

Appendix 2A

Design Evolution

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Contents

1.	Appendix 2A Design Evolution	1
1.1	Introduction	1
1.2	Strategic Options	2
	Strategic Option A	2
	Strategic Option B	2
	Strategic Option C	3
	Strategic Option D	3
	Preferred Strategic Options	3
1.3	Route Corridor Identification	4
	West Route Corridor	4
	South Route Corridor	4
	Runcorn/Rocksavage Spur	5
	Northwich Spur	5
	HAGI Search Areas	5
1.4	Stage 1 Non-statutory Consultation	6
	West Corridor	6
	North Corridor	6
	East Corridor	7
	South Corridor	7
	Northwich Spur	7
	HAGI Search Areas	8
	Other Consultation Responses on Route Corridors	9
	Preliminary Route Alignment/Preliminary Order Limits	9
1.5	Stage 2 Statutory Consultation	12
	Refinement of the Preliminary Order Limits	12
Table 2A 1.1 Notable Amendments to the Preliminary Order Limits		13

1. Appendix 2A Design Evolution

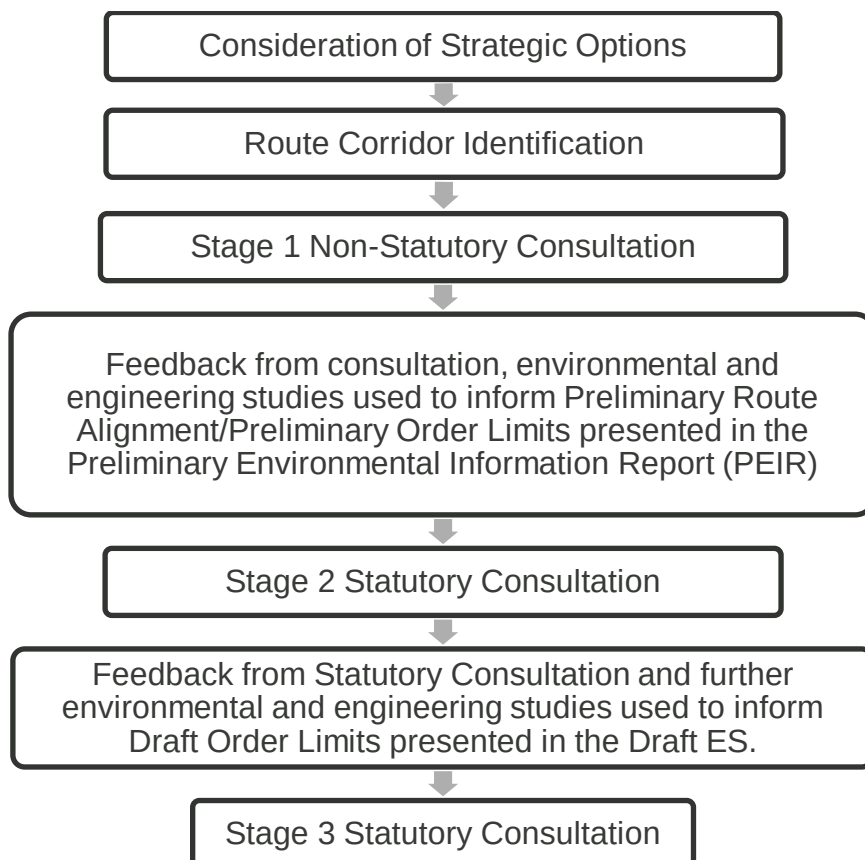
1.1 Introduction

- 1.1.1 Schedule 4 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017¹ (the EIA Regulations) states that an Environmental Statement (ES) should include:

"A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects."

- 1.1.2 This Appendix provides an overview of the options and routes considered, how the design has evolved and how decisions have been made. Further details are provided within the Design Evolution Report (DER), which was published as part of the Stage 2 Statutory Consultation exercise.

- 1.1.3 The route development stages can be summarised as:



¹ UK Government (2017). Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended). (Online) Available at: <https://www.legislation.gov.uk/uksi/2017/572/contents> (Accessed December 2021).

1.2 Strategic Options

1.2.1 Strategic Options were developed to allow the identification of connection routes between the following defined end points, which the Project needs to connect to:

- Hydrogen Production Plant (at Stanlow Refinery):
 - ▶ The initial source of hydrogen supply to the Hydrogen Pipeline Network (HPN).
- Hydrogen Storage Facility (Inovyn, Northwich):
 - ▶ To allow hydrogen to be stored at times of peak supply and released into the HPN to meet demand.
- Carrington Power Station and two blending points on the existing Cadent gas network (Partington and Warburton):
 - ▶ To support electricity generation and allow hydrogen to be blended with natural gas and supplied into the wider gas pipeline network to maximise the extent of supply.
- A cluster of industrial operations in St Helens:
 - ▶ To allow hydrogen to be supplied to these customers as a fuel for their operational requirements.

1.2.2 In addition, a number of other industrial customers in the vicinity that wish to be supplied with hydrogen as a fuel for their operational requirements have been identified. The Project will facilitate connections to those customers via spurs which link into a Hydrogen Above Ground Installation (HAGI) on the main pipeline route.

1.2.3 Illustrative representations of Strategic Options A-D are provided on **Figures 2A.1 A-D**.

Strategic Option A

1.2.4 Strategic Option A formed an 'X' shaped configuration, with a central hub (where a junction of the different pipeline sections is located) near to the A553/A49 junction and four sections out from there: west to Stanlow, north to St Helens, east to Partington and Warburton and south to the Hydrogen Storage Facility. Two alternatives were considered for the southern leg due to the location of Northwich between the Central Hub and the Hydrogen Storage Facility.

Strategic Option B

1.2.5 Strategic Option B formed an 'H' shaped configuration. The western leg ran from Stanlow to Frodsham, and then north across the Mersey Estuary to St Helens. The eastern leg ran from Partington, south past Warburton to a location near to Junction 20 of the M6 and then south to the Hydrogen Storage Facility. A central connection section joined the western and eastern legs from near Junction 20 of the M6 to a location near junction 7 of the M62.

Strategic Option C

- 1.2.6 Strategic Option C was formed from a combination of Strategic Option A and B, with the western, northern and eastern legs being the same as for Strategic Option A. The connection to the hydrogen storage facility utilised the option provided in Strategic Option B, with a leg running from near Junction 20 of the M6 to the storage facility.

Strategic Option D

- 1.2.7 Strategic Option D formed a roughly 'U' shaped configuration, with a western leg running from Stanlow to St Helens across the Mersey Estuary (with a spur off towards Warrington), a southern leg running from Stanlow to the Hydrogen Storage Facility and an Eastern leg from Winsford to Carrington.

Preferred Strategic Options

- 1.2.8 Each of the Strategic Options was reviewed against criteria which include considering the following specific issues:
- the likely length of the pipeline;
 - major road/rail/river crossings (and associated cost, constructability and environmental issues);
 - proximity to population (and associated routeing or connection considerations);
 - conflict with key policy and environmental constraints; and
 - the ability for the network to accommodate future expansion in later stages of the wider HyNet North West programme.
- 1.2.9 Each Strategic Option had both positive and negative considerations; however Strategic Option A was chosen as the most appropriate option on the basis that:
- Strategic Option B and D both involved crossings of the Mersey Estuary with the environmental implications of work within or closer to the Special Protection Area (SPA), Ramsar designations and the additional cost from longer sections of large diameter pipeline and difficulty of long-distance drilling required to create the pipeline route.
 - Strategic Option C would require an additional hub site, which adds complexities and cost to the construction of the development and requires additional land take.

1.3 Route Corridor Identification

- 1.3.1 Within the preferred Strategic Option A, route corridors were then developed to support the EIA Scoping exercise. These followed the direct line routes between connection points where possible, with spur lines identified where needed to make the actual connections. The route corridor boundaries were then drawn to avoid or minimise impacts on features such as built-up areas or identified environmental or construction constraints, such that a pipeline within that route corridor could feasibly be consented and developed. Each route corridor was then considered in more detail with the boundaries refined where possible to further improve the construction viability and minimise any potential impacts.
- 1.3.2 Within Strategic Option A, single corridors were identified within which the North and East route corridors would be located (**Figures 2A.3 and 2A.4**), and two options for both the West and South route corridors, were identified (**Figures 2A.2 and 2A.5**). Spur line options at Runcorn/Rocksavage on the West route corridor and at Northwich, from the Central Hub or South route corridor were also identified (**Figures 2A.6 and 2A.7**). The other spur lines which are needed only contained single corridors and no options.

West Route Corridor

- 1.3.3 The West Route Corridor (**Figure 2A.2**) consisted of:
- West 1: A route running from Stanlow, crossing the M56 to the north of Frodsham, then running to the central hub.
 - West 2: A route running from Stanlow and crossing the M56 before heading towards Dunham on the Hill, and then running to the central hub. This route would require a spur running from the corridor to the east of Frodsham, to provide a connection into customers based to the south of Runcorn.
- 1.3.4 Although the West 1 had increased areas of flood risk, due to the greater pipeline length, flatter topography and greater presence of heritage assets and locally important landscape designations along West 2, West 1 was selected as the most appropriate option to take forward to stage 1 non-statutory consultation.

South Route Corridor

- 1.3.5 The South Route Corridor (**Figure 2A.5**) consisted of:
- South 1: running from Winsford around the southern and western extents of Northwich to connect with the central hub.
 - South 2: running from Winsford around the eastern and northern extents of Northwich to connect with the central hub.
- 1.3.6 Neither corridor provided an obvious preference from an environmental perspective, with the south/west corridor containing slightly more heritage assets, but slightly fewer recreational and ecological assets. From a constructability perspective, South 2 was around 1km longer and although both corridors would cross the HS2 route, the South 1 crossing point was preferable, being flat, open fields. The South 2 corridor would cross close to the A556 and in an area with some Tree Preservation Orders (TPOs) and Ancient Woodland. In addition, the

South 2 corridor would pass over more land and infrastructure associated with the salt caverns/extractions around Northwich. Due to there being no substantial preference for either corridor, pipeline corridors were developed along both corridors and were taken forward for the Stage 1 non-statutory consultation.

Runcorn/Rocksavage Spur

- 1.3.7 The Runcorn/Rocksavage Spur (**Figure 2A.6**) is needed to connect the West pipeline with industrial customers at Interger and The Heath Industrial and Business Park. The corridors for this spur consisted of:
- Interger: the spur would run from the Runcorn Hydrogen Above Ground Infrastructure (HAGI) west into the Interger site and then continue west through other privately owned industrial land, before turning north to reach The Heath.
 - The Heath: the spur would run from the Runcorn HAGI in a north-west direction through Runcorn Golf Club to The Heath. It would then continue south-west into the Interger site. This spur has now been removed from the Project.
- 1.3.8 Whilst the Interger corridor would only require one crossing of the A557 (compared to two crossings for The Heath option) and would avoid Runcorn Golf Club, the Interger option would be reliant on land being available within the Interger site to continue the pipeline onto The Heath. Due to disruption this may cause with operations at Interger it was necessary to maintain both corridors into the non-statutory consultation.

Northwich Spur

- 1.3.9 The Northwich Spur (**Figure 2A.7**) is required to connect Tata Chemicals in Northwich with the pipeline. Four corridors were developed, two leading directly from the Central Hub and two leading from the South Corridors:
- Spur 1: running from the South 1 corridor option in the Gorstage area in a north-east direction between Weaverham and Hartford Beach towards Tata.
 - Spur 2: running from the South 2 corridor option in the Higher Marston area in a south-west direction across Marbury Country Park towards Tata.
 - Spur 3: running from the Central Hub in a south-east direction past the eastern side of Barnton and Anderton before running towards Tata.
 - Spur 4: running from the Central Hub in a south-east direction to the north of Weaverham before running north-east towards Tata.
- 1.3.10 All four corridors were included in the non-statutory consultation. This spur has now been removed from the Project.

HAGI Search Areas

- 1.3.11 Within the Preferred Route Corridors, search areas for Hydrogen Above Ground Installations (HAGIs) were also identified in the non-statutory consultation exercise. These were located at points on the pipeline network where connections are required. The locations reflect the decision to avoid key designations or constraints where possible.

