HyNet North West Hydrogen Pipeline

Delivering clean growth

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Your Gas Network

# Design Evolution Report 2024

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# Glossary

| Term | Description |
|---|---|
| **Blending** | The blending of hydrogen with the existing natural gas supply for use by customers |
| **DCO** | Development Consent Order. The consent required for Nationally Significant Infrastructure Projects, of which this Project is one. |
| **Draft ES** | The draft Environmental Statement which documents the environmental assessment work undertaken on the Draft Order Limits and which is to be consulted upon in the Stage 3 Statutory Consultation. |
| **Draft Order Limits** | The draft version of the Order Limits (the project boundary) produced for consultation at the Stage 3 Statutry Consultation |
| **EIA** | Environmental Impact Assessment. A formal assessment of the environment significance of a proposed development. |
| **FEED** | Front End Engineering Design. The initial design work in a project undertaken prior to the detailed design required for construction purposes. |
| **HyNet North West** | A wider programme of projects to assist with the decarbonisation of the region through the replacement of natural gas with hydrogen, of which this project forms a part. |
| **HAGI** | Hydrogen Above Ground Installation. Infrastructure required in places along the pipeline to control the flow and pressure of hydrogen, facilitate connection and/or provide maintenance points. |
| **Hydrogen Pipeline Network (HPN)** | The pipeline network connecting the HPP, HSF and customers of the Project. |
| **Hydrogen Production Plant (HPP)** | A production plant at Stanlow which will produce hydrogen to be transported by the pipeline to the Hydrogen Storage Facility and to customers. |
| **Hydrogen Storage Facility (HSF)** | A storage facility for hydrogen at Inovyn's underground caverns to the south of Northwich. Hydrogen stored in these caverns will be transported by the pipeline to customers. |
| **Nationally Significant Infrastructure Project (NSIP)** | A project which meets the requirements set out in the Planning Act 2008, or which is of sufficient national interest, for the application for consent to be considered by the Government, rather than the relevant local planning authority/s. |

| Term | Description |
|---|---|
| **PEIR** | Preliminary Environment Information Report. A report detailing the findings of the preliminary EIA work undertaken. |
| **Preferred Route Optioneering** | Third stage of works where specific pipeline route options are considered within the Preferred Route Corridor in order to identify the Preliminary Route Alignment. |
| **Preliminary Order Limits** | The initial, draft Order Limits prepared for consultation at Stage 1 Statutory Consultation. |
| **Preliminary Route Alignment** | The preliminary pipeline route alignment identified in the third stage of works, the Preferred Route Optioneering, which will provide the basis of the final pipeline route for statutory consultation purposes. Including the Preliminary Order Limits for the PEIR assessment and the Stage 2 Statutory Consultation and the Draft Order Limits for the Draft ES and Stage 3 Statutory Consultation. |
| **The Project** | The HyNet North West Hydrogen Pipeline Project. An approximate 100km pipeline and supporting HAGIs which are the subject of this report. |
| **Proposed Route Alignment / Order Limits** | The route alignment finally identified which will form the Order Limits proposed within the DCO application. |
| **Route Corridor Identification / Preferred Route Corridor** | Second stage of works where corridors within which a pipeline would run are considered along the Preferred Strategic Option. This will identify a Preferred Route Corridor. This corridor was used at Stage 1 Non Statutory Consultation. |
| **Stage 1 Non Statutory Consultation** | Consultation exercise undertaken on the Preferred Route Corridor design in early 2022 |
| **Stage 2 Statutory Consultation** | Consultation exercise required by Section 42 of the Planning Act 2008 and undertaken in Autumn 2022. |
| **Stage 3 Statutory Consultation** | Due to the length of time since the Stage 2 Statutory Consultation exercise and the changes to the Project which have occurred since then, another stage of statutory consultation as required by Section 42 of the Planning Act 2008 is to be undertaken in Autumn 2024. |
| **Strategic Optioneering / Preferred Strategic Option** | Initial stage of works to consider strategic layouts for the pipeline route and select a preferred option which will then be used to identify a broad route corridor for the pipeline. |

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# 1. Introduction

## 1.1. Overview

1.1.1. The HyNet North West Hydrogen Pipeline Project (hereafter 'the Project') is a proposal by Cadent Gas Limited to construct and operate the UK's first 100 percent hydrogen pipeline network at scale. It will deliver hydrogen - a clean energy source - to multiple industrial customers and power generators and it will take hydrogen to potential gas blending points for introduction into the existing natural gas network (depending on future Government decisions).

1.1.2. The Project is part of the wider HyNet North West programme that will produce, store and distribute hydrogen as well as capture and store carbon from industry in the North West of England and North Wales. By achieving this, the HyNet North West programme will create and maintain thousands of local jobs, enabling long-term sustainability for businesses and supporting financial security for communities across the region. It is possible that further hydrogen pipelines will be built across the North West region to support the wider supply of hydrogen to homes and industrial customers.

1.1.3. The Project includes the design, construction, operation and maintenance of approximately 100km of new pipeline to distribute hydrogen to industry and to support the potential blending of hydrogen into the existing natural gas network. Hydrogen Above Ground Installations (HAGIs) are also required to control the flow and pressure of hydrogen at key points along the proposed pipeline.

1.1.4. Cadent has obtained a section 35 Direction dated 05 July 2022 from the Secretary of State for Business, Energy and Industrial Strategy. This confirms that the Project (save for the pipeline spurs) is of national significance and is to be treated as development for which development consent is required. Cadent therefore intends to submit an application for an order granting development consent for the Project pursuant to the Planning Act 2008; this application will include the pipeline spurs as associated development.

## 1.2. Purpose of This Report

1.2.1. The Design Evolution Report September 2022 provided information on the background to the Project, the methodology for the routeing and siting work and then the results of the Strategic Optioneering (the first stage of design work) and the Route Corridor Identification (the second stage of design work) works. It also presented initial work undertaken on the Preliminary Route Alignment (third stage). That report was published as part of the Stage 2 Statutory Consultation exercise in September 2022.

1.2.2. The purpose of this report is to present an update to the Design Evolution Report September 2022. This addendum explains how the consultation responses received from the Stage 2 Statutory Consultation exercise, and ongoing routeing and siting work, have influenced the Preliminary Route Alignment and siting of infrastructure within it. The work since September 2022 is a continuation of the Preliminary Route Alignment process (which is the third stage of the design process). The findings of this ongoing work have been used to refine the Project's Preliminary Route Alignment and the Draft Order Limits considered in a draft Environmental Statement that will accompany the Stage 3 Statutory Consultation exercise. This Stage 3 Statutory consultation will be a second statutory consultation exercise undertaken under Section 42 of the Planning Act 2008 and commences in autumn 2024.

## 1.3. Background to the Project

### Need for the Project

1.3.1. As the Hynet North West Hydrogen Pipeline is considered a Nationally Significant Infrastructure Project (NSIP), the background to the need for the project which is set within National Policy Statement (NPS) EN-1[1] is of particular relevance to the Project.

1.3.2. EN-1 states (Paragraph 1.3.5) that where the need for a particular type of energy infrastructure is established by the NPS, but that type of infrastructure is outside the scope of one of the technology specific NPSs, then EN-1 will have effect alone and will be the primary basis for Secretary of State's decision making. It provides by one way of an example, hydrogen pipelines. EN-1 therefore establishes the planning policy support for the need for the Project.

1.3.3. EN-1 goes on to specifically state that to meet the overall objectives for a low carbon energy system, there will be a necessity for "*a significant amount of new energy infrastructure*", which includes "*large nationally significant developments*" and infrastructure "*to store and transport primary fuels and energy carriers into and around the country*" (Paragraph 2.3.4).

1.3.4. In addition, EN- also provides (through Paragraphs 3.4.12 to 3.4.22) further details on the support for low-carbon hydrogen infrastructure. It states that "*There is an urgent need for all types of low carbon hydrogen infrastructure to allow hydrogen to play its role in the transition to net zero.*" EN-1 also provides support to the blending of hydrogen into the current natural gas network, subject to ongoing economic and safety assessments.

[1] Overarching National Policy Statement for Energy (EN-1), Department for Energy Security & Net Zero, 17 January 2024.

1.3.5. Further Government commitment to hydrogen is set out within the Ten Point Plan for a Green Industrial Revolution which was published in November 2020. This plan aims to make the UK a global leader in green technologies recognising that supporting such innovation can deliver significant numbers of new jobs and support the UK to ultimately address its climate change commitments. Point 3 of the Plan is to 'drive the growth of low carbon' and also contained within the Plan is the government aim of delivering 5GW of low carbon hydrogen production capacity by 2030. This Ten Point Plan was accompanied by the National Infrastructure Strategy also published in November 2020 and it was followed by the Energy White Paper, 'Powering our Net Zero Future', December 2020. In this latter document government recognises that setting a net zero target as a means of reducing the effects of future climate change requires investment and innovation. The document also refers to the delivery of a greener energy system, to include low carbon hydrogen.

1.3.6. In March 2021 government produced an Industrial Decarbonisation Strategy to explain how industry can decarbonise in line with net zero, while remaining competitive and without pushing emissions abroad. This was followed by the UK Hydrogen Strategy in August 2021 and consultation on a UK Low Carbon Hydrogen Standard. The Strategy establishes the case for low carbon hydrogen and the role of hydrogen in meeting net zero, stating that it will play an important complementary and enabling role alongside clean electricity in decarbonising the UK's energy system. There is recognition that hydrogen is suitable to use in a number of sectors where electrification is not feasible or is too costly, and where other decarbonisation options are limited. Examples cited include the generation of high temperature heat such as in industrial furnaces which would be relevant to some of the customers of the Project.

1.3.7. In order to support the introduction of hydrogen networks across the UK, the Government has introduced fiscal incentives and promoted partnership. Published in October 2021 the Government's Net Zero Strategy: Build Back Greener provides policies and proposals to keep the UK on track to meet its carbon budgets and aims to deliver the 5GW of hydrogen production capacity by 2030 referenced above (with the expectation this could increase to 10 or 17GW by 2035 depending upon the role of hydrogen for heat). Key policies include the establishment of the Industrial Decarbonisation and Hydrogen Revenue Support (IDHRS) scheme to fund new hydrogen and carbon capture, part of which includes provision of £240m of government co-investment for low-carbon hydrogen production. Under the heading of 'Industry' there is also a direct reference to the HyNet programme, which along with the East Coast Clusters is cited as acting as an economic hub for green jobs.

1.3.8. Also, in October 2021 government confirmed that the HyNet programme and East Coast Clusters had been confirmed as Track 1 clusters for the mid 2020s subject to final decisions being made by ministers. This announcement referenced the government's Ten Point Plan and to its support to Carbon Capture Utilisation and Storage (CCUS). Furthermore, in August 2022 government announced 20 shortlisted projects to proceed to the due diligence stage of the Phase 2 Cluster Sequencing process. These included six related HyNet projects. Although HyNet's carbon capture sits outside of this Project both announcements are an important

step towards the realisation of a low carbon hydrogen supply into the Project's proposed pipeline network.

1.3.9. The British Energy Security Strategy April 2022 aims to improve energy efficiency reduce imports (of natural gas and oil) and accelerate the transition to renewables and other forms of low carbon energy. It recognises that in meeting net zero the UK might require a quarter of the gas currently used but amongst other measures encourages the use of hydrogen as an alternative. The Strategy announced government plans to accelerate targets for the production of hydrogen doubling the 5GW by 2030 set out in the Net Zero Strategy to one which seeks to achieve 10GW over the same timescale.

1.3.10. In summary, Government has identified hydrogen as one of the alternative fuel sources necessary to support the decarbonisation of industry and its wider commitments to achieving net zero by 2050. Already since 2020 it has doubled the target for the production of hydrogen and has identified the HyNet programme as one of the hydrogen hubs to be encouraged and supported in the UK. In addition to the environmental benefits of decarbonisation government recognises that the introduction of new technologies can act as a spur to economic development through the creation of 'green' jobs.

1.3.11. There is a clear need for projects which will transport hydrogen from the place(s) of production to industrial customers and possible residential customers through future blending.

1.3.12. Having established the need for low carbon hydrogen the next step is to understand the requirement for such a project in the North West and the form that it should take.

1.3.13. The Industrial Decarbonisation Strategy referred to above is supported by an Industrial Cluster's Mission. This aims to create a net-zero cluster by 2040 and a low-carbon cluster by 2030. It identifies the six largest industrial clusters by emissions which include 'Merseyside', each being positioned as key areas for low carbon products and technologies.

1.3.14. This Project sits squarely within the Merseyside Cluster, the cluster itself being characterised by a concentration of large-scale industrial customers of natural gas. Regional support for the decarbonisation of this cluster can be found in the work being undertaken by local authorities, enterprise partnerships and local industry to develop an integrated industrial hydrogen cluster in the North West.

1.3.15. Whilst there is a clear need to support the decarbonisation of large-scale industrial customers there is also an opportunity to begin the process of reducing the amount of natural gas used in the domestic gas market. The UK Hydrogen Strategy notes the UK Government is working with the Health and Safety Executive (HSE) to assess the potential to blend hydrogen and whilst current domestic appliances are unable to operate solely on hydrogen, trials have taken place into the blending of hydrogen into the domestic supply (including by Cadent at Keele University). An opportunity exists to deliver blending with this Project.

1.3.16. A hydrogen network requires a number of elements for its operation. These include a source(s) of hydrogen gas (import/production), the means to transport it to customers and a requirement for storage to enable the balancing of supply and demand. The location of these elements, particularly the start (supply) and end points (customers) have determined the Project's strategic location.

1.3.17. EET Hydrogen is committed to bringing forward hydrogen production at Essar's Stanlow facility with elements of the design stage for the core production plant supported under BEIS Hydrogen Supply Programme funding. The initial phases of the production facility have gained planning consent. The scheme would see 'blue' hydrogen produced, that is hydrogen produced using energy from fossil fuels, with the carbon dioxide emitted from the fossil fuel use captured and stored. The carbon dioxide capture would occur under the HyNet Carbon Dioxide Pipeline scheme by Liverpool Bay CCS Ltd and a DCO consent was issued in 2024.

1.3.18. Cadent is currently working with the energy industry to determine additional sources of hydrogen in the North West. The Project proposed will be able to transport all hydrogen (independent of its 'colour'), which meets the required quality standards.

1.3.19. The industrial customers to be supplied by the Project have signed Memorandums of Understanding setting out their requirements for hydrogen as a replacement fuel source for natural gas. They can demonstrate a readiness to connect by 2030 and through their adoption of hydrogen as a fuel source, deliver significant $CO_2$ savings. Customers were identified initially by members of the wider HyNet consortium informed by EU ETS (Emissions Trading System) data as industrial businesses operating in the proximity to Cadent's developing pipeline network and with a high energy use.

1.3.20. The supply, storage and customers, including potential blend points, which drive the location and strategic routeing of the Project are as follows:

- EET Hydrogen's Hydrogen Production Plant (at Essar Stanlow Refinery) (HPP):
  - The initial source of hydrogen supply to the Hydrogen Pipeline Network (HPN).
- Hydrogen Storage Facility (HSF) (Inovyn/Storenergy, Northwich):
  - To allow hydrogen to be stored at times of peak supply and released into the HPN to meet demand.
- West leg offtaker at Intergen, Rocksavage.
- North leg offtakers - Ingevity, Warrington; Novelis, Warrington; NGF Europe Ltd., Clock Face; NSG Pilkington Greengate Works, St Helens; and Glass Futures, St Helens.
- East leg offtakers - at Partington Cadent AGI; and Basell Polyolefins, Partington (work is ongoing with other potential customers in Partington who would construct their own pipelines to the Partington HAGI).
  - To allow hydrogen to be supplied to these customers users as a fuel for their operational requirements.

- Two potential blending points on the existing Cadent gas network (Partington and Warburton):
  - To allow hydrogen to be blended with natural gas and supplied into the wider gas pipeline network to maximise the extent of supply.

1.3.21. The HPP will produce the hydrogen required for supply to the pipeline and drives the need for the western leg of the network.

1.3.22. The HSF would use depleted salt caverns for storage. These already have consent for the storage of natural gas (Keuper Underground Gas Storage Facility Order 2017), which the operator intends to replace with a new DCO application or material amendment to the granted DCO to enable the storage of hydrogen. Storage enables the efficient running of the network allowing for the delivery of agreed levels of gas to customer during potential periods of downtime at the hydrogen supplier and enabling the network to handle seasonal changes in demand. The requirement for storage and the location of the facility described above together with the existing consent and firm commitment by the operator to amend this consent in favour of hydrogen drives the requirement for a southern leg.

1.3.23. A customer base is essential to the Project and the presence of industrial customers in Warrington and St Helens drive the need for the northern leg to the network, at Rocksavage they influence the route location of the western corridor and the potential to blend into the existing natural gas network at points on Cadent's natural gas network at Warburton and Partington, along with customers at Partington (including Basell Polyolefins) drive the requirement for an eastern leg.

1.3.24. The design of the Project has therefore been developed to be in proximity to the supply, storage and customers locations. This approach also supports future customers connection to the Project and its ability to be proportionate to the volume of hydrogen to be produced by the HPP, the amount of storage available in the HSF and the anticipated future demand for hydrogen.

1.3.25. In relation to future customers, a future phase of the Project's development is being considered, with a Pre FEED assessment of Phase 3 of the (HyNet) North West Hydrogen Pipeline being undertaken. This work considers the expansion of the pipeline network into Wales, Lancashire, Manchester and further into Merseyside. Additional, future hydrogen production opportunities are also being considered in the local area, which have the potential to link into the Project in the future. Many of the enquiries received with regard to future connections are from developers looking to build green hydrogen production facilities.

## 1.4. Overview of the Proposed Development

1.4.1. The HPP (western corridor), HSF (southern corridor), potential blending points and industrial customers at Partington (eastern corridor) and industrial customers at St Helens (northern corridor) form the four fixed, cornerstone connection points around which the Project has been developed. The location of these points is shown in Figure 1.1.

## 1.5. Project Team

1.5.1. The project team consists of:

- Cadent; and
- A lands, consents and communications (LCC) team, led by WSP UK Ltd.

1.5.2. Wood Group UK Ltd led the Front End Engineering Design (FEED) process and continue to provide ad hoc support.

## 1.6. Structure of the Report

1.6.1. This report contains:

- Chapter 2: Approach to Routeing and Siting: the methodology for the design work for the Project.
- Chapter 3: Strategic Optioneering: the work undertaken to identify a general layout for the Project.
- Chapter 4: Route Corridor Identification: the work undertaken to identify the corridors within the strategic layout, and the HAGIs and spur connections needed (the Preferred Route Corridor).
- Chapter 5: Preliminary Route Alignment – Preliminary Order Limits: the work undertaken to identify the preferred route, within the route corridors, within which the pipeline, spur connections, HAGIs, block vales and working compounds will be located and which was undertaken for the PEIR and the Stage 2 Statutory Consultation exercise undertaken in 2022.
- Chapter 6: Preliminary Route Alignment – Draft Order Limits: the work undertaken to refine the Preliminary Order Limits from the Chapter 5 position to produce the Draft Order Limits. The Draft Order Limits will contain the pipeline, spur connections, HAGIs, Block Valve Installations and construction compounds. The Draft Order Limits will form the basis of the design being presented within the Stage 3 Statutory Consultation exercise in 2024 and assessed within the accompanying Draft Environmental Statement (Draft ES).

# 2. Approach to Routeing and Siting

2.1.1. This chapter provides the methodology of the routeing and siting work that is needed for the HyNet North West Hydrogen Pipeline project. As a methodology, this section is written as if all of the steps included will be in the future, even though a number of them have now occurred on the Project.

## 2.2. Design Objectives

2.2.1. The key requirement of the routeing and siting work is that it must allow the following objective of the Project to be met:

> "*The HyNet North West Hydrogen Pipeline project will transport low carbon hydrogen from the EET Hydrogen production site at Stanlow or the Inovyn storage site to identified industrial customers and will provide the opportunity to introduce or convey hydrogen into the existing gas network at Partington and Warburton (the "Customers"). The aim is for the Project to be commissioned in 2030, but it will also be designed with foreseeable future phases, demand and need in mind. In this way, it will support some of the North West's biggest businesses and employers for years to come, helping the region lead the way in the transition to Net Zero Carbon by 2050"*

2.2.2. In addition, the Project's selected design must be:

- technically and economically fit for purpose;
- able to receive the relevant consents;
- able to be safely constructed; and
- safe to operate.

2.2.3. In order to be technically and economically fit for purpose, the project design must include flexibility around which industrial customers may connect to the Project now and in the future.

## 2.3. Principles

2.3.1. In principle, the easiest method of laying a pipeline between any fixed points would be to take a direct line between these points. However, constraints are likely to require a direct route line to be amended to avoid or minimise conflict between the pipeline and the constraints. In order to make these amendments, options can be developed and the aim of the routeing and siting work is always to refine any options down to a single route corridor, as soon as practically possible in the process. However, alternative corridors may be identified where options to avoid key constraints are available in order to consult on these options and ensure the most appropriate option is selected. It may be appropriate to take multiple options into a consultation process.

2.3.2. Decisions at all stages of the design evolution process involve a balance of relevant considerations including taking into account the views of engineering and consenting professionals, the advice on the routeing of natural gas pipelines in National Policy Statement EN-4 and other relevant policy, and the results of stakeholder or consultee representations. Where appropriate, decisions made at previous stages are back-checked as a more detailed understanding of previous decisions develops.

## Corridor widths

2.3.3. The width of the route corridors within the final DCO proposals will depend on the diameter of the pipeline being installed. This will vary across the Project with current expectations being for pipelines of 10-18" diameter in the North Corridor, up to 30" in the East Corridor and up to 42" in diameter in the West and South Corridors. The spurs would range from 8-12" through public highways and up to 24" on the Runcorn / Rocksavage Spur.

2.3.4. Except within a highway, each pipeline will have a construction working area (also known as a Right of Way (ROW)) on both sides of the proposed route, and there will also be a Limit of Deviation (LoD) around the proposed pipeline route. The LoD provides a reasonable and proportionate buffer zone to micro-site the pipeline if necessary during construction. Taking into account the LoDs and the construction working widths, a corridor width for each diameter of pipeline can be calculated.

**Table 2.1 Anticipated DCO Pipeline Corridor Widths**

| Pipeline diameter | LoD | Construction working width | Total corridor width |
|---|---|---|---|
| **42"** | 60m | 44m (22m each side of pipeline) | 104m |
| **30"** | 60m | 36m | 96m |
| **16-18"** | 50m | 30m | 80m |
| **12" and below** | Up to adopted highway boundary | Up to adopted highway boundary | Up to adopted highway boundary |

2.3.5. All corridors will need to be wider in certain places to accommodate construction compounds, mitigation measures or access points for example. The principle of the routeing work however will be to refine all of the corridor options being considered, down to these identified widths for the final DCO proposals.

## 2.4. Identify Constraints and Beneficial Features

2.4.1. National Policy Statement EN-4 provides *"Factors influencing site selection by the applicant"* in relation to oil and gas pipelines. These factors have been taken into account in identifying the topics for consideration in the site selection process, as described below, along with the other relevant assessment principles and policy in EN-4 and in EN-1. It is noted that EN-4 states: *"The need for low carbon hydrogen infrastructure is established in Section 3.4 of EN-1. The guidance that follows in this NPS has been drafted in respect of, and has effect only in relation to, natural gas infrastructure. It does not have effect for hydrogen infrastructure but may contain information that is important and relevant to the Secretary of State's decision on applications for hydrogen infrastructure*."

2.4.2. A range of topics and constraints can be identified from reviewing these National Policy Statement as well as policy documents at a national level, and those documents which form the Local Development Plans, which will be considered within the consenting process. These include:

- Air quality
- Biodiversity and geodiversity
- Civil and military aviation and defence interests
- Coastal change
- Pollutants (dust odour, light etc)
- Flood risk
- Historic environment
- Landscape and visual
- Green infrastructure
- Noise and vibration
- Socio-economic
- Traffic and transport
- Green Belt
- Mineral Safeguarding Areas
- Development allocations
- Tree Preservation Orders (TPOs)
- Public Rights of Way and National recreational routes.

2.4.3. Constraints can also be identified in relation to safe construction and operation, and viable design:

- Cost
- Ground conditions and unstable ground

- Densely populated areas:
- Existing / future built developments
- Overhead power lines
- Mineral / mining extraction / landfill sites
- Active/dormant landslips
- Rock at/near surface
- Areas of potential unexploded ordnance/unexploded bombs
- Steep slopes
- Major highway crossings
- Rail line crossings
- Major watercourse crossings
- Buried services
- Overhead lines
- Access (temporary and permanent).

2.4.4. These issues and constraints are considered to provide an appropriate coverage of the regulatory and legislative matters, which will be relevant to the design and consenting processes for the Project. The assessment of constraints/issues has a bearing on the identification of strategic options, routeing and design and on the Development Consent Order (DCO) determination. A number of the topic areas considered are relevant for both environment and engineering considerations, or for multiple environmental topic areas.

2.4.5. A range of designations, policy allocations and features relating to the issues can then be identified and mapped into a GIS system for use in the study.

## Consenting

2.4.6. For this Project, the features in **Table 2.2** have been identified as being of relevance to the consenting process. The majority could be seen as routeing constraints; however, the Green Belt is considered differently (as described in paragraphs 2.4.10-2.4.14). It should be noted that some of the constraints identified in **Table 2.2** will also be of relevance to the engineering considerations presented in **Table 2.3**, and vice versa.

**Table 2.2 Key Environmental, Social and Policy Constraints**

| Topic | Constraint |
|---|---|
| **Air Quality** | Urban areas<br>Special Protection Areas (SPA)<br>Special Areas of Conservation (SAC)<br>Ramsar sites<br>National Nature Reserves (NNR)<br>Sites of Special Scientific Interest (SSSI) |
| **Biodiversity and Geodiversity** | Special Protection Areas (SPA)<br>Special Areas of Conservation (SAC)<br>Ramsar sites<br>National Nature Reserves (NNR)<br>Sites of Special Scientific Interest (SSSI)<br>Local Nature Reserves (LNR)<br>Priority habitats<br>Ancient woodlands<br>Tree Preservation Orders (TPOs)<br>Local Wildlife Sites |
| **Civil and military aviation and defence interests** | Ministry of Defence land |
| **Coastal change** | N/A |
| **Pollutants (dust, odour, light etc)** | Urban/built up areas<br>Public Rights of Way and cycle paths |
| **Flood risk** | Flood zones 2 and 3 |
| **Historic Environment** | Historic battlefields<br>Registered parks and gardens<br>Scheduled Ancient Monuments<br>World Heritage Sites<br>Listed Buildings<br>Conservation Areas<br>Historic Landscapes (Wales) |
| **Landscape and Visual** | Areas of Outstanding Natural Beauty<br>No National Parks within study area |
| **Green infrastructure** | Green Belt (see paragraphs 2.4.10-2.4.14)<br>National Trust land<br>Country parks<br>Public access land (Countryside and Rights of Way Act) |
| **Noise and Vibration** | Urban areas<br>Special Protection Areas (SPA)<br>Special Areas of Conservation (SAC) |

| Topic | Constraint |
|---|---|
| | Ramsar sites<br>National Nature Reserves (NNR)<br>Sites of Special Scientific Interest (SSSI)<br>Public Rights of Way and cycle paths |
| **Socio-economic** | National cycle routes<br>National/Regional walking routes<br>Areas of public recreation/open space |
| **Traffic and transport** | N/A: National policy is related to traffic generation issues rather than constraints to be avoided. Minor and residential roads would however be avoided in the design process. |

## Engineering

2.4.7. From an engineering perspective, the routeing exercise starts with constraints, particularly those which cover more extensive areas of land or which would give rise to substantial levels of difficulty or cost for a pipeline to be routed through.

**Table 2.3 Key Engineering Constraints**

| Topic | Constraints |
|---|---|
| **Ground conditions** | Geo-hazards (i.e. major faults/seismic issues)<br>Karstic features (i.e. limestone caves, sink holes)<br>Marshland or peat type soils<br>Topography (steep forward or side slopes) |
| **Densely populated areas** | Settlements<br>Suburban Areas (therefore maximising rural land)<br>Note: these areas are defined in IGEM/TD/1 pipeline code by population density |
| **Existing / future, built developments** | Planning permissions/applications<br>Planning policy designations<br>Landowner option agreements<br>Outdoor leisure facilities |
| **Overhead power lines** | Parallel running with overhead power lines |
| **Minerals / mining extraction / landfill sites** | Historic, present and future planned activity<br>Deep and shallow mining<br>Shafts<br>Spoil heaps<br>Opencast high walls<br>Contaminated land |

*Hydrogen Above Ground Infrastructure and the Green Belt*

2.4.8. The designations, constraints and issues used in the identification of the pipeline route are generally considered to be relevant for the identification of HAGI locations (including Block Valve installations) as well as the actual pipeline location. The one exception to this is the Green Belt.

2.4.9. The construction of a pipeline development generally favours the use of rural land to avoid the constraints posed by built up areas, such as existing utilities, residential properties and community facilities. Green Belt designations cover substantial extents of the potential development area, due to the location of the supply, storage and customer connection points. The Green Belt is a designation and constraint, which cannot be avoided either by the pipeline route or some of the HAGI requirements.

2.4.10. As the pipeline itself is a buried structure with the land above it being re-instated following its installation it avoids the appearance of any permanent features within the landscape and ensures that any disturbance to existing features is temporary in nature. The pipeline itself could therefore usually be developed in general compliance with Green Belt policy. This is on the basis that it can be demonstrated to be an 'engineering operation' which preserves the openness of the Green Belt and does not conflict with the purposes of including land within it and so is not inappropriate development in the Green Belt for the purposes of the NPPF (see paragraph 155 of NPPF).

2.4.11. HAGIs however need to be considered in greater detail, as they primarily contain pipelines located both above and below ground, plus associated equipment to manage the pipeline's operation. A HAGI would be a permanent piece of infrastructure until the end of the operational phase of the Project, visible in the landscape and resulting in impacts arising from the land lost to development. Due to the nature of the Project, it will not be possible for all HAGIs to be located outside of the Green Belt. Therefore, where a HAGI is required in the Green Belt, an assessment will be undertaken on the specific need for the HAGI and on different location options for its placement. The significance of impact will depend on the scale and nature of each HAGI and the particular characteristics of the landscape in the locations being considered for HAGI siting. In this way, the number of HAGIs proposed in the Green Belt will be kept to the absolute minimum required and proposed locations will be selected to minimise the impact on the Green Belt purposes. This assessment work will be used to analyse the Route Corridors identified to ensure that their proposed routes do not lead to any substantial Green Belt issues.

2.4.12. Green Belt designations would therefore not be considered in the initial Strategic Optioneering work but would be introduced later in the process when considering the potential locations for HAGIs along the corridors. The corridor selection would be revisited and checked once the location of the HAGI locations have been identified.

### Classification of Features

2.4.13. The constraints identified above in section 2.3 are plotted using a GIS system to build a 'heatmap'. The heatmap identifies highly constrained areas and areas with significant constraints, which should be avoided if possible. It is however important to note that the constraints may not in themselves become a critical barrier to the appropriateness of a corridor (and subsequent route) because all of the design decisions ultimately are a matter of balance between all relevant constraints and factors.

## 2.5. Strategic Optioneering

2.5.1. The Strategic Optioneering stage involves the consideration of strategic layouts for the pipeline route and the selection of a preferred option which will then be used to identify a route corridor for the pipeline.

2.5.2. Auto-routeing software can therefore be used with the heatmaps to identify potential strategic options for the pipeline routes. These options are then reviewed by engineering and consenting teams to ensure they are relevant and to determine the Preferred Strategic Option.

## 2.6. Route Corridor Identification

2.6.1. Using the Preferred Strategic Option identified at the previous stage, route corridors can be created between the fixed points identified in **Chapter 1**. These corridors could be broad (e.g. 1+km wide) and could accommodate multiple potential pipeline route alignments within them. The corridors aim to identify linear areas of land through which the pipeline would run, using the principle that the corridors would seek to avoid constraints unless the benefit of doing so would be disproportionate e.g. the length of the pipeline would increase significantly to route around the constraint resulting in additional costs and impacts not justified by the impact on the constraint which could be avoided. The corridor widths are not fixed at this stage so that corridors could widen in places where route options need to be accommodated or narrowed in response to specific pinch points between identified constraints. The Route Corridor would include search areas of HAGIs to provide an indication of where these facilities would be required along the Route Corridor.

2.6.2. The route corridor identification must therefore consider the nature of the individual constraints identified and their value or sensitivity, and what residual effects there may be where the route and these constraints overlap. For example, from an engineering perspective the route corridor identification considers aspects that affect both the constructability and operation of the pipeline. These may include:

- Suitability of access for both construction and operation.
- Minimisation of construction challenges (i.e. reduction of front/side slope or optimisation of drainage).
- Minimising of number of crossing and locations, including other utilities.
- Consideration of landowner activities (i.e. ongoing farming activities).

2.6.3. The work is both desk and site based, with site work allowing desk-based research and considerations to be confirmed in the field, resulting in Preferred Route Corridor(s) for the Project.

## 2.7. Consultation on Preferred Route Corridor

2.7.1. The Preferred Route Corridor identified was presented within the Stage 1 Non Statutory Consultation exercise to allow stakeholders (including members of the public) the opportunity to comment on their location. The results of the consultation exercise influences the corridors being taken forward, alongside ongoing technical assessment. The results of the consultation are provided in the Non-Statutory Consultation Feedback Report on the project website[2].

## 2.8. Preferred Route Optioneering / Preliminary Route Alignment Identification

2.8.1. Within the methodology originally published for the Stage 1 Non Statutory Consultation exercise, the intention was for this stage to produce a 'Preferred Route Option'. However, at both Stage 2 and Stage 3 Statutory Consultation, the work to date still included/includes a degree of optionality in the corridors identified and it is therefore not considered appropriate to refer to the results as a 'preferred' route option. The term Preliminary Route Alignment has therefore been used for the Statutory Consultation stage of the works.

2.8.2. Although the earlier phases of work would have avoided many of the constraint features identified in **section 2.3**, there could be places within the corridors where it has not been possible to avoid every constraint. Where constraints do exist within the corridors, expert advice from the environmental and engineering teams is used to examine how a pipeline could be routed to avoid, or minimise its impact on, these features whilst maintaining a viable project.

2.8.3. The representations received during the earlier consultation exercises are also taken into account at this point. Using both the expert advice and the consultation responses, the wider route corridors are narrowed down to a more defined route, although in places where constraints remain the corridor may need to be drawn to a wider extent, or with options included, to allow space for flexibility or mitigation as the routeing work progresses.

2.8.4. Where HAGIs (including Block Valve Installations (BVIs)) or working compounds are required, a similar process to the pipeline routeing work is undertaken, with locations within the corridors identified for these components which seek to avoid or minimise any conflict with the engineering and consenting issues identified. For certain features, options are identified and these will be reviewed and refined to narrow down the alternatives.

2 Knowledge Hub - HyNet North West Hydrogen Pipeline (hynethydrogenpipeline.co.uk)

2.8.5. The Preliminary Route Alignment is the result of the above exercise, it would include locations, or options, for all of the components and would also include the access points needed from the public highway to facilitate the construction of the Project.

2.8.6. The Preliminary Route Alignment originally identified was used within the PEIR (referred to as the Preliminary Order Limits (POL)) to allow an early assessment of the environment effects to be undertaken, and it was used within the Stage 2 Statutory Consultation exercise.

2.8.7. Since the Stage 2 Statutory Consultation, the Preliminary Route Alignment has continued to be refined, resulting in the need for the Stage 3 Statutory Consultation exercise in 2024. These refinements have produced the Draft Order Limits presented in the consultation documents and assessed within the Draft Environmental Statement. The refinements which have been made to the design to produce the Draft Order Limits follow the same methodology as set out in Paragraphs 2.8.1-2.8.4 and are detailed within Chapter 6 of this report. They have been made as a result of:

- Consultation comments received from landowners, statutory consultees and / or members of the public;
- The findings and recommendations made following continuing environmental survey;
- Additional information concerning constructability including information obtained from ground investigation; and
- The review of future development proposals (from planning application submissions or from local planning authority policy allocations).

2.8.8. In each of the situations listed above, the new information obtained does not mean that a change has been automatically made. The information has been used within the context of all the information currently held by the Project and in light of the previous design choices to determine whether there is a need to change the design. It should be noted that Chapter 6 of this report discusses where changes have been made, but there are also instances where, following consideration, the need for a change has been rejected because it could for example lead to greater environmental effects, be technically more difficult, affect a larger number of landowners or be costly to construct. Information on these instances is contained within the separate Consultation Report.

2.8.9. In addition to the above, this document does not record every occasion where land has been removed from the Preliminary Order Limits which was previously presented at statutory consultation. The removal of land, often resulting from the choice of a preferred option or as a result of greater technical certainty is seen by the applicant as a positive change as it reduces the amount of land potentially affected by the Project. **Figure 6.31** shows all of the land which has been introduced or removed from the Project between the Stage 2 Statutory Consultation (Preliminary Order Limits) and this Stage 3 Statutory Consultation (Draft Order Limits).

2.8.10. The assessment results and representations received on both the Draft Environmental Statement and the Statutory Consultation exercise in 2024 will be used to continue work on the refinement of the Preliminary Route Alignment down to a Proposed Route Alignment.

## 2.9. Selection of Proposed Route Alignment

2.9.1. Using both the preliminary engineering and environmental assessment work, and the more recent, more detailed engineering and environmental assessment works, alongside the representations made to the Stage 2 and Stage 3 Statutory Consultation exercises the Preliminary Route Alignment is then refined further to a Proposed Route Alignment. The Proposed Route Alignment would be a corridor representing the corridor widths identified in Section 2.2 and within that corridor it would include proposed locations for all of the HAGIs, BVIs, working areas and all other requirements of the Project. The Proposed Route Alignment would be examined within the final Environmental Impact Assessment and would be the formal Order Limits proposed within the DCO application.

2.9.2. Following on from the earlier stages of work, the Proposed Route Alignment would have avoided constraints wherever possible, taking into account the advice on the routeing of natural gas pipelines in National Policy Statement EN-4. Where it is not practicable to avoid all constraints then mitigation is recommended to minimise the impact on/from those constraints.

## 2.10. Current stage of work: Preliminary Route Alignment (the Draft Order Limits)

2.10.1. For clarity, within the methodology described in this chapter (specifically section 2.4 to 2.9), the Project has completed sections 2.4, 2.5, 2.6 and 2.7. The result of this work is described in **Chapters 3, 4** and **5**.

2.10.2. The methodology identified in Section 2.8 was completed for use in the PEIR and the Stage 2 Statutory consultation process. As noted in Section 2.8, this stage of work has subsequently continued, as there are a number of issues still under consideration and this optioneering exercise has not progressed to the point where it is possible to identify a “Preferred Route Alignment” (proposed Order Limits) as was previously identified in the methodology published for the Stage 1 Non Statutory Consultation exercise. There remains some limited optionality.

2.10.3. The route that is identified within this report is therefore still within the Preliminary Route Alignment stage and provides the route which is assessed in the Draft Environmental Statement as the Draft Order Limits.

# 3. Strategic Optioneering

## 3.1. Introduction

3.1.1. As the principle behind pipeline routeing is to get from the identified connection points in the most efficient way possible, the Strategic Optioneering identifies route options that the eventual pipeline could follow to reach these connection points. As identified in **Figure 1.1**, the connection points are:

- the Hydrogen Production Plant (HPP) at Stanlow;
- the Hydrogen Storage Facility (HSF), south of Northwich;
- the potential blending points at Partington and Warburton; and
- identified industrial customers in St Helens, Runcorn, Warrington, Carrington, and Lea Green (*Clock Face Spur*).

## 3.2. Strategic Options

### Strategic Options: Discounted

3.2.1. A number of potential strategic options were discounted from more detailed consideration as there were clear reasons why they would not be a viable option for this Project. These included the use of existing or unused pipelines, routeing in rivers or other waterways, routeing directly next to transport links or routeing directly next to current pipelines.

3.2.2. The reasons that these options were discounted were because some of the existing infrastructure is not in a location compatible with the Project's start and end points and that some of this infrastructure has its own safety stand-off distances within which third-party works should be minimised. In addition, the construction of the hydrogen pipeline could disrupt the continued operation of the existing infrastructure. Where infrastructure has been in situ for a number of years, it may pass through areas which have since been developed or are now environmentally constrained such that the routeing of a second parallel pipeline may not be the appropriate option. Existing pipelines, such as those carrying natural gas cannot be repurposed without disrupting existing supplies to customers whilst any redundant pipes would have been designed and constructed to standards and conditions, which may not be suitable for the transportation of hydrogen. In many cases only certain sections of pipe can be repurposed which leads to sections of pipeline being constructed at different times (i.e. some sections constructed before hydrogen use and others when the repurposed pipelines design life ends), leading to operational constraints and greater environmental impacts as land has to be disturbed more frequently.

3.2.3. Notwithstanding the above constraints the strategic options which have been taken forward do in some cases following existing infrastructure corridors in the broader sense.

## Strategic Options: Taken Forward

3.2.4. The employment of the methodology described in sections 2.4 and 2.5 identified four strategic alternatives, which the Project team evaluated. The term ‘leg’ is used to describe the land between the fixed points. The four strategic options are shown in **Figure 3.1 A-D.**

### *Strategic Option A: X Layout*

3.2.5. As can be seen in **Figure 3.1A**, connecting the defined end points produces an 'X' shaped layout west-east and north-south, with all legs running through a central hub location.

3.2.6. In this layout, the western leg follows the M56 corridor between Stanlow and Frodsham, avoiding constraint features to the north (wind turbines and waste sites), built-up areas and related listed buildings to the south. The leg would then pass a number of listed building and ancient woodlands features to reach a central hub location.

3.2.7. The northern leg follows largely open land between the built-up areas of Halton and Widnes in the west, and Warrington in the east, from the central area to St Helen's. Whilst there are isolated constraint features through this path (TPOs, ancient woodland, waste sites and listed buildings) they are not sufficiently widespread as to prevent a pipeline being developed. From the boundary between Warrington and St Helens a pipeline would then need to pass through built-up areas, which cannot be avoided due to the urban nature of this location.

3.2.8. The eastern leg passes between Lymm and the M56, avoiding some ancient woodland and TPO features to the north. It provides a fairly direct connection between Partington and the central hub location.

3.2.9. A direct route between the hydrogen storage area south of Northwich and the central hub location is not possible due to the town of Northwich being located directly between the two points. Two alternatives for the southern leg of an X layout were therefore identified. The first (Alternative 1) runs around the western and southern extents of the town and avoids ancient woodland and SSSI features in this area. The second (Alternative 2) runs around the northern and eastern extents, avoiding TPO, ancient woodland and SSSI features. Alternative 2 does pass over a waste site identified to the east of Northwich, however this is a deep waste storage facility within salt caverns at this location. At this strategic stage it was assumed that the deeper lying caverns would not be affected by a close-to-surface level pipeline.

### *Strategic Option B: H Layout*

3.2.10. Strategic Option B seeks to connect the western clusters of connection points with the north cluster, and the south cluster with the east cluster. A central connection would then join these two legs. This layout is shown on **Figure 3.1B**.

3.2.11. The western leg would follow the M56 corridor between Stanlow and Frodsham (like Strategic Option A), before crossing the Mersey Estuary to the northern cluster. This would pass through the SSSI, SPA and Ramsar designation on the Mersey, but avoids the built-up areas of Speke and Huyton to the west and Runcorn and Widnes to the east.

3.2.12. The eastern leg would follow the Option A leg from Partington to a point near the M6 / M56 Lymm interchange, before heading south to the Hydrogen Storage Facility (HSF) south of Northwich. This southern section is relatively unconstrained.

3.2.13. The central connection between the two legs would follow elements of the northern leg of Strategic Option A, between St Helen's and the Manchester Ship Canal, before cutting across relatively unconstrained land to join the eastern leg.

### *Strategic Option C: XH Layout*

3.2.14. Option C provides a combination of Strategic Options A and B, with the western, northern and eastern legs remaining the same, but the southern leg following the leg from Option B between the Lymm interchange and the HSF south of Northwich. This layout is shown on **Figure 3.1C**.

### *Strategic Option D: U Layout*

3.2.15. Option D utilises the western and eastern legs of Strategic Option B but does not provide a central connection. Instead, a connection is provided from the western leg to reach the northern cluster of connections points (following a section of the Option A northern leg) and a west-east connection is provided via a southern leg between Stanlow and Northwich. This layout is shown in **Figure 3.1D**.

3.2.16. The southern leg runs from Stanlow, bypassing the built-up area of Helsby to the south before passing to the north of Delamere Forest. The pathway then runs south around Sandiway, avoiding some isolated ancient woodland, SSSI and Ramsar features, before connecting to the HSF.

## Comparison of Strategic Options

3.2.17. **Table 3.1** sets out a comparison of the four strategic options based on calculations undertaken at the time these options were considered. All four options have been designed to connect to the four connection points identified in Chapter 1 and to allow connections to multiple hydrogen customers along the legs, so that they are not dependent on any one customer.

**Table 3.1 Strategic Options Comparison**

| | Option A – X layout | Option B – H layout | Option C – XH layout | Option D – U layout |
|---|---|---|---|---|
| **Constructability** | Single multi-junction central hub | Requires lengthy underground drilling under Mersey Estuary. Two multi-junction central hubs needed. | Two multi-junction central hubs needed. | Require lengthy underground drilling under Mersey Estuary. |
| **Security of supply** | Individual legs can be isolated at the central hub. | Isolation can occur at either of the two central hubs | Isolation can occur at either of two central hubs | No central hub locations: isolation is more complex. |
| **Total installed cost** | Least expensive of the four options | +£15m over Option A* | +£20m over Option A* | +£22m over Option A* |
| **Pipeline length** | 99km | 95km | 96km | 112km |
| **Spurs** | 32km | 34km | 32km | 34km |
| **Environment** | No significant constraints that cannot be routed around. | Closer proximity to / disturbance to Mersey Estuary international and national designations. Increased land-take required for central hubs | No significant constraints that cannot be routed around. Increased land-take required for central hubs | Closer proximity to / disturbance to Mersey Estuary designations. |

*At the time of the evaluation

## Preferred Strategic Option

3.2.18. From the comparison of the strategic options shown in **Table 3.1**, Option D was discounted as it:

- provides the longest pipeline route;
- is the most expensive option; and
- requires a significant crossing of the Mersey Estuary with either lengthy underground drilling and/or potential disturbance to the SSSI, SPA and Ramsar designations.

3.2.19. Option B is discounted due to the significant Mersey Estuary crossing and also the requirement for two central hubs, further increasing the complexity, cost and land take required for construction and operation.

3.2.20. The comparison between Option A and C shows that Option A has a longer route (by 3km), but that Option C would be £20m more expensive. Given that this increased route length of Option A would all be underground pipeline and that the surface would be reinstated upon completion of its construction, the following impacts are considered to outweigh any construction related impacts from the increased length of Option A:

- increased permanent land take of the second hub;
- increased operational complexities for this facility; and
- increased costs.

3.2.21. Option A has therefore been identified as the Preferred Strategic Option.

3.2.22. The optioneering work on the Strategic Options, and the Preferred Strategic Option identified, were consulted upon during the Stage 1 Non Statutory Consultation. A specific question was asked in the consultation documents about people's views on this stage of works and whether any additional information was available, in order to help confirm the optioneering work undertaken, and the choice of Preferred Strategic Option, was appropriate.

# 4. Route Corridor Identification

4.1.1. Using the Preferred Strategic Option identified in **Chapter 3**, a route corridor selection exercise was undertaken using the methodology outlined in **Chapter 2**. This exercise was undertaken to identify the Preferred Route Corridor which was used for the EIA Scoping Request and which was consulted upon in the Stage 1 Non Statutory Consultation exercise.

4.1.2. The work identified the following corridors, search areas for HAGIs and connection spurs along the Western, Northern, Eastern and Southern legs.

4.1.3. Search areas for HAGIs were identified, rather than specific location options, as at this stage, no detailed work had been undertaken to site HAGIs within the parameters of the corridors identified. The precise location of each HAGI would be subject to further design work, and therefore a search area was identified for each HAGI to both provide some indication of their likely general locations, whilst also providing flexibility for the detailed siting work to be undertaken in the Preferred Route Optioneering stage.

## 4.2. Western Leg

### Pipeline Corridor

4.2.1. From the HPP connection point at Stanlow, the western leg is required to achieve two further connections: one to the cluster of customers in the Rocksavage / Weston area of Runcorn, and one to the central hub location (see section 4.6).

4.2.2. A straight line route joining up these connections would see a pipeline running parallel to the M56 on its northern side between Stanlow and Rocksavage, and then a route between Rocksavage and the central hub location, which passes between Sutton Weaver to the north and Aston to the south.

#### *Western Leg Options*

4.2.3. Between Stanlow and Rocksavage, this straight-line corridor (named West 1, shown on **Figure 4.1**) was defined by the M56 to the south, and the industrial developments, the Frodsham Wind Farm and a former landfill in the Ince and Frodsham marshes area to the north. This corridor avoided crossings of the motorway, ran through a flat landscape and avoided the built-up areas of Helsby and Frodsham on the south side of the M56. This corridor did however run through an area of local landscape value, flood risk areas and small amounts of mineral safeguarding land, and also included multiple listed buildings and areas of ancient woodland. An alternative option was therefore considered.

4.2.4. The alternative option (named West 2, **Figure 4.1**) crossed the M56 south of Stanlow, before running in a roughly eastern direction between Dunham on the Hill and Helsby and on towards Kingsley. The corridor then passed to the north of Kinglsey before running to the central hub location. A spur would need to run north from this option to allow the Rocksavage connection to be made. This would have started near Kingsley, heading in a northern direction, passing to the east of Frodsham to reach Rocksavage. Between Stanlow and Kingsley, West 2 encountered hilly terrain, an ancient woodland designation and numerous individual listed buildings and it would also have run through multiple areas designated for local landscape value. The spur to Rocksavage would also have run through land at risk of flooding and small amounts of minerals safeguarding areas. The requirement for the spur would also have increased the length of West 2 over West 1 and would have required a longer spur connection from Rocksavage to the Runcorn hub of industrial customers.

4.2.5. A comparison of the two options is provided in **Table 4.1**:

**Table 4.1 Western Leg Options**

| | West 1 | West 2 |
|---|---|---|
| **Constructability** | Single HAGI: to serve Rocksavage – Runcorn spur<br>Flat topography | Two HAGIs: to serve Rocksavage – Runcorn and Kingsley to Rocksavage spurs<br>Hill topography |
| **Pipeline length** | 17.9km | 20.9km |
| **Rocksavage to Runcorn Spur length** | 3.9km | 4.6km |
| **Historic Environment** | Multiple listed buildings and two Scheduled Monuments (SMs) within corridor (but can be avoided by detailed routeing) | Multiple listed buildings and five Scheduled Monuments (SM)s within corridor (but can be avoided by detailed routeing) |
| **Traffic and Transport** | Crossings needed:<br>1no. motorway<br>1no. A-roads<br>1no, rail line<br>1-3no. watercourses<br>2no. walking trails | Crossings needed:<br>2no. motorways<br>1no. A-road<br>1no. rail line<br>1no. watercourse<br>5no. walking trails |
| **Landscape** | Within Weaver Valley Area of Special County Value (Part A: Lower) | Within Weaver Valley Area of Special County Value (Part A: Lower) and Helsby and Frodsham Hills Area of Special County Value |

| | West 1 | West 2 |
|---|---|---|
| **Biodiversity** | Multiple areas of ancient woodland (but can be avoided by detailed routeing) | Multiple areas of ancient woodland (but can be avoided by detailed routeing) |
| **Flood Risk** | Pipeline would run through 8-10km of Flood Zones 2 and 3 | Pipeline would run through 1km of Flood Zones 2 and 3 |

### *Preferred West Corridor option*

4.2.6. Other than for flood risk, the comparison of West 1 and West 2 showed a preference for West 1. During construction it is likely that flood risk impacts on nearby receptors can be mitigated through dewatering practices and the controlled release of water back into watercourses. During operations existing levels of flood storage capacity would not be lost as the pipe would be underground with the land returning to its baseline status with no increased risk of flooding for other receptors. Flood risk to the pipeline structure itself can be mitigated by the consideration of buoyancy in the design. West 1 was therefore the preferred option.

4.2.7. A corridor was therefore identified along West 1 which stretches up to 1.7km in width in places but takes a mostly direct route between the connection points.

4.2.8. From the initial West 1 corridor identified, further refinement took place to remove land associated with the ancient woodland and around listed building designations associated with Beckett's Wood, Chapel Wood and Aston, from the centre of the corridor. The width of the corridor was also been reduced in places to avoid ancient woodland at Bird's Wood and Blackamoor Wood, and the ancient woodland and SSSI designations at Hatton's Hey Wood, Whittle's Corner and Bank Rough. The identified corridor had sufficient width to allow a route pathway to be selected through it which can avoid, or substantially reduce impact on, the designations identified within it. The Preferred Route Corridor identified from this refinement work is shown in **Figure 4.2.**

## HAGIs

4.2.9. Up to two HAGIs are needed in the Rocksavage area, to provide connections to the customers in Rocksavage and Runcorn, and therefore a search area was identified within the corridor at this point. To serve potential industrial customers in the Runcorn area, the search area included three parcels of land 1) to the north west of the M56, dissected by the River Weaver; and 2) to the south east of the M56, mainly between the River Weaver and the Weaver Navigation (shown as the Rocksavage HAGI Search Area on **Figure 4.2**). A third search area has also been identified to the north of the Weaver Navigation between the M56 and the A557 (the Runcorn HAGI Search Area shown on **Figure 4.2**). Areas 1 and 2 were almost entirely within Flood Zones 2 and 3 and also contained parts of former landfill sites. Area 3 was outside of the flood risk areas but also contained a former landfill site.

### Spurs

4.2.10. In order to provide connections between the HAGIs and the identified industrial customers in the Rocksavage/Runcorn area, pipeline spurs will need to be provided. Options are limited in this area for the spur corridors due to the existing urban nature of much of the land here, so a direct corridor was identified between the customers. This spur corridor is shown on **Figure 4.2**.

