

Importance/ Value	Criteria	Typical Examples
	loss of part attribute	<p>Reduces local small scale resource availability but no discernible change to assessment point status.</p> <p><b>Fluvial Geomorphology</b> Moderate deterioration from baseline conditions, with partial loss or damage to habitat due to modifications and / or changes to natural fluvial forms and processes. Replacement of the natural bed and / or banks with artificial material.</p> <p><b>Groundwater</b> Moderate long term or temporary significant changes to groundwater aquifer(s) flow, water level, quality or available yield which results in moderate long term or temporarily significant decrease in resource availability. Groundwater resource use / abstraction is impacted slightly, but existing supplies remain sustainable. Changes to water table level or groundwater quality would result in partial change in or loss of a groundwater dependent area, where the value of the site would be affected, but not to a major degree. Changes to groundwater aquifer(s) flow, water level and quality would result in moderate changes to groundwater baseflow contributions to surface water and / or alterations in surface water quality, resulting in a moderate shift from baseline conditions upon which the WFD status rests. Dewatering effects create moderate differential settlement effects on existing infrastructure and buildings leading to consideration of undertaking minor repairs.</p>
Minor Adverse	Results in some measurable changes in attributes quality or vulnerability	<p><b>Surface water hydrology and quality</b> Structures and changes to flow which cause deviation from natural flow regime Slight deterioration in baseline water quality conditions but not significant enough to be measurable. Localised small scale reduction in resource availability.</p> <p><b>Fluvial Geomorphology</b> Slight deterioration from baseline conditions, with partial loss/damage to habitat due to modifications and / or changes to natural fluvial forms and processes.</p> <p><b>Groundwater</b> Minor changes to groundwater aquifer(s) flow, water level, quality or available yield leading to a noticeable change, confined largely to the Proposed Bowland Section. Changes to water table level, groundwater quality and yield result in little discernible change to existing resource use. Changes to water table level or groundwater quality would result in minor change to groundwater dependent areas, but where the value of the site would not be affected. Changes to groundwater aquifer(s) flow, water level and quality would result in minor changes to groundwater baseflow contributions to surface water and / or alterations in surface water quality, resulting in a minor shift from baseline conditions (equivalent to minor but measurable change within WFD status). Dewatering effects create minor differential settlement effects on existing infrastructure and buildings which may need to be monitored but where repairs may be avoidable.</p>
Negligible	Results in effect on attribute, but	<p><b>Surface water hydrology and quality</b> Structures and changes to flow which cause deviation from natural flow regime</p>

Importance/ Value	Criteria	Typical Examples
	of insignificant magnitude to affect the use or integrity.	<p>Slight deterioration in baseline water quality conditions but not significant enough to be measurable.</p> <p>No impact on WFD measures and / or their ability to achieve WFD water body objectives.</p> <p>No change in resource availability.</p>
		<p><b>Fluvial Geomorphology</b></p> <p>Very slight change from surface water baseline conditions, approximating to a 'no change' situation.</p>
		<p><b>Groundwater</b></p> <p>Very slight change from groundwater baseline conditions approximating to a 'no change' situation. Dewatering effects create no or no noticeable differential settlement effects on existing infrastructure and buildings.</p>

#### A.2.3 Significance of Effect

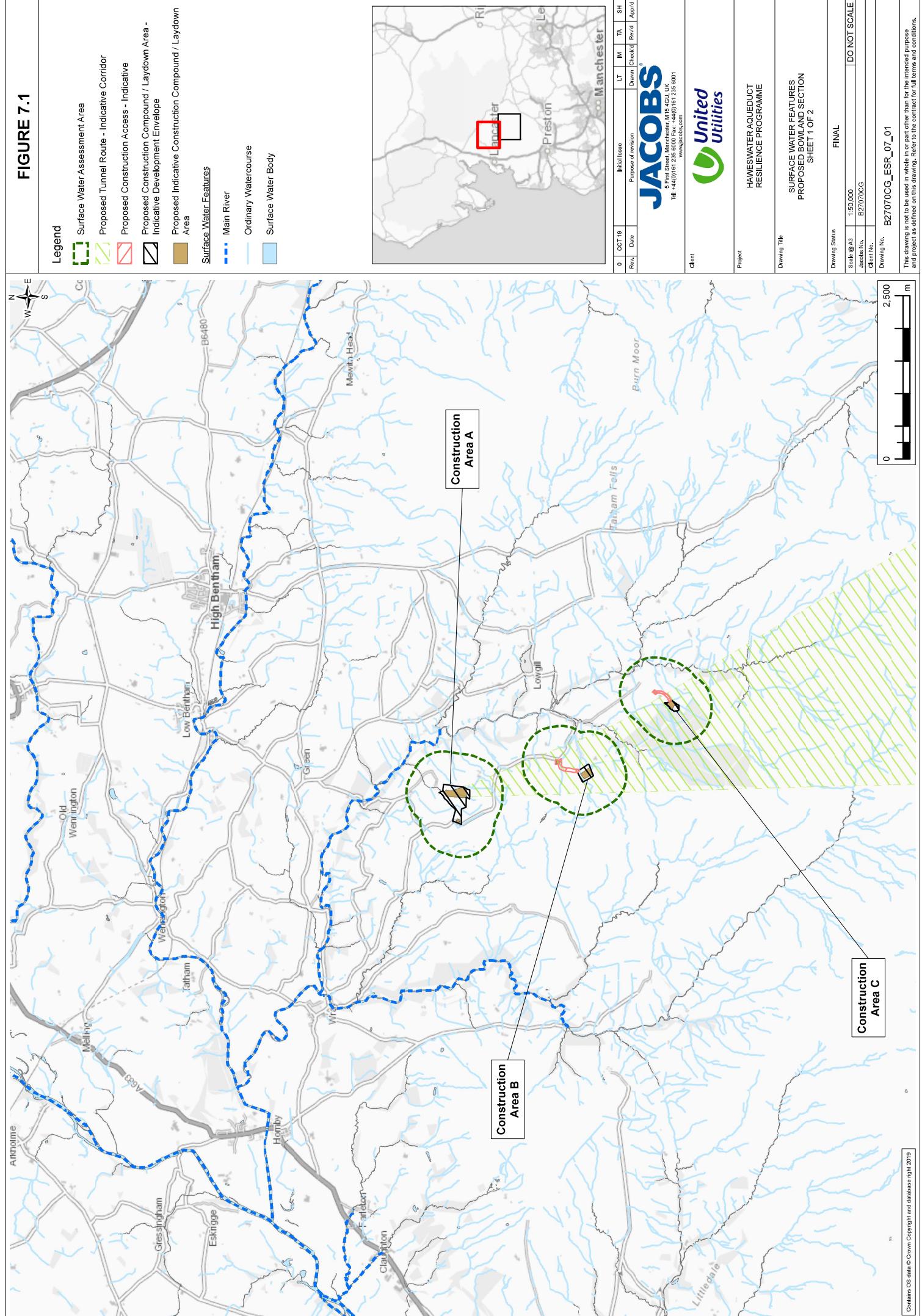
278) Considering the value of the feature and the potential magnitude of impact, the significance of the effect is based on the combination of the value of the feature and the magnitude of impact using the matrix in Table A7.1C. Potential effects can be either beneficial or adverse. The level of significance is assigned initially after consideration of any embedded mitigation to enable additional mitigation requirements to be identified and then finally following any additional proposed mitigation. The assessment assumes that all mitigation identified is appropriately implemented and maintained where necessary.

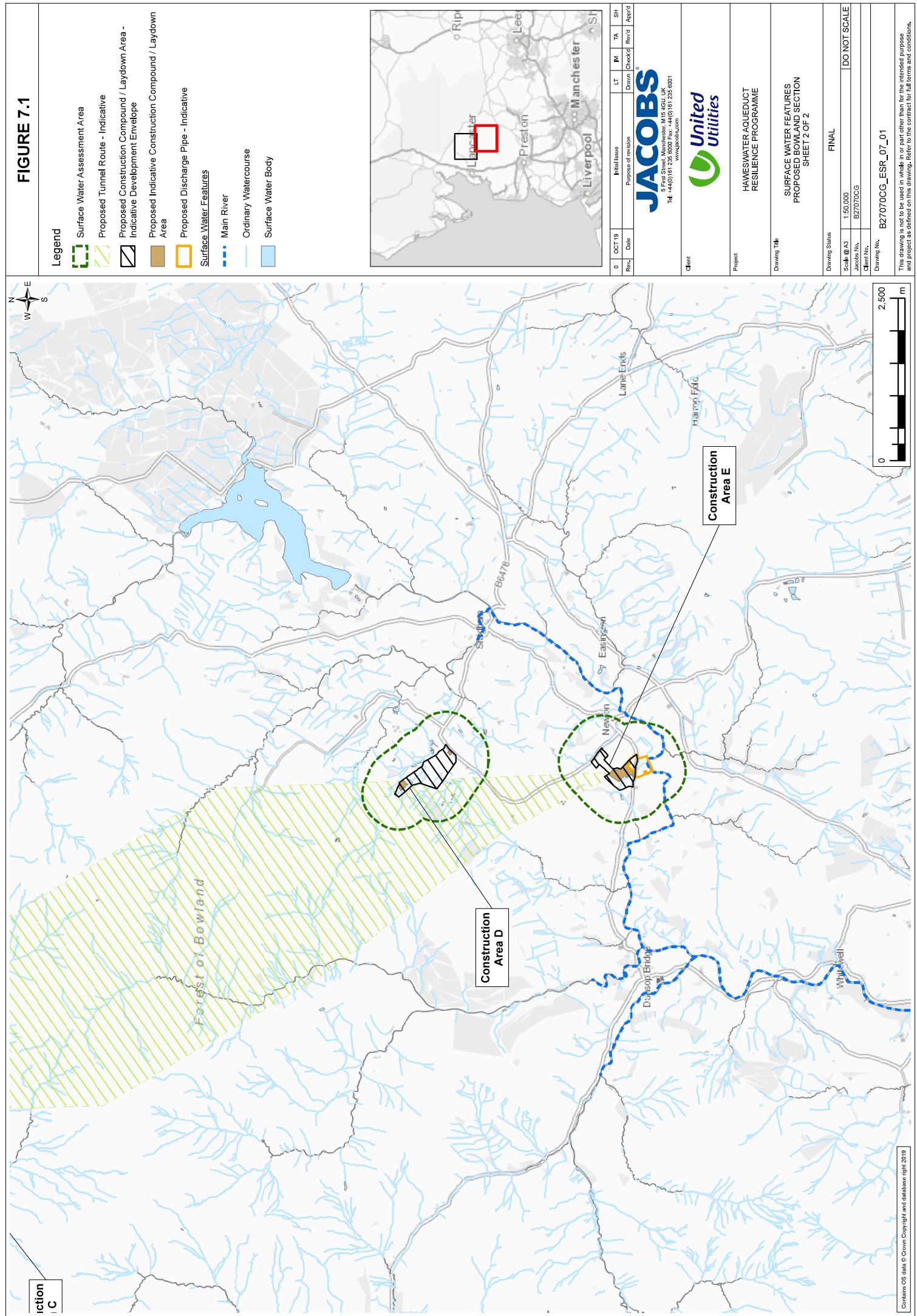
**Table A7.1C: Significance of effect**

Importance / value of feature	Magnitude of impact				
		Negligible	Minor	Moderate	Major
Low	Neutral	Neutral	Slight	Slight/Moderate	
Medium	Neutral	Slight	Moderate	Large	
High	Neutral	Slight/Moderate	Moderate/Large	Large/Very Large	
Very High	Neutral	Moderate/Large	Large/Very Large	Very Large	

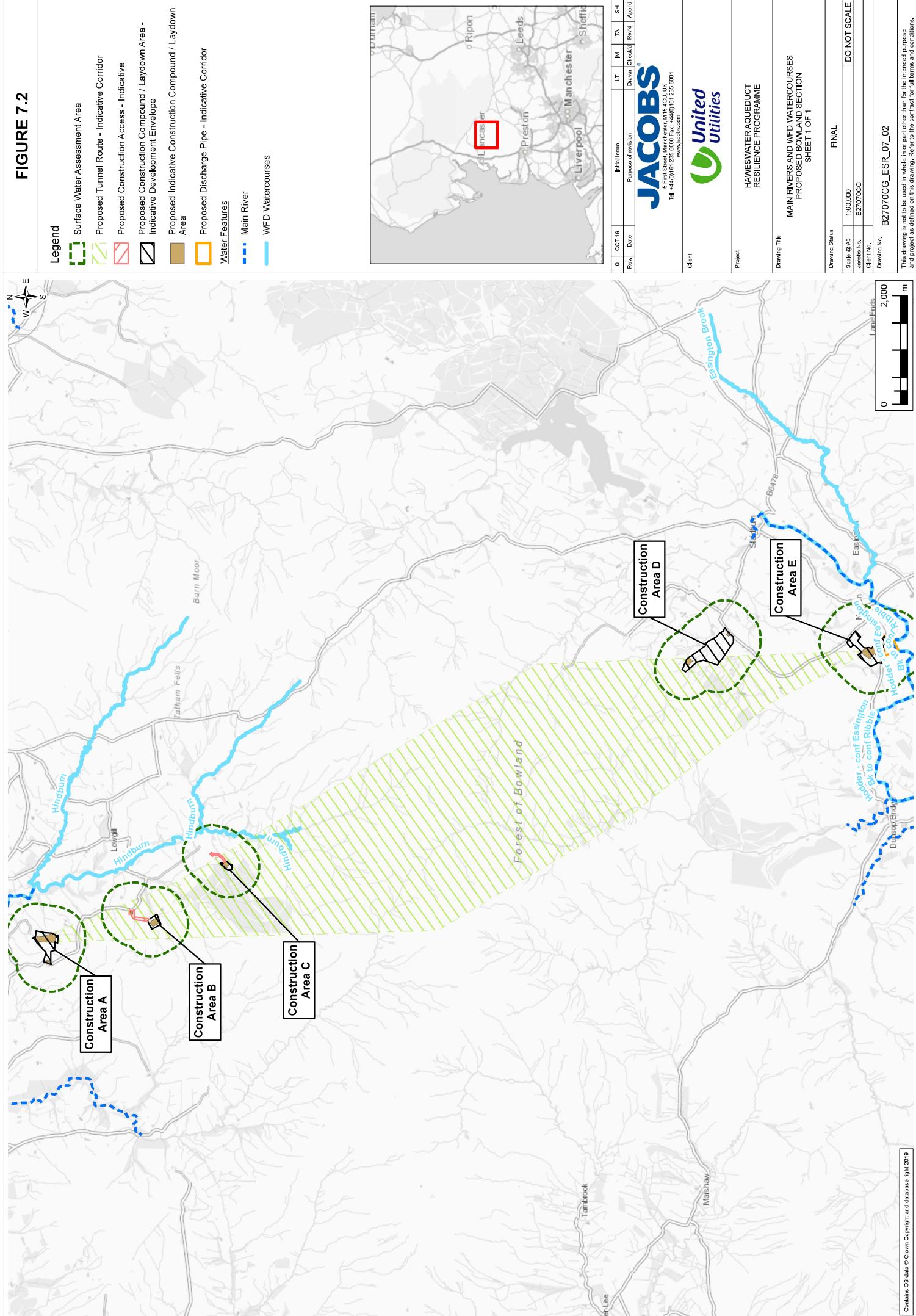
279) For the purposes of the EIA regulations those residual effects described as having a Moderate, Large or Very Large significance effect upon a feature are usually considered to be significant in terms of the EIA Regulations and thus are material considerations when determining planning applications. The use of the terms 'neutral' or 'slight' are used to acknowledge that there will be some change from the baseline conditions but that these effects are not significant.

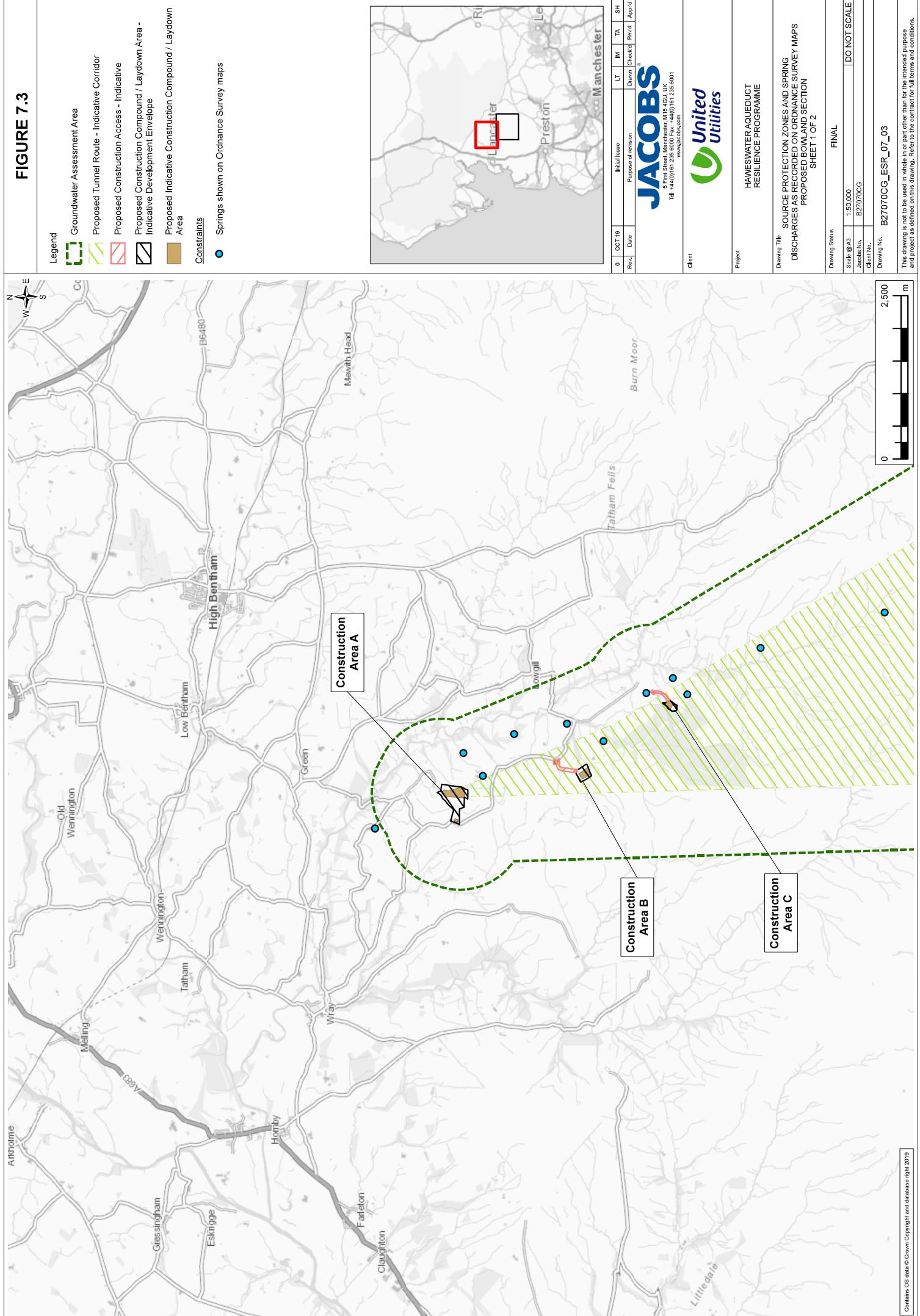
**FIGURE 7.1**

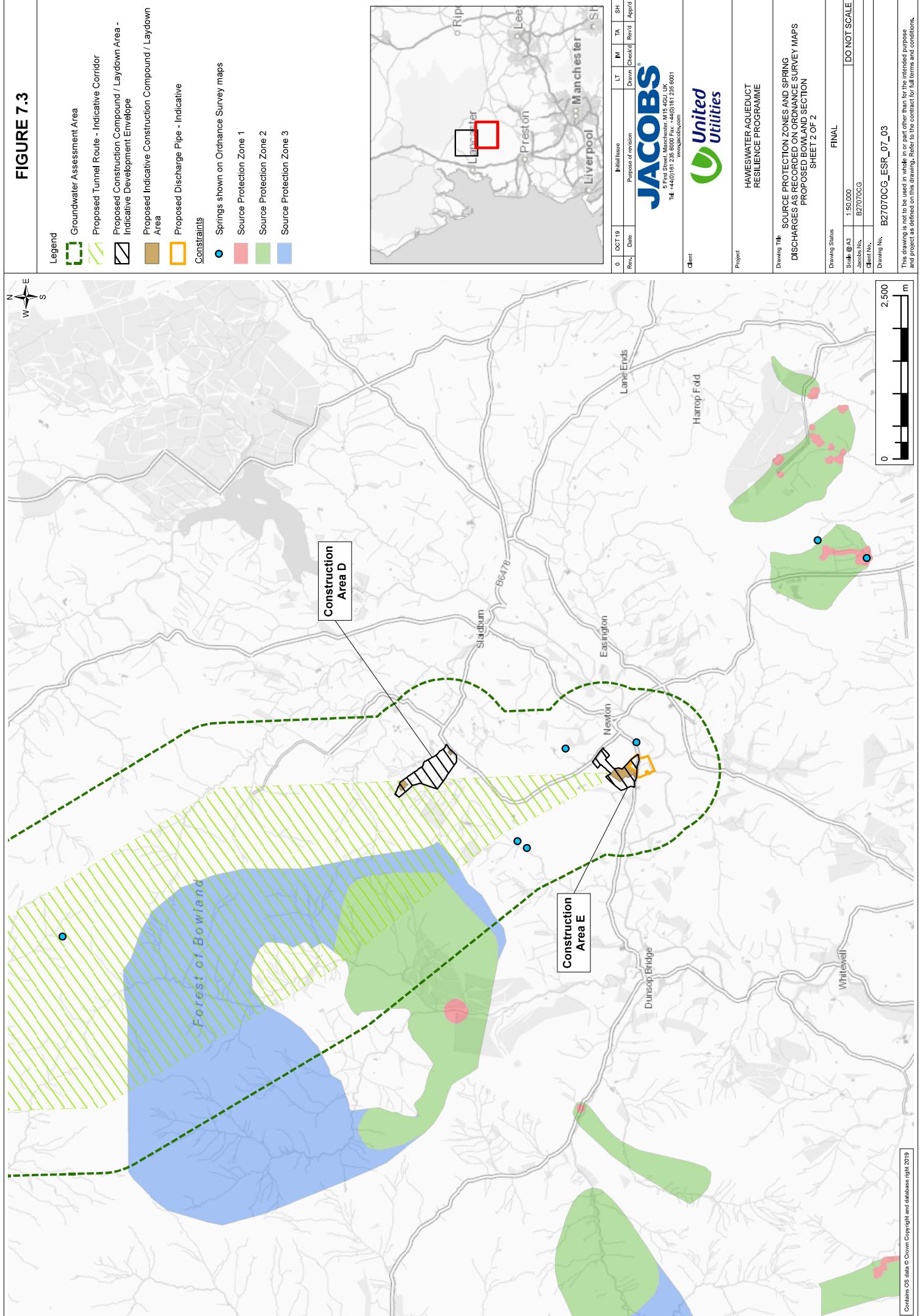


**FIGURE 7.1**

**FIGURE 7.2**



**FIGURE 7.3**

**FIGURE 7.3**

## 8. Flood Risk

### 8.1 Overview

280) This chapter presents the outcome of the scoping exercise in relation to potential flood risk effects on the Proposed Bowland Section. Flood risk can arise from a range of sources including:

- Rivers – also known as fluvial flooding
- The sea – high tides and wave overtopping can cause flooding in coastal areas. It can also combine with high river levels. The Proposed Bowland Section is located entirely inland and is remote from sources of tidal risk. Therefore, this source has been scoped out
- Surface water – rainfall that has not yet entered a formal watercourse and poses a risk of flooding in areas away from rivers or the sea
- Groundwater – the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground, through natural processes, under conditions where the 'normal' range of groundwater levels and groundwater flows are exceeded
- Artificial sources – this includes flooding from reservoirs, canals, water mains and sewers.

281) In this chapter, the flood risk baseline is summarised and provisional consideration of the potentially significant effects is provided. The scope of the flood risk impact assessment that will be undertaken to inform the EIA and its technical methodology is described below.

282) The National Planning Policy Framework<sup>35</sup> (NPPF) defines the requirements for flood risk assessments within England which is supplemented by guidance provided by the Environment Agency<sup>36</sup>.

### 8.2 Proposed Methodology

283) The assessment will be undertaken in accordance with the NPPF, and will draw on previous experience of similar projects, professional judgement and knowledge of local flood risk within which the Proposed Bowland Section will be delivered.

284) An assessment of the existing risk will be undertaken to establish the baseline conditions. This will include:

- A review of national flood risk datasets including the Environment Agency's flood map for planning, the flood map for surface water, the British Geological Survey (BGS) Susceptibility to Groundwater Flooding dataset, and reservoir flood risk maps. This will be cross referenced with Ordnance Survey (OS) mapping to identify existing and potential future receptors to flood risk
- Consultation with the Environment Agency, Lead Local Flood Authorities (LLFA) and the Coal Authority as required, to identify areas of historical flooding and known 'problem' areas (for example due to mine water rebound); existing flood risk management schemes; and proposed new schemes. This consultation will include a review of catchment flood management plans and strategic flood risk assessments
- A flow routing analysis to identify existing surface water flow paths and catchment boundaries
- A review of groundwater level data collected during future ground investigations, as well as from ongoing groundwater monitoring, hydrogeological information obtained from the groundwater assessment carried out in Chapter 7 Water Environment, and evidence of groundwater discharge points (springs, seeps, flushes, water wells and baseflow component to watercourses)
- Identification of artificial infrastructure including reservoirs, canals, water supply and waste water infrastructure from OS mapping and consultation with United Utilities and the Canals and Rivers Trust
- Identification of property and infrastructure that is potentially at risk from impacts on flood risk as a result of the Proposed Bowland Section from OS mapping and consultation with the LLFAs covering Lancashire, the Environment Agency and United Utilities.

<sup>35</sup> National Planning Policy Framework (2012) Department for Communities and Local Government

<sup>36</sup> Flood Risk Assessment for Planning Applications (2017) Environment Agency, Available online at <https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications> [Accessed July 2019]

285) In accordance with the NPPF, following the identification of baseline flood risk, an assessment will be undertaken to determine the flood risk posed to the Proposed Bowland Section and the potential for the Proposed Bowland Section to increase flood risk elsewhere over the life of the works. This will include:

- A review of the development proposals including enabling works and drainage designs. The assessment will be based on professional judgement and will investigate the potential interaction between components of the construction process or completed scheme with sources of flood risk identified during the baseline assessment
- Discharges of groundwater would be subject to a level of assessment dependent on downstream receptors, size of receiving watercourse and the magnitude and timing of the discharge. It is noted that the multi siphon drain down locations currently in place would be retained and used by the Proposed Bowland Section. Also, the replacement of sections of the aqueduct will reduce the likelihood of failure. Therefore, no detailed assessment of discharges from overflows and drain down pipes is currently proposed
  - Where discharges are to large watercourses in areas remote of sensitive receptors, the assessment may consider the use of a managed discharge regime to assess if discharges would pose a risk to downstream receptors without the need for hydraulic modelling
  - Where the volume of discharge would increase compared to the baseline and would pose a potential risk to sensitive receptors, detailed assessments would be made which may include hydraulic modelling
- The methodology for the assessment of watercourse crossings will be determined on a case by case basis following an initial review once further details of the design have been established. No detailed assessment is currently proposed for watercourse crossings that are tunnelled under, or where existing crossings are retained unchanged. Detailed assessments such as hydraulic modelling may be undertaken where significant new watercourse crossings are proposed or where sensitive land uses are identified that could be impacted by new or upgraded crossings. The methodology of these detailed assessments will be agreed with the relevant regulator on a case by case basis
- Hydrological analysis will be undertaken to derive design flows within sub-catchments to inform the design of any significant channel diversions required in any sections of open-cut
- The groundwater flood risk assessment methodology would initially comprise a detailed review of the data and information made available from future ground investigations and ongoing groundwater monitoring. Groundwater head pressures would be identified, seasonal groundwater levels would be analysed and a Conceptual Site Model would be developed.

### **8.3 Proposed Assessment Criteria**

286) It is a key principle of the NPPF that new developments should take place in low flood risk areas. However, there is an acknowledgement that essential utility infrastructure that has to be located within flood risk areas for operational reasons can be appropriate, providing that it can remain operational during times of flood and that it does not increase flood risk elsewhere.

287) Assessing the significance of flood risk impacts can be complex and can depend on changes in flood extent, depth, hazard and frequency as well as the sensitivity of the receptor to these components of flood risk. Therefore, set assessment criteria to define the importance of receptors and the magnitude of the impacts will not be defined but will be based upon professional judgement on a case by case basis.

288) This chapter will summarise the flood risk baseline for the assessment area and identify receptors where there is potential for significant effects to arise. It will also set out the methodology that will be used to quantify, assess and mitigate these effects. A brief description of the existing conditions is also included.

### **8.4 Existing Conditions**

289) The process of scoping commenced with the definition of a preliminary assessment area within which existing flood risk would be evaluated to assist in the identification of potential effects.

#### **8.4.1 Assessment area**

- 290) The assessment will initially consider an assessment area that includes the locations of the Construction Areas A, B, C, D and E. It is anticipated that these shafts would be linked by approximately 16.4 km of tunnel, although it is noted that design decisions have yet to be made on whether one or more intermediate shaft facilities would be employed. The shafts would link to the existing Haweswater Aqueduct by short lengths of open-cut pipework.
- 291) The decommissioning proposals for the existing Haweswater Aqueduct have not yet been finalised. However, if the existing aqueduct is left in-situ, groundwater would flow to the end of the decommissioned section and would be discharged to local watercourses. Overflow equipment and potential discharge routes are already in place into the River Hodder to the south.
- 292) The flood risk assessment does not have a fixed assessment area. The assessment will focus on the area within the indicative development envelope, but the assessment will be extended downstream if appropriate due to the magnitude of the impacts and the sensitivity of the potential receptors.