1.4 Stage 1 Non-statutory Consultation

- 1.4.1 The Route Corridors and HAGI search areas described above (and described in the Design Evolution Report as the Preliminary Route Corridors), were identified for the non-statutory consultation exercise event which ran from January to March 2022 and were sufficiently broad (up to a maximum of approximately 2.5km in places) in order for preliminary route alignments to be considered within them. A summary of how the feedback from the Stage 1 non-statutory consultation has shaped the development of the Project is described below (more detail is contained in the Design Evolution Report).

West Corridor

- 1.4.2 Comments received on the West Route Corridor from the non-statutory consultation highlighted potential constraints within the Route Corridor (areas of flooding, topography south of the A553 and Runcorn Golf Club on the Runcorn/Rocksavage Spur).
- 1.4.3 An alignment has been selected around the Sutton Weaver and north of Aston area due to a lower number of water course crossings and a smaller area of flood plain than a route that passed to the south of Alston. In other areas of the West Corridor, particularly between Stanlow and Rocksavage, it has not been possible to avoid flood plain land completely. The land to the south of the A553 was not taken forward as a location for the Central Hub and therefore will only be used for pipeline route and related construction activities where the topography is not a substantial constraint.
- 1.4.4 On the Runcorn/Rocksavage Spur, comments were received on The Heath option, raising concerns that Runcorn Golf Club would have to close. The spur line would run through the golf course here and will take a number of holes out of use for a temporary period of time during construction. This may lead to the Golf Club having to close, or partially close, during the construction works and until the restoration work on the holes affected has returned them to a usable condition. We are in the process of commencing discussions with the Club to discuss our proposals. However, the alternative Intergeren route corridor would not be feasible due to it running through operational industrial land and the safety issues and disruption to activities which would arise. The Heath route corridor has therefore been taken forward as the proposed spur.

North Corridor

- 1.4.5 Between the M56 and the River Mersey in the North Route Corridor, two specific corridors were included in the non-statutory consultation to consider the best option for passing a number of constraints in this area: the Creamfields Festival site, built development associated with the Higher Walton and Moore settlements and designations such as TPOs, Ancient Woodlands and nature conservation sites. On the western boundary, a route corridor shown as NP7 was included, plus a widened corridor in the eastern part of the corridor to allow routes to be considered within it. NP7 was between Sandymoor and Moore/Daresbury.

- 1.4.6 Responses to the non-statutory consultation raised concerns about the proximity to residential properties at Daresbury and to the impact on the Creamfields festival site. Further baseline work also identified planning permissions (adjacent to Delph Lane) for housing developments along NP7 (between Sandymoor and Daresbury). Engineering work on the NP7 option also identified 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. NP7 was therefore dropped from the corridor.
- 1.4.7 Options remain within the North Corridor to route appropriately past the Creamfields site.

East Corridor

- 1.4.8 Comments from the non-statutory consultation raised a number of concerns about the East Route Corridor and how it could affect features such as National Trust owned land, proposals for new housing near Partington, Warburton and Carrington Mosses and the settlement of Lower Whitley. One comment was also received that the pipeline should follow the HS2 corridor to avoid Broomedge.
- 1.4.9 The East Corridor described above has been routed away from the National Trust land at Dunham Massey, to avoid Lower Whitley, to route through planned developments at Partington and to minimise effects on the two Mosses. It is not possible to utilise the HS2 route due to safety issues that could arise from their proximity and conflicting construction schedules. However, the East Corridor has been routed away from Broomedge.

South Corridor

- 1.4.10 Comments from the non-statutory consultation raised concerns about South Route Corridor over the historic/existing salt and brine mines and on the interaction with the HS2 route. Specific support was received for both South 1, due to there being fewer wildlife designations along the route compared to South 2, and for South 2, due to there being fewer watercourse crossing along this option.
- 1.4.11 The South 2 route corridor would have contained a greater length of pipeline running above the salt and brine mines found in this area, and their associated buried infrastructure which includes other pipelines and cables. South 1 was therefore considered to provide a more viable construction route corridor.

Northwich Spur

- 1.4.12 As the South 1 route corridor was dropped, the Northwich Spur 2 was no longer available. Comments from the non-statutory consultation raised concerns around various environmental designations along the different spur routes, although some comments noted that there was space within the spur routes to avoid these designations during the detailed routeing works. Comments also raised the presence of the Anderton Boat Lift, a Scheduled Monument, close to Spur 3. Further consideration of the spur routes concluded that Spur 3 would be the preferable route to take forward. Spur 1 would pass through an area of ancient woodland, permitted waste site and Hartford Golf Club. It was also likely to require an additional HAGI to connect to the main pipeline. Spur 4 had substantially more

watercourse crossings (six compared to two on Spur 3) and subsequently passed through greater extents of flood plain land as well. Both Spurs 1 and 4 would have seen pipeline laid in the local highway network. Although Spur 3 does pass close to Anderton Boat Lift and through sections of Marbury Country Park/Anderton Nature Park, the proposed route has been drawn further away from the boat lift and the temporary nature of impacts should mean that any impacts are minimised.

HAGI Search Areas

- 1.4.13 There were few specific comments received during the non-statutory consultation exercise about the location of HAGIs within these search areas. Objections were received to the Rocksavage and Runcorn HAGI search areas in general due to ecological designations in this area, suggestions made that HAGIs should avoid ecological designations in other search areas and to the siting of HAGIs in Green Belt land. General comments were also made that HAGIs would be useful in other locations outside of the Project. As these general comments related to connections that are not feasible as part of this project, or would be longer term potential future connections, they have not been considered further.
- 1.4.14 The comments received were used alongside other engineering and environmental work to identify specific HAGI options within the search areas and these have been assessed to produce the locations and options discussed in the sections below.
- 1.4.15 These options have sought to avoid all ecological designations wherever possible or to provide options which minimise the potential effects on the designations. Where a HAGI would be within the Green Belt (Rocksavage, Higher Walton, Clock Face, Warburton and Central Hub), the HAGI and any associated land take for construction is being kept to a minimum and siting considers the Green Belt purposes. Further detail on the HAGIs in the Green Belt and how the Green Belt Assessment has shaped the corridor routeing and HAGI siting is provided within the Design Evolution Report.
- 1.4.16 As noted above, other locations that were suggested for HAGIs were mainly requests for HAGIs that could serve other connection points or areas that are outside of the scope of this Project. One comment on the Partington HAGI search area did however suggest a location within the Carrington industrial area would be more appropriate as it is a brownfield site and it would minimise groundworks in the open countryside. However, the Partington search area is already within brownfield land and a location within Carrington would still need a pipeline through open countryside to reach it. Such a location would also result in a longer length of pipeline and as such there are not considered to be any benefits from a Carrington location.

Other Consultation Responses on Route Corridors

- 1.4.17 A number of other comments were received through the non-statutory consultation exercise which provided potential suggestion to alternative routes that were applicable to the scheme as a whole. These included suggestions that the pipeline should follow existing infrastructure corridors such as the M56, the Manchester Ship Canal, the route of existing or redundant pipelines or that it could re-purpose redundant pipelines. Largely due to viability and safety issues around the construction or operation of a pipeline, these options are not feasible for substantive lengths of the proposed pipeline. Working in or adjacent to motorways, canals or existing pipelines raises safety concerns over the structural integrity of existing infrastructure, traffic collision risks or working in and around water. Re-purposing pipelines for hydrogen use would also have been difficult as not all pipelines would be constructed to the standards required for hydrogen transportation or in the correct locations. Some concerns were also raised about the proposed route crossing or developing in proximity to infrastructure of these types, due to concerns over damage to existing features and subsequent safety issues arising. Where the proposed pipeline does need to cross, or comes close to, other utility lines or transport infrastructure, the design accommodates all relevant safety measures that are identified in UK legislation and guidance.
- 1.4.18 Other generic comments raise concerns about impacts from either the pipeline or from HAGIs on local communities or on environmental matters. The entire design of the pipeline is taking into consideration the potential impacts for both construction and operations on local residents and the environment. Further details on how these matters are being assessed, avoided or minimised where possible or where mitigation is being proposed to manage any issues which could occur is provided within the topic chapters of this Draft ES (**Chapters 5 to 18**). This detailed assessment will continue to DCO submission where a full assessment of all identified matters will be included within the Final ES.

Preliminary Route Alignment/Preliminary Order Limits

Preliminary Route Alignments

- 1.4.19 Following the Stage 1 non-statutory consultation exercise, the representations received and ongoing engineering and environmental work allowed the corridors to be refined in places to provide a more defined corridor, and for route alignments to be identified within the corridors. The Preliminary Route Alignments subsequently identified formed the Preliminary Order Limits described which were assessed in the Preliminary Environmental Information Report (PEIR) published in September 2022.

Rocksavage and Runcorn HAGI options

- 1.4.20 Within the West Corridor, seven HAGI options were considered (**Figure 2A.8**) in the Rocksavage and Runcorn area. Five options south of the Weaver Navigation to allow connection to the Runcorn/Rocksavage Spur and two options north of the Weaver Navigation, on the Runcorn/Rocksavage Spur, to provide a connection to the different industrial customers. Options RSH4 and RSH5 were discounted to the south of the Weaver Navigation due to their proximity to the Frodsham Substation and location within a restored landfill site respectively. Option RSH3 to

the east of the M56 was moved to be outside of an area of historic landfill. RSH1, RSH 2 and the revised RSH3 were taken forward into the PEIR. North of the Weaver, RH 1 was ruled out as topographically challenging, with RH2 carried forward as the preferred option, re-positioned slightly to the east to accommodate a change in the preferred route of the Runcorn/Rocksavage Spur.

- 1.4.21 HAGI options (RSH1, RSH2 and RSH3) were therefore taken forward as HAGI options for the Rocksavage HAGI and RH2 for the Runcorn HAGI.

Higher Walton HAGI options

- 1.4.22 Eight HAGI location options were considered in the Higher Walton area to provide a connection point to the Warrington Spur. The high number of options considered was due to the multiple route options identified in this area between the M56 and River Mersey (**Figure 2A.9**). One option was discounted after the NP7 route option was dropped and HW4 was discounted as it was within a licensed landfill site. Options HW5, HW6 and HW7 were also discounted due to their location south of the Manchester Ship Canal and the need for additional crossings (by the Warrington Spur line) of the rail lines and canal.
- 1.4.23 The Higher Walton HAGI options taken forward for the PEIR therefore included HW2 to the east, and to the west HWH2 was combined with HWH1 to be taken forward as a single HAGI option (known as HWH1).

Cuerdley HAGI – now discounted

- 1.4.24 A HAGI search area was identified at Cuerdley as a potential facility to provide connections for future expansion of the hydrogen network (**Figure 2A.10**) and three options were initially identified within this area. However, further examination showed that the Clock Face HAGI could accommodate this potential facility and therefore the Cuerdley option was dropped.

Clock Face and Burtonwood HAGI options (Burtonwood – discounted)

- 1.4.25 A cojoined search area for Clock Face and Burtonwood was identified (**Figure 2A.11**) which covered a large amount of land between Bold Heath, the M62 at Crows Nest Farm, junction 7 of the M62 and the A557/Chapel Lane junction. Within this area, a single option at A557/Chapel Lane (CF1) and three HAGI options near to junction 7 (CF2 CF3 and CF4) were identified for potential Clock Face HAGI locations, and three options near to Crows Nest Farm (CF5, CF6 and CF7) were identified as the potential Burtonwood HAGI locations.
- 1.4.26 The Clock Face HAGI was to serve the Lea Green connection and to allow potential future connections to be made, with the Burtonwood HAGI to provide potential future connections. Further work identified that a single HAGI in the Clock Face search area could provide the connections to the Lea Green connection plus the potential future connections for both Clock Face and Burtonwood. The Burtonwood search area/HAGI options CF5, CF6 and CF7 were therefore able to be discounted.
- 1.4.27 The assessment of the four Clock Face HAGIs identified CF3 as the option to take forward, as CF1 and CF4 both raised issues with the Green Belt and access for CF2 from the highway was not as good as for CF3.

