserve the character of the AONB

Conceal structures where possible

You said...

Restore the area using planting of native or indigenous species

We did...

Incorporate habitat features – hibernacula, basking banks, bat & bird boxes

You said...

Design structures that can be concealed or blended into the landscape

We did...

Move the building as far away from the lane as possible

Arrange the buildings around an agricultural style courtyard

Design the building to have a simple contemporary barn aesthetic

Choose a simple robust palette of materials that will age naturally

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9.0
Summary

Summary of the CSG Vent Shaft and landscape design proposals alongside the feedback from the HS2 Independent Design Panel.

Overview

9.1.1 Design Summary

Chalfont St Giles (CSG) Ventilation Shaft has been sensitively designed to complement the rural and agricultural character of the Chilterns. The form and materiality of the buildings are a modern interpretation of the local agricultural vernacular, both historical and industrial, while the landscape design reflects the character of area and enhances the biodiversity value of the site.

The single-storey buildings are wrapped in simple grey zinc standing-seam cladding with steel door and vent openings distinguished by a dark brown / grey colour. The pre-weathered zinc roof will age subtly over time, giving the buildings a sense of permanence and high levels of robustness. The position and orientation of the headhouse buildings have been carefully located within the site to conceal them within the surrounding landscape and form a courtyard arrangement similar to local farmyards.

Below ground level, a ventilation shaft will reach down to the twin tunnels below, with fans and other equipment designed to regulate air quality and temperature in the tunnels. The shaft also removes smoke in the event of a fire and provides access for the emergency services.

Mature trees along the existing boundaries are retained as far as possible to help screen the site from neighbouring properties. Openings through vegetation provide glimpsed views of the headhouse buildings sitting within their landscape setting from the public right of ways to the south.

The landscape and ecological design will increase biodiversity value within the site and create a setting for the headhouse which positively reflects the character and qualities of the landscape in the AONB. The proposals establish a mosaic of habitat types including species rich grassland; new tree and scrub margins; and ephemeral waterbodies. In addition, bird boxes, reptile basking banks and a hibernaculum will be provided. Most of the existing mature trees and hedgerows will be retained around the site boundary to provide screening and maintain established habitat corridors.

The proposed design for the CSG Ventilation Shaft achieves the briefing criteria set out in Section 3 of this DAS; including the HS2 core design principles and goals, a host of demanding technical and operational requirements, the environmental requirements, and the extensive commitments set out in the HS2 Act.

9.1.2 IDP response

The challenging requirements of the brief have been balanced with the aspirations of stakeholders, the Local Planning Authority (LPA) and the local community. The proposed design is the result of extensive engagement with the Chilterns AONB Review Group, the HS2 Independent Design Panel (HS2 IDP), Buckinghamshire Council, statutory consultees, environmental groups and local communities. The recommendations and feedback provided during this engagement process have been key to informing the design now presented for approvals.

The proposed CSG Ventilation Shaft design, in a form ready for Schedule 17 submission, was presented to the HS2 IDP on 30th Oct 2020 and their subsequent report is included in Appendix 10.1

ALIGN JV have reviewed the response to the presentation given to the HS2 IDP and has considered these together with the responses and the feedback from the public engagement events, technical design requirements and their deliverability. A summary of the design feedback within the report, together with ALIGN JVs design response, is detailed below;

Headhouse Design

Architectural Approach

The HS2 IDP report states that the overall approach to the headhouse and vent shaft buildings is successful, and that the Schedule 17 stage designs promise to deliver a series of high quality buildings. The concept of a series of farm buildings located around a central courtyard, the materiality and massing are all considered to work well.

The report notes that the S17 submission should provide robust and clear description of how choices have been made, including the options explored and how the chosen design complements the overall approach. This has been explained in detail within Section 5.4.3.

ATS Building

The panel is supportive of the attention which has been given to reducing the mass of the plant room building and open-topped Auto Transformer Substation (ATS), including the introduction of larger spaces between the upper louvres of the transformer structure to help reduce its perceived scale.

The orientation of the ATS has been considered from the principal viewpoints into the site. Views from public spaces are predominantly from the south, looking northwards into the site. As a result, the lower elevation and roof pitch would be seen most often from public viewpoints, reducing the perceived scale of the building.