#### **8.4.2 Information Sources**

- 293) The following desk-based sources have been used to inform this scoping chapter:
- Environment Agency flood risk mapping
  - The Strategic Flood Risk Assessment for Lancaster City Council and Ribble Valley Borough Council
  - The Lune Catchment Flood Management Plan and the Ribble Catchment Flood Management Plan
  - Hydrogeological approach contained within Chapter 7 Water Environment
  - British Geological Survey Mapping
  - An internet search for historic flood incidents
  - Information related to environmental constraints entered onto the project GIS database.

#### **8.4.3 Fluvial Flooding**

- 294) All proposed compounds are located entirely within Flood Zone 1 (Figure 8.1) indicating that the annual risk of flooding from major fluvial sources is less than 0.1 %. The closest main river to the north of the Proposed Bowland Section is the River Hindburn approximately 610 m east of the Construction Area A envelope at the northern end of the Proposed Bowland Section and the River Hodder approximately 160 m south of the Construction Area E envelope.
- 295) The River Hodder has a floodplain approximately 100 m wide at this location and the existing drain down pipe in this location is located within Flood Zone 3. Although the floodplain of the River Hodder is relatively wide at this location no properties are at risk from this source until the river possess through Dunsop Bridge approximately 3 km downstream of the drain down location.
- 296) OS Mapping indicates that several smaller ordinary watercourses would also be within the development envelope of the Proposed Bowland Section. The floodplains of these watercourses are not recorded on the Environment Agency's flood map for planning, but as small, first or second order streams they are likely to have flashy surface water dominated regimes which can rise and fall very quickly, giving little warning of flooding. As the aqueduct across this section will be tunnelled at significant depth, the risk from ordinary watercourses to the Proposed Bowland Section would generally be very low. However, several compound locations have been identified that are near these watercourses where the risk may be locally high.
- 297) Several of these minor watercourses pass alongside isolated residential properties and cross minor roads. However, no records of historical flooding have been found following a review of the Lancaster City and Ribble Valley Borough SFRAs and web sources.

#### **8.4.4 Surface water**

- 298) The EA's flood map for surface water, presented on Figure 8.2, identifies that the risk of surface water flooding within the compound envelopes is very low (less than 0.1 % AEP). This is generally the case along the course of the proposed tunnel corridor. However, narrow areas of higher risk are identified along the

minor watercourses that cross the corridor. The main areas of risk are associated with the minor watercourses detailed above.

#### **8.4.5 Groundwater**

- 299) Groundwater level data are currently unavailable at the time of writing. However, it is anticipated that groundwater levels are shallowest adjacent to the small ordinary watercourses that are crossed by the Proposed Bowland Section and mentioned in Section 8.12.3 above. Sixteen springs are also shown to be present on Ordnance Survey mapping, within the Groundwater Assessment Area (see Figure 7.5). These areas of springs are indicative of groundwater flooding conditions, however additional or wider groundwater flooding areas are also likely to occur.
- 300) Given that the aqueduct is below ground level (bgl) throughout this section (up to 365 mbgl), it is likely that groundwater will be encountered at varying depths. The development is expected to cut through several Secondary A bedrock aquifers, which comprise highly productive horizons, and which form important local aquifers for water supply (see Chapter 7 Water Environment). It is therefore possible that significant artesian pressure heads are present at the depth of the proposed development, although this would need to be confirmed following the results of scheduled ground investigations.

#### **8.4.6 Artificial Infrastructure**

- 301) The existing Haweswater Aqueduct underlies the site.
- 302) Stocks Reservoir is located approximately 6 km upstream of Construction Area E at the southern end of the Proposed Bowland Section. EA reservoir flood mapping shows that in the event that this reservoir failed, the maximum extent of flooding would not pose a risk to Construction Area E but would affect any access routes to Construction Area E from the south and also the existing drain down location. Maintenance of this reservoir by United Utilities to meet the requirements of the Environment Agency will ensure that the likelihood of any flooding from this source is low, although it is noted that the consequences within the area affected would be high with significant flow velocities and depths.
- 303) No other existing artificial water infrastructure has been identified at this stage and the baseline risk is assumed to be to be low.

#### **8.4.7 Key Receptors**

- 304) Key receptors include:
- Agricultural land
  - Isolated farm properties
  - The transport network including minor local roads
  - The Proposed Bowland Section itself.

### **8.5 Potential Effects**

- 305) The following potential effects on flood risk were identified during the preliminary flood risk investigations and will need to be addressed as the scheme develops. However, it should be noted that these risks would be adequately mitigated with appropriate planning and design.

#### **8.5.1 Construction**

- 306) Preliminary investigations have indicated that the construction phase has the potential to cause the following effects:
- An increase in fluvial flood risk as a result of any construction works within the floodplain of Main Rivers or Ordinary Watercourses which disrupt flood flows and reduce floodplain volume. No Main River Crossings are currently identified
  - An increase in fluvial flood risk in the location of any temporary above ground watercourse crossings due to the constriction of flood flows

- An increase in surface water flood risk due to the creation of temporary site compounds and the storage of construction materials within the natural surface water catchments due to a decrease in permeability
- An increase in surface water flood risk due to linear infrastructure such as small open-cut sections and sections of track disrupting natural catchments
- Changes to groundwater flood risk because of groundwater levels and flows being altered by:
  - Temporary dewatering activities (for tunnelling, shaft and open-cut) drawing down the level of the groundwater table and therefore temporarily reducing groundwater flooding risks (refer to Chapter 7)
  - The release of artesian groundwater pressures within bedrock aquifers
  - The potential discharge to ground (in the absence of surface water feature to discharge to) of dewatered groundwater could cause groundwater levels to rise.

### **8.5.2 Operation**

307) The potential effects caused by the development once the scheme is fully operational are summarised below:

- Should the development involve the construction of any permanent above ground infrastructure such as washout chambers, outfalls and associated access roads within the floodplain, the development would have the potential to increase the risk of fluvial flooding due to the alteration of natural flood storage mechanisms and flow regimes
- Any permanent above ground infrastructure, has the potential to increase the rate of surface water runoff generated within their sites. This would have the potential to increase the risk of fluvial flooding from an increase in surface water entering Main Rivers and Ordinary Watercourses
- Any above ground watercourse crossings for associated infrastructure such as permanent access tracks, has the potential to increase fluvial flood risk elsewhere as a result of reduced channel capacity and flow accumulation behind the structure. (It is noted that no permanent crossings are currently anticipated.)
- Any above-ground watercourse crossings for associated infrastructure such as permanent access tracks have the potential to increase the risk of surface water flooding due to the creation of low permeability surfaces and the likely increase in the amount of surface water runoff generated by the site. (It is noted that no permanent above ground watercourse crossings are anticipated.)
- Where elements involve re-profiling of the land surface and localised changes in ground level, the scheme has the potential to alter surface water flow paths and increase surface water flood risk elsewhere. If the groundwater table is already shallow, there is also potential for the ground level to be reduced in relation to the groundwater level, and potentially increase the likelihood of groundwater emerging at the ground surface, thus increasing groundwater flood risk
- Changes to groundwater flood risk due to groundwater levels and flows being altered by:
  - The potential for groundwater to rebound, as the new pipeline would be more water-tight than the existing aqueduct, which would limit groundwater ingress
  - The pipeline could provide a barrier to groundwater flow, which could cause groundwater levels to rise on the up-gradient side of the pipeline and cause groundwater flood risk to increase (would be very localised to adjacent sensitive receptors)
- Discharges from existing drain down locations into the River Hodder Discharges from existing washouts and overflows are currently not expected to differ from the current situation and therefore there will be no potential to increase flood risk.
- Any new connections from the existing tunnel to watercourses to facilitate drainage of groundwater seeping into it, would also have the potential to increase the risk of flooding downstream of outfall locations.

## 8.6 Design and Mitigation

308) An optimised design will be developed that includes mitigation to help reduce likely significant flood risk effects. This would include:

- Design optimisation of surface level construction activities to avoid areas of risk if possible
- Design of the scheme, including construction phase in accordance with established good practice as identified within CIRIA and other industry standard guidance
- Management of discharges to minimise the impact on receiving watercourse
- Detailed ground investigations and groundwater level monitoring.

309) Additional mitigation may include the identification of opportunities to reduce baseline flood risk to sensitive receptors as part of the design through measures such as the restoration of areas disturbed through the construction process.

## 8.7 Summary Scope for the EIA

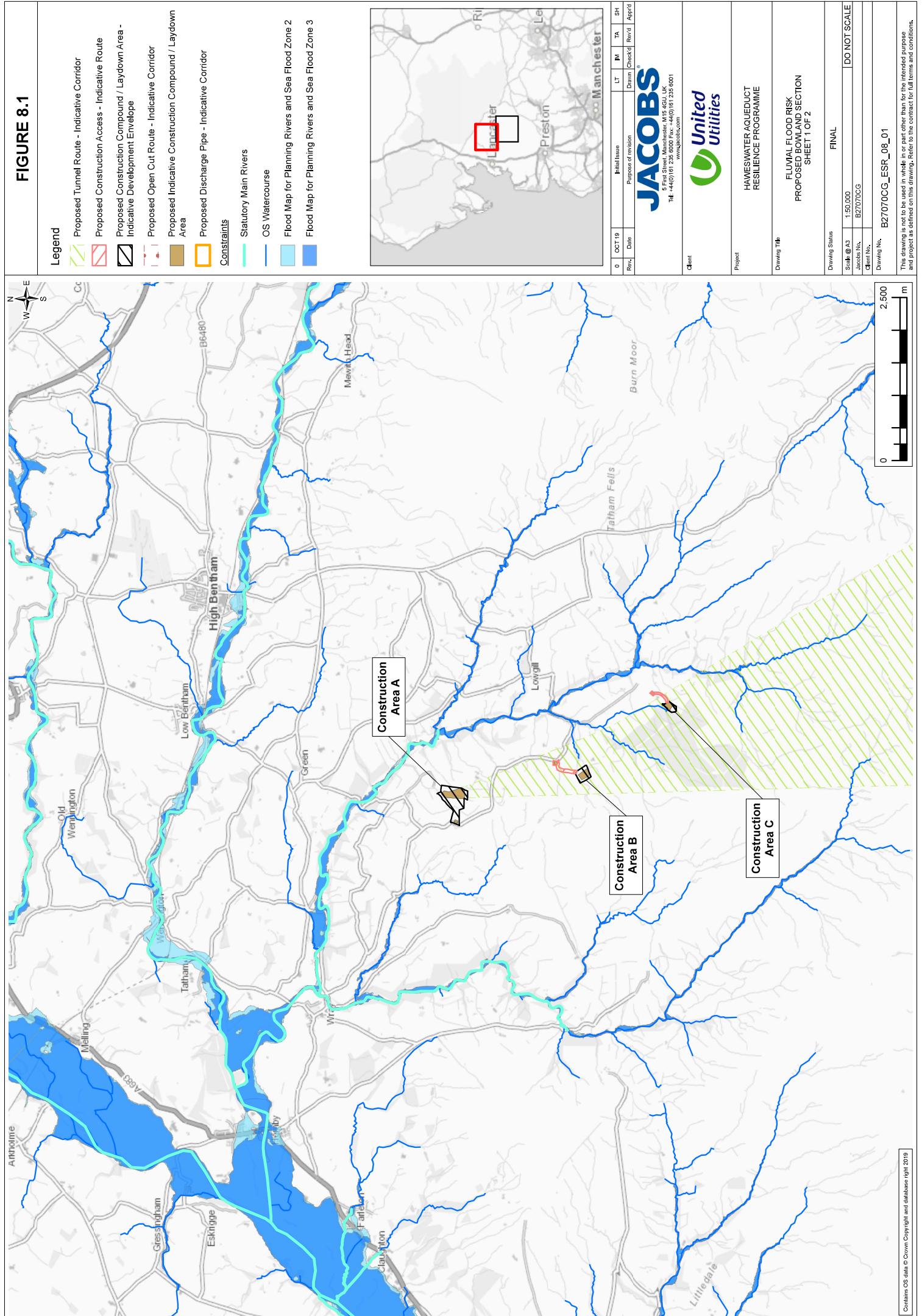
310) Very minor open-cut construction techniques may be required in this location (short connections from new tunnel to existing multi-line), and so impacts associated with this are currently included within the scope of the EIA. A summary of the scope is detailed in Table 8.3 below.

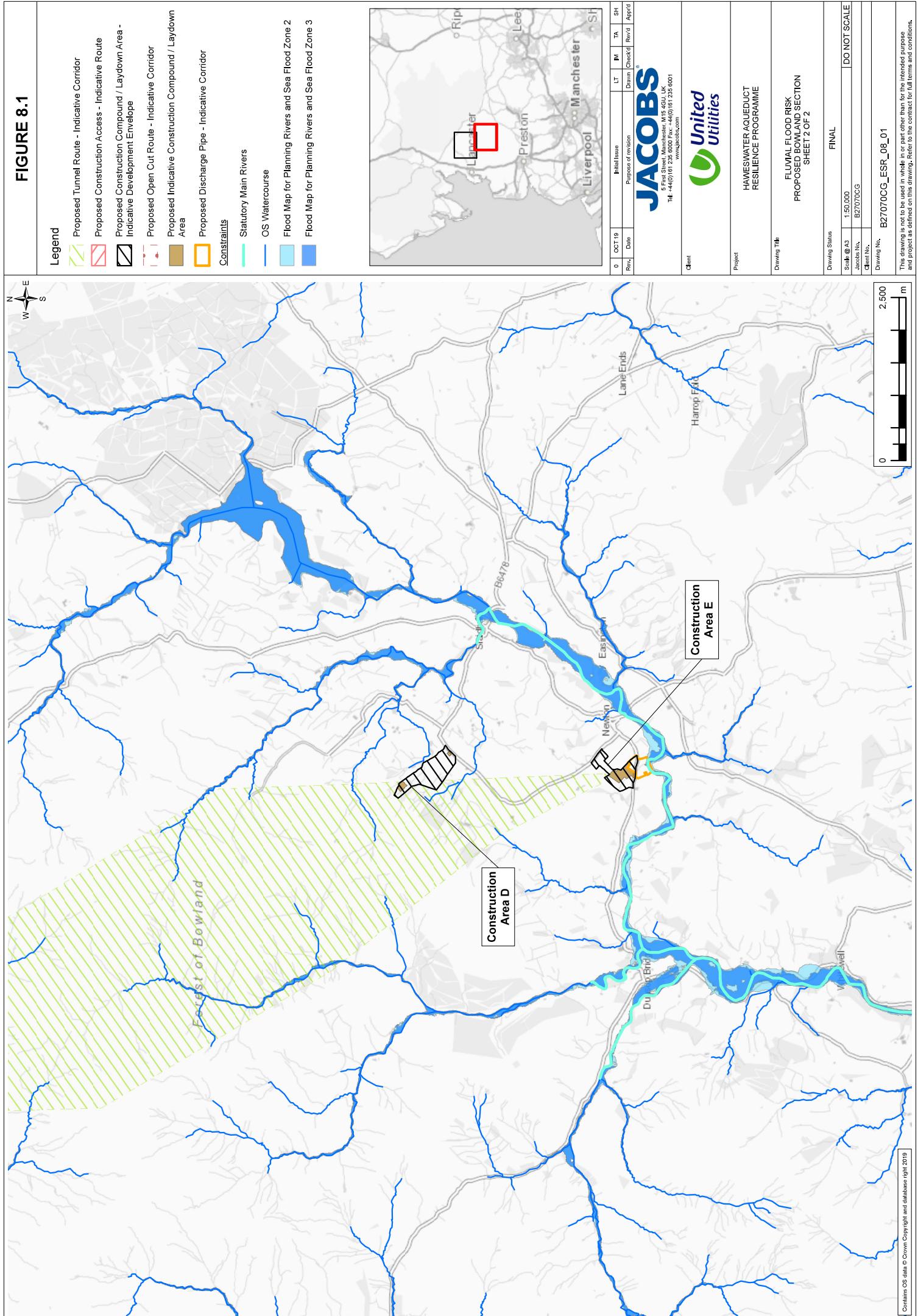
**Table 8.3: Matters of significance for flood risk effects during both construction and operation**

Receptor group	Matter / potential effects	Location within assessment area	Comments
Local isolated properties	Increase in flood risk	Refer to Figure 8.1 and 8.2	Scoped in.  Provides an assessment of flood risk effects proportional to the scale and nature of the Proposed Bowland Section and the likely effects, which would largely be of a temporary nature. Assessment would allow development of flood risk mitigation.
Agricultural land and uncultivated moorland	Increase in flood risk	Assessment area wide	Scoped in.  Although receptor is low sensitivity, there is potential for significant impacts which may require mitigation.
Nature conservation sites/ecological sites of local, national and international importance.	Increase in flood risk	Assessment area wide	Scoped in.  Provides an assessment of flood risk effects proportional to the scale and nature of the Proposed Bowland Section and the likely effects, which would largely be restricted to the construction period. Assessment would allow development of flood risk mitigation.
Transport infrastructure	Increase in flood risk	Minor local roads.	Scoped in.  Provides an assessment of flood risk effects proportional to the scale and nature of the Proposed Bowland Section and the likely effects, which would largely be restricted to the construction period. Assessment would allow development of flood risk mitigation.

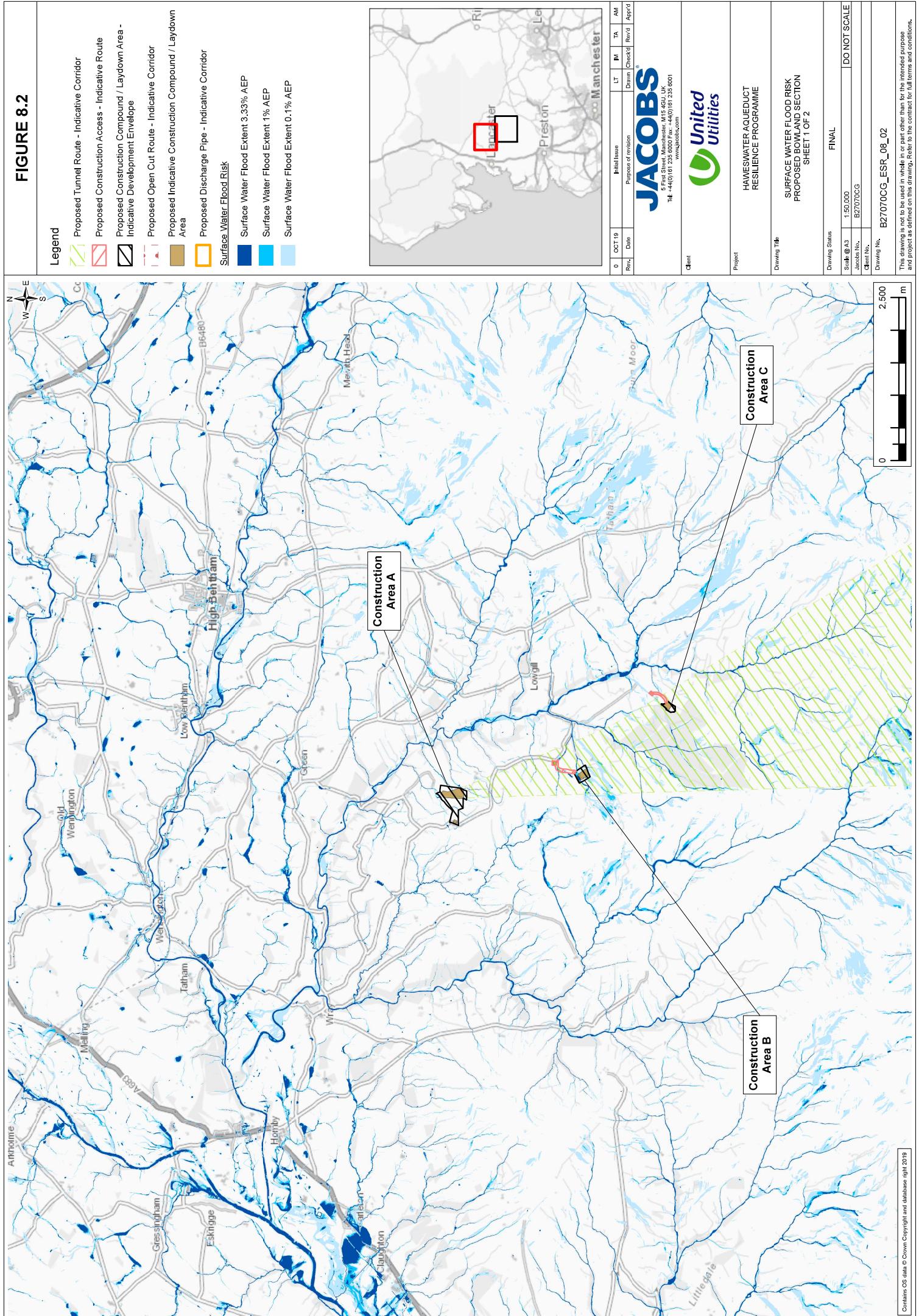
Receptor group	Matter / potential effects	Location within assessment area	Comments
The Proposed Bowland Section	Increase in flood risk	Refer to Figure 8.1 and 8.2	Scoped in.  Construction activities and temporary infrastructure could be at risk as could any permanent above ground infrastructure associated with the scheme.

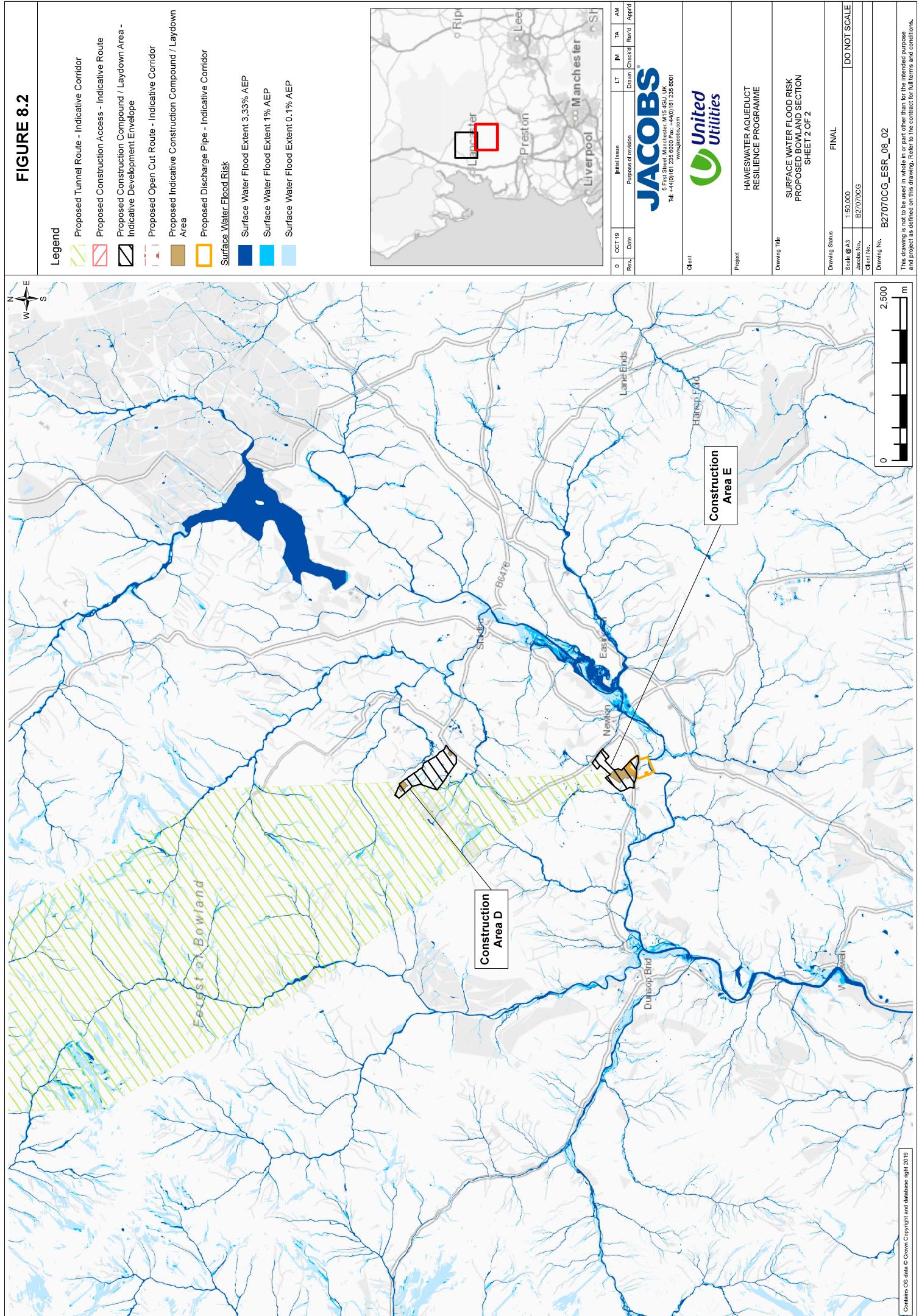
**FIGURE 8.1**



**FIGURE 8.1**

**FIGURE 8.2**



**FIGURE 8.2**

## 9. Ecology

### 9.1 Overview

- 312) This chapter presents the outcome of the scoping exercise in relation to potential terrestrial and aquatic ecological effects associated with the Proposed Bowland Section. The Proposed Bowland Section includes options for construction activities that would occur at ground level and also below the surface. It is expected that underground construction activities (i.e. the indicative tunnel corridor shown in Figure 3.1) would have no ecological impacts (either directly or indirectly). The proposed tunnel route corridor has therefore not been considered within this chapter. This will continue to be reviewed throughout the EIA delivery programme. Chapter 7 Water Environment considers the interaction between ground water dependent ecosystems and sub-surface works. The results of this assessment would be included within the ecology review process. Should any potential impacts be identified from sub-surface works; additional ecological surveys may be required.
- 313) For the purpose of this chapter, the development envelopes considered within this scope include the proposed construction compounds / laydown areas, the proposed construction access route and the proposed discharge pipe and are shown in Figure 9.1.
- 314) This chapter presents the current ecological baseline for the Proposed Bowland Section and how this was established. It considers the nature conservation value / importance for biodiversity of the ecological features present, the means by which the Proposed Bowland Section may potentially affect those features, and provides the ecological surveys and methodologies required to address gaps and limitations in existing data to inform the impact assessment for the EIA.

### 9.2 Proposed Methodology

#### 9.2.1 Desk study

- 315) Data gathering from a combination of web-based sources and local biological records centres was undertaken in August 2018 by United Utilities and subsequent data gathering undertaken in August 2019 by Jacobs. Most of the data gathering exercise was completed in August 2018 during the early concept phase when detailed design information was not available. Subsequently, part of the desk study data provided in this report has been compiled from early scheme design and not the detailed development envelopes shown in Figure 9.1.
- 316) Additional desk study searches will be undertaken where it is considered that existing information is insufficient to appropriately assess likely significant ecological effects. This particularly relates to desk study searches for non-statutory designated sites of nature conservation interest and protected / notable species.
- 317) A summary of the desk study searches undertaken as part of this assessment is provided below:
- A search for statutory designated sites of nature conservation interest within 5 km (restricted to 2 km for Local Nature Reserves) of the Proposed Bowland Section
  - A search for non-statutory designated sites of nature conservation interest and protected / notable species within 2 km of the Proposed Bowland Section (based on early scheme design). It is acknowledged that these searches will need to be updated to cover a 2 km search from additional development envelopes that have / will be developed through the detailed design phase
  - A search for European Protected Species Mitigation Licences (EPSML) within 2 km of the Proposed Bowland Section.

- 318) As part of the desk study the following data sources were contacted or accessed for records:

- Lancashire Environment Record Network (LERN) for protected / notable species and non-statutory designated sites data (data received September 2018)
- The Multi Agency Geographic Information for the Countryside (MAGIC) website (<https://magic.defra.gov.uk/MagicMap.aspx>) - accessed in July and August 2019. For statutory designated sites, search for European Protected Species Mitigation Licences (EPSML) and to identify

if the Proposed Bowland Section falls within any of Natural England's Impact Risk Zones for Sites of Special Scientific Interest (SSSI's)<sup>37</sup>

- Google maps (<https://www.google.co.uk/maps>) – accessed in July and August 2019. To identify potential habitat and species present within the Proposed Bowland Section and wider area including a search for ponds which may support amphibians up to 500m from the Proposed Bowland Section
- Environment Agency (North West region Analysis and Reporting team) – information requested August 2019. In addition to Open Government (<https://data.gov.uk/>), macroinvertebrate / macrophyte site and metric data, a request for data relating to freshwater invertebrates, freshwater macrophyte and diatom, and protected species records was submitted for selected watercourses across the Proposed Bowland Section.

### **9.2.2 Field Surveys**

319) The following field surveys were undertaken by Bowland Ecology on behalf of United Utilities between April and June 2019. Field surveys are still ongoing and it has not been possible to incorporate data gathered from July 2019 onwards into this report. Advanced surveys which have been completed to date were determined by an advanced scoping exercise undertaken by United Utilities. Surveys were selected based on professional judgement. Field surveys will continue throughout the EIA process to address any data gaps and provide further baseline information where appropriate. Surveys will be completed prior to submission of the ES. Surveys have undertaken in accordance with the survey methodologies outlined in Table 9.5 in Section 9.7.2.

#### **Extended Phase 1 Habitat Surveys**

320) Extended Phase 1 Habitat Surveys (EP1HS) were undertaken for the Proposed Bowland Section between April and June 2019. The EP1HS survey area was defined prior to the development envelopes being finalised and as such some areas within the Proposed Bowland Section have not been surveyed. Access limitations also restricted a comprehensive survey of the Proposed Bowland Section. Where this occurred, aerial imagery was used to identify potential habitats and provide descriptions. Aerial imagery was not used for mapping purposes.

321) The EP1HS results undertaken to date, are shown in Figure 9.5.

#### **Hedgerow Surveys**

322) Hedgerow surveys were undertaken within the EP1HS area where access was permitted between April and June 2019. The EP1HS area (i.e. hedgerow survey area) was defined prior to the development envelopes being finalised and as such some hedgerows within the Proposed Bowland Section have not been surveyed. An assessment of each hedgerow within the EP1HS area was made in accordance with the Hedgerow Regulations (1997).