St Helens HAGI options

- 1.4.28 Three HAGI options were identified in St Helens to provide connections to serve industrial customers in this location (**Figure 2A.12**). Two of these options (SH1 and SH3) were found to be within areas of historic landfill.
- 1.4.29 Option SH2 was therefore selected as the St Helens HAGI option.

Warburton HAGI options

- 1.4.30 Three HAGI options were considered at Warburton to allow a connection to be made to the natural gas network (**Figure 2A.13**). W1 is located within a Local Wildlife Site and both W1 and W2 are situated close to existing pipeline serving the natural gas network.
- 1.4.31 Option W3 was therefore selected as the Warburton HAGI option.

Partington HAGI options

- 1.4.32 Three options were also initially considered at Partington to allow a connection to the natural gas network and to industrial customers (**Figure 2A.14**). However, due to planned development in this area these three options could not be pursued, and a different location was identified within the search area which was free from constraints and the footprint of the planned development.
- 1.4.33 This new option was taken forward as the Partington HAGI option.

Central Hub HAGI options

- 1.4.34 Within the Central Hub five options for a HAGI were considered. This HAGI would provide the connection point between each of the four corridors (**Figure 2A.15**). Options CHH3, CHH4 and CHH5 were discounted due to potential impacts on the Green Belt, Options CHH3 and CHH4 being within, or close to minerals safeguarding areas and Option CHH4 close to an area of flood risk.
- 1.4.35 CHH2 was moved slightly to the north to provide sufficient space for the associated working areas and construction compounds needed around the HAGI.
- 1.4.36 CHH1 and the amended CHH2 were therefore taken forward as the Central Hub HAGI options for the PEIR.

Block Valve Installation options

- 1.4.37 On the East Corridor three options for a Block Valve Installations (BVIs) were identified and taken forward as the East Corridor BVI options.
- 1.4.38 Within the South Corridor, five options for a BVIs were identified and taken forward as the South Corridor BVI options.

1.5 Stage 2 Statutory Consultation

Refinement of the Preliminary Order Limits

- 1.5.1 Following submission of the PEIR and the Stage 2 Statutory Consultation exercise, further refinements to the Preliminary Order Limits have been made and the overall extent of the Order Limits, termed the 'Draft Order Limits' in this Draft ES, has reduced significantly. 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 Limits.
- 1.5.2 It has also been necessary to extend the Draft Order Limits in some locations, for example to allow for additional route or HAGI options under consideration, or to allow for electrical distribution network operator's (DNO) connection points.
- 1.5.3 **Table 2A 1.1** sets out notable changes between the Preliminary Order Limits presented in the PEIR and the Draft Order Limits considered in this Draft ES. Justification for these changes can be found in the **Design Evolution Report 2024**.

Table 2A 1.1 Notable Amendments to the Preliminary Order Limits

Location	Description of Amendments
West Corridor	
Chester Services	Owing to possible impacts from the interaction with a new electrical sub-station close to Chester Services, and a proposed CO₂ pipeline development, an alternative pipeline route has been identified to the north, avoiding an existing utility pipeline at the approach to Chester Services and at the crossing of the A5117. The Draft Order Limits include additional land to facilitate additional trenchless crossing compounds either side of the A5117 and an optional microtunnel compound at the A5117/Ince Lane junction.
Protos estate access	Ash Road has been removed as an access point and several additional options for access through the Protos estate have been included in the Draft Order Limits to accommodate other development plans in the area.
Hover Force	Within the PEIR two pipeline route options were considered (Option WP1 and WP2, see Figure 2.17, Sheet 3 to 4 of the PEIR) around the Hover Force Outdoor Activity Centre. These were approximately 300m apart from the centre of each option with key factors to consider in confirming which option to use including proximity to overwintering bird habitats and engineering feasibility. Either option would be constructed using open-cut techniques. Option WP1 has been selected as the preferred option and taken forward for the Draft ES.
Rocksavage HAGI and connecting pipeline	Three options were considered in the PEIR for the location of the Rocksavage HAGI (Option RSH1, RSH2 and RSH3, see Figure 2.17, Sheet 5 of the PEIR). RSH3 has been selected as the preferred option and taken forward for the Draft ES. The Draft Order Limits now cover the entirety of the landowner's land holding and accommodate construction works relating to the proposed Rocksavage HAGI to the south of the M56. The additional land is an extension of the Preliminary Order Limits in the PEIR and is located to the south of the M56, running parallel to the River Weaver. Work is ongoing to reduce the Draft Order Limits in this area.

Location	Description of Amendments
	Refinement of the HAGI options has allowed for refinement of the connecting pipeline.
Sutton Weaver	Two pipeline options were considered in the PEIR (Option WP3 and WP4, see Figure 2.17 , Sheet 5 of the PEIR) southeast of the Rocksavage HAGI. The options split following the trenchless crossing of the Chester to Manchester Line railway. WP3 ran northeast from here and included a trenchless crossing of the Weaver Navigation, passed north west of properties on the A56 and then switched southeast with another trenchless crossing of the A56. WP4 headed broadly northeast with a single trenchless crossing of the A56 and the Weaver Navigation and passed to the southeast of the properties on the A56. Option WP3 has been selected as the preferred option and taken forward for the Draft ES.
Runcorn HAGI and approach	It is proposed to relocate the Runcorn HAGI to the north-west due to the presence of environmental constraints at the original location. To accommodate this change, the Preliminary Order Limits have been amended and a new trenchless crossing of the Weaver Navigation introduced. The Draft Order Limits now cross the River Weaver to the south-east of the M56 before crossing back below the M56 further north-east than the Preliminary Order Limits in the PEIR. The Draft Order Limits are located closer to Weston Point Expressway and follow Weaver View on the approach to the relocated Runcorn HAGI. Runcorn HAGI is now located to the north of Weaver View, rather than to the south as presented in the 2022 PEIR and an additional area has been included in the Draft Order Limits to facilitate a construction compound adjacent to the HAGI.
Runcorn HAGI to the Heath	The Preliminary Order Limits included a spur from the Runcorn HAGI to The Heath Industrial and Business Park. Following consultation with the customer at The Heath Business Park (SOG) it has been decided to move its hydrogen connection to a later phase of the hydrogen pipeline's development. Cadent is continuing to work with the business to determine its hydrogen requirements and the most appropriate connection point. The Draft Order Limits have therefore been removed beyond the Runcorn HAGI and associated construction compound.

Location	Description of Amendments
Land between Chester to Manchester Railway Line and A56	The Preliminary Order Limits have been extended further into an agricultural field to the east of the proposed Rocksavage HAGI location to accommodate a horizontal directional drilling (HDD) stringing area to enable a trenchless crossing of the A56. The additional land now included in the Draft Order Limits is located to the south-west of the Halton Station Road and / A56 junction.
West Corridor approach to Central Hub	The Draft Order Limits include greater extent of fields to straighten the route out, as expansion of the Plant Hire yard to the North would now be over the pipeline route.
North Corridor	
Daresbury Estate / Creamfields Festival site	The PEIR considered three options at the Daresbury Estate / Creamfields Festival site (Option NP1, NP2 and NP3, see Figure 2.17 Sheet 11 to 12 of the PEIR). Option NP1 ran to the west of the Creamfields site past Daresbury and continued north parallel to the A56 (Chester Road), Option NP2 ran between the east of the Creamfields site and Warrington Road to the east, with Option NP3 crossing Warrington Road and then running parallel on its eastern side. Each option included open cut construction and crossing of Daresbury Lane, followed by a number of fields with hedgerows and trees, and each end at the trenchless crossing point of A56 (Chester Road) south of Higher Walton. The options avoid Ancient Woodland (Outer Wood and Rows Wood) and Halton Borough Council Local Wildlife Site. Option NP3 has been selected as the preferred option and taken forward for the Draft ES.
Higher Walton, Moore Nursery and Bellhouse Lane	Following the trenchless crossing of the A56, the PEIR considered two options at Higher Walton (Option NP4 and NP5, see Figure 2.17, Sheet 12 to 13 of the PEIR). Option NP4 ran north-northwest to cross the Bridgwater Canal and West Coast Mainline, approximately 400m south of the Manchester Ship Canal. The option then turned southwest for approximately 600m

Location	Description of Amendments
	and then returned north to cross the Manchester Ship Canal and connect to HWH1 on its northern bank. This HAGI option would be located in the south of the Moore Nature Reserve. Option NP5 ran broadly north from the A56, crossing the Bridgwater Canal and fields before reaching a single trenchless crossing point of the Manchester Ship Canal and West Coast Mainline (note, at this point the West Coast Mainline is on a bridge over the canal) and connecting to HWH2. This HAGI option would be located on land north of the Manchester Ship Canal and the southern edge of the Moore Nature Reserve. The route selected for the Draft ES broadly follows NP5, although some changes have been made in the area around Bellhouse Lane / National Trust Nursery: • Addition of new Heavy Access Road along Bellhouse Lane, off Runcorn Road to bypass National Trust Nursery. • Addition of Right of Way (ROW) width reduction through nursery areas in Environmental Commitments Register (LCC). HAGI Option HWH2 is being taken forward for the Draft ES and a new HAGI Option (HWH8) is also being considered to the south-east of the Manchester Ship Canal, accessed from Mill Lane, with the Draft Order Limits in this location also incorporating a construction compound and trenchless crossing compound. The Draft Order Limits around HWH2 have also been extended to include a DNO connection point at Higher Walton and to allow for construction access from the Higher Walton HAGI to the trenchless crossing compound at Morley Common.
Moore Nature Reserve	The route of NP5 proposed at the first stage of statutory consultation ran along the northern boundary of the Moore Nature Reserve. 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. A number of important trees (Category A) have been identified within this area from aboricultural surveys, and the proposed route amendment has been designed to avoid these trees

Location	Description of Amendments
Fiddler's Ferry	Owing to a new housing allocation in the likely adopted Local Plan and the associated redevelopment of the area immediately to the east of Fiddler's Ferry Power Station, alternative pipeline routes NP6 and NP7 have been identified to avoid the relocation of allocated housing units from this site, requiring additional development. The Draft Order Limits have been amended to facilitate an alternative pipeline route which avoids the allocated area, proceeding in a north-westerly orientation from Moore Nature Reserve, facilitating a trenchless crossing of the River Mersey, canal and railway line before proceeding along the eastern edge of Fiddler's Ferry Golf Course and re-joining the route presented in the PEIR, after crossing the A562 via a trenchless technique. 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 PEIR north of the A562.
Warrington Spur	
Solvay	The location of the pig trap/customer connection at Solvay was identified on open land within the company's site boundary, north of the Manchester Ship Canal. 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.
Novelis Connection	The PEIR considered two options for the connection to Novelis; - WSp1 spur would remain south of the River Mersey and cross under the railway underpass then proceed as street works along Eastford Road. The option would then proceed broadly northeast crossing the disused Runcorn and Latchford Canal, then toward A5060 and proceed with street works for approximately 4.8km to Novelis. - WSp2 would run 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