## 4.3. Northern Leg

### Pipeline Corridor

4.3.1. The connection point cluster in St. Helens is made up of two locations, industrial customers in central St Helens, and a single customer at Lea Green Industrial Park. Between these customers and the connection to the Central Hub, the Northern Leg is also required to achieve one further connection: to industrial customers in the Warrington area. The initial corridor identified from the Route Corridor identification work is shown in **Figure 4.3**, with the refined Preferred Route corridor described below shown in **Figure 4.4**.

4.3.2. From the customers in central St Helens, a direct route to the Lea Green customers is heavily constrained by the existing urban area and a desire to maximise use of the open space between Sutton Heath and Rainhill. A single corridor was therefore identified which followed Sherdley Road and Elton Head Road, before running through the open space between Sutton Heath and Rainhill, to eventually cross the A570 between Micklehead Green and the junction of the A570 with the M62. The section was subsequently refined to narrow this corridor to avoid a housing allocation/planning permission for housing at the former Linkway Distribution Park / Suttons transport site. Additional land was also added to provide a potential option that crosses the A570 at Sherdley Park, to utilise open space in this area before re-joining the corridor in the open space near Micklehead Green and the Lea Green customer.

4.3.3. Around the M62, the initial corridor covered a wide stretch of land between the northern side of the M62, the Omega Business Park and Lingley Green in the east, the Manchester to Allerton Junction rail line in the south and the A557 in the west. This section of the Corridor was then amended to avoid land within Sutton Manor Woodland from the north of the M62. In addition, land at the Mersey Valley Golf Club and its Local Wildlife Site were removed from the centre of the corridor and the western extent was drawn back from the A557 to reduce land take.

4.3.4. Running south to the A56, the route of the corridor was restricted to a relatively direct route through the open space between Cuerdley Cross, Fiddlers Ferry Power Station and Sandymoor to the west, and Penketh and Higher Walton in the east, to the M56. Subsequent refinement of this section saw additional land included around the Birchwood area to help facilitate the connection to Warrington. Land was included around Daresbury to provide optionality in passing this settlement, whilst land was drawn in from the eastern side of Halton, to avoid this settlement. The Corridor then ran in a direct line between the M56 to the central hub.

## HAGIs

4.3.5. Four HAGI search areas were identified along the northern corridor to accommodate five potential HAGIs. All four search areas are shown in **Figure 4.4** and are described below:

### *St Helens*

4.3.6. A HAGI search area was located at the northern extent of the corridor to connect to the St Helen's customers. A search area for this was identified immediately adjacent to the customers. This search area is free from all constraints, except for historic landfill sites. However, given the extent of these historic landfills in the local area, and that much of the land associated with these historic landfills (outside of the search area) has been previously developed, it is not expected to prove to be a major constraint to a HAGI development.

### *Clock Face and Burtonwood*

4.3.7. In the Clock Face area, a HAGI will need to be provided to allow a connection to be made to the Lea Green spur customer.

4.3.8. A HAGI to service a potential future connection in a northern direction, past Burtonwood and towards Wigan, was also considered.

4.3.9. A combined search area for these two HAGIs was identified. This search area contained a number of constraints (a small area of flood risk land at the northern extent, near Lea Green, and a small number of TPO protected trees, one listed building and a small area of historic landfill) all of which would be easily avoided when looking to route the pipeline.

### *Cuerdley*

4.3.10. A HAGI was considered close to Cuerdley Cross to serve potential future customers in Widnes.

### *Higher Walton*

4.3.11. Near Higher Walton, a HAGI is required to connect to the industrial customers in Warrington. A search area was identified within the corridor, which straddled the Manchester Ship Canal. The northern half of the search area would be the preferred location to allow a connection to run to the north of the canal to join the customers located there. The northern part of the search area contained a waste site, local wildlife site and areas of flood risk. The search area south of the Ship Canal was largely free from constraints.

## Spurs

4.3.12. Three spurs are required from the northern pipeline corridor to industrial customers (shown in **Figure 4.4**). At the northern extent, a short spur would run from the St Helens HAGI to connect the St Helen's customers.

4.3.13. At Lea Green, two spur options were identified (to run from the Clock Face HAGI), one running from the main corridor along Eurolink Road and the second running through Chapel Road and then following Lea Green Road. The Eurolink option avoided any constraints. The Chapel Road option contained a number of TPOs, although there was available land within the option to avoid these trees.

4.3.14. From the Higher Walton, a spur would need to run east towards Warrington to connect three customers. The spur corridor identified ran to Slutchers Lane, before splitting into two legs. A northern leg that followed the River Mersey and an eastern leg that followed public highways through the Latchford area. Part of the corridor to Slutchers Lane included an area identified as a permitted waste site and there were a number of listed buildings located along the spur corridor, although not to an extent that they could not be avoided.

## 4.4. Eastern Leg

### Pipeline Corridor

4.4.1. The connections required on the Eastern Leg include two connections to the existing natural gas network where hydrogen can potentially be blended into the natural gas supply (one at Warburton and one at Partington), and also a connection to an industrial customer at Partington. The corridor identified from the central hub location, was able to follow an almost straight path with only a slight diversion to the south of the Lymm Interchange (where the M62 and M6 cross). This variation also avoided a cluster of ancient woodland and TPO constraints between Lymm and the M62. Other than these constraints, there were isolated listed buildings within the corridor. The corridor was crossed by minerals safeguarding areas, flood risk zones and, at the time, the proposed line of HS2. However, these constraints are mainly linear in nature and would need to be crossed for any corridor option chosen for the Eastern Leg. The initial corridor from the Route Corridor identification work is shown in **Figure 4.5**, with the refined Preferred Route Corridor described below shown in **Figure 4.6**.

4.4.2. The corridor route ran between Higher Whitley and Antrobus in the A559 Northwich Road area, between the Lymm Interchange, Lymm and High Legh around the M6 and M62, before running to the north and passing Warburton and into Partington. It was a maximum of 2.5km in width, narrowing to around 700m where it crosses the A50 and M62.

4.4.3. The initial corridor was subsequently amended to avoid ancient woodland at Spud Wood near Lymm, and also Hey Wood near Deansgreen. The corridor was also narrowed between these points to also avoid Deansgreen itself and other properties around Kay Lane and the A56. The corridor was also narrowed to bring the corridor further away from Dunham Massey Park and to avoid the Dunham Massey and Dunham Woodhouses settlements. The corridor also aims to avoid the settlements of Frandley, Antrobus and Arley. A small area of additional land (with no constraints) was added to the corridor near the B5159 Mill Lane.

### HAGIs

4.4.4. Two HAGIs will be required on the East Corridor, at Warburton and at Partington to service the connections identified. Search areas for both are shown on **Figure 4.6**.

#### *Warburton potential blending point*

4.4.5. At Warburton, the HAGI search area was located adjacent to the Warburton gas network site. Part of the search area (including the existing gas network site) was covered by a wildlife corridor which runs adjacent to the River Bollin. The remainder of the search area was free from constraints.

#### *Partington HAGI*

4.4.6. At Partington, the HAGI would be needed to connect to industrial customers and also for a potential blending connection with the natural gas network. The search area was located at the eastern extent of the corridor, on previously developed land located adjacent to the Partington gas network site. The location was close to proposed industrial developments but otherwise was considered free of constraints.

### Spurs

4.4.7. One spur is required from the eastern corridor (shown in **Figure 4.6**): running from the eastern extent of the corridor (and the associated Partington HAGI) to connect the customers here. The spur would need to be routed to avoid proposed industrial developments in the area.

## 4.5. Southern Leg

### Pipeline Corridor

4.5.1. Two corridors were identified on the Southern Leg (as described for Strategic Option A in paragraph 3.2.9). The initial corridors from the Route Corridor identification work for both options are shown in **Figure 4.7**, with the refined Preferred Route Corridor options both shown in **Figure 4.8**.

4.5.2. South 1[3] ran around the west and south of Northwich, taking a route between Acton Bridge, Cuddington, Sandiway and Wharton to the west, and Weaverham, Hartford and Moulton to the east, to reach the HSF. South 1 was approximately 17.5km in length, and was mainly in flat, open fields and crossed:

- 4no. A-roads (A533 (twice), A556, A530);
- 5no. watercourses (River Weaver/Weaver Navigation (twice), Trent and Mersey Canal (twice) and the River Dane; and

[3] South 1 has also been referred to as Alternative 1 in some previous Project documents.

- 4no. rail lines (West Coast Main Line (twice), Altrincham to Cheshire line and the Northwich to Sandbach line).

4.5.3. This corridor also avoided the SSSI and ancient woodland associated with Pettypool Wood and some of the TPO designations around Vale Royal Abbey.

4.5.4. The initial corridor was substantially narrowed in the Acton Bridge area to remove the land around Acton Bridge and to draw the corridor away from Weaverham where the corridor crosses Station Road. Minor amendments were also made around Vale Royal Park to move the Corridor boundary away from the golf course and additional TPO coverage there. Land was also removed from the Corridor around the ancient woodland at Newbridge Wood and the at Weaver Parkway and Vale Royal River Park (caravan site). The Corridor was also amended to remove land around Bostock Hall and the listed buildings here and a permitted waste site close to here.

4.5.5. South 2[4] ran around the north and east of Northwich, with the initial corridor passing to the north of Marbury Country Park (and associated TPOs and ancient woodland), between Wincham and Higher Wincham, around Lostock Gralam and Lostock Green and then passing east of Rudheath to reach the HSF. The Corridor was close to 19km in length, and was mainly in flat, open fields and crossed:

- 3-5no. A-roads (A49, A559 (likely once, but possibly up to three times), A556);
- 3no. B-roads (B5075, B5391, B5082); and
- 1no. rail line (Altrincham to Cheshire rail line).

4.5.6. This corridor also avoided, or predominantly avoided, ancient woodland and TPOs at Winnington and Leonard's Woods, and the Plumley Lime Beds scheduled monument and SSSI, to the east of Lostock Gralam. The corridor did pass over the permitted waste operations associated with the salt caverns around Lostock Green and include some TPO designations at Wincham Hall. It also included TPOs located around Comberbach and Greater Budworth although there would have been routes through these designations to avoid them.

4.5.7. The corridor route was subsequently amended to take a route that generally runs further to the east of the initial corridor. It passed around Pickmere and then between Lostock Gralam and Plumley. It was located to the east of the salt caverns around Lostock Green and then around Lach Dennis to reach the HSF. This amendment was made to avoid expected buried services associated with the salt caverns. This amended route still included the TPOs around Comberbach and Greater Budworth, but largely avoided the TPOs around Wincham Hall and passed around the Plumley Lime Beds scheduled ancient monument and SSSI. It did include the ancient woodland and TPOs at Winnington and Leonard's Woods.

4.5.8. Both South 1 and South 2 passed across areas of minerals safeguarding and flood risk zones. Due to the extent of these designations, it would not be possible to avoid them on either option. In addition, both options would have needed to cross the HS2 route (prior to its abandonment).

[4] South 2 has also been referred to as Alternative 2 in some previous documents.

4.5.9. A comparison of the two options is provided below:

**Table 4.2 Southern Leg Options**

| | South 1 | South 2 |
|---|---|---|
| **Constructability** | Flat topography | Flat topography |
| **Pipeline length** | 17.5km | 18.6-19km |
| **Historic Environment** | Multiple listed buildings and one Scheduled Monument within corridor (but can be avoided by detailed routeing) | Multiple listed buildings within corridor (but can be avoided by detailed routeing) |
| **Traffic and Transport** | Crossings needed<br>• 3-5no. A-roads<br>• 5no. watercourses<br>• 4no. rail lines<br>• 3no. walking trails<br>• 2no. national cycle routes | Crossings needed:<br>• 3-5no. A-roads<br>• 3no. B-roads<br>• 1no. rail line.<br>• 1no. walking trail<br>• 1 national cycle route |
| **Landscape** | Within Weaver Valley Area of Special County Value (Part A: Lower and Part B: Middle) | Within Weaver Valley Area of Special County Value (Part A: Lower) |
| **Biodiversity** | Multiple areas of ancient woodland (but can be avoided by detailed routeing) | Multiple areas of ancient woodland and one SSSI (but can be avoided by detailed routeing) |

4.5.10. From the comparison in **Table 4.2**, it can be seen that there is little substantial difference between the two options. South 1 was slightly shorter and avoided a SSSI designation, whereas South 2 avoided a scheduled monument designation and had fewer recreational route crossings. Due to the similarities, it was considered appropriate to take both options forward to the Stage 1 Non Statutory Consultation exercise.

4.5.11. A pipeline running through either of these corridors would require a BVI due to the length of the pipeline between the central hub and the HSF. A BVI provides a cut-off point, to isolate a section of pipeline for maintenance, repair or safety reasons.

## HAGIs

4.5.12. One HAGI is required at the HSF and would be part of either the South 1 or South 2 options. Other than a minerals safeguarding area (for deep-lying salt) there were no constraints identified with this HAGI search area, which is shown in **Figure 4.8**. At this stage it was assumed the presence of deep-lying salt resources would not be an impediment to the ground level development of a HAGI.

## Spurs

4.5.13. A spur was identified from the South Corridor area to a hydrogen customer at Winnington. Different options were available for this Spur due to the options available for the South Corridor.

4.5.14. From South 1, a spur corridor (Spur 1 on **Figure 4.8**) was identified that passed through open land between Weaverham and Hartford, and then between Barnton and Winnington to reach the site. This spur included ancient woodland at Beach Hill Wood, part of a permitted waste site north of Wallerscote Road and flood risk zones around the Weaver Navigation and River Weaver. Depending on the exact route chosen for the spur corridor, there could have been up to four watercourse crossings and one A-road crossing.

4.5.15. From South 2, a corridor spur (Spur 2 of **Figure 4.8**) would have passed through Marbury Country Park / Anderton Nature Park to the site. This spur included ancient woodland at Big Wood in the country park, flood risk zones around the Forge Brook, Marbury Brook and Weaver Navigation and the local nature reserve at Anderton Nature Park. Two watercourse crossings would have been needed.

4.5.16. These corridors were subsequently amended to widen around Wallerscote Road, to allow an option to follow the public highway through Winnington and to narrow the corridor through Marbury Country Park / Anderton Nature Park to avoid the Big Wood ancient woodland.

4.5.17. For either of these two spur options a HAGI would have been required within the relevant corridor. Search areas have not been identified for such a HAGI at this stage, as it is likely that any HAGI would be incorporated into the same site as the BVIsrequired within the corridor. Due to the detailed design needed to identify BVIs, a HAGI location was to have been considered during subsequent stages should either of these two spurs have been chosen.

4.5.18. In order to minimise the number of potential HAGIs needed, two additional spurs were subsequently introduced. Both would run directly from the central hub location thereby utilising this required HAGI), one passing to the north of Barnton and Anderton to reach the site and one running between Barnton and Weaverham (Spurs 3 and 4 respectively on **Figure 4.8**).

4.5.19. Spur 3 would have been largely free of constraints until it passes Anderton, where it runs through some of the Anderton Local Nature Reserve and crosses flood risk zones on the Weaver Navigation. Two watercourse crossings would have been needed.

4.5.20. Spur 4 would have run between Weaverham and Runcorn, before joining the route of Spur 1 near to Wallerscote Road. This spur option would have crossed flood risk zones and require up to six watercourse crossings.

## 4.6. Central Hub HAGI

4.6.1. Where all four corridors meet a HAGI search area is required to accommodate the Central Hub. The HAGI to be located here will provide a central hub of all four pipelines legs. The four corridors meet around the Dones Green crossroads (the junction of the A553 and A49). A search area (**Figure 4.9**) was identified in this location, mostly to the west of the A49. In the north of the search area there is land within flood risk zones and in the south an area of ancient woodland. Mineral safeguarding areas exist in both the north and south of the search area.

## 4.7. Preferred Route Corridor

4.7.1. **Figure 4.10** shows the Preferred Route Corridor options that were selected for use in the EIA scoping request. They were also consulted upon in the Stage 1 Non Statutory Consultation exercise in early 2022, along with the HAGI search areas and spur corridors identified to provide connections to customers, in order to confirm that the corridor identification work undertaken, and the Preferred Route Corridor identified, were appropriate.

# 5. Preliminary Route Alignment: Preliminary Order Limits

5.1.1. Chapter 5 describe how the corridors were refined from the Preferred Route Corridor identified in **Chapter 4** to form the Preliminary Route Alignment / Preliminary Order Limits which were used in Stage 2 Statutory Consultation and within the environmental assessment work of the PEIR at this stage. In general the refinements saw the land requirement narrowed along each corridor to provide more certainty on where the pipeline is to be proposed. Whereas the Preferred Route Corridor consulted on at the Stage 1 Non Statutory Consultation accommodated multiple potential pipeline route alignments, the Preliminary Order Limits mainly comprised a single route alignment. The Project was positioned further away from certain sensitive receptors, where possible, to reduce the land take required. In some places, some width or optionality was retained in the preferred route where refinement work was still ongoing or where working compounds may be needed for the construction stage. This ongoing work included items such as ground investigation work, discussions with landowners and environmental surveys.

5.1.2. The location of the HAGIs is largely determined by the customer/spur connections needed. This therefore finds some of the HAGIs within Green Belt locations. Each HAGI location option was therefore reviewed in light of the comments received from the Stage 1 Non Statutory Consultation comments received, and they were also assessed against Green Belt purposes[5]. Further details are provided within the relevant HAGI sections below.

5.1.3. Figures are provided to illustrate specific points mentioned below, and a fully detailed set of plans showing the entire Preliminary Order Limits, including all proposals and options for the pipeline route, HAGIs, BVIs and Spurs is provided in **Figure 5.19** and in **Appendix B**. Appendix B is a copy of the full set of plans from the PEIR (the PEIR Figure 2.17).

## 5.2. West Corridor

### Pipeline

5.2.1. The pipeline will run from the HPP to the Rocksavage area, where a connection spur will run towards Runcorn to supply industrial customers. The corridor will then run to the east to join up with the Central Hub. The Preliminary Order Limits described below is shown in **Figure 5.1** and in more detail in **Appendix B**.

[5] The Green Belt Assessment that was undertaken for the Stage 2 Statutory Consultation can be found at: https://cadent-nwhp-pier.s3.eu-west-2.amazonaws.com/Design-Evolution-Report-Appendix-A.pdf The Green Belt Assessment included at **Appendix A** of this report, has been updated from the Stage 2 Statutory Consultation version to reflect the current project design.

5.2.2. From the Stage 1 Non Statutory Consultation exercise, comments were received that requested the corridor should consider following either the M56 or the River Weaver and that it should avoid key roads and commuter corridors. The corridor followed a line adjacent to the M56 from the HPP to Rocksavage, however it is not possible for the pipeline to follow the M56 directly. Neither is it possible for the pipeline to be routed within the motorway itself due to the disruption this would cause both from construction activities and then potential maintenance in the future. From Rocksavage, the M56 then runs to the north east towards Daresbury and there is limited land available to route a pipeline adjacent to the motorway along this section. Due to the general direction of travel of the corridor, a number of key roads and commuter route will have to be crossed. However, where this is the case (M56, A5117, A56, A553 and three rail line crossings), these would be constructed as trenchless crossings (tunnelled under the roads and rail lines) to avoid any disruption to customers of these routes.

5.2.3. Along the section from the HPP to Rocksavage, the Preferred Route Corridor was narrowed to keep the route as close to the M56 as possible, to reduce potential impacts on the biodiversity value of the Helsby and Frodsham Marshes and to minimise the land required within areas of flood risk here. In places some width was retained to allow further investigation of existing services within this area (overhead lines and other pipelines) to ensure that the Project does not impact on those. A number of local access roads/tracks were also included within this section to ensure that appropriate access will be available from the public highway network. Options (WP1 and WP2) were included around the Hover Force outdoor activity centre, and are shown in **Appendix B, Sheets 3 and 4**.

5.2.4. At Rocksavage a wider area was provided to allow the HAGI and spur connections needed to provide supply to Runcorn. These are discussed in more detail in the respective sections below.

5.2.5. The preferred route would then run between Sutton Weaver and Aston, before crossing the West Coast Main Line and connecting with the Central Hub. The original route corridor had an option running south of Aston; however this was discounted due to an increased number of crossings of the River Weaver/Weaver Navigation and the greater extent of flood plain it would cross compared to the Sutton Weaver/Aston option chosen. In addition, the closure of Sutton Hall Golf Club removed this recreational receptor from the preferred route. The reduction in width of this section of the Corridor provided greater stand-off distances between features such as ancient woodland (including Beckett's Wood, Bird Wood and a number of smaller woodlands around the West Coast Main Line area).

**Table 5.1 Rocksavage to Central Hub options**

| | North | South |
|---|---|---|
| **Constructability** | 1no. crossing of Weaver Navigation needed. Access direct from A56. | 2no. crossings of River Weaver needed. Access difficult away from Frodsham area. |

| | North | South |
|---|---|---|
| **Pipeline length** | 5.5km | 5.5km |
| **Traffic and Transport** | Major road crossings: 2no. (A557 and A56) | Major road crossings: 1no. (A56) |
| **Biodiversity** | Passes through approx. 0.1km of Lower Weaver Valley Woods LWS | Passes through approx. 0.2km of Blackamoor Wood and Coppice LWS |
| **Recreation** | None | None |
| **Agricultural land** | Passes through approx. 3.6km of Grade 2 agricultural land | All Grade 3 or 4 |
| **Flood Risk** | Passes through approx. 0.4k of flood plain land | Passes through approx. 1.7k of flood plain land |
| **Minerals Safeguarding Area** | Passes through approx. 3.4km of MSA. | Passes through approx. 1.1km of MSA. |

5.2.6. Both options were the same length and neither would have any impact on recreational facilities. The northern option had only one major watercourse crossing, marginally less impact on local wildlife sites and passed through less land within the flood plain, but did have two A-road crossings, passed through Grade 2 agricultural land and through greater extents of minerals safeguarding areas. The southern option had one A-road crossing, only passed through Grade 3 or 4 agricultural land and didn't have as much of an impact on minerals safeguarding areas, but it did have two major watercourse crossings, slightly greater impacts on Local Wildlife Sites and ran through greater extent of floodplain.

5.2.7. The construction access for the northern option would be good, with direct access from the A56 or Aston Lane. Access for the southern option would be more complicated, involving the creation of access tracks across the wetland areas near Frodsham and extended routes through the northern option to service construction, as it moved towards the Central Hub. Due to the single major watercourse crossing and the favourable construction access, the northern option was chosen as the preferred route. The refinement of this option then narrowed the potential land take and moved the route further away from a cluster of listed buildings at Aston. Options WP3 and WP4 remained for the crossing of the Weaver Navigation, and are shown in **Appendix B, sheets 5 and 7**.

## HAGIs

5.2.8. With the HAGI search areas identified for Rocksavage and Runcorn for the scoping and Stage 1 Non Statutory Consultation exercise, seven possible HAGI locations were identified. Five were located south of the Weaver Navigation to provide a location for the Rocksavage HAGI and two north of the Weaver Navigation for the Runcorn HAGI (**Figure 5.2**). Design work was still ongoing ion this area, and whilst it was possible that a single HAGI site could have been utilised to provide all the connection requirements, the working assumption at this stage was that two HAGIs would be required one at Rocksavage and one at Runcorn.

5.2.9. Of the Rocksavage options, RSH1 was located to the south of the River Weaver in land, which was free from built development constraints, although it was within flood zones. RSH2 and RSH3 were both located on land between the M56, Weaver Navigation, River Weaver and the Warrington to Chester rail line. RSH3 was located within a flood zone and RSH2 within an area of historic landfill. RSH4 was located adjacent to the Frodsham substation to minimise the length of the Runcorn Spur. RS5 was located on a potential spur option to the west of Frodsham substation and outside of identified flood zones. All five options are within Local Wildlife Sites. Comments were received during the Stage 1 Non Statutory Consultation exercise, which raised concern about ecological features in the area.

**Table 5.2 Rocksavage HAGIs**

| | RSH1 | RSH2 | RSH3 | RSH4 | RSH5 |
|---|---|---|---|---|---|
| **Constructability** | 4no. major crossings: (River Weaver x2, Weaver Navigation, M56) | 4no. major crossings: (River Weaver, Weaver Navigation, M56 x2) | 4no. major crossings: (River Weaver, Weaver Navigation, M56 x2) | 3no. major crossings: (River Weaver, Weaver Navigation, M56) Adjacent to Frodsham sub-station. | 4no. major crossings: (River Weaver x2, Weaver Navigation, M56) |
| **Biodiversity** | Frodsham, Helsby and Ince Marshes LWS | East Clifton Tip LWS | East Clifton Tip LWS | Frodsham Fields Studies Centre LWS | Frodsham, Helsby and Ince Marshes LWS |
| **Permitted waste site** | No | No | No | No | Yes |
| **Historic landfill site** | No | Yes | Yes | No | No |

| | RSH1 | RSH2 | RSH3 | RSH4 | RSH5 |
|---|---|---|---|---|---|
| **Impact on Green Belt** | Moderate | Moderate to Limited harm | Moderate to Limited harm | Limited | Moderate to Limited harm |
| **Agricultural land** | n/a | Grade 4 | Grade 3 | n/a | Grade 3 |
| **Flood plain** | Yes | No | Yes | Yes | No |

5.2.10. RSH5 was discounted due to being located within a landfill site with a valid permit and RSH4 due to concerns over operational safety with it being adjacent to the Frodsham sub-station. RSH3 was moved so it was outside of the flood zone and retained as an option, and RSH2 was retained as an option until results of ground investigations on the historic landfill are known. RSH1 is not located within the Green Belt and is also outside of any classified agricultural land. RSH1 has therefore also been retained as an option. Options RSH1, RSH2 and RSH3 are shown in **Appendix B, sheet 5**).

5.2.11. North of the Weaver Navigation, two options were identified outside of the Green Belt for the Runcorn HAGI. Neither option had any particular differences from an environmental perspective and the main difference from an engineering point of view was the need for cut and fill operations for RH1. No comments were received from the Stage 1 Non Statutory Consultation exercise specifically on the Runcorn HAGI options. RSH2 was therefore preferred due to the lack of cut and fill needed in the construction phase. Further work was undertaken which moved this option further to the east as a larger site was required and additional space was available to the east away from an existing gas pipeline.

## Runcorn Spur

5.2.12. The Runcorn Spur is the only spur required on the West Corridor, and at Preliminary Order Limits stage, ran from the Rocksavage HAGI, in a north-west direction to the Runcorn HAGI and then on to provide connections to Intergen and The Heath Industrial and Business Park (The Heath). Optionality was retained to route the Spur between the Rocksavage and Runcorn HAGIs, with options running either to the east or the west of Frodsham sub-station (Options RSp1 and RSp2 shown in **Appendix B, sheet 5**).

5.2.13. At Stage 1 Non Statutory Consultation, the Runcorn Spur was presented as a loop as different options were available to supply the two customers in this area. **Figure 5.3A** shows these options as:

- Separate connections to both customers (purple (Intergen) and orange (The Heath) routes);
- To route to Intergen (purple) and then continue on past Weston on the yellow loop to connect to The Heath (orange); or
- To route to The Heath (orange), then continue on past Weston on the yellow loop to connect to Intergen (yellow).

5.2.14. Further discussions with Intergen clarified that any works through their site would be pursued, consented and delivered by them rather than as part of this project**.** No comments were received from the Stage 1 Non Statutory Consultation specifically on the options for the Runcorn Spur. Due to uncertainties about whether Intergen would be willing to continue any connection through their land to join up with The Heath on its western boundary, a further option, named A557, was identified to connect the Heath, which would run west along the A557 and then join The Heath from the west (**Figure 5.3A**, Green (A557) route).

**Table 5.3 Runcorn Spur**

| | Intergen | The Heath | A557 |
|---|---|---|---|
| **Constructability** | Would be delivered by Intergen | Topography/ land types are favourable for construction. | Constrained land availability: highway verge and multiple side road crossings. |
| **Pipeline length** | 4.5km | 1.9km (To The Heath only) | 3.6km |
| **Historic Environment** | None | None | Grade II listed Buildings at Old Hall |
| **Traffic and Transport** | Major road crossings: 1no. (A557) | Major road crossings: 1no. (A557) | Major road crossings: 1no. (A557), plus running adjacent to A557 |
| **Biodiversity** | Spur connection south of Weaver Navigation is within Frodsham, Helsby and Ince Marshes LWS and possibly Frodsham Field Studies LWS | Spur connection south of Weaver Navigation is within Frodsham, Helsby and Ince Marshes LWS and possibly Frodsham Field Studies LWS | Spur connection south of Weaver Navigation is within Frodsham, Helsby and Ince Marshes LWS and possibly Frodsham Field Studies LWS |

| | Intergen | The Heath | A557 |
|---|---|---|---|
| **Recreation** | None | Within Runcorn Golf Club | None |
| **Historic landfill** | Would need to pass through Weston Road and Chesyre's Lane landfills to connect The Heath | Would need to pass through Weston Road and Chesyre's Lane landfills to connect Intergen | Would need to pass through Weston Road and Chesyre's Lane landfills to connect The Heath |
| **Flood Risk** | Spur connection south of the Weaver Navigation is all within flood plain land | Spur connection south of the Weaver Navigation is all within flood plain land | Spur connection south of the Weaver Navigation is all within flood plain land |

5.2.15. All of the options ran through flood plain land and Local Wildlife Sites to the south of the Weaver Navigation. The Heath option would pass through Runcorn Golf Club and disrupt golf activities at the course during construction and restoration. There is uncertainty over the deliverability of the Intergen option as this would be outside of the control of Cadent. The A557 option is constrained alongside the highway and by listed buildings on Heath Road South. It would therefore be difficult to secure appropriate working areas to construct the spur. Both the A557 and utilising the loop option would also see the spur passing through an area of historic landfill.

5.2.16. The A557 option was therefore discounted due to the constraints on working areas and the historic landfill site. The loop option was also discounted due to uncertainties over the availability of Intergen land and the historic landfill. The Preliminary Order Limits therefore provided an individual connection to the Heath, with a short spur leading off this to connect Intergen, as shown in **Figure 5.3B**.

## 5.3. North Corridor

### Pipeline route

5.3.1. From the Central Hub, the North Corridor heads in a northwards direction, crossing the M56, passing Daresbury and Moore before crossing the Manchester Ship Canal and River Mersey. It then headed in a north-western direction, past Cuerdley and Bold Heath before crossing the M62 near Rainhill. The Corridor then continued north past Lea Green towards the Pilkington's site in St Helens. North of the Manchester Ship Canal, the Warrington Spur ran to the east to connect industrial customers in Warrington and at Lea Green a spur connected to a customer at the Lea Green Industrial Park. Following the Stage 1 Non Statutory

Consultation exercise, it was discovered that the location supplied for the connection to the Glass Futures site was incorrect and therefore a spur was added from the St Helens HAGI to provide this connection. The Preliminary Order Limits described below are shown in **Figure 5.4** and in more detail in **Appendix B**.

5.3.2. Between the Central Hub and the M62 the corridor was substantially narrowed from the 2km Corridor width shown at Stage 1 Non Statutory Consultation to a corridor that was a maximum of 500m wide, as the route alignment had evolved. Between the M62 and the A56, the route needed to pass the site which hosts the annual Creamfields festival. It also had to consider the built environment associated with the Higher Walton and Moore settlements and designations such as TPOs, ancient woodlands and nature conservation sites. A wide corridor was provided at the Stage 1 Non Statutory Consultation stage with additional potential routes to the west to provide flexibility in how this could be achieved. These options included for a route shown as NP7 on **Figure 5.5** to the west of the main corridor between Sandymoor and Daresbury.

5.3.3. Responses to the Stage 1 Non Statutory Consultation raised concerns about the proximity to residential properties at Daresbury and to the impact on the Creamfields festival site.

5.3.4. Further baseline work discovered planning permissions (adjacent to Delph Lane) for housing developments along NP7 (between Sandymoor and Daresbury), which allowed this section of NP7 to be discounted. The remainder of NP7 was then discarded as further work showed that the costs of crossing the Manchester Ship Canal and two rail lines (including the West Coast Mainline) would be more than double some of the other options, due to the distance between the two rail lines and the Canal. The removal of this option also took the pipeline route further away from existing residential properties at Daresbury.

5.3.5. Three options were retained in this location to provide flexibility in how the pipeline could pass through or around the Creamfields festival site. Work was still ongoing at the time with various stakeholders to determine the best location for the pipeline to cross this area. Options NP1, NP2 and NP3 provided alternatives under each of these scenarios. NP6 was briefly considered as a means of further bypassing Creamfields but this would have brought the pipeline into conflict with Walton Hall Golf Course and some TPO designations and was discarded. North of NP1, NP2 and NP3, two options then existed for crossing the West Coast Rail Line (and a local rail line) and the Manchester Ship Canal. Comments were received during the Stage 1 Non Statutory Consultation stage with regard to the areas around the Moore Nature Reserve and other ecological features in this area. Option NP4 ran through the Moore Nature Reserve for around 500m and would also have required a permanent land requirement of around 1.5 ha from within the Nature Reserve for a HAGI (option HWH1). NP5 ran across between 250m and 750m of the Nature Reserve depending on its exact positioning but would not have required any permanent land take.

**Table 5.4 North Corridor Options**

| | NP 1 | NP 2 | NP 3 | NP 4 | NP 5 | NP 6 | NP 7 |
|---|---|---|---|---|---|---|---|
| **Constructability** | 1no. crossing of A56 | 1no. crossing of A56 | 1no. crossing of A56 | 1no. crossing or rail lines, 2no. canal crossings. 1,3km extra Spur line required (than (NP5) | 1no. combined crossing of rail lines and Manchester Ship Canal, 1 no. crossing of Bridgewater Canal. | 1no. crossing of A56 | 2 no. crossing of rail lines (or 1no. lengthy trenchless crossing. 2km extra Spur line required (than NP5). |
| **Biodiversity** | None | None | None | 0.5km: Moore Nature Reserve LWS | 0.25km – 0.75km. Moore Nature Reserve LWS, Upper Moss Side Farm LWS | None | 0.7km: Moore Nature Reserve LWS, Manor Park Woodland LWS, Moore meadows LWS |
| **Permitted waste site** | None | None | None | None | Adjacent to Arpley landfill site | None | No |
| **Agricultural land** | 2.7km: Grade 2 | 0.2km: Grade 2 | 0.2km: Grade 2 | 1.4km: Grade 2 | 1.1km: Grade 2 | None | 2.7km: Grade 2 |

| | NP 1 | NP 2 | NP 3 | NP 4 | NP 5 | NP 6 | NP 7 |
|---|---|---|---|---|---|---|---|
| **Flood plain** | None | 0.1km | 0.1km | 2.5km | 1.4km | 0.1km | 2km |
| **Planning permissions** | None | None | None | None | None | None | Housing off Chester Road |
| **Land Use** | Creamfields Festival Site | Creamfields Festival Site | Creamfields Festival Site | None | None | Walton Hall Golf Club | None |
| **Water source protection zone** | SPZ3 | SPZ3 | SPZ3 | SPZ3 | SPZ3 | None | SPZ2 and 3 |
| **Tree Preservation Orders** | None | None | None | None | None | Yes. Underbridge Lane | None |

Note: NP1, NP2 and NP3 would have needed to be used in conjunction with either NP4 or NP5. NP6 would have needed to be used in conjunction with most of NP3 and NP5. NP7 would have been a stand-alone route.

5.3.6. Options NP1, NP2, NP3, NP4 and NP5 were taken forward for assessment within the PEIR and the Stage 2 statutory consultation exercise.

5.3.7. Continuing north, Stage 1 Non Statutory Consultation comments were received around the crossing of the River Mersey and the former Sankey (St Helens) Canal, with a request that the proposals did not disturb either of the features. The crossing of both of these features (one single crossing at Fiddler's Ferry Reach) would be a trenchless crossing and no disturbance would occur.

5.3.8. In the Bold Heath area, an option north of Bold Heath (Burtonwood), towards the M62 was included in the Stage 1 Non Statutory Consultation exercise. This option was included to allow an additional HAGI to service potential future connections to the scheme (North of St Helens). No consultation comments were received on the Burtonwood area. Additional engineering work however concluded that future connections could be serviced from a single HAGI in this area. In addition, the Burtonwood option would have had to pass through or close by a number of TPOs. The Burtonwood option was therefore dropped. The route taken forward for Stage 2 Statutory Consultation ran to the south of Bold Heath and crossed underneath the M62 near Junction 7 at Rainhill.

5.3.9. The corridor then ran north past the Liverpool to Manchester rail lines and towards Sutton Heath and was narrowed and located to minimise interaction with groundwater source protection zones.

5.3.10. The corridor then ran through public highway land along the B5204, Sherdley Road and Sutton Heath Road to reach the St Helens HAGI site. Comments were received around the former Linkway Distribution site in this area and potential conflict with a residential development on this land. The selected route was restricted to the public highway in this area to avoid any such conflict.

## HAGIs

5.3.11. Three HAGIs were proposed along the North Corridor, at Higher Walton, Clock Face and St Helens. The HAGI search areas identified at Stage 1 Non Statutory Consultation at Cuerdley and at Burtonwood have been dropped as the potential connections needed from these HAGIs could be serviced by the proposed Clock Face HAGI.

### *Higher Walton*

5.3.12. Within the Higher Walton HAGI search area, eight potential HAGI locations were identified (**Figure 5.6**). The high number of options was due to the multiple route options that pass through this area (**Table 5.4**). One HAGI option was dropped after route option NP7 was discounted, leaving seven to be considered.

**Table 5.5 Higher Walton HAGI Options**

| | HWH1 | HWH2 | HWH3 | HWH4 | HWH5 | HWH6 | HWH7 |
|---|---|---|---|---|---|---|---|
| **Constructability** | 1.25km extra spur length. Restricted construction area | 0km extra spur length | 1.25km extra spur length | 0.7km extra spur length | 50m extra spur length. Restricted construction area | 0.6km extra spur length | 0.7km extra spur length |
| **Biodiversity** | Moore Nature Reserve LWS | None | Moore Nature Reserve LWS | None | None | None | None |
| **Permitted waste site** | None | None | None | Arpley landfill Site | None | None | None |
| **Agricultural land** | Grade 3 | Non-agricultural land | Grade 3 | Non-agricultural land | Non-agricultural land | Grade 2 | Grade 2 |
| **Green Belt** | Moderate to Limited | Limited | Moderate to Limited | Moderate to Limited | Moderate to Limited | Moderate to Limited | Moderate |

5.3.13. No comments were received on any of the options in the Stage 1 Non Statutory Consultation. Options HWH1 and HWH2 were taken forward into Stage 2 Statutory Consultation on the basis that HWH2 was the closest to the spur connections needed and had fewest constraints. HWH1 and HWH3 were located on the NP4 pipeline alignment option and were combined together into a single HAGI site (HWH1) for further consideration.

### *Clock Face*

5.3.14. Due to the decision to drop the route option at Burtonwood (**paragraph 5.3.9**), the search area at Clock Face, identified at the Stage 1 Non Statutory Consultation phase, was able to be reduced to an area of land in the vicinity of Junction 7 of the M62. HAGI options CF5, CF6 and CF7 were therefore also able to be dropped (**Figure 5.7**). This decision allowed a single HAGI to be sited, which could serve the Clock Face Spur (previously known as the Lea Green Spur) and also potential future customers in the Widnes area. Four options were then identified within the Junction 7 area: CF1 adjacent to St Helens Linkway and Chapel Lane; CF2 adjacent to Junction 7; CF3 to the south of the M62 adjacent to Jubits Lane; and CF4 adjacent to A57 Warrington Road.

**Table 5.6 Clock Face HAGI Options**

| | CF1 | CF2 | CF3 | CF4 |
|---|---|---|---|---|
| **Constructability** | Shorter Clock Face spur, but longer spurs to potential Phase 3 connections | Central location between Clock Face connection and potential future Phase 3 connections. 180m from highway for access. | Central location between Clock Face connection and potential future Phase 3 connections. Adjacent to highway for access. | Longer spurs for both Clock Face spur and potential future Phase 3 connections |
| **Agricultural land** | Grade 3 | Mostly Grade 3 / partially Grade 2 | Mostly Grade 2 / partially Grade 3 | Grade 2 |
| **Green Belt** | Moderate to significant harm | Moderate harm | Moderate harm | Moderate to significant harm |

5.3.15. No comments were received on any of the options in the Stage 1 Non Statutory Consultation. Options CF1 and CF4 were discounted due to the impact on the Green Belt.

5.3.16. CF3 was selected as the Clock Face HAGI and was taken forward for assessment in the PEIR and for Stage 2 statutory consultation. CF3 was generally unconstrained in terms of environmental designations, benefits from good road access and is located such that it minimised the length of spur pipeline that would be associated with it. The Site would also be screened from the north by the M62 motorway.

### *St Helens*

5.3.17. Three HAGI options were identified within the search area at St Helens, all located around Burtonwood Road and all are previously developed land (brownfield) and unconstrained by environmental designations (**Figure 5.8**): SH1 to the north west of the Ravenhead Retail Park; SH2 between the Ravenhead Retail Park and Burtonwood Road; and SH3 adjacent to the Biffa waste site. No comments were received on any of the options in the Stage 1 Non Statutory Consultation. The main consideration was the location of the HAGI in relation to historic landfill sites. Although much of the surrounding land is historic landfill and has been successfully developed, suggesting it would not be a significant constraint, SH2 was not located within an historic landfill area but was on a brownfield site with existing access to the highway. It had a Historic Environment Record (HER) which designates the site as the former Ravenhead Sanitary Pipe and Brick Works although this was not expected to be a barrier to re-development. It was taken forward as the St Helens HAGI for assessment in the PEIR and for Stage 2 statutory consultation.

## Spurs

5.3.18. Three spurs were proposed from the main North Corridor to connect customers.

### *Warrington Spur*

5.3.19. The Warrington Spurs run from either of the HAGI options at Higher Walton (HWH1 or HWH2) in an eastwards direction to connect customers at Ingevity (single connection) and Novelis (**Figure 5.6**). The Ingevity connection ran adjacent to the Manchester Ship Canal directly into the connection point. The Novelis spurn followed the edge of Moss Wood before crossing the Arpley Meadows/River Mersey area and then following the public highway along Gainsborough Road, Loushers Lane, Station Road, Clearwater Quays and Thelwall Lane to Novelis. This spur no longer ran north to Bank Quay (as was included in the Stage 1 Non Statutory Consultation) as a connection to the potential customer here was dropped. No comments were received on the Warrington Spur in the Stage 1 Non Statutory Consultation. The spur was refined from the Stage 1 Non Statutory Consultation phase to avoid Listed Buildings, Scheduled Ancient Monuments, Conservation Area, playing fields and a permitted waste site within the previous corridor boundary. It also minimised interaction with flood zones and local wildlife sites.

5.3.20. Two options were available in the Arpley Meadows area and both were taken forward for assessment in the PEIR and for Stage 2 statutory consultation (**Figure 5.9**). WSp1 spur ran south of the River Mersey and cross under the railway underpass, then proceed as street works, along Eastford Road. WSp1 would then proceed broadly northeast, crossing the disused Runcorn and Latchford Canal, then towards the A5060 before proceeding as street works for approximately 4.8km to Novelis. WSp2 ran northeast with a trenchless crossing of the River Mersey, followed by the route turning southeast with a trenchless crossing of the railway, and onto the A5196 (Slutchers Lane / Centre Park Link Road), before exiting the Lane for another trenchless crossing of the River Mersey. The option would then proceed as per WSp1 to Novelis.

### *Clock Face Spur (previously known as the Lea Green Spur)*

5.3.21. Two options were considered in the Stage 1 Non Statutory Consultation for the Clock Face Spur, designed to make a connection to NGF Europe Ltd (**Figure 5.7**). CFS1 ran adjacent to Chapel Lane and then along Lea Green Road to reach NGF Europe Ltd in Lea Green Industrial Park. CFS1 provided a wide corridor to avoid the TPOs along Chapel Lane and the Micklehead Green scheduled ancient monument. CFS2 ran along or adjacent to the St Helens Linkway and Eurolink roads, before joining Lea Green Road as for CFS1. Both options would have crossed the Pendlebury Brook Local Wildlife Site. No comments were received on either option during the Stage 1 Non Statutory Consultation.

5.3.22. Due to the land available adjacent to Chapel Lane to avoid the TPOs here, and the disruption that would be created on the St Helens Linkway dual carriageway if CFS2 were to be constructed, CFS1 was taken forward as the Clock Face Spur for assessment in the PEIR and for Stage 2 statutory consultation.

### *St Helens Spur*

5.3.23. At Stage 1 Non Statutory Consultation, the St Helens Spur was a link between the main North Corridor and the adjacent Pilkington UK Greengate Works to allow a connection to be constructed into the works. This connection spur remained at Stage 2 Statutory Consultation but the spur was also extended to the east to allow a connection to be made to the Glass Futures site off Langtree Way (**Appendix B, sheet 22**). This additional part of the spur ran from the St Helens HAGI along Burtonhead Road, turned north adjacent to the St Helens Linkway before crossing under the Linkway into Glass Futures. No comments were received on the St Helens Spur in the Stage 1 Non Statutory Consultation.

## 5.4. East Corridor

5.4.1. From the Central Hub, the East Corridor ran in a north-east direction, to the south of Lower Whitley and Highly Whitley, crossing the A559 and the M6 before passing to the north of High Legh. It then ran north, crossing the M62 before connecting to a HAGI at Warburton Sub-station and then continuing north on the eastern side of Partington to the Partington HAGI. The Preliminary Order Limits described below are shown in **Figure 5.10** and in more detail in **Appendix B**.

5.4.2. Comments received during the Stage 1 Non Statutory Consultation exercise requested that the route avoided the settlement of Lower Whitley and the woodland to the south of the village. The route taken forward at Stage 2 Statutory Consultation did this by running to the south of both. The route was also moved away from the settlement boundary of Higher Walton.

5.4.3. The route ran to the south of Antrobus Golf Course where two options were considered around Arley and the M6 area. A northern option would have seen the route pass by the southern boundary of the former Stretton Airbase before crossing the M6 near Crowley Brook. The southern option would have seen the route pass to the south of Park Moss Wood Local Wildlife Site and then cross the M6 to the north of Crowley Hall. The options would have then re-joined to the north west of Moss Hall Farm. The southern option ran through a short section of flood

plain land east of the M6 but due to it being the shorter route, which would provide a quicker construction programme and less general disruption, the southern option was taken forward for assessment in the PEIR and for Stage 2 statutory consultation.

5.4.4. The route passed to the west and north of High Legh, avoiding High Legh Golf Club and then to the east of Broomedge. A comment was received during the Stage 1 Non Statutory Consultation about Spud Wood, which is partly protected by a TPO. The original corridor consulted upon in that exercise avoided Spud Wood and the route taken forward continued to avoid it as well.

5.4.5. The corridor then passed the Cadent Warburton AGI where a HAGI would be located to provide the opportunity to blend hydrogen into the natural gas network in the future. To the north of here, comments were raised about the proximity of the East Corridor to National Trust land, primarily property in and around the Dunham Massey estate. The preferred route was therefore chosen further away from the Dunham Massey estate to reduce any potential effects on the National Trust land or property holdings.

5.4.6. As the corridor approaches Partington a number of relevant comments were made about the proposed housing development associated with the Partington East area of the New Carrington Masterplan. In relation to this, the route considered a number of planning permissions relating to the Masterplan, and the proposed plots for future development, with the route taken forward running between the proposed built up areas. Comments were also received in relation to this area (and the Warburton area) over the Carrington and Warburton Mosses, areas of carbon rich soils. Unfortunately, the East Route cannot avoid these Mosses completely so discussions have been held, and will continue, with local consultees to minimise the impact of the pipeline through this area. Engineering solutions relating to the depth of the pipeline in these areas were also being considered.

## HAGIs

5.4.7. Two HAGIs were identified in the East Corridor, at Warburton and at Partington. The Warburton HAGI would facilitate potential blending into the natural gas network at the Warburton gas network site. The Partington HAGI would provide a connection to a customer at Carrington Power Station and also facilitate potential blending into the natural gas network at the Partington gas network site.

### *Warburton*

5.4.8. A search area for the Warburton HAGI was identified at Stage 1 Non Statutory Consultation around the Cadent Warburton AGI. Three HAGI options were identified within this search area, immediately adjacent to the west, north and east (**Figure 5.11**). All three options were within the Green Belt. W1 would have been sited to the west of the AGI with harm to the Green Belt assessed as Limited. Pipelines into the existing AGI pass through this site already. W2, to the north, would have given rise to Moderate to Significant harm to the Green Belt and an existing pipeline also runs through part of the site. The selected option W3 was a site to the east of the existing AGI and was assessed as having Moderate to Limited harm to the Green Belt. It was however considered to be more contained

in terms of visual impact and does not include any existing gas pipelines. Option W1 would have proved the most difficult in terms of vehicular access, with W3 being slightly preferred in this regard to W2. W3 also allowed sufficient space to be provided to allow an adequate stand off to protected species identified to the south. W3 was therefore taken forward as the Warburton HAGI for assessment in the PEIR and for Stage 2 statutory consultation.

### *Partington*

5.4.9. The search area for the Partington HAGI included land within the employment area of the New Carrington Masterplan close to the existing Cadent Partington gas infrastructure/AGI to allow the opportunity for a connection here to accommodate the future blending of hydrogen into the natural gas network. Three potential HAGI locations were initially identified within this area (**Figure 5.12**), although further examination of proposals for industrial development showed that there was limited space for the HAGI in between the project plots. The preferred HAGI location was therefore chosen within this space (different to the original three options) to avoid conflict with wider built development proposals (**Appendix B, sheet 33**).

### *Block Valve Installations (BVIs)*

5.4.10. The East Corridor required one BVI to support maintenance or pipeline isolation purposes. Three options were identified (**Figure 5.13**), EBV1 was located in an agricultural field with hedgerows at its edges. It was approximately 1.1km to the northeast of the M6 and adjacent to Moss Lane.

5.4.11. The locations for EBV2 and EBV3 were in agricultural fields approximately 30m southwest and northeast respectively of the A50 (Warrington Road), to the rear of established trees and hedgerows. All three options were taken forward for assessment in the PEIR and for Stage 2 statutory consultation.

## Spurs

5.4.12. Three spurs were proposed on the East Corridor, a short spur from the Warburton HAGI into the Warburton sub-station site and two from the Partington HAGI. The Partington Spurs would connect customers at SAICA and Basell Polyolefins and provide opportunity for blending with the natural gas network at the Partington sub-station. A connection would also be made with Carrington Power Station within or adjacent to the HAGI.

### *Warburton Spur*

5.4.13. The Warburton Spur was a short length of pipeline, around 200m long, which led from within the Warburton HAGI directly into the adjacent existing Warburton gas infrastructure/AGI to allow the opportunity for a connection to accommodate the future blending of hydrogen into the natural gas network (**Appendix B, sheet 31**).

### *Partington Spurs*

5.4.14. The Partington Spurs are shown in **Appendix B, sheet 33**. One spur ran north from the Partington HAGI to connect the Basell Polyolefins site.

5.4.15. The connections to the existing Cadent Partington AGI and SAICA both ran to the west of the Partington HAGI, following spaces between the existing and proposed built development.

5.4.16. Carrington Power Station would also be connected to the Project at Partington but via a connection to the HAGI rather than via a Spur.

## 5.5. South Corridor

5.5.1. Of the two corridor options presented at Stage 1 Non Statutory Consultation for the South Corridor, South 1 was selected as the preferred corridor. This corridor ran south from the Central Hub, to the west of Bartington and to the east of Acton Bridge before crossing the West Coast Main Line and running to the east of Cuddington and Forest Hill Quarry. Options then existed to south of the Hartford A556 bridge to the west of Davenham before the Corridor turned east and passes south of Moulton to connect to the HSF HAGI near the A530. The Preliminary Order Limits described below are shown in **Figure 5.14** and in more detail in **Appendix B**.

5.5.2. During Stage 1 Non Statutory Consultation, comments were received both supporting and objecting to both South 1 and South 2 around Northwich, with no clear preference from the representations received as to which option was preferred. The Corridor identified for South 2 included slightly more ecological designations, including one SSSI at Plumley Lime Beds, although there was space within both options to avoid any such features. From an engineering point of view, the options were also very similar with the main difference being that South 2 would potentially have had a constricted crossing point with HS2 due to nearby TPOs and the Plumley Lime Beds SSSI prior to its abandonment. Both options ran through areas allocated for minerals safeguarding and flood plain land.

**Table 5.7 South Corridor Options**

| | South 1 | South 2 |
|---|---|---|
| **Constructability** | 12 major road/rail/water courses to be crossed, although 3 could be crossed with one single trenchless crossing. | TPO and SSSI constraints within the area where HS2 needed to be crossed (since abandoned).<br>9 major road/rail/watercourses to be crossed.<br>Passes over a greater extent of the Inovyn brinefields with increased underground services to avoid. |

| | South 1 | South 2 |
|---|---|---|
| **Ecology** | Local Wildlife Sites, TPOs and ancient woodland, particularly around the Vale Royal Area | TPOs, ancient woodland and Plumley Lime Beds SSSI around Comberbach and Lostock Gralam |
| **Permitted Waste Sites** | None | Landfill storage within underground brinefields |

5.5.3. The comparison of both options did not show many differences between the two alternatives. However, due to the presence of the Plumley Lime beds SSSI, the increased underground services and infrastructure related to the brinefields along South 2, and the difficulties this could create during construction, South 1 was selected as the preferred corridor.

5.5.4. The route taken forward therefore ran south from the Central Hub, crossing the Trent and Mersey Canal and the Weaver Navigation to the west of Bartington. This route avoided a crossing of the River Weaver to the east of Bartington, which would have impacted on recreational businesses including Woodbine Cottage caravan park and Acton Bridge boating club. The route then passed to the east of Acton Bridge and ran along the western side of the B5142 until it crossed the West Coast Main Line to the west of the A49. This crossing was preferrable to a crossing to the east of the A49 as it avoided a stretch of pipeline running adjacent to the West Coast Main Line and the resulting constrained working area available.