#### **Great Crested Newt Surveys**

323) Great Crested Newt (GCN) (*Triturus cristatus*) environmental DNA (eDNA) surveys were undertaken on 86 of 116 ponds within 250m of the Proposed Bowland Section to determine presence or absence within nearby waterbodies. At the time of the surveys, 26 ponds were dry. Surveys were undertaken between April and June 2019.

324) A positive eDNA result was returned for one pond indicating GCN presence. The remaining ponds returned negative or inconclusive eDNA results.

#### **Breeding Bird Surveys**

325) Three breeding bird transects were completed across the EP1HS area where suitable breeding bird habitat was identified. Each transect survey comprised three visits undertaken between April and June 2019 (one visit per month). Access limitations were minor and areas were visible from roads or adjacent land and therefore there were no significant constraints.

<sup>37</sup>These have been identified by Natural England for use by Local Planning Authorities to assess planning applications for likely impacts on SSSIs / SACs / SPAs and Ramsar sites and to determine when to consult Natural England

### Aquatic Surveys

- 326) In addition to data gathered from desk study searches outlined above, an additional data request has been made to the Environment Agency for species level data, which is not freely available. Data have been requested for macroinvertebrates and aquatic flora; fish data is available online in its entirety.
- 327) The Proposed Bowland Section comprises a tunnel with very short (approximately 400 m) open-cut sections. The tunnelling option is assumed to have no significant effect on macroinvertebrates, so whilst data coverage is presented here it is assumed that no pathway to effect exists. However, tunnelling would have associated construction activities that could potentially effect macroinvertebrates. These include; construction areas, compound/laydown areas, access tracks and associated infrastructure (e.g. discharge pipes) which may affect nearby watercourses (habitat loss, changes in water quality or quantity from site run off) and therefore these areas have been assessed.
- 328) Existing macroinvertebrate data have been assumed to be relevant if:
- Sites lie within surface level construction envelopes
  - Sites lie on watercourses hydrologically connected to surface level construction activities or other areas of surface level construction activity within the wider assessment area (5 km) buffer. Sites beyond 5 km are unlikely to be affected by construction activities
  - Data are less than ten years old. Data have been requested to 1995, to provide an indication of long-term trends at each site however data earlier than 2010 may not be representative of current conditions or environmental value.

## 9.3 Proposed Assessment Criteria

### 9.3.1 Field Surveys

- 329) The scope of further field survey work needed to inform the EIA has been determined based upon current baseline knowledge of the assessment area and a review of current good practice survey guidance and nature conservation legislation / policy frameworks (e.g. National Planning Policy Framework (NPPF) 2019, Natural Environment and Rural Communities (NERC) Act 2006 Section 41 list etc.).

### 9.3.2 Evaluation of Ecological Features

- 330) This scoping report and the EPH1S results, along with data obtained from the further field surveys are intended to form the framework for the completion of an Ecological Impact Assessment (EcIA). The EcIA will be undertaken using guidance from the Guidelines for Ecological Impact (CIEEM, 2019)<sup>38</sup>. The EcIA will in turn form part of the EIA for the Proposed Bowland Section.
- 331) The preliminary evaluation of the importance of ecological features identified within this scoping report has been based on Section 4 of the Guidelines for Ecological Impact Assessment (CIEEM, 2019). This includes the following geographical frame of reference;
- **International and European**
  - **National** (England)
  - **Regional** (north west England)
  - **County** (e.g. Lancashire)
  - **District** (local authority e.g. Lancaster City Council and Ribble Valley Borough Council)
  - **Local** (the feature is of ecological importance beyond the Proposed Bowland Section but is not considered to be of District importance for biodiversity)
  - **Less than local** (the feature does not meet the criteria for local importance).

<sup>38</sup> Guidelines for Ecological Impact Assessment in the UK and Ireland Terrestrial, Freshwater, Coastal and Marine September 2018

## 9.4 Existing Baseline and Preliminary Evaluation

### 9.4.1 Designated Sites

#### Statutory Designated Sites of Nature Conservation

- 332) Two international designated sites the North Pennines Dales Meadows Special Area of Conservation (SAC) and Bowland Fells Special Protection Area (SPA), were identified within 5 km of the Proposed Bowland Section. Eleven nationally designated SSSIs were identified within 5 km of the Proposed Bowland Section.
- 333) No locally designated statutory designated sites (LNRs) were identified within 2 km of the Proposed Bowland Section.
- 334) The data search also revealed that the Proposed Bowland Section falls within the Natural England's Impact Risk Zone for two of the SSSI's; these relate to the Bowland Fells and one parcel of the North Pennines Dales Meadows SAC. This is a defined zone around the SSSI that reflects the particular sensitivities of the features for which it is notified and is used by local planning authorities to indicate the types of development proposals that could potentially have adverse impacts on the site.
- 335) Further information relating to these statutory designated sites is presented in Table 9.1 below and shown in Figure 9.2.

#### Non-Statutory Designated Sites of Nature Conservation

- 336) Nineteen non-statutory designated sites were identified within 2 km of the Proposed Bowland Section. Further information relating to these designated sites is presented in Table 9.1 and also shown in Figure 9.3 in Appendix A.
- 337) An updated desk study search for non-statutory sites will be undertaken which would include a 2 km search from the Proposed Bowland Section. This would ensure that all designated sites which may be ecologically and / or hydrologically linked to the Proposed Bowland Section are identified.

**Table 9.1: Designated sites for nature conservation baseline information and preliminary evaluation**

Site name	Designation	Area	Location and distances	Reason for designation	Falls within SSSI Impact Risk Zone	Preliminary evaluation
<b>Statutory Designated Sites of Nature Conservation Interest within 5 km (and 2 km for LNR) of the Proposed Bowland Section</b>						
North Pennine Dales Meadows	SAC	497.09 ha	0.62 km east of Construction Area D	A series of isolated mountain hay meadows supporting a diverse range of rare and local meadow species.	N/A	International / European
Bowland Fells	SPA SSSI	16,002.3 ha	0.91 km north west of Construction Area D	An area of upland fells supporting Lancashire's largest expanse of blanket bog and heather moorland. The site provides habitat suitable for a diverse upland breeding bird community including Annex I upland breeding birds, hen harrier ( <i>Circus cyaneus</i> ) and merlin ( <i>Falco columbarius</i> ), and an internationally important breeding population of lesser black-backed gull ( <i>Larus fuscus</i> ).	N/A Yes	International / European National
Myttons Meadows	SSSI	10.0 ha	0.62 km east of Construction Area D	Three fields below Myttons Farm, Lancashire and part of a fourth field to the south representing the largest traditionally managed, species-rich hay meadows. The site forms part of the North Pennine Dales Meadows SAC.	Yes	National
Far Holme Meadow	SSSI	1.66 ha	0.75 km east of Construction Area A	An area of lowland grassland supporting species characteristic of traditionally managed hay meadows.	No	National
Roeburndale Woods	SSSI	41.7 ha	1.93 km west of Construction Area A	An area of broadleaved woodland believed to be an ancient woodland site containing a wide range of soils from acidic podzols to basic brown earths.	No	National
Bell Sykes Meadows	SSSI	13.68 ha	2.19 km south east of Construction Area D	Six fields of unimproved, enclosed, herb-rich grassland supporting a rich floral community. Forms part of the North Pennine Dales Meadows SAC.	No	National
Clear Beck Meadow	SSSI	0.54 ha	2.58 km north west of Construction Area A	Although small the site represents one of the best examples of species-rich meadow grassland in Lancashire.	No	National

Haweswater Aqueduct Resilience Programme  
Proposed Bowland Section - EIA Scoping Report

Site name	Designation	Area	Location and distances	Reason for designation	Falls within SSSI Impact Risk Zone	Preliminary evaluation
Robert Hall Moor	SSSI	18.8 ha	2.88 km north of Construction Area A	An area of wet, unimproved grassland, flashes and scrub on a glacial mound supporting a number of rare plant communities and species.	No	National
Field Head Meadow	SSSI	3.29 ha	3.14 km south east of Construction Area E	An area of herb-rich hay meadow forming part of the North Pennine Dales Meadows SAC.	No	National
Langcliffe Cross Meadow	SSSI	5.3 ha	3.25 km east of Construction Area E	An area of northern hay meadow containing 19 grass species. Forms part of the North Pennine Dales Meadows SAC.	No	National
Standridge Farm Pasture	SSSI	4.46 ha	3.87 km east of Construction Area D	An area of unimproved enclosed herb-rich pasture supporting a mosaic of flushed mire and neutral grassland communities. Forms part of the North Pennine Dales Meadows SAC.	No	National
Barn Gill Meadow	SSSI	5.58 ha	3.96 km north east of Construction Area D	An area of grassland supporting several species characteristic of hay meadow communities.	No	National
<b><i>Non-Statutory Designated Sites of Nature Conservation Interest within 2 km of the Proposed Bowland Section</i></b>						
River Hodder From Confluence with River Ribble Upstream to Cross of Greet Bridge/ Bowland Fells SSSI Boundary	BHS	94.9 ha	Within the footprint of the Proposed discharge pipe corridor	Large section of river important for otter ( <i>Lutra lutra</i> ), Atlantic salmon ( <i>Salmo salar</i> ), brown trout ( <i>Salmo trutta</i> ), bullhead ( <i>Cottus gobio</i> ), dace ( <i>Leuciscus leuciscus</i> ) and stone loach ( <i>Barbatula barbatula</i> ).	N/A	County

Haweswater Aqueduct Resilience Programme  
Proposed Bowland Section - EIA Scoping Report

Site name	Designation	Area	Location and distances	Reason for designation	Falls within SSSI Impact Risk Zone	Preliminary evaluation
Goodber Common (Including Summersgill Fell and White Moss)	BHS	914.9 ha	Within the footprint of Construction Area B	Extensive area of open moorland with an intricate mosaic of blanket bog, wet acid grassland and marshy grassland with many flushes and small streams.	N/A	County
Dunsop Fell and Low Fell	BHS	279.19 ha	Immediately to the north of Construction Area D	Mosaic of upland moorland habitats including blanket bog, heathland and acid grassland.	N/A	County
Upper Hindburn Valley – Grassland and Woodland Between Stairend Bridge and Botton Bridge	BHS	11.05 ha	0.25 km north of Construction Area C	A series of semi-natural grasslands situated along the upper reaches of the River Hindburn with several small areas of semi-natural woodland.	N/A	County
Over Houses Great Wood	BHS	6.67 ha	0.32 km east of Construction Area A	Semi-natural woodland situated on steeply sloping ground. Notable for wood fescue ( <i>Festuca altissima</i> ) being present.	N/A	County
River Hindburn	BHS	13.59 ha	0.37 km east of the access route for Construction Area C	No citation available	N/A	County

Haweswater Aqueduct Resilience Programme  
Proposed Bowland Section - EIA Scoping Report

Site name	Designation	Area	Location and distances	Reason for designation	Falls within SSSI Impact Risk Zone	Preliminary evaluation
Helks Wood	BHS	8 ha	0.43 km north east of access route for Construction Area B	Semi-natural woodland which is identified within Natural England's Inventory of Ancient Woodland. Ancient woodland is an irreplaceable habitat.	N/A	National (due to the presence of a viable area of ancient woodland listed on the Ancient Woodland Inventory (AWI)).
Mean Garth Wood	BHS	5.18 ha	0.44 km east of the access route for Construction Area C	The site consists of a long narrow band of ancient semi natural woodland along Middle Gill, a tributary of the River Hindburn. Ancient woodland is an irreplaceable habitat.	N/A	National (due to the presence of a viable area of ancient woodland listed on the Ancient Woodland Inventory (AWI)).
Swans Wood (Including Far Close Wood)	BHS	4.8 ha	0.58 km north of the access route for Construction Area C	A band of ancient semi-natural woodland on the eastern side of the River Hindburn. Ancient woodland is an irreplaceable habitat.	N/A	National (due to the presence of a viable area of ancient woodland listed on the Ancient Woodland Inventory (AWI)).
Burn End Pasture	BHS	2.28 ha	0.6 km east of Construction Area D	An area of wet flushed pasture supporting a mosaic of base-rich springs and flushes amidst acidic and marshy grassland.	N/A	County
Lower Helks Pasture	BHS	15.62 ha	0.75 km north east of the access route for Construction Area B	No citation available.	N/A	County
Gibbs Wood and Bonstone Wood	BHS	4.15 ha	0.78 km south of the proposed discharge pipe corridor	No citation available.	N/A	County

Haweswater Aqueduct Resilience Programme  
Proposed Bowland Section - EIA Scoping Report

Site name	Designation	Area	Location and distances	Reason for designation	Falls within SSSI Impact Risk Zone	Preliminary evaluation
Hollinhurst Wood	BHS	3.26 ha	0.91 km east of the access route for Construction Area B	Three parcels of semi-natural woodland situated on sloping ground alongside Hollinhurst Brow.	N/A	County
Waddington Fell Road, Roadside Verges	BHS	0.22 ha	0.95 km south west of Construction Area E	Species-rich roadside verges.	N/A	County
Crag House Roadside Verges	BHS	0.75 ha	1.26 km south of the proposed discharge pipe corridor.	Species-rich roadside verges.	N/A	County
Birkett Fell, Hodder Bank Fell and Mossthwaite Fell	BHS	231.12 ha	1.29 km south west of the proposed discharge pipe corridor	Large area of upland heath and blanket bog with scattered flushes.	N/A	County
Ashnott Wood	BHS	2.55 ha	1.42 km south of the proposed discharge pipe corridor.	No citation available.	N/A	County
Bonstone Brook Pastures	BHS	14.77 ha	1.48 km south of the proposed discharge pipe corridor.	Two pastures containing species-rich semi-natural grassland.	N/A	County
Ashnott Meadow	BHS	2.63 ha	1.71 km south of the proposed discharge pipe corridor.	Damp, semi-natural, neutral grassland meadow notable for <i>Dactylorhiza maculata subsp. Erizetorum</i> .	N/A	County

#### **9.4.2 Habitats and Species of Principal Importance**

- 338) Under the provisions of the Natural Environment and Rural Communities (NERC) Act 2006 Section 40, all public bodies, including local authorities and statutory undertakers (including United Utilities), are required to take account of the conservation of species and habitats of Principal Importance for biodiversity. Section 41 (S41) of the Act requires the Secretary of State to publish and maintain a list of habitats and species which are of principal importance for the conservation of biodiversity in England (commonly referred to as 'priority' habitats / species).
- 339) These habitats and species generally form the basis for local Biodiversity Action Plan targets. Lancashire's Local Biodiversity Action Plan (LBAP) was designed to implement national biodiversity targets at a local level, but with a focus on local priorities. The effects of the Proposed Bowland Section on priority habitats and species listed within local Biodiversity Action Plans (BAPs) should also be considered, even though not all these habitats / species are legally protected.
- 340) Several of these habitats and species were found to be either present or potentially present within the Proposed Bowland Section. These are summarised in Tables 9.2 and 9-3 in Section 9.4 below.

#### **9.4.3 Habitats within the survey area**

- 341) The following habitats have been identified within the EP1HS area. Several of these habitats have been identified as habitats of nature conservation value / importance. An assessment of the value / importance for biodiversity is provided in Table 9.2 below.

**Table 9.2: Preliminary evaluation of habitats found within the Proposed Bowland Section survey area**

Phase 1 Habitat Classification	Description / extent	Habitat of Principal Importance (NERC Act, 2006)	LBAP Habitat	Preliminary evaluation / importance
Broadleaved semi-natural woodland	<p>Three blocks of broadleaved semi-natural woodland were recorded across the area. The first of these was located alongside a road in the northern section of the EP1HS area. Species present included oak (<i>Quercus sp.</i>), semi mature sycamore (<i>Acer pseudoplatanus</i>), silver birch (<i>Betula pendula</i>) and beech (<i>Fagus sylvatica</i>). A second block, in this case ancient woodland, occurred on the slopes of a watercourse at Well Beck Wood and downstream at Middlefield Wood. Species included alder (<i>Alnus glutinosa</i>), rowan (<i>Sorbus aucuparia</i>), oak, ash (<i>Fraxinus excelsior</i>), and hawthorn (<i>Crataegus monogyna</i>) with a ground flora of several ancient woodland indicator species.</p> <p>A third block was present along Mill Beck at Fall Wood Coppice and comprised of scattered oak, ash and alder with a locally dominant patch of aspen (<i>Populus tremula</i>). Additional small, isolated pockets of woodland were present in the northern section of the EP1HS area alongside roads including an area of wet woodland.</p> <p>Lowland deciduous broad-leaved woodland is a Habitat of Principal Importance in England and is listed on the Lancashire LBAP. These areas of semi-natural woodland are considered of County importance for biodiversity. The area of ancient woodland is made up of 6.6ha of woodland and is of National importance for biodiversity.</p>	Yes	Yes	National (Ancient woodland) County (Other semi-natural broadleaved woodland areas)
Coniferous plantation woodland	<p>This habitat is rare within the EP1HS area, being present in only one location in the south; Higher Thrushgill Plantation. This large block of woodland was coniferous with some recently planted broadleaf specimens present along the north-western edge. A relatively diverse ground flora was also present.</p> <p>Coniferous plantation woodland is not listed as a Lancashire LBAP habitat or as a Habitat of Principal Importance in England and is not considered to be of significant ecological value. Therefore, this habitat is of Less than local importance for biodiversity.</p>	No	No	Less than local
Dense / continuous scrub	Dense/continuous scrub was frequent throughout the EP1HS area, often associated with woodland blocks and areas inaccessible for grazing. This habitat comprises dominant hawthorn and bramble ( <i>Rubus fruticosus</i> ) along with holly ( <i>Ilex aquifolium</i> ), elder ( <i>Sambucus nigra</i> ), willow ( <i>Salix sp.</i> ) and honeysuckle ( <i>Lonicera periclymenum</i> ) were	No	No	Local

Haweswater Aqueduct Resilience Programme  
Proposed Bowland Section - EIA Scoping Report

**JACOBS®**

**JACOBS®**

Phase 1 Habitat Classification	Description / extent	Habitat of Principal Importance (NERC Act, 2006)	LBAP Habitat	Preliminary evaluation / importance
Scattered scrub	Scattered scrub was frequent throughout the EP1HS area, often associated with woodland blocks and areas inaccessible for grazing. Lines of scrubby hawthorn trees were also present where hedgerows have become defunct over time. Some areas of scattered holly ( <i>Ilex aquifolium</i> ), elder ( <i>Sambucus nigra</i> ), willow ( <i>Salix sp.</i> ), hawthorn, bramble ( <i>Rubus fruticosus</i> ) and honeysuckle ( <i>Lonicera periclymenum</i> ) were present on road verges, some of which were botanically interesting.  Scattered scrub does not qualify as a Habitat of Principal Importance in England or a Lancashire LBAP habitat and is therefore considered to be of Less than Local importance for biodiversity.	No	No	Less than Local
Parkland / Scattered trees	Scattered trees were found frequently throughout the EP1HS area, particularly alongside roads in the northern section, where they often form standard trees within hedgerows or other boundary features. Several trees present were significant in age with abundant features providing habitat opportunities for fauna.  Tree species were predominantly ash and oak but included sycamore, alder, beech, horse chestnut ( <i>Aesculus hippocastanum</i> ), and pine ( <i>Pinus sp.</i> ).  Mature trees are a nationally declining resource but are not listed as a Lancashire LBAP habitat or a Habitat of Principal Importance in England and are therefore considered of Local importance for biodiversity.	No	No	Local
Acid grassland (Unimproved and semi-improved)	Acid grassland was recorded frequently within the EP1HS area, typically as an intricate mosaic with other upland acid habitats, most notably heath. The typical species composition of these grasslands includes abundant bryophytes along with sheep's fescue ( <i>Festuca ovina</i> ), purple moor grass ( <i>Molinia caerulea</i> ), wavy-hair grass ( <i>Deschampsia flexuosa</i> ), and tormentil ( <i>Potentilla erecta</i> ). Much of this habitat is unfenced upland grazing land and forms discrete areas of the Goodber Common (including Summersgill Fell and White Moss) BHS. This habitat also occurred on ungrazed banks.	Yes	No	County - National

Haweswater Aqueduct Resilience Programme  
Proposed Bowland Section - EIA Scoping Report

**JACOBS**

**JACOBS**

Phase 1 Habitat Classification	Description / extent	Habitat of Principal Importance (NERC Act, 2006)	LBAP Habitat	Preliminary evaluation / importance
Semi-improved neutral grassland	<p>In the northern sections of the EP1HS area where a small overlap occurs with the boundary of Dunsop Fell and Low Fell BHS and Bowland Fells SSSI and SPA, acid grassland forms extensive areas in a mosaic with heath.</p> <p>This habitat qualifies as lowland acid grassland, a Habitat of Principal Importance in England but is not listed as a Lancashire LBAP habitat. Areas of this habitat recorded within the EP1HS area form part of Goodber Common (Including Summersgill Fell and White Moss) BHS. It is likely that the acid grassland recorded comprises of semi-natural and unimproved acid grassland, however further assessment is required to determine this. Therefore, this habitat is considered to be of County to National importance for biodiversity.</p>		Yes	Local - District
Poor semi-improved grassland	<p>Areas of semi-improved neutral grassland were limited across the EP1HS area. The habitat was found frequently along road verges and adjacent to watercourses. Patches were also present within inaccessible parts of grazed grasslands such as steep slopes or areas absent from fertilization.</p> <p>Species rich hay meadows were not frequent within the EP1HS area but occurred both in northern and southern sections. Species present included pignut (<i>Conopodium majus</i>), yellow rattle (<i>Rhinanthus minor</i>), sweet vernal grass (<i>Anthoxanthum odoratum</i>), crested dog's-tail (<i>Cynosurus cristatus</i>) and meadow foxtail (<i>Alopecurus pratensis</i>).</p> <p>Areas of semi-improved neutral grassland within the EP1HS area qualify as lowland meadow, a Habitat of Principal Importance, and as a Lancashire LBAP habitat. Depending on the quality of this habitat, it is considered likely to be of Local - District importance for biodiversity.</p>		No	Less than local

Haweswater Aqueduct Resilience Programme  
Proposed Bowland Section - EIA Scoping Report

**JACOBS®**

**JACOBS®**

Phase 1 Habitat Classification	Description / extent	Habitat of Principal Importance (NERC Act, 2006)	LBAP Habitat	Preliminary evaluation / importance
Improved grassland	Improved grassland was present in several locations in northern sections of the EP1HS area and occurred in combination with species poor semi-improved neutral grassland. Improved grassland in the survey area does not qualify as a Lancashire LBAP habitat or a Habitat of Principal Importance in England. The low ecological value of this habitat type is considered of Less than local importance for biodiversity.	No	No	Less than local
Marshy grassland	Marshy grassland was frequent throughout the survey area, usually occurring in small patches associated with ditches, watercourses, and at the base of slopes where run off has resulted in waterlogged ground conditions. Areas were typically not species rich and included species such as soft rush, marsh-bedstraw ( <i>Galium palustre</i> ) and marsh thistle ( <i>Cirsium palustre</i> ).  More significant areas occurred north of the wooded corridor of Well Beck, as a mosaic with acid grassland. Species present included common lousewort ( <i>Pedicularis sylvatica</i> ) and marsh pennywort ( <i>Hydrocotyle vulgaris</i> ). Further significant stands were also present alongside a tributary to Mill Beck. Opposite leaved golden saxifrage ( <i>Chrysosplenium oppositifolium</i> ) greater bird's-foot trefoil ( <i>Lotus pedunculatus</i> ) and meadowsweet ( <i>Filipendula ulmaria</i> ) were abundant in this area.  Areas of marshy grassland within the EP1HS area are unlikely to qualify as a Habitat of Principal Importance, however are likely to qualify as a Lancashire BAP under Moorland and Fen habitat. This habitat is considered of Local importance for biodiversity.	Yes	No	Local
Continuous bracken	Continuous bracken ( <i>Pteridium aquilinum</i> ) cover was extensive within some habitats in the survey area, sometimes forming locally dominant stands within acid grassland or heath mosaics.  The areas of continuous bracken present were species poor, of limited ecological value and do not qualify as a Lancashire LBAP habitat or a Habitat of Principal Importance in England. Therefore, this habitat type is considered of Less than local importance for biodiversity.	No	No	Less than local
Tall ruderal	Tall ruderal vegetation formed rare limited stands within the EP1HS, most often associated with other habitats and on roadside verges. Species present included broad-leaved dock ( <i>Rumex obtusifolius</i> ), rosebay willowherb ( <i>Chamaenerion angustifolium</i> ), cow parsley ( <i>Anthriscus sylvestris</i> ) and creeping buttercup ( <i>Ranunculus repens</i> ).	No	No	Less than local

Haweswater Aqueduct Resilience Programme  
Proposed Bowland Section - EIA Scoping Report

**JACOBS**

**JACOBS**

Phase 1 Habitat Classification	Description / extent	Habitat of Principal Importance (NERC Act, 2006)	LBAP Habitat	Preliminary evaluation / importance
	These areas were dominated by species of low botanical diversity and would not qualify as Lancashire LBAP habitat or Habitat of Principal Importance in England. This habitat is therefore considered to be of Less than local importance for biodiversity.			National
Dry heath/acid grassland mosaic	This habitat occurs frequently in the southern section of the EP1HS area in combination with wet heath acid grassland mosaic on Dane Hill and Low Fell. Typical species present included bilberry ( <i>Vaccinium myrtillus</i> ), cross-leaved heath ( <i>Erica tetralix</i> ), ling heather ( <i>Calluna vulgaris</i> ) and purple moor grass.  A section of this habitat was present within Dunsop Fell and Low Fell BHS and within Bowland Fells SSSI and SPA.  Sections of this habitat qualify as upland heath, a Habitat of Principal Importance in England and as Moorland and Fell, a Lancashire LBAP habitat. The habitat within the Proposed Bowland Section forms part of Dunsop Fell and Low Fell BHS site and falls within Bowland Fells SSSI and SPA. The habitat is considered to be of between County to National importance for biodiversity.	Yes	No	National
Wet heath/acid grassland mosaic	Wet heath acid grassland mosaic habitat was rare in the northern section of the EP1HS area; an area was present forming part of the Goodber Common (Including Summersgill Fell and White Moss) BHS. Species included hare's-tail cotton grass ( <i>Eriophorum vaginatum</i> ), cranberry ( <i>Vaccinium oxycoccus</i> ), <i>Sphagnum</i> mosses and common spike-rush ( <i>Eleocharis palustris</i> ).  This habitat was very frequent in the southern section of the EP1HS area in combination with dry heath acid grassland mosaic on Dame Hill and Low Fell BHS and within Bowland Fells SSSI and SPA.  Sections of this habitat qualify as upland heath, a Habitat of Principal Importance in England and as Moorland and Fell, a Lancashire LBAP habitat. The habitat within the Proposed Bowland Section forms part of Dame Hill and Low Fell BHS and falls within Bowland Fells SSSI and SPA. The habitat is considered to be of between County and National importance for biodiversity.	No	No	National
Blanket bog	Blanket bog occurred in a restricted area within the EP1HS area in a complex/intricate mosaic of other upland habitats associated with Goodber Common (Including Summersgill Fell and White Moss) BHS. This area was unfenced, grazed and the water		Yes	County and National

## Haweswater Aqueduct Resilience Programme Proposed Bowland Section - EIA Scoping Report

**JACOBS®**

**JACOBS®**

Phase 1 Habitat Classification	Description / extent	Habitat of Principal Importance (NERC Act, 2006)	LBAP Habitat	Preliminary evaluation / importance
table was close to the ground surface. Species present included hare's-tail cotton grass, heath rush ( <i>Juncus squarrosum</i> ), bryophytes and blankets of <i>Sphagnum</i> sp. A small section of an extensive area within Dunsop Fell and Low Fell BHS also falls within the boundaries of the EP1HS area and within Bowland Fells SSSI and SPA. Sections of this habitat qualify as a Habitat of Principal Importance in England and as Moorland and Fell, a Lancashire LBAP habitat. The habitat within the Proposed Bowland Section forms part of Dane Hill and Low Fell BHS and falls within Bowland Fells SSSI and SPA. The habitat is considered to be of between County and National importance for biodiversity.	No	Yes	Local to County	
Wet modified bog	Wet modified bog occurred in a limited area around White Moss within a complex of upland habitats. The area was dominated by soft rush and heavily grazed with abundant dead plant matter. Significant <i>Sphagnum</i> mosses were present. This habitat does not qualify as a Habitat of Principal Importance in England but qualifies as Moorland and Fell, a Lancashire LBAP habitat. The habitat within the Proposed Bowland Section forms part of the Goodber Common (Including Summersgill Fell and White Moss) BHS. The habitat is considered to be of between Local and County importance for biodiversity.	Yes	Local to County	
Acid/neutral flush	Flush habitats were abundant within upland sections of the EP1HS area, occurring as a complex with other upland habitats and typically associated with watercourses or seepages. Species noted included soft rush, marsh bedstraw, <i>Polytrichum</i> moss species and numerous <i>Sphagnum</i> moss species. This habitat within the EP1HS area formed part of the Goodber Common (Including Summersgill Fell and White Moss) BHS. Sections of this habitat qualify as Upland flushes, Fens and Swamps, a Habitat of Principal Importance in England and as Moorland and Fell, a Lancashire LBAP habitat. The habitat within the Proposed Bowland Section forms part of Goodber Common BHS. The habitat is considered to be of between Local and County importance for biodiversity.	Yes	Local to County	
Valley Mire	Valley mire was found rarely within the EP1HS area, in small pockets along watercourses such as a tributary of Mill Beck, where inundation was likely.	Yes	Yes	District to County

Haweswater Aqueduct Resilience Programme  
Proposed Bowland Section - EIA Scoping Report

**JACOBS**

**JACOBS**

Phase 1 Habitat Classification	Description / extent	Habitat of Principal Importance (NERC Act, 2006)	LBAP Habitat	Preliminary evaluation / importance
A species rich example was recorded in the area and included species such as bogbean ( <i>Menyanthes trifolia</i> ), marsh arrowgrass ( <i>Triglochin palustris</i> ), marsh helleborine ( <i>Epipactis palustris</i> ) and quaking grass ( <i>Briza media</i> ). Areas of valley mire within the EP1HS area qualify as lowland fen, a Habitat of Principal Importance, but are not listed as Lancashire LBAP habitat. This irreplaceable habitat is found in small, discrete areas and is considered to be of between District and County importance for biodiversity.				
Standing water	<p>A single extant pond was present within the survey area close to the Bottom Hall/Over Houses settlement in the northern section of the EP1HS area. The pond had some flow and well-developed aquatic vegetation including water starwort species (<i>Callitriches</i> sp.), ivy-leaved crowfoot (<i>Ranunculus hederaceus</i>) and water mint (<i>Mentha aquatica</i>). Two dry ponds are also present in the northern section of the EP1HS area. A further ten ponds were identified outside of the EP1HS area but within 250m and were included in the GCN survey area.</p> <p>Ponds are a Habitat of Principal Importance in England. However, due to the low quantity and ecological value of the ponds in the survey area, this habitat is considered of Local importance for biodiversity.</p>	Yes	Yes	Local
Running water	<p>Many watercourses were present in the EP1HS area. The majority were well vegetated ditches and minor watercourses supporting species such as water crowfoot (<i>Ranunculus aquatilis</i>), floating sweet grass (<i>Glyceria fluitans</i>), blinks (<i>Montia fontana</i>) and water starwort species. Often a dense fringing band of soft rush was present that, in some cases, caused the channel to appear indistinct due to dense growth. A small number of ditches were almost dry at the time of survey, with limited pockets of stagnant water. Well Beck and Mill Beck, tributaries of the River Hindburn BHS, also occurred within the EP1HS area and were shallow, rocky, and shaded by adjacent woodland. Areas of undercut bank, exposed roots and fallen deadwood were present in addition to bryophyte rich sections and varied substrate.</p> <p>The River Hindburn and associated tributaries qualify as Habitats of Principal Importance in England and as a Lancashire LBAP habitat and are therefore of County level importance for biodiversity. Other watercourses identified within the EP1HS area are</p>	Yes	Yes	Local - County

Phase 1 Habitat Classification	Description / extent	Habitat of Principal Importance (NERC Act, 2006)	LBAP Habitat	Preliminary evaluation / importance
Amenity grassland	unlikely to qualify as Habitats of Principal Importance and considered of Local importance for biodiversity.	No	No	Less than local
Introduced shrub	Amenity grassland was limited in the EP1HS area and limited to gardens associated with residential properties in the northern sections. This habitat was of low botanical species diversity and therefore considered to be of Less than local importance for biodiversity.	No	No	Not applicable
Species-poor defunct hedge	Introduced shrub was limited in the survey area and denoted by target notes on Figure 9.5 due to the small coverage. A stand of potential ( <i>Cotoneaster</i> sp.) and a stand of coppertips ( <i>Montbretia</i> ) (Schedule 9 invasive species) were present opposite Lane House, a residential property, within a road section in the north of the EP1HS area. This habitat relates to the presence of non-native invasive plant species listed on Schedule 9 (WCA). This habitat is considered to be of Less than local importance for biodiversity.	Yes	Yes	County
Species-poor intact hedge	A small number of hawthorn hedgerows were present within the EP1HS area which have become gappy and defunct due to lack of management. These features are typically unfenced and therefore grazed and poached at the base, with no significant ground flora.			
Species-rich hedge with trees	Species rich hedgerows with trees were recorded along a road section in the northern part of the EP1HS area and classify as 'Important' under The Hedgerow Regulations 1997. Hedgerows were usually hawthorn dominated with abundant additional species including ash, holly, hazel, rowan, gorse ( <i>Ulex europeaeus</i> ), sycamore, elder, willow sp., yew ( <i>Taxus baccata</i> ), blackthorn ( <i>Prunus spinosa</i> ) and dog rose ( <i>Rosa canina</i> ). Standard trees were common and often of significant age. Typical species included ash, sycamore and oak.			
Species poor hedge with trees	Species poor hedgerows with trees occurred more frequently within the EP1HS area than species-rich examples. Hawthorn, hazel and holly occur most commonly. Hedgerows are listed as a Habitat of Principal Importance but are not listed as priority habitat within the Lancashire LBAP. A number of species rich hedgerows have been classified as Important in accordance with the Hedgerow Regulations (1997). The hedgerow network associated with the Proposed Bowland Section are considered likely to be of County importance for biodiversity.			