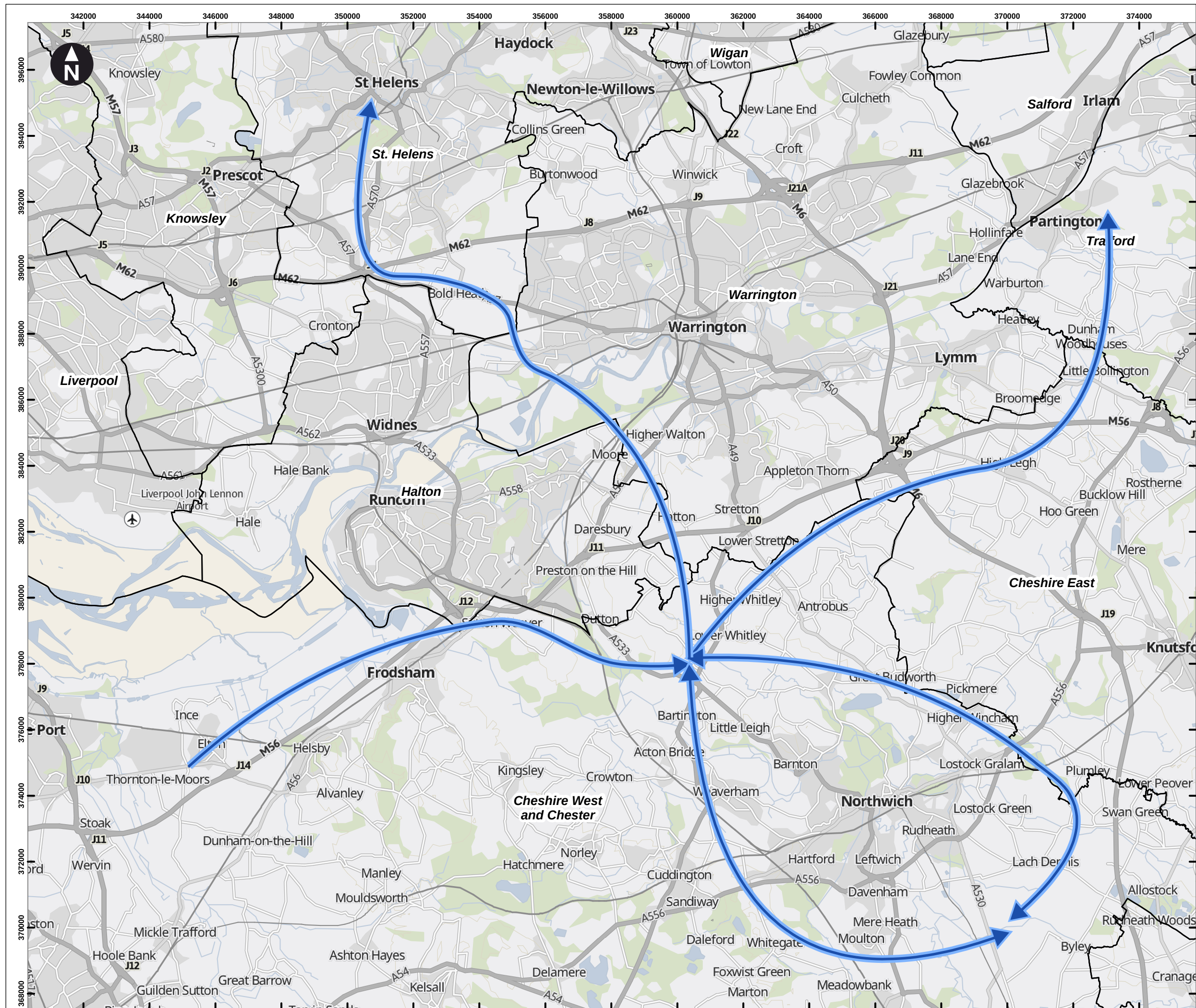
Location	Description of Amendments
	Lane/Centre Park Link Road) then before exiting the lane for another trenchless crossing of the River Mersey. The option would then proceed as per Option WSp1 to Novelis. Option WSp1 is being taken forward for the Draft ES, with the addition of a change at the Trans Pennine Trail crossing (see below).
Arpley Meadows and Morley Common	To reduce interaction with the Trans Pennine Trail and the proposed Warrington Western Link Road scheme and minimise effects on the Walton Locks Local Wildlife Site, it is proposed to utilise a trenchless crossing technique in this location rather than open cut north-eastwards from Eastford Lane to the A5060/Gainsborough Road. This would require an increase in the Preliminary Order Limits to accommodate a trenchless crossing entry compound, to be located on part of Morley Common and an access route for construction vehicles into this compound from the Higher Walton HAGI. The trenchless crossing would exit at either Gainsborough Road or Cranbourne Avenue depending which option is selected (see below).
Cranbourne Avenue	A new street works option along Cranbourne Avenue (WSp3) is being considered in the Draft ES, so the Draft Order Limits now include Cranbourne Avenue.
St Helens Spur	
St Helens HAGI	The St Helens HAGI has been removed from the Draft Order Limits as it is no longer required.
M62 Crossing	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. 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.
Sherdley Road	The proposed pipeline would be routed along Sherdley Road. The POL provided at Stage 2 Statutory Consultation included for land alongside the highway to be used as a construction compound(s). The

Location	Description of Amendments
	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.
Clock Face Spur	
Chapel Lane	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. 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.
East Corridor	
Block Valve Installation	The PEIR considered three potential BVI locations: EBV1 located in an agricultural field bound by hedgerows, approximately 1.1km to the northeast of the M6 and adjacent to Moss Lane and EBV2 and EBV3 located in agricultural fields approximately 30m southwest and northeast respectively of the A50 (Warrington Road) to the rear of established trees and hedgerows. EBV1 has been selected as the preferred option and taken forward for the Draft ES.
Partington HAGI	Two options for Partington HAGI are being considered within the Draft ES; PH1 located west of the junction of Ashton Road and Townsend Farm Lane on an existing disused brownfield site as shown in the PEIR, and a new PH2 option located in an agricultural field to the east.

Location	Description of Amendments
Partington HAGI Access Route and DNO connection	A new access road is required from the A6144 Manchester Road 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 Voltage Park development access road depending on construction timescales and whether these coincide. The Draft Order Limits now accommodate the new access routes and have also been extended to accommodate a DNO connection point. In addition, the connection in to Saica and the associated pigging compound has been removed.
South Corridor	
Bartington and Trent and Mersey Canal crossing	Consultation feedback identified concerns over stability of the canal embankment in this location owing to historic breaches of the Trent and Mersey Canal. As a result, the option for a HDD trenchless crossing has been introduced, allowing a longer and deeper crossing. This option however would require a stringing area, which necessitates additional landtake and an increase to the Preliminary Order Limits presented in the PEIR. This increase to the Preliminary Order Limits is in agricultural fields to the west of Warrington Road/north of Weaver Vale Caravan Park, parallel to the A49 (Warrington Road). An alternative route is being considered at Acton Bridge (SP6), passing west of the residential property rather than east and has therefore been included in the Draft Order Limits.
Vale Royal Falconry Centre	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.
North of A49 near Gorstage	There is a minor increase to the Draft Order Limits to accommodate the required working width for the pipeline construction. This minor increase is located on agricultural land to the north-east of Grange Lane off the A49, near Gorstage.

Location	Description of Amendments
Forest Hill Quarry / Littledale's Gorse	An alternative pipeline route has been identified to the west of Littledale's Gorse, through Forest Hill Quarry. This change is located to the north of the trenchless crossing of the A556 Chester Road, and south of crossing the Mid Cheshire Line (railway).
West Coast Mainline Route Crossing at Vale Royal	An alternative route for the pipeline crossing the West Coast Mainline (railway) and River Weaver at Vale Royal has been identified. An engineering feasibility study was conducted to assess multiple routing options and the new option was selected as being preferable over the alternatives, due to better constructability, lower technical risk and a shorter crossing, minimising cost. The Draft Order Limits have been updated to accommodate this option. This change from the Preliminary Order Limits is located south of South Pipeline Option 1 (SP1) and north of South Pipeline Option 2 (SP2) presented in the PEIR. The Draft Order Limits cross Whitegate Lane and then cross the River Weaver and West Coast Mainline to the east.
A556 (Chester Road) to A533	South of the trenchless crossing of the A556 (Chester Road) four options were considered in the PEIR; SP1 ran east towards Hartford before turning southeast for a trenchless crossing of the West Coast Mainline. SP2 ran southeast to a single trenchless crossing of the Weaver Navigation and the West Coast Mainline near Vale Royal Locks. SP3 and SP4 ran further south via the eastern edge of the golf club at Vale Royal Park. For the Draft ES (2024), a new route has been selected which follows SP2 along the edge of Sandiway golf course but then crosses east, to cross the River Weaver in a similar location to SP1. From here, it runs parallel to SP1 but slightly further east, until it joins the route of SP1 to the west Moulton.
Southern (Hartford) BVI	The PEIR considered five options for the location of the South BVI; 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 and SBV4 was located further south in a field to the west of Whitegate Lane. SBV1 has been selected as the preferred option and taken forward for the Draft ES. The Draft Order Limits have also been extended to allow for DNO connection and drainage to adjoining watercourses from the Hartford BVI.

Location	Description of Amendments
South of Bostock Green	To minimise farm disruption an amendment to the route has been identified. A new trenchless crossing of London Road has also been introduced to minimise effects on vegetation and the Conservation Area. A change in the Preliminary Order Limits is therefore required. The Draft Order Limits now cross the A533 and are then located in agricultural fields slightly south of the Preliminary Order Limits presented in the PEIR.
Inovyn HSF HAGI	The Draft Order Limits have been extended to allow for drainage to adjoining watercourses at the Inovyn (Hydrogen Storage Facility) HAGI and to accommodate changes to the Inovyn storage design.
Central Hub	
Central Hub HAGI	The PEIR considered two Central Hub HAGI Options (CHH1 to CHH2) shown in Figure 2.17, Sheet 9 of the PEIR. CHH1 was located approximately 160m north of the A553 (Northwich Road) in an agricultural field to the rear of Woodside Farm. CHH2 was further north and approximately 380m from the A553 in an agricultural field adjacent to an existing area of hardstanding used for storage, accessed via an existing hardstanding track. CHH2 has been selected as the preferred option and taken forward for the Draft ES.
Northwich Spur	
Northwich Spur	The PEIR considered two options for the Northwich Spur. The Northwich Spur is no longer required, so neither option is being considered in the Draft ES and the Northwich Spur has been removed from the Draft Order Limits.



Key
Option A

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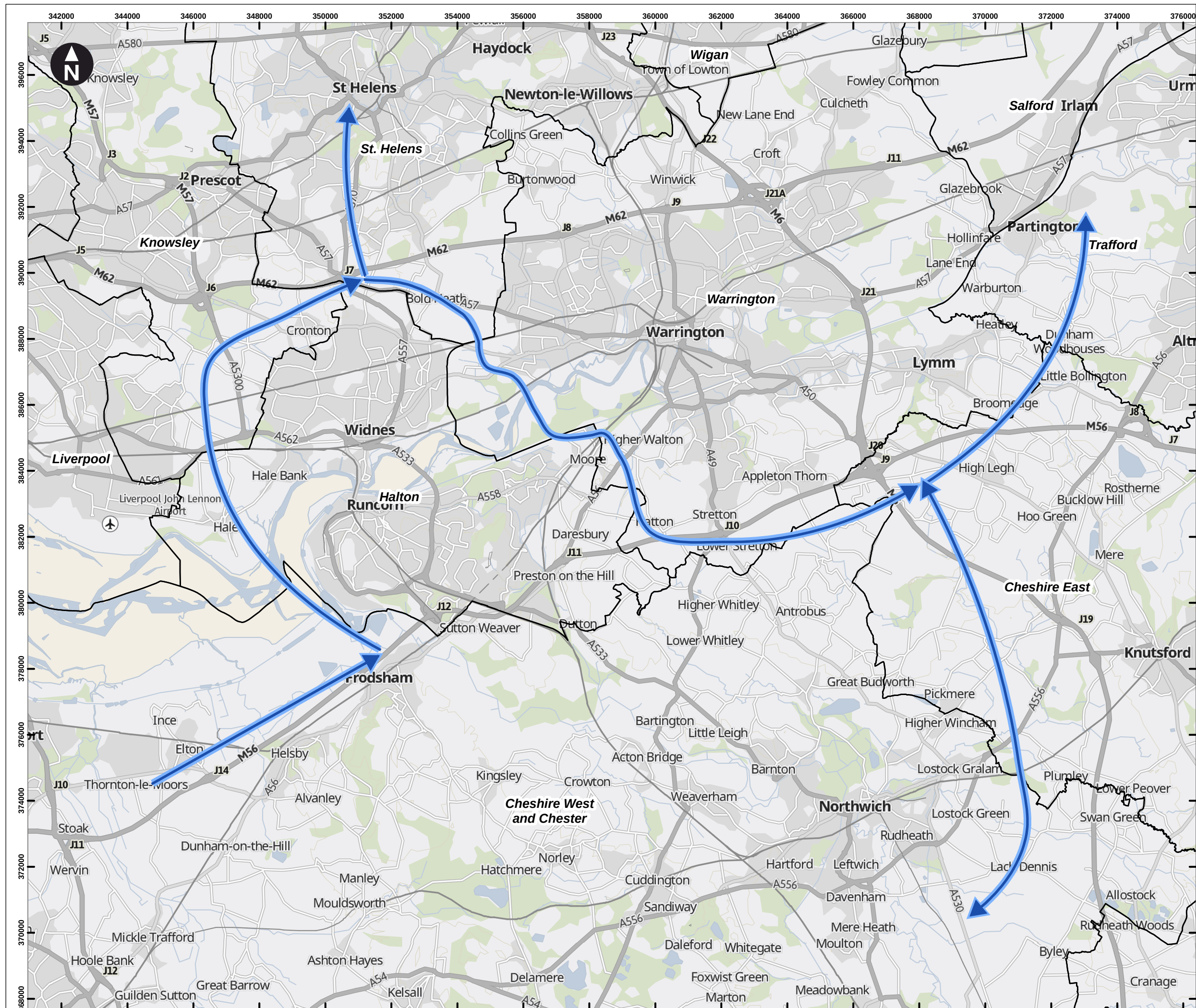