Landscape Design

ALIGN JV has considered the feedback from the design panel regarding the landscape design.

Compound level

The panel questioned whether the right balance has been struck between the amount of cut and fill, and urged ALIGN JV to interrogate this further.

The compound level of the site has been situated at a level that provides an optimal cut and fill balance for the main compound area. If it was to be raised much higher, the basement box would begin to extrude from the ground in the lower parts of the site, increasing the visual mass the buildings. A consequence of any raising would be an increased structure/ building size, or retaining walls on the southern boundary of the site which we consider would create a further element of incongruence and massing that would not be appropriate to the setting. This is best illustrated by the following application drawings submitted as part of this application: 1MC05-ALJ-TP-DSC-CS02_CL04-324121, 1MC05-ALJ-TP-DSC-CS02_CL04-324122 and elevation 1MC05-ALJ-TP-DSE-CS02_CL04-321135.

Furthermore, an appropriate gradient is required along the access to and from Bottom House Farm Lane. Presently, the grade of the access is at approximately 6.5%. The maximum permissible is 8% which would only equate to a maximum compound raise of a further 150 – 200mm. Any further gradient increase beyond 8% would cause access difficulties for large vehicles.

In conclusion, we consider the platform is set at the appropriate level to achieve access from the highway, appropriately hide any basement structure and provide a reasonable cut and fill balance.

Retaining Wall

ALIGN JV has also reviewed whether a retaining wall would be appropriate. Again, the drawing 1MC05-ALJ-TP-DSC-CS02_CL04-324121 submitted as part of this application illustrates both the level changes that will take place, their effect on the perception of the landform, and the consequences of any retaining wall.

If a retaining wall were to be provided to existing land levels on the northern side of the compound, it would range from 3 to 6 metres in height. The retaining wall would need to provide a safety handrail on its crest and associated flank walls that would need to key to existing earthwork levels on the east and west side of the compound. Collector ditches would be required at the top of the retaining wall for surface water and these would then need to drain to the south east corner of the site.

The proposals presented to the HS2 IDP were to regrade the landscape and "chase" the contours back to their natural point using sensitive cut profiles. This helps to preserve the apparent openness of the upper slopes to the north and northwest of the compound and limits the amount of apparent human intervention. The table below reports the change in grade and is based on the sections contained in application drawings 1MC05-ALJ-TP-DSC-CS02_CL04-324121 and 1MC05-ALJ-TP-DSC-CS02_CL04-324122.

Section	Change in level across change in earthwork profile.	Original grade from southern site boundary (average)	Original grade from southern site boundary (steepest)	New grade from rear of compound (average)	New grade from rear of compound (steepest)
B-B	Rise of 14 metres over 210 metres	1 in 15 (appx)	1 in 7 to the northwest of the compound area	Rise of 11 metres over 70 metres = 1 in 6.5 (appx)	1 in 7 over a greater distance than the original slope profile to the northwest boundary of the site.
C-C	Rise if 12 metres over 345 metres	1 in 29 (appx)	1 in 24 (appx) in proximity to Bottom House Farm Lane	Rise of 10.8 metres over 236 metres = 1 in 22 (appx)	1 in 3 (drainage cut) then 1 in 4.5 – 1 in 5 – initial slope behind main headhouse between levels 96mAOD and 102mAOD

Fig.9.1_ Table - Site gradient comparison

The lower slopes of the regraded land will be screened to a degree by the presence of the new buildings, when viewed from both Bottom House Farm Lane and the footpath at a higher elevation to the south. However, some of the regraded upper slopes would be visible.

Given some of the more substantial grade changes are screened by the new buildings when viewed from the south, ALIGN JV consider the regrading is a preferable solution to a further urbanising feature on the site. Earthworks held back by engineered structures are not a common feature in this part of the Chilterns AONB and we consider that the gentle regrading of the landformis the appropriate design response.

Compound highways

The panel considered it important that the width of the splayed entrance to the compound access road is reduced if at all possible, to avoid excessive urbanisation of what is a characterful rural lane.