## Haweswater Aqueduct Resilience Programme Proposed Bowland Section - EIA Scoping Report

**JACOBS®**

**JACOBS®**

Phase 1 Habitat Classification	Description / extent	Habitat of Principal Importance (NERC Act, 2006)	LBAP Habitat	Preliminary evaluation / importance
Buildings	A small number of buildings were present within the EP1Hs area. Some were operational, and some were disused or dilapidated barns and agricultural buildings. Occupied residential buildings were also present, some associated with farms. Whilst they may support protected / notable species, buildings are considered to be of low inherent biological interest. Buildings do not qualify as a Habitat of Principal Importance in England and are not listed as a priority habitat within the Lancashire LBAP. This habitat is considered to be of Less than local importance for biodiversity	No	No	Less than local
Bare ground	Bare ground includes hardstanding, gravel and bare earth. It is infrequent in the survey area, largely associated with roads, farm tracks, parking areas etc. Bare ground does not qualify as a Habitat of Principal Importance in England and is not listed as a priority habitat within the Lancashire LBAP. This habitat is considered to be of Less than local importance for biodiversity	No	No	Less than local
Wall	A number of lichen rich dry-stone walls were recorded within the EP1HS area. Whilst they may support protected / notable species, walls are intrinsically of low biological interest, do not qualify as a Habitat of Principal Importance in England or a priority habitat within the Lancashire LBAP. This habitat is considered to be of Less than local importance for biodiversity.	No	No	Less than local

#### 9.4.4 Species

342) A list of protected and notable species (relevant legislation and conservation policies outlined below) which were provided by LERN within 2 km of the Proposed Bowland Section is provided in Table 9.3 below and shown in Figure 9.4. Generally, records over 10 years old were considered historical and not included within the assessment. However, records older than this time period are included for assessment if it they were considered to have a significant bearing on the evaluation and / or recommendations made within this scoping report (e.g. records of bat roosts and main badger setts).

**Table 9.3: Summary of Protected and Notable Species Records**

Species group	Species	Relevant legislation and conservation policies*
Terrestrial Invertebrates	Various records of notable butterfly and moth species including brimstone ( <i>Gonepteryx rhamni</i> ), green hairstreak ( <i>Callophrys rubi</i> ), large heath, ringlet ( <i>Aphantopus hyperantus</i> ), small heath ( <i>Coenonympha pamphilus</i> ), small pearl-bordered fritillary ( <i>boloria selene</i> ), autumnal rustic ( <i>Eugnorisma glareosa</i> ), brown rustic ( <i>Rusina ferruginea</i> ), dark marbled carpet ( <i>Dysstroma citrate</i> ), scarce sedge marble ( <i>Bactra lacteana</i> ) and wood tiger ( <i>Parasemia plantaginis</i> ).	S41, LBAP
Birds	Various notable bird species including multiple records for several amber and red list species and / or priority species including curlew ( <i>Numenius arquata</i> ), oystercatcher ( <i>Haematopus ostralegus</i> ), brambling ( <i>Fringilla montifringilla</i> ) and meadow pipit ( <i>Anthus pratensis</i> ). Barn owl ( <i>Tyto alba</i> ) and peregrine ( <i>Falco peregrinus</i> ) listed as Schedule 1 species were also recorded.	Birds Directive 1 & 2, WCA1; WCA9, S41, LBAP; Red and Amber List (Birds of Conservation Concern, BoCC)
Bats	Common pipistrelle ( <i>Pipistrellus pipistrellus</i> )	HabRegs2, WCA5, S41; LBAP
Other terrestrial mammals	Hedgehog ( <i>Erinaceus europaeus</i> )	S41; LBAP
	Brown hare ( <i>Lepus europaeus</i> )	S41; LBAP.
Fish	Atlantic salmon ( <i>Salmo salar</i> )	HabRegs2; S41; LBAP
	Brown/Sea trout ( <i>Salmo trutta</i> )	HabRegs2; S41; LBAP
	European eel ( <i>Anguilla anguilla</i> )	HabRegs2; S41; LBAP

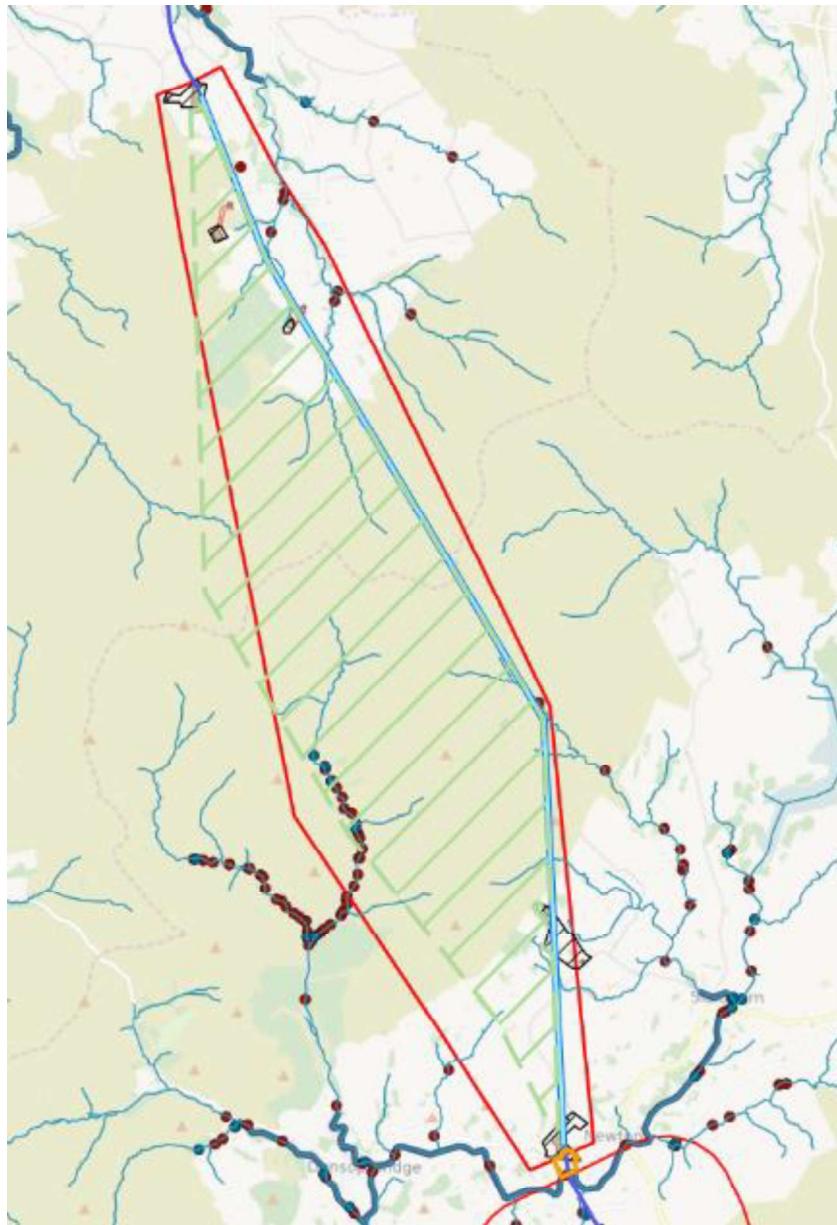
\*HabRegs2 = Section 2 of the Conservation of Habitats and Species Regulations 2017; LBAP = Local Biodiversity Action Plan; S41 = Section 41 of the Natural Environment and Rural Communities Act 2006; WCA1 = Schedule 1 of the Wildlife and Countryside Act 1981 (as amended); WCA5 = Schedule 5 of the Wildlife and Countryside Act 1981 (as amended); WCA9 = Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

343) In addition to the species records listed above, the MAGIC data search (August 2019) revealed the presence of one EPSML within 2 km of the Proposed Bowland Section. The bat licence related to the destruction of a roost for brown long-eared bat in Slaidburn, 1.75 km south east of the Back Lane compound / laydown area. The EPSML expired in 2010.

344) Three riverine catchments are encompassed by the Proposed Bowland Section; tributaries of the River Hindburn in the north, the Whitendale River to the west and tributaries to the Croasdale Brook to the east. Macroinvertebrate data are available for the Whitendale River only with four sites surveyed within the assessment area. These sites have been surveyed regularly between 2010 – 2017 and as such this data forms a suitable baseline to the western extent of the assessment area. No data exists for tributaries of the

River Hindburn or Croasdale Brook, however data is available for the main rivers downstream of the assessment area. This data would not be considered representative of the headwater streams within the assessment area (Figure 9.6 below). The proposed tunnelling methodology and minor headwaters that lie within the assessment suggest that field work is not required in autumn 2019 for macroinvertebrates in the Proposed Bowland Section.

**Figure 9.6: Environment Agency data (blue – macroinvertebrates, red – fish) for the Proposed Bowland Section**



- 345) The data search and EP1HS identified the potential for protected and notable species to occur within the development envelopes. A preliminary assessment of the value / importance for biodiversity of the likely populations of these species / species groups is provided in Table 9.4 below. These are preliminary assessments based on limited survey information and will be reviewed and refined based on further species-specific surveys and further desk study analysis.

**Table 9.4: Preliminary evaluation of protected / notable species within the EP1HS area**

Species / species group	Description	Legal protection	Species of Principal Importance (NERC Act, 2006)	LBAP Species	Preliminary Evaluation / Importance
Terrestrial Invertebrates	<p>Records of 26 species of butterfly and moth were returned as part of the desk study.</p> <p>Habitats within the EP1HS area were identified as providing good quality habitat for a range of terrestrial invertebrates including butterflies, moths and dragonflies. Goodber Common (Including Summersgill Fell and White Moss) BHS lies within the Proposed Bowland Section and is noted for its assemblages of invertebrates including several colonies of large-heath butterfly (<i>Coenonympha tullia</i>).</p> <p>A number of invertebrate species recorded within the assessment area are Species of Principal Importance in England and large heath is listed in the Lancashire LBAP. Terrestrial species recorded within the survey area are likely to be of Local to County importance for biodiversity.</p>	No	Yes	Yes	Local to County
Aquatic Invertebrates (exc. White-clawed crayfish)	<p>Desk study data from the Environment Agency has not been received and therefore no data is available</p> <p>However, based on the aquatic habitats recorded during EP1HS, the Proposed Bowland Section is likely to support aquatic invertebrate populations of Local to District importance for biodiversity.</p>	Yes	Yes	Yes	Local to District
White-clawed crayfish	<p>No records for white clawed crayfish (<i>Austropotamobius pallipes</i>) were returned from the desk study, although data from the Environment Agency is still to be obtained.</p> <p>Numerous watercourses were identified as providing suitability to support white-clawed crayfish (<i>Austropotamobius pallipes</i>) due to the varied substrate providing optimal refuges.</p> <p>White-clawed crayfish are listed as a Species of Principal Importance in England and is listed in the Lancashire LBAP. If confirmed to be present, the white-clawed crayfish population associated with the Proposed Bowland Section is likely to be of County to Regional importance for biodiversity.</p>	Yes	Yes	Yes	County to Regional
Fish	<p>Multiple records of Atlantic salmon, brown/sea trout and European eel were returned as part of the desk study.</p>	Yes	Yes	Yes	District

Haweswater Aqueduct Resilience Programme  
Proposed Bowland Section - EIA Scoping Report

Species / species group	Description	Legal protection	Species of Principal Importance (NERC Act, 2006)	LBAP Species	Preliminary Evaluation / Importance
No fish were observed during the EP1HS, but a number of watercourses including Well Back and Mill Beck were noted as providing suitable habitat for fish species.					Local to District
Great Crested Newt	<p>No records of GCN were returned as part of the desk study.</p> <p>eDNA surveys were undertaken on 87 ponds within the survey area. One positive GCN eDNA result was returned for a single pond at the northern extent of the GCN survey area. Three ponds returned an indeterminate result and the remaining 83 ponds returned a negative result.</p> <p>Habitats recorded within the EP1HS area provided excellent terrestrial habitat for GCN in the form of rough grassland and dense scrub.</p> <p>Individual GCN populations associated with the Proposed Bowland Section are likely to be of Local importance for biodiversity. However, if several populations are present, in the wider area the GCN populations could collectively be of District importance for biodiversity.</p>	Yes	Yes		Local to District
Amphibians (Exc. GCN)	<p>No records of amphibians were returned as part of the desk study.</p> <p>Ponds identified within 250 m of the EP1HS area provide suitable habitat to support amphibian species including common toad (<i>Bufo bufo</i>), common frog (<i>Rana temporaria</i>), palmate newt (<i>Lissotriton helveticus</i>), and smooth newt (<i>Lissotriton vulgaris</i>).</p> <p>Common toad are a Species of Principal Importance and are listed as a Lancashire LBAP Species Populations of amphibians that are likely to be present within the Proposed Bowland Section are likely to be of Local importance for biodiversity.</p>	No	Yes		Yes (common toad)
Reptiles	<p>No records of reptiles were returned as part of the desk study.</p> <p>A slow worm (<i>Anguis fragilis</i>) carcass (roadkill) was noted on a road in the northern section of the EP1HS area.</p>	Yes	Yes	No	Local to District

## Haweswater Aqueduct Resilience Programme Proposed Bowland Section - EIA Scoping Report

Species / species group	Description	Legal protection	Species of Principal Importance (NERC Act, 2006)	LBAP Species	Preliminary Evaluation / Importance
	<p>Large areas of the acid grassland/heath mosaic provide suitable habitat for adder (<i>Vipera berus</i>) and common lizard (<i>Zootoca vivipara</i>), whilst suitable habitats for slow worm are present throughout the EP1HS area.</p> <p>Reptile species including common lizard and adder are listed as Species of Principal Importance in England and listed in the Lancashire LBAP. Individual populations of reptile species potentially present within the Proposed Bowland Section are likely to be of Local importance. However, if populations of several reptile species are present, collectively reptiles associated with the Proposed Bowland Section could be of District importance for biodiversity.</p>				Local to European/ International
Birds	<p>Curlew, lapwing (<i>Vanellus vanellus</i>), oystercatcher, skylark (<i>Alauda arvensis</i>), snipe (<i>Gallinago gallinago</i>), pied flycatcher (<i>Ficedula hypoleuca</i>), meadow pipit, ring ouzel (<i>Turdus torquatus</i>) and merlin (<i>Falco columbarius</i>) were observed during breeding bird surveys undertaken in April – June 2019. Hirundine nests were recorded on buildings in the survey area.</p> <p>The majority of the habitats within the survey area offer potential for ground nesting bird species. The open grasslands are particularly suitable for lapwing, curlew and oystercatcher. Snipe were flushed from numerous ditches. There are also a small number of buildings in the survey area which offer potential for hirundines and for barn owl.</p> <p>The woodlands in this section is known to be particularly important for pied flycatcher. Hedgerows, scrub and trees offer potential for nesting passerines, corvids and raptors. The open moorland is also suitable for ground nesting species such as meadow pipit.</p> <p>The Proposed Bowland Section is also close to known merlin and hen harrier (<i>Circus cyaneus</i>) nesting sites which is a qualifying feature of the Bowland Fells SPA. Whilst the Proposed Bowland Section would fall outside the SPA, functional habitat is present. Hen harrier and merlin may be reliant on these habitats which fall within the Proposed Bowland Section.</p>	Yes	Yes	Yes	

Haweswater Aqueduct Resilience Programme  
Proposed Bowland Section - EIA Scoping Report

Species / species group	Description	Legal protection	Species of Principal Importance (NERC Act, 2006)	LBAP Species	Preliminary Evaluation / Importance
	<p>Many of the species identified above are Species of Principal Importance in England, Lancashire LBAP species, and birds listed on Schedule 1 of the WCA (e.g., barn owl and kingfisher).</p> <p>Ongoing assessments would determine the importance of the bird assemblages associated with the Proposed Bowland Section, however they are potentially of Local to European / International importance for biodiversity.</p>		No		Less than local to Local
Badger	<p>No evidence of badger was recorded during the EP1HS. The majority of habitats within the survey area are unsuitable or offer very limited potential for badger setts, with the habitat mostly being open with little cover. The woodlands, such as Well Beck Wood and Middlefield Wood are considered to have most potential for badger setts. Other than these habitats, potential for setts is limited to hedge banks. Many of the habitats offer suitable foraging habitat for badger.</p> <p>Badger is not a species of conservation concern but is protected for animal welfare reasons (Badger Protection Act, 1992). Badgers are common and widespread in England. Individual populations of badger are considered to be of less than local importance for biodiversity. However, if several populations are present, in the wider area the badger populations could collectively be of Local importance for biodiversity.</p>	Yes	No		Local to District
Bats	<p>Sections of the EP1HS area is considered to be of good suitability for bats with suitable foraging and roosting habitat identified throughout. Suitable foraging habitat includes wooded stream corridors, linear features such as hedgerows and potentially wetland habitats which would attract invertebrate prey.</p> <p>With regard to suitable roosting habitat, a small number of buildings are present in the survey area, including commercial buildings, occupied residential buildings, farm dwellings and disused barns. Many trees have been identified as supporting Potential Roosting Features (PRF's) for bats due to their significant size and age.</p> <p>The northern part of the EP1HS area is exposed moorland, with no suitable roosting features or linear features. Further south, along the road section, there</p>	Yes	Yes		Local to District

Haweswater Aqueduct Resilience Programme  
Proposed Bowland Section - EIA Scoping Report

Species / species group	Description	Legal protection	Species of Principal Importance (NERC Act, 2006)	LBAP Species	Preliminary Evaluation / Importance
	<p>are suitable roosting features in the form of trees and disused barns and commuting routes in the form of linear features such as roadside hedgerows.</p> <p>The desk study returned one record of common pipistrelle which is listed in the Lancashire LBAP. An EP1HS relating to a roost site in Slaidburn was also recorded. All species of bat are priority species in the Lancashire LBAP. Several species of bat known to occur within Lancashire are Species of Principal Importance in England. Bats (depending on the species) that are associated with the Proposed Bowland Section are likely to be of Local - District importance for biodiversity.</p>				
Otter	<p>No records of otter were returned from the desk study.</p> <p>Numerous watercourses have been identified as having potential to support otter foraging and commuting. There was limited potential for couches and holts within the EP1HS area, and this was restricted to the wooded river corridors of Well Beck and Mill Beck. There were shallow, rocky watercourses which were shaded by adjacent woodland with areas of undercut banks and exposed roots, bryophyte rich areas and fallen deadwood. There was a varied substrate which included bedrock, boulders, cobbles and gravel.</p> <p>Otter is a Species of Principal Importance in England and it is listed in the Lancashire LBAP. Otter populations potentially present within the Proposed Bowland Section are likely to be of District importance for biodiversity.</p>	Yes	Yes	Yes	District
Water vole	<p>No records of water vole were returned as part of the desk study.</p> <p>A number of watercourses were identified as having potential to support water vole during the EP1HS. The watercourses have well vegetated banks, banks suitable for burrowing and slow flow of water.</p> <p>Water vole are listed as a Species of Principal Importance and listed as a priority species in the Lancashire LBAP. Water vole populations potentially present within the Proposed Bowland Section are likely to be of between Local to District importance for biodiversity.</p>	Yes	Yes	Yes	Local to District

## Haweswater Aqueduct Resilience Programme Proposed Bowland Section - EIA Scoping Report

Species / species group	Description	Legal protection	Species of Principal Importance (NERC Act, 2006)	LBAP Species	Preliminary Evaluation / Importance
Other Notable Mammals	<p>The data search revealed the presence of hedgehog and brown hare within 2km of the Proposed Bowland Section. Habitats recorded within the EP1HS are likely to support these species.</p> <p>No records of red squirrel were returned as part of the desk study search, however suitable coniferous woodland was identified during the EP1HS.</p> <p>All three mammal species are listed as priority species in the Lancashire LBAP and are listed as Species of Principal Importance. Populations of these species which are potentially present within the Proposed Bowland Section are likely to be of Local to District importance for biodiversity.</p>	No	Yes	Yes	Local to District

## 9.5 Potential Effects

346) The development may affect site-specific ecological features (habitats and floral species) and mobile ecological features (fauna). Impacts may occur through several means including:

- Direct loss of wildlife habitats through land-take including the resulting effects upon species reliant on those habitats
- Indirect harm through disturbance (dust, noise, vibration)
- Lighting pollution from construction activities and site compounds
- Changes in air quality
- Disruption of local watercourses and drainage patterns causing;
- Changes in water quality
- Morphological and geomorphological variations
- Polluted runoff affecting the water environment
- Increased sediment delivery to the water environment
- Increase in severance and fragmentation, by dividing habitats or wildlife corridors
- Direct mortality, injury, disturbance or displacement through construction activities
- Deposits of contaminated substrate affecting habitats and species
- Introduction of invasive, non-native plants and animals.

## 9.6 Design and Mitigation

347) The Proposed Bowland Section EIA and design will be an iterative process. The early stage and ongoing ecology surveys will feed into the scheme design which would minimise impacts on biodiversity.

348) Where adverse ecological effects are identified, a sequential process will be adopted to avoid, mitigate and compensate these effects. This is referred to as the 'mitigation hierarchy' and includes avoidance, mitigation, compensation and enhancement measures (CIEEM, 2019) which will be identified as part of the Proposed Bowland Section EIA process.

349) Many of the adverse ecological effects would be temporary and primarily attributed to the construction phase of the Proposed Bowland Section. Habitats would be reinstated, where practicable, on completion of works. Adverse effects on protected species will be identified, and an appropriate licensing regime applied to deliver the mitigation required.

350) The principle of *no net loss of biodiversity* was established under the NPPF and new targets for biodiversity net gain (BNG) were outlined in the Government's response to their consultation on the issue (Defra, July 2019). It is expected that new BNG targets will be included in the Environment Bill (anticipated in late 2019) and a two year period will be allowed to phase in the new targets. United Utilities will use the latest Defra METRIC to determine biodiversity losses and gains of the proposed Haweswater Aqueduct Resilience Programme and commits to delivering biodiversity net gain in line with both local and national policies.

## 9.7 Summary Scope for the EIA

### 9.7.1 Field Surveys

351) The scope of further field survey work needed to inform the Proposed Bowland Section has been determined based upon current baseline knowledge of the assessment area and a review of current good practice survey guidance and nature conservation legislation / policy frameworks (e.g. NPPF 2019, and NERC Act 2006 Section 41 list).

352) Surveys would need to be completed during 2020 for a range of ecological features. These are described in Table 9.5 below. Where the need for further surveys / assessments have been scoped out this is also detailed in the table

### **9.7.2 Ecological Impact Assessment**

353) This scoping report and the EP1HS report (report to be completed in 2020 which will incorporate additional EP1HS data) along with data obtained from the further field surveys, are intended to form the framework for the completion of an Ecological Impact Assessment (EcIA). The EcIA will be undertaken using guidance from the Guidance for Ecological Impact Assessment (CIEEM 2019). The EcIA will in turn form part of the Environmental Impact Assessment (EIA) for the Proposed Bowland Section.

354) Ecological features which are assessed of Less than local value for biodiversity will be scoped out of the EcIA as these features are not important enough to warrant further consideration.

355) For those features scoped in for EcIA (i.e of Local importance or higher), assessments will be undertaken which consider construction, operational and decommissioning effects. The assessment of operational effects will also consider whether the decommissioning of the existing asset will result in effects during the operational phase of the new asset.

**Table 9.5: Ecological field surveys and methodologies**

Surveys	Assessment area and further details	Date (approximate)	Good practice guidance
Designated Sites	<p><b>Statutory designated sites</b></p> <p>There are two international designated sites identified within 5 km of the Proposed Bowland Section; North Pennine Dales Meadows (SAC) and the Bowland Fells (SPA). A Habitats Regulations Assessment (HRA) Stage 1 screening assessment will be undertaken. Consultation with Natural England on HRA has commenced.</p> <p>Three SSSIs (which form part of the international designated sites identified above) have been identified within the Natural England Impact Risk Zone and will therefore require consideration.</p> <p><b>Non-statutory designated sites</b></p> <p>Nineteen BHS have been identified within 2 km of the Proposed Bowland Section, three of which have been identified within the indicative development envelope of the Proposed Bowland Section and two more within 30 m. Further surveys and / or consultation will be required to inform the planning applications.</p> <p>An updated desk study search will be undertaken to identify additional sites within 2km that were not previously identified.</p>	September 2019 – November 2020	To be confirmed.
Extended Phase 1 Habitat Survey	<p>An EP1HS has been undertaken for much but not all of the indicative development envelope. A gap analysis exercise will be undertaken to identify those areas which have not been surveyed to date. This will include up to 50 m buffer around all of the construction compound, laydown and access areas. In addition, surveys would be undertaken beyond these construction areas where potential ecological impacts are anticipated i.e. within the overflow areas and drain down locations. This would be determined through ongoing consultation with design engineers and specialist environmental disciplines including water environment.</p> <p>Currently there are no proposals to undertake E1PHS within the tunnel corridor sections as ecological impacts within this area are not anticipated. However, ongoing consultation with design engineers and specialist environmental disciplines would determine this. If likely significant ecological effects are identified within sections of the tunnel corridor an EP1HS would be undertaken, applying an appropriate survey buffer.</p>	August – September 2019, April – June 2020	Joint Nature Conservation Committee (JNCC, 2010) Handbook for Phase 1 Habitat Survey CIEEM (2017) Guidelines for Preliminary Ecological Appraisal.