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Draft Environmental Statement
Chapter 2: The Project
Appendix 2A: Design Evolution

Figure 2A.1
Strategic Options A-D
Sheet: 1 of 4

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Key
Option B

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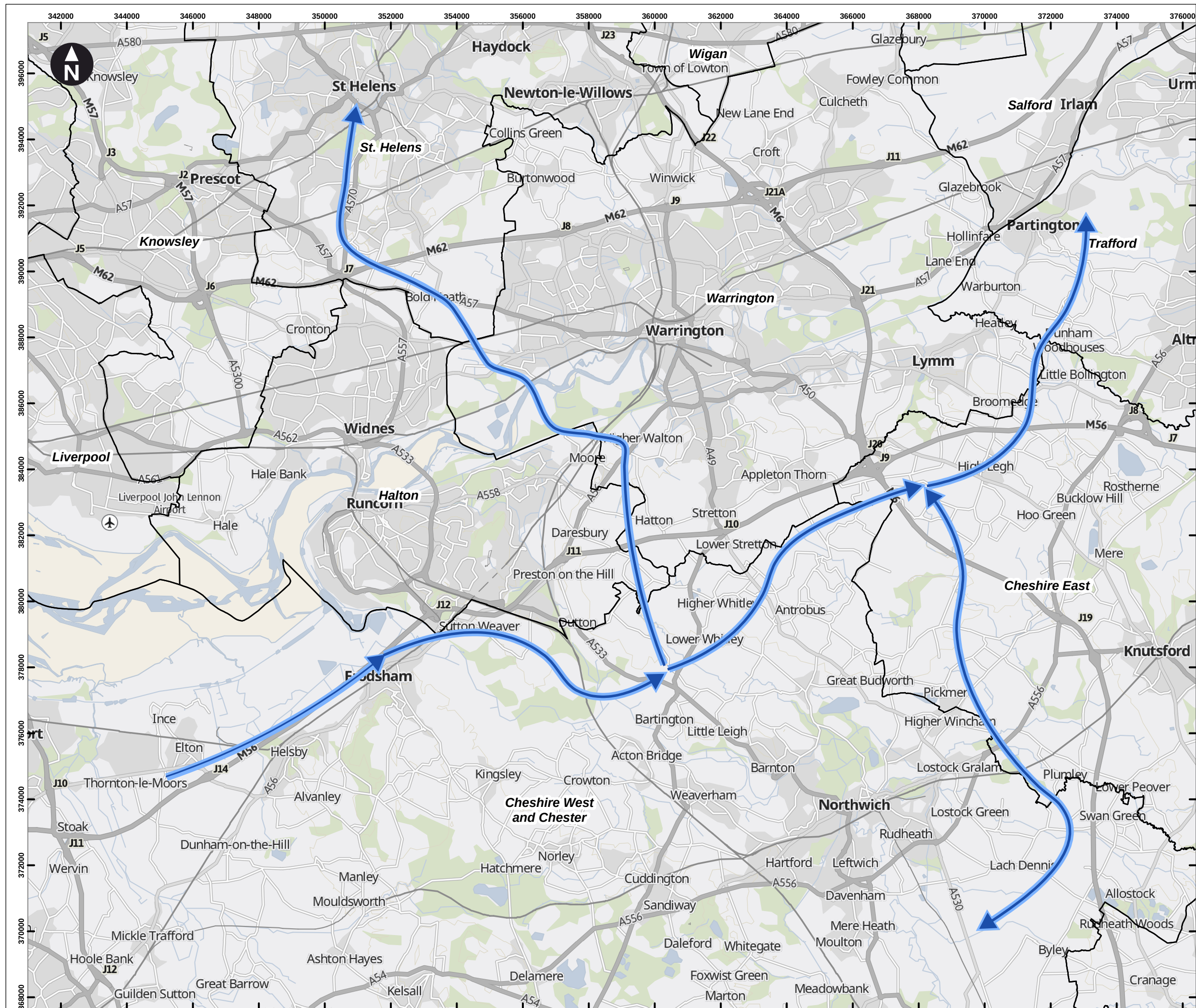
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Draft Environmental Statement
Chapter 2: The Project
Appendix 2A: Design Evolution

Figure 2A.1
Strategic Options A-D
Sheet: 2 of 4

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Key
Option C

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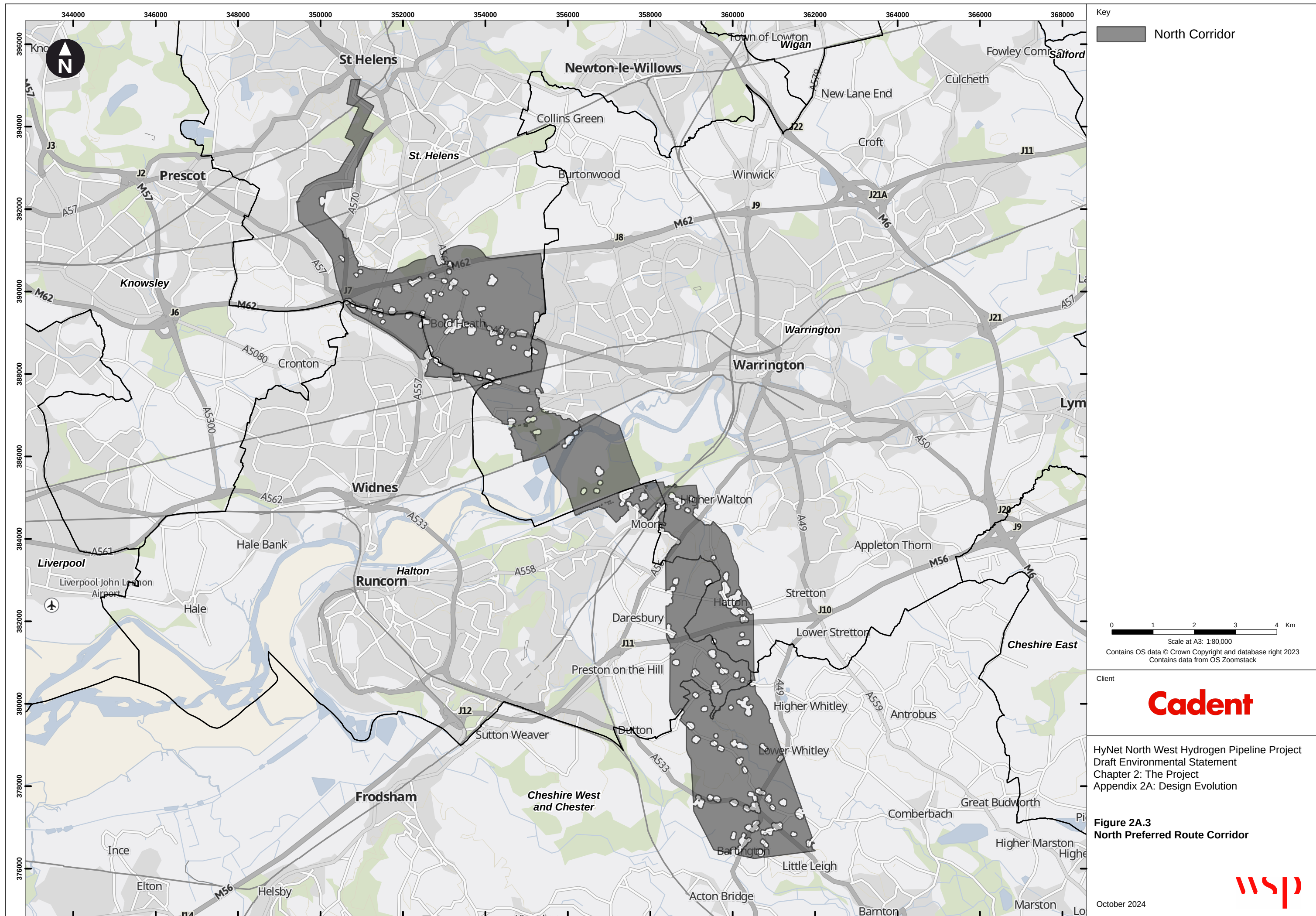


HyNet North West Hydrogen Pipeline Project
Draft Environmental Statement
Chapter 2: The Project
Appendix 2A: Design Evolution