5.5.5. The route then crossed the A49 and avoided the existing Forest Hill Quarry and its approved northern extension on the west, passing between areas of TPO at Littledales Gorse and Forest Hill. The route then crossed the A556 and passed around Sandiway Golf Club to the east, before four options were identified to cross the Weaver Navigation in the area around the Vale Royal Locks and the Vale Royal Cut.

5.5.6. These four options (SP1 to SP4) are shown in **Figures 5.15**. SP1 ran east, south of Hartford, towards Davenham, before turning southeast for a trenchless crossing of the West Coast Mainline. The option would have crossed an area of ancient woodland (Heys Wood), which would have required a trenchless crossing to avoid impact on this feature.

5.5.7. SP2 ran southeast to a single trenchless crossing of the Weaver Navigation and the West Coast Mainline near Vale Royal Locks.

5.5.8. SP3 and SP4 both ran further south via the eastern edge of the golf club at Vale Royal Park and an area with a number of TPOs. SP3 would have had a single trenchless crossing of the Weaver Navigation and West Coast Mainline starting south of Hulses Island. This crossing would have gone beneath the ancient woodland at Eaton Bank Wood and other deciduous broadleaved woodland.

5.5.9. SP4 ran further south crossing Mill Lane / Bradford Road and the belt of established deciduous broadleaved woodland, using an open cut trench. A trenchless crossing of the Weaver Navigation would have been undertaken near Bradford Road with the pipeline continuing to a second trenchless crossing of the

West Coast Mainline. This option could also have been undertaken as a single trenchless crossing.

5.5.10. SP1, SP2 and SP3 all continued southeast between the West Coast Mainline to the west and Moulton to the east, avoiding the Scheduled Monument near Moultonbank Farm. South of Moulton these options headed east towards Jack Lane and the A533. SP4 also headed east at this point.

**Table 5.8 Vale Royal Locks route options**

| | SP1 | SP2 | SP3 | SP4 |
|---|---|---|---|---|
| **Constructability** | Difficult crossing of River Weaver, with steep banks and woodland on either side. | Constrained space to cross River Weaver/ Weaver Navigation and West Coast Main Line, or could be done as a longer, single trenchless crossing. | Lengthy trenchless crossing needed if impacts on Vale Royal Golf Club and associated, scheduled ancient monument and TPOs are to be avoided | Potentially the longest of the four options. Retains requirement to cross West Coast Main Line and River Weaver. Comes closer to residential properties and still requires the lengthy trenchless crossing referred to for SP3. |
| **Biodiversity** | Heys Wood ancient woodland and LWS (could be avoided by trenchless crossings) | Weaver Valley LWS and TPOs (could be avoided by trenchless crossing) | Rookery Wood and Weaver Valley LWS, TPOs (could be avoided by trenchless crossing) | Rookery Wood and Weaver Valley LWS, TPOs (could be avoided by trenchless crossing). Newbridge Wood ancient woodland and LWS can be avoided within corridor |
| **Permitted waste site** | None | Arpley landfill Site | None | None |
| **Agricultural land** | Grade 3 | Non-agricultural land | Non-agricultural land | Grade 2 |

5.5.11. To the south of Moulton, the route ran to the east, passing south of Bostock Green. This brought the route across a stretch of Grade 2 agricultural land approximately 600m wide. This could have been avoided by routeing north of Bostock Green but would have brought the pipeline into greater extents of floodplain land around the River Dane. The route then continued east to cross the A530 to connect to the HSF HAGI. In this area, to the east of Moulton, the route passed across mineral safeguarding areas relating to salt and brine extraction. As these minerals are at depth, and the route avoided existing ground level infrastructure, no minerals sterilisation was expected to occur.

5.5.12. All four options were included in the Stage 2 Statutory Consultation.

### Hydrogen Storage Facility HAGI

5.5.13. The only HAGI along the South Corridor was the HSF HAGI, located within an area already consented for gas storage to the east of the A530. The HSF HAGI location is fixed by operational requirements of the storage facility.

### Block Valve Installations (BVI)

5.5.14. The South Corridor required a BVI for maintenance and isolation purposes. Five BVIs options were identified (**Figure 5.16**) and were included in the Stage 2 Statutory Consultation. Options SBV1 and SBV2 were located in fields to the north and south of the A556 (Chester Road) respectively. SBV3 was located in a field to the east of Whitegate Lane; note that this option would only have been possible on route option SP1. SBV4 was located further south in a field to the west of Whitegate Lane and was applicable to route options SP2 to SP4. SBV5 was located to the west of an established belt of trees at Jack Lane after the route options SP1 to SP4 converged.

## 5.6. Central Hub

5.6.1. Within the search area for the Central Hub HAGI, five options were identified for a potential HAGI location (**Figure 5.17**). Options CHH1, CHH2, CHH4 and CHH5 were located north of the A533 with option CHH3 located to the south. A number of comments were received during the Stage 1 Non Statutory Consultation in relation to land to the south of the A533, with issues raised such as the Dutton Dean ancient woodland, potential land stability issues around the Trent and Mersey Canal and the sloping topography of the land. Whilst, the slope in this area would not be sufficient to have prevented a HAGI being developed and the ancient woodland could be easily avoided, the options north of A533 had fewer constraints and CHH3 was therefore discounted.

**Table 5.9 Central Hub HAGI options**

| | CHH1 | CHH2 | CHH3 | CHH4 | CHH5 |
|---|---|---|---|---|---|
| **Construction** | Close to built development at Woodside Farm | No substantial constraints | 400m of access road required. | Proximity to flood plain. | No substantial constraints |
| **Flood zones** | None | None | None | Adjacent to flood plain | None |
| **Minerals safeguarding area** | None | None | MSA surrounds location | Within MSA | None |
| **Green Belt** | Moderate to Limited harm | Moderate harm | Moderate to Significant harm | Moderate to Significant harm | Moderate to Significant harm |
| **Other issues** | None | None | None | Proximity to A49 presents potential security concern | None |

5.6.2. Options CHH4 and CHH5 were also discounted, due to their impact on the Green Belt, and for CHH5 potential issues around flood risk and security. Two options were therefore put forward for assessment in the PEIR and for Stage 2 statutory consultation. These were CHH1 and CHH2. CHH1 was located adjacent to Woodside Farm and CHH2 was partially enclosed by existing vegetation and bunding, and as such they would have had a more limited effect upon the Green Belt than the other options (albeit that CHH1 performs slightly better as it is also screened by the farm buildings and associated plant storage area). CHH2 was adjacent to an existing area of hardstanding, which could be used for the construction compound. Like CHH1, it had good access via an existing track from the A533.

## 5.7. Northwich Spur

5.7.1. Four spur options were presented at Stage 1 Non Statutory Consultation to connect to TATA Chemicals at Winnington (**Figure 5.18**). Spur 2 would have connected from the South 2 corridor option, so when this route option was discounted this spur was also abandoned. Spur 1 would have involved a spur running off the Preferred Route Corridor (South 1). Spurs 3 and 4 were spurs which were identified to run directly from the Central Hub to TATA Chemicals. Spur 3 would have involved multiple crossings of the River Weaver and Trent and Mersey Canal, whilst Spur 1 would have had a number of constraints including Beach Hill Wood ancient woodland, Hartford Golf Club and a permitted waste site

to the north of the golf course. Both Spurs 1 and 4 would have involved pipelines being laid along the highway. Spur 1 would also have required an additional HAGI to be constructed on the southern corridor to accommodate the spur connection. This would have removed the need for a BVI but the HAGI would have been a more substantial development that that BVI.

**Table 5.10 Northwich Spur options**

| | Spur 1 | Spur 2 | Spur 3 | Spur 4 |
|---|---|---|---|---|
| **Constructability** | Requires an additional HAGI on southern corridor. Constrained working areas to avoid constraints. | Option discounted as relates to Option B which has not been taken forward. | No substantial concerns. | Multiple trenchless crossing needed at watercourses. |
| **Flood zones** | Grade 3 | | Mostly Grade 2 / partially Grade 3 | Mostly Grade 3 / partially Grade 2 |
| **Minerals Safeguarding** | Amber | | Amber | Amber |
| **Ancient woodland** | Beach Hill Wood | | None | None |
| **Permitted waste site** | North of Hartford Golf Course | | None | None |
| **Watercourse crossings** | None | | 2no. (River Weaver and Trent and Mersey canal) | 6 no. (multiple crossings of River Weaver and Trent and Mersey canal) |
| **Route in Highway** | Leach Drive, Walker Road, Winnington Lane | | n/a | Leach Drive, Walker Road, Winnington Lane |
| **ALC** | 0.7km Grade 2 | | 2.8km Grade 2 | 0.8km Grade 2 |
| **Recreation** | Hartford Golf Club | | None | Marbury Country Park / Anderton Nature Park |

5.7.2. Due to the need for an additional HAGI for Spur 1 and the proximity to an ancient woodland and permitted waste site, the multiple water course crossings required for Spur 4 and the disruption to the highway for both Spur 1 and 4, these options were discounted. Spur 3 was therefore taken forward for assessment in the PEIR and for Stage 2 statutory consultation.

## 5.8. Working Compounds: Construction, Trenchless Crossings, Material Storage Areas

5.8.1. Within the Preliminary Order Limits various construction compounds and working areas would have been required, alongside the pipeline construction line, to facilitate the construction works. These typically involved:

- Construction compounds for trenchless crossings: when trenchless crossings are required to pass underneath certain features along the route (e.g. major roads or watercourses) then a construction compound is required for these works. Both entry and exit compounds will be required, one on either side of the feature, to allow the underground 'tunnel' to be constructed, the pipeline sections to be joined together and then pushed/pulled through the tunnel.
- Material storage areas: compounds will be needed to store equipment and materials needed for the construction workings in particular the pipeline sections, prior to their deployment along the route. These will be located in various positions across the Project to reduce transportation requirements during construction and storage times.
- HAGI construction compounds: As the HAGIs and BVIs will involve a similar construction process to a standard built development (rather than the short term, moving construction area for the pipelines) a construction compound will be needed adjacent to the HAGI locations to provide equipment, material and fuel stores, site administration facilities, workers welfare facilities and vehicle parking.

5.8.2. Due to the work undertaken in selecting corridors and routes, it is considered that the locations selected for these workings were free from any nationally or internationally important designations/constraints and that any other localised matters had also been minimised. Comments about the pipeline route or HAGI/BVIs locations within the corridors text were also relevant to these compounds.

5.8.3. All of the proposed locations for these locations are shown in **Appendix B**.

## 5.9. The Preliminary Route Alignment / Preliminary Order Limits

5.9.1. The Preliminary Order Limits identified from the work described in **Chapter 5** are shown in **Figure 5.19,** and in greater detail in **Appendix B**.

5.9.2. The HAGI assessments for Rocksavage, Higher Walton, Clock Face, Warburton and Central Hub showed that these HAGIs could be accommodated without a significant effect on Green Belt purposes. The overall Preliminary Order Limits area was therefore also considered to be appropriate when considered against Green Belt purposes.

The optionality that remained within the Preliminary Order Limits at Stage 2 Statutory Consultation stage is described below.

**Table 5.11 West Corridor Options**

| Option | Description |
|---|---|
| **There was a distance of approximately 300 metres between the centre of each route option, with key factors being considered including proximity to overwintering bird habitats, existing energy infrastructure (i.e. overhead electric lines and wind turbines) and engineering feasibility. Either option would be constructed using 'open cut' techniques.** | |
| **WP1** | WP1 was the most northerly route and avoids interaction with existing overhead electric lines (see WP2). |
| **WP2** | WP2 bought the pipeline closer to a corridor of land already affected by M56 traffic and existing overhead electric lines, thereby reducing disturbance on land closer to the River Mersey. However, this land is often used by birds from the Special Protection Area on the River. |
| **There were three options identified for the location of the Rocksavage HAGI (RSH1, RSH2 and RSH3).** | |
| **RSH1** | RSH1 was within an area identified as being at risk of flooding. This could have made construction and operational access more difficult. Alternative locations (RSH2 and RSH3) were therefore identified. |
| **RSH2** | RSH2 avoided the flood area, thereby providing good access. However, there were potential land contamination concerns. |
| **RSH3** | RSH3 was located near to RSH2 in an area of woodland. However, it broadly avoided the flood zone and ground associated with historic landfill. |

| Option | Description |
|---|---|
| **There were two further pipeline options south east of the Rocksavage HAGI (WP3 and WP4).** | |
| **WP3** | WP3 included a trenchless crossing of the Weaver Navigation. It would have passed north west of properties on the A56 and then switched south east, with another trenchless crossing of the A56. This option would have required two individual crossings which, if technically feasible, could be completed as one larger crossing (see WP4) |
| **WP4** | WP4 would have headed broadly north east with a single trenchless crossing of the A56 and Weaver Navigation. It then passed to the south east of properties on the A56. This option required one larger trenchless crossing of the A56 and Weaver Navigation. |
| **There were two pipeline route options for the crossing of the River Weaver and Weaver Navigation, which were required between the Rocksavage and Runcorn HAGIs (RSp1 and RSp2).** | |
| **RSp1** | RSp1 reduced the number of more difficult, large diameter pipeline crossings in the area. It would have been used in conjunction with RSH3. |
| **RSp2** | RSp2 would have required a longer single trenchless crossing of both the River Weaver and Weaver Navigation, passing north east of an existing National Grid substation. It would have removed the need for RSH1, RSH2 or RSH3, but, overall, required more difficult, larger diameter pipeline crossings. Assessments were being completed at the time of Stage 2 Statutory Consultation to determine its feasibility. |

**Table 5.12 North Corridor Options**

| Option | Description |
|---|---|
| **The Preliminary Order Limits included an area used by Creamfields festival, located north of the M56 and between Hatton and Daresbury. The Project aimed to mitigate impacts on the operation of the festival site where possible. To do so various options (NP1, NP2 and NP3) were identified and discussions were being held with the landowner and festival organisers.** | |
| **NP1** | NP1 passed along the western side of the Creamfields festival site, past Daresbury and continued north, parallel to the A56 (Chester |

| Option | Description |
|---|---|
| | Road). It was designed to avoid the key areas of the Creamfields festival site |
| **NP2** | NP2 passed within the Creamfields site and west of Warrington Road. It was designed to avoid the key areas of the Creamfields festival site. |
| **NP3** | NP3 crossed Warrington Road and then ran parallel on its eastern side. It was designed to avoid the key areas of the Creamfields festival site and avoided the largest area of the festival site overall. |
| **Following the trenchless crossing of the A56, there were two options at Higher Walton (NP4 and NP5) that included the trenchless crossings of the Bridgwater Canal, the West Coast Mainline and the Manchester Ship Canal.** | |
| **NP4** | NP4 ran through Moore Nature Reserve and an area of flood risk, but to a lesser extent than NP5. It required individual crossings of the railway line and Manchester Ship Canal. The Higher Walton HAGI option on this route would have required a longer spur to reach Warrington customers. |
| **NP5** | NP5 facilitated a HAGI option closer to Warrington customers and avoided Moore Nature Reserve. It would have required individual crossings of the railway line and Manchester Ship Canal. Engineering assessments were ongoing at the time of Stage 2 Statutory Consultation. |
| **There were also two HAGI options at Higher Walton that included the trenchless crossings of the Bridgewater Canal, the West Coast Mainline and the Manchester Ship Canal (HWH1 and HWH2).<br>Each option connected to one of two Higher Walton HAGI location options on the north side of the Manchester Ship Canal and rejoins towards the crossing of the River Mersey to the west.** | |
| **HWH1** | This HAGI location option was dependent on pipeline route option NP4 being appropriate. It required a longer spur line to Warrington customers and was located within Moore Nature Reserve and an area of flood risk. |
| **HWH2** | This HAGI location option was dependent on pipeline route option NP5 being appropriate. It required a shorter spur line to Warrington customers and was located outside Moore Nature Reserve and an area of flood risk. |
| **There were two options for the Warrington spur connection to Novelis (WSp1 and WSp2).** | |
| **WSp1** | WSp1 remained south of the River Mersey. It crossed under the railway underpass and continued as street works along Eastford Road. It then proceeded broadly north east, crossing the disused Runcorn |

| Option | Description |
|---|---|
| | and Latchford Canal, then toward the A5060, and continued as street works towards Novelis. This option would have run along the same corridor as the Warrington Linkway road development. |
| **WSp2** | WSp2 ran north east with a trenchless crossing of the River Mersey. It then turned south east, with a trenchless crossing of the railway, and continued on to the A5196 (Slutchers Lane / Centre Park Link Road). Finally, it exited the lane before another trenchless crossing of the River Mersey and headed towards Novelis. |

**Table 5.13 East Corridor Options**

| Option | Description |
|---|---|
| **There were three options identified for the BVIs needed in the east corridor. The first option (EBV1) was off Moss Lane, approximately 1.1km (0.7 miles) northeast of the M6 and located in an agricultural field. The other two options (EBV2 and EBV3) were in agricultural fields approximately 30 metres southwest and northeast respectively of the A50 (Warrington Road).** | |
| **EBV1** | This BVI option was located in an agricultural field with hedgerows at its<br>edges. It was approximately 1.1 kilometres north east of the M6 and adjacent to<br>Moss Lane. |
| **EBV2** | This BVI option was located in agricultural fields south west of the nearby<br>A50 (Warrington Road). |
| **EBV3** | This BVI option was located in an agricultural field north east of the nearby A50 (Warrington Road). |

**Table 5.14 South Corridor Options**

| Option | Description |
|---|---|
| **In this area four options for the required trenchless crossings of the Weaver Navigation and West Coast Mainline were identified, south of the trenchless crossing of the A556 (Chester Road) (SP1, SP2, SP3 and SP4).** | |
| **SP1** | SP1 required individual trenchless crossings of the West Coast Mainline and an area of ancient woodland (Heys Wood). |
| **SP2** | SP2 ran south east to a long trenchless crossing of the Weaver Navigation and West Coast Mainline, near Vale Royal Locks. |
| **SP3** | SP3 ran along the eastern edge of the golf club at Vale Royal Park and an area with a number of Tree Preservation Orders. It required a single trenchless crossing of the Weaver Navigation and West Coast Mainline, starting south of Hulses Island as access between the two crossings would be challenging. |
| **SP4** | SP4 ran along the eastern edge of the golf club at Vale Royal Park and an area with a number of Tree Preservation Orders. It then ran further south, crossing Mill Lane / Bradford Road and the belt of established deciduous broadleaved woodland using open cut construction. A trenchless crossing of the Weaver Navigation, near Bradford Road, and the West Coast Mainline, would then be required. This option could also have been completed as a larger single trenchless crossing of the Weaver Navigation and West Coast Mainline. |
| **There were five options for the BVI needed in this area (SBV1, SBV2, SBV3, SBV4 and SBV5).** | |
| **SBV1** | This BVI option was located in fields to the north of the A556 (Chester Road). |
| **SBV2** | This BVI option was located in fields to the south of the A556 (Chester Road). |
| **SBV3** | This BVI option was located in a field to the east of Whitegate Lane. This option would only be possible if pipeline route option SP1 was preferred. |
| **SBV4** | This BVI option was located further south than SBV1 and SBV2, in a field to the |

| Option | Description |
|---|---|
| | west of Whitegate Lane. It was applicable to pipeline route options SP2, SP3 and SP4. |
| **SBV5** | This BVI option was located to the west of an established belt of trees at Jack Lane, after the pipeline route options SP1, SP2, SP3 and SP4 converge. |

**Table 5.15 Central HAGI Options**

| Option | Description |
|---|---|
| **The Central Hub was the HAGI at the centre of the proposed pipeline, required to provide a connection and onward distribution point to customers along the south, east and north corridors. Two options for the Central Hub HAGI were identified.** | |
| **CHH1** | This Central Hub HAGI option was located in an agricultural field to the rear of Woodside Farm. This field is generally bound by hedgerows with some existing gaps. |
| **CHH2** | This Central Hub HAGI option was located further north. It was along an existing hardstanding track leading to an area currently used for storage. The adjacent field has hedgerows and some mature trees at its edges. CHH2 was set back a fair distance from existing public roads, decreasing its visibility. |

**Table 5.16 Northwich Spur Options**

| Option | Description |
|---|---|
| **There were two options following the combined trenchless crossing of Marbury Road, Trent and Mersey Canal and Lift Lane (NSp1 and NSp2).** | |
| **NSp1** | NSp1 ran south to a trenchless crossing of the River Weaver. It then followed open areas and tracks to, as far as possible, avoid impact on woodland through Anderton Nature Reserve and associated recreational areas. |
| **NSp2** | NSp2 ran south east and then south west to avoid existing ponds and areas of mature woodland. |

# 6. Preliminary Route Alignment: Draft Order Limits

6.1.1. The following sections describe how the corridors were refined from the Preliminary Order Limits (POL) identified in **Chapter 5** to form the Draft Order Limits which are subject to Stage 3 Statutory Consultation. In general, the land requirement was narrowed along each corridor to provide more certainty on where the pipeline is to be proposed, and further information obtained has allowed decisions to be made on most of the optionality included in the Preliminary Order. However, additional information has also led some areas of optionality being introduced. The Project has been positioned further away from certain sensitive receptors, where possible, to reduce potential impacts on these receptors.

6.1.2. As noted in earlier stages, the locations of the HAGIs are largely determined by the connections required leading to the need for some of the HAGIs to be proposed within Green Belt locations. Each HAGI location option was therefore reviewed again against Green Belt purposes (**Appendix A**). Further details are provided within the relevant HAGI sections below.

6.1.3. Figures are provided to illustrate the specific points mentioned below, and a detailed set of plans showing the entire Draft Order Limits, including all proposals and options for the pipeline route, HAGIs, BVIs and Spurs is provided in **Figures 6.1 and 6.2** and in **Appendix B**. Appendix B is a copy of the full set of plans from Figure 2.2 from the Draft Environmental Statement.

## 6.2. Minor amendments

6.2.1. In addition to the changes identified along the different corridors and described below, there have been other changes to the Preliminary Order Limits along the route for the following reasons:

- As route options have been confirmed and the initial corridors of land refined, it has been possible to consider the route against more detailed digital map bases. This has identified locations where it is considered sensible to redraw the Draft Order Limits to reflect field/property/landownership boundaries and avoid very small parcels or strips of land, which would not actually be required. This has therefore led to minor additions and deletions to the Draft Order Limits.
- The confirmation of options and the other design changes noted have also allowed the LoD to be identified. This then allows the Draft Order Limits to be narrowed around the LoD and excess land has therefore been removed. In most locations the Draft Order Limits now only identifies the land required for the pipeline, its construction, operation and associated infrastructure and the LoD (flexibility) to be applied for. In a small number of locations where additional flexibility still remains, this is identified in this report. In some locations the size of construction compounds and permanent above ground

infrastructure has also been reduced, informed by additional technical consideration.

- Other changes made include the relocation of some vehicular accesses to the adopted highway as a result of consultation with local highway authorities and/or additional assessment work undertaken by the Applicant. Where amendments to accesses are considered to be more than minor (for example Eaton Lane) these are referenced within this document.

6.2.2. These changes have not been individually identified in this report due to their small scale or, in the case of the narrowing of the Draft Order Limits, positive effect (in that less land is required to construct and operate the Project).

## 6.3. West Corridor

6.3.1. The pipeline in the West Corridor maintains its general route from previous stages of the design evolution, running from the HPP to the Rocksavage area, where a connection spur will run towards Runcorn to supply industrial customers. The corridor will then run to the east to join up with the Central Hub. The Draft Order Limits described below for the West Corridor are shown in **Figures 6.1 and 6.2** and in more detail in **Appendix B**.

6.3.2. Design changes within the West Corridor which have resulted from consultation or from further environmental or technical work are identified are identified below.

### Chester Services

#### *Description and rationale*

6.3.3. In this location the pipeline must pass through a corridor between Chester Services and residential properties at Elton (**Figure 6.3**). This corridor is also the proposed route of the HyNet CO2 Pipeline and a proposed substation relating to Chester Services and therefore the change is proposed to allow all three developments to be accommodated in the space available. In addition, representations from the landowner at Stage 2 Statutory Consultation requested the pipeline route be ‘straightened’ in this location to minimise land take.

6.3.4. An alternative route further to the north is therefore included in the Draft Order Limits, where the pipeline would run in a direct line on the approach to the A5117, then cross both the A5117 and Ince Lane before passing Chester Services. The trenchless crossing compounds required for the crossing of the roads would also move from their previous location to match with the new pipeline location. Two trenchless crossing options are located here, a single HDD crossing which would pass under both the A5117 and Ince Lane, or a microtunnel option which would consist of two parts, running under each road separately. This option would therefore need additional compound at the A5117/Ince Lane.

6.3.5. The change also allows for the substantial reduction in the previous corridor to the south (closer to the M56) and around the northern boundary of Chester Services.

### *Assessment and Conclusion*

6.3.6. The microtunnel crossing option would result in woodland loss due to the additional compound needed between the A5117 and Ince Lane. Both trenchless crossing options would be closer to residential properties than the initial Preliminary Order Limits identified in the PEIR, with the HDD option potentially giving rise to longer lasting effects. This loss of woodland and movement towards residential properties could give rise to adverse impacts for terrestrial ecology, landscape and visual, major accidents and disasters, noise and vibration, people and communities and transport. From an engineering perspective, the proposed amendment would require a similar number of services to be crossed along with one extra highway and the additional trenchless crossing this requires. However, by moving away from Chester Services the likelihood of encountering made ground or contaminated ground reduces.

6.3.7. As explained in the Design Evolution Report (September 2022) there is no other route option to the south of Chester Services (as this would involve additional crossings of the M56) or further to the north due to the settlement of Elton. The pipeline therefore has to pass through the gap between Elton and Chester Services. Although the proposed change does produce increased engineering and environmental impacts, the engineering impacts are not so great as to affect viability and for the majority of environmental matters these increased impacts are not so great as to change the assessment conclusions from the PEIR. Noise impacts would increase at the nearest properties in Elton to become potentially significant and there could be potentially significant adverse access impacts for agricultural land nearby. However, during construction contractors would be required to follow a Construction Environmental Management Plan (CEMP). This will set out those construction management measures necessary to mitigate significant environmental effects. Furthermore, the removal of a contractor area in the car park at Chester Services would be beneficial for this business and for any customers using it. The changes also straighten the proposed pipeline route in this location, as requested by the landowner. The change would therefore allow three different development proposals to proceed, and the increased impacts arising from the change are not considered to be substantially different from those originally proposed.

## Encirc and Protos

### *Description and Rationale*

6.3.8. At statutory consultation, responses were received from landowners providing further information on their operational activities and future intentions. In the case of Encirc and Protos (**Figure 6.4**), they have neighbouring sites at Elton, north of Chester Services. Representations received in relation to the statutory consultation raised the potential for difficulties in managing their operations with the Project's proposal for access and, in the case of Encirc, identification of land as a potential materials store.

6.3.9. Three main changes have therefore been made in this location. The first is to remove the Draft Order Limits which occupied Encirc's internal service road, this runs north of the railway bridge, from Ash Road. The road is already heavily used and the number of vehicles that Encirc can operate along Ash Road is limited by an existing planning condition. The proposal to utilise Ash Road for construction traffic would have added traffic onto Ash Road and could therefore create unacceptable traffic issues or could impact on Encirc's operations.

6.3.10. East of the service road a large area of land, which had been identified as a potential materials store, has been removed because it includes Encirc's railway sidings. This removal is also undertaken to avoid impacts on Encirc's operations.

6.3.11. East of the Encirc site is the proposed Protos development which has approval for development under planning permission 23/01239/FUL. This development would require new internal service roads, which could be used by the Project to access its working area north of the M56. The Draft Order Limits therefore include both the intended temporary (1) and permanent (2) Protos service roads, whilst also retaining the previous road link (3) as there are uncertainties over which routes will be in place at the time of pipeline construction.

### *Assessment and Conclusion*

6.3.12. Ash Road is bordered to the west by a residential area and is used as the sole access for vehicles to Encirc. The removal of Ash Road from the Draft Order Limits ensures that no traffic associated with the Project will use it thereby protecting existing levels of amenity and also preventing conflict between Encirc and project traffic. This is particularly important as Encirc operates a signalised entry system for vehicles passing along single carriageway under the railway.

6.3.13. Previously the Project proposed light vehicle use of Ash Road. With Ash Road now removed from the Project the light vehicles will now need to access the Project via the private road which runs from Pool Lane to the Protos / Encirc sites. Access to this private road is via the A5117 and Pool Lane, existing highways that serve Stanlow and the Protos Site (and previously CF Fertilisers). These highways do not pass through residential areas. The addition of light vehicles should not therefore relocate potential amenity issues in one location to another. These highways are more suitable for construction traffic.

6.3.14. The three options into the Project from Protos avoid the need to use Ash Road. One access is existing, the other two represent the temporary construction and final access routes associated with the planning permission for new development here. With regard to the addition of two alternative means of access into the Project, only one will be used.

## Hoverforce (Options WP1 and WP2)

### *Description and Rationale*

6.3.15. The Preliminary Order Limits contained two options for passing the Hoverforce Outdoor Activity Centre (Hoverforce) (**Figure 6.5**). Option WP1 around the northern boundary of Hoverforce and WP2 around the southern boundary. Both options are of a similar length, with WP2 requiring crossings of two additional pipelines and one overhead power line in comparison to WP1. WP2 would also run parallel to an additional overhead power line, with the need to mitigate against AC (alternating current) induction, and crosses one additional Public Right of Way than WP1. WP1 would pass through land used by Runcorn Model Aircraft Club and part of the Hoverforce site.

### *Assessment and Conclusion*

6.3.16. WP1 would bring the pipeline route further into the functional land associated with the Mersey Estuary Special Protection Area (SPA) and also crosses land used by Runcorn Model Aircraft Club. However, the proposed LoD for the pipeline avoids the Aircraft Club land, so this would be a potential construction phase impact only.

6.3.17. Due to the additional pipeline and power line crossings, WP1 would be the preferred engineering solution. Although WP1 is located further within the functional land associated with the Mersey Estuary SPA there is considered to be little difference between WP1 and WP2 from an ornithological impact perspective.

6.3.18. Hoverforce is an outdoor activity centre which includes off-road hovercraft, karting and buggy racing, plus activities such as shooting, archery and axe-throwing. The Draft Order Limits would temporarily (during the construction phase) result in around 10% of the off-road activity area being unavailable. Given that around 90% of the off-road activity area will still be available, and that the construction works are unlikely to disrupt this type of activity from indirect effects, it is therefore considered that the WP1 proposals would have negligible impacts on the Hoverforce business.

6.3.19. The construction phase works are likely to require the activities of the Runcorn Model Aircraft Club to cease for the duration of the works. The land they use may be required for construction works and the pipeline trenches would run across the access route to the Site. However, given the nature of the recreational facility and the engineering difficulties associated with the Option WP2, this is considered to be an unavoidable impact. Once the construction works in this location have completed, the land and access will be restored allowing the model aircraft use to continue.

6.3.20. WP1 is therefore proposed as the preferred option due to the engineering constraints along the WP2 route, and the negligible effects on Hoverforce and the functional land use associated with the Mersey Estuary SPA.

## Moorditch Lane / Alder Lane

### *Description and Rationale*

6.3.21. On land located between Moorditch Lane and Alder Lane (**Figure 6.6**), two caravan sites for use by the traveller community have been constructed without the benefit of planning permission. Both of these sites are subject to separate retrospective planning applications, which were submitted to the Local Planning Authority in June 2022 and September 2022. These planning applications are currently undetermined and from information available on-line (September 2024), it appears that the LPA has requested further information from the Applicant prior to making a determination. The two sites are located directly in line with the Project. Neither application references the Project despite the Project being in the public domain at the time of these submissions. The Draft Order Limits have been narrowed at this point to allow the pipeline to pass the two sites, however this does restrict the LoD substantially in this location. The Draft Order Limits will therefore be kept under review in this location, depending on the outcome of the retrospective planning applications.

## Rocksavage and Runcorn HAGIs and connecting pipelines

Please note that, as described in paragraph 5.2.9, RSH3 was moved during the design work for Stage 2 Statutory Consultation. During the works leading up to Stage 3 Statutory Consultation, a back check of all previous HAGI options has been undertaken to ensure that the correct decisions have been made. In order to differentiate between the different RSH3 locations, the re-located RSH3 option was re-named RSH2a. **References to RSH2a in this document therefore relate to the site which was previously identified as RSH3 in the Stage 2 statutory consultation documents.**

### *Description and Rationale*

6.3.22. Within the Rocksavage area (**Figure 6.7**), the pipeline needs to be aligned so that it can continue to the Central Hub and so it can connect Intergen via the Runcorn HAGI. During Stage 2 Statutory Consultation a connection to the Heath was also required and a wide corridor was shown to accommodate a number of options, which were still subject to consideration at the time. This included three options for the Rocksavage HAGI, one location for the Runcorn HAGI and a number of options for the mainline and spur pipelines needed (as a result of the different HAGI options).

6.3.23. The connection to the Heath Business and Technical Park via Runcorn Spur has been removed from the Project as the Site with a future connection to the Project to be considered in the future when further certainty is known with regard to the use of hydrogen at the Site. The Runcorn Spur therefore now runs only to the Runcorn HAGI to facilitate the connection to Rocksavage power station.

6.3.24. The Rocksavage HAGI options included RSH1 (to the south west of the River Weaver), RSH2 (east of the M56 and close to the Warrington to Chester rail line)

and RSH3 (adjacent to the east of the M56). The pipeline route options included the mainline running through RSH1 with two spurline options running towards Runcorn, or the mainline option running to either RSH2 or RSH2a and then a connection running to the Runcorn HAGI.

6.3.25. These options were included due to potential difficulties in this area from flood risk, unknown ground conditions from historic landfill operations, potential land holder interest in development and the complexities of crossing the River Weaver, Weaver Navigation and M56. These potential difficulties required a more detailed consideration of the Project in this area. This consideration included the options above, plus the co-location of the Rocksavage and Runcorn HAGIs and the potential for an alternative Rocksavage HAGI location close to the Warrington to Chester Rail line.

### *Assessment and Conclusion*

6.3.26. The design of the pipeline in this area has developed from a number of related items:

### *Runcorn HAGI:*

6.3.27. Stage 2 Statutory Consultation reported that two locations for the Runcorn HAGI had been considered, RH1 and RH2, both located on the north side of the Weaver Navigation, north and south of Weaver View respectively. The assessment in the DER at the time, showed that RH2 was the preferred location due to RH1 requiring cut and fill land profiling works (and all other engineering and environmental being very similar across both locations). However, subsequent discussions with the landowner in this area raised that the RH2 location was subject to historic ground contamination issues and development here could give rise to pollution events. Inovyn would be taking hydrogen supply from the Runcorn HAGI and they expressed a preference for the RH1 location due to the ground contamination issue at RH2 and their ownership of the land at RH1. The RH1 location has therefore been established as the preferred location for the Runcorn HAGI. The RH1 location also provides opportunity for the connecting pipelines to avoid the area of contaminated land identified north of the Weaver Navigation.

### *RSH1 and spurline to the west of Frodsham Substation.*

6.3.28. If RSH1 was selected, the Runcorn Spur could be routed to the west (RSp2) or to the east (RSp1) of the Frodsham substation where it would cross the River Weaver and Weaver Navigation. These two options were presented at Stage 2 Statutory Consultation stage (see **Figure 5.2**). RSp2 would require a Horizontal Directional Drilling (HDD) crossing that would span beneath both the River Weaver and the Weaver Navigation in a single crossing. This is because the land between the two watercourses is constrained by two waterbodies meaning that there is insufficient area for the HDD to surface. RSp2 was therefore discounted because RSp1 allows for separate microtunnel crossings of both watercourses.

### *Co-location of the Rocksavage and Runcorn HAGIs*

6.3.29. Consideration was also given to the co-location of the two HAGIs in to reduce the permanent land take which would be needed in this area. However, any co-location would require substantial lengths of additional pipelines to either create the Runcorn spur (RSH1), provide the two connections into Runcorn (RSH2 or RSH2a) or continue the mainline pipeline to Central Hub (RH1) These additional lengths of pipeline would all require additional crossings of the River Weaver, Weaver Navigation and/or the M56. The construction impacts, programme and cost implications led to the co-location option being discounted.

### *Rocksavage HAGI*

6.3.30. Stage 2 statutory consultation included three alternative sites for the Rocksavage HAGI. The Stage 2 statutory consultation documents, these were titled as RSH1, RSH2 and RSH2a.

6.3.31. All of the pipeline route options available to connect any of these HAGI locations would be subject to constraints from issues such as: flood risk, potential contaminated land from historic land uses (south of the Weaver Navigation) and crossings of the River Weaver, Weaver Navigation, the M56 and the Warrington to Chester rail line. The design of the Project in this location therefore had to focus on the location of the required HAGIs, with the pipeline route then being largely dependent on the location and connection of these HAGIs.

6.3.32. Following the issue of the DER, further environmental surveys have identified ecological constraints in the vicinity of RSH2a, and because of this additional HAGI sites were therefore identified for consideration. These are options RSH3a located to the rear of the Sailing Club and immediately north west of the Warrington to Chester rail line and RSH6 which is located to the south east of the rail line.

6.3.33. Of these five options (RSH1, RSH2, RSH2a, RSH3a and RSH6, RSH1 was discounted as it was located within the flood zone, which would have provided potential difficulties during construction, it would have also created Moderate harm to the Green Belt being open land with extensive views across (although mitigation through boundary planting could help to mitigate visual impacts over time). It is considered the most inappropriate option on Green Belt grounds because the only other option (RSH6) giving rise to potentially Moderate harm would be viewed within the context of a nearby industrial estate and railway line. RSH1 is also located in an area of potentially peaty soils and in closer proximity to the Mersey Estuary SPA & Ramsar site and the qualifying / assemblage features (statutory designated site) than the other options. Depending on the route taken for the pipeline connections from RSH1, up to six major trenchless crossings could also be required (if the contaminated land to the north of the Weaver Navigation is to be avoided), and a longer pipeline for the Runcorn Spur would be required.

6.3.34. Option RSH6 is located outside of any ecological designations and there are no records of historic land uses which could lead to contaminated land issues. However, its location would lead to a longer Runcorn Spur line and would require two pipeline crossings of the rail line and two water pipelines (one crossing by the main pipeline and one by the Runcorn spur line). The HAGI options west of the rail

line would have shorter spur lines and would only require one crossing of the rail line and water pipelines (by the main pipeline). RSH6 would also be located within a flood risk area. Development of this land would give rise to Moderate harm to the Green Belt, although within a context of the nearby industrial estate and rail line. Overall whilst performing better environmentally, this option is discounted on the additional cost and complexities in the construction works required to make the additional crossings of the rail line and water pipelines.

6.3.35. Considering the remaining options, all are located within a Local Wildlife Site. They would each require the same number of trenchless crossings to provide the relevant pipeline crossings, with those closer to the rail line requiring a slightly longer pipeline connection for the Runcorn Spur.

6.3.36. RSH2 is recorded as being within an area of historic landfill with RSH2a being outside this area. RSH2 and 3 would be located on an area of calcareous grassland which is the designated feature of the LWS. However, there is considered to be land available around the RSH2 location to create calcareous grassland to mitigate the grassland lost to the development. The mainline and spur line routes in and out of RSH2 could be potentially routed to avoid active badger setts to the north west of RSH2.

6.3.37. Visibility of RSH2 and 2a is limited to close views from within the LWS with RSH3a being more visible from the nearby sailing club. In Green Belt terms RSH2a is considered to preferable as it is considered to give rise to Limited harm because it is located within a woodland area. This woodland area is not a designated feature of the LWS, although it is expected to be more difficult to mitigate through replanting due to the extent of land available nearby and the existing habitats in those areas. Some of the trees are Category B. There are also protected species in close proximity which, depending upon the ability to microsite the HAGI, could require the provision of alternative habitat, providing the necessary licensing could be obtained.

6.3.38. RSH3a is closest to residential properties (amenity) and this factor combined with those others listed above has resulted in it being discounted as an option.

6.3.39. RSH2, 2a, 3 and 3a are located within a plot of land that has an extant planning permission for water pipelines and a pumping station related to the King Street gas storage project, whilst RSH2a is also of interest for an anaerobic digester development (although an EIA Scoping Opinion has been made for this proposal, it has not been followed up with a planning application).

6.3.40. RSH2a (previously RSH3 at Stage 2 statutory consultation) remains to be taken forward within the Draft Order Limits. Like all of the locations within the Rocksavage area it is not free from constraints, but it does perform the best for Green Belt and flood risk and it is considered to be in an optimal location in terms of the pipeline routeing for the Runcorn HAGI.

6.3.41. Taking forward RSH2a would require the pipeline to cross the M56 (west to east) shortly after the River Weaver to avoid waterlogged ground closer to the Weaver Navigation. It then connects to the Rocksavage HAGI at RSH2a before continuing east. The HAGI location then allows the Runcorn Spur to cross the Weaver Navigation immediately to its north.

## Sutton Weaver (Options WP3 and WP4)

### *Description and Rationale*

6.3.42. The Preliminary Order Limits contained two options for the crossing of the A56 and the Weaver Navigation in the area south of Sutton Weaver (**Figure 6.8**). WP3 crossed the Weaver Navigation (and Clifton Road) between the Warrington to Chester rail line and the A56, and then crossed the A56 to the north east of the Super Shine car wash. WP4 crossed the A56 to the south of the Weaver Navigation, before then crossing the Weaver Navigation on the eastern side of the A56: these two crossings for WP4 would require a single HDD trenchless crossing. The two options then re-join to the south of Sutton Weaver.

### *Assessment and Conclusion*

6.3.43. Ground conditions identified by borehole test drilling in the area suggest that the single HDD crossing for WP4 could be difficult to achieve, with the predominant glacial till including sand and gravels (including blowing sands) and cobbles. WP3 could utilise HDD if the ground conditions allow, but if this was not possible it could utilise two separate trenchless crossings using micro-tunnel or auger methods which would be more suited to the ground conditions.

6.3.44. WP3 would bring the pipeline route into closer proximity to residential properties, although standard mitigation measures would minimise any air quality or noise and vibration issues. WP3 would impact on a single PRoW and would have both positive and negative impacts from transport over WP4. Other environmental matters are considered to be negligible or neutral.

6.3.45. The selection of WP3 has also included an increase in land to accommodate a stringing area should HDD be utilised for the trenchless crossing under the Weaver Navigation. This would be on land between the Chester to Manchester Railway Line and A56, south of Halton Station Road. This would bring the construction phase works in closer proximity to a small number of residential properties and businesses, but it is considered that standard mitigation measures should be able to minimise any impacts to acceptable levels.

## Aston Grange

### *Description and Rationale*

6.3.46. To the north of the Weaver Navigation and west of the West Coast Mainline, the Applicant understands that a solar farm is being proposed on land through which the pipeline crossed at Stage 2 Statutory Consultation (**Figure 6.9**). Should this solar farm be pursued it is considered that the pipeline route can be amended to allow both developments to proceed. Four options were considered including routeing the pipeline through existing wayleave ‘gaps’ within the solar site and routeing around the northern edge of the solar farm. Both of these options would utilise some land currently identified for the potential solar development. The other two options would allow the pipeline to avoid the potential solar proposals

completely but would bring the pipeline into close proximity to an area of ancient woodland and a local wildlife site.

### *Assessment and Conclusion*

6.3.47. To the north of the proposed solar farm lies the Rye Grass Pipes 2 Local Wildlife Site and ancient woodland. The woodland takes the form of two fingers of woodland, both running west to east. A gap between the two fingers of woodland exists, through which the pipeline could possibly be routed, although the gap is only around 30m wide at its narrowest point. This would be a space constraint for both the pipeline construction and the development of the trenchless crossing compounds needed to cross the West Coast Main Line (which runs north/south at the eastern end of these woods). In addition, this trenchless crossing of the railway line could either run perpendicular to the rail line, which would bring it out in woodland on the eastern side (giving rise to landscape and ecological effects), or at an oblique angle to avoid the woodland. The oblique angle would not be favoured by National Rail and would add cost and complexity to the construction of the trenchless crossing here.

6.3.48. Two other options were considered which run through the potential solar farm development area, one option which runs along the northern boundary and one which follows existing wayleave lines through the centre of the solar farm site. The wayleave option would follow the route of an existing overhead line through the solar farm site. Whilst this would be technically possible from an engineering point of view, it would be the longest of the options considered and the overhead line would present constraints that need to be worked around due to its proximity and from the risk of AC induction.

6.3.49. The option along the northern boundary would be a similar length to the two options through Rye Grass Pipes LWS woodland, but it would not have the same space and crossing constraints. The option would sterilise some of the land, which is being considered for the solar farm, but this is limited to the edge of the potential development area, minimising the impacts.

6.3.50. In conclusion, although the options to run through Rye Grass Pipes LWS woodland would avoid the potential solar farm development, the constraints from the ancient woodland, Local Wildlife Site designations and the railway line crossing mean that these options are not favourable. As the solar development is not yet subject to any planning related consents or submissions, it is considered that both projects should be able to proceed alongside each other and therefore the option along the northern boundary of the solar development is the preferred option.

## The Heath

### *Description and Rationale*

6.3.51. The Heath located in Runcorn, in the Halton Council area is a business and technology park and was a Project customer (**Figure 6.10**). This necessitated the spurline being routed north of the Runcorn HAGI. Further work is required for the potential customer to understand whether it will require a hydrogen supply and if

so what the level of demand will be. Therefore this spur has been removed from the DCO application. It is possible that this spur may be amended and future consents sought for its development, depending on the outcomes of the assessments being undertaken by customer.

### *Assessment and Conclusion*

6.3.52. The removal of the spurline north of the Runcorn HAGI would have neutral environmental effect in that it would remove the requirement for works north of the Runcorn HAGI. This would mean that there would be no construction activity across the Runcorn Golf Club or within the local highways.

## West Corridor Options

6.3.53. As described above, at Stage 3 Statutory Consultation, the following optionality exists within the West Corridor:

**Table 6.1 West Corridor Options**

| Option | Description |
|---|---|
| **Chester Services** | |
| | Adjacent to Chester Services (junction 14 of the M56), the pipeline has a trenchless crossing of the A5117 and Ince lane. There is potential for this crossing to be undertaken using two micro-tunnels: one under the A5117 and one under Ince Lane. This proposal would see each micro-tunnel commenced to the west of the A5117 and to the east of Ince lane respectively, with both of them running to a central exit compound located between the two roads. The central compound would require the felling of a woodland area in this location. An alternative option would be to run a HDD from the east of Ince lane right through to the west of the A5117, removing the need for the central exit compound and the tree felling, but potentially lengthening the construction works programme in this area. |
| **Encirc and Protos (access points)** | |
| | In the proximity of the Encirc and protos sites, a number of roads are being proposed to facilitate various industrial developments in this area. Three options are therefore identified within the Draft Order Limits, with one option to be selected depending on what developments proceed by the time Project access is needed and what route/s are available. |
| **Rocksavage HAGI** | |
| | No formal options exist in the West Corridor at Stage 3 Statutory Consultation, however in the area around the Rocksavage HAGI additional land is included within the Draft Order Limits due to uncertainties over the ground conditions in this location. There are records of historic landfill in this location, but little detail of what materials may be in the ground here. Further ground investigation work is planned for late 2024 and these results, along with responses from the Stage 3 Statutory Consultation and any further design and assessment will confirm the final design location. |

# 6.4. North Corridor

6.4.1. The pipeline in the North Corridor maintains its general route from previous stages of the design evolution, running north from the Central to cross the M56 near Summer Lane. It then continues north, passing between Moore and Higher Walton to connect to the Higher Walton HAGI to the north of the Manchester Ship Canal. The North Corridor then runs to the north west, crossing the River Mersey at Fiddlers Ferry, before running between Cuerdley and Bold Heath before connecting to the Clock Face HAGI close to junction 7 of the M62. The North Corridor includes three spurs for customer connections: the Warrington Spur which runs from the Higher Walton HAGI in a westerly direction, the St Helens Spur which runs north from the Clock Face HAGI into St Helens and the Clock Face Spur which follows the St Helens Spur north from the Clock Face HAGI until Chapel Lane, when it turns east into the Lea Green Industrial Estate. The Draft Order Limits described below for the North Corridor are shown in **Figures 6.1 and 6.2** and in more detail in **Appendix B**.

6.4.2. Design changes within the North Corridor which have resulted from consultation or from further environmental or technical work are identified below.

## Daresbury and Higher Walton HAGI

### *Description and Rationale*

6.4.3. At statutory consultation, a wide corridor, consisting of three different route options (NP1, NP2 and NP3), was presented around the Daresbury Estate / Creamfields Festival site because discussions were still ongoing as to the best location to cross the festival site. This is due to the need for temporary piling (or similar) across the festival to support various festival stages. The Daresbury options then lead into two main options for linking to the Higher Walton HAGI and crossing the West Coast Main Line and Manchester Ship Canal (NP4 and NP5).

6.4.4. Statutory consultation also led to a challenge with regard to the Higher Walton HAGI option, HWH2. This site lies within the Green Belt but it is previously developed and has an implemented consent to be redeveloped. Further consideration has therefore been given to additional optionality in the form of HWH8. This HAGI option would be located on agricultural land south of the Manchester Ship Canal. This area is shown on **Figure 6.11**.

### *Assessment and Conclusion*

6.4.5. Due to the configuration of the festival site, Option NP2 was not feasible (running through the centre of the site). Option NP1 would see most of the pipeline running within the western boundary of the site, with NP3 mainly running outside the site with only short sections within. NP4 would involve two separate trenchless crossings (one for the West Coast mainline and one for the Manchester Ship Canal) whereas NP5 could be constructed with one single trenchless crossing, underneath both of these features.

6.4.6. Options NP4 and NP5 corresponded to HAGI options HWH1 and HWH2 respectively. HWH2 was the preferred HAGI location due to shorter spur lines needed to the connection points in Warrington and to maintain separation from the village of Moore. However, for the reasons given above, additional optioneering work has been undertaken (see below).

6.4.7. The pipeline route from Creamfields to the Higher Walton HAGI in NP5 was also amended to follow an existing pipeline corridor. The change to the Preliminary Order Limits occurs to the west of the village of Higher Walton, where the proposed pipeline crosses the Bridgewater Canal and Runcorn Road, crossing agricultural fields before re-joining the route presented in the 2022 PEIR south of the Manchester Ship Canal. A trenchless crossing compound is now located to the north of Bridgewater Canal/south of Runcorn Road.

6.4.8. The various options give rise to similar environmental impacts, with only minor differences across the relevant environmental topics.

6.4.9. Options NP3 and the amended NP5 are therefore proposed for the HWH2 HAGI option, the alternative HWH8 option which is also suggested for Stage 3 Statutory Consultation would require an extension of the selected pipeline option due west and into the proposed HWH8 site, which would require the crossing of a tree lined watercourse.

6.4.10. The HWH8 site would be on agricultural land south of the Manchester Ship Canal. Like HWH2 it would be within the Green Belt with the main differentiating features between the two options being that HWH8 is not the subject of a planning permission but it is located within an area of flood risk (overlapping Zones 2 and 3). Furthermore, it lies within a Groundwater Source Protection Zone. HWH8 would also be closer to residential properties and constitute development in the open countryside with corresponding landscape and visual effects, although these could be mitigated through planting. The Applicant's Green Belt Assessment concludes that HWH8 would present moderate harm to the Green Belt in contrast to the limited harm provided by HWH2.

## Moore Nursery, Bellhouse Lane

### *Description and Rationale*

6.4.11. As a result of amending the route of NP5 to follow an existing pipeline corridor (see above) the realignment would result in the pipeline being constructed across a plant nursery (**Figure 6.12**). Consideration was therefore given to a HDD option under the plant nursery or to a reduced Right Of Way (ROW) and to the most appropriate access route for construction vehicles.

### *Assessment and Conclusions*

6.4.12. To HDD under the land occupied by the plant nursery would necessitate an entry point south of Holly Hedge Lane as there is insufficient setback from the Bridgewater Canal for HDD entry. Land south of Holly Hedge Lane is used as a paddock and is adjacent to a dwelling which could give rise to amenity issues.

6.4.13. Land take through the plant nursery can be minimised by reducing the requirement for construction vehicle access along the ROW with bulk construction equipment access land to the north from either of two lanes. Options considered Mill Lane and Bellhouse Lane. Mill Lane is a single track lane and includes a bridge with a 3 tonne weight limit. The Lane provides access to a small number of residential properties and for the first 200m metres is bordered by overhanging mature trees (trees which run along Mill Lane south of the junction with Runcorn Road are classified as Category B).

6.4.14. Bellhouse Lane also provides access from Runcorn Road. It is bordered by mature trees for approximately 150m. The Lane provides access to a small number of residential properties, commercial properties, a caravan storage site and sewage works. Whilst also narrow, it is already used by commercial vehicles. Using Bellhouse Lane and taking access from it and into a field to the west and north of the plant nursery would ensure that construction vehicles would only need access for approximately 200m of its length. This would allow most construction traffic to avoid most of the existing commercial and other uses which congregate further to the north. Bellhouse Lane is the favoured option.

## Moore Nature Reserve

### *Description and Rationale*

6.4.15. Along the northern extent of NP5, the pipeline route runs along the northern boundary of the Moore Nature Reserve, avoiding the southern boundary of the Arpley Landfill Site adjacent (**Figure 6.13**). However, to the north west of Birchwood Pool existing utility lines have been identified. These will require an amendment to NP5, which would bring the route further into the woodland area of the Nature Reserve.

### *Assessment and Conclusions*

6.4.16. The route of NP5 proposed at the first stage of statutory consultation ran along the northern boundary of the Moore Nature Reserve. The route could not run any further north (outside of the reserve) as this land is the subject of a live permit for the Arpley Landfill Site. The initial proposed route therefore minimised the extent that the pipeline would enter into the Reserve and the resulting impacts it would create. However, the identification of existing pipelines in this area means that NP5 has to move further south to avoid them. This would be across an approximate 400m distance, although only around 220m of the pipeline would affect additional trees in the Nature Reserve.

6.4.17. A number of important trees (Class A) have been identified within this area from aboricultural surveys, and the proposed route amendment has been designed to avoid these trees. The pipeline will be located within the Limit of Deviation to avoid impacts on trees, where possible.