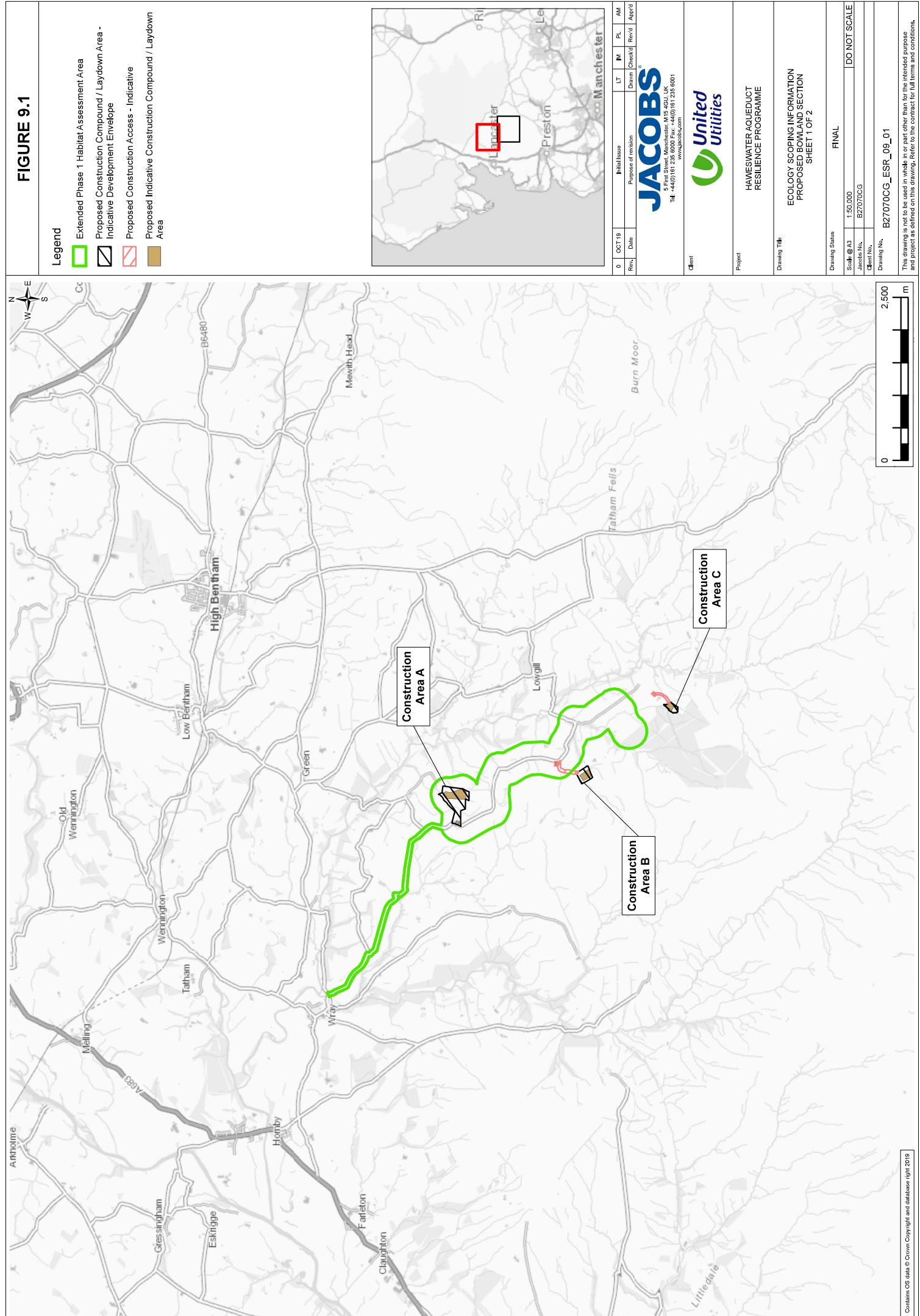
Surveys	Assessment area and further details	Date (approximate)	Good practice guidance
Detailed Botanical Survey	<p>There are habitats associated with the Proposed Bowland Section that will and / or may qualify as priority habitats. More detailed survey effort to further classify the habitat types and level of importance would be undertaken where impacts to these habitats are anticipated (e.g. direct habitat loss or hydrological changes). Surveys will follow good practice guidance (Rodwell, 2006).</p> <p>Surveys will be undertaken between May and August depending on the habitat requiring survey.</p>	August – September 2019 and May – August 2020	Rodwell, J.S. (2006), NVC Users' Handbook, JNCC.
Formal Hedgerows Regulations Assessment	<p>All hedgerows that are within 50 m of construction working areas and likely to be directly affected by the proposed works will be assessed. Analysis of the 2019 EP1HS and aerial imagery will be made prior to attending site. Assessments will be made of the species composition of each hedgerow and whether it reaches the threshold level to be classed as 'Important' in accordance with The Hedgerows Regulations (1997).</p>	May – July 2020	The Hedgerows Regulations (1997). The Hedgerow Survey Handbook (2nd Edition) (Defra, 2007).
Aquatic Ecology Surveys	<p>Aquatic ecology habitat suitability assessments would be undertaken along all watercourses which would be directly or indirectly impacted by the works. These surveys informed by a review of desk study data would determine the requirement for focused aquatic ecology surveys. Where data gaps are identified, aquatic ecology surveys may be required to target data gaps and reduce uncertainty. Aquatic ecology surveys could include:</p> <ul style="list-style-type: none"> <li>• Aquatic invertebrate surveys (two visits annually, undertaken once in spring (Mar – May) and autumn (Sep – Nov))</li> <li>• Fish surveys (one visit annually, undertaken in summer (Jun – Sep))</li> <li>• Aquatic plants (one visit annually, undertaken in summer (Jun – Sep))</li> </ul> <p>If the desk review indicates the presence of protected aquatic species, for example Desmoulins whorl snail (<i>Vertigo mouliniana</i>) or freshwater pearl mussel (<i>Margaritifera margaritifera</i>) then targeted surveys for these species may be required. White clawed crayfish have already been scoped in for survey (see below).</p>	September – November 2019 and March – August 2020	Surveys for protected species will follow standard best practice guidance for each species. Habitat suitability assessment may potentially be used as a proxy for species specific surveys with agreement from the Environment Agency.
White-clawed crayfish surveys	<p>Habitat suitability assessments and desk study information indicate the potential presence of white-clawed crayfish.</p> <p>White-clawed crayfish surveys will be undertaken on all watercourses which have been identified with potential to support the species. Surveys will be undertaken</p>	August – September 2019 and	Peay S (2003). Monitoring the White-clawed Crayfish ( <i>Austropotamobius pallipes</i> ). Conserving Natura 2000 Rivers

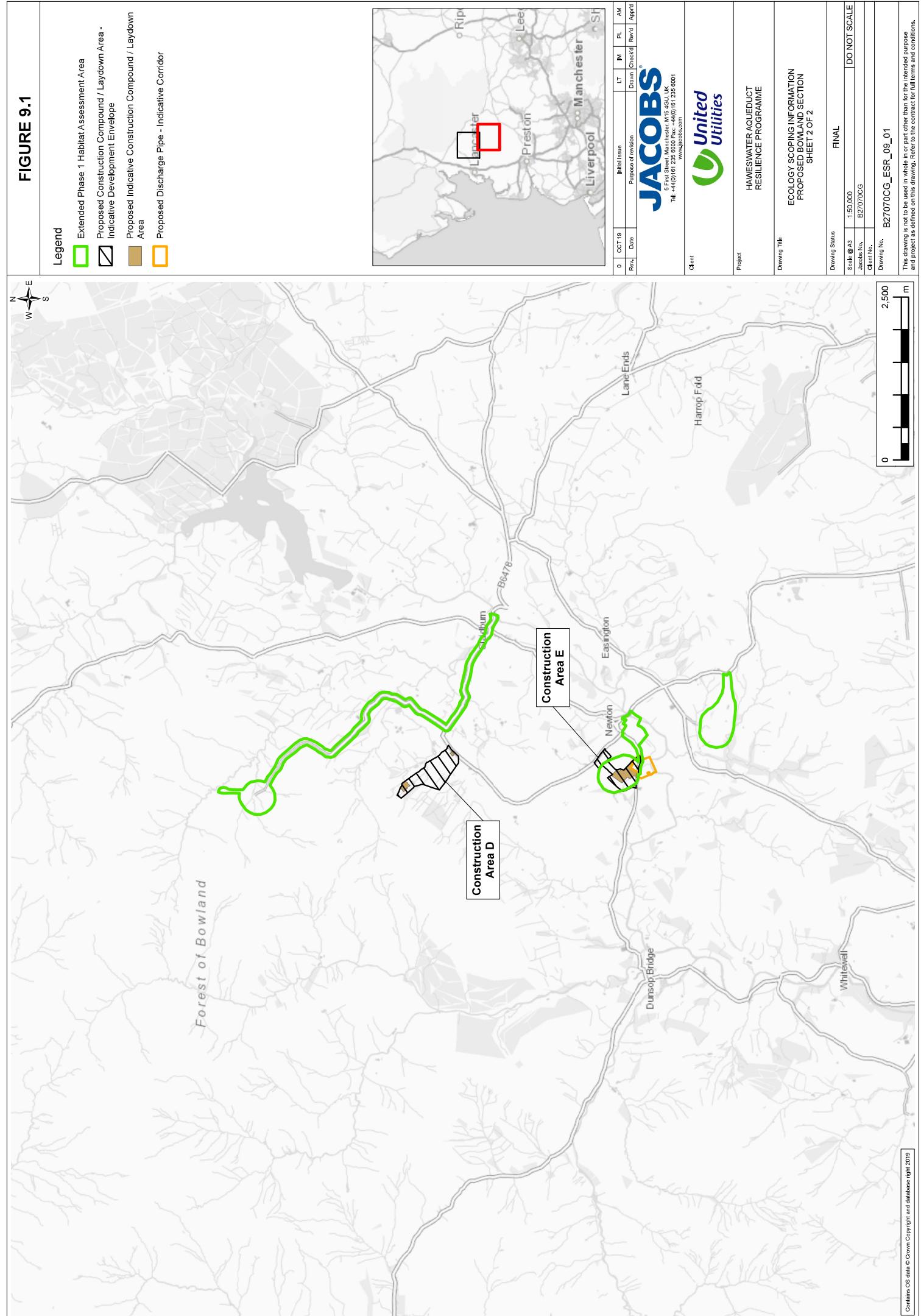
Surveys	Assessment area and further details	Date (approximate)	Good practice guidance
Terrestrial Invertebrates	Habitats identified during the EP1HS and desk study with potential to support notable assemblages of terrestrial invertebrates, fall outside of the Proposed Bowland Section. No further surveys are proposed for terrestrial invertebrates.	May – July 2020 (optimal survey window July – September)	Monitoring Series No. 1, English Nature, Peterborough
Great Crested Newt (GCN)	<p>edNA surveys were completed by Bowland ecology in 2019 on 86 of 87 suitable ponds identified within 250 m of the EP1HS area (area based on early scheme design). One pond returned a positive edNA result indicating GCN presence. Three ponds returned indeterminate results.</p> <p>A gap analysis will be undertaken to identify any additional ponds which are located within 250 m of the Proposed Bowland Section. The following ponds will be subject to edNA surveys in 2020 (where access permits):</p> <ul style="list-style-type: none"> <li>• Any additional ponds identified during the gap analysis exercise</li> <li>• Any pond with indeterminate edNA results during 2019 surveys</li> </ul> <p>These surveys will be carried out following good practice guidelines (Nature metrics; and Biggs <i>et al.</i>, 2014).</p> <p>Any pond which returns a positive edNA sample (during the 2019 and 2020 edNA surveys) will be subject to population class size assessment surveys during the 2020 survey season. Incidental records of other amphibians including common toad (LAP species) would be documented during these surveys. These surveys will be carried out with reference to good practice guidelines (English Nature, 2001).</p> <p>A Habitat Suitability Assessment (HSI) will be undertaken on all ponds which are scoped in for survey (Oldham <i>et al.</i>, 2000)</p>	<p>March – May 2020</p> <p>HSI can be completed at any time of the year</p>	<p>English Nature (2001) Great Crested Newt Mitigation Guidelines</p> <p>Biggs J, Ewald N, Valentini A, Gaboraud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Defra Project WC1067. Freshwater Habitats Trust: Oxford</p> <p>Oldham, R.S. et al. (2000). Evaluating the suitability of habitat for the Great Crested Newt (<i>Triturus cristatus</i>). Herpetological Journal: 10 (4); 143-155.</p>
Reptiles	Suitable reptile habitat has been identified during the EP1HS. Reptile surveys will be undertaken within and immediately adjacent to suitable habitat areas that would be directly impacted by the Proposed Bowland Section. Surveys would include a combination of visual encounter surveys and artificial refugia searches. Seven survey visits would be undertaken.	<p>September 2019 and April – June 2020</p>	<p>Foster J and Gent T (1996). Reptile Survey Methods. English Nature; Gent T and Gibson S (2003). Herpetofauna Workers Manual. JNCC, Peterborough and JNCC (2004).</p>

Surveys	Assessment area and further details	Date (approximate)	Good practice guidance
Breeding Birds (including Barn Owl)	<p>Three breeding bird surveys incorporating standard Common Bird Census (CBC) and British Trust for Ornithology methods have been carried out between April and June 2019. These surveys were undertaken based on early scheme design. A gap analysis exercise has been undertaken to determine whether the completed breeding bird survey transects based on early scheme design, have appropriately covered the Proposed Bowland Section. It is considered that breeding bird surveys undertaken to date are sufficient to provide an appropriate assessment. This will be kept under review as the Proposed Bowland Section design progresses.</p> <p><u>Barn Owl</u></p> <p>Local barn owl groups will be approached for local knowledge. The roost information would be collated and habitat plans reviewed against potential impacts to determine if further surveys are required.</p>	<p>No additional surveys required</p> <p>To be confirmed.</p> <p>Surveys undertaken November 2019 – March 2020.</p>	<p>Froglife (2016). Surveying for reptiles.</p> <p>Gilbert G., Gibbons D.W., Evans J. (1998). Bird Monitoring Methods. RSPB</p> <p>Barn Owl Trust (2012) <i>Barn Owl Conservation Handbook</i></p> <p>Shawyer (2011) <i>Barn Owl Survey Methodology and Techniques for use in Ecological Assessment: Developing Best Practice in Survey and Reporting</i>.</p> <p>Barn Owl Trust (2010) <i>Survey techniques</i>. Leaflet no. 8. The Barn Owl Trust, Ashburton, Devon.</p>
Wintering Birds	<p>Suitable wintering bird habitat has been identified within and in close proximity to the Proposed Bowland Section. Wintering bird surveys will be undertaken in accordance with the methodology agreed with Natural England [email; 14/08/2019].</p> <p>Seven wintering bird surveys would be undertaken between September 2019 and mid-March 2020 undertaken between dawn and dusk. Surveyors would walk a pre-determined transect route and will extend up to 500 m from the Proposed Bowland Section.</p> <p>A comprehensive desk study will be undertaken as part of this assessment and will include requests for information from local bird and raptor groups.</p>	<p>September 2019 – March 2020</p>	<p>Gilbert G., Gibbons D.W., Evans J. (1998). <i>Bird Monitoring Methods</i>. RSPB</p> <p>Hardley, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. &amp; Thompson, D. (2013). <i>Raptors: a field guide to survey and monitoring (3rd Edition)</i>. The Stationery Office, Edinburgh.</p>
Badger	<p>No records of badger have been returned as part of the desk study. However suitable habitat to support badger has been recorded during EP1HS. Badger surveys will be undertaken to identify badger setts within the Proposed Bowland Section and within 30 m of the Proposed Bowland Section. Survey areas will be</p>	<p>February – April 2020</p>	<p>Harris <i>et al.</i> (1989) Surveying badgers</p>

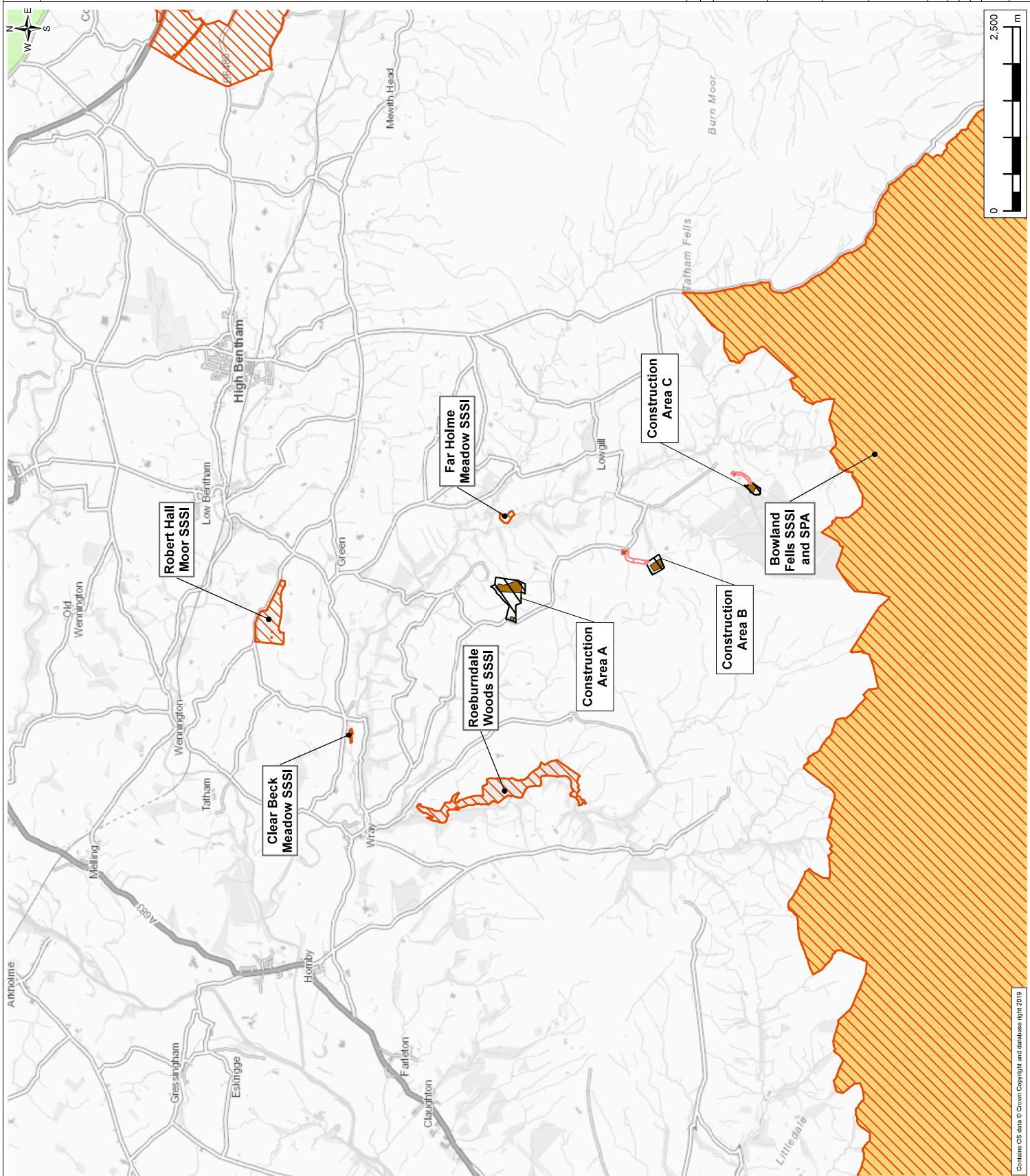
Surveys	Assessment area and further details	Date (approximate)	Good practice guidance
Bats	<p>Surveyed on one occasion and will be focused on identifying setts (and not specifically searching for and recording all signs of badger).</p> <p><u>Preliminary bat roost potential survey</u> All trees, buildings and structures up to 50 m from the Proposed Bowland Section (i.e. construction compound areas, laydowns and access tracks) will be subject to ground level bat roost assessments.</p> <p><u>Tree climb and inspect surveys</u> Any trees categorised as moderate and high in their potential to support bats will be subject to specialist climb and inspect surveys. These surveys will evaluate the potential roost features, search for evidence of bats and to recategorise the bat roost classifications where appropriate. Surveys would be completed between November 2019 and April 2020</p> <p><u>Building assessments / inspections</u> Any buildings up to 50 m from the Proposed Bowland Section categorised as moderate or high in their potential to support bats will be subject to closer inspection (external and internal where access permission can be obtained).</p> <p><u>Presence / absence surveys (buildings and trees) and / or back tracking surveys</u> Where potential disturbance impacts to bats within roosts may result from proposed works, the trees and buildings will be subject to dusk emergence / dawn re-entry surveys to determine the presence / absence of roosts and to characterise the roost type. Where trees and buildings cannot be safely or thoroughly inspected during the surveys above, they may be subject to an additional emergence / re-entry survey. Where access permission does not permit thorough inspections or bat emergence / re-entry surveys, back tracking surveys may be required to identify the likely presence / absence of bat roosts.</p>	November 2019 – March 2020	Collins (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd Edition; Mitchell-Jones (2004) Bat Mitigation Guidelines; Mitchell-Jones (2004) Bat Mitigation Guidelines; Mitchell-Jones & McLeish (2004) Bat Workers' Manual.

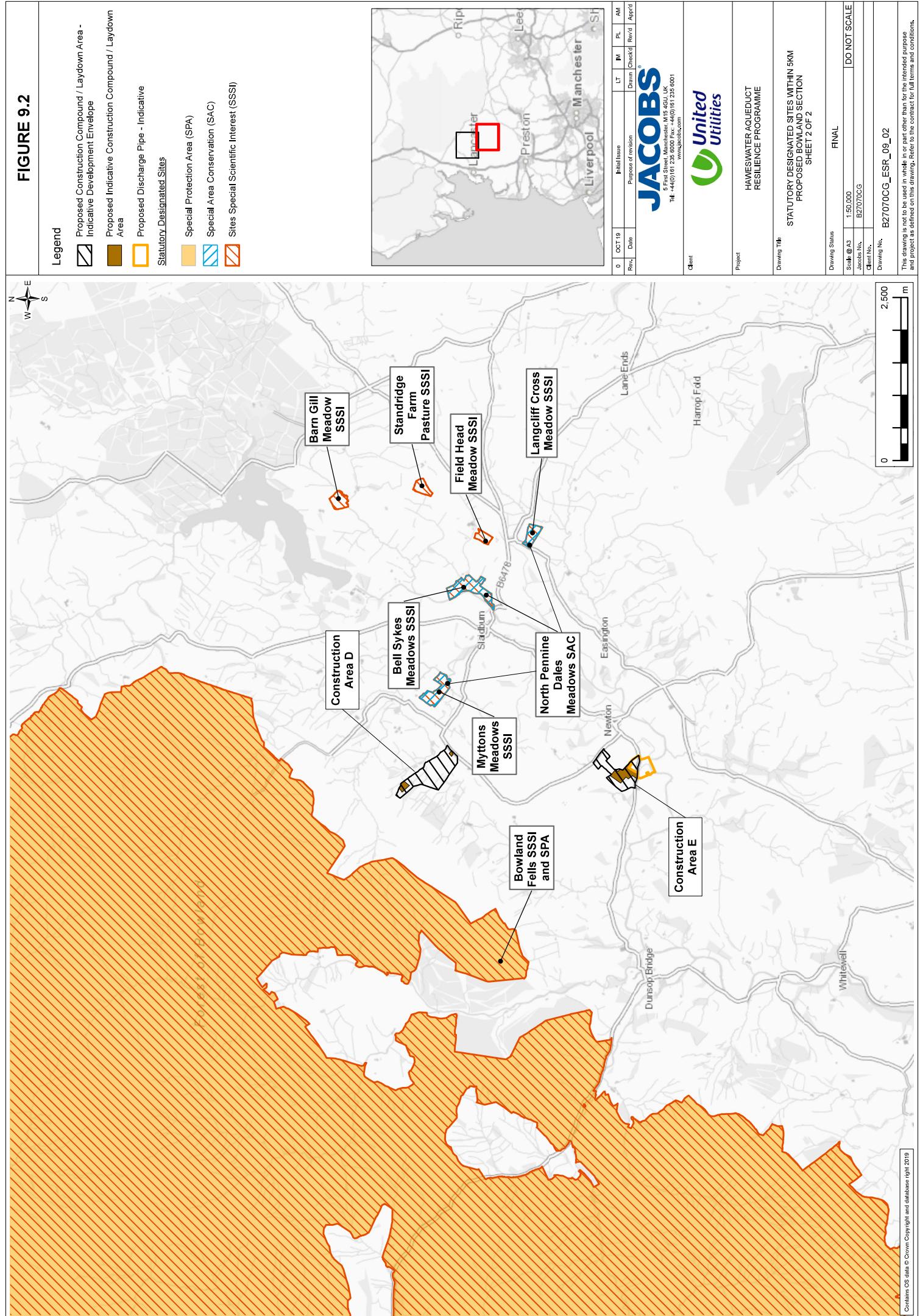
Surveys	Assessment area and further details	Date (approximate)	Good practice guidance
<u>Bat activity surveys</u>  In order to build up a greater understanding of bat foraging / commuting activity within the key areas of the Proposed Bowland Section, bat transect and / or static bat detector surveys will be undertaken.  Development areas will be subject to up to three survey periods, anticipated to be September 2019, April / May 2020 and June / July 2020.		April – July 2020	
<b>Otter Surveys</b>  Suitable otter habitat has been recorded within the EP1HS area. Otter surveys will be undertaken on watercourses which would be impacted by the construction works. Where watercourses / suitable adjacent resting places could potentially be impacted, surveys will be undertaken 200 m upstream and downstream of these areas with a focus on identifying potential for and presence of otter holts. Given the relatively low impact anticipated on the watercourses from the Proposed Bowland Section, 200 m upstream and downstream is considered an appropriate survey area. Furthermore, it is considered unnecessary to undertake spot checks on bridges as per the guidance.		April – June 2020	National Rivers Authority (1993). <i>Otters and River Habitat Management</i> . Conservation Technical Handbook Number 3. Ward, D., Holmes, N., and Jose, P., (1994) <i>The New Rivers &amp; Wildlife Handbook</i> . Royal Society for the Protection of Birds (RSPB)
<b>Water Vole</b>  Water vole surveys will be undertaken on watercourses which would be impacted by the construction works. Where watercourses could potentially be impacted, surveys will be undertaken 100 m upstream and downstream from the construction working areas. A late season survey will be undertaken in September 2019, with an early season survey undertaken in April 2020.		September 2019 and April 2020	Dean, M., Strachan, R., Gow, D., and Andrew, R. (2016) <i>Water Vole Mitigation Handbook: The Mammal Society Mitigation Guidance Series</i> .
<b>Other Mammals</b>  Several other notable species including species of principal importance / LBAP species such as hedgehog and brown hare known to be present in the wider area. These species will be assumed to be present in low densities within the assessment area. Specific surveys are not currently proposed although surveyors will remain vigilant for signs of such species during the suite of diurnal and nocturnal surveys.  Ongoing scheme design aims to avoid important habitats such as woodland, which have the potential to support notable mammals. If it cannot be confirmed before February 2020 that these important habitats would be retained, then species specific surveys may be required to provide an appropriate baseline upon which the significance of effect can be determined.		September 2019 – September 2020	To be determined