Figure 2A.1
Strategic Options A-D
Sheet: 3 of 4



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Key

North Corridor

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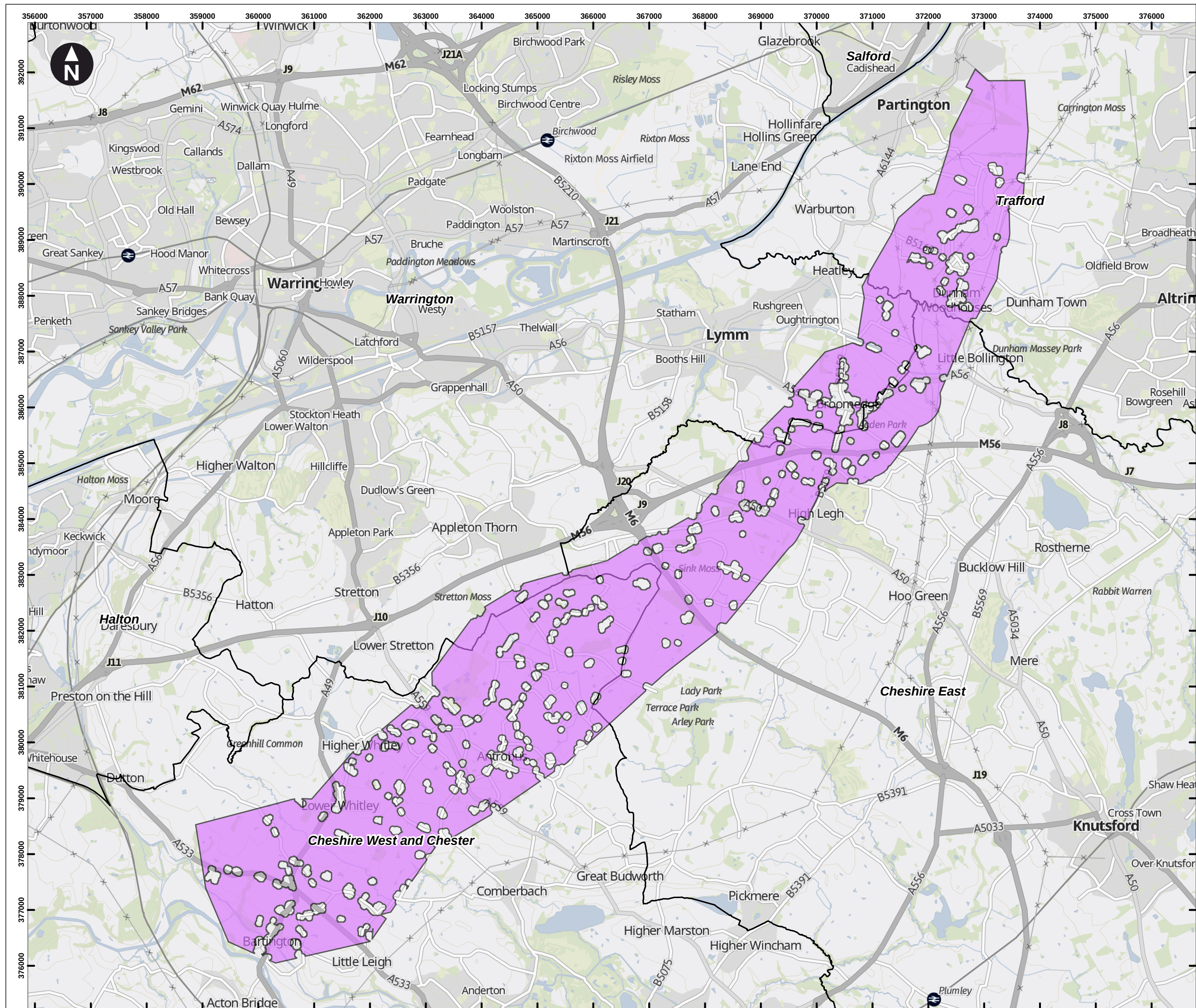
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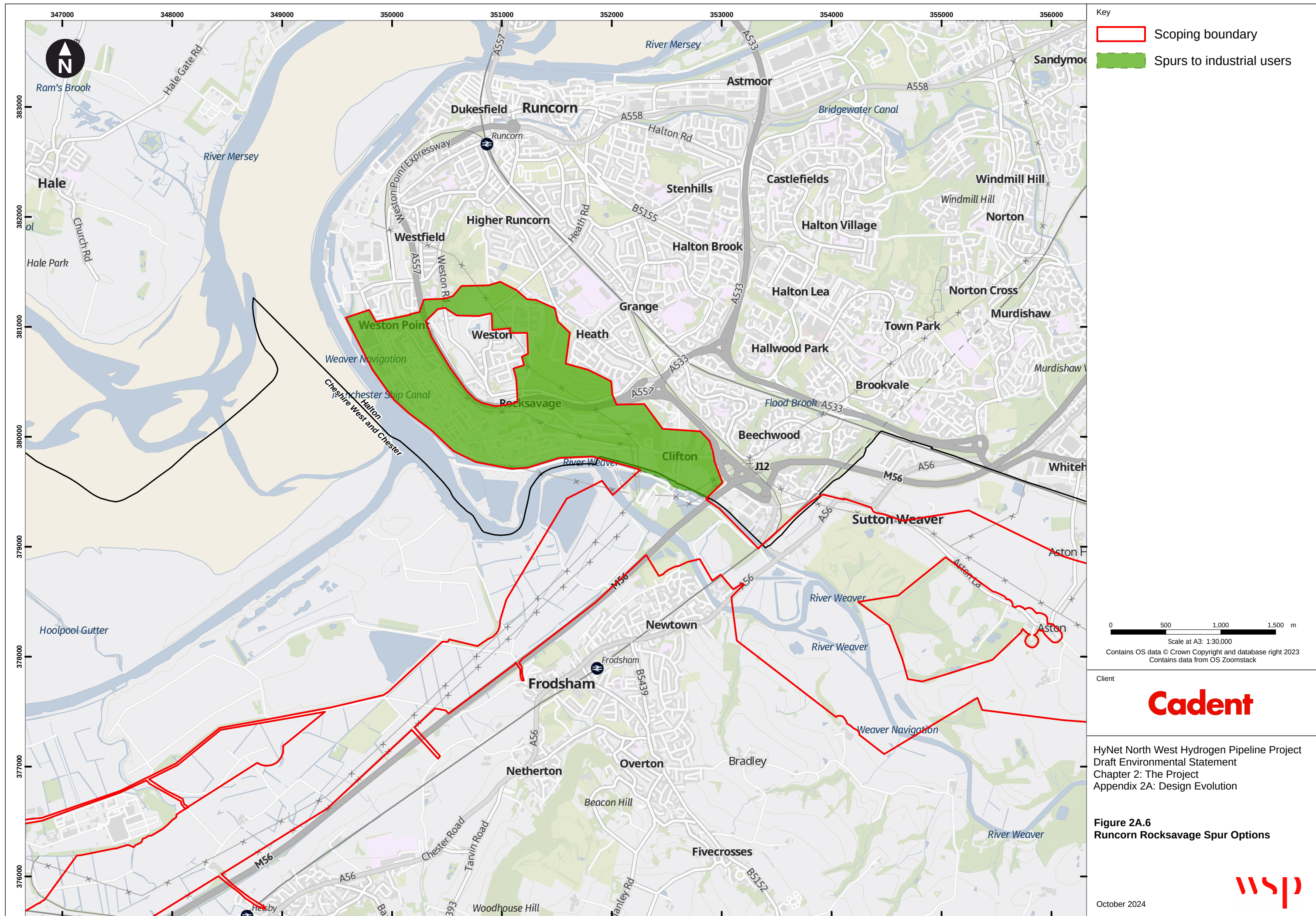
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Draft Environmental Statement
Chapter 2: The Project
Appendix 2A: Design Evolution

Figure 2A.3
North Preferred Route Corridor





Key

Scoping boundary

Spurs to industrial users

0 500 1,000 1,500 m

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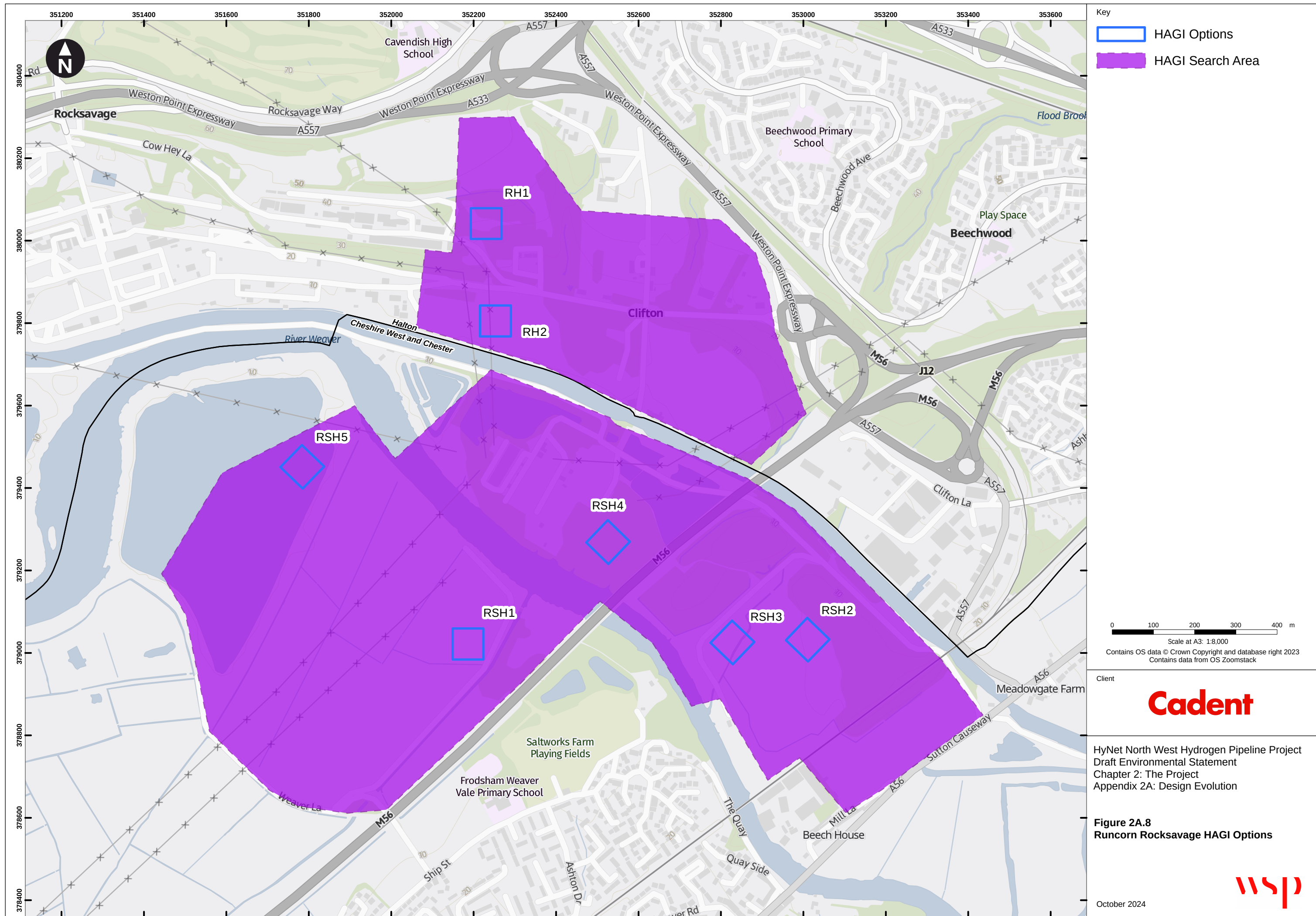
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Chapter 2: The Project

Appendix 2A: Design Evolution

Figure 2A.6

Runcorn Rocksavage Spur Options



Key

HAGI Options

HAGI Search Area

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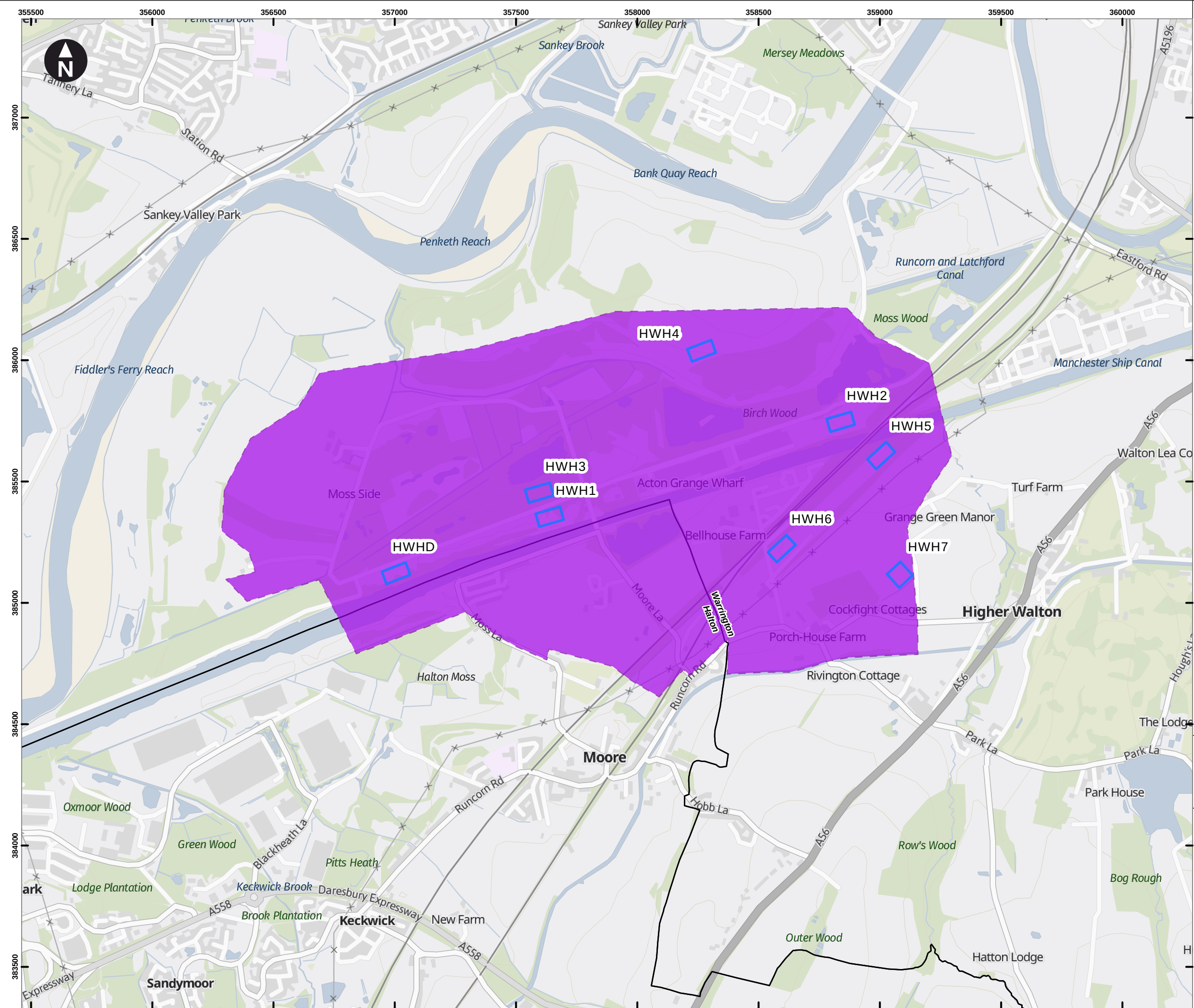
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Chapter 2: The Project