6.4.18. Whilst there would be negative environmental impacts for ecological, soils, social and landscape/visual matters, there is no other option available to re-route the pipeline in this area. With the avoidance of the Class A trees, the impacts that do occur will however be minimised.

## Fiddlers Ferry and the True Fit Golf Course

### *Description and Rationale*

6.4.19. Owing to a proposed new employment and housing allocation in the newly adopted Local Plan and the associated redevelopment of the Fiddler's Ferry Power Station, alternative pipeline routes have been considered to reduce the likelihood of future development sterilisation in this area (**Figure 6.14**). Avoiding the allocated land would also avoid the need for the Council to consider additional land allocations to respond to any deficit in its housing numbers and remove the objection it made to this section of the pipeline at Stage 2 Statutory Consultation.

6.4.20. A number of other potential options running along the eastern boundary of the allocated land, in the area around Marsh Lane, were considered. However, an area of land containing deep deposits of landfilled Pulverised Fuel Ash (PFA), or the extensive land take needed to avoid this PFA, means these options are not viable.

6.4.21. New options NP6 and NP7 have been identified to facilitate an alternative pipeline route, which avoids the local plan allocation, and the Preliminary Order Limits have been amended to accommodate these options.

6.4.22. Option NP6 proceeds in a north-westerly orientation from the Moore Nature Reserve, facilitating a trenchless crossing of the River Mersey, canal and railway line before proceeding along the eastern edge of the True Fit (Fiddler's Ferry) Golf Course and re-joining the route presented in the 2022 PEIR, after crossing the A562 via a trenchless technique.

6.4.23. A second option (NP7) is also under consideration, heading north-westwards across the Golf Course after crossing the River Mersey, canal and railway, utilising the route of an existing ethylene pipeline, before re-joining the route presented in the 2022 PEIR north of the A562. To avoid an area of woodland which runs alongside the eastern boundary of the golf course, this second option would also include for a HDD. The HDD would enter to the east of the existing woodland on the eastern boundary of the course, exiting within the golf course.

### *Assessment and Conclusions*

6.4.24. Option NP6 would run along the eastern boundary of the True Fit Golf Course. This would allow the pipeline to run outside of the golf course, however the working area associated with the laying of the pipeline would require some land from within the golf course. The exact ground conditions encountered during construction may also lead to the pipeline running within the golf course itself. It is not possible for the pipeline to run further to the north/east so as to avoid the golf course completely, due to the presence of properties along Tannery Lane.

6.4.25. Option NP7 would run through the centre of the golf course, following the route of an existing pipeline. This option would see greater impacts during the construction phase as more land will be needed from within the golf course, and it will 'split' the course meaning access to the southern holes would be difficult. However, once operational this option could have a smaller impact as any wayleaves agreements would be focussed on a similar plot of land as for the existing pipeline.

6.4.26. Other environmental and engineering considerations are very similar for both options.

6.4.27. Both options remove the pipeline from the local plan allocation at Fiddlers Ferry power station and have similar environmental and engineering considerations. As Option NP6 could have greater operational stage impacts, but NP7 could have greater construction stage impacts, both are included in the Draft Order Limits to allow consultation on the two options.

6.4.28. Relevant considerations include land use, transport, historic environment, landscape and visual and water with positive effects considered to result from the proposed change to HDD under the woodland other than for land use which would see the trenchless construction area located within the golf club potentially leading to a lengthier construction period than the alternative of open cut. Ecological and ornithological effects arising from the change are considered positive given the avoidance of the trees although specific surveys have not been possible due to land access issues. On a precautionary basis a 30m stand-off has been added and should be maintained between the HDD compounds and the edge of the woodland to avoid and/or minimise direct and indirect effects upon potential ecological features such as badgers and bat roosts.

## Warrington Spur: Solvay/Ingevity

### *Description and Rationale*

6.4.29. The location of the pig trap/customer connection at Solvay/Ingevity was identified on open land within the company's site boundary, north of the Manchester Ship Canal (**Figure 6.15**). Ecological surveys undertaken in 2023 identified protect species in close proximity to the location which had been identified. The pig trap/customer connection was therefore located further east (within the company's site) to increase the distance from the protected species.

### *Assessment and Conclusions*

6.4.30. As a result of the change the pig trap/customer connection would now be located to avoid the protected species and would sit alongside trees which mark the boundary with the Manchester Ship Canal. Depending upon the precise location of the equipment care should be taken to avoid damage to these trees. The pipe that would connect into the pig trap/customer connection could still, potentially, pass close to the protected species. The precise micrositing of this pipeline will need to be informed by further, pre-commencement, surveys and potentially an EPS licence. The previous location straddled Flood Zones 2 and 3 whilst the new location is wholly within Flood Zone 3, resulting in a slightly negative conclusion with regards to climate change resilience and hydrology. The site is however brownfield, in existing industrial use.

## Warrington Spur: Arpley Meadows and Morley Common

### *Description and Rationale*

6.4.31. The Preliminary Order Limits presented at the Stage 2 Statutory Consultation in 2022 had been drawn with a wide corridor in the area around the Morley Common and Slutchers Lane (Arpley Meadows housing development) due to a number of uncertainties with other development proposals and land availability (**Figure 6.16**). To the north, the corridor encompassed land within the Arpley Meadows housing development in case the pipeline could be accommodated through the development area, or make use of streetworks rights along Slutchers Lane. To the south, the corridor encompassed land along the south bank of the River Mersey and the northern edge of Morley Common: following a route along the Trans Pennine Trail or via Eastford Road to reach the A5060. To the east of the A5060, the pipeline was intended to run along Gainsborough Road.

6.4.32. Those Preliminary Order Limits were subject to a number of constraints, with the housing development at Arpley Meadows, the planned Warrington Western Link Road, Trans Pennine Trail, Morley Common (sports pitches and registered Common Land) and allotments west of the A5060 being relevant in the western area. There is also a local Wildlife Site along the Walton Lock Cut, both west and east of the A5060. The A5060 has an elevated section over the former Walton Lock Cut to navigate. The Walton Lock Cut is also registered as being under the jurisdiction of the Marine Management Organisation (MMO) at this point (the River Mersey is tidal in this area), although the Cut is not navigable.

6.4.33. To the west of the A5060, it has not been possible to identify a route through the Arpley Meadows development, and the route therefore needs to run to the south of the River Mersey. In order to avoid conflict with the proposed Western Link Road, the pipeline route will have to follow the Trans Pennine Trail where it passes through the bridges and under the West Coast Main Line, with the access requirements for construction traffic to use additional parts of the Trail. A trenchless crossing is then proposed from Morley Common to the A5060, before the pipeline continues east along the Gainsborough Road option. This avoids any interaction with the Walton Lock Local Wildlife Site and MMO jurisdiction, or having to navigate the elevated section of the A5060.

6.4.34. The proposals would require additional land to accommodate a trenchless crossing entry compound, to be located on part of Morley Common, which would exit via an exit compound within the allotments to the west of the A5060/Gainsborough Road junction.

6.4.35. An alternative pipeline (spurline) route has been identified running from the alternative Higher Walton HAGI location (HWH8) described above. It would cross the Manchester Ship Canal north of HWH8 then run in a north easterly direction alongside the existing industrial area and railway land before entering Morely Common. This option would be used if HWH8 is progressed and would also reduce the interface between the Project and the proposed Western Link.

6.4.36. To the east of the A5060, an option (WSp3) is added along Cranbourne Road / Antony Road (to link to Gainsborough Road further east of the A5060) to move pipeline construction works away from a section of the busier Gainsborough Road (option WSp1). Further along Gainsborough Road an area of land within the Bruntwood-Wilderspool Park which was previously identified as a potential construction laydown area has been removed from the Draft Order Limits.

*Assessment and Conclusions*

6.4.37. The proposed route would avoid current development activity at the Arpley Meadows housing site, which is permitted and in construction, with no opportunity to route a pipeline through. By necessity, this therefore means the pipeline has to run south of the River Mersey where there would be interaction with the Trans Pennine Trail. However, it is understood that the two crossings of the Trans Pennine Trail needed would be able to be constructed in a way that keeps access open along the Trail. The route south of the River Mersey has been discussed with Warrington Borough Council with regard to its proposed Western Link Road and the Applicant is confident that both projects can come forward without undue detriment to either.

6.4.38. The HWH8 HAGI option provides an alternative pipeline route to Morley Common and the crossing of Walton Lock Cut. Skirting the western side of the industrial area north of the Ship Canal it would lead to the potential loss of trees and require open cut trenching along the western side of Morley Common. This may require the relocation/reduction of football pitches on the Common although it might be possible to mitigate effects upon the pitch users by scheduling the construction activities outside of the football season. Advanced warning of construction dates may also allow the Council to reschedule/relocate the teams for a temporary period. This route option would reduce the interface between the Project and the Western Link, although as set out above the Applicant is confident that both projects can come forward.

6.4.39. To cross the Walton Lock Cut and the A5060, a trenchless crossing is required from Morley Common to the A5060. The previous options were to follow Eastford Road or an off-road section of the Trans Pennine Trail, then run north up the A5060, however, this is not possible due to the elevated section of the A5060 (no gas pipeline can be run beneath the road surface here or be hung from the bridge structure). A trenched crossing of the Walton Lock Cut area would create impacts on the Local Wildlife Site, require an MMO licence and also impact on the allotments to the west of the A5060. The trenchless crossing would require an exit compound within the allotments but would avoid direct impacts on the Local Wildlife Site and MMO land. It would however require the trenchless crossing entrance compound to be located within Morley Common, which could impact on a football pitch and its use as Common Land.

6.4.40. This proposal would see the pipeline avoid the elevated section of the A5060 and then be able to run directly along Gainsborough Road to the east. An alternative option would be to run along the Trans Pennine Trail to the east of the A5060, then along Cranbourne Avenue / Antony Road before joining up with Gainsborough Road further east. This would reduce impacts on Gainsborough Road, which is a busy local traffic and public transport route, but would raise

further impacts on the Trans Pennine Trail, residential amenity and possibly access along Cranbourne Avenue.

6.4.41. The removal of the potential construction laydown area within Bruntwood-Wilderspool Park would be a positive change in that access to the Park would be maintained, the boundary hedge and grassland maintained and noise and general disturbance to occupiers of properties on the opposite side of Gainsborough Road avoided.

## St Helens Spur: Glass Futures / Greengates and the Removal of St Helens HAGI

### *Description and Rationale*

6.4.42. Ongoing engineering work relating to pressure of hydrogen supplies and the appropriate materials for pipelines at different pressures has allowed the pipelines from the Clock Face HAGI to the Glass Futures and Greengates connections in St Helens to be changed from carbon steel to polyethylene (PE). In order to provide the two connections in St Helens, the pipeline is required to 'split' into two separate lines. With a carbon steel pipeline this requires a HAGI, but with a PE pipeline this can be achieved by use of a simple 'T' junction. This junction can be incorporated into the pipeline underground, with no need for any above ground equipment. The St Helens HAGI has therefore been removed from the Project (**Figure 6.17**).

6.4.43. The removal of the St Helens HAGI has allowed the Greengates connection to be reconfigured, resulting in a reduction in the Draft Order Limits in this area. Further discussions have also taken place with Glass Futures and a revised connection point further east within its site has been identified. This would provide an appropriate connection to the business while also avoiding land in the west of the holding with could have future development potential. A route has therefore been identified around the north west corner of the land.

### *Assessment and Conclusions*

6.4.44. The removal of the St Helens HAGI removes both construction and operational phase impacts from the Project relating to this HAGI. The pipeline connections required will be very similar to the original design and therefore there will not be any substantial, additional impacts arising. In addition, the routeing of the connection lines has been amended to avoid attenuation ponds and potential future development plots.

### *St Helens Spur*

6.4.45. At Stage 2 Statutory Consultation, the Preliminary Order Limits included the main pipeline of the North Corridor running from the Central Hub to the St Helens HAGI, located near to the northern extent of the Project. The St Helens Spur then provided connections from the St Helens HAGI to Pilkington UK's Greengate Works and Glass Futures. With the removal of the St Helens HAGI, the pipeline route from the Clock Face HAGI to Pilkington UK's Greengate Works and Glass

Futures has now become the St Helens Spur. The Clock Face Spur (running from the Clock Face HAGI to NGF Europe Ltd will remain and share a route with the St Helens HAGI to Chapel Lane, where the two spurs branch away from each other). No other changes (other than that described above regarding the removal of the St Helens HAGI) are required for this naming change.

## St Helens Spur: M62 crossing

### *Description and Rationale*

6.4.46. North of the Clock Face HAGI, the Pipeline crossed the M62 and then turned west before following the eastern side of the St Helens Linkway as it headed north (**Figure 6.18**). Additional work on this route section found that it would need to make two crossings of the existing water pipelines north of the M62. The proposed amendment would see the Draft Order Limits cross School Lane further to the north-east in order to remove the need for these crossings.

### *Assessment and Conclusions*

6.4.47. The proposed amendment would remove the need for two pipeline crossings of the water pipelines, making the construction process simpler. The proposed amendment would also move the pipeline away from a Tree Protection Order located in the corner of the M62 / St Helens Linkway junction. The amendment would cross a public footpath but it is expected that access could be maintained by appropriate management measures, or a short diversion could be made towards School Lane. It would also take the works closer to three residential properties on School Lane. It is considered that amenity effects on these properties would increase in significance as a result, although the Applicant's commitment to a Construction Environmental Management Plan would ensure that the potential for effects is minimised.

## St Helens Spur: Sherdley Road

### *Description and Rationale*

6.4.48. The proposed pipeline would be routed along Sherdley Road (**Figure 6.19**). The POL provided at Stage 2 Statutory Consultation included for land alongside the highway to be used as a construction compound(s). The Draft Order Limits include both the highway junction of Sherdley Road and Elephant Lane and the side road which provides access to properties facing Sherdley Road. It also includes land to the north of the Elephant Lane junction, which is planted with trees. It is not the intention to use highway land for the purposes of siting construction equipment and these areas have been removed from the Draft Order Limits.

### *Assessment and Conclusions*

6.4.49. The reduction removes highway land, and potentially front gardens from the potential to be used as a construction compound. This has environmental benefits in that it maintains access to homes, moves the potential compound further away from homes (noise and air quality effects reduced). Whilst some land with street trees has been removed there remains part of a street frontage area that has been retained with trees. These trees will need to be protected and fenced to prevent materials being stored against them. The visibility splay at the junction with Elephant Road will also need to be maintained.

## Clock Face Spur, Chapel Lane

### *Description and Rationale*

6.4.50. Within the Preliminary Order Limits, the connection to NGF Europe Ltd was deliberately routed through the fields to the west of Chapel Lane due to the presence of utility lines running beneath Chapel Lane (**Figure 6.20**). The landowner of these fields has requested that pipeline runs within the highway, rather than through the fields. The Draft Order Limits have therefore been amended to include the highway, however the fields to the west have been retained in case the utilities present do prove too much of a constraint to pipeline construction.

### *Assessment and Conclusions*

6.4.51. Chapel Lane is bordered on both sides by trees protected by a Tree Preservation Order. If the pipeline runs through the fields to the west, it would be possible to avoid the trees, although the point where the pipeline meets Lea Green Road has limited space available. If a route along Chapel Lane is available then the pipeline could follow the highway along Chapel Lane, and into Lea Green Road, and any impacts on the trees should be avoided. However, the number of utility lines already in place in the highway in this location may make it difficult to find a route along the highway land. A wide corridor at this point which encompasses both the highway and the fields to the west is therefore included within the Draft Order Limits.

## North Corridor Options

6.4.52. At Stage 3 Statutory Consultation, the following optionality exists within the North Corridor:

**Table 6.2 North Corridor Options**

| Option | Description |
|---|---|
| **Higher Walton HAGI**<br>Two options exist at Higher Walton for the HAGI, due to landowner concerns over option HWH2. The Stage 3 Statutory Consultation will ask for options about the two options, with the responses, plus the ongoing discussions with the landowner and any further design/assessment work being used to determine the final HAGI location. | |
| **HWH2** | HWH2 is located on the North bank of the Manchester Ship Canal, on Birchwood Road. It was identified as the preferred location for the Higher Walton HAGI at Stage 2 Statutory Consultation but subsequently it was identified there was a valid planning permission for a port related development on the land. Other than this planning permission issue, the site is considered to remain a good choice from an environmental, construction and operational perspective. |
| **HWH8** | HWH8 has been prepared as an alternative option to HWH2 for Stage 3 Statutory Consultation. It is located on the south bank of the Manchester Ship Canal, on agricultural land to the north of Mill Lane. |
| **Warrington Spur: Higher Walton HAGI to Morley Common**<br>From either of the two Higher Walton HAGI options, two options then exist to reach Morley Common and the rest of the Warrington Spur to Novelis. The Stage 3 Statutory Consultation will ask for options about the two options, with the responses, plus any further design/assessment work being used to determine the final HAGI location. | |
| **Birchwood Lane** | The Birchwood Lane option runs to the north west of the West Coast rail line, through the edge of the Moore Nature Reserve. It then passes under the rail line along Eastford Road to Morley Common. |
| **Morley Common** | The Morley Common option would run to the south east of the West Coast rail line, along the boundary of the Ingevity chemicals site, and then across the north west edge of Morley Common to reach Eastford Road. |
| **Warrington Spur: East of Chester Road**<br>On the Warrington Spur to Novelis, there are two options presented from Chester Road, running east. The Stage 3 Statutory Consultation will ask for options about the two options, with the responses, plus any further design/assessment work being used to determine the final HAGI location. | |
| **WSp1** | WSp1 would run in the highway along Gainsborough Road, from its junction with Chester Road to a point near Irwell Road. The option is most direct route for the Spur but would have a greater impact on Gasinborough Road which serves greater traffic numbers than option WSp2. |

| Option | Description |
|---|---|
| **WSp2** | WSp2 would run from Chester road, across a short stretch of open space to meet Cranborne Avenue. The Spur would then run along Cranborne before joining Gainsborough Road near Irwell Road. The option would remove the need for highways work on the busier Gainsborough Road, but would run along quieter residential streets, with potential for greater impacts on residents. |
| **True Fit Golf Course**<br>Two options exist to cross True Fit Golf Course, due to differing impacts at construction and operational stage from the two options. Direct discussions with the golf club owners have been delayed and are due to take place in Autumn 2024. The results of these discussions, along with responses to the Stage 3 Statutory Consultation and any further design/assessment work being used to determine which option to select. | |
| **NP6** | NP6 would see the pipeline routed outside of the northern boundary of the golf course but would require land within the golf course to be used during the construction phase and an easement to be created to allow access during the operational phase for any required repair/maintenance activities. that may be needed. |
| **NP7** | NP7 would see the pipeline routed through the golf course, which is likely to create a greater construction impact on the course than NP6. However, the pipeline would run alongside an existing pipeline for which there is already easement agreement sin place. Once operational, the potential impact of the easement arrangements on the golf course would be very similar to the existing situation. |

## 6.5. East Corridor

6.5.1. The pipeline in the East Corridor maintains its general route from previous stages of the design evolution, running north east from the Central Hub, crossing the M6 near Moss Lane and the M56 to the north of High Legh. The East Corridor then runs in a generally north direction to Partington. The Draft Order Limits described below for the East Corridor are shown in **Figures 6.1 and 6.2** and in more detail in **Appendix B**.

6.5.2. Design changes within the East Corridor which have resulted from consultation or from further environmental or technical work are identified below.

## East Block Valve Installation

### *Description and Rationale*

6.5.3. Due to the length of the pipeline along the Eastern Corridor, from the Central Hub to Warburton HAGI, a BVI is required to allow isolation of different parts of the pipeline for maintenance or repairs. Three options were presented in Stage 2 Statutory Consultation: EBV1 at Moss Lane, EBV2 on the south side of the A50 and EBV3 on the north side of the A50 (**Figure 6.21**).

6.5.4. EBV3 has been selected as the preferred option to take forward.

### *Assessment and Conclusions*

6.5.5. EBV1 and EBV2 would be located in a higher soil quality location (Agricultural Land Classification (ALC) Grade 2) compared to EBV1. EBV3 is located on the boundary of Grade 2/3 and soil surveys undertaken indicate that it would be possible to locate EBV3 on Grade 3 land. EBV2 and 3 would require slightly more land take, being set back into the fields due to the need for trenchless crossing compounds for the pipeline to cross under the A50. However, the soils at EBV1 have more potential to include peaty soils, which could create stability issues and are potentially of greater ecological and historical importance. EBV1 is also located slightly closer to the nearest residential property (at 265m) than EBV2 or EBV3 (both around 300m) and would require access off Moss Lane, a 4m wide single lane road which would be less suitable for HGVs. EBV2 and EBV3 could both take access from the A50, a two lane, 8m wide A-road.

6.5.6. Comments received from Stage 2 Statutory Consultation raised concerns over the Moss Lane access for EBV1 and that it was considered by some to be a more open countryside location than EBV2 and EBV3. Concerns were however also raised over EBV2 and EBV3 due to potential impacts on properties in High Legh and more generally that it was thought that built development was unsuitable in rural locations. The whole of that part of the Project which crosses Cheshire East Council, including the three BVIs locations lies within the Green Belt.

6.5.7. As there is a need for a BVIs in this general location, and the pipeline by necessity focuses its route on rural areas where possible, the development of a BVIs in an open countryside location is unavoidable. Whilst there are both positives and negatives to the three options, the potential access constraints imposed by Moor Lane and the higher soil quality mean that EBV1 is less appropriate to take forward. Of Options EBV2 and EBV3 it is the latter which has been selected because of the potential to site it on lower grade agricultural land.

## Partington HAGI

### *Description and Rationale*

6.5.8. Due to a need to realign the proposed route to accommodate potential housing development allocated within the Carrington Masterplan, a minor increase in land has been added to the Draft Order Limits on the approach to the Partington HAGI (adjacent to Sinderland Road) has been introduced. This minor change moves the pipeline from the centre to the edge of agricultural fields. As these fields form the boundary of future development parcels the movement to the edge avoids undue restrictions on any future housing developments in this area. The Draft Order Limits has been reduced in adjacent areas to support the slight change to the route (**Figure 6.22**).

6.5.9. A new access road is required from the A6144 Manchester Road (near Carrington Gateway) to the Partington HAGI to avoid conflict with the proposed development of commercial warehouse units at Voltage Park in this location. Access may also be possible via the proposed Voltage Park access road (depending on the construction timescales for that scheme) and this has been added to the Draft Order Limits as well. If the Voltage Park access road is developed first, the proposed Carrington Gateway access would not be needed.

6.5.10. Two options are now presented for the location of the Partington HAGI. Option PH1 is located to the west of the HAGI location proposed at Stage 2 Statutory Consultation, to the site of a previous gasholder. This is to reduce the potential for it to affect landowner proposals for re-development on adjacent land. Option PH2 has been introduced to the Project, located on land, which was outside of the previous Preliminary Order Limits, to the east of Sinderland Road.

6.5.11. In addition to the above the spurline connection to SAICA has been removed as this customer has decided not to use hydrogen in its processes.

### *Assessment and Conclusions*

6.5.12. The minor increase adjacent to Sinderland Road would see the pipeline run through an area of existing trees and close to a former building which is noted within the Historic Environment Record (HER). However, the pipeline cannot be located any further to the east due to the presence of electricity infrastructure in these fields, and it has to move from the west due to the land being part of a housing allocation in the Places for Everyone Plan. The impacts on the trees and historic record are not considered to be significant and could be mitigated.

6.5.13. The proposed new access road via Carrington Gateway would utilise existing roads on the business park and then existing internal access roads. Some upgrading works may be required which could result in the loss of localised vegetation, however this is not expected to be significant. The potential use of the Voltage Park access road would utilise a road that is already approved under a different permission.

6.5.14. Environmental effects as a result of the changes listed above are considered negligible with mitigation in the form of documents such as the CEMP and a commitment to pre-construction surveys assumed for work close to trees. Overall however the reduction to the width of the Draft Order Limits resulting from the choice of route in this location has seen a reduction in the amount of land required. This reduction, which minimises the amount of woodland and agricultural land potentially affected, is positive.

6.5.15. The movement of the Partington HAGI is required to avoid the planned development of warehouses on this site, and this development, together with existing pipelines running through the land, restricts the land available in the area in which to site the HAGI. The proposed location of Option PH1 is the site of a former gas holder, which following demolition, has seen the void left fill with water and the surrounding land populated by scrub. The vegetation and water would be lost as a result of siting the HAGI in this location but this is not expected to be of any ecological value. It is understood that the site of the former gas holder was the subject of basic remediation but that there is the potential for any contamination remaining to be disturbed. Mitigation measures in the form of site investigation prior to commencement of development followed by works to remove and treat contamination would be required. Option PH2 would be located on greenfield land, outside of the boundaries of any of the nearby planning permissions. However, as a greenfield site it is more sensitive from an environmental point of view, with potential issues from ecology, soils, landscape and flood risk. It is however considered that these issues are relatively minor and could be managed with appropriate mitigation measures.

6.5.16. The removal of the spurline to Saica would have neutral environmental effect in that it would remove the requirement for works beyond the Partington HAGI and in proximity to the Partington Trail Nature Reserve.

## East Corridor Options

6.5.17. At Stage 3 Statutory Consultation, the following optionality exists within the East Corridor:

**Table 6.3 East Corridor Options**

| Option | Description |
|---|---|
| **Partington HAGI**<br>Two options exist at Partington Walton for the HAGI, due to development pressure in the local area and uncertainty over the ground conditions on option PH1. The Stage 3 Statutory Consultation will ask for options about the two options, with the responses, plus any further design/assessment work being used to determine the final HAGI location. | |
| **PH1** | Following the Stage 2 Statutory Consultation, responses indicated that the Partington HAGI location which had been identified as a preferred location could impact on proposed development in this area. PH1 was subsequently identified as being outside of the proposed development |

| Option | Description |
|---|---|
| | area. The PH1 site is previously developed land, but would be quite tightly confined by proposed adjacent development, and as a former gas holder site, the ground conditions are yet to be fully determined. |
| **PH2** | PH2 has been prepared as an alternative option to PH1 for Stage 3 Statutory Consultation. It is located on greenfield, agricultural land to the east of Sinderland Road and north of Ashton Road, outside of the boundaries of any current planning applications for future development. |

## 6.6. South Corridor

6.6.1. The pipeline in the South Corridor maintains its general route from previous stages of the design evolution, running south from the Central Hub to cross the Trent and Mersey Canal and River Weaver / Weaver Navigation to the west of Bartington. It then continues south, running to the west of the A49, before crossing the A49 near Millington Lane and then continuing south east. The South Corridor will cross the A556 just to the east of Sandiway Golk Club before heading east towards Moulton and again crossing the River Weaver / Weaver Navigation. To the south of Moulton, the South Corridor will turn east, crossing the A583, River Dane, Trant and Mersey Canal and then the A530 to reach the HSF. The Draft Order Limits described below for the South Corridor are shown in **Figures 6.1 and 6.2** and in more detail in **Appendix B.**

6.6.2. Design changes within the South Corridor which have resulted from consultation or from further environmental or technical work are identified are identified below.

### Bartington and Trent and Mersey Canal crossing.

#### *Description and Rationale*

6.6.3. Consultation feedback identified concerns over stability of the canal embankment in this location owing to historic breaches of the Trent and Mersey Canal (**Figure 6.23**). Discussion subsequently took place with the owners and operators of the Canal, the Canal and Rivers Trust. Whilst the initial proposals of a micro-tunnel may still be appropriate, subject to additional ground investigation, the decision has been taken to include an option for a HDD trenchless crossing, allowing a longer and deeper crossing. This option would require a stringing area, which necessitates additional landtake and an increase to the Preliminary Order Limits presented in Stage 1 Statutory Consultation. The land would be required for a short period of time. This increased area is in agricultural fields to the west of Warrington Road/north of Weaver Vale Caravan Park, parallel to the A49 (Warrington Road).

6.6.4. Following a meeting with a landowner in this location, a further review of this addition has led to an optional route and crossing of the Trent and Mersey Canal being introduced to the Draft Order Limits to provide a route that would be further

away from the residential properties around the A49. This option, SP6, would split off from the original route (SP5) just south west of Dones View Farm and run in a south west direction, to the west of Herons Court. It would cross the Trent and Mersey Canal and then turn east to re-join the original route before it crosses the River Weaver/Weaver Navigation. Any HDD stringing that is required for SP6 would be able to be accommodated within the line of the route.

6.6.5. On the north bank of the River Weaver/Weaver Navigation is the Acton Dredging Tip which is an active dredging disposal site linked to the River Weaver (Navigation) and owned and operated by the Canal and Rivers Trust. Previously the intention was to microtunnel or HDD under the Weaver Navigation and emerge within the dredging site. The dredging site is used annually and is licensed by the Environment Agency to receive dredged material. Whilst the dredged material is unlikely to be contaminated significantly it has resulted in the creation of 'made ground' which could have stability issues. A HDD exit has therefore been proposed further north, which would remove the need to undertake work within the dredging site. This has not led to a requirement to increase the size of the working area but it has resulted in a minor amendment to the proposed limit of deviation across the Weaver Navigation and dredging site to provide the alignment necessary to terminate at the HDD exit described. The proposals would move tunnelling operations closer to some residential properties, which may increase some amenity impacts. The original HDD exit compound, plus options for microtunnelling, within the dredging area are therefore currently maintained in case future ground investigations work show the site can be worked without stability issues arising.

6.6.6. There is also potential for this alternative HDD exit site to be used for both HDD exits on SP5 (crossing of Trent and Mersey Canal and crossing of River Weaver). This would minimise land take requirements but may lead to a longer working period at this location.

### *Assessment and Conclusion*

6.6.7. Due to the proposed increase in land take on the original route (SP5), some additional environmental effects would result however these would all range between negligible to negative. The proposed stringing area would extend towards a range of buildings at Hill Farm but these buildings would screen the works from the farmhouse. The area within which the stringing would occur would also cross hedgerow and potentially cross an internal farm access track. However, should HDD be selected it would remove the requirement for a microtunnel and consequently for the use of land directly south and immediately adjacent to the existing residential property at Herons Court. Occupiers of this property would experience lower levels of noise, have more oblique views of the construction activities and generally be subjected to lower levels of disturbance. In conclusion, the very short-term construction impacts arising from HDD would be different but no greater than microtunnel. The inclusion of HDD as an option provides flexibility to allow the construction of the pipeline minimising damage to the Canal.

6.6.8. Option SP6 would see the pipeline, including HDD, further to the west of SP5. This route would pass through an area of woodland and close to a badger sett. It would be located further away from residential properties meaning that effects upon amenity should be reduced over SP5. The proposed HDD would exit north of the wooded area and providing sufficient depth is obtained, the trees should not be affected. The badger sett (active outlier) could be avoided by micro-siting the HDD to ensure that works are undertaken a sufficient distance away. Construction vehicle numbers would be similar for both options with access most likely taken from the A533 in the case of this option.

6.6.9. The alternative HDD compound proposed for the crossing of the River Weaver/Weaver Navigation is considered positive with regard to ground conditions in that it would avoid an area with potential for contaminated sediment and significantly reduce land instability issues associated with soft ground. Bringing the HDD closer to residential properties (albeit in the same location proposed for Option SP5) would bring activity closer to residential properties with the potential for additional negative effects in relation to noise and visual, potentially requiring mitigation. Other effects are considered negligible or neutral other than ecology which would be positive due to the fact that the dredging site includes an area of wet scrub habitat.

## Vale Royal Falconry Centre

### *Description and Rationale*

6.6.10. Responses received to statutory consultation stated that the construction of the proposed pipeline could affect the flying of birds and their accommodation at the Falconry Centre, groups and personal visits, plus equestrian activities. The centre-line for the pipe has therefore moved west and the Draft Order Limits reduced in relation to the flying area **(Figure 6.24**). The Vale Royal Falconry Centre is a registered zoo.

### *Assessment and Conclusion*

6.6.11. The proposed change would have a positive effect for the Peoples and Communities assessment given that it would reduce the potential effect upon business operations. The change is considered to give rise to negligible effects upon other environmental topics, with the exception of ecology and landscape. This is because the new proposed pipeline route would cross two hedgerows, including an additional hedgerow not previous crossed.

6.6.12. Engineering effects arising from the proposed changes are considered to be neutral.

6.6.13. Whilst the revised route would affect a second hedgerow it is considered that the benefits that would arise for the local business are such that the change to the should be taken forward.

## West of A49 near Bryn

### *Description and Rationale*

6.6.14. There is a minor increase to the Draft Order Limits to accommodate the required working width for the pipeline construction (**Figure 6.25**). This minor increase is located on agricultural land to the west of Grange Lane/Hefferston Rise, west of the A49, near Bryn. As presented at Stage 2 Statutory Consultation a pipeline centre-line to the Preliminary Order Limits would have resulted in the route passing through a wooded area and closer towards an existing overhead electricity line. Providing additional width to the eastern boundary of the POL provides the opportunity to place the pipeline further east, thereby avoiding the area of woodland and providing greater clearance to the overhead line.

### *Assessment and Conclusion*

6.6.15. The increase in the Draft Order Limits 20m to the east would be contained within the same field. This could result potentially in the pipeline being located 20m closer to residential properties off Hefferston Rise. The pipeline would still be approximately 70m from the properties and mitigation delivered through the CEMP should ensure that effects would not be significantly different from those that would be experienced without the change. Similarly, the Draft Order Limits would now extend 20m closer to the residential property on Grange Lane, reducing the distance to 130m.

6.6.16. There is a final property accessed by a private drive from Grange Lane. The pipeline would pass between it and the existing overhead line. The proposed changes provide a greater separation distance between it and the trees which adjoin its boundary and the construction activity associated with the pipeline.

6.6.17. As noted above, the key environmental constraints are existing trees which include category A, B and C and the proximity of residential properties. The proposed change is however unlikely to give rise to any environmental effects greater than those predicted at Stage 2 Statutory Consultation and provides greater flexibility to micro-site the pipe to avoid the constraints identified.

## Forest Hill Quarry / Littledale's Gorse

### *Description and Rationale*

6.6.18. The pipeline route in the vicinity of Forest Hill Quarry (**Figure 6.26**) has been amended in discussion with the quarry operator, CEMEX, in order to allow the pipeline to be developed without affecting the current, future quarry working plans.

6.6.19. The original route aimed to avoid the current, working quarry area However, this working area is reaching the end of its working life, and therefore will no longer be a constraint. The Draft Order Limits have therefore been amended so the pipeline runs to the west of the existing woodland at Littledale's Gorse and across the currently active quarry. This movement would be to the west of the quarry's existing parking/bagging and weighbridge which CEMEX may seek to retain in position whilst mineral extraction continues in the approved northern extension to

the quarry. The movement of the Draft Order Limits to the west of the woodland (from the east of the woodlands which was presented at Stage 2 Statutory Consultation), also keeps the eastern area free of the pipeline development. This land is identified within the Cheshire West and Chester Local Plan as both an Area of Search and a Preferred Area for future minerals extraction, so the removal of the pipeline from this area will remove any policy conflict.

6.6.20. North of the Mid-Cheshire Line (railway), CEMEX has planning permission for the northern extension of the Forest Hill Quarry. Preparation work is currently underway on this site as work is completed on the existing Forest Hill Quarry. The intention is that the pipeline will run to the east of the northern quarry extension, thereby avoiding any impacts on the Quarrying operations. However, depending on the timing of quarrying operations and the pipeline development, it may be that quarrying has been completed in the northern extension, which would allow the pipeline to be routed through this land. The Draft Order Limits and LOD have therefore been left wider here to allow the exact pipeline route to be confirmed depending on the progress of the quarrying operations at the time of pipeline construction.

6.6.21. A final change in the area around Forest Hill Quarry relates to work which has been undertaken to prepare the Outline Drainage Strategy. This indicates that a connection to the watercourse running to the north east of the proposed BVI site (near to the A556) should form one option of the strategy, the other being direct infiltration. This has necessitated an amendment to allow the Draft Order Limits to include a drainage corridor.

### *Assessment and Conclusion*

6.6.22. The routeing of the Draft Order Limits to the west of the Preliminary Order Limits would increase the distance between the pipeline and existing residential properties with beneficial albeit negligible benefits for noise. The Draft Order Limits would pass close to the end of Green Lane/Hunts Lane, which is recorded on the Historic Environment Record (although no direct effects would occur). Whilst there would be the potential to affect Category B trees this would have also occurred under the Preliminary Order Limit route. With the Draft Order Limits running alongside an existing hedgeline and the woodland, it will be important to ensure that a suitable stand-off distance is applied to ensure that canopies and root zones are protected.

6.6.23. The Draft Order Limits running through restored as opposed to original farmland is preferable for soils.

6.6.24. The Draft Order Limits proposed around the Mid Cheshire Line (railway) would result in a reasonable width of the Draft Order Limits to accommodate the crossing of the railway and to provide flexibility to avoid protected species. Cadent would also work with CEMEX to ensure that the timing of the pipeline construction took place following extraction of any mineral in this location. Such an approach would be positive and consistent with Cheshire West and Chester planning policy. From a ground condition viewpoint the preference would be to minimise interaction with restored quarry land to mitigate the potential for encountering backfilled waste, which may require mitigation during excavation. However, the possibility of this is

expected to minimal given this is a modern quarry, and there are no waste deposition proposals as part of the quarry restoration works. Historic environment effects are considered to be negligible. Whilst the Draft Order Limits would be closer to sensitive residential receptors on Weaverham Road, the temporary nature of the works means there is considered to be a negligible difference in effect overall.

6.6.25. The change to enable a drainage connection to the watercourse which runs east of the proposed BVI location would involve land within the same landownership. Environmental surveys have not identified protected species or habitats which differ from those elsewhere within the land parcel whilst the amended order limits are drawn to ensure a minimum 20m stand-off distance from trees.

6.6.26. In conclusion, the re-route will enable the quarry operator (and landowner) to continue future phases of extraction and has been discussed/agreed with in consultation with them. It is considered to be an appropriate engineering response and with embedded mitigation in place the environmental effects should be similar to those associated with the route consulted upon previously.

6.6.27. Whilst it may be possible to use infiltration to drain surface water at the BVI the changes allow for a suitable alternative arrangement, should this be necessary, and the connection points identified ensure a buffer to nearby trees.

## West Coast Mainline Route Crossing at Vale Royal and Eaton Lane

### *Description and Rationale*

6.6.28. An alternative route for the pipeline crossing the West Coast Mainline (railway) and River Weaver at Vale Royal has been identified (**Figure 6.27**).

6.6.29. Consultation responses that were received included requests in relation to option SP3 and SP4 to avoid the Vale Royal Abbey Golf Club and comment was also made with regard to the historic significance of Vale Royal Abbey and to the potential tree loss along the western bank of the Canal.

6.6.30. An engineering feasibility study was conducted to assess multiple routing options and the new option was selected as being preferable over the alternatives consulted upon previously. This is due to better constructability, lower technical risk and a shorter crossing, minimising cost.

6.6.31. Due to this change, the Draft Order Limits are located south of South Pipeline Option 1 (SP1) and north of South Pipeline Option 2 (SP2),which were presented in the 2022 PEIR and consulted upon at Stage 2 Statutory Consultation. The Draft Order Limits cross Whitegate Lane and then cross the River Weaver and West Coast Mainline to the east.

6.6.32. Related to the works necessary to facilitate a crossing of the River Weaver would be the use of Eaton Lane by construction vehicles. A number of consultation responses were received expressing concern over its use. This is because it is a public right of way, it provides vehicular access to farming and tourism-related businesses and, close to its junction with Hartford Road, it is bordered on both side by residential properties. At Stage 2 Statutory Consultation it was proposed

that 844 HGVs would use the Lane (Access SH-21) over a five month period. In response to comments received these vehicles have been redirected to use the A533 (Access SH-31) with instead one HGV delivery morning and evening proposed for Eaton Lane (maximum of 4 HGV movements per day). During HDD set up and removal it may be that proposals are made to increase this number, but this would be only undertaken with the prior agreement of the local highway authority and with advanced warning provided to local residents and businesses as appropriate.

### *Assessment and Conclusion*

6.6.33. The proposed route would avoid Vale Royal Abbey Golf Club thereby removing effects upon this business that may have otherwise arisen from previous options SP3 and SP4. It would also remove the need for any construction close to Vale Royal Abbey. There would be no tunnelling under the listed Vale Royal locks (options SP2) although the railway viaduct that it would pass under is listed as a Grade 2 listed building. Whilst the relocated pipeline would pass under an Ancient Woodland and a Local Wildlife Site (Heys Wood and the Riddings), it would be constructed using a trenchless technique and therefore be at depth to avoid any direct impacts. Environmentally the re-route is considered to have a mix of positive, negative and negligible effects over the options presented at statutory consultation and is considered to perform similar to the option which previously crossed under Vale Royal Locks. However, the proposed re-route is considered to be beneficial from an engineering perspective as it allows for more than one trenchless crossing technique to be considered.

6.6.34. The relocation of HGVs from SH-21 (Eaton Lane) to SH-31 (A533) would have positive environmental effects in relation to traffic and transport (reduction in potential for conflict between vehicles and pedestrians), noise and vibration, air quality and dust (removal of HGV traffic passing close by residential properties) and for people and communities (reduction in potential of disturbance to users of the PRoW and local businesses). Other environmental effects as a result of the change would be neutral or negligible with the exception of ecology because the previously proposed Right of Way used by construction vehicles accessing from SH-31 passes through a belt of trees (Jack Lane). Whilst physical effects upon these trees and any species within them would not change, the increase in the number of HGVs would have the potential to prolong or increase possible disturbance.

6.6.35. Due to the mainly positive environmental benefits associated with the change and the ability to mitigate traffic disturbance to ecological features, for example by operating within defined hours of operation, the change has been taken forward.

## South Block Valve Installation (BVI)

### *Description and Rationale*

6.6.36. At Stage 2 Statutory Consultation five alternative locations for a BVI were presented on the Southern Corridor (**Figure 6.28**). Four locations (SBV1-4) were in the A56/Sandiway area, with one location at Bostock. Responses received requested that the options to site a BVI on land at Sandiway Bank Farm (land south of the A556) be rejected. Representations were also received objecting to SBV5 such that it would interfere with current operations on the land and potential frustrate future development. United Utilities also raised the proximity of a main trunk water main to SBV2 and SBV3.

6.6.37. The chosen location for the BVI is SBV1. This would be located on land which has been previously quarried for soft sand (application no. 10/04021/MIN), and it would be located north of the A56. The site is well screened by trees from the A556 and from adjoining housing to the east. Access from the A566 would be via the existing site road which serves the wider Forest Hill Quarry. The site selected lies along the alignment of the former Chester to Manchester Roman Road although having been quarried, any archaeological value is unlikely to still be present. The chosen BVI site is the only BVI located within the Green Belt (the A556 forms the boundary), however the benefit of being able to use an existing vehicular access from the A556, is considered to be determinative in this instance and the relative scale of the BVI required.

### *Assessment and Conclusion*

6.6.38. The choice of SBV1 has been made over the other locations presented at statutory consultation. SBV2 would be located directly south of the A556 and would require a new access from the A566 which is a fast dual carriageway or from Whitegate Lane. SBV3 is located on agricultural land (provisional Grade 3). In common with SBV4 access would be from Whitegate Lane, which is shared by farms and residential properties. United Utilities also raised the proximity of a main trunk water main to SBV2 and SBV3. SBV4 is located within an arable field in close proximity to a seasonal pond and soil survey indicates the land is Grade 1. Soil surveys also indicate that SBV2 is Grade 3a whilst SBV1 is Grade 3a-4. SBV1 is located on land that has been previously quarried.

6.6.39. SBV3 is located to respond to South Pipeline Option 1 (SP1), which has not been taken forward. Hence SBV3 is no longer applicable for consideration.

6.6.40. Potentially each of the three BVI locations (SBV2-4) would be accessed from Whitegate Lane. This lane crosses the A556 via a road bridge and there is no direct access to it from the westbound A556 carriageway. Construction traffic would therefore need to access the lane either from the eastbound carriageway and A559 or from the westbound carriageway via Hartford or via the village of Whitegate to the south. Whilst Whitegate Lane is identified as an access point for pipeline construction, the number of vehicles using the Lane can be reduced should SBV1 be selected as an alternative to these options.

6.6.41. SBV5 is located near Bostock and significantly further east along the southern pipeline leg. Whilst it is not in the Green Belt and there are no over-riding environmental or technical reasons for its deselection landowner representations were received at Stage 2 Statutory Consultation objecting to the location proposed. Furthermore, the BVI would be located on land due north of an identified brine well and due east of a Prescribed Notice of Damage (subsidence) area. It is also agricultural land, provisionally Grade 3.

6.6.42. In conclusion, SBV1 has been selected as the BVI location. Located on land previously the subject of soft sand extraction it benefits from an existing access directly off the strategic highway network and would avoid loss of best and Most Versatile Agricultural land. Any buried archaeology is likely to have been lost during the sand extraction, whilst trees to the south and east provide visual screening. Whilst the BVI would be in the Green Belt (unlike the other SBVs) the Green Belt assessment concludes that harm would be Moderate to Limited. If consultees considered it necessary, the trees to the south and east could be supplemented with additional planting.

## South of Bostock Green

### *Description and Rationale*

6.6.43. An amendment to the route across Brook House Farm is proposed, which should reduce disturbance to farming operations (**Figure 6.29**). This alternative would include a new trenchless crossing of London Road, which has been introduced to minimise effects on vegetation and the Bostock Green Conservation Area. The Draft Order Limits therefore cross the A533 and then follows the south western and southern boundary of the fields. This ensures that land closest to the farm buildings, where the dairy herd is housed, remains free of construction activity.

### *Assessment and Conclusion*

6.6.44. The reroute of the pipeline along the southern boundaries of the fields would affect land of similar soil quality as that consulted upon at statutory consultation. The proposal to cross London Road by trenchless technique would lead to a greater level of soil disturbance in the fields although this would be offset by the lack of a requirement to excavate a trench. From a biodiversity, heritage and a landscape perspective the trenchless crossing the wooded London Road would prevent direct effects upon the trees. Micro-siting to avoid root protection zones will be required.

6.6.45. The proposal to cross London Road by trenchless technique will add cost to the proposal previously consulted upon. The previous and now proposed pipeline route and the wider area is also known to have been used for underground salt extraction. The location for the trenchless crossing is proximate to but outside a prescribed notice of damage area.

6.6.46. In conclusion, the relocation of the pipe would be beneficial to the operation of the business over the route consulted upon at Stage 2 Statutory Consultation. The addition of a trenchless crossing of London Road, whilst increasing cost would ensure that the ecological, landscape and historic features of the Conservation Area are protected.

### South Corridor Options

6.6.47. At Stage 3 Statutory Consultation, the following optionality exists within the South Corridor:

**Table 6.4 South Corridor Options**

| Option | Description |
|---|---|
| **Bartington**<br>To the west of Barrington, two options exist for the pipeline route between Northwich Road and the River Weaver. Option SP6 has been introduced following landowner discussions in this area. The Stage 3 Statutory Consultation will ask for options about the two options, with the responses, plus any further design/assessment work being used to determine the final route. | |
| **SP5** | Option SP5 represents the preferred route option that was identified at Stage 2 Statutory Consultation. It runs south from Northwich Road, passing between the residential property at Herons Court and the Weaverdale Park residential caravan park. It then turns to the south west to cross the Trent and Mersey Canal before reaching the River Weaver. The option would require a piece of land to the west of Hill Farm to provide a pipeline stringing area to facilitate the trenchless crossing of the canal. |
| **SP6** | Option SP6 would run in a south west direction from Northwich Road, passing to the west of the residential property at Herons Court before crossing the Trent and Mersey Canal. It would then turn to the south east to reach the River Weaver. |
| **Forest Hill Quarry (North)** | |
| The current extraction operations at Forest Hill Quarry will soon be ceasing, with works moving to an approved extension are to the north of the Mid-Cheshire rail line. Discussions have been held with the quarry operator, and a route has been proposed which would allow the quarry extension to be worked, and the operator to move on to potential further extraction areas and allow the pipeline to be developed and operated with no impacts for either projects. However, | |

## 6.7. Central Hub

### *Description and Rationale*

6.7.1. At the Stage 2 Statutory Consultation exercise, the Central Hub was shown with two HAGI options CHH1 close to the properties around Woodside Farm and CHH2 further north, between CHH1 and Marsh Lane (**Figure 6.30**). A wide corridor was identified around these options to allow for the routeing of the four main pipeline corridors and the Northwich Spur from the HAGI.

6.7.2. Following discussion with the landowner a request was made to undertake a minor amendment to the alignment of the western corridor as it approaches the Central Hub. This is to reduce the potential for conflict with the landowners future plans for the area immediately to the south west of the proposed Central Hub.

*Assessment and Conclusion*

6.7.3. CHH2 has been selected as the preferred HAGI location, due to it being more positive for ecology and noise (with fewer noise receptors in proximity), being located partly on and/or adjacent to an existing hard standing and being the preferred choice of the landowner when considering his existing commercial operations. CHH1 does have some benefits from being located close to existing buildings, due to a consolidation of built development providing screening and thereby reducing visual impacts when viewed from the A533 meaning that the likely degree of harm to the Green Belt would be Moderate to Limited. CHH2 is located some distance from roads and footpaths and whilst recording a Moderate degree of harm to the Green Belt it would not itself be seen easily by members of the public and both during its construction and operation, would be sufficiently distant to avoid the potential for effects upon the amenity of the existing residential farm properties.

6.7.4. It has been possible to narrow the width of the corridor around the Central HAGI following selection, as the pipeline routes into the HAGI have been confirmed and potential construction compounds relating to CHH1 are no longer required. Corridor width retained to the south of CHH2 is mainly for the associated construction compound and pipeline storage area.

6.7.5. The minor change in the alignment of the western corridor has resulted in a widening of the Draft Order Limits when compared with the Preliminary Order Limits. This widening allows for a straighter pipe route and potentially moves the pipe away from the landowners existing area of hardstanding. The widening does potentially affect an existing pond. There is however sufficient flexibility within the LoD to allow for the pond and adjacent trees to be retained. Given that the pond is located within Cheshire West and Chester it has not been surveyed for Great Crested Newts due to the use of district licencing within the authority. This approach has been agreed with Natural England.

## 6.8. Northwich Spur

6.8.1. The Northwich Spur had been proposed in order to supply a hydrogen customer at Tata Chemicals Europe in Northwich. Ongoing discussions with the customer have identified that their hydrogen supply requirements are now different from those originally identified, and as such it would not be possible to provide the Spur connection as part of the DCO application. The Northwich Spur (**Figure 5.18**) has therefore been removed from the DCO proposals.

## 6.9. DNO Connections

6.9.1. HAGIs and BVIs will require electrical power. The Applicant has been in contact with the relevant District Network Operators (DNO) to identify appropriate connection points. The DNO's indicate that all of the connections will be underground. For most HAGIs the connection points are located within the Preliminary Order Limits consulted upon at Stage 2 Consultation. Three locations are described below where the Draft Order Limits have had to be extended to accommodate the connection.

### *Partington HAGI*

6.9.2. Amendments to the Draft Order Limits would create an extension of circa 50m continuing the limits north along an existing internal service road to an existing substation (**Figure 6.22**). The entirety of the connection, from the Partington Substation to the existing substation, would be within or alongside the existing service road. The land is previously developed and the route of the pipeline would be immediately to the south of the consented planning application for the erection of five storage and distribution buildings at Voltage Park Manchester (97261/FUL/19).

6.9.3. The amendment responds to a connection to HAGI Option PH1. Should PH2 be taken forward, a connection location will be sought from the DNO.

### *Higher Walton HAGI*

6.9.4. Amendments to the Draft Order Limits are proposed to enable an electrical connection along the Port of Warrington access road (which was included within Stage 2 statutory consultation as an access road for the Project) but extended south along the internal service road and car park of an existing business to connect into an existing substation located within the car park (**Figure 6.11**). The connection could be placed within the service road.

6.9.5. The amendment responds to a connection to HW2. Should HWH8 be taken forward, a connection location will be sought from the DNO.

### *South Corridor SBV1*

6.9.6. The Draft Order Limits are amended to enable a connection circa 60m east of the Preliminary Order Limits proposed at Stage 2 statutory consultation to enable a connection to an existing power line (**Figure 6.28**). The connection may require a pole within the SBV1 site but outside it would be underground. The Draft Order Limits are extended to include land within the verge of the A556 and the turning head to a residential service road (the latter being the location of the connection).

### *DNO Connection Conclusion*

6.9.7. Each connection location has been identified in alignment with the advice provided by the DNO. Each connection would be delivered by an underground cable, meaning that environmental effects such as visual, noise and dust would arise during construction only and be of a short-scale, temporary nature.

# 7. Next Steps

## 7.1. Stage 3 Statutory Consultation

7.1.1. The Draft Order Limits have been subject to an assessment of environmental effects which is presented within the Draft ES. The information is included in the Stage 3 Statutory Consultation exercise to show consultees the development of design and the identified environmental impacts. Within this consultation the views of consultees on both the work undertaken to date and on the options that remain will be collected and analysed.

## 7.2. Final Route Alignment and DCO Submission

7.2.1. Following the Stage 3 Statutory Consultation exercise, the representations received from consultees will be reviewed alongside any ongoing engineering and environmental work to confirm whether any further refinements to the project design are required. The intention is to finalise the Draft Order Limits, to form the Final Route Alignment. This will be submitted as the proposed Order Limits as part of the DCO application. This is scheduled for submission in Spring 2025.