**FIGURE 9.1**

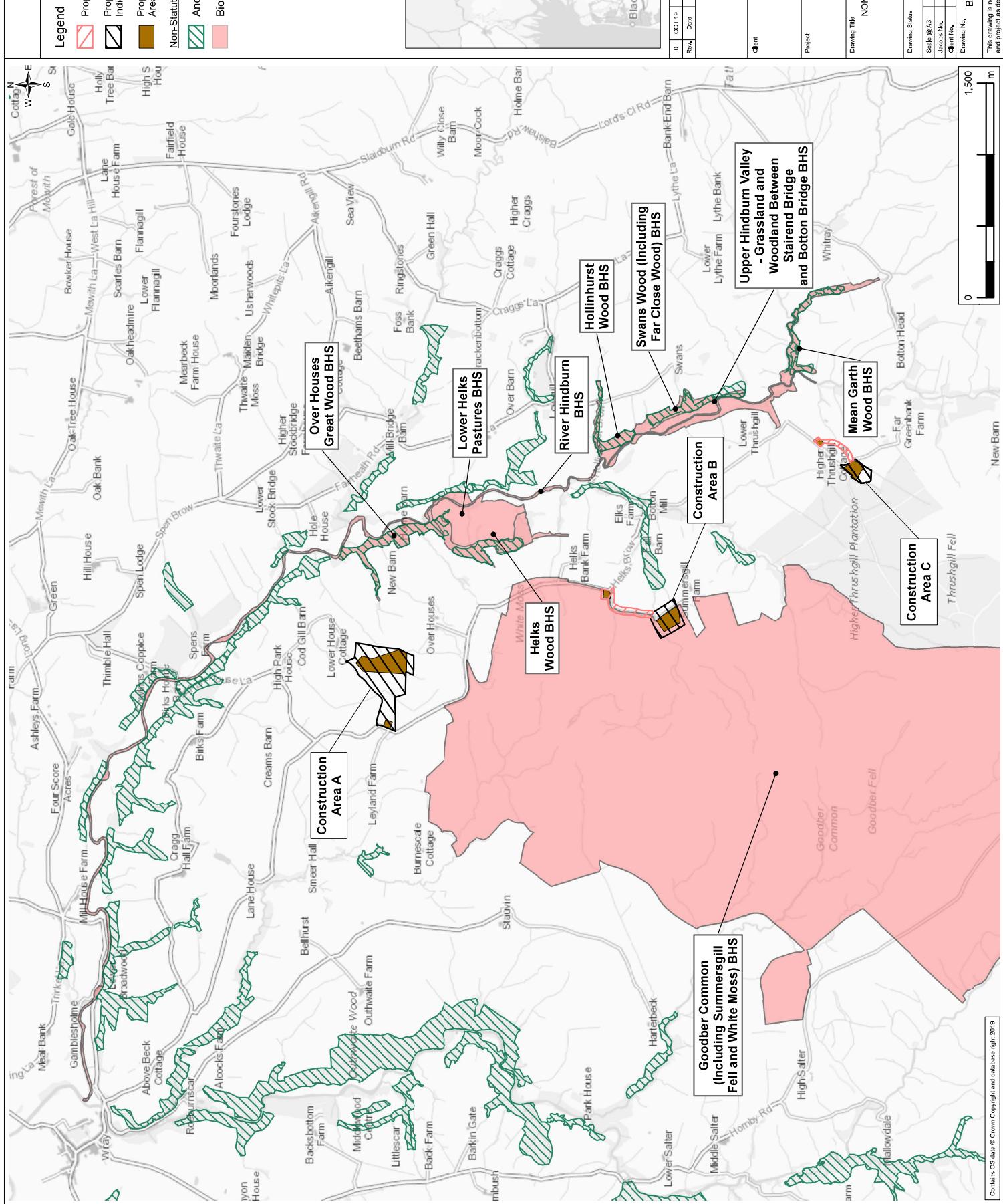
**FIGURE 9.1**

**FIGURE 9.2**

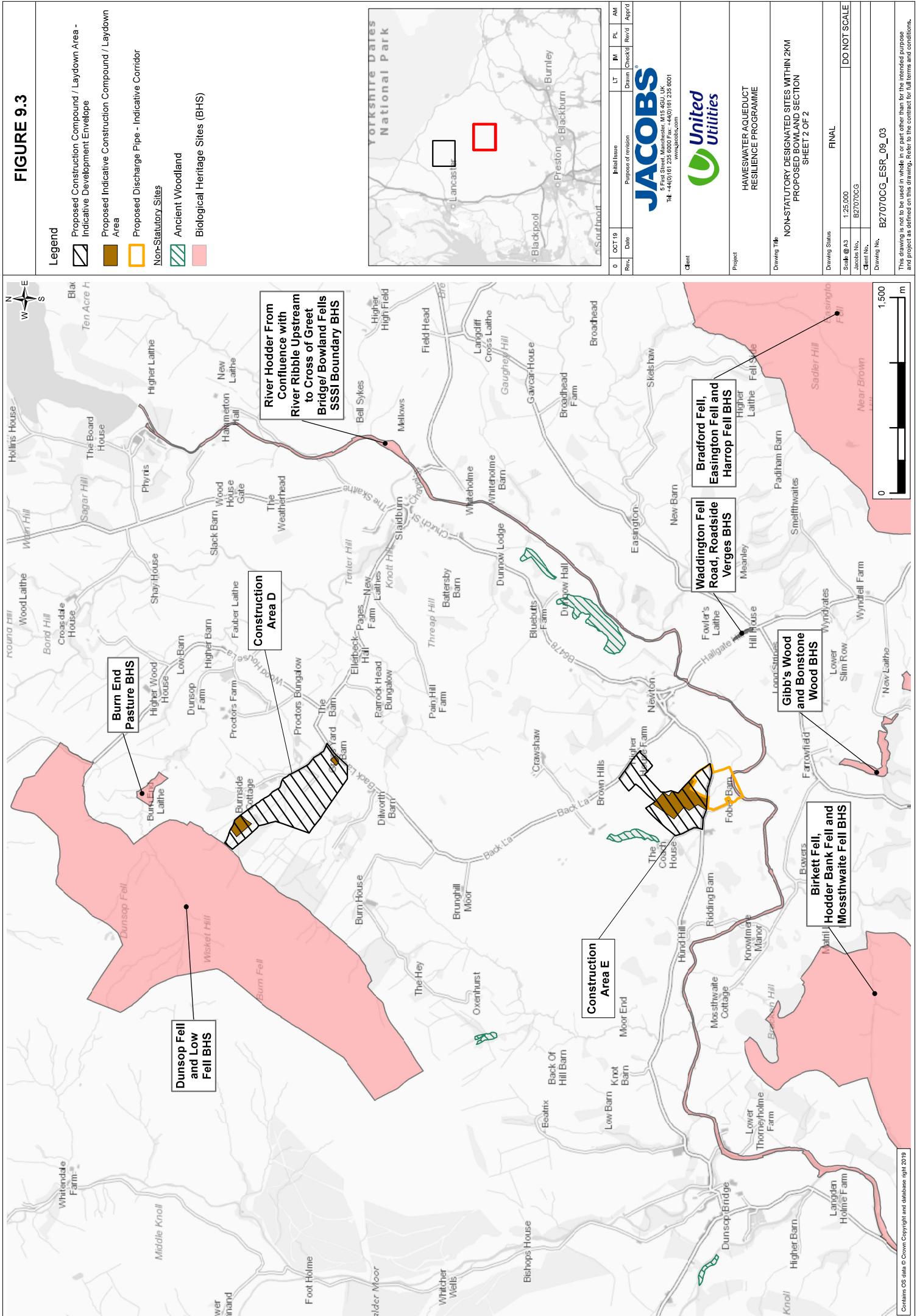


**FIGURE 9.2**

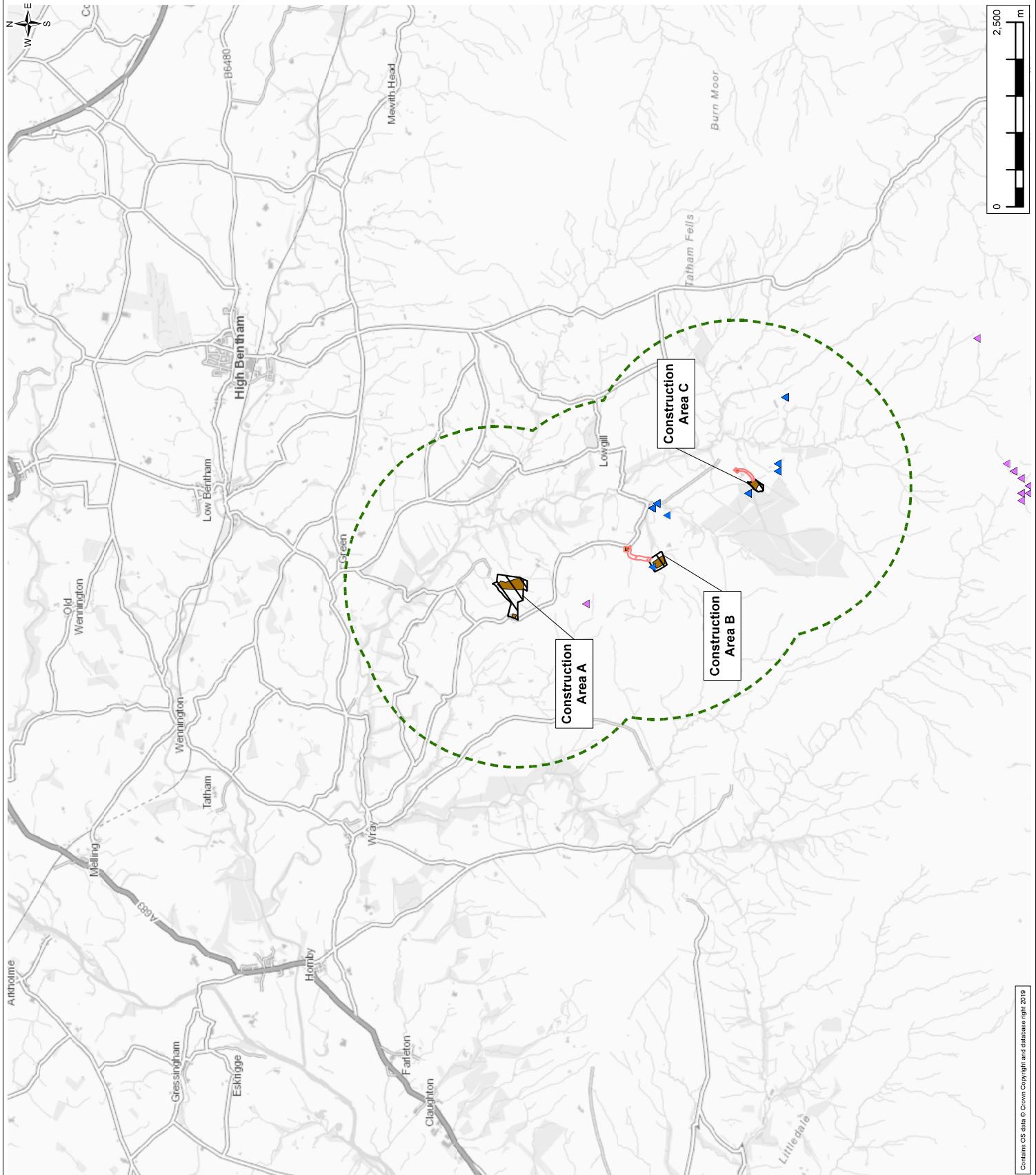
**FIGURE 9.3**

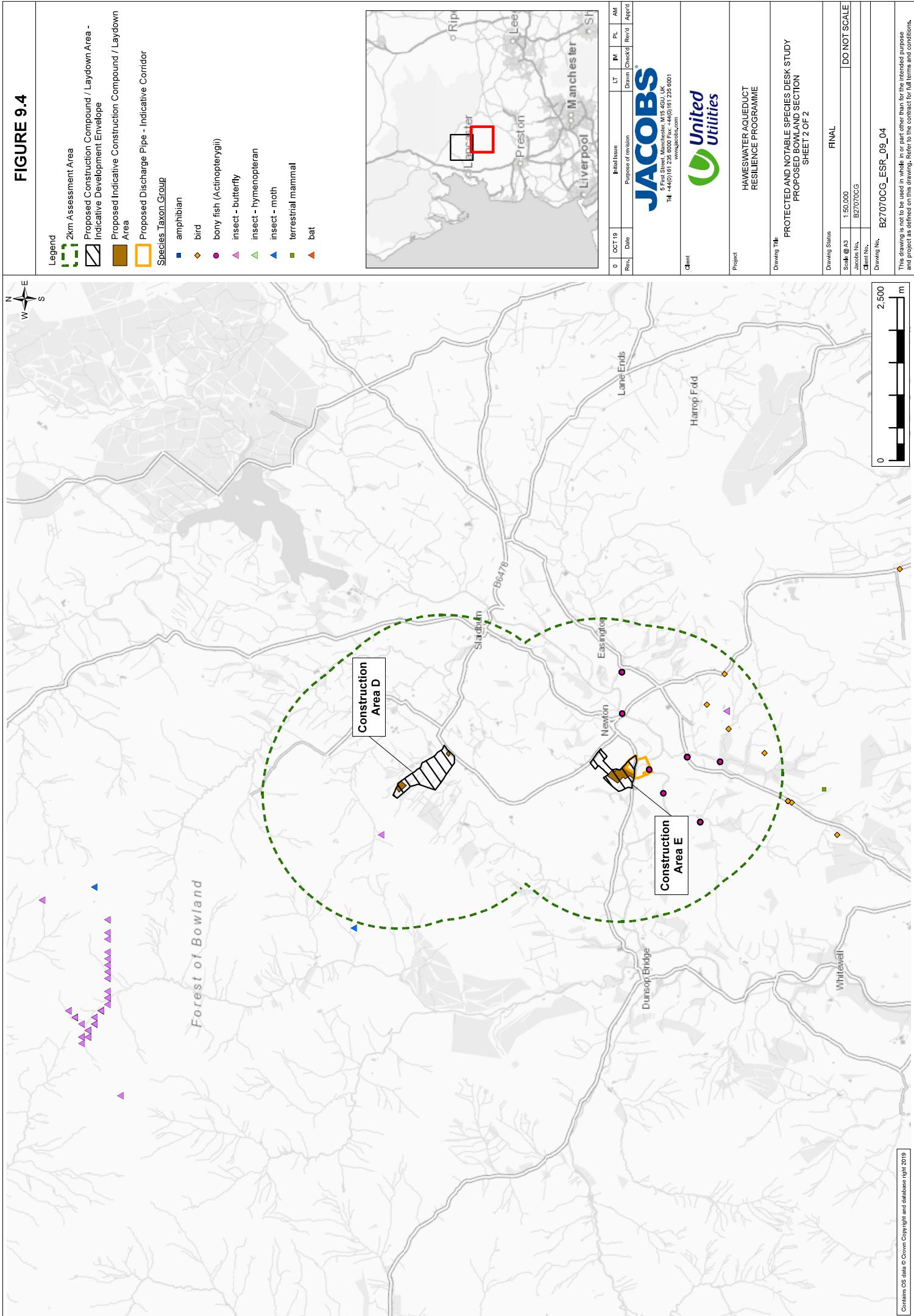


**FIGURE 9.3**

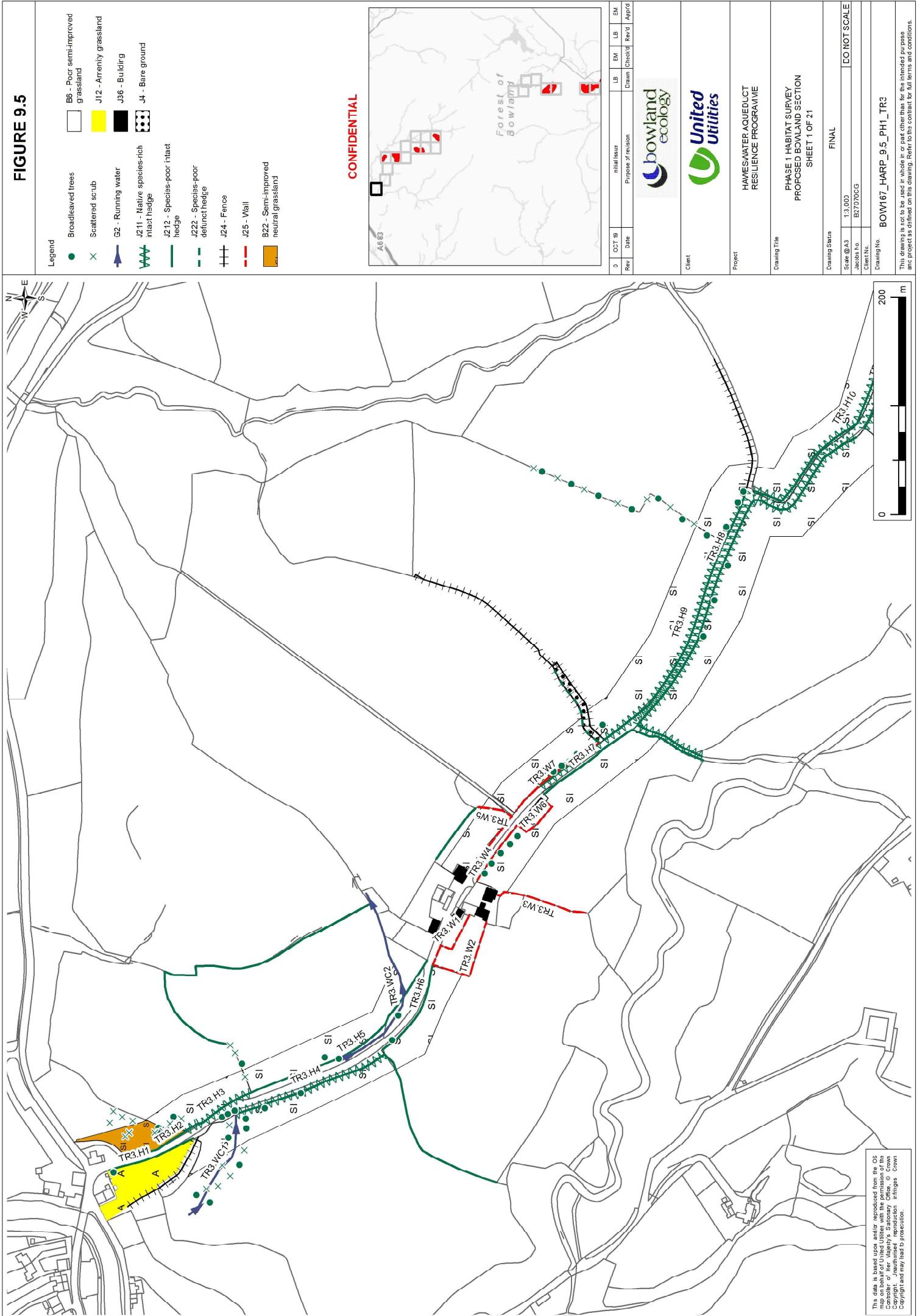


**FIGURE 9.4**

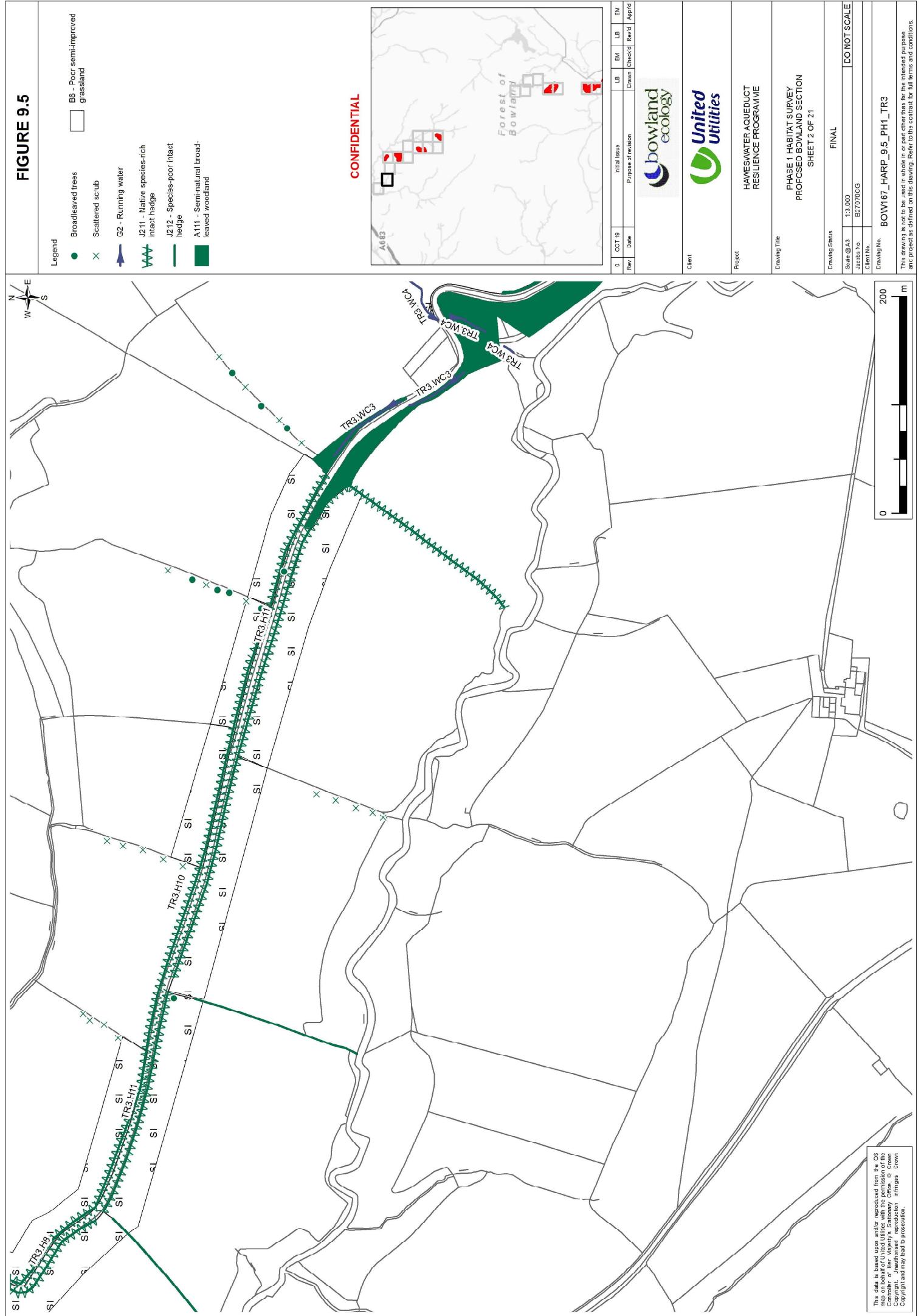


**FIGURE 9.4**

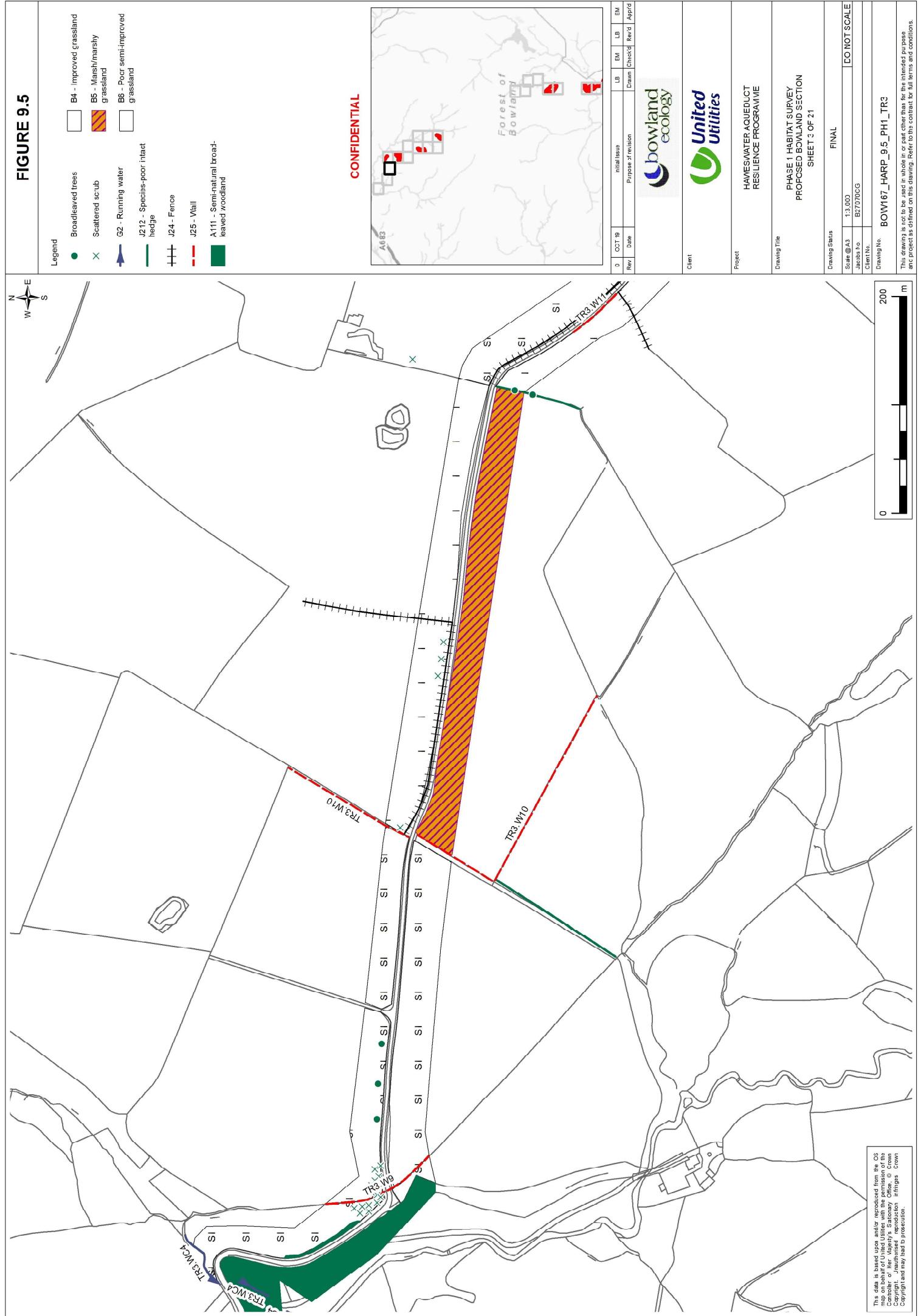
**FIGURE 9.5**



**FIGURE 9.5**



**FIGURE 9.5**

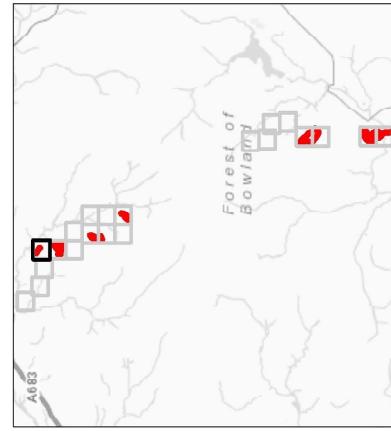


**FIGURE 9.5**

**Legend**

- Spring 2019 Phase 1 Habitat Survey Area:**
  - B4 - Improved grassland
  - BS** - Marsh/marshy grassland
  - BS** - Roc semi-improved grassland
- Broadleaved trees**: ●
- Scattered scub**: ✕
- G2 - Running water**: ↗
- J24 - Fence**: + + +
- J25 - Wall**: — — —
- A21 - Dense/continuous scrub**: [green textured box]