One of the key grounds that must be considered in Schedule 17 design is highway safety. A safe design must be provided for vehicles entering in to and exiting the compound. The radius design of the highways bell mouth is at the minimum permissible, being 10 metres on the eastern side and 5 metres on the west side – as we do not expect vehicles to arrive from and exit to the west. The access radius and width is also not dissimilar to other accesses along Bottom House Farm Lane, such as at Lower Bottom House Farm which has a radius of 8 metres. At 5 metres, ALIGN JV do not consider the width to be excessive and as it allows two vehicles to safely maneuver into and out of the site.

Compound surfacing

The panel considered that the proposed asphalt surface treatment for the courtyard is an incongruous part of the overall farmyard concept.

The chosen bitumen pavement is required to withstand and distribute the loads of vehicles visiting the site, both in emergency and routine maintenance situations. The compound sits aloft a large basement structure, so highway and vehicle load need to be carefully distributed across the slab. Lesser performing materials do not perform this function. This surfacing choice also matches other compounds along Bottom House Farm Lane. Additionally, it is expected that the bitumous surface will fade over time.

Fencing

The panel asked ALIGN JV to ensure it has taken every possible step to question HS2 security requirements for barbed wire, and to explore opportunities to soften the impact of the fencing. The panel also questioned the need to provide an additional outer layer of fencing, currently proposed as post and wire.

The HS2 security requirements have been challenged by ALIGN JV. However, it needs to be understood that this is a railway of national importance and there is a need to protect the assets from trespassers and members of the public.

The outer fence is a typical demarcation of a boundary in rural situations, and examples of post and rail or post and wire fences demarcating land boundaries are evident to the south of Bottom House Farm Lane and in other rural locations. There would be nothing to prevent the landowner erecting their own boundary fence along the land boundary utilising their permitted development rights in the future. In any case, given the distance of the view, we consider a post and wire fence would not be particularly perceptible in the wider landscape.

Overview (continued)

9.1.3 Conclusion

The challenging requirements of the brief have been balanced with the aspirations of stakeholders, the Local Planning Authority (LPA) and the local community. The proposed design is the result of extensive engagement with the Chilterns AONB Review Group, the HS2 Independent Design Panel (HS2 IDP), Buckinghamshire Council, statutory consultees, environmental groups and local communities. The recommendations and feedback provided during this engagement process have been key to informing the design now presented for approvals.

ALIGN JV wishes to thank all stakeholders, the LPAs, members of the community, the wider general public and the HS2 IDP for their views, ideas and feedback, and look forward to continuing to work closely with them on the future stages of the project.