# Figures

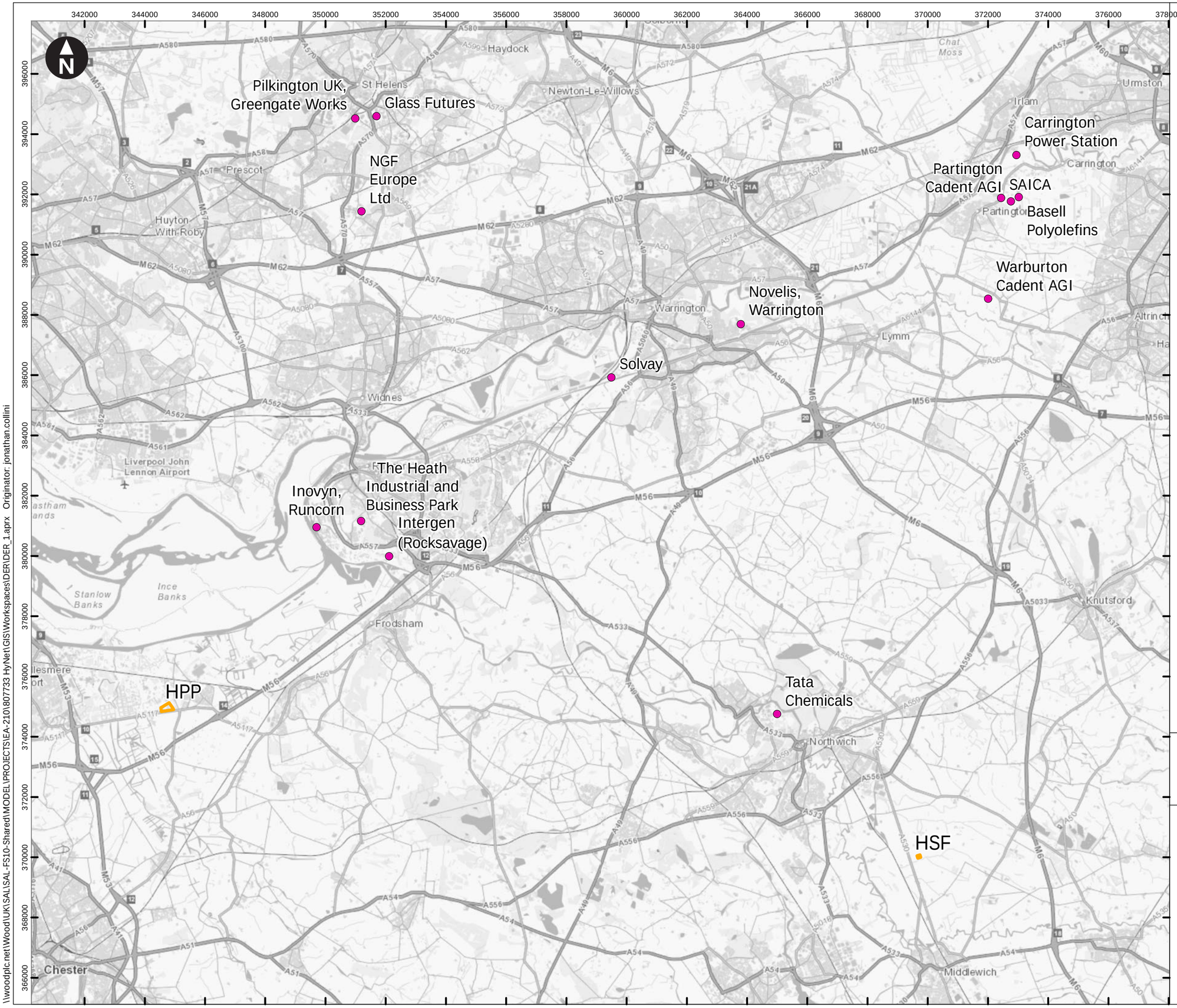


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Figure 1.1
Fixed Connection Points

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Key

**Option A**

0 1 2 3 4 5 Kilometers

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**Figure 3.1A**
**Strategic Option A**
**Sheet 1 of 4**

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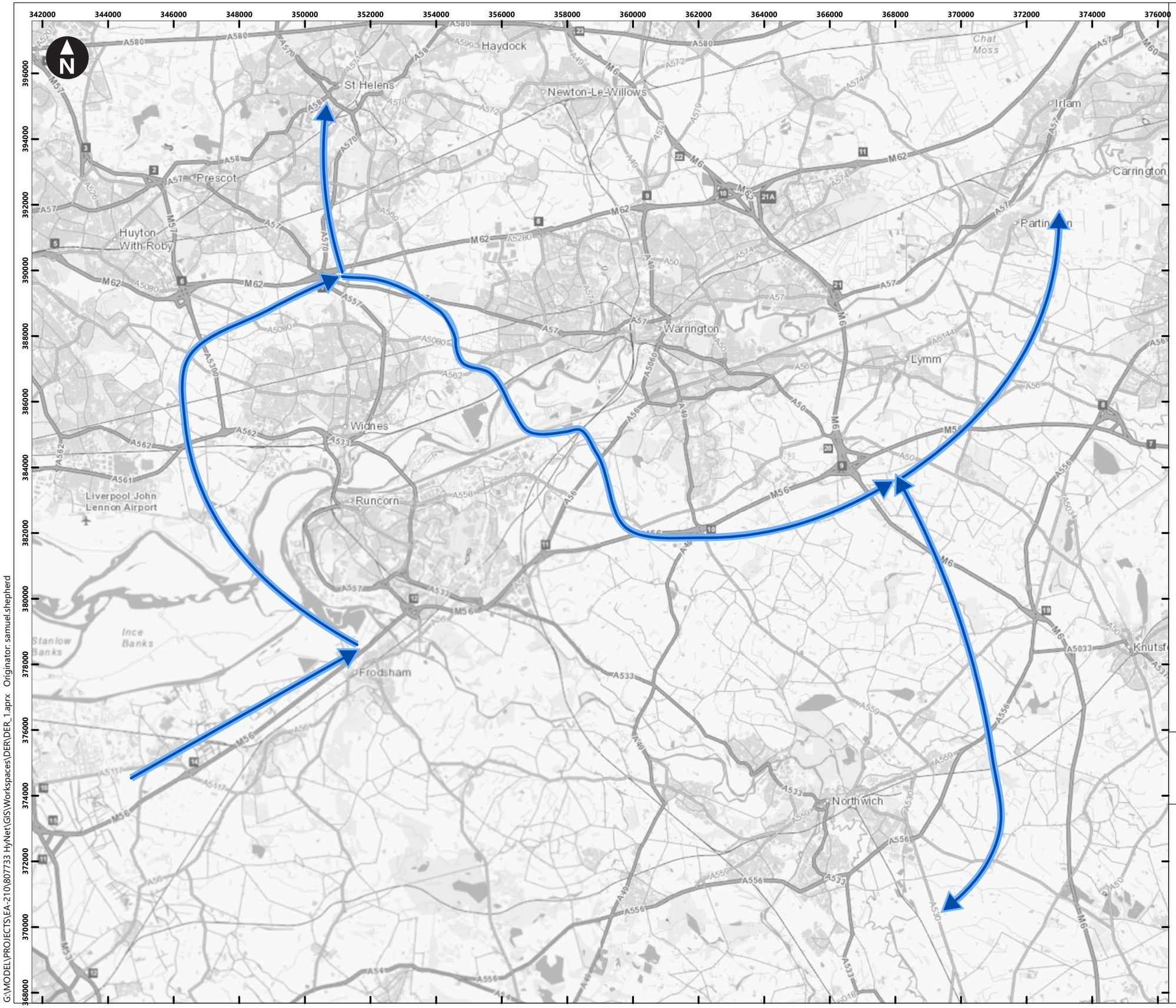


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**Option B**

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**Figure 3.1B**
**Strategic Option B**
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**Option C**

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**Figure 3.1C**
**Strategic Option C**
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**Option D**

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**Figure 3.1D**
**Strategic Option D**
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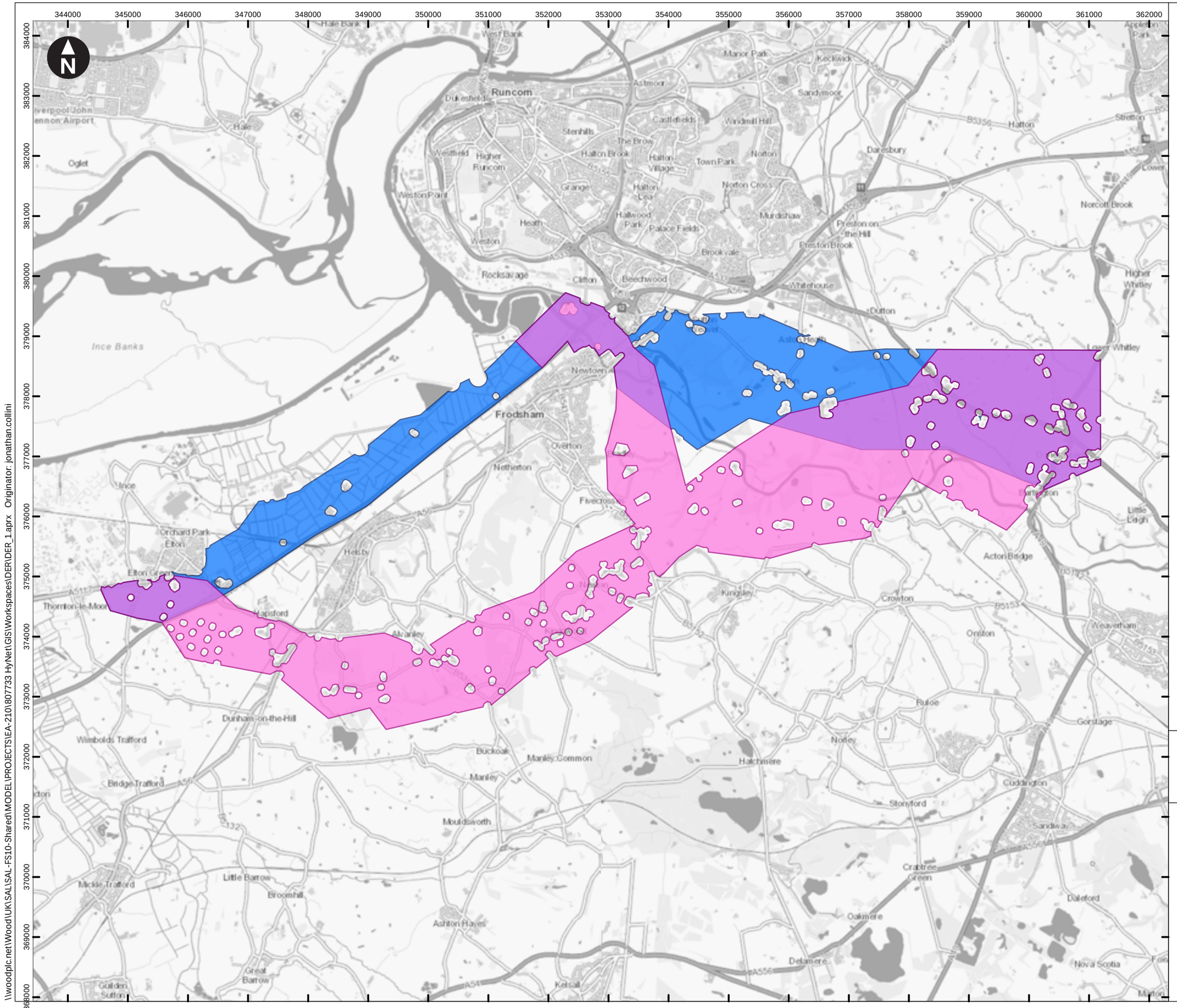
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Sandymoor
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Dukesfield
Stenhills
The Brow
Halton Brook
Halton Village
Town Park
Norton Cross
Murdishaw
Palace Fields
Brookvale
Whitehouse
Norcott Brook
Preston on the Hill
Stretton
Lower
Appleton Park
Halton
Weston Point
Grange
Halton Lea
Hallwood Park
Weston
Heath
Westfield
Higher Runcom
Oglet
Hale
Hale Bank
West Bank
Liverpool John Lennon Airport
Newtown
Overton
Netherton
Fivecross
Helsby
Elton
Elton Green
Orchard Park
Thornton-le-Moor
Lapsford
Alvanley
Kingsley
Crowton
Acton Bridge
Weaverham
Oulton
Ince
Little Leigh
Dunham-on-the-Hill
Wimbolds Trafford
Bridge Trafford
Buckoak
Manley Common
Manley
Mouldsworth
Hatchmere
Norley
Ruloe
Gorstage
Cuddington
Stoneyford
Sandiway
Crabtree Green
Daleford
Oakmere
Delamere
Nova Scotia
Middle Trafford
Little Barrow
Broomhall
Ashton Hayes
Great Barrow
Guilden Sutton
Kelsall
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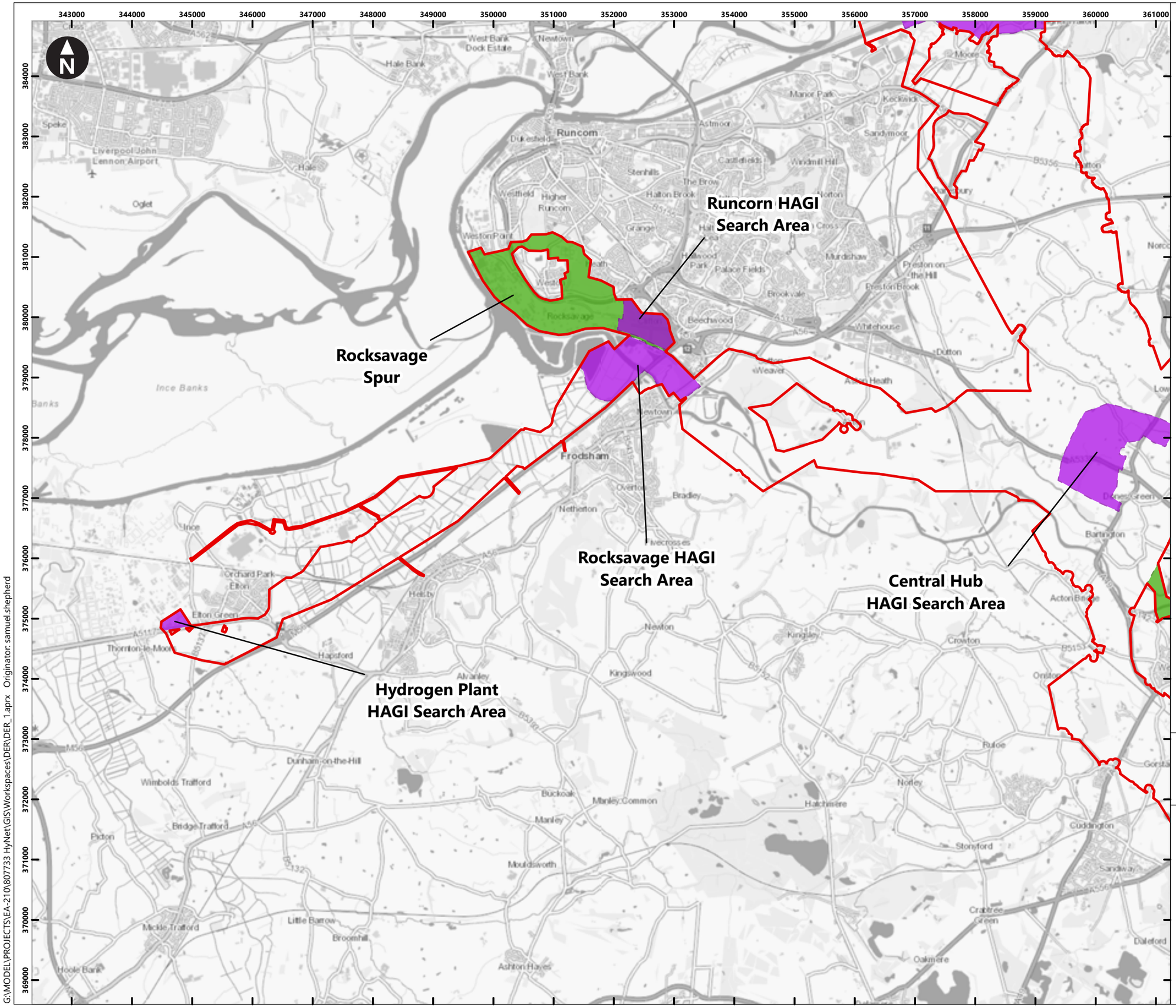


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**Figure 4.2**
**West Preferred Corridor**

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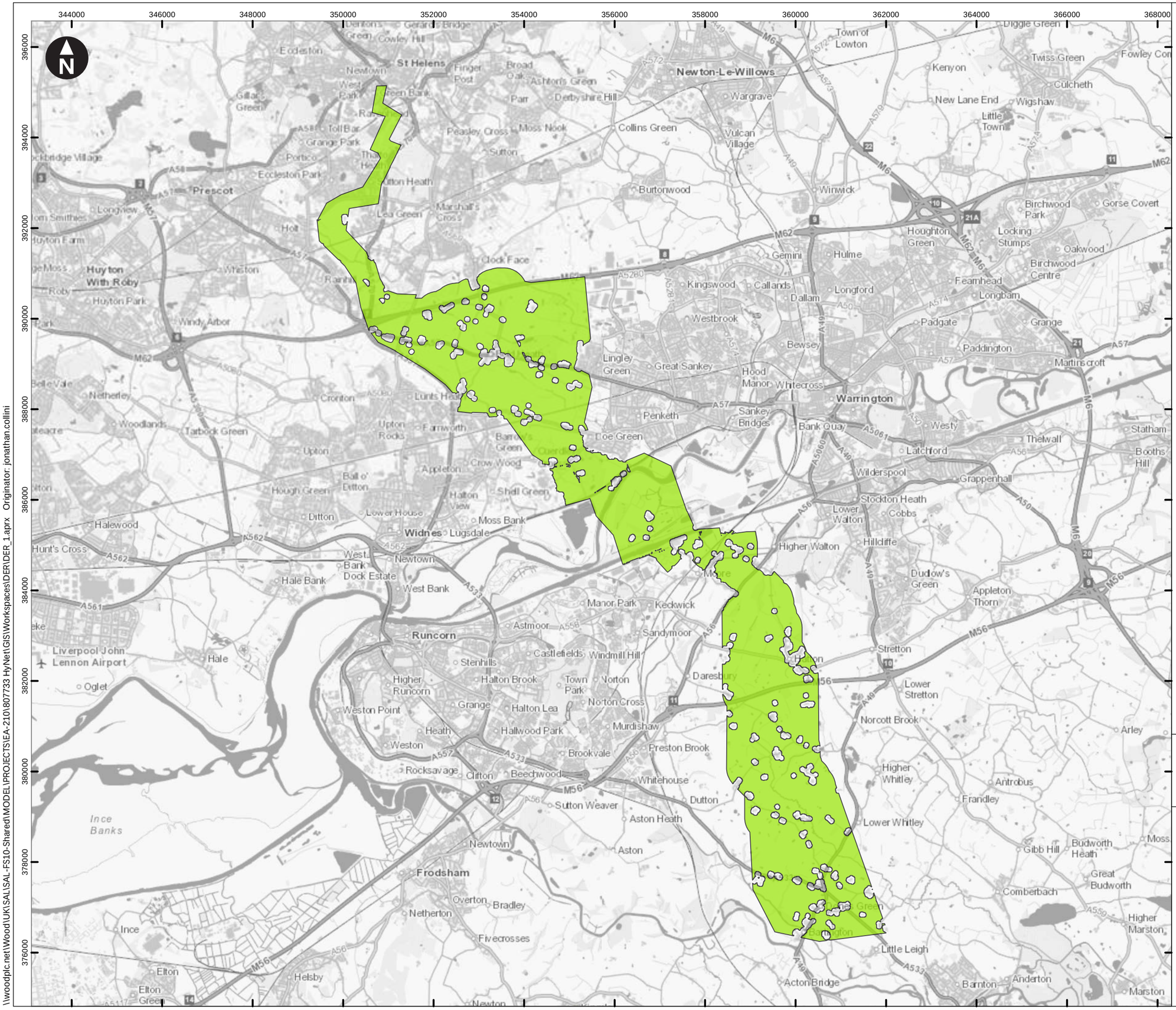


Key

North Corridor

0 1 2 3 4 Kilometers

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Figure 4.3
Initial North Corridor

September 2022

wood.

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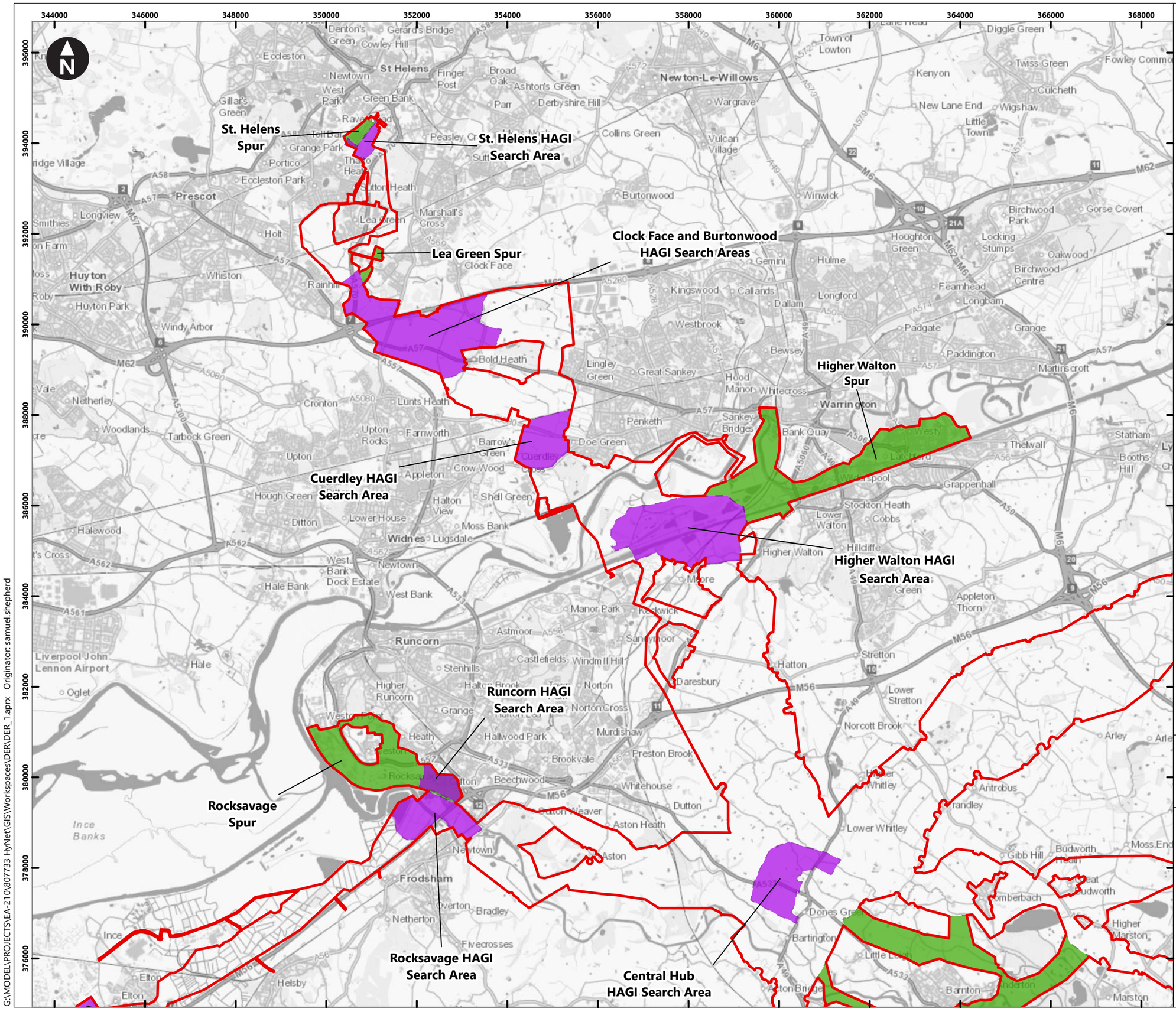


Key

- Preferred Route Corridor
- HAGI search areas
- Spurs to industrial users

0 1 2 3 4 Kilometers

Scale at A3: 1:80,000

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**Figure 4.4**
**North Preferred Route Corridor**

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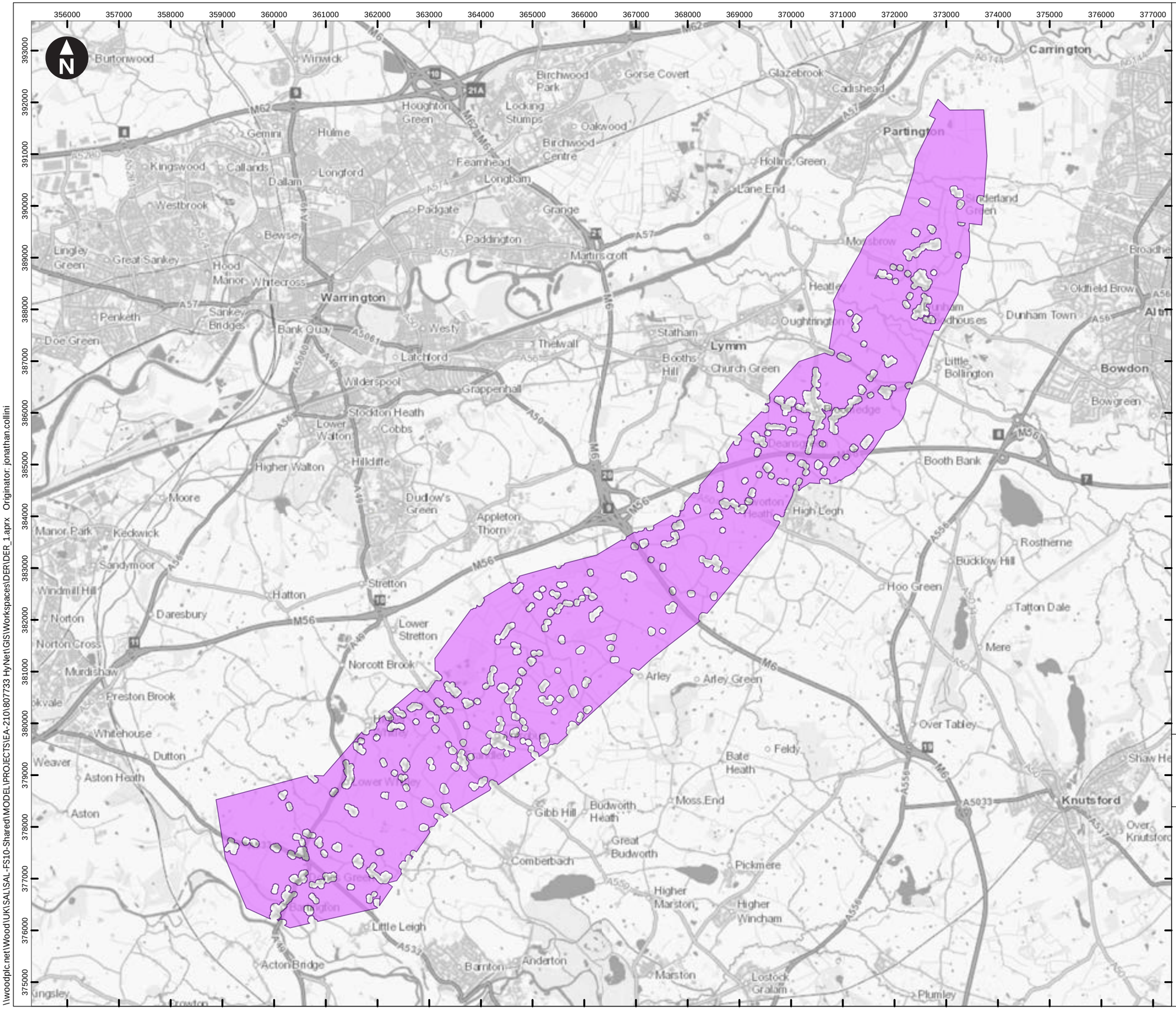
Key
East Corridor
0 1 2 3 Kilometers
Scale at A3: 1:70,000
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Figure 4.5
Initial East Corridor
September 2022
wood.
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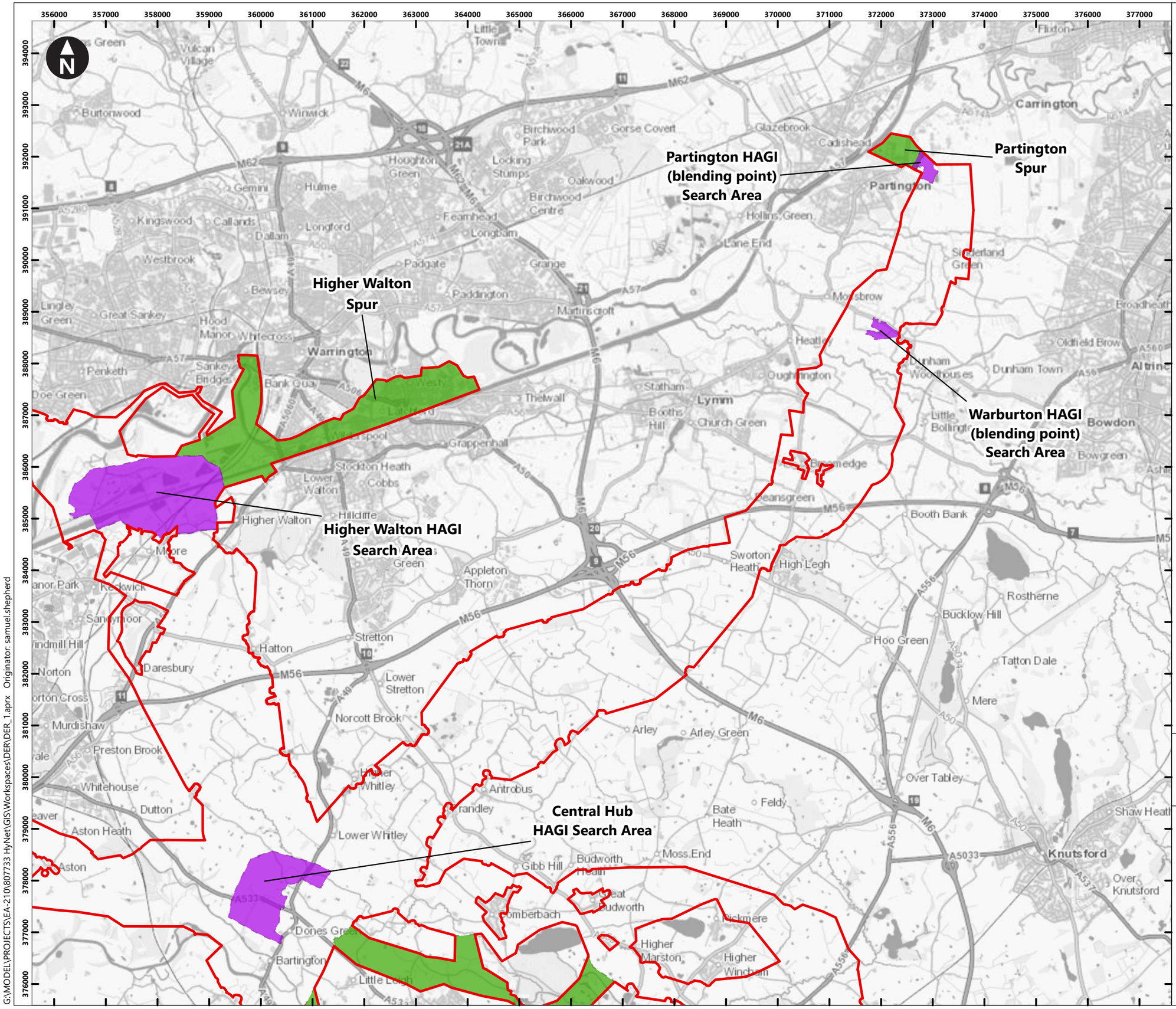


Key

- Preferred Route Corridor
- HAGI search areas
- Spurs to industrial users

0 1 2 3 Kilometers

Scale at A3: 1:70,000

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**Figure 4.6**
**East Preferred Route Corridor**

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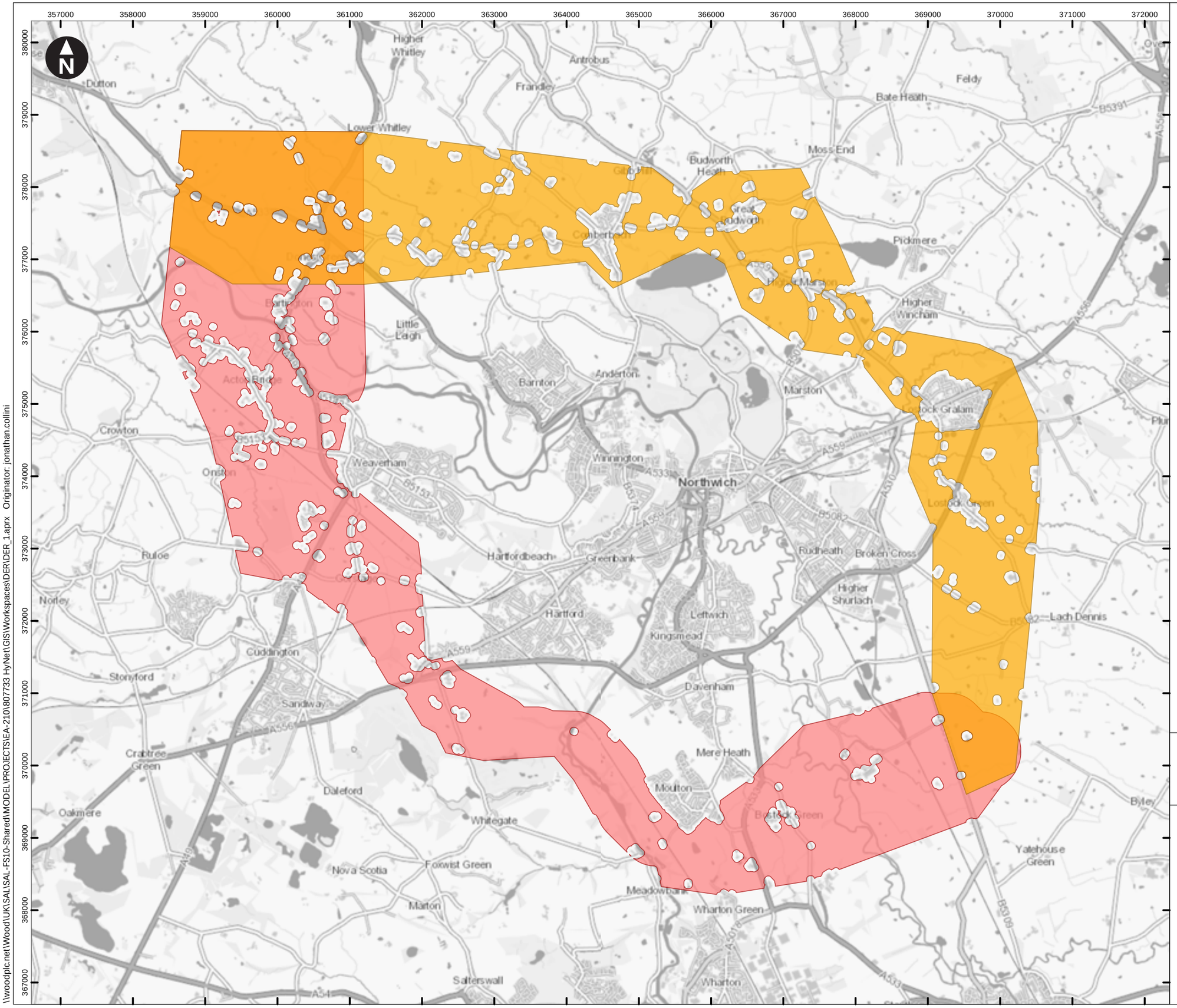


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Figure 4.7
Initial South Corridor Options

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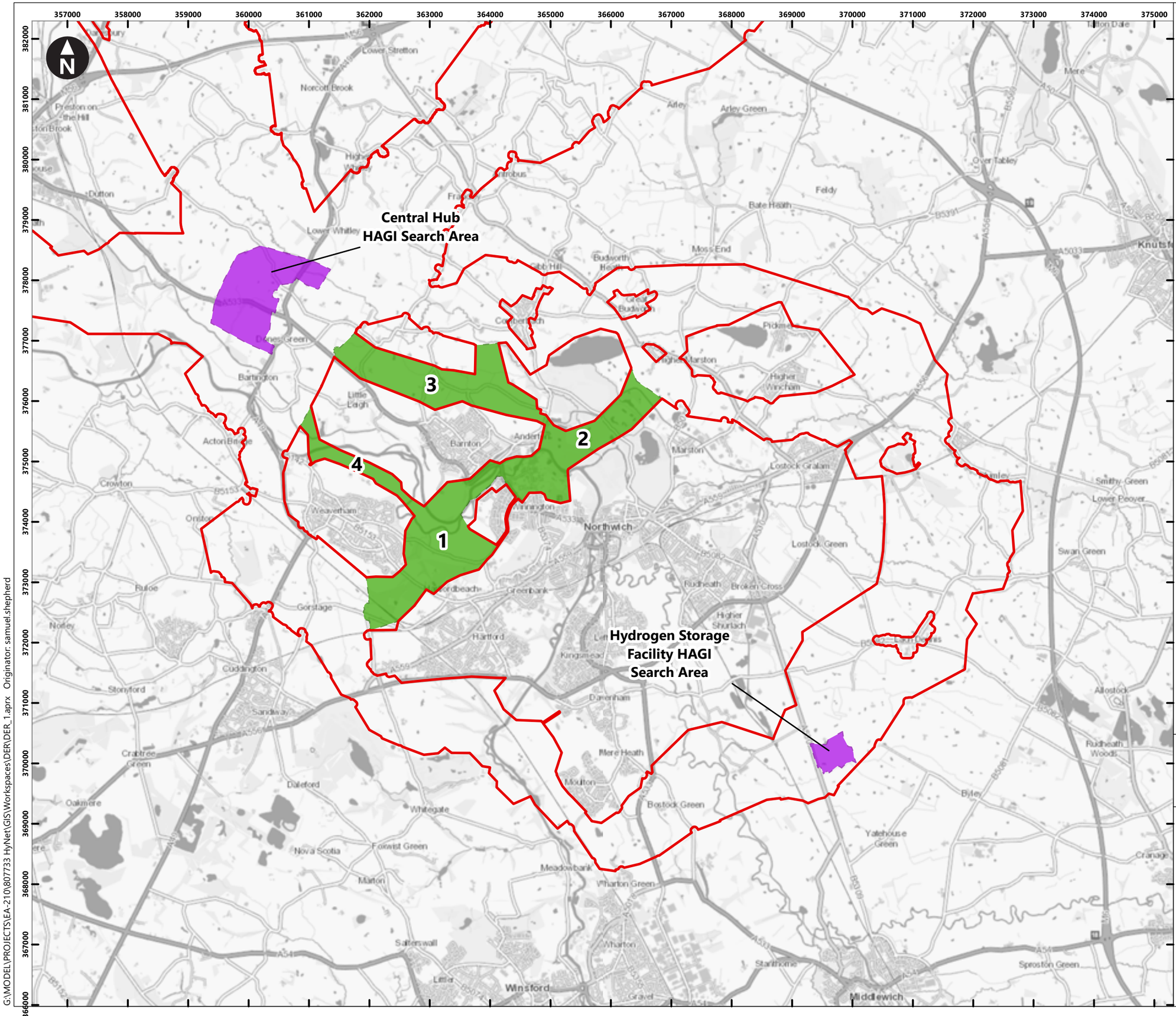


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**Figure 4.8**
**Preferred South Corridor Options**

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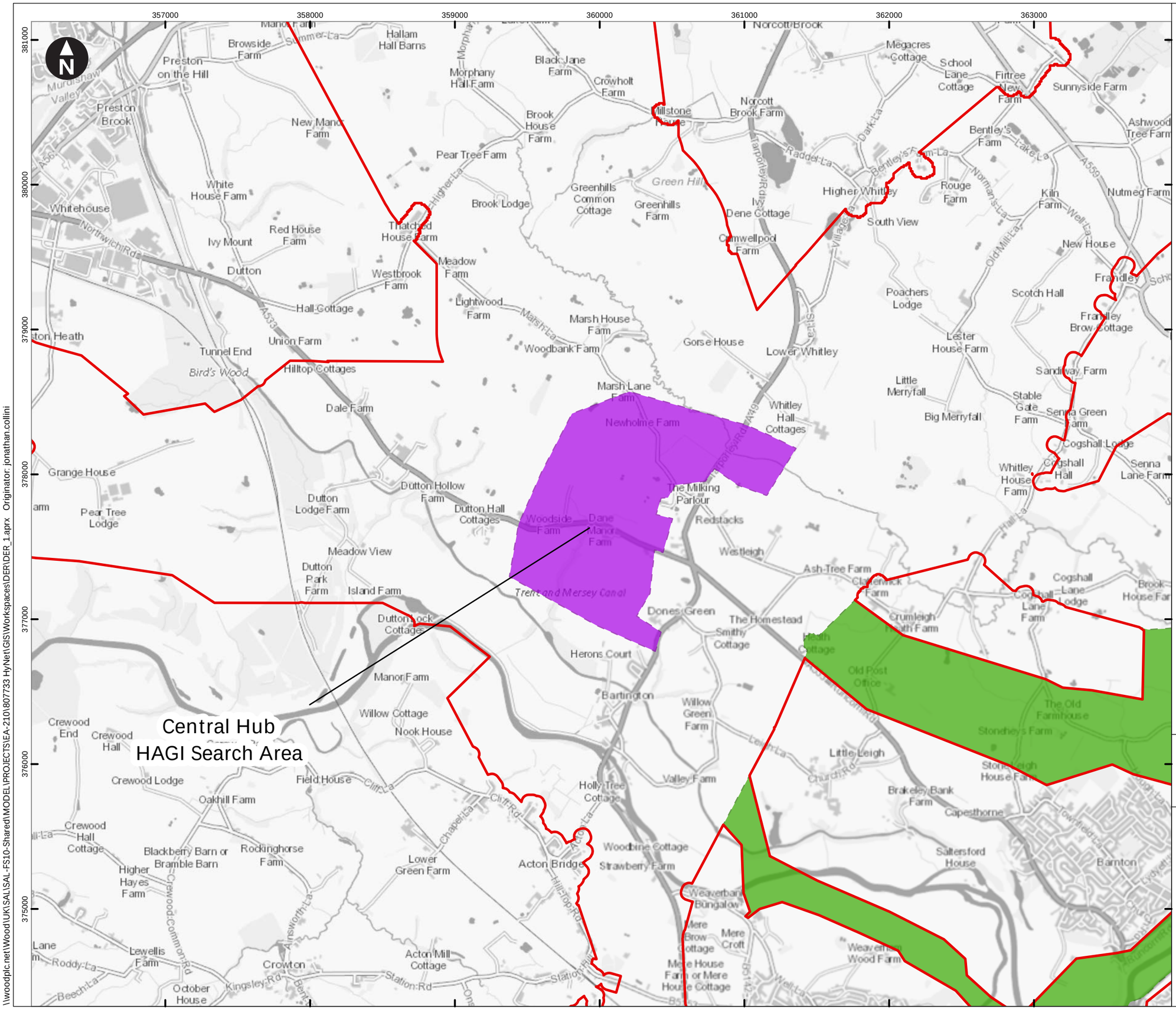


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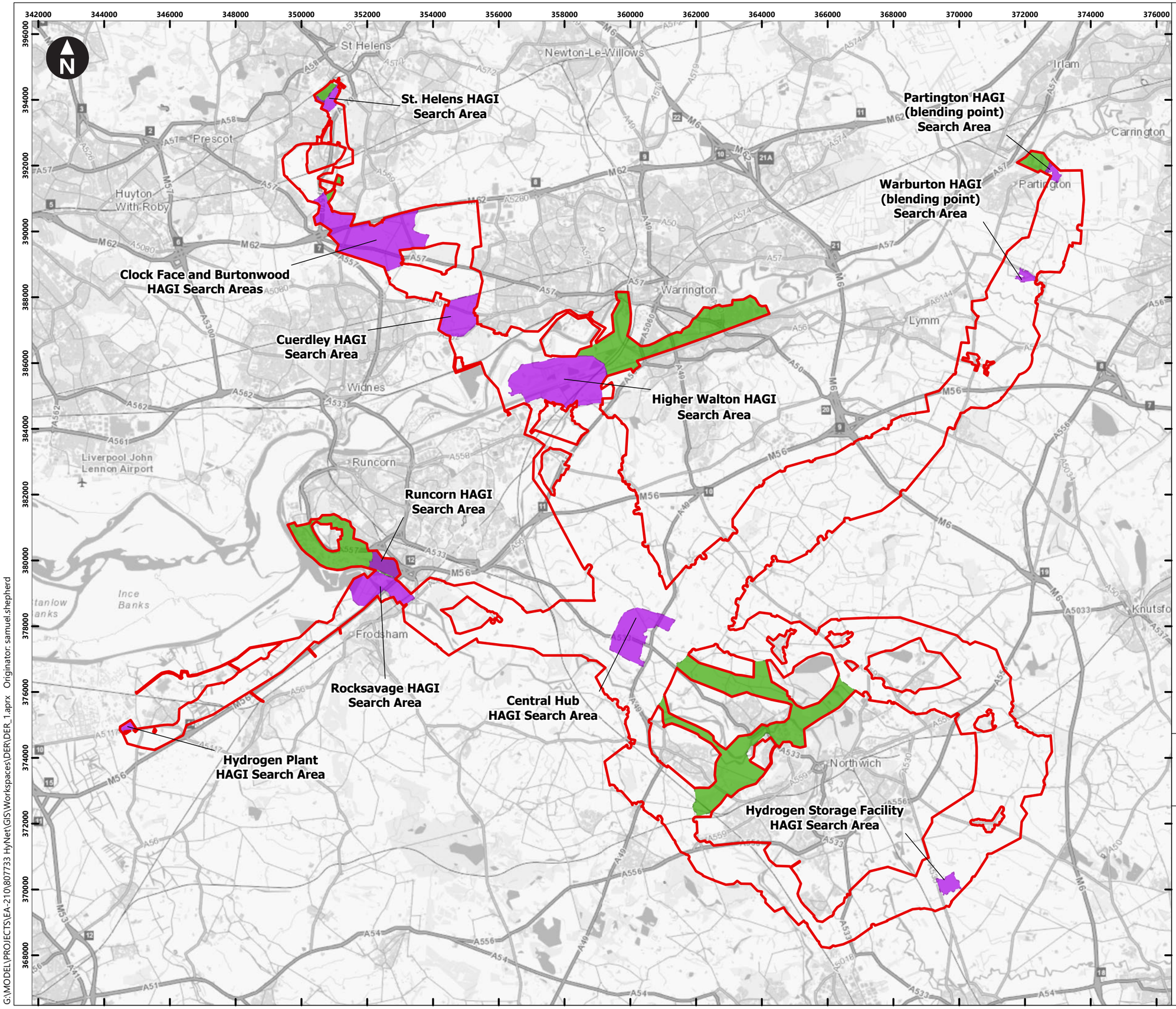


Key

- Preferred Route Corridor
- HAGI search areas
- Spurs to industrial users

0 1 2 3 4 5 Kilometers

Scale at A3: 1:110,000

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**Figure 4.10**
**Preferred Route Corridors**

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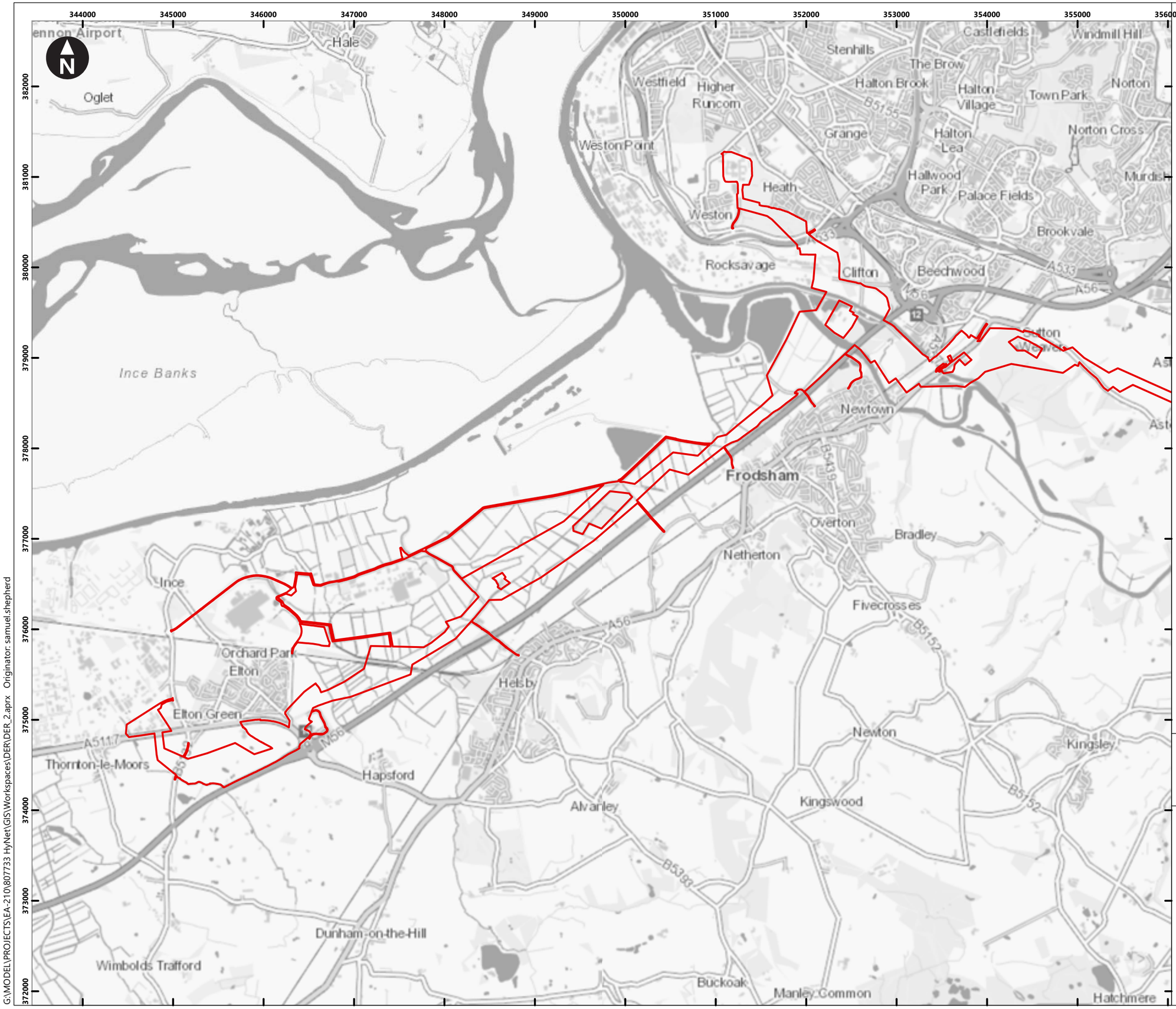


Key

Preliminary Order Limits

0 0.5 1 1.5 2 Kilometers

Scale at A3: 1:40,000

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**Figure 5.1**
**West Corridor: Preliminary Route Alignment**

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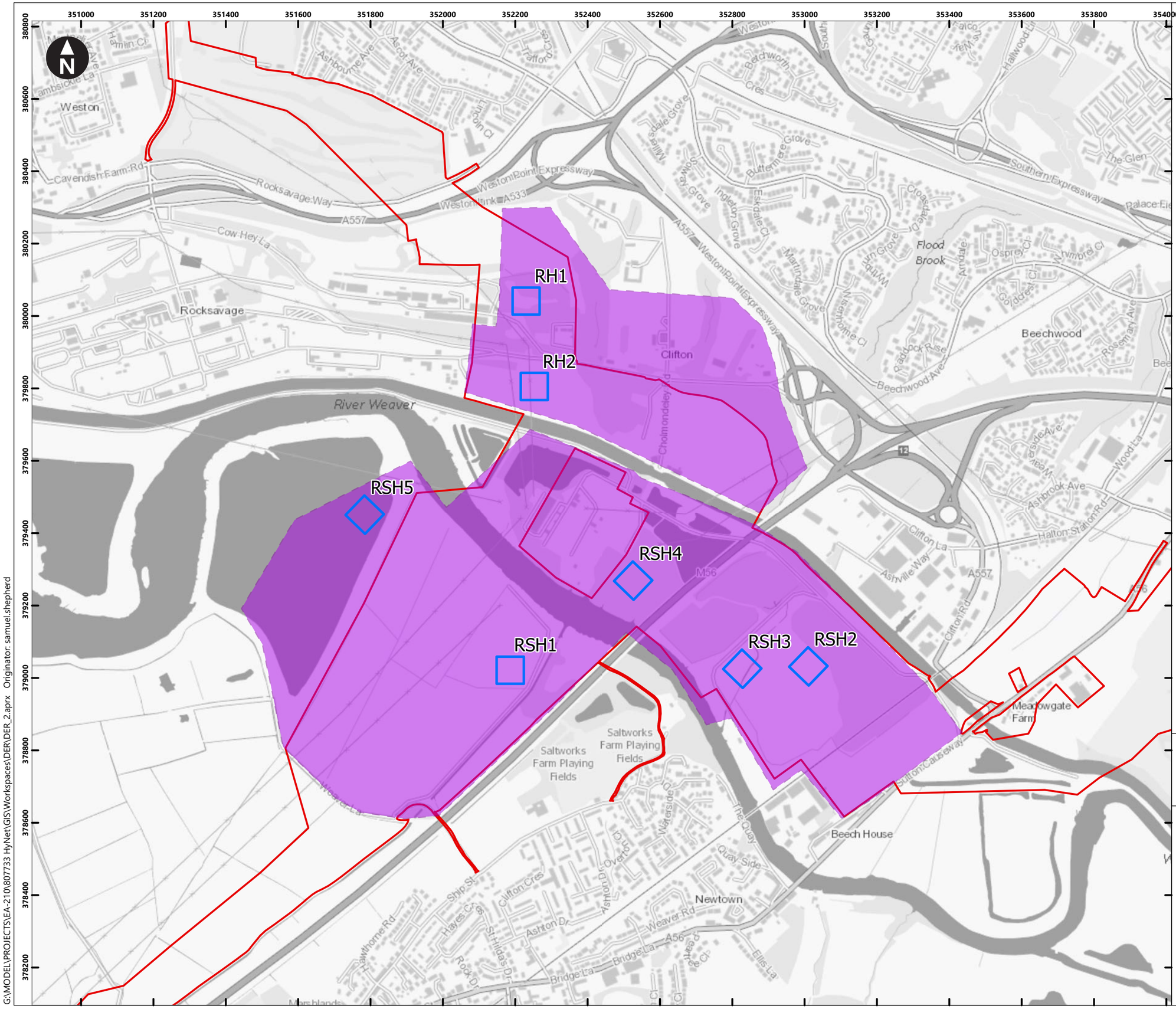