CONFIDENTIAL

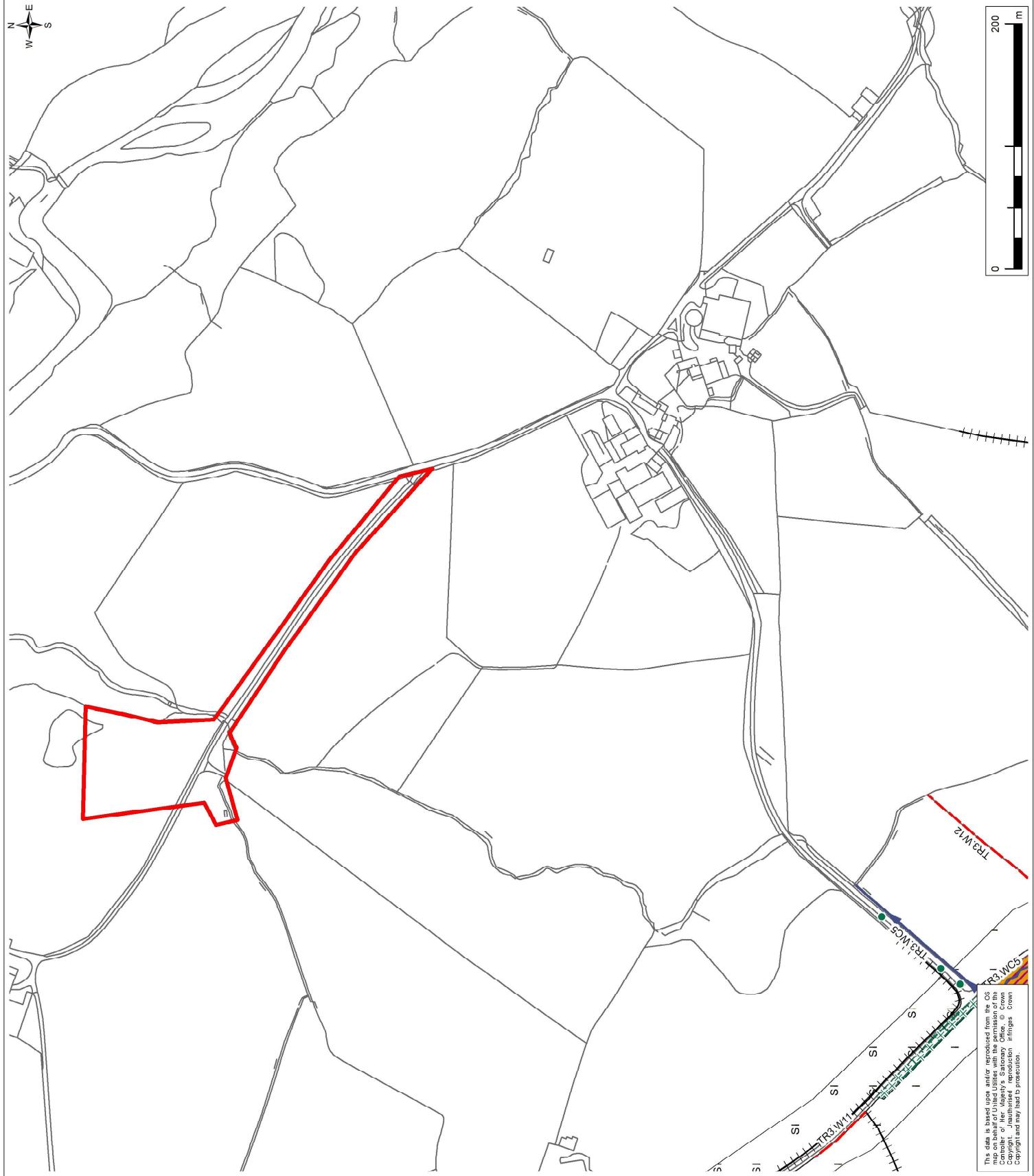


## **HAWESWATER AQUEDUCT RESILIENCE PROGRAMME**

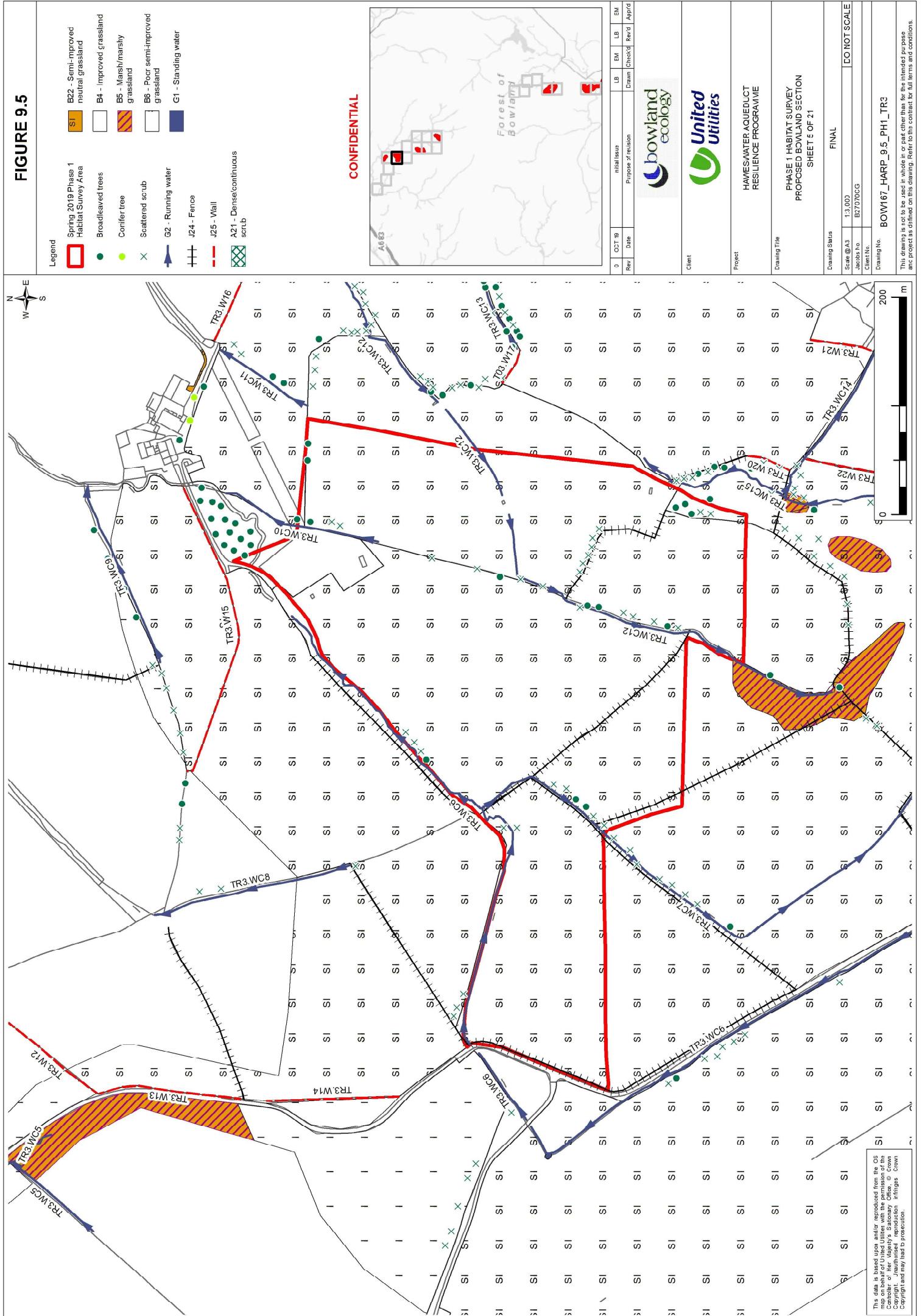
## **PHASE 1 HABITAT SURVEY PROPOSED BOWLAND SECTION**

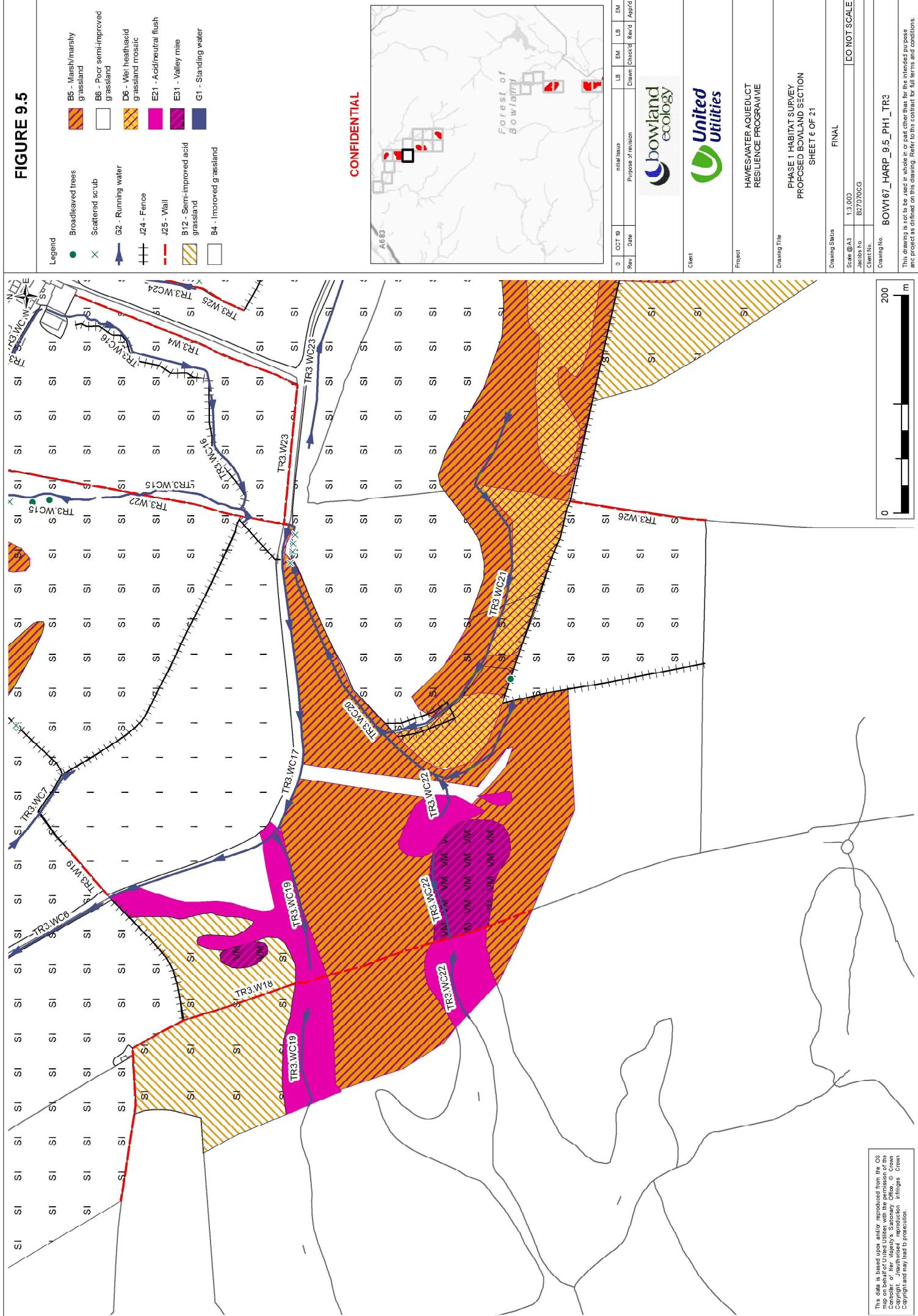
SHEET 4 OF 21

Scale @ A3 1:3,000 [ ] DO NOT SCALE  
Drawing No. BOW167\_HARP\_9.5\_PH1\_TR3  
Title: Drawing No. BOW167\_HARP\_9.5\_PH1\_TR3  
Client No. Jacobs No. BZ2707OCG  
Comments: This drawing is not to be used as a layout or plot, other than for the intended purpose as defined on this drawing. Retain it under contract for 7 years and conditions.



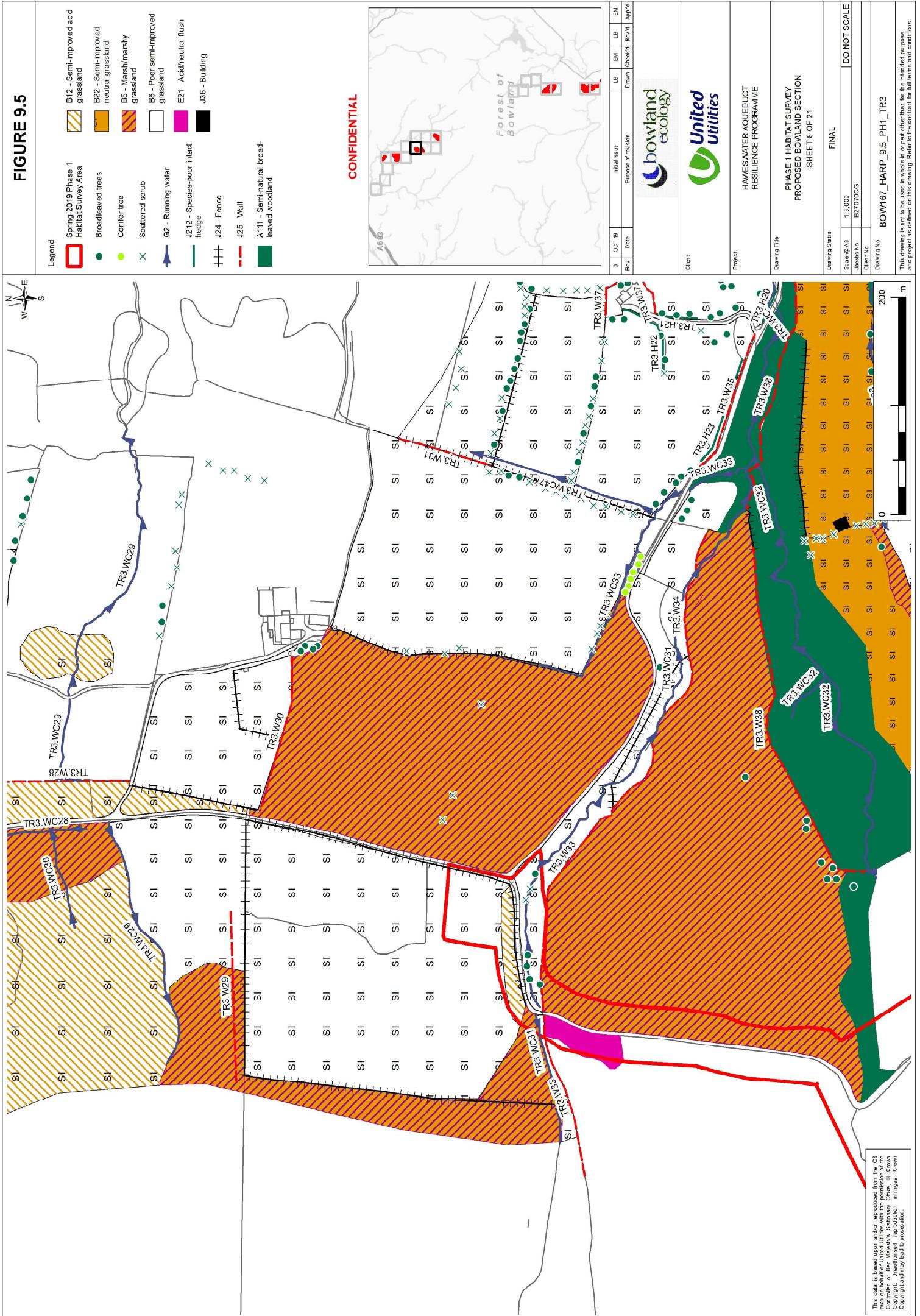
**FIGURE 9.5**

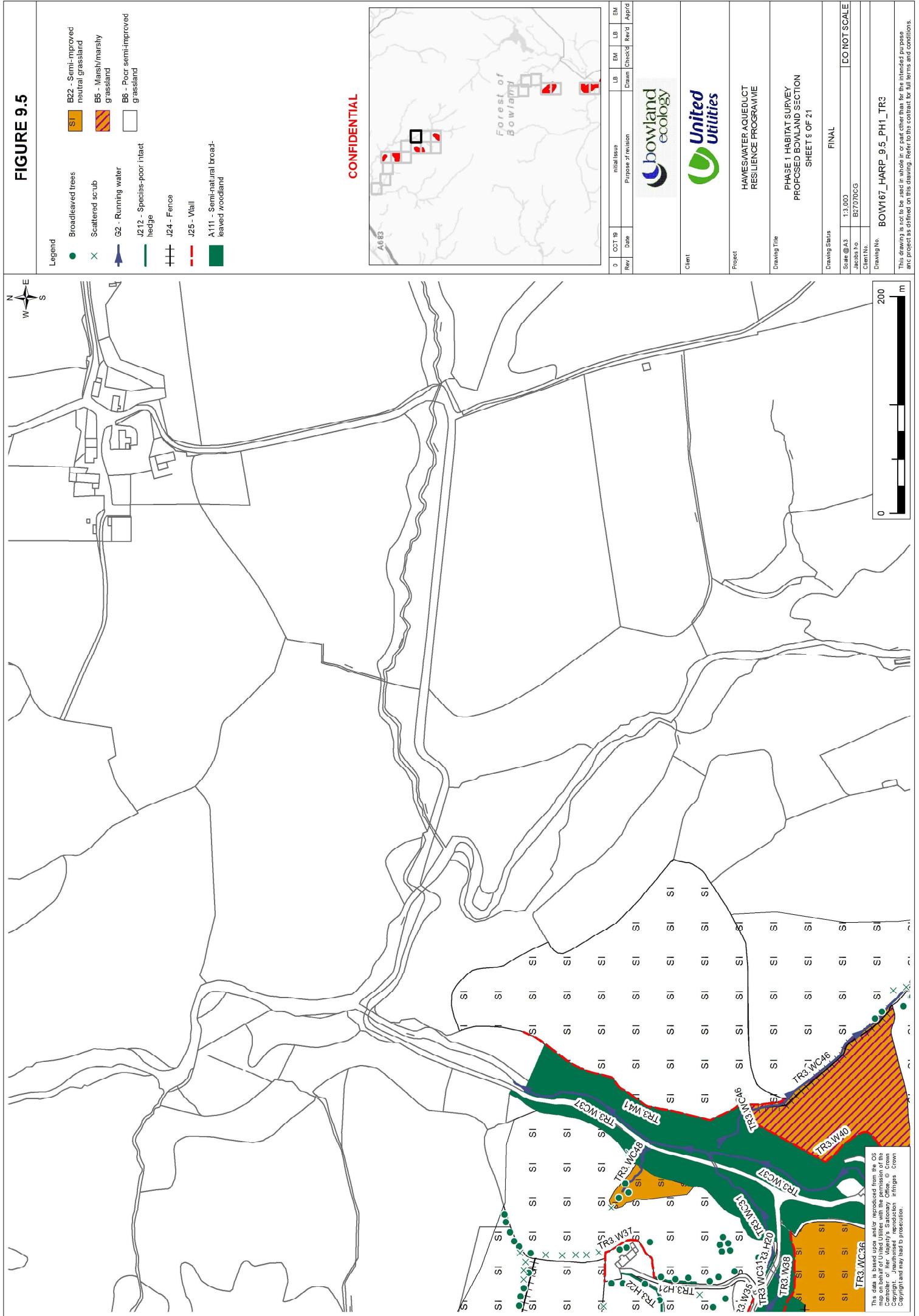


**FIGURE 9.5**

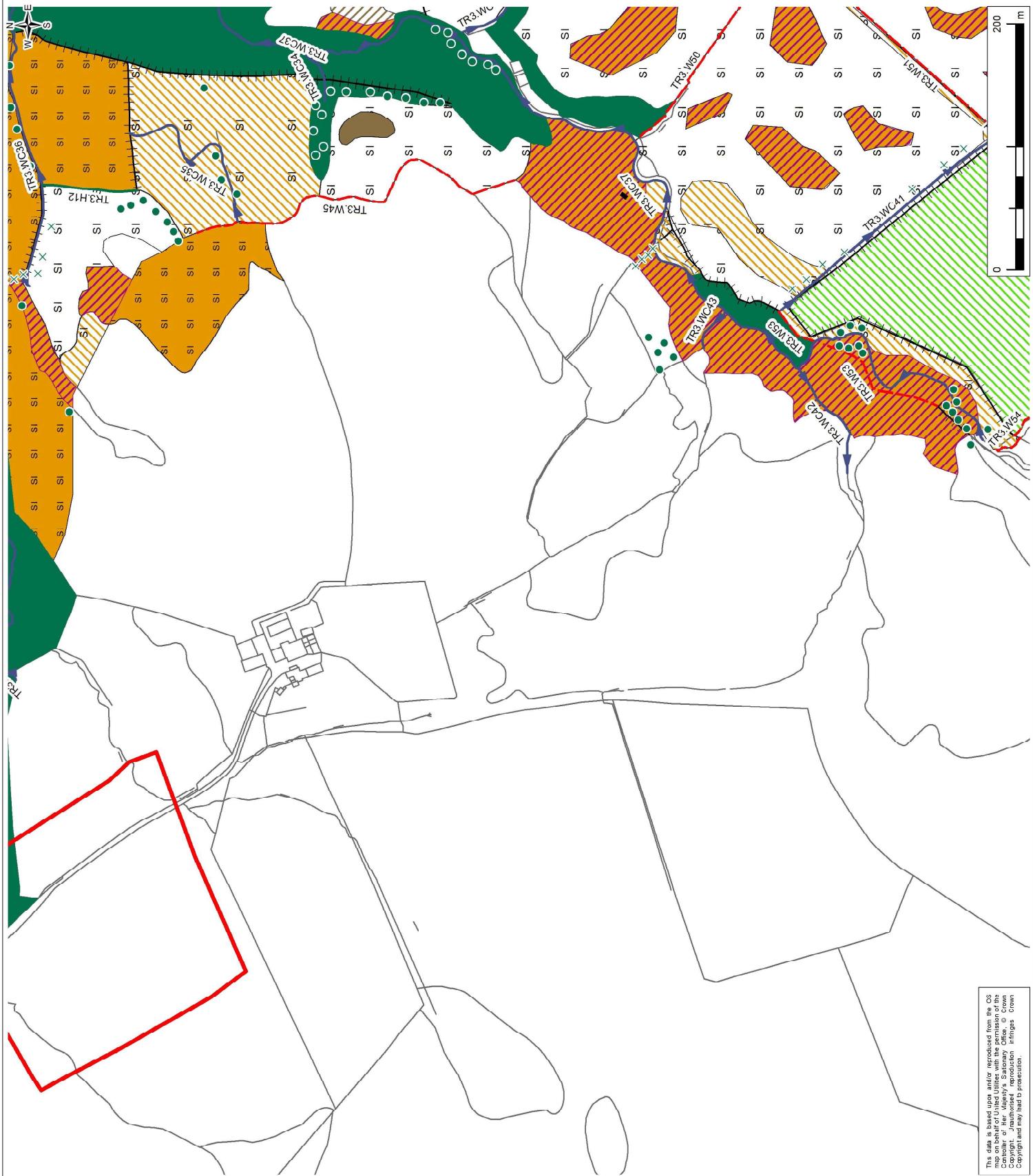
**FIGURE 9.5**

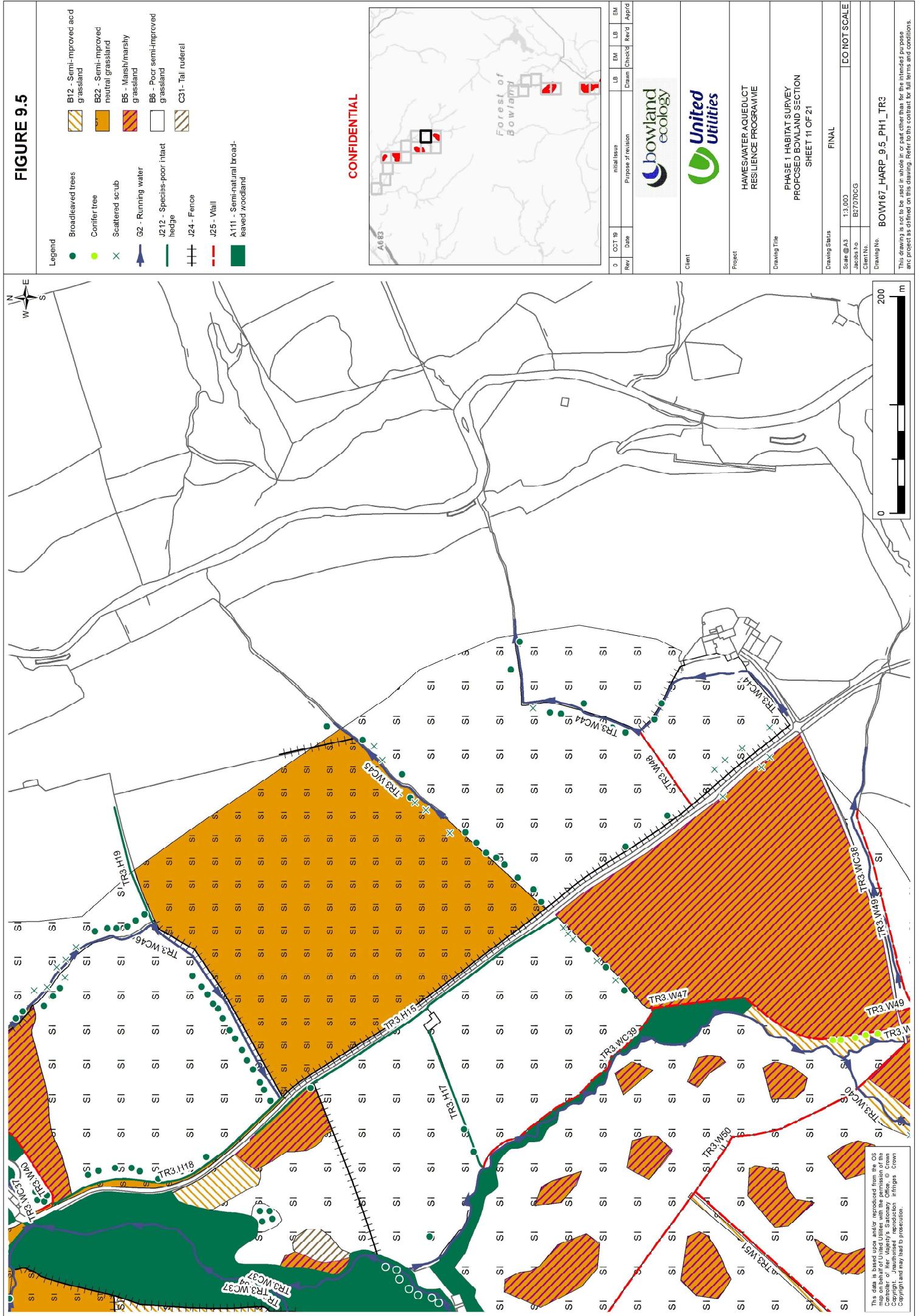
**FIGURE 9.5**



**FIGURE 9.5**

**FIGURE 9.5**



**FIGURE 9.5**

**FIGURE 9.5**

CONFIDENTIAL



**FIGURE 9.5**

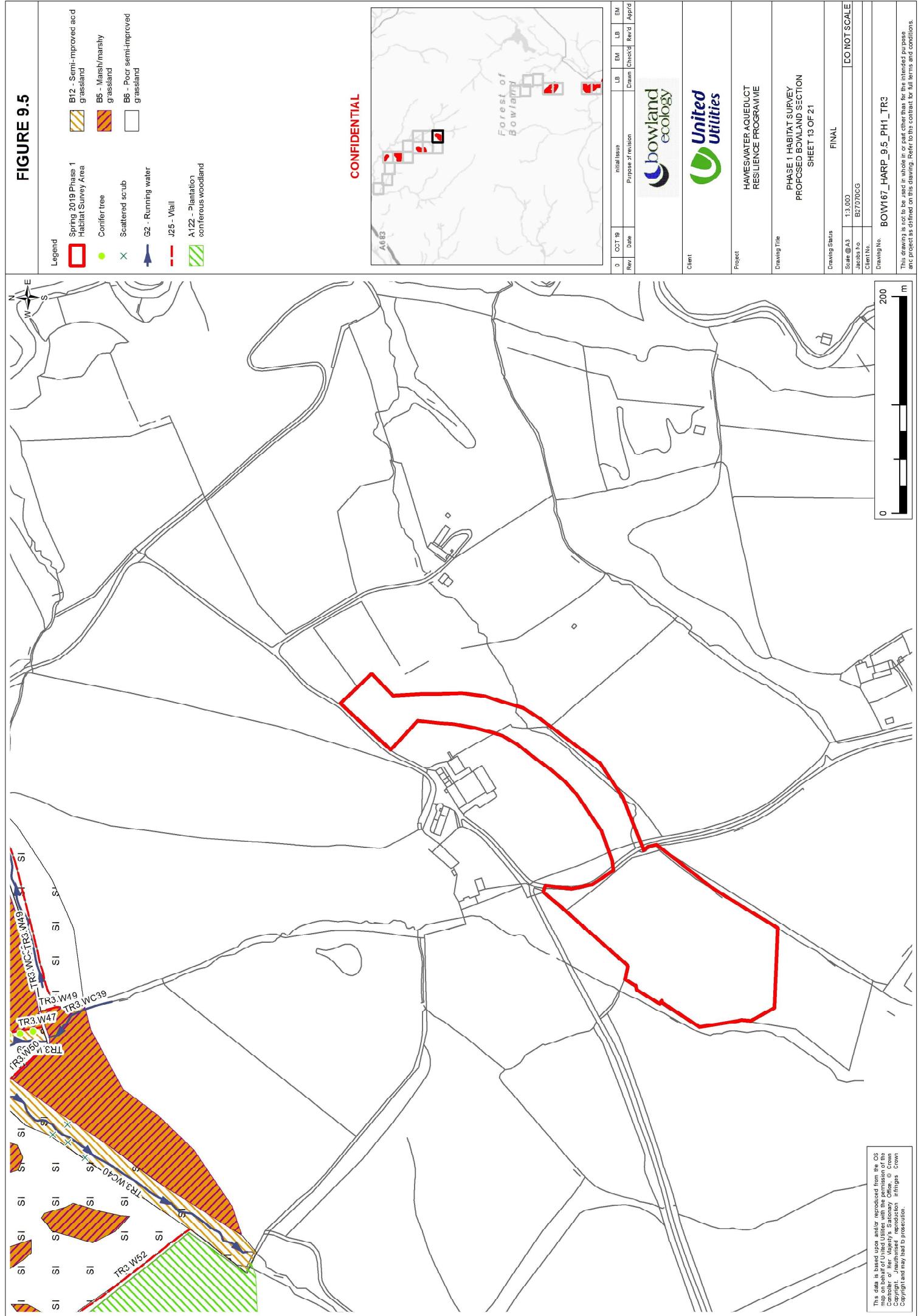
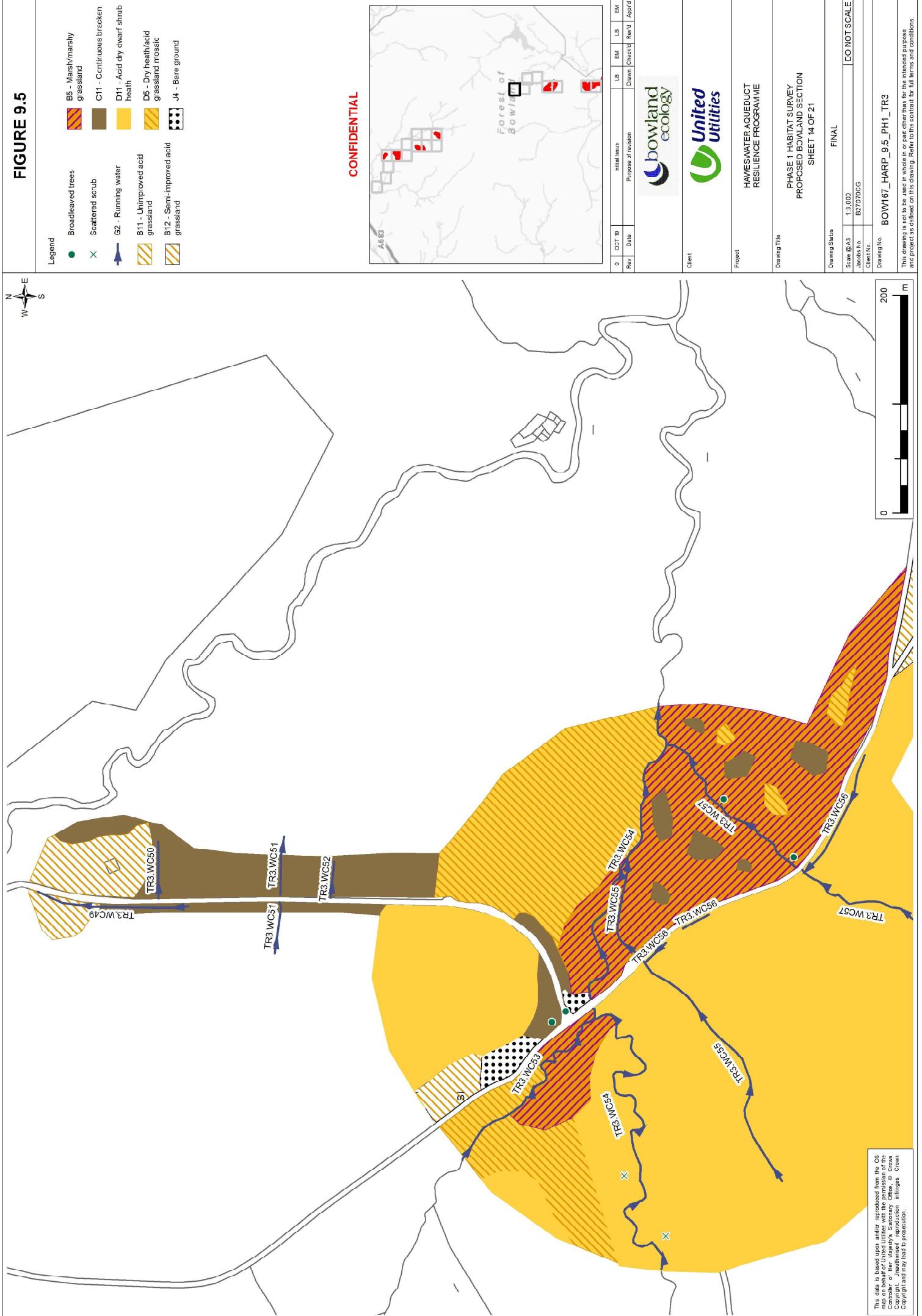
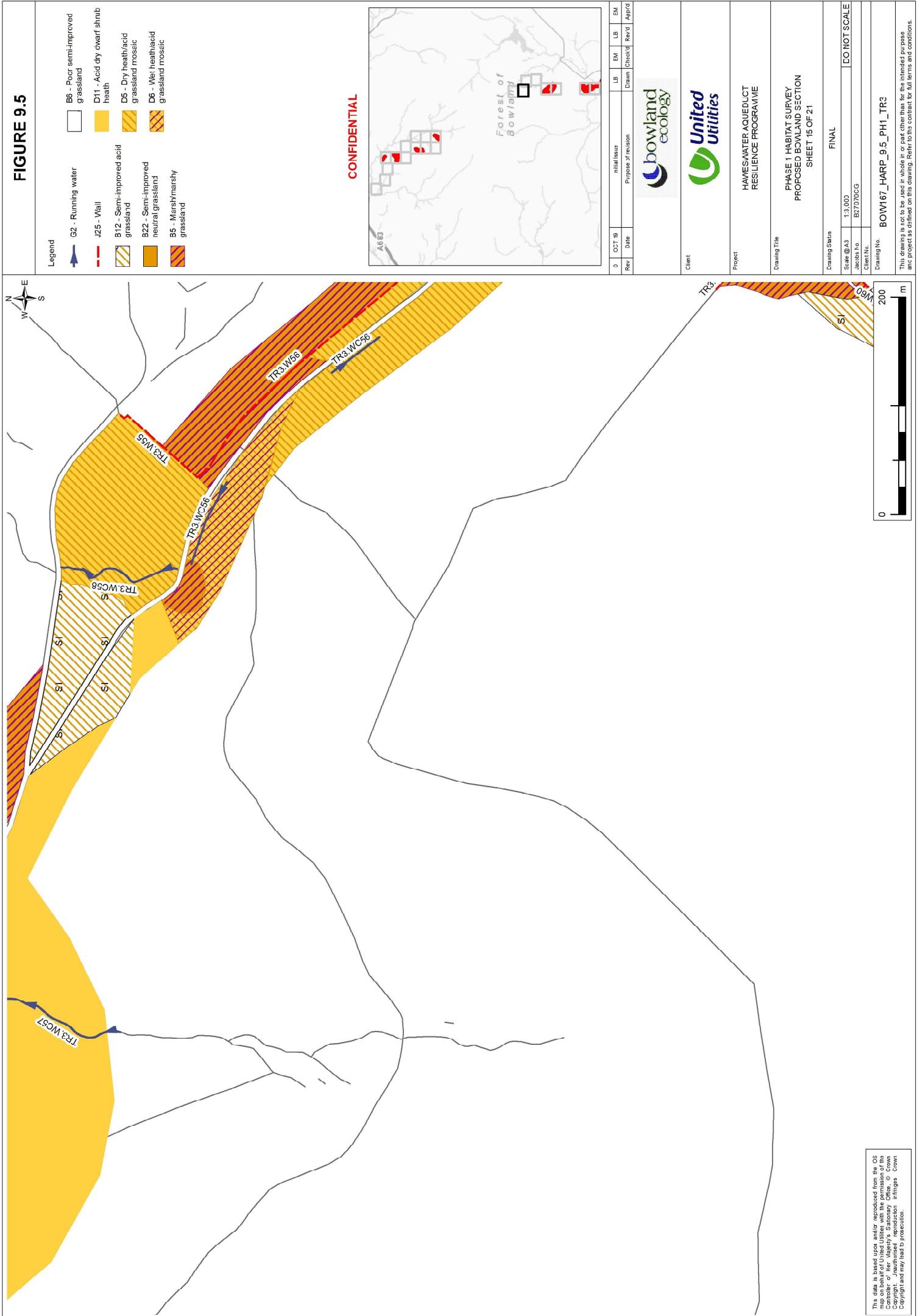