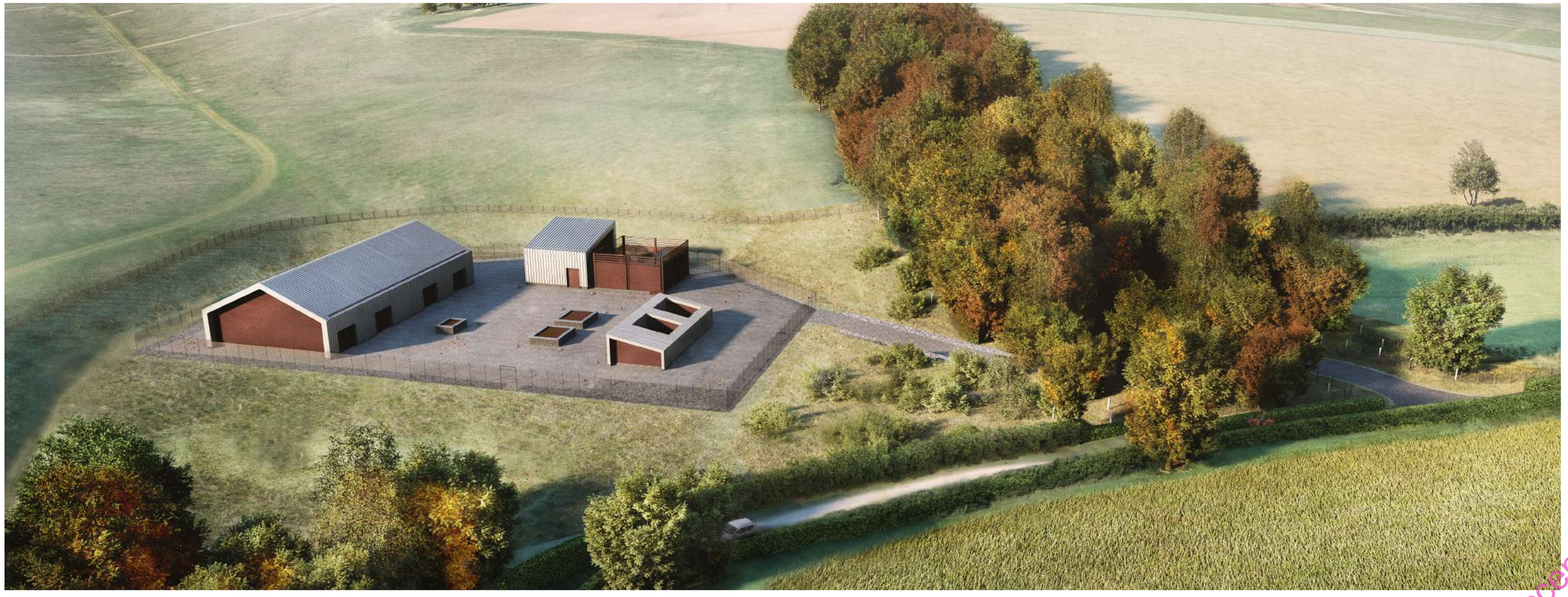

Fig.9.2_ Visualisation - Aerial view looking north east

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Fig.9.3_ Visualisation - PRoW to south of site looking north (Year 1)

Fig.9.4_ Visualisation - PRoW to south of site looking north north east (Year 1)

Fig.9.5_ Visualisation - Bottom house farm lane looking west (Year 1)

Fig.9.6_ Visualisation - PRoW to south of site looking north (Year 15)

Fig.9.7_ Visualisation - PRoW to south of site looking north north east (Year 15)

Fig.9.8_ Visualisation - Bottom house farm lane looking west (Year 15)

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Appendices

HS2 Independant Design Panel Report

HS2 INDEPENDENT DESIGN PANEL

REPORT

HS2 Design Panel Meeting to discuss the Schedule 17 stage designs for Chalfont St Giles Headhouse

13.30 – 16.30 Friday 30 October 2020
Via Microsoft Teams

HS2 Independent Design Panel

Tony Burton (chair)	Vice chair of the HS2 Independent Design Panel
Jonathan McDowell	HS2 Independent Design Panel
Kathryn Moore	HS2 Independent Design Panel
Martin Stockley	Deputy Chair of the HS2 Independent Design Panel

Attendees

Dan Ashmore	Assistant Project Manager, HS2 Ltd
Steve Austin	Town Planning Manager, HS2 Ltd
Mark Clapp	Senior Project Manager, HS2 Ltd
Robert Howard	Landscape Manager, HS2 Ltd
Kevin Roberts	Head of Engineering and Environment, HS2 Ltd
Martin Short	Lead Architect, HS2 Ltd
David Costello	Align JV
Diane Metcalfe	Architect, Align JV
Chris Patience	Architect, Align JV
Alan Price	Design Director, Align JV
Simon Railton	Lead Landscape, Align JV
John Woodhouse	Lead Planner, Align JV
Richard Hannay	Buckinghamshire Council
Saeed Mahmood	Buckinghamshire Council
Catherine Murray	Buckinghamshire Council
Neil Jackson	The Chilterns AONB
Edward Bailey	Frame Projects

Apologies / copied to

Christoph Brintrup	Head of Landscape, HS2 Ltd
James Dearing	Design Manager, HS2 Ltd
James Glynn	Senior Town Planning Manager, HS2 Ltd
Pippa Whittaker	Senior Communications Manager, HS2 Ltd

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Leigh Crowhurst	Landscape Architect, Align JV
Ben Northover	Architect, Align JV
Ian Thomas	Project Manager, Align JV
Ifath Nawaz	Buckinghamshire Council
Chelsea Evans	Apprentice Project Manager, HS2 Ltd
Bernadette Hurd	Head of Benefits, HS2 Ltd
Kay Hughes	Design Director, HS2 Ltd
Giles Thomas	Phase One Engineering Director, HS2 Ltd
Nicole Linney	PA to Design Director, HS2 Ltd
Paul Gilfedder	Head of Town Planning, HS2 Ltd
Design Inbox	HS2 Ltd
Lana Elworthy	Frame Projects
Deborah Denner	Frame Projects

Note on Design Panel process

The HS2 Independent Design Panel was established in 2015 at the request of the Department for Transport, to help ensure that, through great design, HS2 delivers real economic, social and environmental benefits for the whole country.