Appendix 2A: Design Evolution

Figure 2A.8

Runcorn Rocksavage HAGI Options



Key

- HAGI Options
- HAGI Search Area

0 200 400 600 800 m

Scale at A3: 1:15,000

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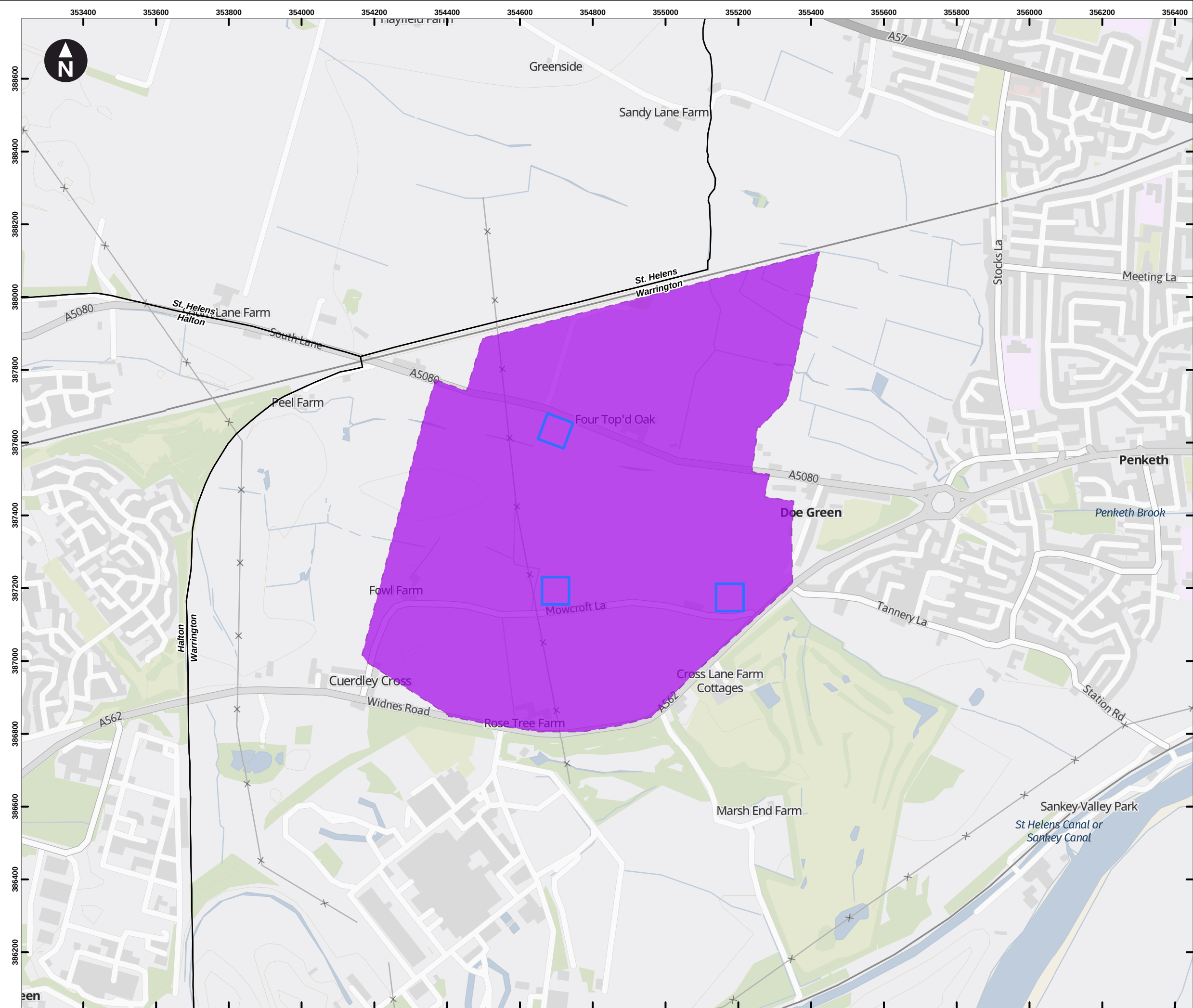
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Draft Environmental Statement
Chapter 2: The Project
Appendix 2A: Design Evolution

Figure 2A.9
Higher Walton HAGI Options

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Key

- HAGI Options
- HAGI Search Areas

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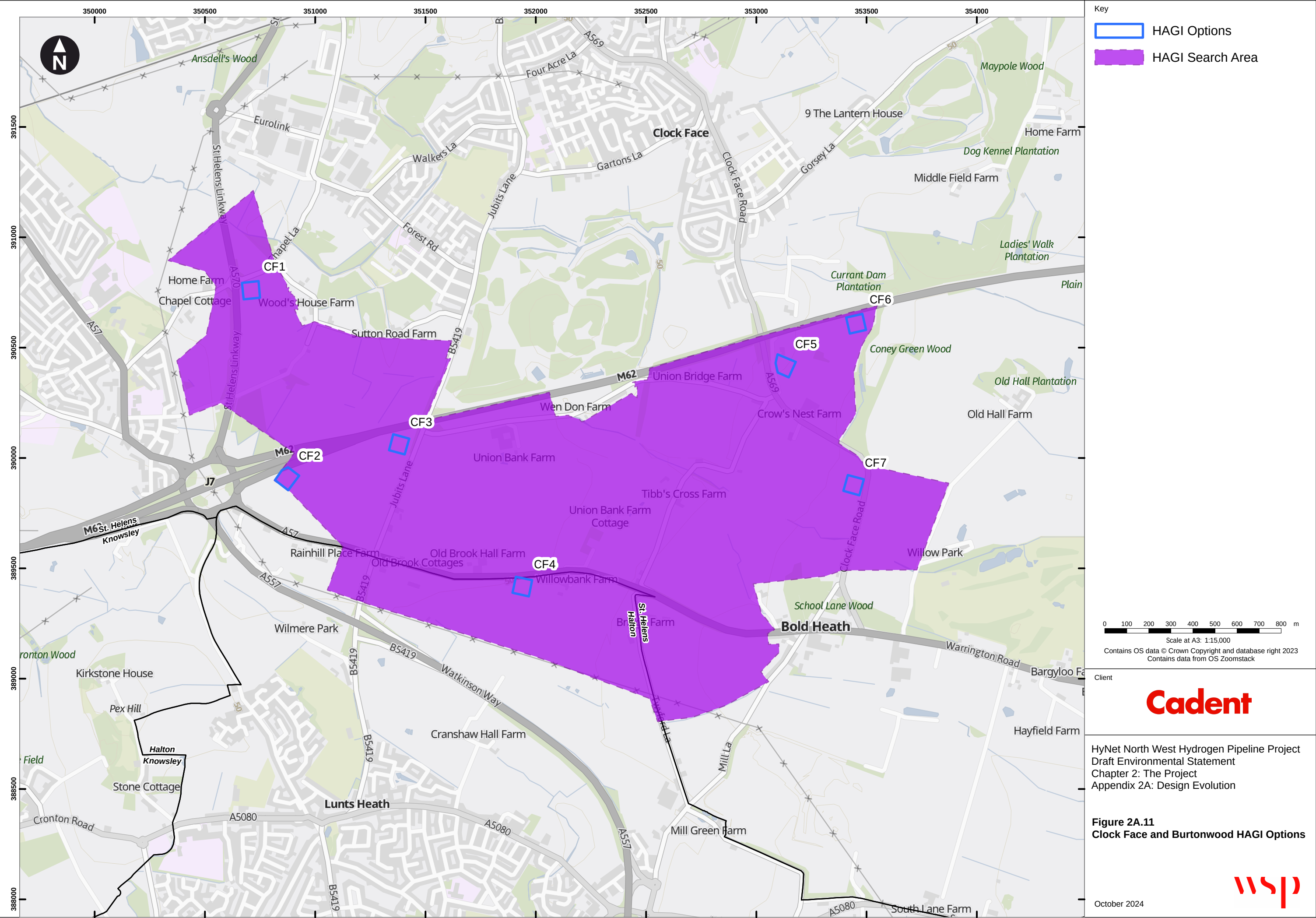
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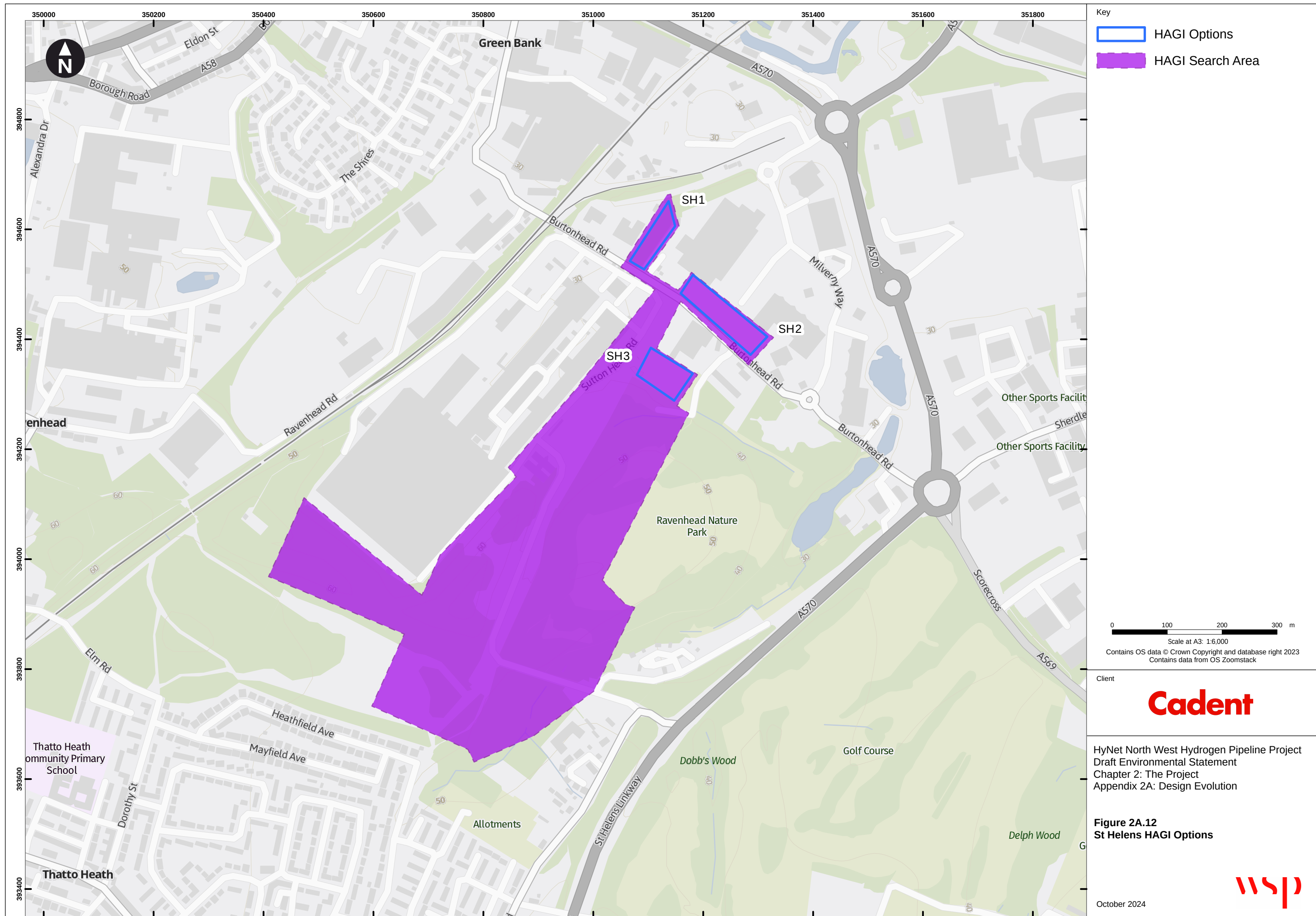
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Draft Environmental Statement
Chapter 2: The Project
Appendix 2A: Design Evolution