Key

- Preliminary Order Limits
- HAGI Search Area
- HAGI Option

0 100 200 300 400 500 Meters

Scale at A3: 1:10,000

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**Figure 5.2**
**Runcorn / Rocksavage HAGI Options**

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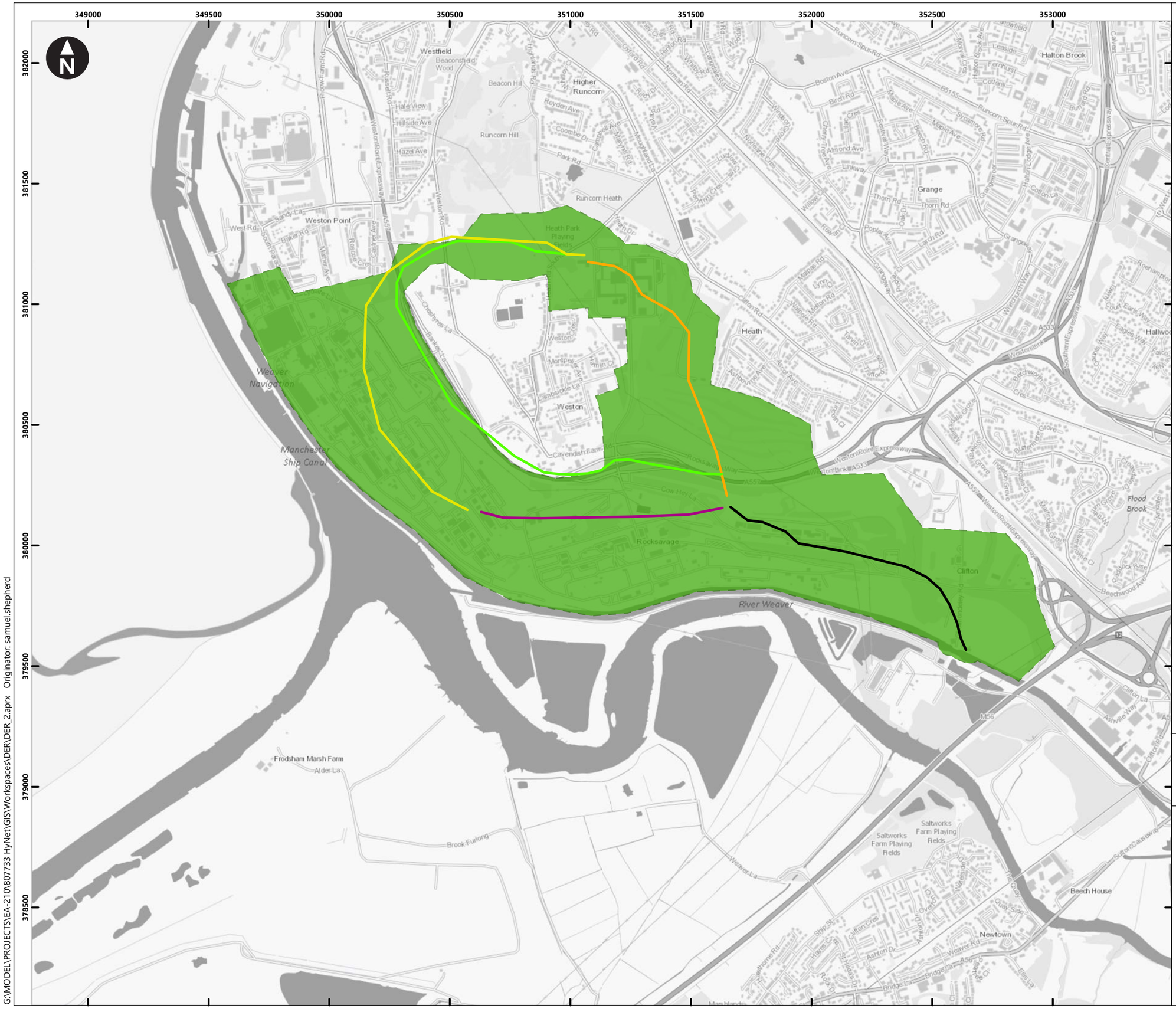


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**Figure 5.3A**
**Runcorn/Rocksavage Spur (A&B)**

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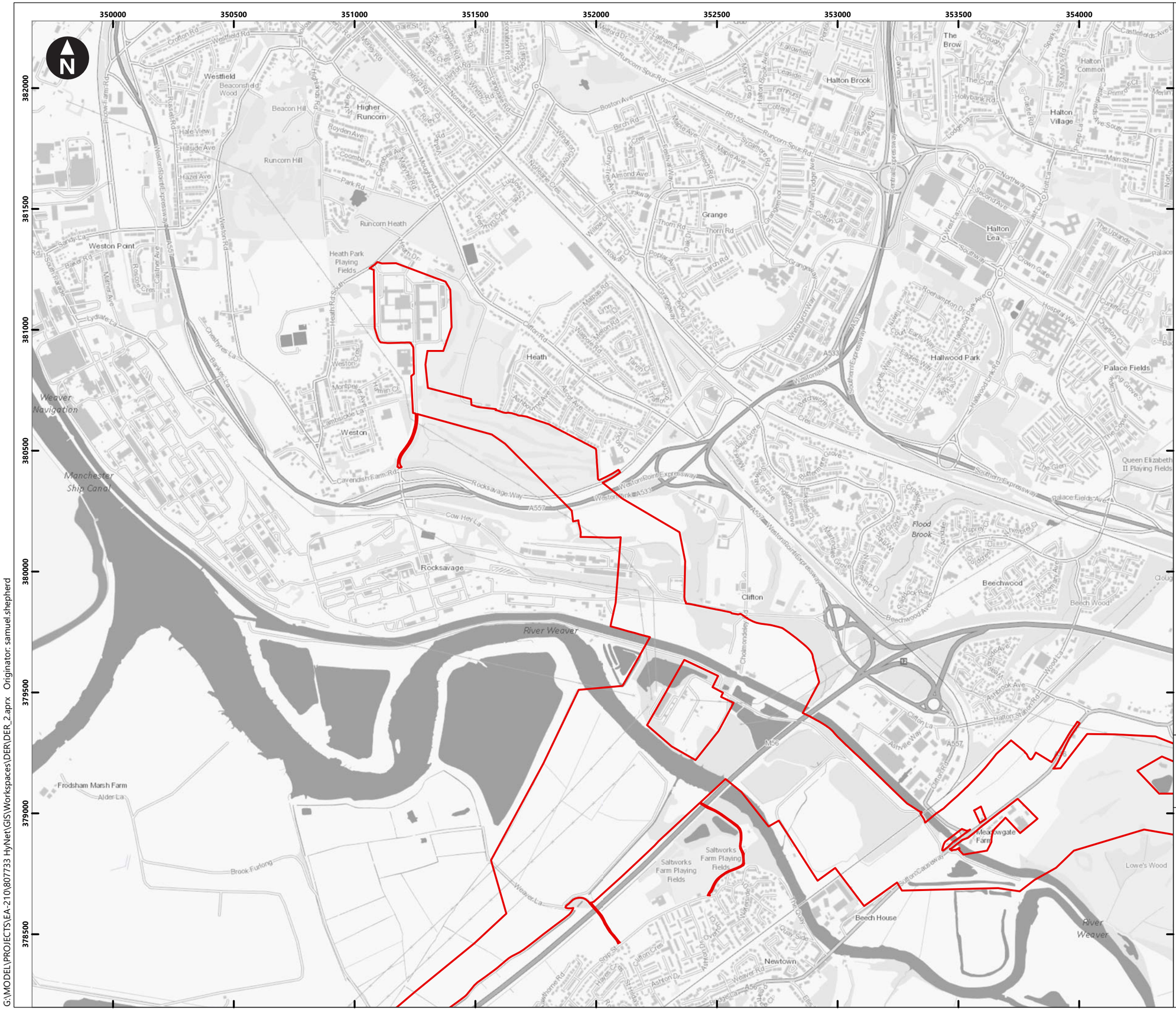


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Little Town
Toll Bar
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Portico
Peasley Cross
Moss Nook
Collins Green
Vulcan Village
Sutton
Eccleston Park
Sutton Heath
Prescot
Burtonwood
Winwick
Lea Green
Marshall's Cross
Holt
Houghton Green
Clock Face
Gemini
Hulme
Whiston
Rainhill
Kingswood
Callands
Dallam
Longford
Roby
Windy Arbor
Westbrook
Padgate
Bewsey
Paddington
Bold Heath
Lingley Green
Great Sankey
Hood Manor
Whitecross
Warrington
Cronton
Lunts Heath
Penketh
Sankey Bridges
Bank Quay
Woodlands
Tarbock Green
Upton Rocks
Farnworth
Barrow's Green
Doe Green
Westy
Upton
Appleton
Crow Wood
Wilderspool
Grappenhall
Ball o' Ditton
Hough Green
Halton View
Shell Green
Stockton Heath
Ditton
Lower House
Moss Bank
Lower Walton
Cobbs
Widnes
Lugsdale
Higher Walton
Hilldiffe
Newtown
West Bank Dock Estate
Moore
Dudlow's Green
Hale Bank
West Bank
Appleton Thorn
Manor Park
Kedwick
Runcorn
Astmoor
Sandymoor
Castlefields
Windmill Hill
Stretton
Hale
Stenhills
Hatton
Higher Runcorn
Halton Brook
Town Park
Norton
Daresbury
Lower Stretton
Weston Point
Grange
Halton Lea
Norton Cross
Norcott Brook
Heath
Hallwood Park
Murdishaw
Brookvale
Preston Brook
Rocksavage
Clifton
Beechwood
Whitehouse
Higher Whitley
Antrobus
Dutton
Sutton Weaver
Aston Heath
Frandley
Lower Whitley
Aston
Newtown
Frodsham
M62
M6
M56
A57
A58
A562
A533
A557
A5080
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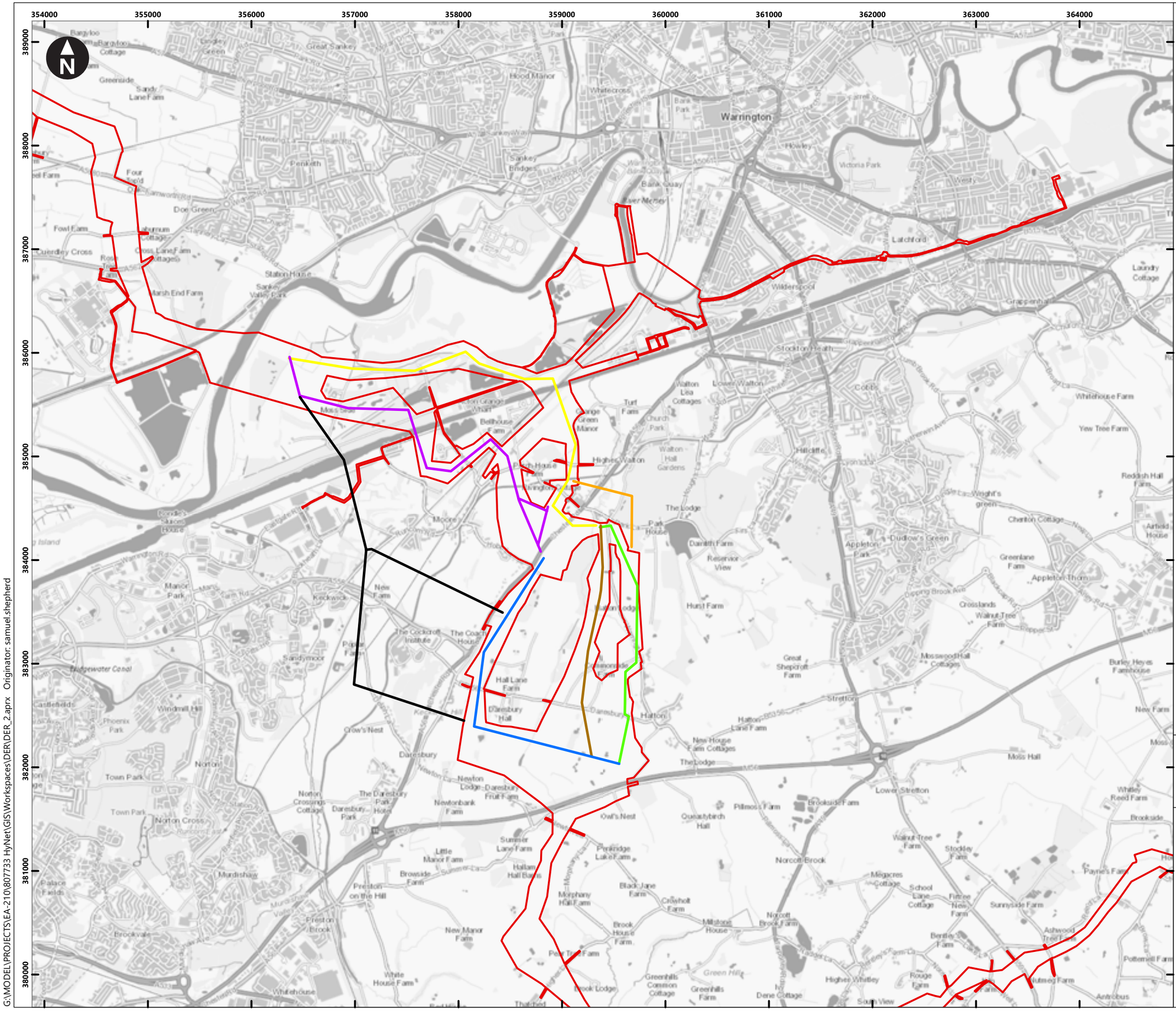


Key

Preliminary Order Limits

## Route Options

- NP1
- NP2
- NP3
- NP4
- NP5
- NP6
- NP7

0 500 1,000 1,500 Meters

Scale at A3: 1:35,000

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**Figure 5.5**
**Higher Walton Route Options**

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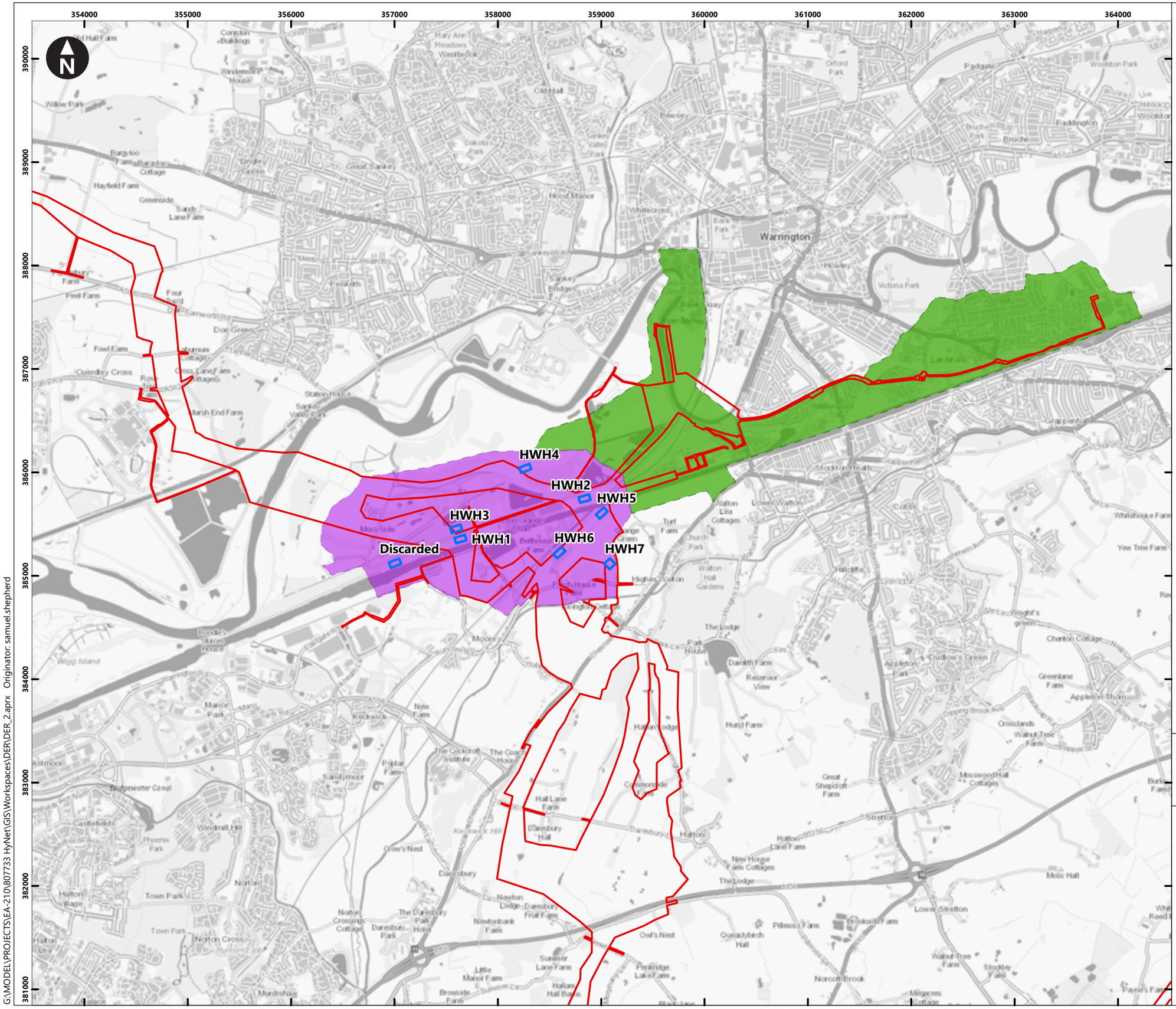


Key

- Preliminary Order Limits
- HAGI Search Area
- HAGI Option
- Spurs search area

0 400 800 1,200 1,600 Meters

Scale at A3: 1:35,000

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**Figure 5.6**
**Higher Walton HAGI Options and Spur**

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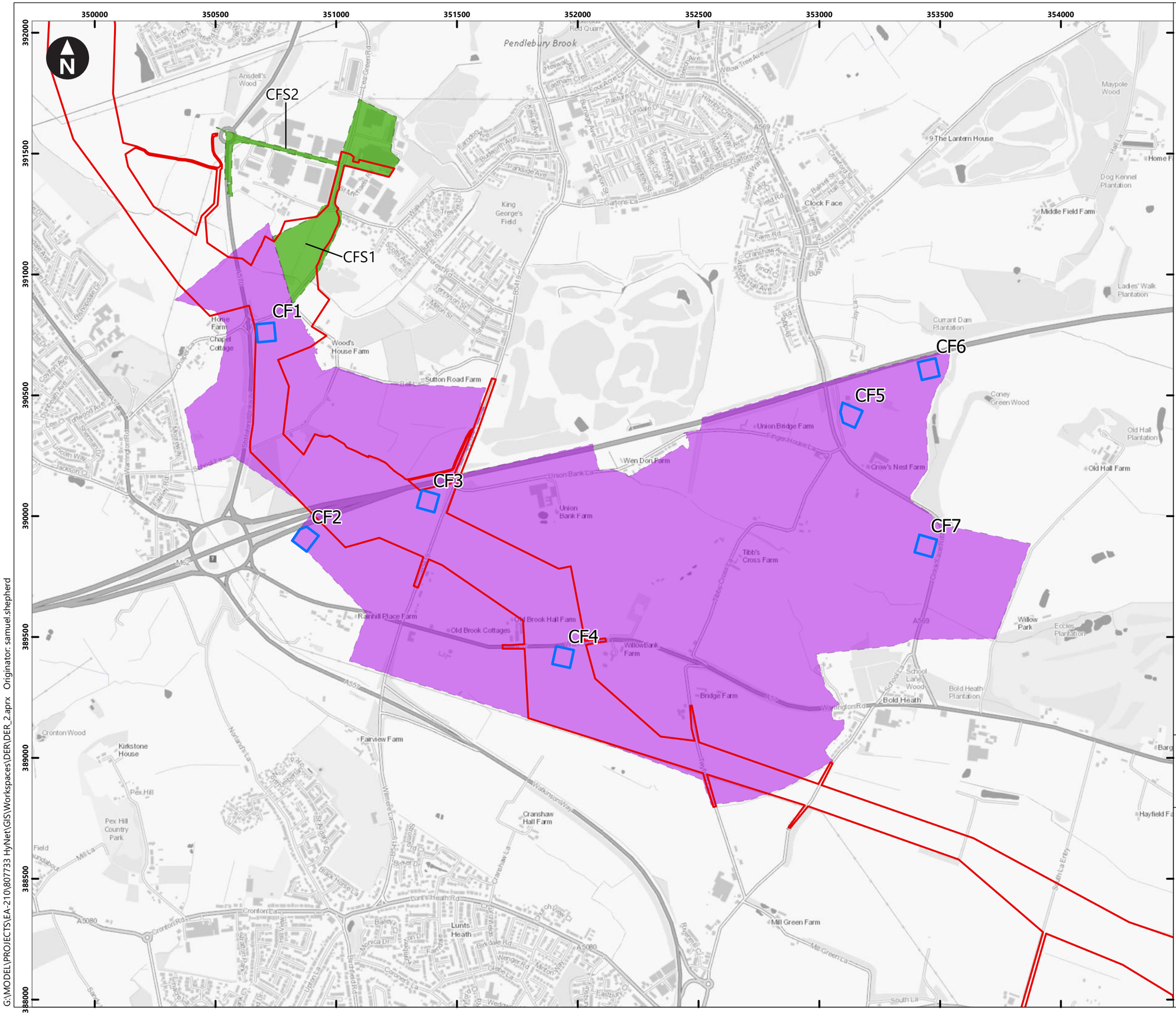


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**Figure 5.7**
**Clock Face HAGI Options and Spur**

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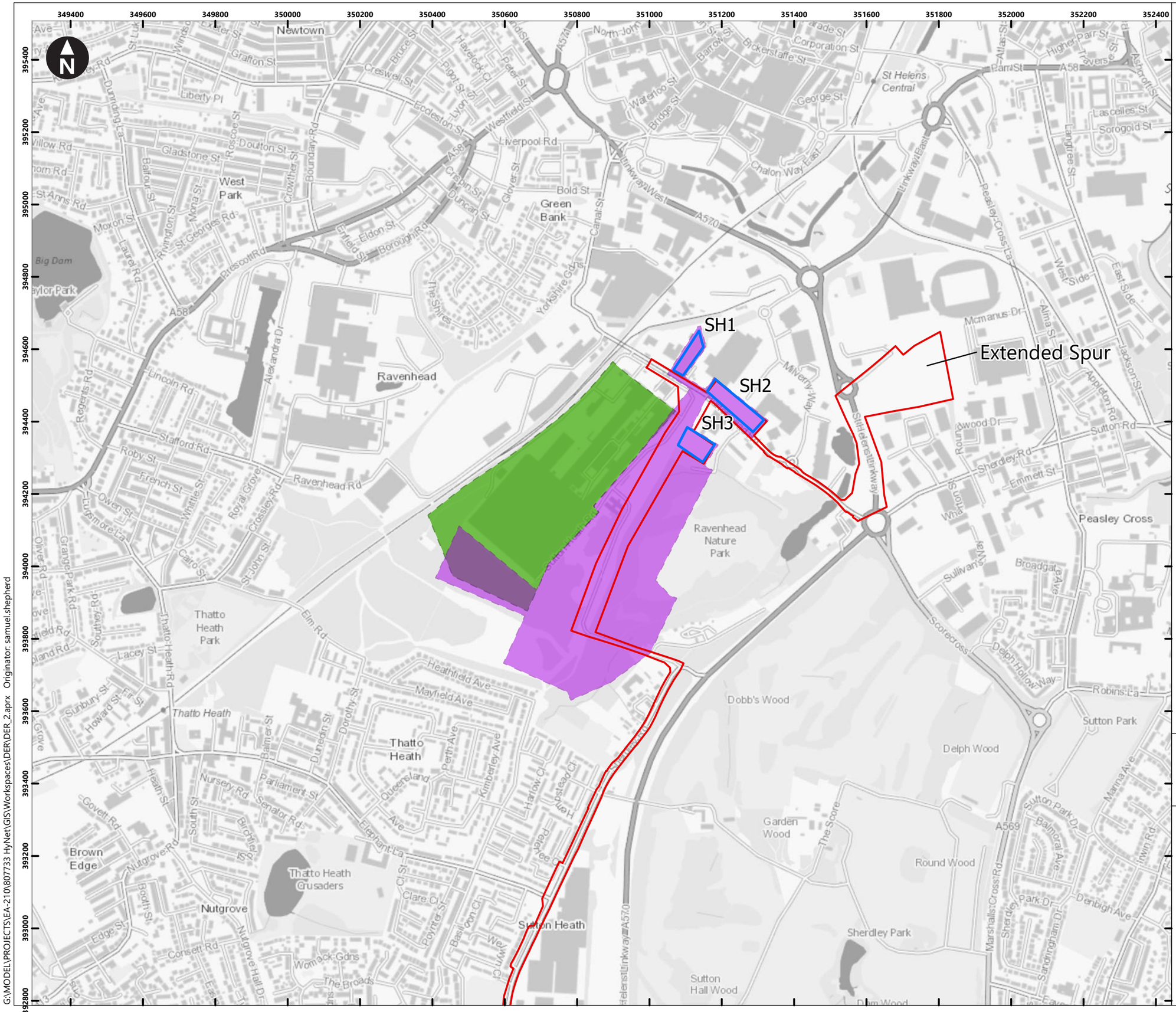
SH1
SH2
SH3
Extended Spur
Newtown
West Park
Green Bank
Ravenhead
Ravenhead Nature Park
Thatto Heath Park
Thatto Heath
Thatto Heath Crusaders
Brown Edge
Nutgrove
Sutton Heath
Dobb's Wood
Garden Wood
Round Wood
Delph Wood
Sutton Hall Wood
Sherdley Park
Peasley Cross
Sutton Park
St Helens Central
Big Dam
Liverpool Rd
Ravenhead Rd
Stafford Rd
Lincoln Rd
Prescott Rd
Elm Rd
Sutton Rd
A58
A570
A569
A57(M)
Key
Preliminary Order Limits
HAGI Option
HAGI Search Area
Spur search area
0 100 200 300 400 500 Meters
Scale at A3: 1:10,000
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Figure 5.8
St Helens HAGI Options and Spur
September 2022
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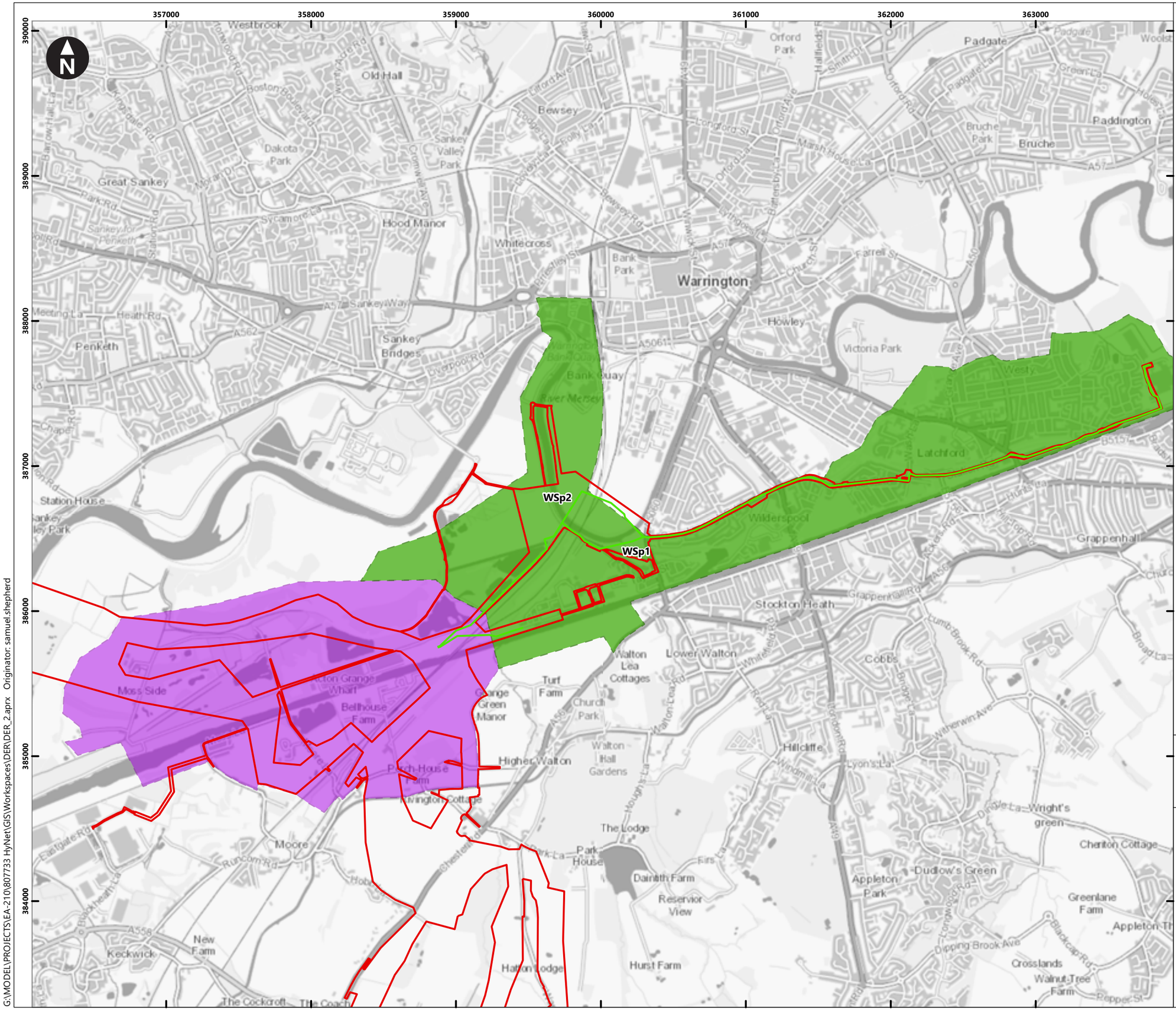


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**Figure 5.9**
**Warrington Spur Options**

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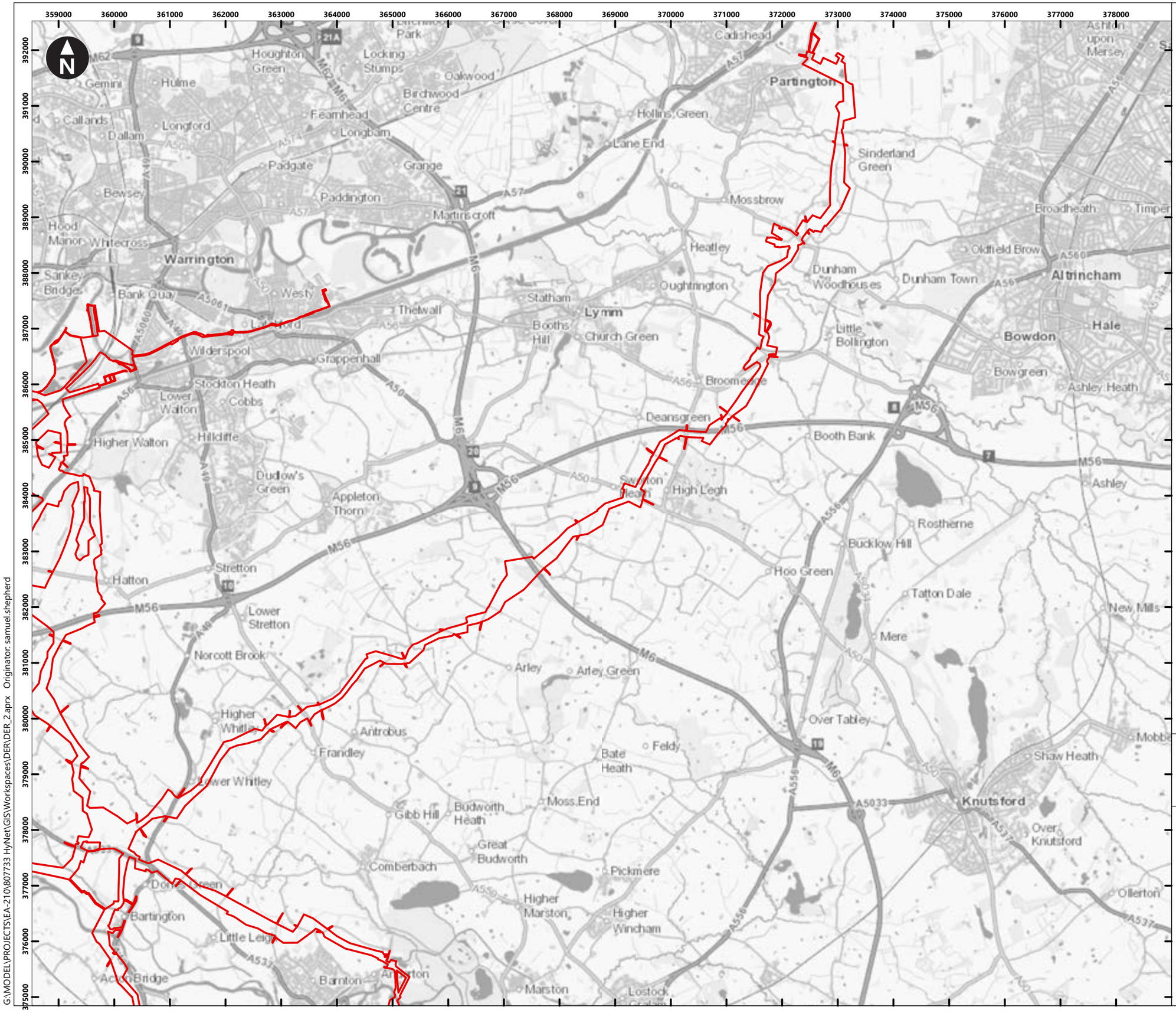


Key

Preliminary Order Limits

0 1 2 3 Kilometers

Scale at A3: 1:65,000

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**Figure 5.10**
**East Corridor Preliminary Route Alignment**

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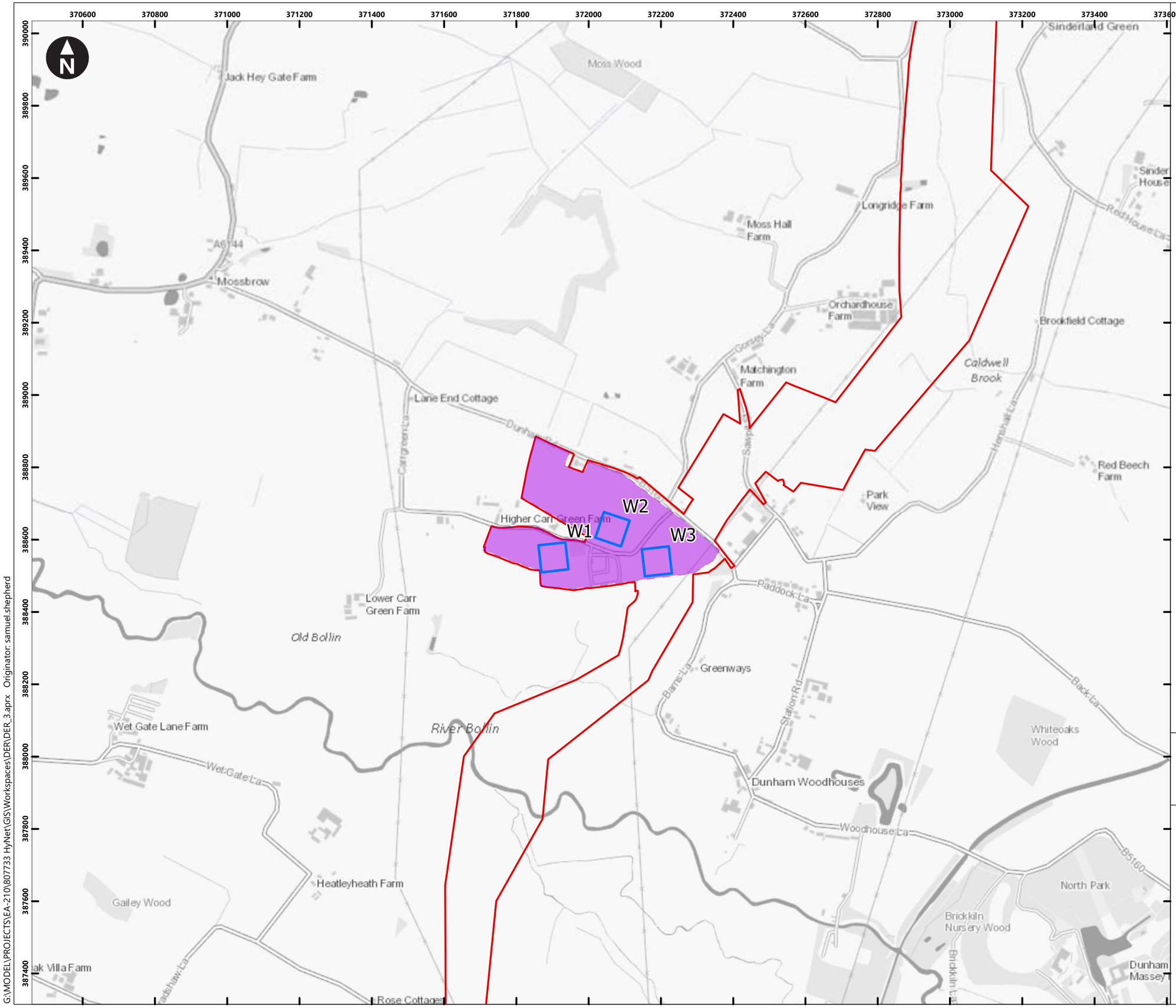


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**Figure 5.11**
**Warburton HAGI Options**

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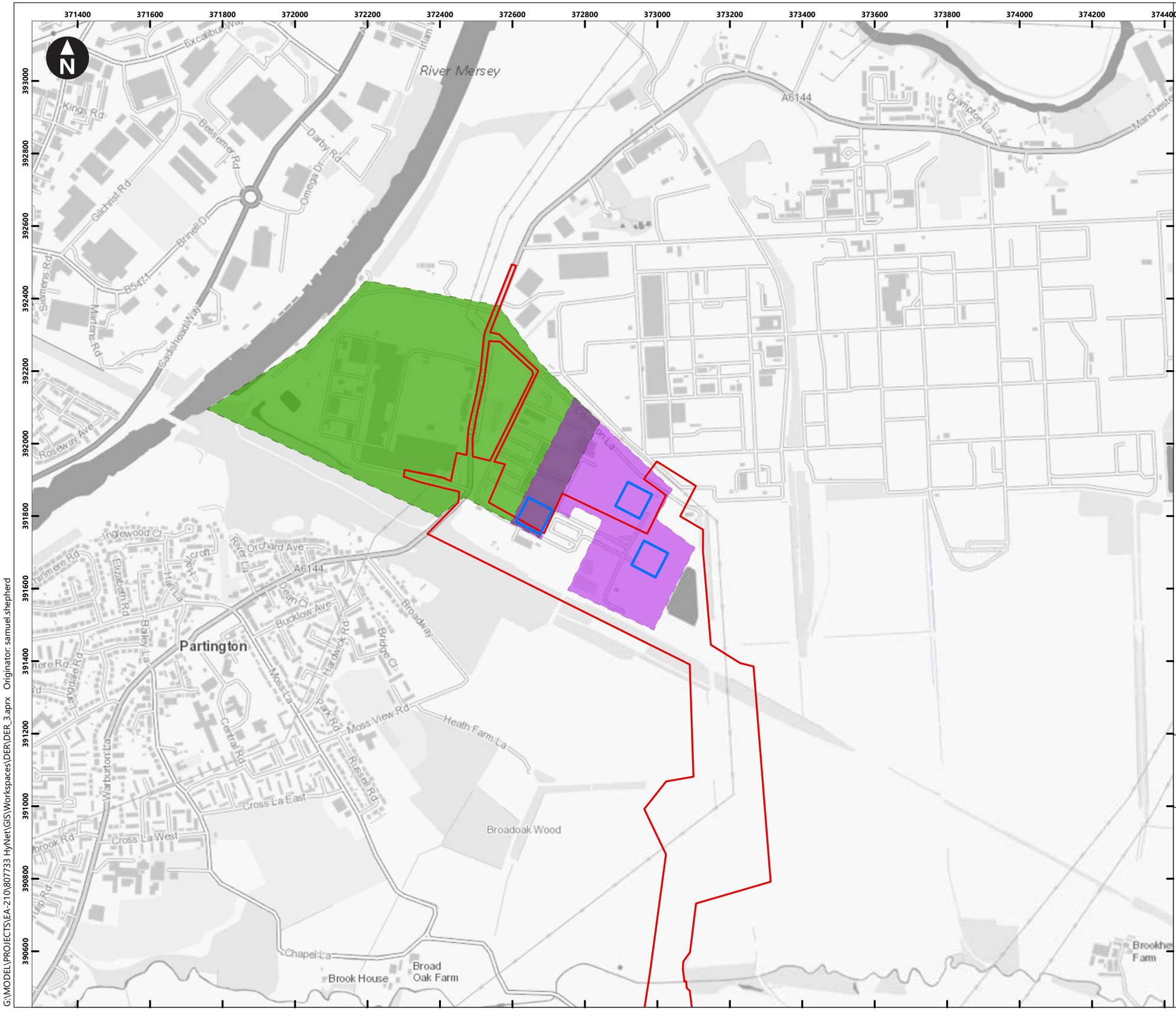


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**Figure 5.12**
**Partington HAGI Options and Spur**

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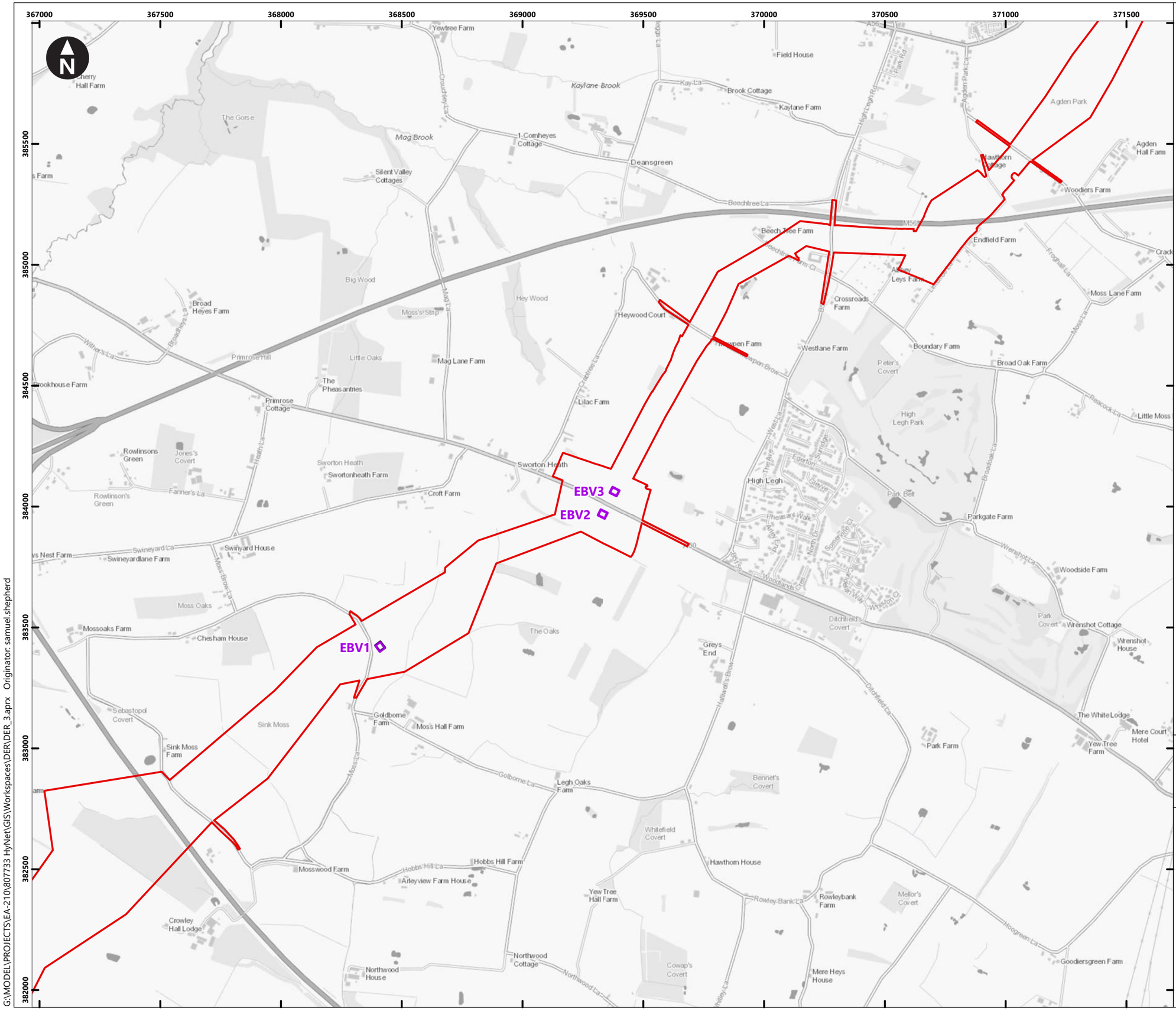


Key

- Preliminary Order Limits
- Block Valve Options
- Block Valve Options 26th May 2022

0 200 400 600 800 Meters

Scale at A3: 1:15,000

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**Figure 5.13**
**East Block Valves**

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Key

Preliminary Order Limits

0 0.5 1 1.5 2 2.5 Kilometers

Scale at A3: 1:50,000

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**Figure 5.14**
**South Corridor Preliminary Route Alignment**

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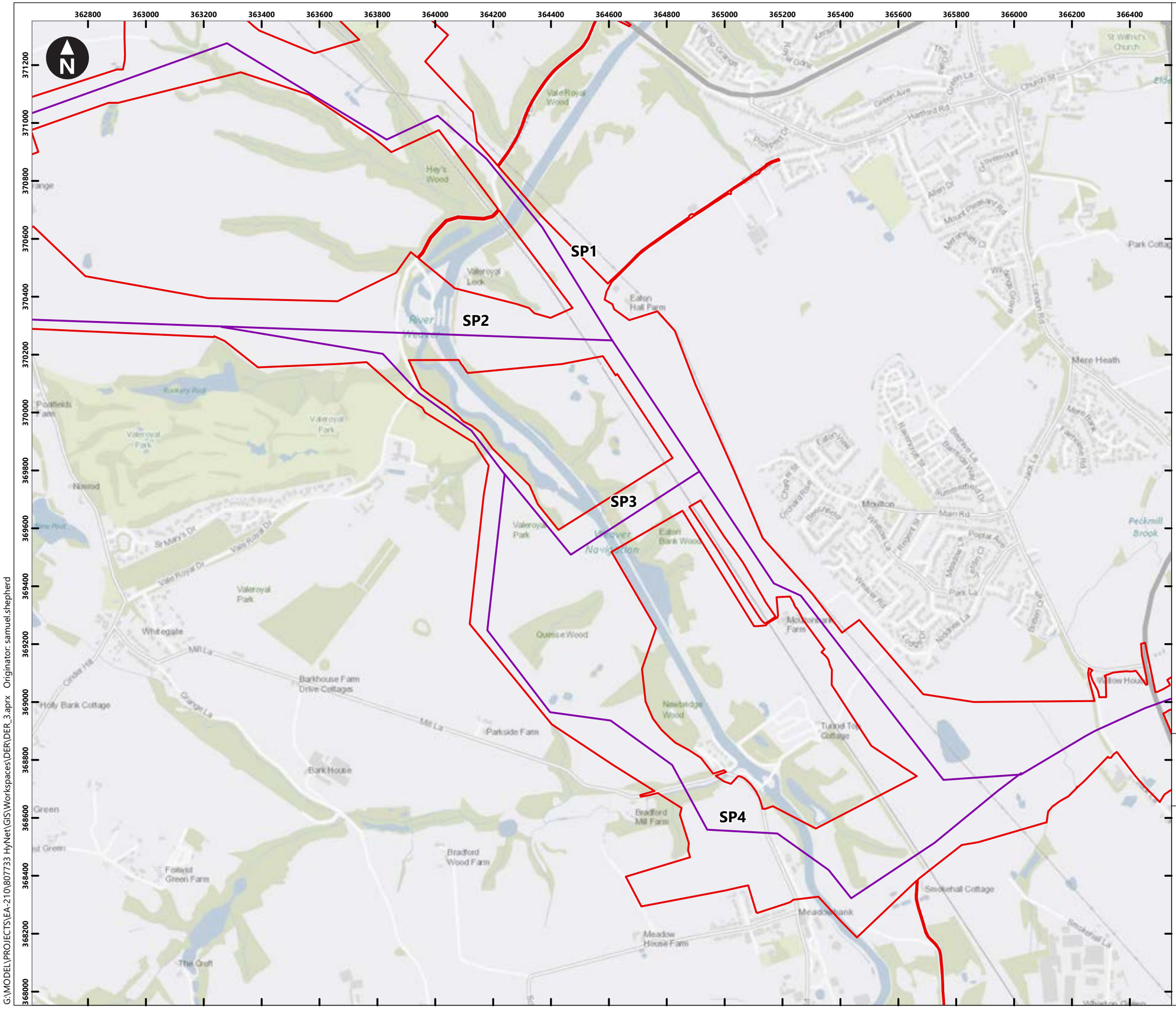


Key

Preliminary Order Limits

Pipeline Centrelines

0 100 200 300 400 500 600 Meters

Scale at A3: 1:12,500

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**Figure 5.15**
**Vale Royal Locals Route Options**

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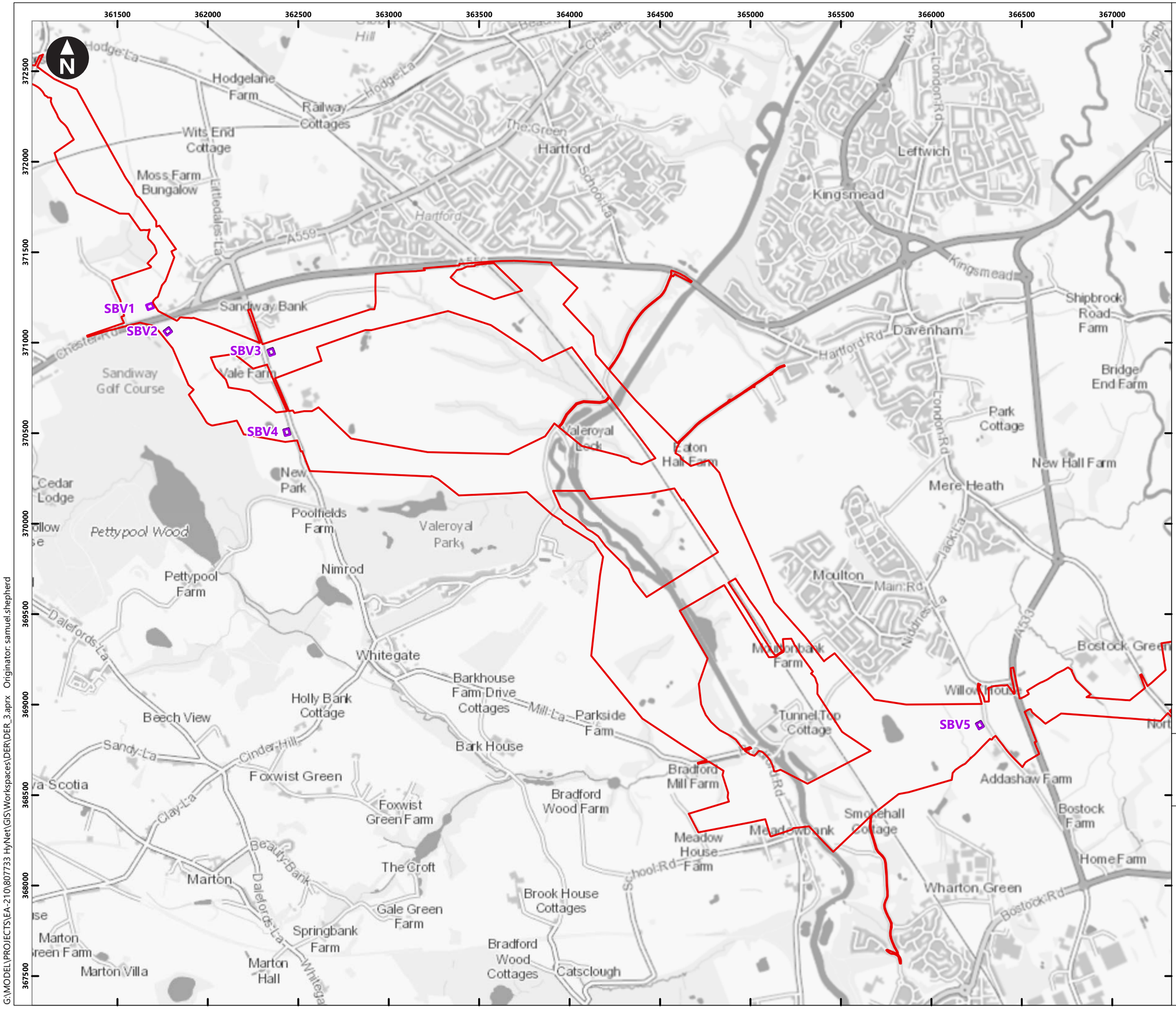


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**Figure 5.16**
**South Block Valves**