The HS2 Design Vision sets out nine principles grouped around three themes: People; Place; and Time. The design uses this framework to help the HS2 Ltd leadership, project teams and other partners to make the right design choices – and this also informs its advice on designs that are to be submitted under Schedule 17 of the High Speed Rail (London – West Midlands) Act 2017.

The panel plays an advisory role, providing impartial and objective advice, to support the design process. At a pre-application stage it is for HS2 Ltd to decide what weight to place on the panel's comments balanced with other considerations. Once a Schedule 17 application is submitted, the panel's advice may inform the local planning authority's decision making process.

Further details of panel membership and process are available at:
https://www.gov.uk/government/publications/hs2-design-panel

The HS2 Design Vision is available at:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/607020/HS2_Design_Vision_Booklet.pdf

The HS2 Independent Design Panel comments below follow on from two pre-application reviews of the Chalfont St Giles Headhouse.

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Timing of Schedule 17 meeting

This meeting took place in advance of a Schedule 17 submission for the Chalfont St Giles Headhouse, which will be submitted around December 2020. This will include 'plans and specifications' and 'site restoration' Schedule 17 submissions. Aspects of the designs that will be submitted for approval include ventilation shaft and headhouse buildings, stairwell buildings, Automated Transformer Station (ATS) buildings, earthworks, and compound fencing. The 'site restoration' submission will be for the area within the confines of the fencing.

The submission will also include supporting information for other aspects of the scheme not being submitted for approval at this stage, including full details of soft landscaping measures. 'Bringing into use' requests will be submitted to the local planning authority, at a later stage.

HS2 Ltd indicates that it is satisfied that the proposal would meet the aspirations of the HS2 Design Vision and the Sustainability Approach.

Post meeting note: HS2 Ltd confirmed that will be no significant design changes, except some minor changes as a result of ongoing design development.

Local planning authority views

Buckinghamshire Council

Buckinghamshire Council has held two pre-application discussions with the applicants and its general response to its working relationship with Align JV and the proposed approach is positive. The Council is in general agreement with the headline aspects of the scheme, including strategy and vision, design intent, and broadly the scale and massing of the buildings. It considers the approach to address the Chilterns AONB Detailed Design Principles and welcomes the intention to submit both the 'plans and specifications' and 'site restoration' Schedule 17 submissions at the same time.

The Council's comments focus on the delivery of the proposed design intent. The presentation of scale drawings as part of a pre-application discussion in October has prompted further questions relating to detailed aspects of the proposals. The Council requests further information on the height of the ATS building and to what extent this is driven by the equipment it will contain. It would also like further information on landform integration, including aspects such water management, fencing and soft works. The Council is supportive of the proposed approach to materiality, subject to the receipt of samples and RAL numbers. The proposed surface treatment to the compound is of concern and would encourage Align JV to explore other potential treatments.

It notes the importance of the Schedule 17 submission containing sufficient information for it able to give a confident view of the acceptability of the proposals. It will be important to consider how clear the information is when accessed online, particularly as

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this will be how most people will view the information due to the impact of the COVID - 19. The Council would welcome a further pre-application discussion with the team to resolve outstanding issues to help smooth the application process.

The Council also noted its concerns relating to the proposed changes to Bottom House Farm Lane (which will not be used for construction but will be provide the permanent access route to the site). This will not form part of these Schedule 17 submissions.