Figure 2A.10
Cuerdley HAGI Options





Key

- HAGI Options
- HAGI Search Area

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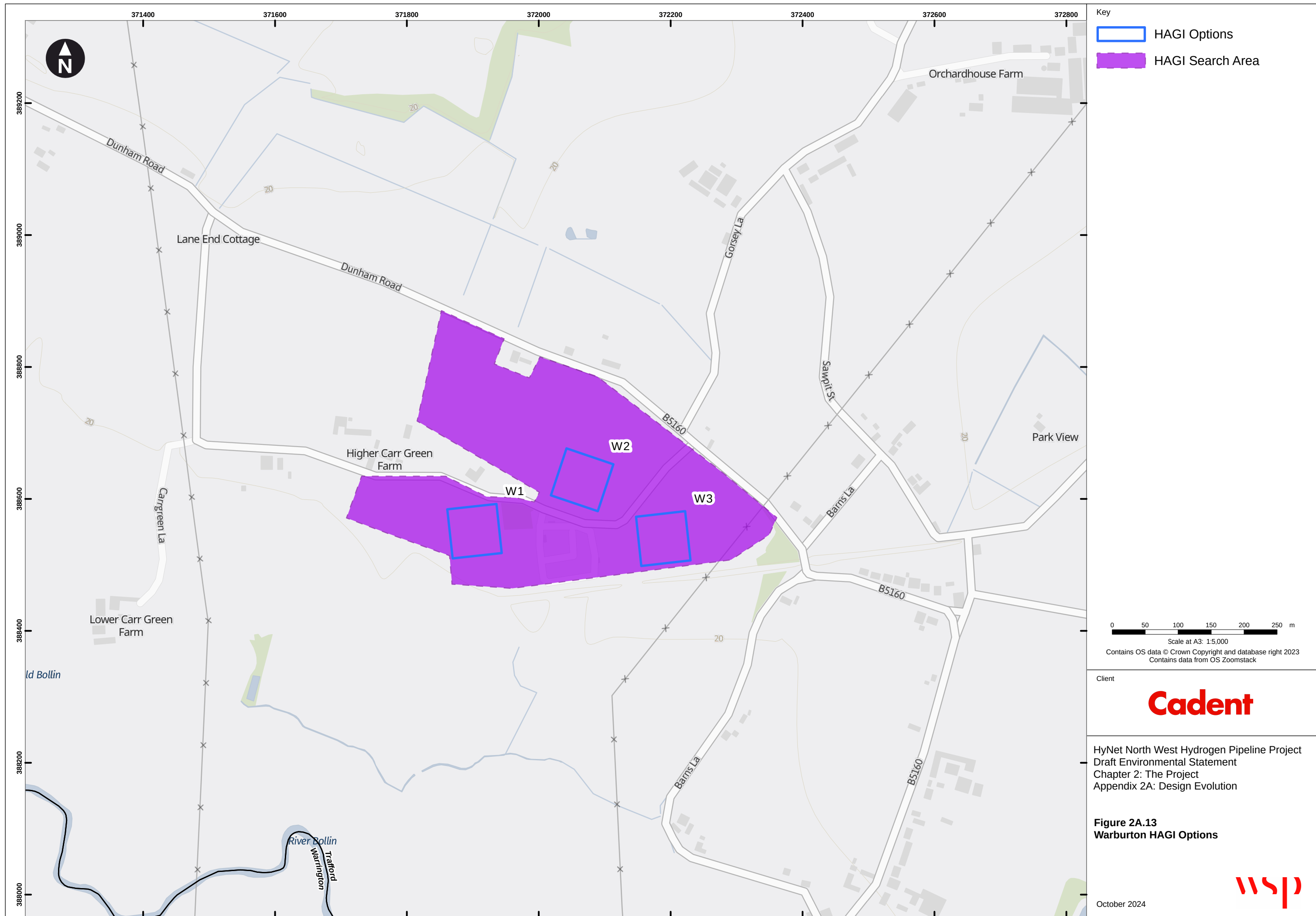
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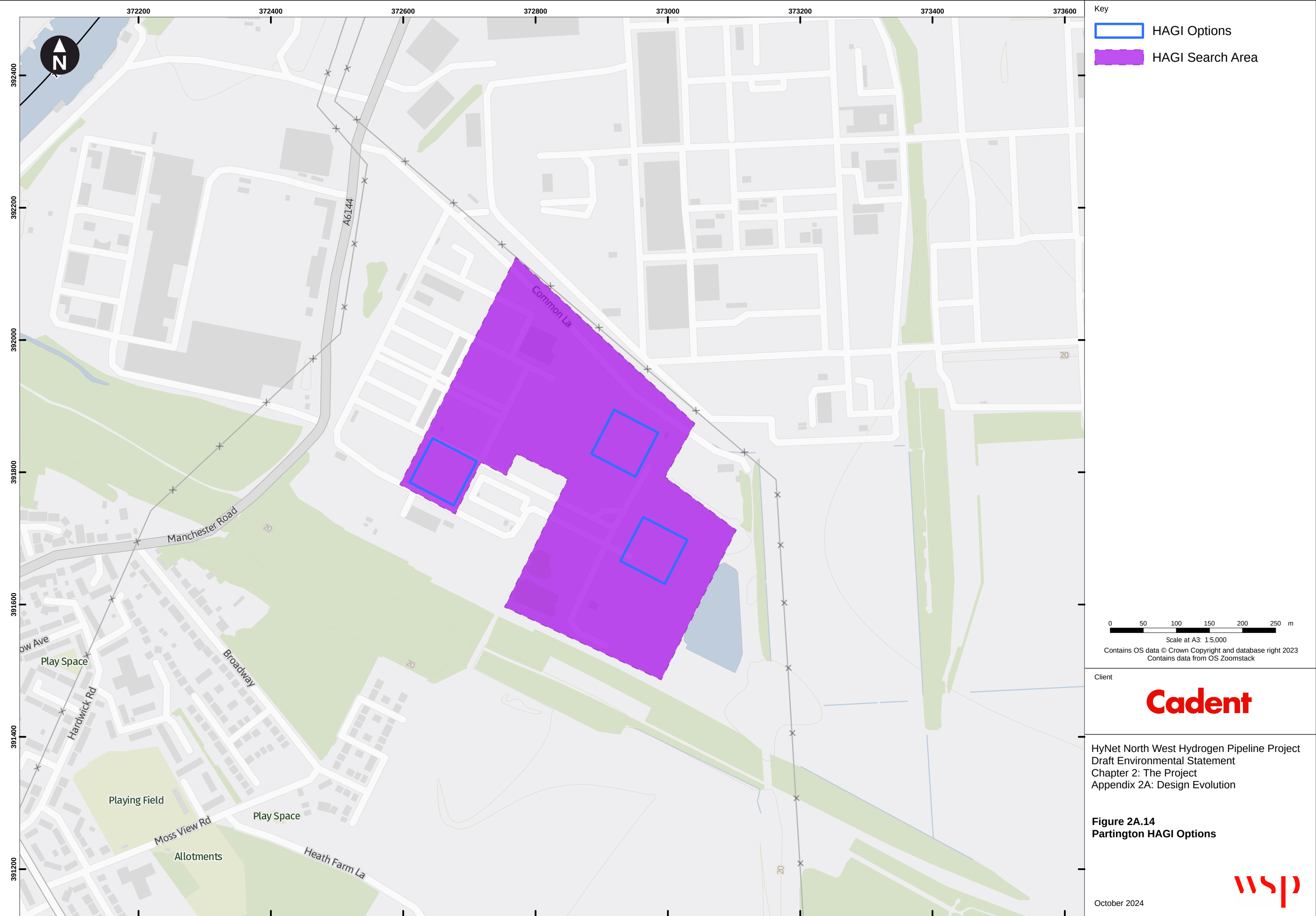
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Draft Environmental Statement
Chapter 2: The Project
Appendix 2A: Design Evolution

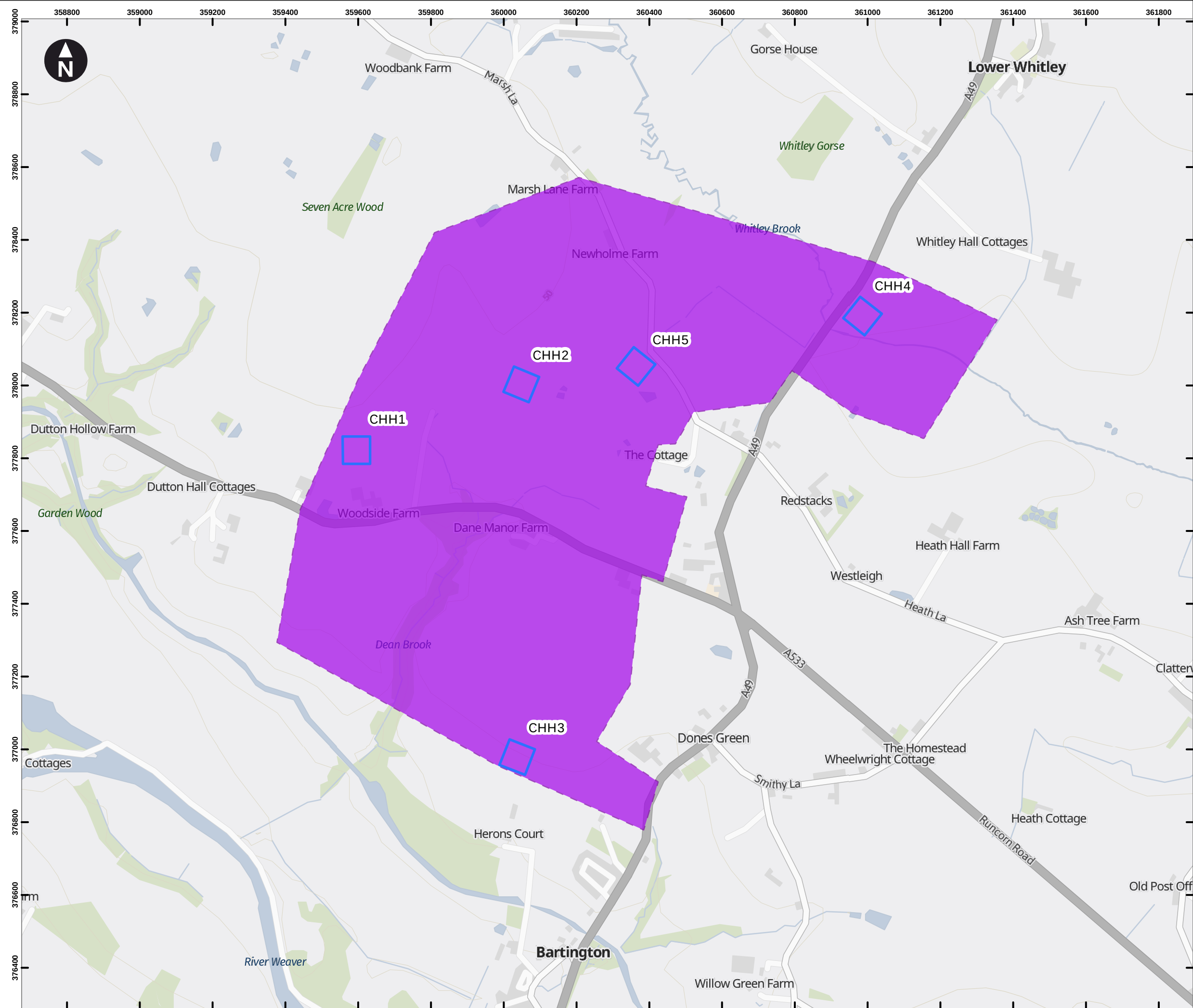
Figure 2A.12
St Helens HAGI Options

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Key

- HAGI Options
- HAGI Search Area

0 100 200 300 400 500 m

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Chapter 2: The Project
Appendix 2A: Design Evolution

Figure 2A.15
Central Hub HAGI Options

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