September 2022

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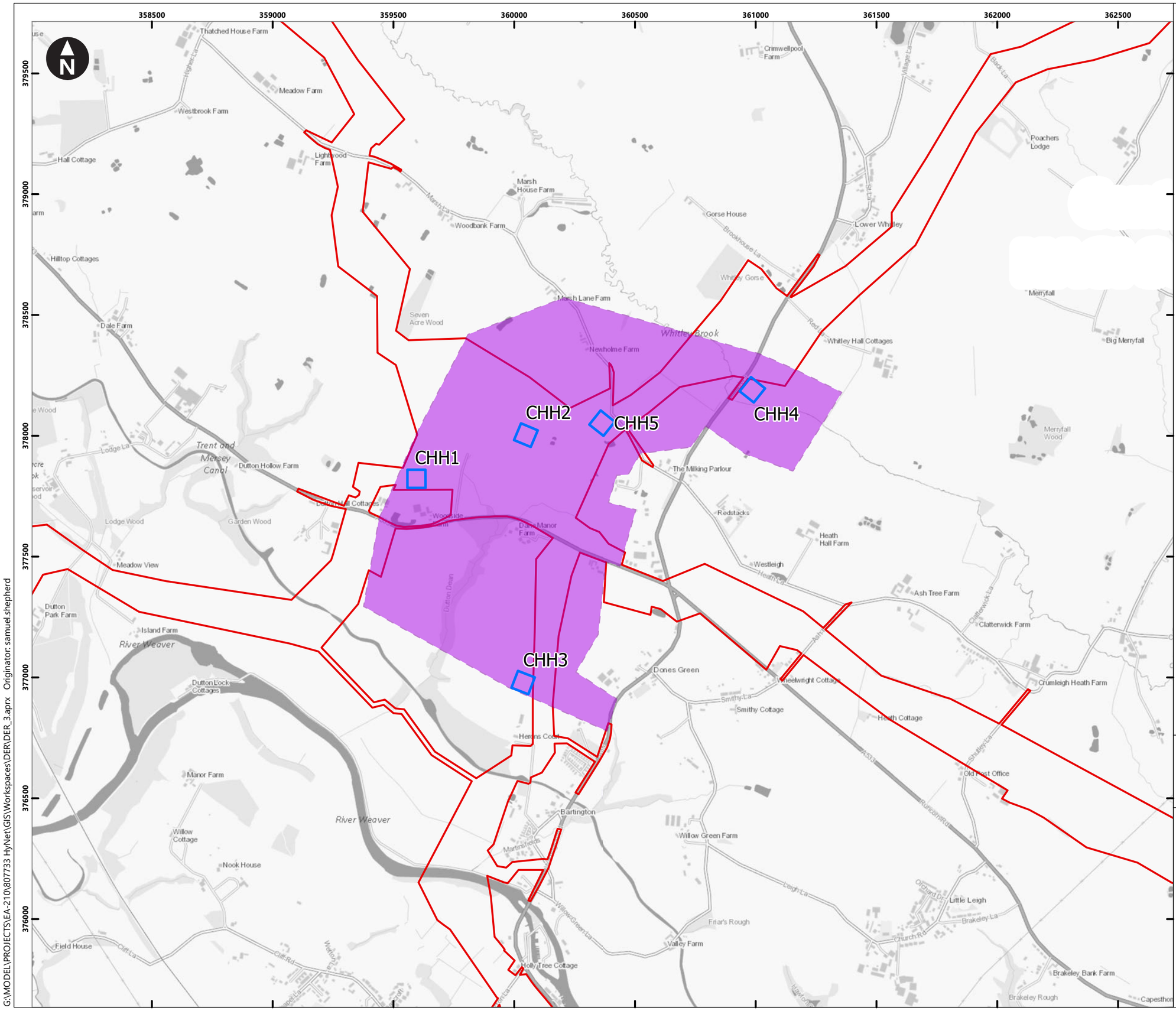


Client

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**Figure 5.17**
**Central Hub HAGI Options**

September 2022

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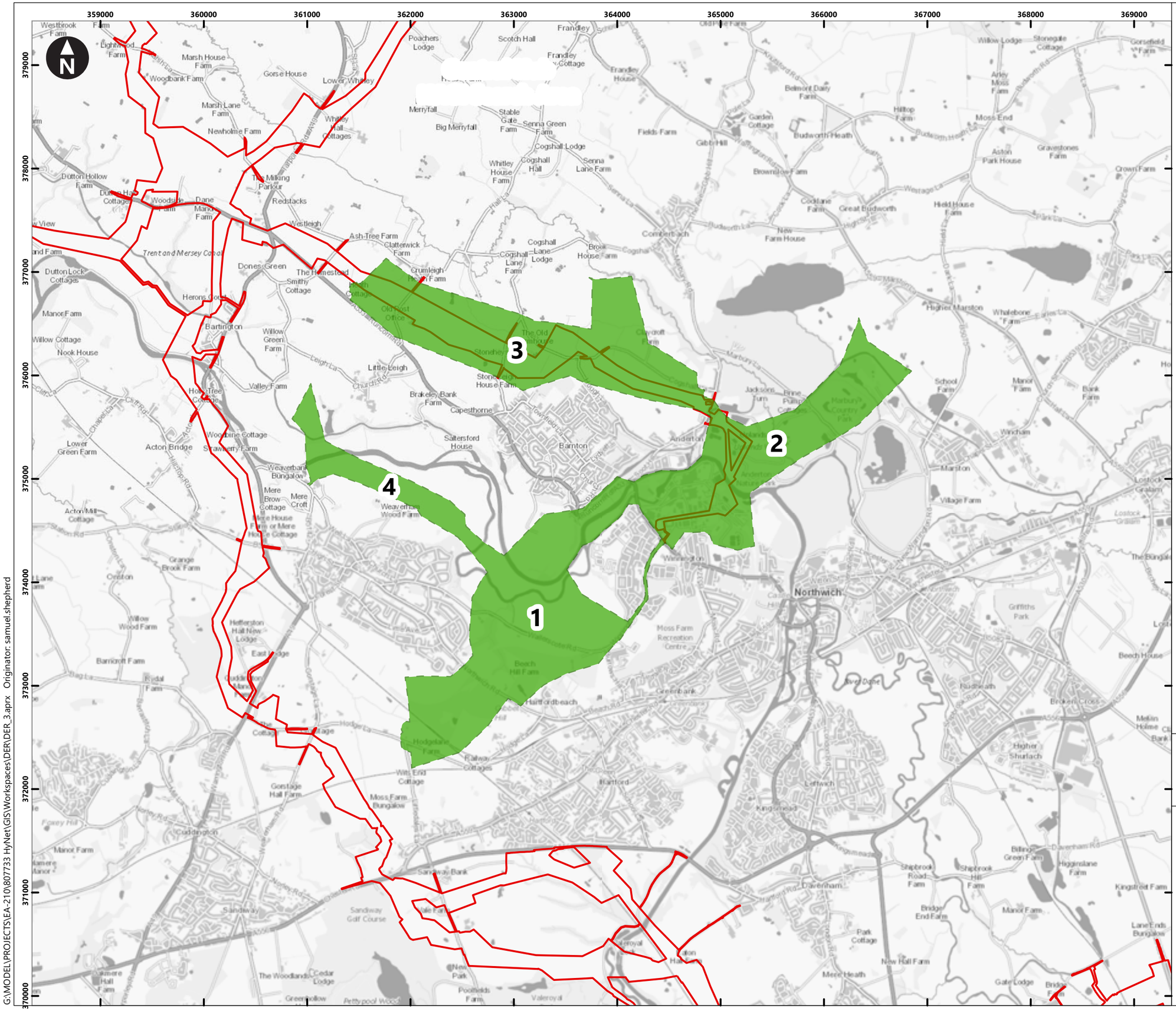
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3
4
Northwich
Runcorn
Frandley
Scotch Hall
Poachers Lodge
Frandley Cottage
Frandley House
Belmont Dairy Farm
Willow Lodge
Stonegate Cottage
Gorsefield Farm
Arley Moss Farm
Moss End
Hilltop Farm
Garden Cottage
Budworth Heath
Gibb Hill
Fields Farm
Aston Park House
Gravestones Farm
Crown Farm
Brownlow Farm
Coddane Farm
Great Budworth
Heald House Farm
New Farm House
Comberbach
Brook House Farm
Cogshall Lane Farm
Cogshall Lane Lodge
Cogshall Lodge
Cogshall Hall
Senna Lane Farm
Whitley House Farm
Stable Gate Farm
Senna Green Farm
Big Merryfall
Merryfall
Whitley Hall Cottages
Lower Whitley
Gorse House
Marsh House Farm
Marsh Lane Farm
Newholme Farm
Woodbank Farm
Westbrook Farm
Lightwood Farm
Dutton Hollow Farm
Dutton Hall Cottages
Woodside Farm
Dane Manor Farm
The Milking Parlour
Redstacks
Westleigh
Ash-Tree Farm
Clatterwick Farm
Crumleigh Head Farm
Trent and Mersey Canal
Dutton Lock Cottages
Dones Green
The Homestead
Smithy Cottage
Herons Court
Manor Farm
Willow Cottage
Nook House
Bartington
Willow Green Farm
Little Leigh
Valley Farm
Holly Tree Cottage
Brakeley Bank Farm
Capesthorne
Saltersford House
Barnton
Anderton
Lower Green Farm
Acton Bridge
Woodbine Cottage
Strawberry Farm
Weaverbank Bungalow
Mere Brow Cottage
Mere Croft
Mere House Farm or Mere House Cottage
Acton Mill Cottage
Weaverham Wood Farm
Grange Brook Farm
Croston
Willow Wood Farm
Barnicroft Farm
Rydal Farm
Hefferston Hall New Lodge
East Lodge
Cuddington
Manor Farm
Sandiway
Sandiway Golf Course
Sandiway Bank
Vale Farm
Valeroyal
New Park
Poolfields Farm
The Woodlands
Cedar Lodge
Greenhollow
Pettypool Wood
Hartford
Hartfordbeach
Greenbank
Moss Farm Bungalow
Gorstage Hall Farm
Wits End Cottage
Railway Cottages
Hodgelane Farm
Moss Farm Recreation Centre
Beech Hill Farm
Beech House
Griffiths Park
Nuthurst
Broken Cross
Higher Shurlach
Leftwich
Kingsmead
Davenham
Billinge Green Farm
Higginslane Farm
Shipbrook Road Farm
Shipbrook Hill Farm
Bridge End Farm
Manor Farm
Park Cottage
New Hall Farm
Mere Heath
Gate Lodge
Lane End Bungalow
Kingsmead Farm
Higher Marston
Wholebone Farm
Marston
Village Farm
Lostock Gralam
School Farm
Manor Farm
Bank Farm
Winnington
Jackson's Turn
Marbury Country Park
Clay croft Farm
The Old Smithy
Stonehey House Farm
Old Post Office
Trent and Mersey Canal
Key
Preliminary Order Limits
Spurs search area
0
400
800
1,200
1,600
Meters
Scale at A3: 1:35,000
OS Open Greyscale: Contains OS data © Crown Copyright and database right 2020
Client
wood.
Cadent
HyNet North West Hydrogen Pipeline Project
Design Evolution Report
Figure 5.18
Northwich Spur Option
September 2022
wood.
G:\MODEL\PROJECTS\EA-210\807733 HyNet\GIS\Workspaces\DER\DER_3.aprx Originator: samuel.shepherd

Key

Preliminary Order Limits

0 1 2 3 4 5 Kilometers

Scale at A3: 1:110,000

OS Open Greyscale: Contains OS data © Crown Copyright and database right 2020

Client

wood. Cadent

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Design Evolution Report

**Figure 5.19**
**Preliminary Route Alignment**

September 2022

wood.

G:\MODEL\PROJECTS\EA-210\807733 HyNet\GIS\Workspaces\DER\DER_3.aprx Originator: samuel.shepherd

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**Figure 6.1**
**Project Location Plan**
**Sheet A: Overview**

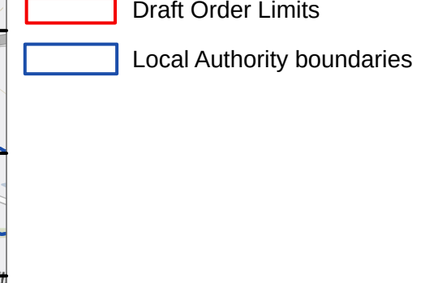
wsp

October 2024

Key

Draft Order Limits

Local Authority boundaries




0 500 1,000 1,500 2,000 2,500 m

Scale at A3: 1:50,000

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**Figure 6.1**
**Project Location Plan**
**Sheet B: West**

October 2024

Key

Draft Order Limits

Local Authority boundaries

0 500 1,000 1,500 2,000 2,500 m

Scale at A3: 1:50,000

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Design Evolution Report

**Figure 6.1**
**Project Location Plan**
**Sheet C: North**

October 2024

Key

Draft Order Limits

Local Authority boundaries

0 500 1,000 1,500 2,000 2,500 m

Scale at A3: 1:50,000

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HyNet North West Hydrogen Pipeline Project
Design Evolution Report

**Figure 6.1**
**Project Location Plan**
**Sheet D: East**

October 2024

Key

Draft Order Limits

Local Authority boundaries

0 500 1,000 1,500 2,000 2,500 m

Scale at A3: 1:50,000

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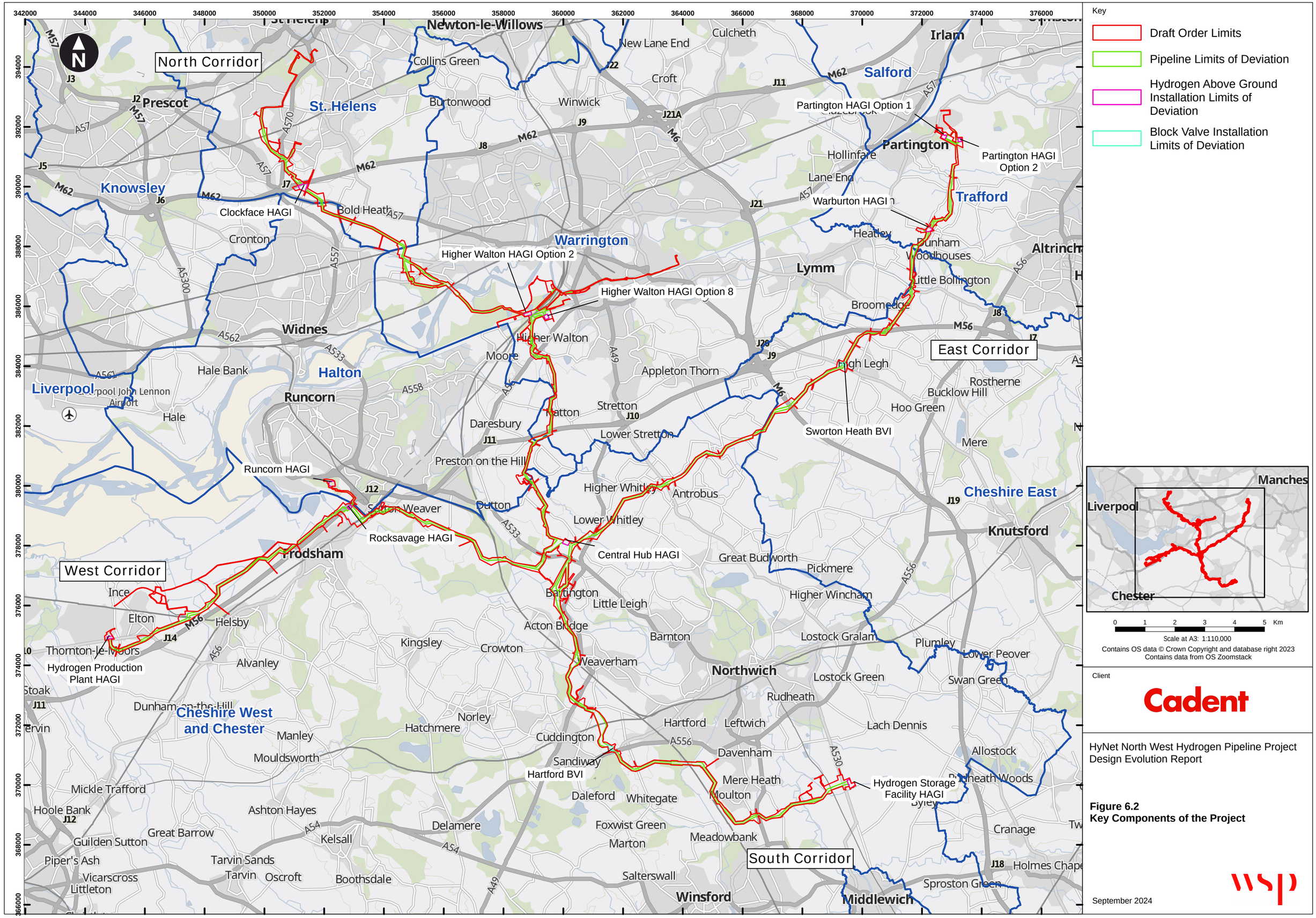
Design Evolution Report

**Figure 6.1**
**Project Location Plan**
**Sheet E: South**

October 2024


North Corridor
West Corridor
East Corridor
South Corridor
Cheshire West and Chester
Cheshire East
Clockface HAGI
Runcorn HAGI
Rocksavage HAGI
Hydrogen Production Plant HAGI
Higher Walton HAGI Option 2
Higher Walton HAGI Option 8
Central Hub HAGI
Hartford BVI
Partington HAGI Option 1
Partington HAGI Option 2
Warburton HAGI
Sworton Heath BVI
Hydrogen Storage Facility HAGI
Newton-le-Willows
St. Helens
Prescot
Knowsley
Liverpool
Widnes
Runcorn
Halton
Warrington
Frodsham
Northwich
Lymm
Partington
Trafford
Salford
Irlam
Altrincham
Knutsford
Middlewich
Winsford
Chester
Manchester
Liverpool
Key
Draft Order Limits
Pipeline Limits of Deviation
Hydrogen Above Ground Installation Limits of Deviation
Block Valve Installation Limits of Deviation
0 1 2 3 4 5 Km
Scale at A3: 1:110,000
Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack
Client
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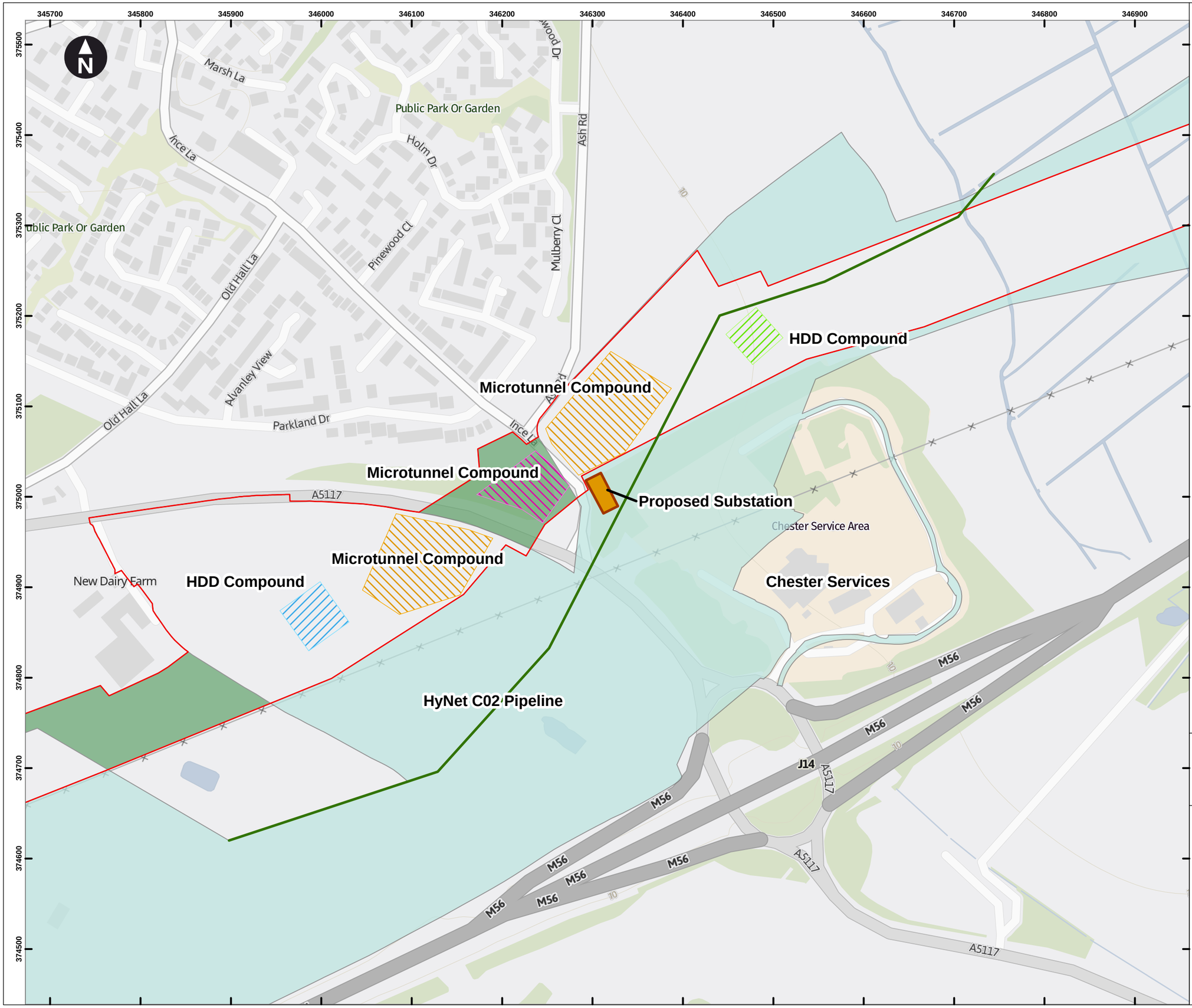
HyNet North West Hydrogen Pipeline Project
Design Evolution Report
Figure 6.2
Key Components of the Project
September 2024

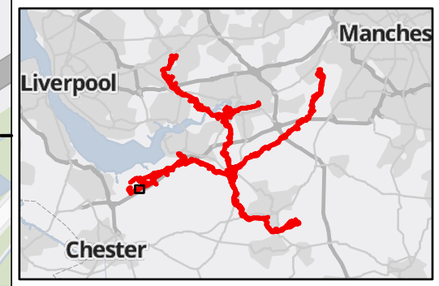



Key

- Draft Order Limits
- Land Added To Draft Order Limits
- Land Removed From Draft Order Limits
- Proposed Substation
- HyNet C02 Pipeline

Crossing Compound Footprints

- HDD Entry 2000m2
- HDD Exit 3000m2
- Microtunnel Entry 10000m2
- Microtunnel Exit 4000m2




0 50 100 150 200 Meters

Scale at A3: 1:4,000

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Design Evolution Report

**Figure 6.3**
**Chester Services**

October 2024

345600 345800 346000 346200 346400 346600 346800 347000

376800 376600 376400 376200 376000 375800 375600

N

Marsh La

Marsh La

Access Option 3

Access Option 1

Access Option 2

Encirc

Protos

Ince and Elton

Orchard Park La

Orchard Park

Coppice Green

Play Space

Elton

Key

Draft Order Limits

Land Added To Draft Order Limits

Land Removed From Draft Order Limits

Manches

Liverpool

Chester

0 50 100 150 200 250 Meters

Scale at A3: 1:5,000

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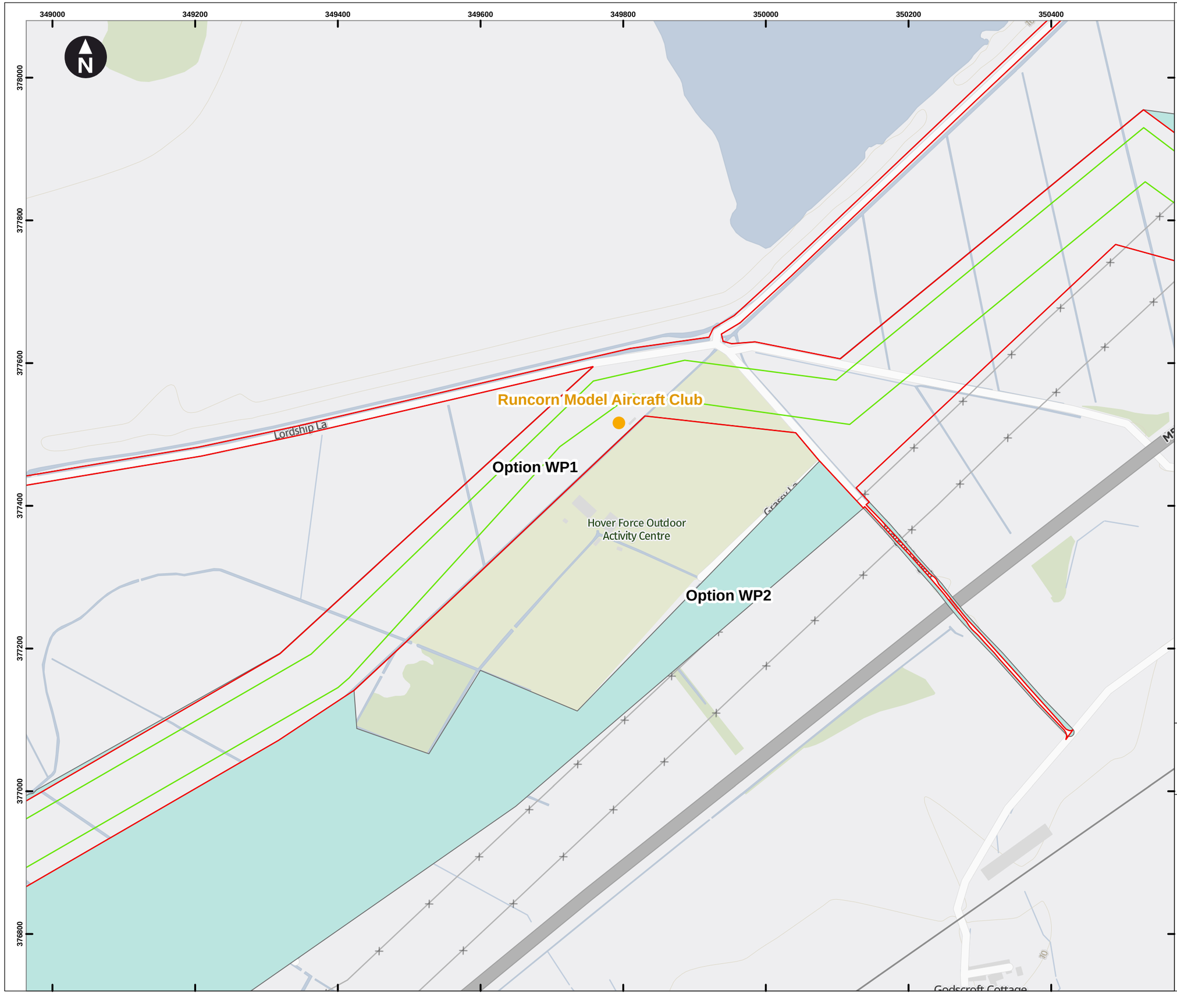
Design Evolution Report

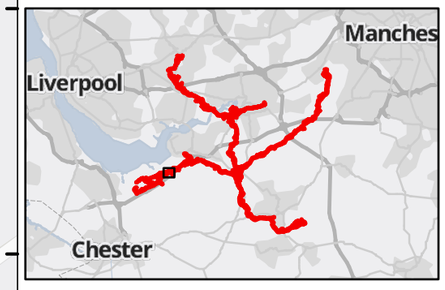
**Figure 6.4**
**Encirc and Protos**

September 2024




Key

- Draft Order Limits
- Pipeline Limits of Deviation
- Land Removed From Draft Order Limits




0 50 100 150 200 250 Meters

Scale at A3: 1:5,000

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HyNet North West Hydrogen Pipeline Project
Design Evolution Report

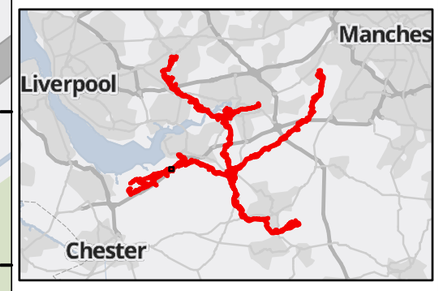
**Figure 6.5**
**Hoverforce (Options WP1 and WP2)**

wsp

September 2024

Key

- Draft Order Limits
- Pipeline Limits of Deviation
- Land Removed From Draft Order Limits
- Caravan Sites




0 25 50 75 100 Meters

Scale at A3: 1:2,000

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Client

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HyNet North West Hydrogen Pipeline Project
Design Evolution Report

**Figure 6.6**
**Moorditch Lane / Alder Lane**

October 2024

Key

- Draft Order Limits
- Pipeline Limits of Deviation
- Rocksavage HAGI Options
- Land Removed From Draft Order Limits
- Land Added To Draft Order Limits

RSH1
RSH2A
RSH2
RSH3A
RSH6

Liverpool
Manches
Chester

0 80 160 240 320 400 Meters

Scale at A3: 1:8,000

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Client

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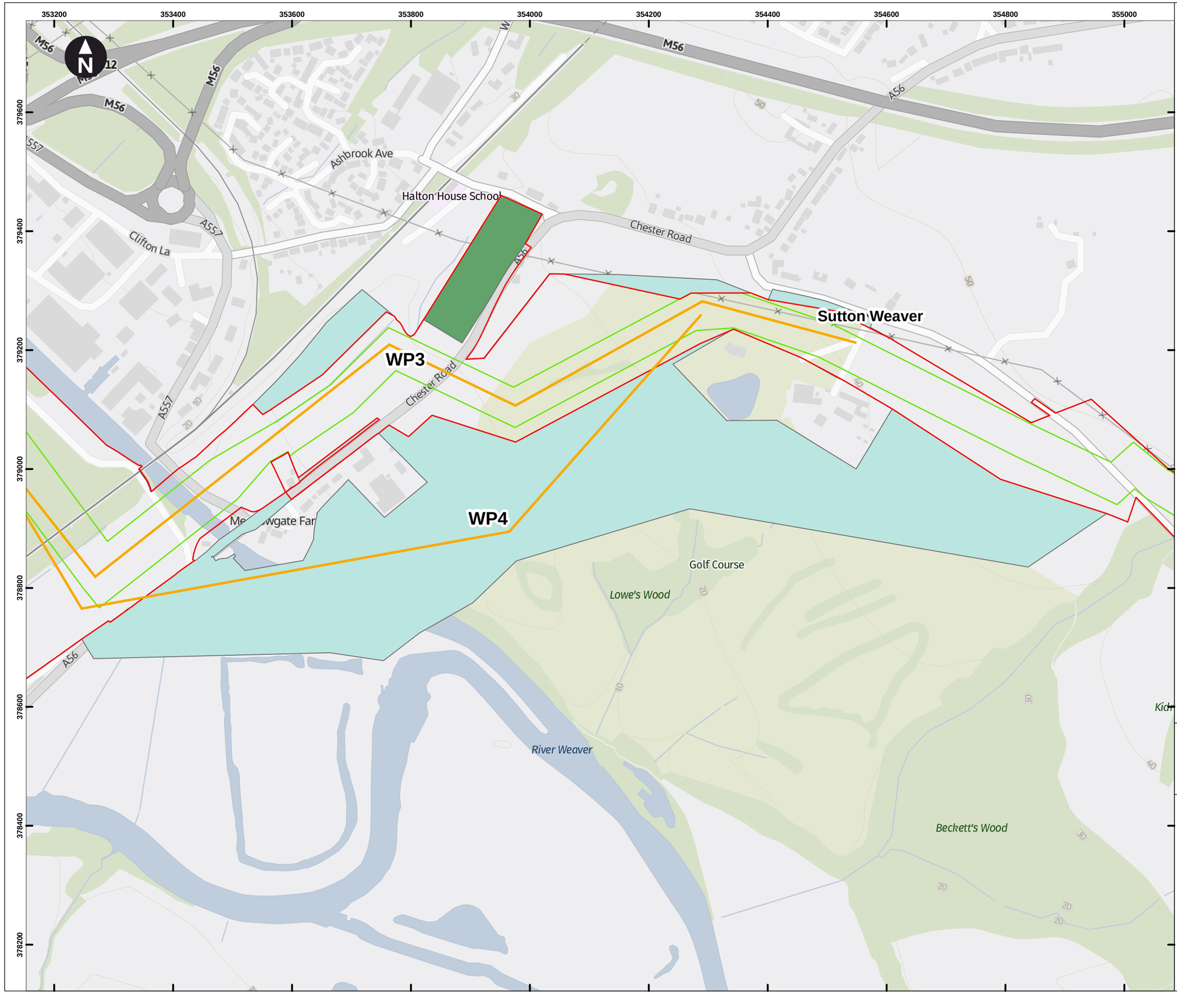
HyNet North West Hydrogen Pipeline Project
Design Evolution Report

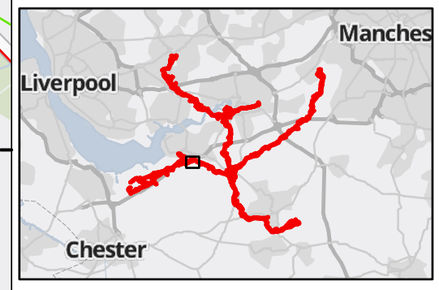
**Figure 6.7**
**Rocksavage and Runcorn HAGIs**

October 2024




Key

- Draft Order Limits
- Pipeline Limits of Deviation
- Land Added To Draft Order Limits
- Land Removed From Draft Order Limits
- Pipeline Options




0 50 100 150 200 250 Meters

Scale at A3: 1:6,000

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Client

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HyNet North West Hydrogen Pipeline Project
Design Evolution Report

**Figure 6.8**
**Sutton Weaver (Options WP3 and WP4)**

wsp

October 2024

356600 356800 357000 357200 357400 357600 357800 358000 358200 358400

378200 378000 377800 377600 377400 377200 377000 376800

N

Weaver View Cottages

Pear Tree Lodge

Longacre Wood

Longacre Brook

Reservoir Wood

Dutton Lodge Farm

Lodge La

Lodge Wood

Meadow View

Dutton Park Farm

Rye Grass Pipes Option

Solar Farm Central Option

Potential Solar Development

Key

- Draft Order Limits
- Pipeline Limits of Deviation
- Land Removed From Draft Order Limits
- Pipeline Options

0 50 100 150 200 250 Meters

Scale at A3: 1:6,000

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Client

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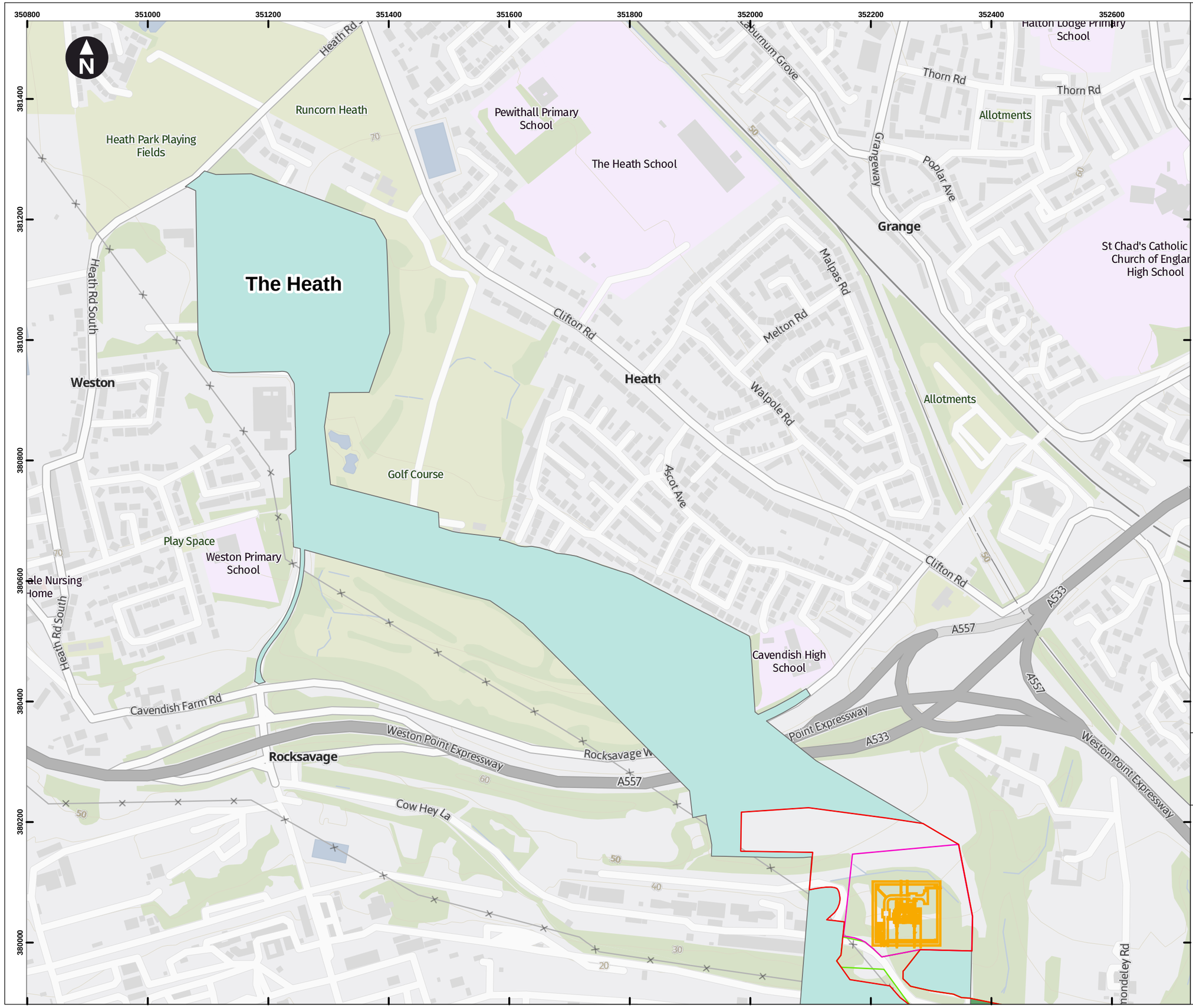
HyNet North West Hydrogen Pipeline Project
Design Evolution Report

**Figure 6.9**
**Aston Grange**

October 2024




Key

- Draft Order Limits
- Pipeline Limits of Deviation
- Hydrogen Above Ground Installation Layouts
- Hydrogen Above Ground Installation Limits of Deviation
- Land Removed From Draft Order Limits

0 50 100 150 200 250 Meters

Scale at A3: 1:6,000

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Contains data from OS Zoomstack

Client

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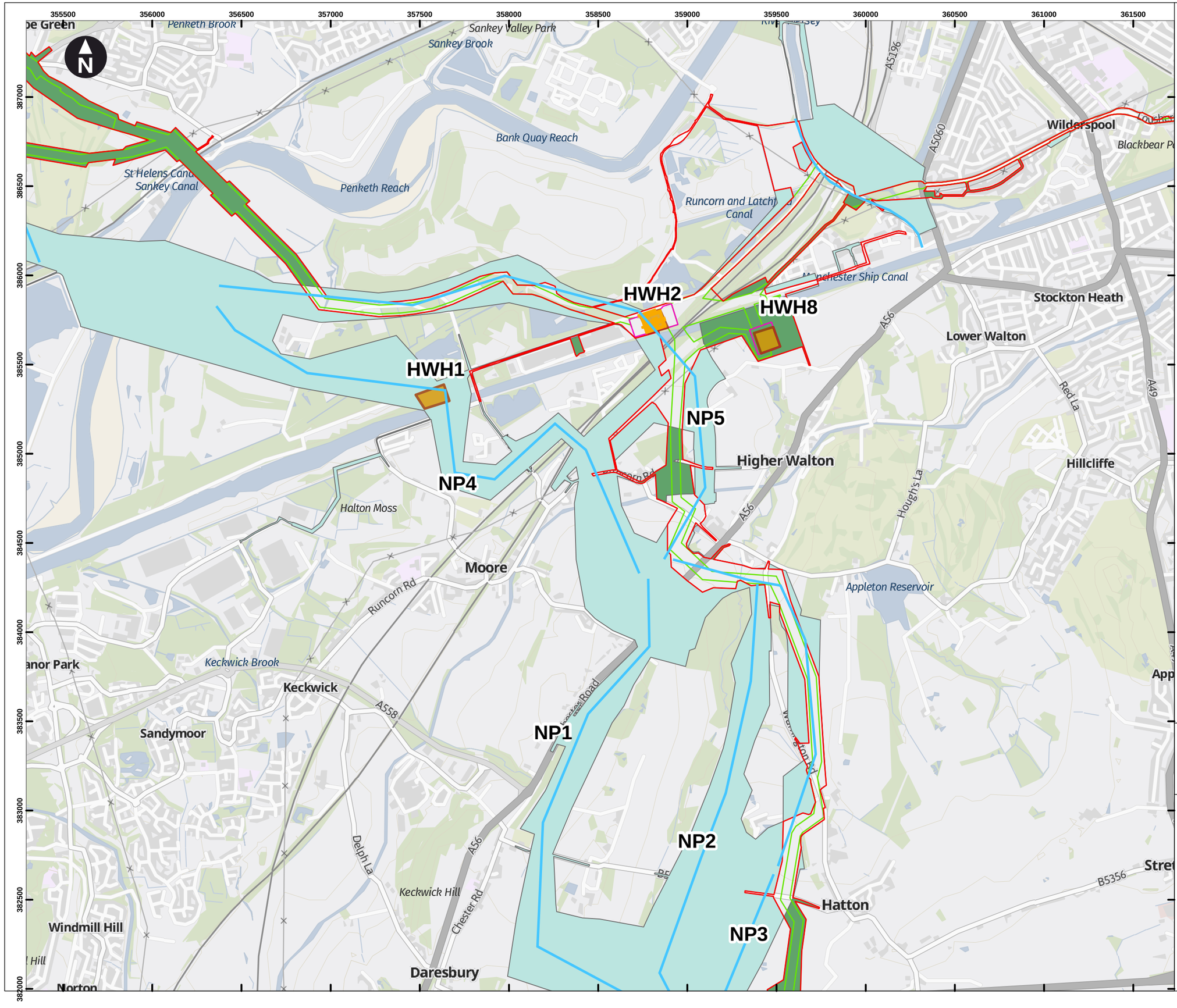
HyNet North West Hydrogen Pipeline Project
Design Evolution Report

**Figure 6.10**
**The Heath**

October 2024




Key

- Draft Order Limits
- Pipeline Limits of Deviation
- Hydrogen Above Ground Installation Layouts
- Hydrogen Above Ground Installation Limits of Deviation
- Land Added To Draft Order Limits
- Land Removed From Draft Order Limits
- Higher Walton HAGI Options
- Pipeline Options

Scale at A3: 1:20,000

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Client

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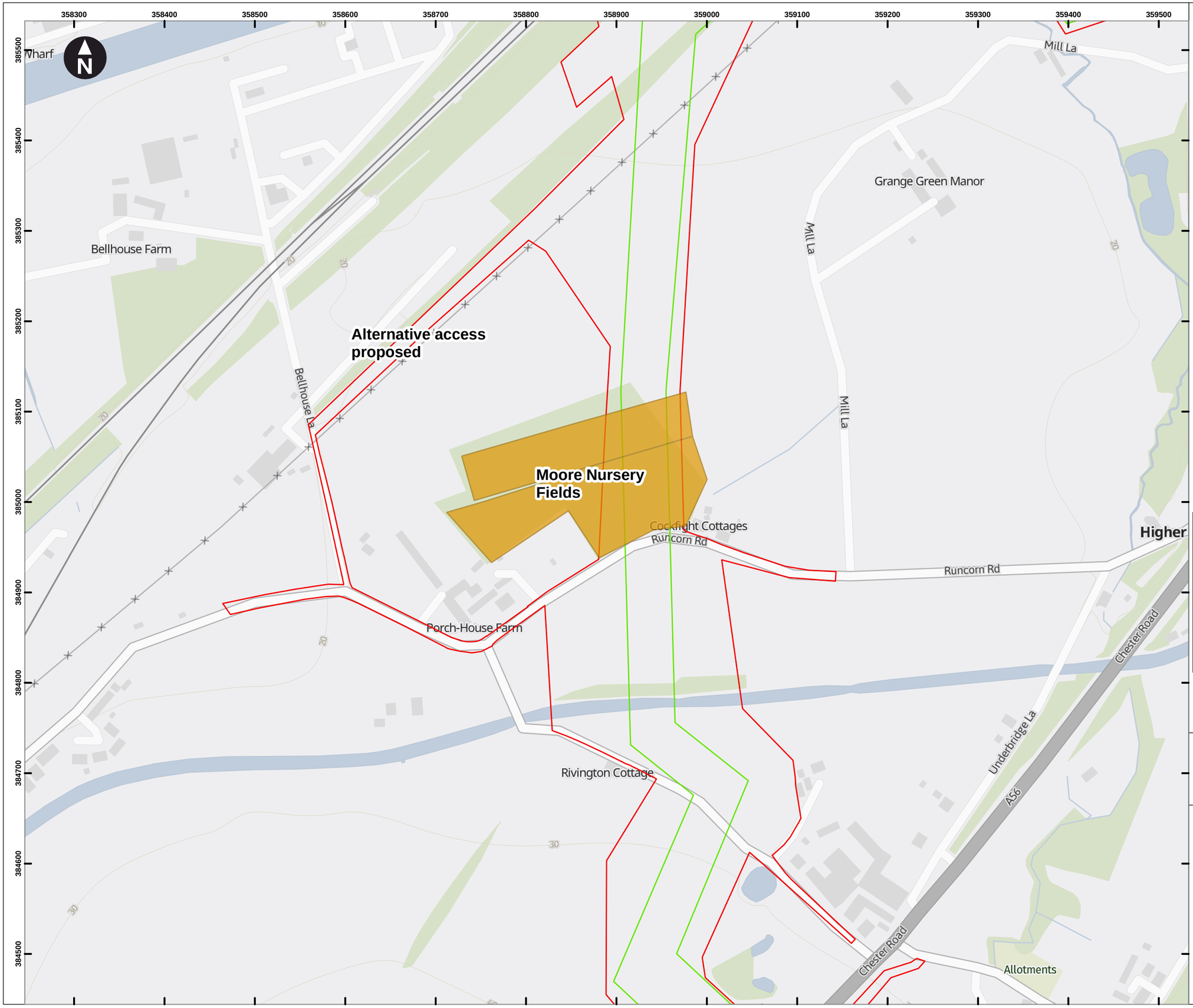
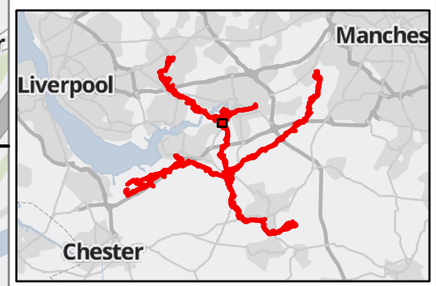
**Figure 6.11**
**Daresbury and Higher Walton HAGI**

October 2024




Key

- Draft Order Limits
- Pipeline Limits of Deviation
- Moore Nursery Fields




0 50 100 150 200 Meters

Scale at A3: 1:4,000

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Contains data from OS Zoomstack

Client

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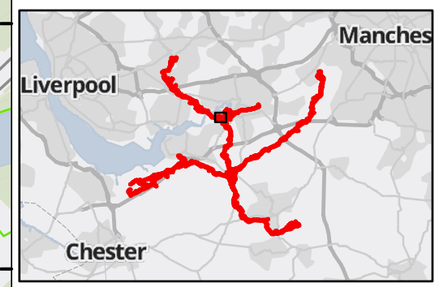
**Figure 6.12**
**Moore Nursery, Bellhouse Lane**

October 2024

Key

- Draft Order Limits
- Pipeline Limits of Deviation
- Hydrogen Above Ground Installation Layouts
- Hydrogen Above Ground Installation Limits of Deviation
- Land Added To Draft Order Limits
- Land Removed From Draft Order Limits




0 50 100 150 200 250 Meters

Scale at A3: 1:5,000

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Contains data from OS Zoomstack

Client

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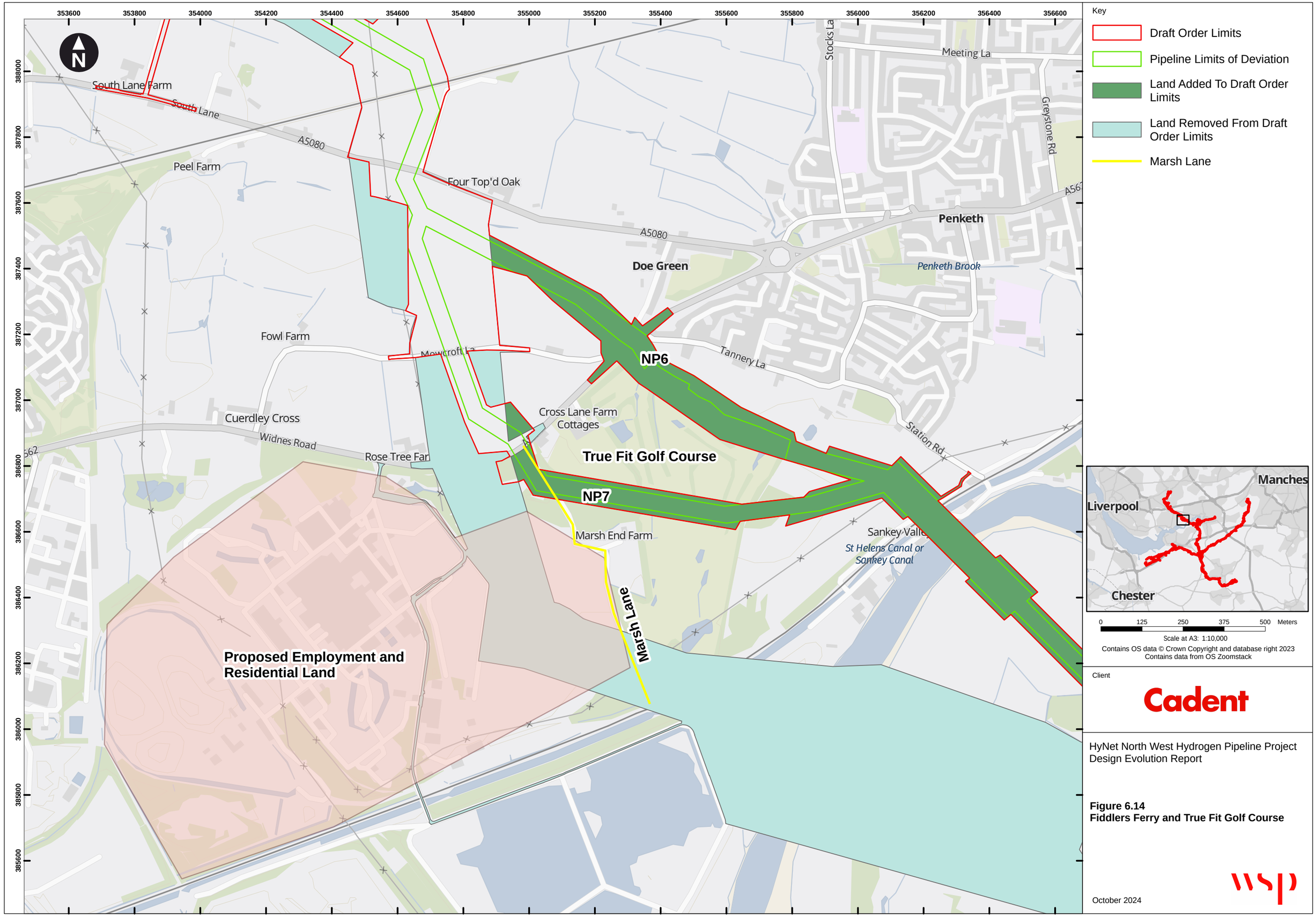
**Figure 6.13**
**Moore Nature Reserve**

October 2024


353600
353800
354000
354200
354400
354600
354800
355000
355200
355400
355600
355800
356000
356200
356400
356600
388000
387800
387600
387400
387200
387000
386800
386600
386400
386200
386000
385800
385600
N
South Lane Farm
South Lane
A5080
Peel Farm
Four Top'd Oak
A5080
Doe Green
Penketh
Penketh Brook
Meeting La
Stocks La
Greystone Rd
A567
Fowl Farm
Mewcroft La
NP6
Tannery La
Cross Lane Farm Cottages
Station Rd
Cuerdley Cross
Widnes Road
Rose Tree Far
True Fit Golf Course
NP7
Marsh End Farm
Sankey Valley
St Helens Canal or Sankey Canal
Marsh Lane
Proposed Employment and Residential Land
Key
Draft Order Limits
Pipeline Limits of Deviation
Land Added To Draft Order Limits
Land Removed From Draft Order Limits
Marsh Lane
Manches
Liverpool
Chester
0
125
250
375
500
Meters
Scale at A3: 1:10,000
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Contains data from OS Zoomstack
Client
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Figure 6.14
Fiddlers Ferry and True Fit Golf Course
October 2024

359200 359250 359300 359350 359400 359450 359500 359550 359600 359650 359700 359750 359800

386300 386250 386200 386150 386100 386050 386000 385950 385900 385850 385800

N

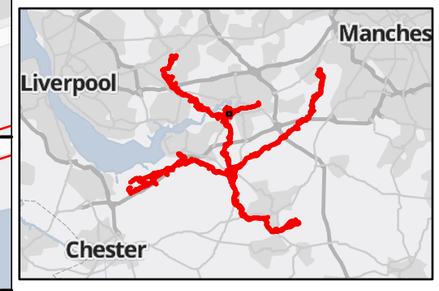
Solvay

Previous Pig Trap

Amended Pig Trap

Key

- Draft Order Limits
- Pipeline Limits of Deviation
- Pigging Areas Limits of Deviation
- Previous Pig Trap
- Pigging Compound Layouts