HS2 Independent Design Panel's views

Summary

The HS2 Independent Design Panel considers that the Schedule 17 stage proposals for the Chalfont St. Giles Headhouse building and structures have the potential to meet the aspirations of the HS2 Design Vision – subject to the quality of its detailed design and landscape (aspects of which will be approved through a separate mechanism at a later date). The panel congratulates the team on the huge amount of work which has been undertaken to date and considers that the architecture of the headhouse building and associated structures promise to deliver a high design quality. The scale of the ATS is challenging, and the panel asks the team to consider whether its design could be developed further to help address this issue. The panel welcomes the significant progress which has been made on the delivery of the HS2 Sustainability Approach, particularly in the re-use of materials. The panel has not seen sufficient detail for it to be able to give a confident view on whether the designs will deliver on the ambitions of the HS2 Sustainability Approach. At the appropriate decision making point, the panel asks the team to ensure the information provided can describe the scheme's response to the broad spectrum of HS2 Ltd's sustainability ambitions. The panel is supportive of the overall landscape approach which seeks to embed the proposals within the landscape, including the intention to wrap the landform around the site. The panel questions whether the right balance has been struck between cut and fill and asks the team to consider this further. The panel believes that further landscape design development can ensure the ambition of embedding the headhouse within the landscape is delivered. The panel also believes that further collaboration between the design team and HS2 Ltd can address constraints imposed by the latter's requirements, in particular the design of the compound security fencing and the requirements for the outer fencing. Further work should also be carried out to reduce the dominance of the site access and the surface treatment to the courtyard. These comments are expanded below.

Headhouse architecture

The panel considers that the overall approach to the headhouse and vent shaft buildings is successful, and that the Schedule 17 stage designs promise to deliver a series of high quality buildings. The concept of series of farm buildings located around a central courtyard, the materiality and massing are all considered to work well.

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The panel highlights that its support for the proposals is dependent on the quality promised being maintained through detailed design and construction. It encourages the inclusion of sufficient detail as part of any Schedule 17 submissions, or other future approval mechanisms, to help provide assurances that the quality promised will be upheld. This could include additional information on for example, material samples and texture, and should be at a sufficient scale to provide assurances on the commitment to design quality in the detailed aspects of the scheme.

ATS building and structure

The additional information presented on the scale of the ATS has highlighted the significant impact the ATS will have on the overall scheme.

The panel is supportive of the attention which has been given to reducing the mass of the plant room building and open-topped transformer structure, including the introduction of larger spaces between the upper louvres of the transformer structure to help reduce its perceived scale.

The designs for the ATS plant room building propose a mono-pitched roof. The panel feels that this could appear to conflict with the intended hierarchy of buildings and structures around the courtyard. While a mono-pitched roof may be the best approach, exploration of other roofing options, such as a gabled roof, were not presented to the panel to enable it to confidently support the chosen approach.

The panel urges the team to carefully describe the designs for the ATS as part of the information submitted alongside the Schedule 17 submission. This should provide robust and clear description of how choices have been made, including the options explored and how the chosen design complements the overall approach.

The panel asks the team to also challenge the required volume for the ATS, reducing this and consequently the building and structure, if at all possible.

Landscape design approach

The proposals involve a significant intervention into the Chilterns Area of Outstanding Natural Beauty (AONB) landscape. Consequently, the panel supports the focus given to embedding the Chalfont St Giles headhouse buildings and structures within the landscape, including the proposal to wrap newly created landform around the site.

The panel questions whether the right balance has been struck between the amount of cut and fill, and urges the team to carefully interrogate this further. Given the scale of transformation and the sensitivity of the Chilterns AONB, it is important that information submitted alongside the Schedule 17 submission provides robust justification for the chosen approach to the landform. This should include comprehensive information on the chosen level for the headhouse platform and the impact this will have on the surrounding landform.

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It suggests that the team also considers whether a retaining wall around the northern edges of the site could be introduced to help soften the gradient requirements for the landform behind.

Hydrology

Drainage is very important to the landscape, and the scale of the proposed changes will undoubtedly have a significant impact on its hydrology. The panel welcomes the confirmation that the intention is to deliver an integrated approach to water management that connects HS2 Ltd water management requirements as part of one hydrological system.

It is important that sufficient supporting information is provided alongside the Schedule 17 submission, or other future approval mechanisms, which can provide assurances that an integrated approach will be delivered. The panel suggests that this includes assurances on how the proposals have been designed to avoid any impact on Bottom House Farm Lane. This is particularly important given the existing flooding this lane experiences and the impact of drainage requirements on the sensitive boundaries of the rural lane.

Courtyard surfacing

The panel considers that the proposed asphalt surface treatment for the courtyard is an incongruous part of the overall farmyard concept. It asks that this aspect of the design is revisited prior to a submission being made and other material options are explored.