FIGURE 9.5

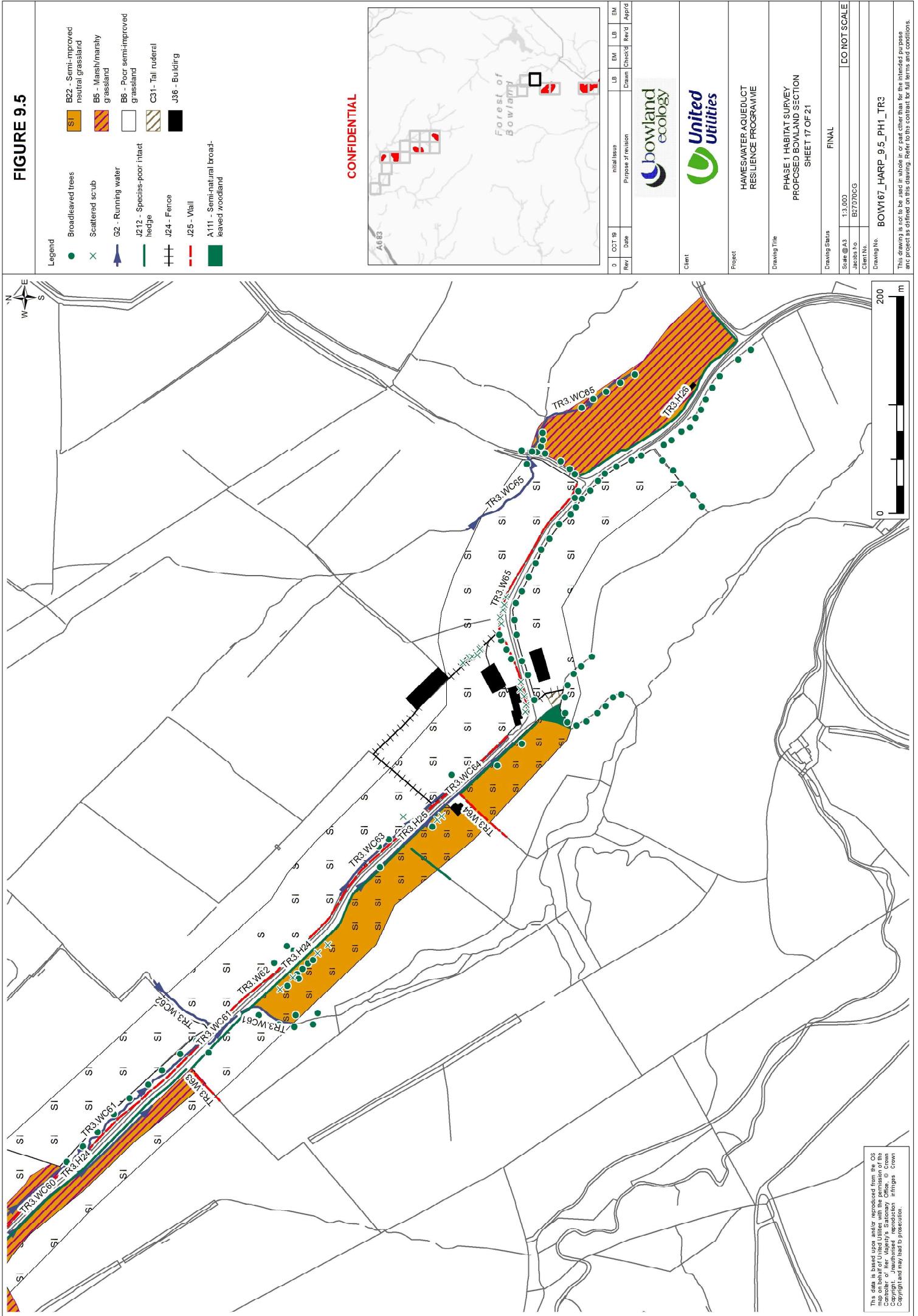


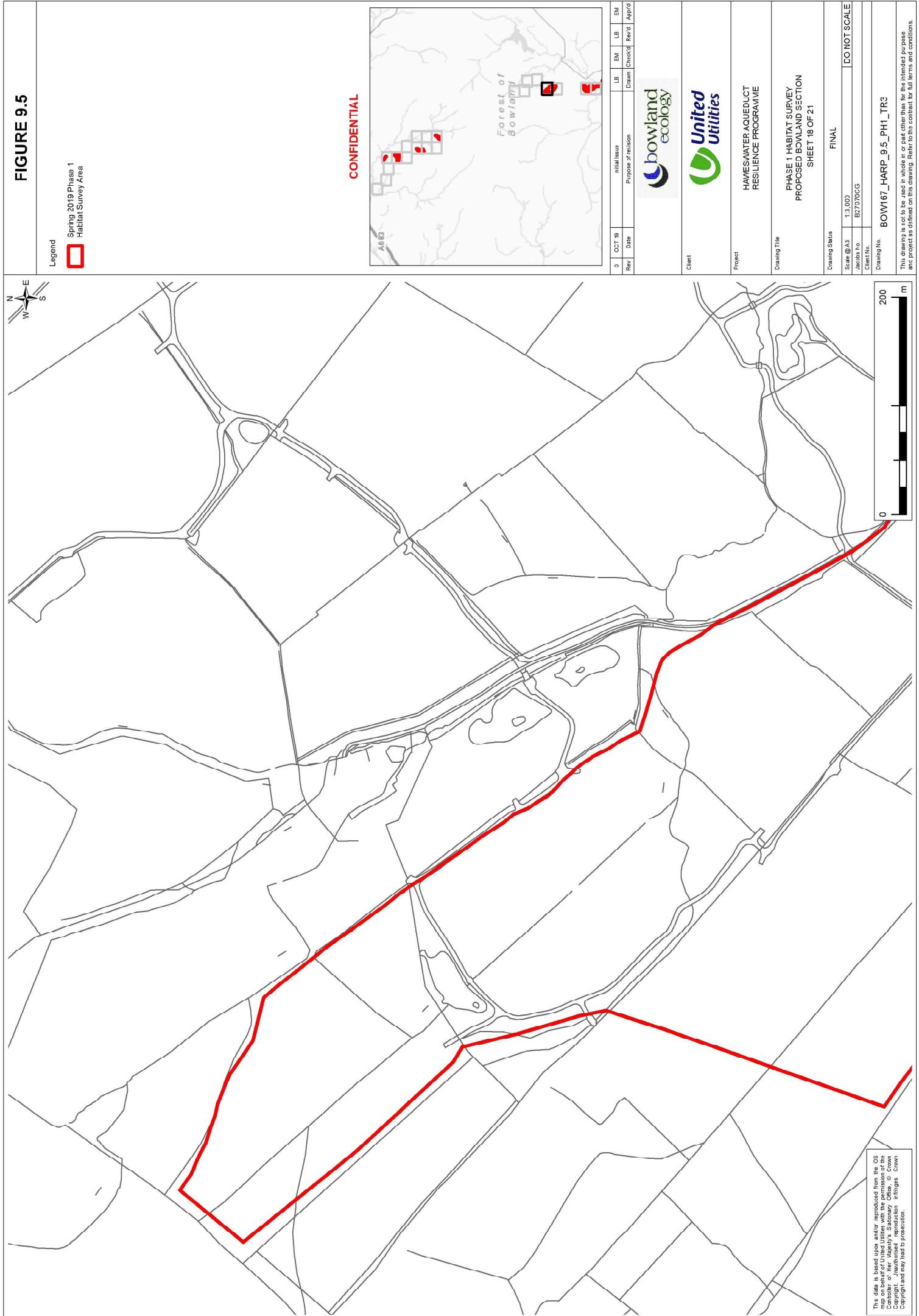
**FIGURE 9.5**



**FIGURE 9.5**

**FIGURE 9.5**



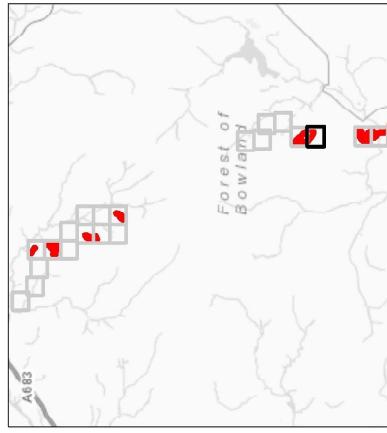
**FIGURE 9.5**

**FIGURE 9.5**

**Legend**

	Spring 2019 Phase 1 Habitat Survey Area
--	--

CONFIDENTIAL



Rev	Date	Oct 19	Initial issue	Purpose of revision	LB	EM	LB	EM	App'd
					Drawn	Check'd	Rev'd		



HAWESWATER AQUEDUCT  
RESILIENCE PROGRAMME

PHASE 1 HABITAT SURVEY  
PROPOSED BOWLAND SECTION

Drawing Status FINAL

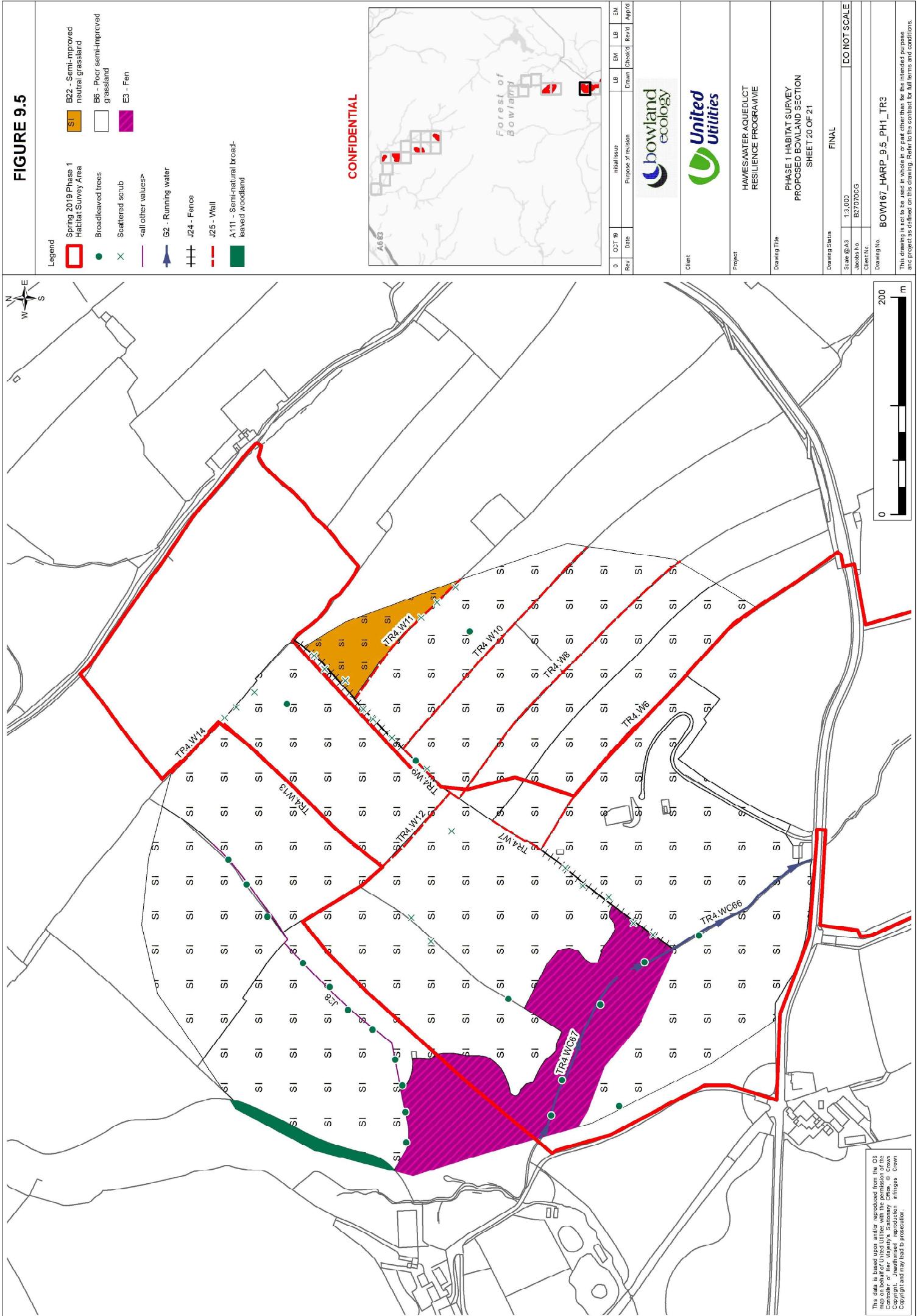
B27070CG

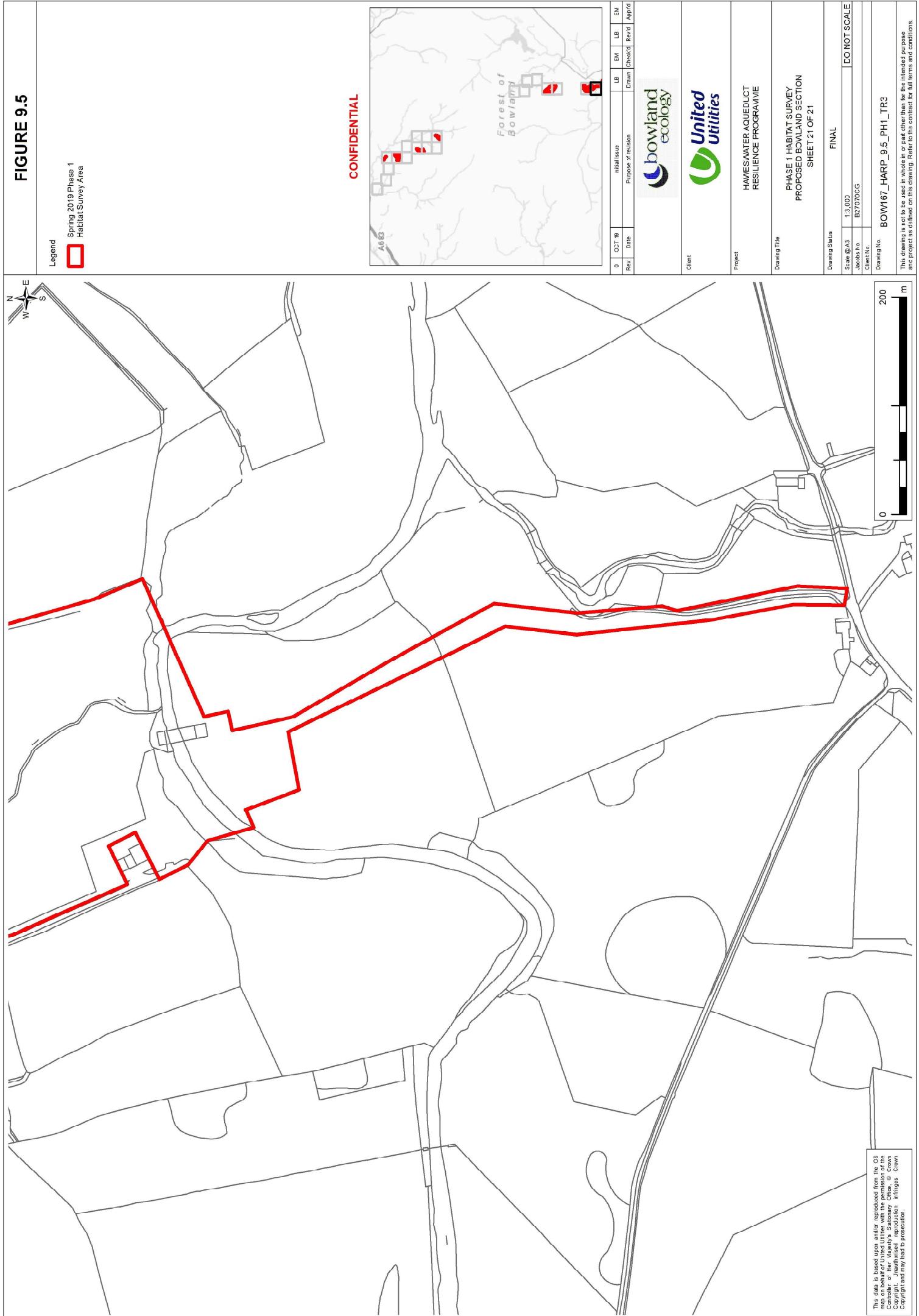
This drawing is not to be used in whole or in part other than for the intended purpose and procedure as claimed on the drawing. Refer to the Contract for full terms and conditions.

A detailed Ordnance Survey map showing a red line route starting from the bottom left corner and ending at a point near the top center. The map includes a compass rose in the top left corner indicating North, South, East, and West. In the top right corner, there is a scale bar with markings for 0, 200, and 400 meters. The map features a grid system with numerous roads, paths, and geographical features. Several buildings are represented by small rectangles with internal details. A prominent red line starts at the bottom left, curves upwards and to the right, then follows a road segment before continuing diagonally upwards towards the center of the map.

This data is based upon and/or reproduced from the Ordnance Survey's National Grid and the Ordnance Survey One-Colour 1:25000 Series. © Crown Copyright. Unauthorised reproduction infringes copyright and may lead to prosecution.

**FIGURE 9.5**



**FIGURE 9.5**

## 10. Cultural Heritage

### 10.1 Overview

356) This chapter presents the outcome of the scoping exercise in relation to potential cultural heritage effects. In this context, cultural heritage includes:

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

357) The historic environment covers all aspects of the environment resulting from the interaction between people and places through time. This includes all surviving physical remains of past human activity and the changes that humans have had on the environment. Development proposals have the potential to have a physical effect on heritage assets during construction and operation. They can also change how a heritage asset is perceived.

358) All heritage assets including buried remains have a setting, which is defined as the surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve (NPPF 2019, Annex 2 Glossary). Where a setting contributes to the value of a heritage asset this can be affected by impacts on the setting during construction and operation.

359) In this chapter, the cultural heritage baseline of the assessment area is summarised, and an initial indication of the potentially significant cultural heritage effects is provided. The scope of the cultural heritage impact assessment for the EIA and the technical methodology are described.

360) The Design Manual for Roads and Bridges, DMRB HA 208/07 Cultural Heritage (Highways Agency 2007) (hereafter DMRB) sets out a methodology for assessing value of heritage assets and the significance of effects of a proposed development. This recognised methodology will inform the assessment of effect and the scoping in or out of historic environment aspects.

### 10.2 Proposed Methodology

361) The assessment will be undertaken using professional judgement, guided by DMRB HA 208/07 Cultural Heritage (Highways Agency 2007).

362) The following activities were undertaken in the scoping assessment:

- An assessment of locally listed heritage assets, where available
- An assessment of the value of designated heritage assets
- An assessment of mitigation measures included in the Programme of Works.

363) During the EIA, the following activities will be undertaken:

- Walkover survey
- Settings assessment
- Some evaluation may be undertaken, such as geophysical survey and / or archaeological trial trenching.

364) The extents of the zone of visual influence (ZVI) will form the boundaries of the assessment area for designated assets. Professional judgement will be used to determine which designated assets are likely to be affected by temporary impacts on setting due to potential visual and noise intrusion. The assessment area will include the full extent of any neighbouring features of special value to reflect the setting of those features.

- 365) In establishing the existing conditions, the assessment will include description and value assessment of existing heritage assets in the assessment area. This will draw on available information already gathered and considered during scoping, but will be supplemented with further study in the field to validate the preliminary findings.
- 366) The assessment of setting will be conducted in general accordance with the following guidance: *Conservation Principles* (English Heritage 2008) and *Good Practice Advice Note 3: The Setting of Heritage Assets* (Historic England 2017).
- 367) Information from National Planning Policy Framework (NPPF) and DMRB, together with Historic England guidance, will be used as a basis for the heritage value and effect assessment.
- 368) The identification of impacts and effects will consider potential physical and settings effects on heritage assets.
- 369) The assessment of likely significant effects will take account of mitigation proposals developed as an integral part of the overall scheme design.
- 370) Mitigation measures which have been included in the project design will be considered in relation to the effects of the Proposed Bowland Section on heritage assets.

### 10.3 Proposed Assessment Criteria

- 371) The results of any investigation(s) will inform the assessment of archaeological value and significance of effects. The results will also assist the formulation of any further evaluation and / or mitigation measures. Any proposed evaluation and subsequent mitigation will be designed with reference to the research aims contained in the *Archaeological Research Framework for North West England* (Brennand, Chitty and Nevell (Eds), 2007).
- 372) The NPPF defines significance as '*the value of a heritage asset to this and future generations because of its heritage interest*'. This significance may be related to '*archaeological, architectural and artistic or historic elements, and may also derive from the setting of the site*' (DCLG 2019, Annex 2).
- 373) The significance of heritage assets will be assessed on a six point scale of Very High, High, Medium, Low, Negligible and Unknown as set out below in Tables 10.1 and 10.2 for archaeological remains and historic buildings. A five point scale will be used to assess historic landscape types set out in Table 10.3. All assessment will be moderated by professional judgement and informed by guidance contained in DMRB.

**Table 10.1: Criteria to Assess the Value of Archaeological Remains**

Value	Criteria
Very High	<ul style="list-style-type: none"> <li>• World Heritage Sites (including nominated sites)</li> <li>• Assets of acknowledged international importance</li> <li>• Assets that can contribute significantly to acknowledged international research objectives.</li> </ul>
High	<ul style="list-style-type: none"> <li>• Scheduled Monuments (including proposed sites)</li> <li>• Undesignated assets of schedulable quality and importance</li> <li>• Assets that can contribute significantly to acknowledged national research objectives.</li> </ul>
Medium	<ul style="list-style-type: none"> <li>• Designated or undesignated assets that contribute to regional research objectives.</li> </ul>
Low	<ul style="list-style-type: none"> <li>• Designated and undesignated assets of local importance</li> <li>• Assets compromised by poor preservation and / or poor survival of contextual associations</li> <li>• Assets of limited value, but with potential to contribute to local research objectives</li> </ul>
Negligible	<ul style="list-style-type: none"> <li>• Assets with very little or no surviving archaeological interest.</li> </ul>
Unknown	<ul style="list-style-type: none"> <li>• The importance of the resource has not been ascertained.</li> </ul>

**Table 10.2: Criteria to Assess the Value of Historic Buildings**

Value	Criteria
Very High	<ul style="list-style-type: none"> <li>• Structures inscribed as of universal importance as World Heritage Sites</li> <li>• Other buildings of recognised international importance.</li> </ul>
High	<ul style="list-style-type: none"> <li>• Scheduled Monuments with standing remains</li> <li>• Grade I and Grade II* Listed Buildings</li> <li>• Other listed buildings that can be shown to have exceptional qualities in their fabric or historical associations not adequately reflected in the listing grade</li> <li>• Conservation Areas containing very important buildings</li> <li>• Undesignated structures of clear national importance.</li> </ul>
Medium	<ul style="list-style-type: none"> <li>• Grade II Listed Buildings</li> <li>• Historic (unlisted) buildings that can be shown to have exceptional qualities in their fabric or historical associations</li> <li>• Conservation Areas containing buildings that contribute significantly to its historic character</li> <li>• Historic Townscape or built-up areas with important historic integrity in their buildings, or built settings (e.g. including street furniture and other structures).</li> </ul>
Low	<ul style="list-style-type: none"> <li>• 'Locally Listed' buildings</li> <li>• Historic (unlisted) buildings of modest quality in their fabric or historical association</li> <li>• Historic Townscape or built-up areas of limited historic integrity in their buildings, or built settings (e.g. including street furniture and other structures).</li> </ul>
Negligible	<ul style="list-style-type: none"> <li>• Buildings of no architectural or historical note; buildings of an intrusive character.</li> </ul>
Unknown	<ul style="list-style-type: none"> <li>• Buildings with some hidden (i.e. inaccessible) potential for historic significance.</li> </ul>

**Table 10.3: Criteria to Assess the Value of Historic Landscape Types**

Value	Criteria
Very High	<ul style="list-style-type: none"> <li>• World Heritage Sites inscribed for their historic landscape qualities</li> <li>• Historic landscapes of international value, whether designated or not</li> <li>• Extremely well preserved historic landscapes with exceptional coherence, time-depth, or other critical factor(s).</li> </ul>
High	<ul style="list-style-type: none"> <li>• Designated historic landscapes of outstanding interest</li> <li>• Undesignated landscapes of outstanding interest</li> <li>• Undesignated landscapes of high quality and importance, and of demonstrable national value</li> <li>• Well preserved historic landscapes, exhibiting considerable coherence, time-depth or other critical factor(s).</li> </ul>
Medium	<ul style="list-style-type: none"> <li>• Designated special historic landscapes</li> <li>• Undesignated historic landscapes that would justify special historic landscape designation, landscapes of regional value</li> <li>• Averagely well-preserved historic landscapes with reasonable coherence, time-depth or other critical factor(s).</li> </ul>
Low	<ul style="list-style-type: none"> <li>• Robust undesignated historic landscapes</li> <li>• Historic landscapes with importance to local interest groups</li> </ul>

Value	Criteria
	<ul style="list-style-type: none"> <li>Historic landscapes whose value is limited by poor preservation and / or poor survival of contextual associations.</li> </ul>
Negligible	<ul style="list-style-type: none"> <li>Landscapes with little or no significant historical interest.</li> </ul>

## 10.4 Existing Conditions

### 10.4.1 Assessment area

374) The assessment will initially consider an assessment area that includes the locations of Construction Areas A to E and the area between these construction areas and associated temporary works such as haulage routes and access roads. The tunnelling will be deep below the current ground level and there are no physical impacts predicted by the tunnelling. Construction machinery, particularly gantry cranes, could be highly visible in the landscape for some distance and may temporality impact on the setting of heritage assets. Construction traffic may cause increased noise and visual intrusion through historic locations, such as Conservation Areas outside the indicative development envelopes. The cultural heritage assessment area for the scoping stage is shown in Figure 10.1. This assessment area for the ES will be defined through the assessment process based upon desk-study data and field survey verification and will be refined throughout the design development.

375) For the purposes of the scoping study, a 1 km assessment area beyond the Proposed Bowland Section was used for designated assets. The archaeological landscape around the development envelopes was used for archaeological remains.

### 10.4.2 Information Sources

376) The following desk-based sources have been used to inform this scoping chapter:

- National Heritage List for England (NHLE) List for information on nationally designated heritage assets (World Heritage Sites, Scheduled Monuments, Listed Buildings, Registered Battlefields, and sites included on the Register of Historic Parks and Gardens);
- The Lancashire Historic Environment Record.

### 10.4.3 Archaeological Remains

377) There are no designated archaeological remains within the 1 km assessment area for the Proposed Bowland Section. The archaeological landscape within the assessment area is a mainly post medieval landscape with earlier Roman roads. The post medieval sites include barns (PRN16313, PRN27276, PRN37930, PRN13070), bridges (PRN12757, PRN12593), lime kilns (PRN13255, PRN34857) and a number of farmsteads and limestone quarries. Accrington contains a cemetery (PRN22535), Peel Park (PRN37776) and the New High Riley Farm and Spire Farm (PRN39613). There is also a medieval cross base (PRN289) which is on the boundary between Tatham and Easington, formerly the Lancashire-Yorkshire boundary. The known line of Roman roads include the Roman Road (Non-Magary) Shooters Clough to Hornby (PRN26150), the Roman Road 7c-Ribchester to Tebay (Low Borrowbridge (PRN26148) and the Roman Road between Low Fell and Botton Head Fell, Forest of Bowland (PRN23814) with a number of recorded culverts. The assets are of medium to negligible value.

378) There is the potential for previously unknown archaeological remains to be present.

### 10.4.4 Historic Buildings

379) There are 35 historic building assets in the 1 km assessment area for the Proposed Bowland Section, they comprise 35 designated assets, all grade II or II\* listed buildings shown in Table 10.4.

380) One of the designated historic buildings is a grade II\* listed building of high value, Newton Hall (Asset 1072246). The remaining 34 historic buildings are grade II listed buildings of medium value (see table 5.1 for asset numbers). The 29 historic buildings of medium value comprise 14 18th century houses (Assets 1071556, 1071572, 1071589, 1072247, 1072248, 1072249, 1072253, 1163405, 1163458, 1163535, 1165124, 1165157, 1317767, 1362272), five 17th century houses (Assets 1072252, 1072254, 1318036,