0 25 50 75 100 Meters

Scale at A3: 1:2,000

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Client

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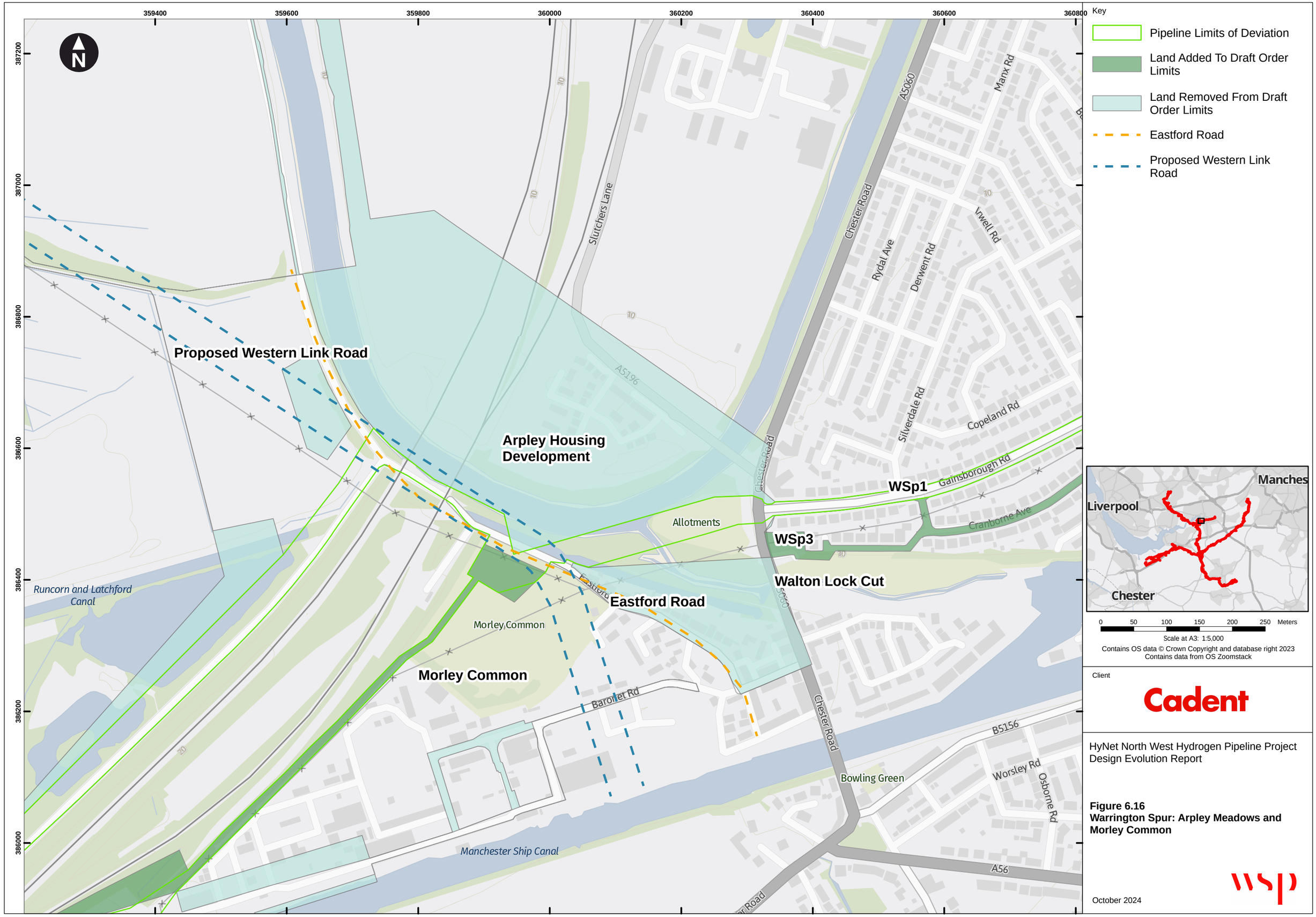
**Figure 6.15**
**Warrington Spur: Solvay**

October 2024




Key

- Pipeline Limits of Deviation
- Land Added To Draft Order Limits
- Land Removed From Draft Order Limits
- Eastford Road
- Proposed Western Link Road




0 50 100 150 200 250 Meters

Scale at A3: 1:5,000

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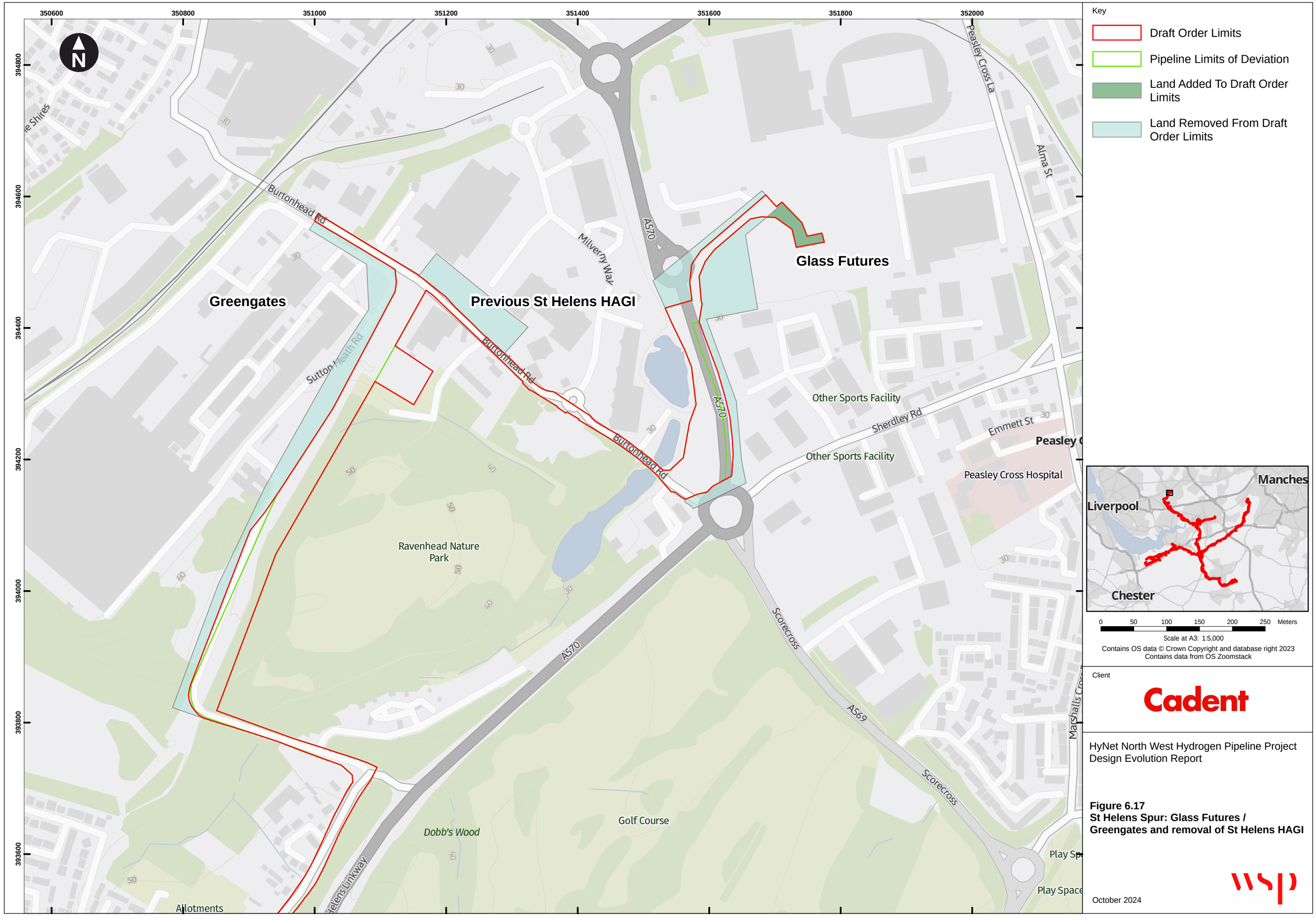
**Figure 6.16**
**Warrington Spur: Arpley Meadows and Morley Common**

October 2024

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Contains data from OS Zoomstack

Client

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**Figure 6.17**
**St Helens Spur: Glass Futures / Greengates and removal of St Helens HAGI**

October 2024

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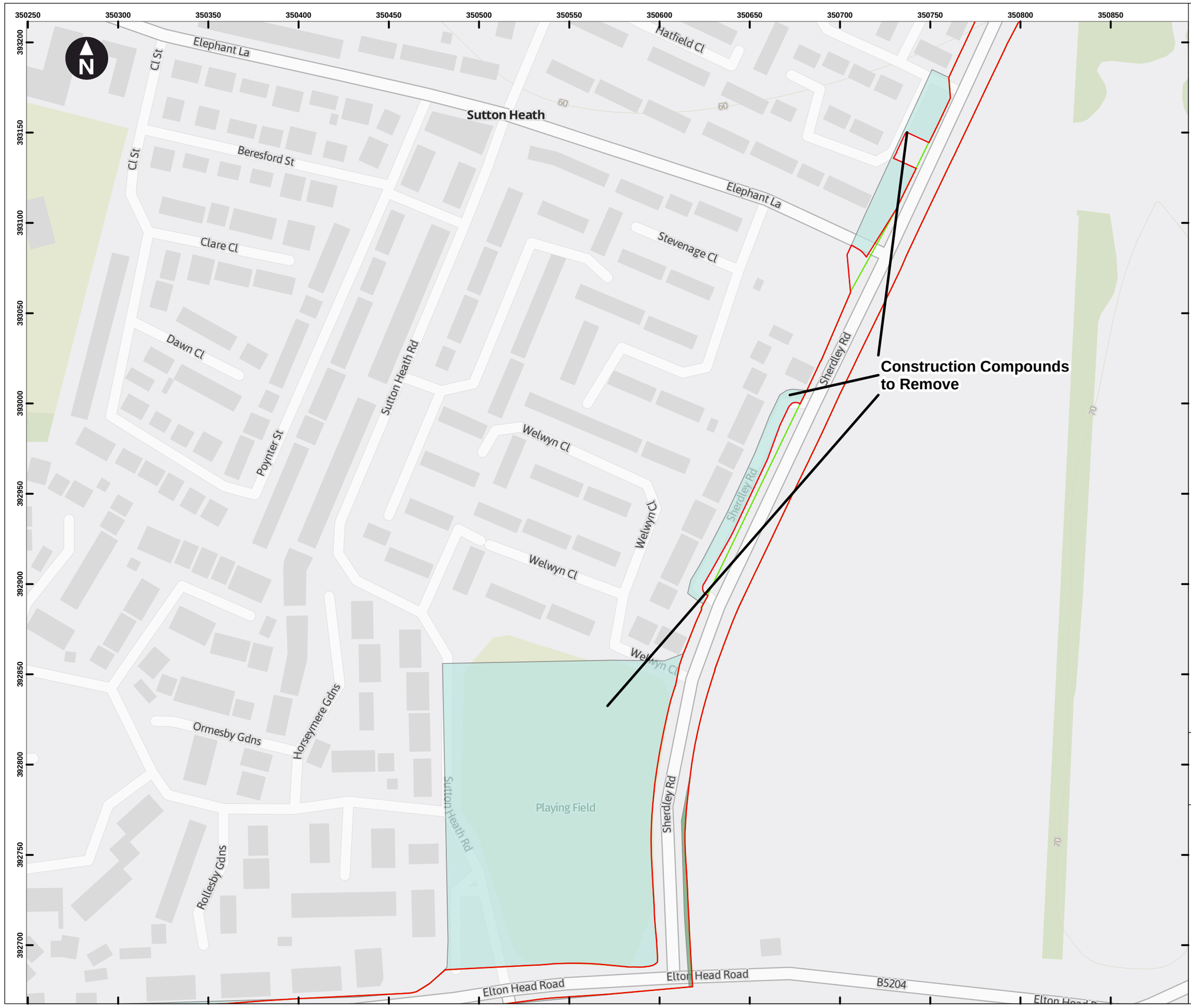
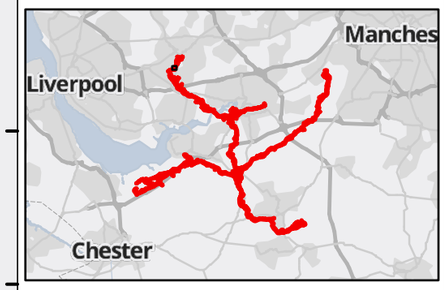
**Figure 6.18**
**St Helens Spur: M62 crossing**

October 2024




Key

- Draft Order Limits
- Pipeline Limits of Deviation
- Land Added To Draft Order Limits
- Land Removed From Draft Order Limits




0 25 50 75 100 Meters

Scale at A3: 1:2,000

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Contains data from OS Zoomstack

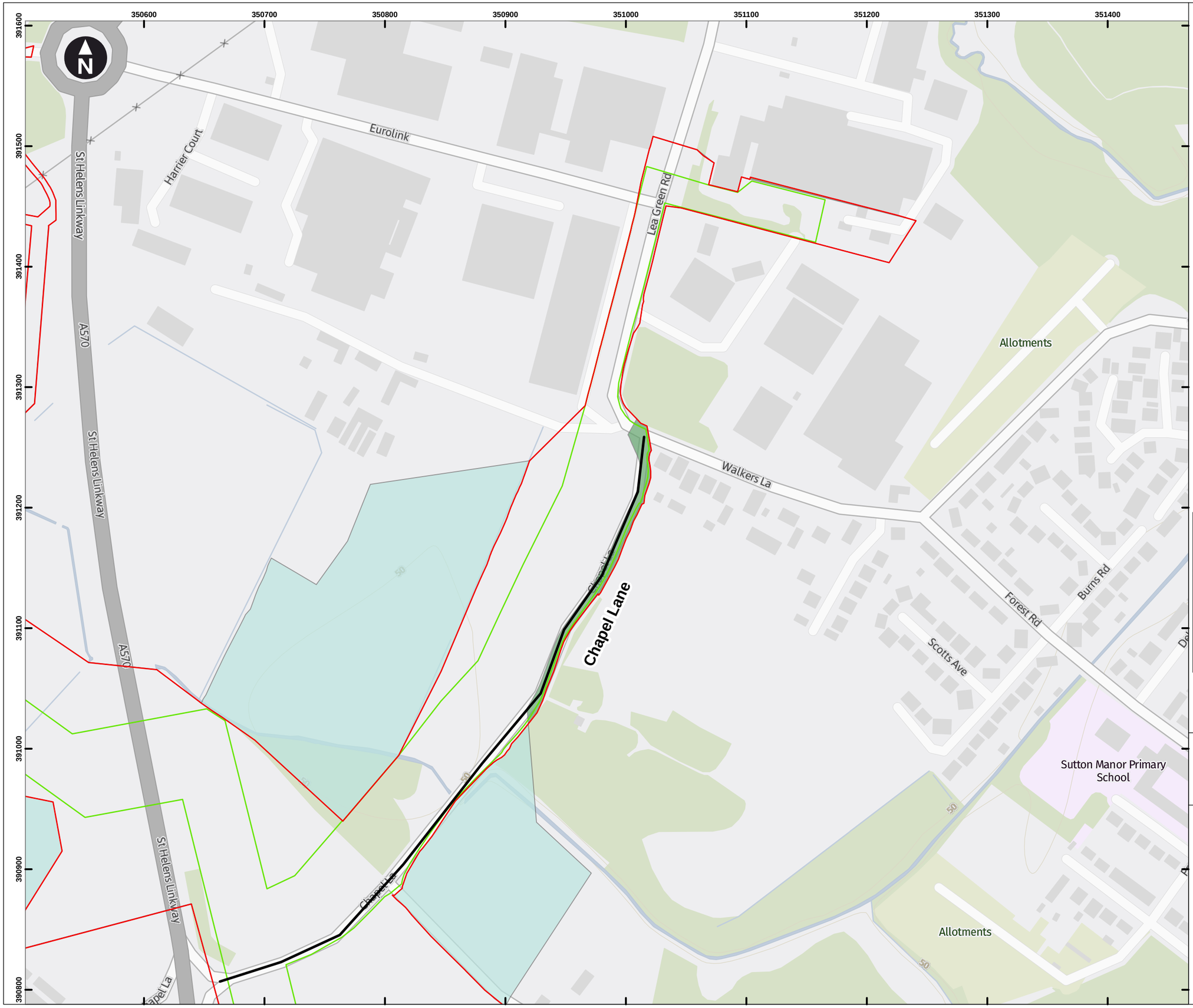
Client

Cadent

HyNet North West Hydrogen Pipeline Project
Design Evolution Report

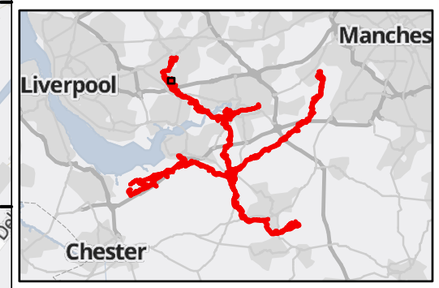
**Figure 6.19**
**St Helens Spur: Sherdley Road**

October 2024




Key

- Draft Order Limits
- Pipeline Limits of Deviation
- Land Added To Draft Order Limits
- Land Removed From Draft Order Limits




0 25 50 75 100 125 Meters

Scale at A3: 1:3,000

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Contains data from OS Zoomstack

Client

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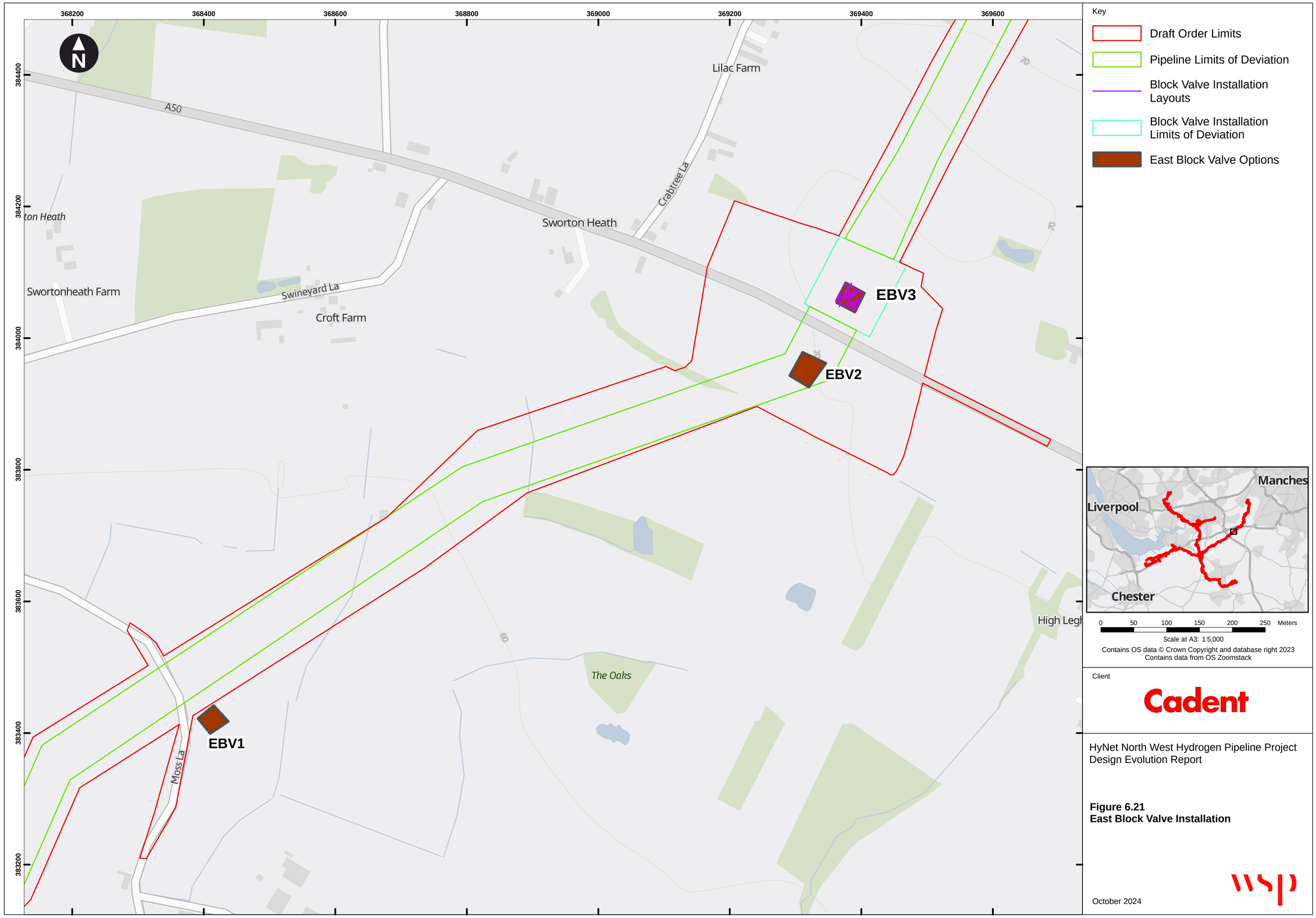
Design Evolution Report

**Figure 6.20**
**Clock Face Spur: Chapel Lane**

October 2024




Key

- Draft Order Limits
- Pipeline Limits of Deviation
- Block Valve Installation Layouts
- Block Valve Installation Limits of Deviation
- East Block Valve Options




0 50 100 150 200 250 Meters

Scale at A3: 1:5,000

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**Figure 6.21**
**East Block Valve Installation**

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372400 372600 372800 373000 373200 373400 373600 373800

392400 392200 392000 391800 391600 391400 391200

N

Access Options

PH1

PH2

Partington Trail
Nature Reserve

A6144

Common La

Manchester Road

Broadway

Moss View Rd

Play Space

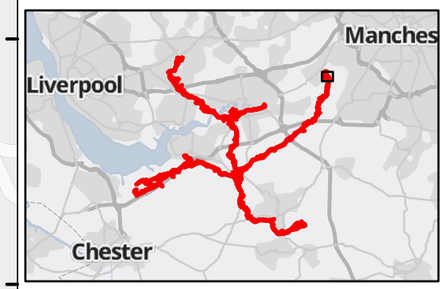
Allotments

Heath Farm La

20

Key

- Draft Order Limits
- Pipeline Limits of Deviation
- Hydrogen Above Ground Installation Layouts
- Hydrogen Above Ground Installation Limits of Deviation
- Partington HAGI Options
- Land Added To Draft Order Limits
- Land Removed From Draft Order Limits




0 50 100 150 200 250 Meters

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**Figure 6.22**
**Partington HAGI**

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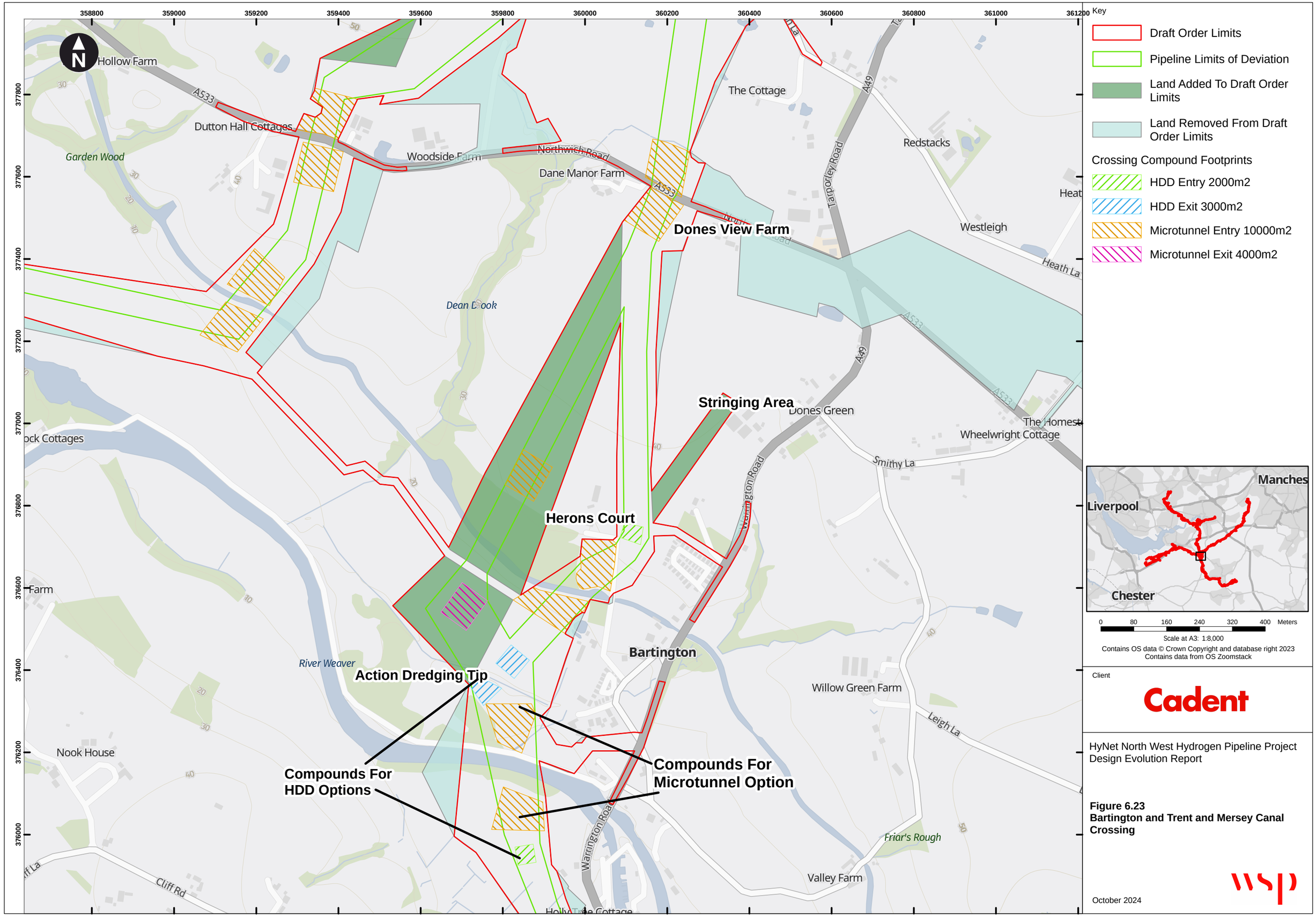


Key

- Draft Order Limits
- Pipeline Limits of Deviation
- Land Added To Draft Order Limits
- Land Removed From Draft Order Limits

Crossing Compound Footprints

- HDD Entry 2000m2
- HDD Exit 3000m2
- Microtunnel Entry 10000m2
- Microtunnel Exit 4000m2




0 80 160 240 320 400 Meters

Scale at A3: 1:8,000

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**Figure 6.23**
**Bartington and Trent and Mersey Canal Crossing**

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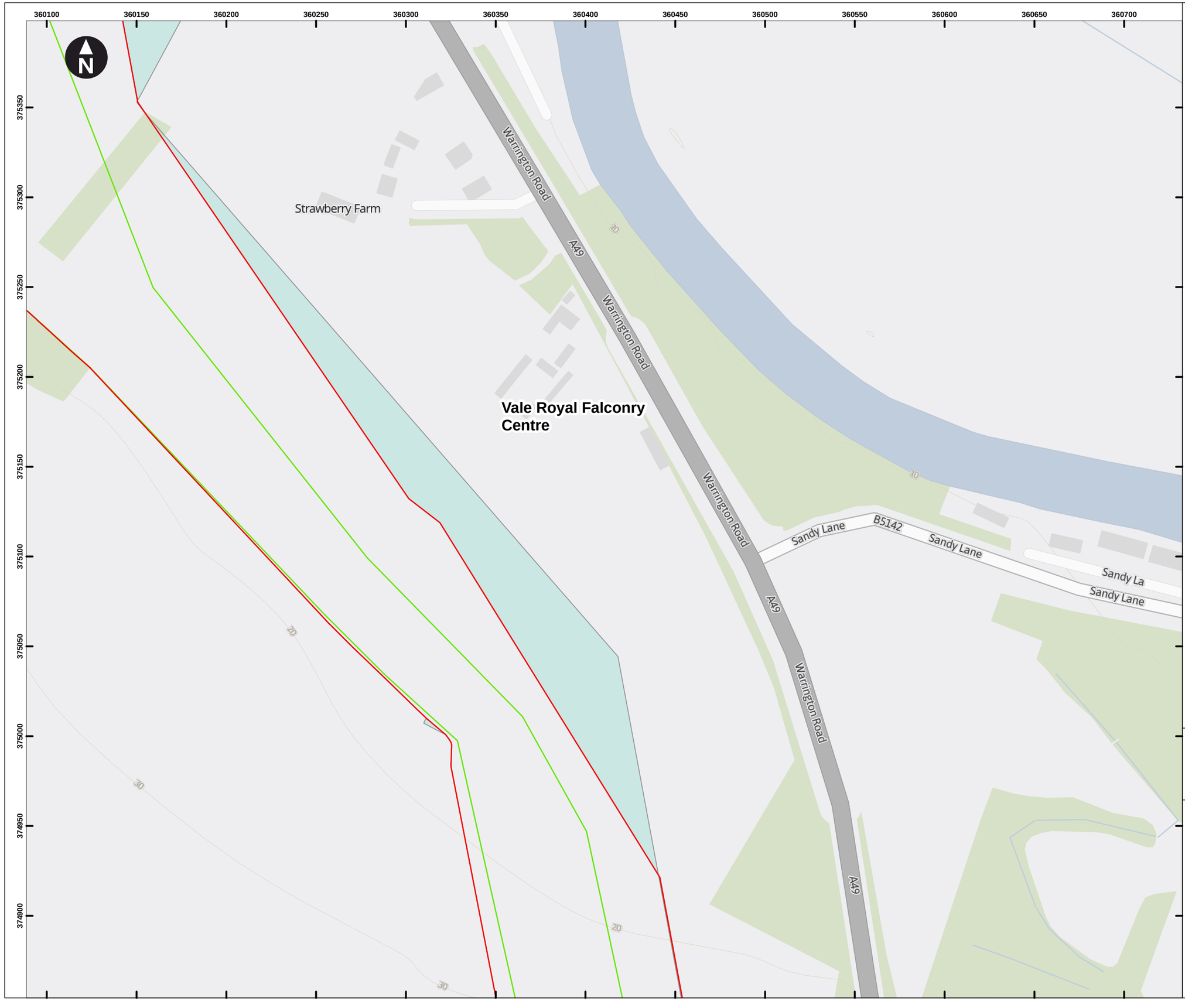
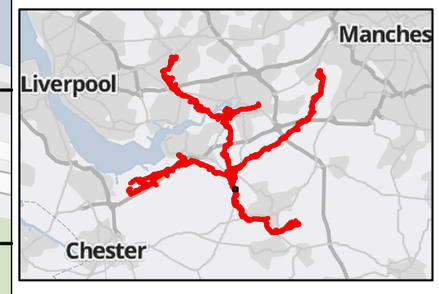



Key

- Draft Order Limits
- Pipeline Limits of Deviation
- Land Added To Draft Order Limits
- Land Removed From Draft Order Limits




0 25 50 75 100 Meters

Scale at A3: 1:2,000

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**Figure 6.24**
**Vale Royal Falconry Centre**

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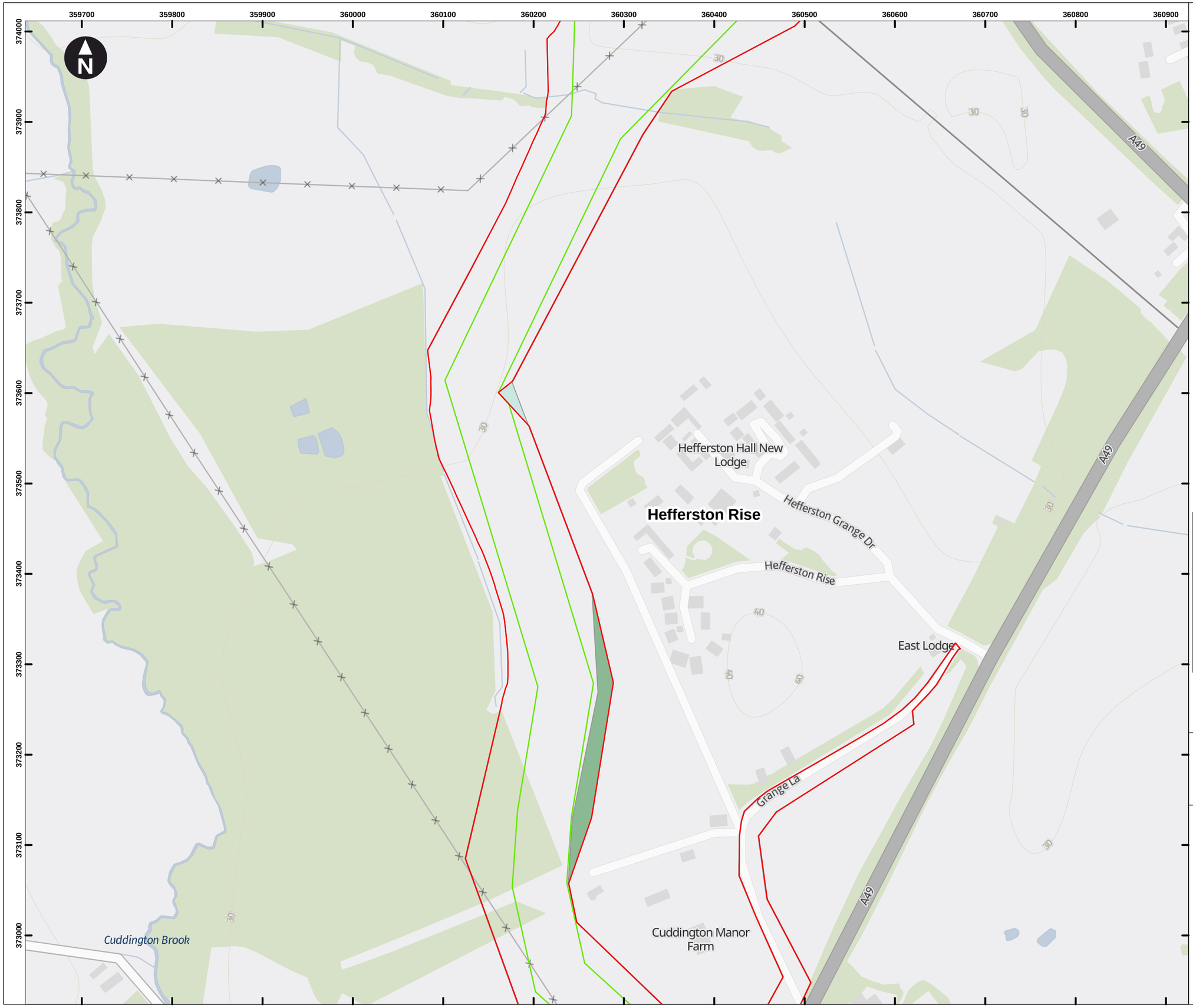
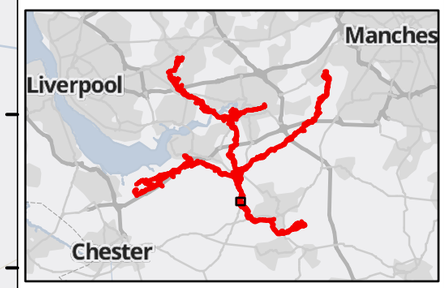



Key

- Draft Order Limits
- Pipeline Limits of Deviation
- Land Added To Draft Order Limits
- Land Removed From Draft Order Limits




0 50 100 150 200 Meters

Scale at A3: 1:4,000

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**Figure 6.25**
**North of A49 near Gorstage**

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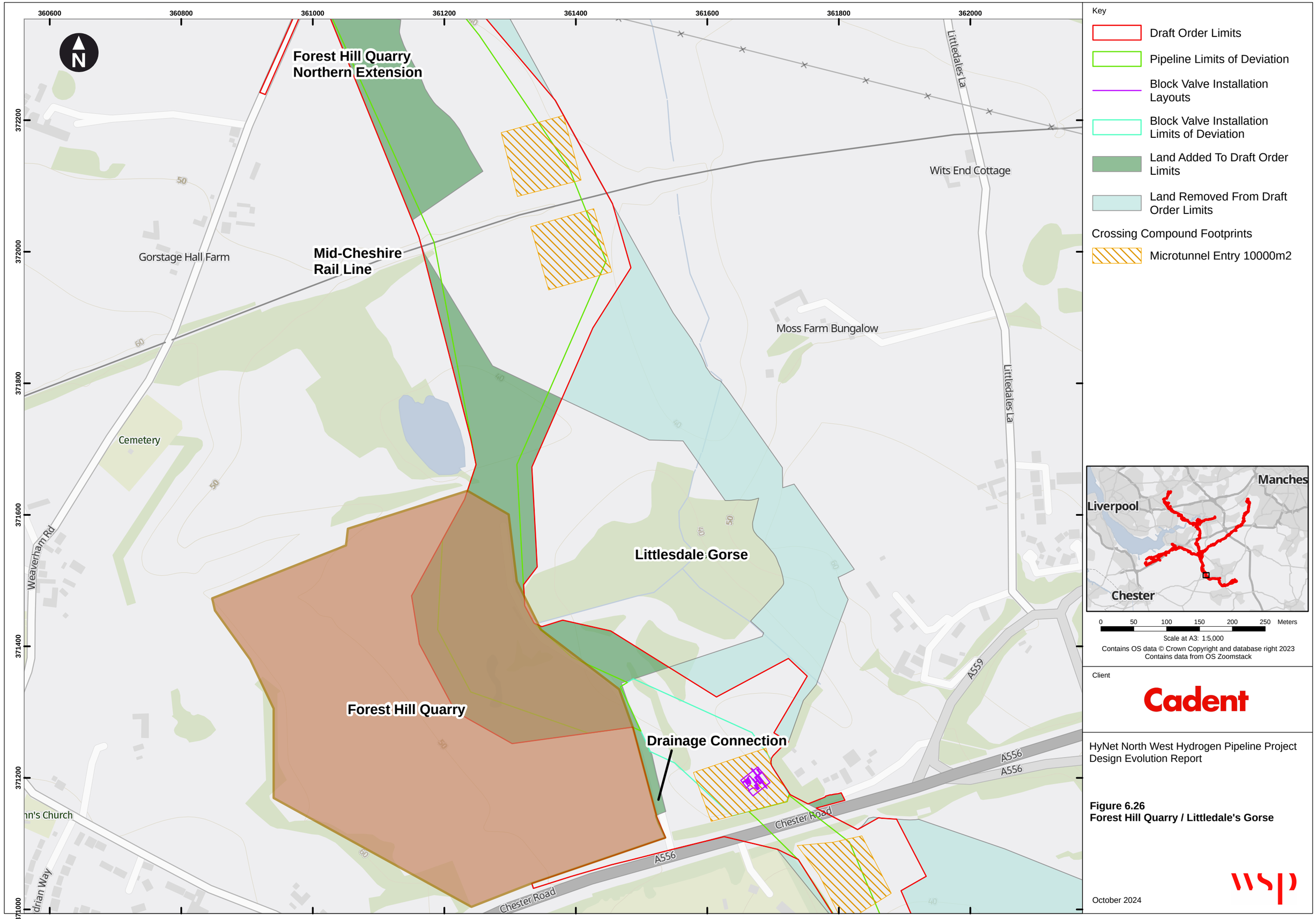


Key

- Draft Order Limits
- Pipeline Limits of Deviation
- Block Valve Installation Layouts
- Block Valve Installation Limits of Deviation
- Land Added To Draft Order Limits
- Land Removed From Draft Order Limits

Crossing Compound Footprints

- Microtunnel Entry 10000m2




0 50 100 150 200 250 Meters

Scale at A3: 1:5,000

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**Figure 6.26**
**Forest Hill Quarry / Littledale's Gorse**

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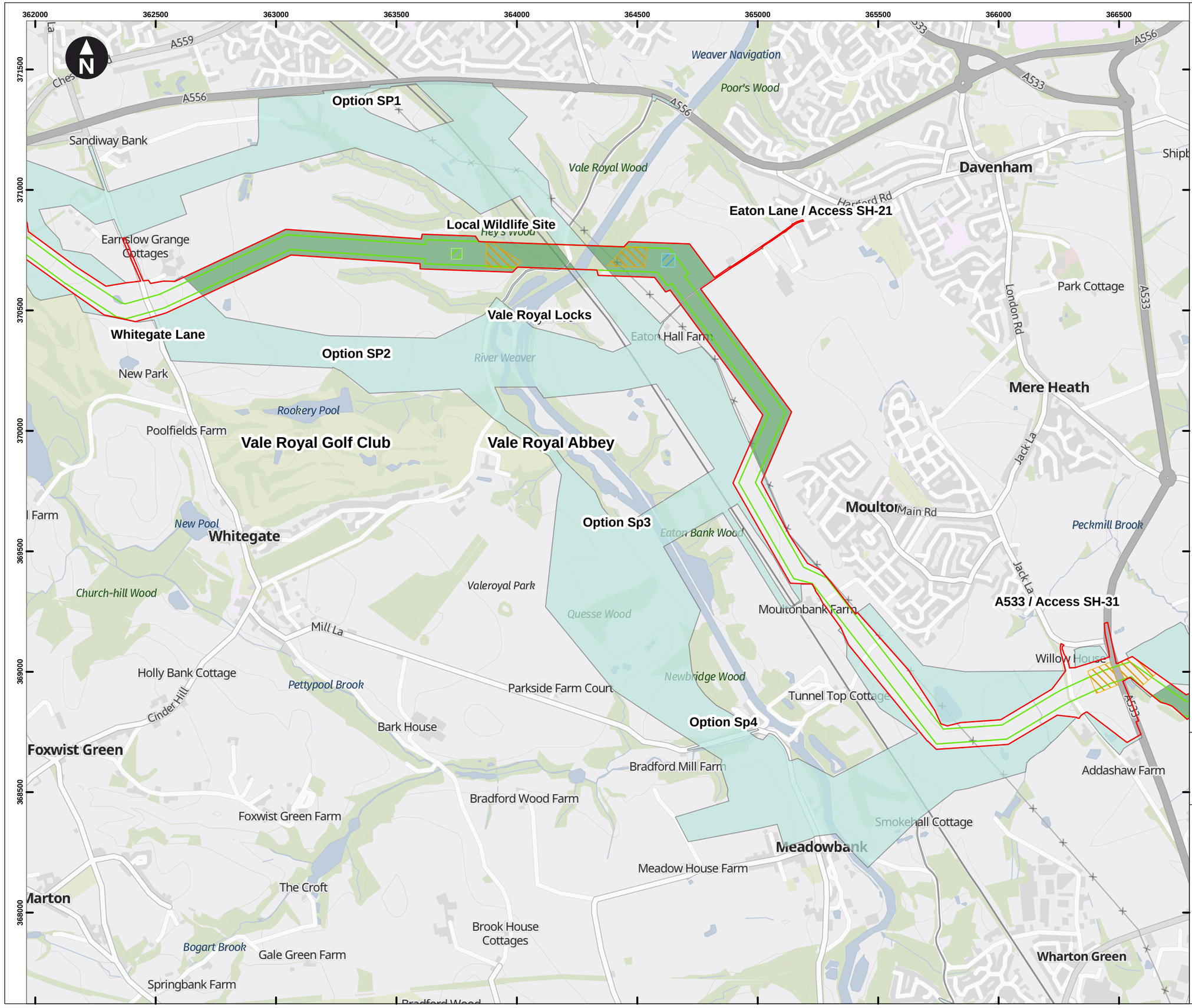


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**Figure 6.27**
**West Coast Mainline Route Crossing at Vale Royal and Eaton Lane**

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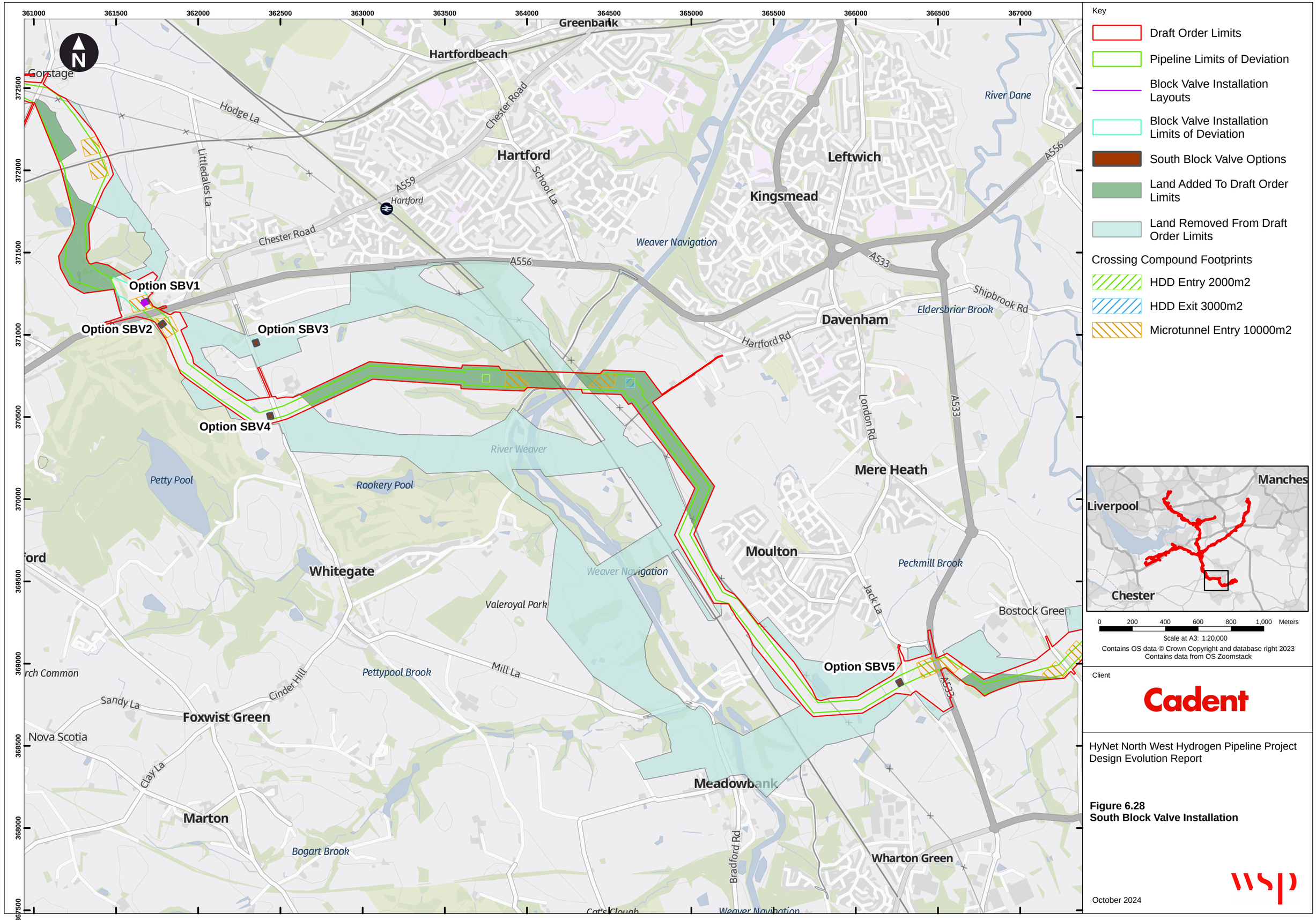


Key

- Draft Order Limits
- Pipeline Limits of Deviation
- Block Valve Installation Layouts
- Block Valve Installation Limits of Deviation
- South Block Valve Options
- Land Added To Draft Order Limits
- Land Removed From Draft Order Limits

Crossing Compound Footprints

- HDD Entry 2000m2
- HDD Exit 3000m2
- Microtunnel Entry 10000m2

Scale at A3: 1:20,000

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**Figure 6.28**
**South Block Valve Installation**

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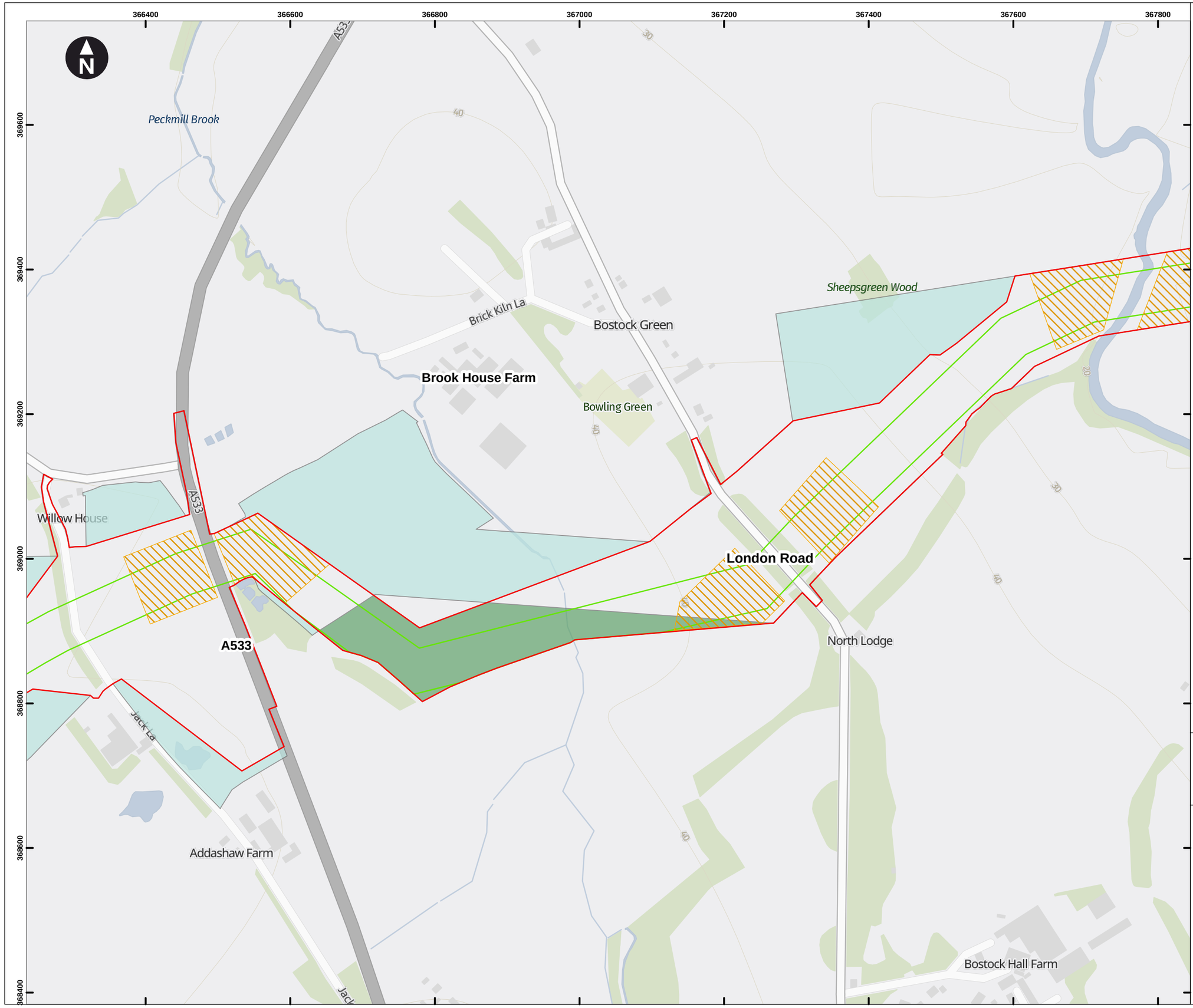
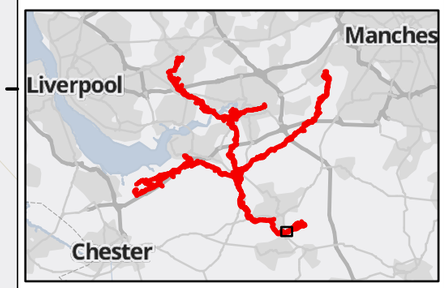



Key

- Draft Order Limits
- Pipeline Limits of Deviation
- Land Added To Draft Order Limits
- Land Removed From Draft Order Limits

Crossing Compound Footprints

- Microtunnel Entry 10000m2




0 50 100 150 200 250 Meters

Scale at A3: 1:5,000

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**Figure 6.29**
**South of Bostock Green**

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359400 359600 359800 360000 360200 360400 360600 360800

378600 378400 378200 378000 377800 377600 377400

N

Marsh Lane Farm

Seven Acre Wood

Whitley Brook

Newholme Farm

Marsh Lane

CHH2

CHH1

Marsh La

Tarporley Road

A49

The Cottage

Redst

Woodside Farm

Northwich Road

Dane Manor Farm

A533

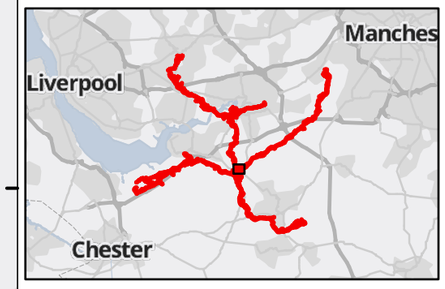
Dean Brook

Key

- Draft Order Limits
- Pipeline Limits of Deviation
- Hydrogen Above Ground Installation Layouts
- Hydrogen Above Ground Installation Limits of Deviation
- Central Hub HAGI Options
- Land Added To Draft Order Limits
- Land Removed From Draft Order Limits

Crossing Compound Footprints

- Microtunnel Entry 10000m2




0 50 100 150 200 250 Meters

Scale at A3: 1:5,000

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**Figure 6.30**
**Central Hub**

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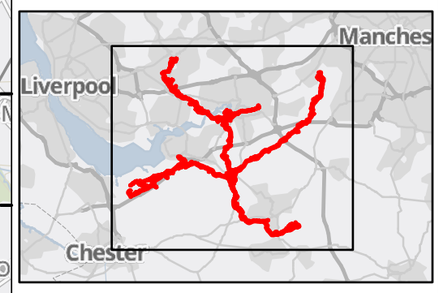
Key

- Draft Order Limits
- Land Added To Draft Order Limits
- Land Removed From Draft Order Limits




0 1 2 3 4 5 Km

Scale at A3: 1:110,000

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**Figure 6.31**
**Land Removed or Included since Stage 2 Statutory Consultation**

wsp

October 2024

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