Security fencing

The design of the compound security fencing will be important to the overall quality of the site. The panel considers that the proposed use of three strands of barbed wire above a 2.8m mesh fence around the headhouse compound will compromise the design, giving the site a hostile, unpleasant appearance. It was informed that this aspect of the scheme has not changed through the design process despite earlier challenge from the panel.

The panel understands that the requirements for fencing are set by HS2 Ltd. However, it asks the design team to ensure it has taken every possible step to question HS2 Ltd's requirement for barbed wire, and to explore opportunities to soften the impact of the fencing.

The panel also questions the need to provide an additional outer layer of fencing, currently proposed as post and wire. If the function of this fence is purely to identify the ownership boundary, then it asks the team to explore whether this could be expressed in different, less intrusive ways, for example through soft landscaping.

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HS2 Independant Design Panel Report (continued)

Site access

The panel considers it important that the width of the splayed entrance to the compound access road is reduced if at all possible, to avoid excessive urbanisation of what is a characterful rural lane. While it understands that the width is required for periodic crane access to the headhouse, it suggests that one option could be to introduce a change in materiality for the additional area of splay. This would reduce the visual impact of the road on the character of the lane, whilst still being able to cope with the loads of the occasional vehicles which enter the site.

Bottom House Farm Lane

The site has a symbiotic relationship with Bottom House Farm Lane. The panel understands that the proposed permanent changes are outside of the scope of the Schedule 17 submissions due to be made later this year. It is also uncertain which approval mechanisms will ensure these changes are thoroughly scrutinised.

The panel highlights the importance of avoiding any unnecessary changes to the lane which may compromise its existing character and function, including loss of hedges. In particular, the proposed drainage channels along Bottom House Farm Lane will need careful consideration ensure the character of the lane is maintained.

Sustainability

The panel appreciates the design team's explanation of the way the proposed designs respond to the HS2 Sustainability Approach and welcomes the efforts to maximise the re-use of materials and to reduce carbon.

The panel has not seen sufficient detail for it to be able to give a confident view on whether the designs will deliver on the ambitions of the HS2 Sustainability Approach. At the appropriate decision making point, the panel asks the team to ensure the information provided can describe the scheme's response to the broad spectrum of HS2 Ltd's sustainability ambitions.

Management and maintenance

The panel welcomes the commitment from the team that all landscaping proposals within the site's ownership boundary, including elements such as bat boxes, will be delivered and maintained by HS2 Ltd.

Views and communication

The panel welcomes the variety of visualisations the team has developed to help show the schemes impact in views from the south. These will perform an important role in helping to convey how the build will sit in the landscape to those viewing and assessing the proposals, once a submission is made.

The panel appreciates that the proposals may only be visible from limited viewpoints. However, it suggests that there would be value in including additional visualisations from different viewpoints, such as from the north, and different perspectives, such as from a vehicle using Bottom House Farm Lane, as part of the supporting information submitted alongside the Schedule 17 submissions. This would help provide a sense of the scale of the proposed buildings and structures, particularly for those who are not used to examining such complex proposals, and assurances that the entire scheme is of a high quality design.

Next steps

The panel feels that the Chalfont St. Giles Headhouse buildings and structures have the potential to meet the aspirations of the HS2 Design Vision at Schedule 17 stage - subject to the detail of landscape design and the design quality presented being maintained through detailed design and construction.

It asks the that the designs for the ATS are revisited, to interrogate the volume requirements for the plantroom and transformer.

The panel supports the team's intention to submit a 'site restoration' Schedule 17 alongside the 'plans and 'specifications' Schedule 17 application. It also supports the intention to include indicative information for the aspects of the landscape not being approved at this stage, as part of the Schedule 17 submission.

The landscape design will play an important role in the success of these proposals. It therefore asks that more design development is carried out in areas discussed, including the balance of cut and fill in the proposed landform, the site access and the proposed materiality of the courtyard surfacing. The panel would welcome an opportunity to be involved in commenting on the proposals further at 'bringing into use' stage, once the 'plans and specifications' and 'site restoration' Schedule 17 decisions have been made. It also asks that this opportunity includes consideration of the detailed proposals for the future of Bottom House Farm Lane.

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Figure Contents

10.2.1 Figure List

10.1.1 Figure List (Continued)