



THE
ENVIRONMENT
PARTNERSHIP



**PORT WARRINGTON AND WARRINGTON
COMMERCIAL PARK
MOORE, WARRINGTON
ECOLOGICAL ASSESSMENT**



Document Title	Ecological Assessment
Prepared for	Peel Land and Property Ltd
Prepared by	TEP - Warrington
Document Ref	6929.01.001

Author	IH
Date	October 2019
Checked	ACP
Approved	ACP

Amendment History					
Version	Date	Modified by	Check / Approved by	Reason(s) issue	Status
2.0	10/2018	IH	ACP	Update to final version including habitat info	superseded
3.0	09/2019	IH	ACP	Update following additional survey	superseded
4.0	10/2019	IH	ACP	Updates following client feedback	For issue

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1.0 Executive Summary

- 1.1 TEP has undertaken ecological surveys across an area of land in Warrington lying between the village of Moor to the south and Great Sankey to the north. The area surveyed is made up of Moore Nature Reserve, the former Arpley Landfill site and a strip of unmanaged grassland.
- 1.2 These surveys are to support redevelopment of this land to create a new port facility (Port Warrington) and Commercial Park (Warrington Commercial Park). Development will be undertaken on approximately fifty percent of Moore Nature Reserve (~37ha) and on approximately twenty percent (~30ha) of land associated with the former Arpley Landfill site. The remainder of the site will be subject to significant enhancement to improve biodiversity and provide recreation for the local community, resulting in the enhancement of the retained area of Moore Nature Reserve and creation of Arpley Country Park.
- 1.3 Based upon the findings of the surveys carried out to date, there is no overriding ecological reason that sustainable development of this site cannot be undertaken.
- 1.4 A variety of ecological surveys have been undertaken across 2018 and 2019 in order to assess the potential for expansion of existing port operations and the suitability of the site for removal from the greenbelt as part of the Warrington Local Plan review.
- 1.5 The surveys have also been designed to inform the suitability of the creation of Arpley Country Park and to inform what mitigation and enhancement measures can be undertaken within the country park and on the retained area of Moore Nature Reserve. Detailed designs are not currently available, however indicative site proposals have been provided (See Appendix A).
- 1.6 The proposed development site incorporates approximately 37ha of Moore Nature Reserve, composed of a mosaic of habitats including wetlands, woodland, grassland and reedbeds. An area of unmanaged grassland totalling 7ha is also to be developed along with 30ha of land in the north west of site made up of scrub, grassland, trees and tall ruderal vegetation.
- 1.7 A Construction Environmental Management Plan (CEMP) for construction and an Environmental Management Plan (EMP) during operation will be required to ensure there are no pollution impacts on protected sites in close proximity to the development including River Mersey SPA/Ramsar site, Oxmoor Wood LNR, Dorchester Park LNR, Moss Side Farm LWS, Upper Mersey Estuary LWS, Norton Marsh and Upper Moss Side Farm LWS, Gatewarth LWS and Manor Park Woodland LWS sites. Prior to submittal of a planning application.
- 1.8 Up to 37ha of Moore Nature Reserve will be lost to development. A biodiversity offsetting assessment is being undertaken by TEP to ensure that there is a net gain in biodiversity. The results of this are to be presented within a separate report. All recommendations made in this report will be adhered to in order to ensure there is no net loss of replaceable habitats.

- 1.9 Based on the results of the Phase 1 Habitat Survey and National Vegetation Classification (NVC) surveys the following floristic surveys will be undertaken to inform a planning application:
- A full aquatic flora survey of any waterbodies to be affected by development; and
 - Site specific survey for both protected bluebell and invasive non-native species.
- 1.10 Based on the results of the above surveys, mitigation measures may be required which include:
- Bluebell protection and translocation strategy; and
 - Invasive species method statement
- 1.11 In addition to the above detailed mitigation plans will need to be produced for the habitats to be lost, including long-term management plans. Management plans for retained habitats should also be produced to ensure that their biodiversity value is maintained and enhanced. Details of how retained habitats adjacent to the development will be protected during clearance and construction works should be provided within the Construction Environmental Management Plan (CEMP).
- 1.12 An initial assessment of the trees on site for their suitability to support roosting bats has been undertaken and identified a significant number of trees with high, moderate and low potential to support roosting bats. Prior to development further survey of the trees with bat roosting potential and bat activity surveys will be undertaken to identify the potential impact on bats and enable appropriate mitigation/licencing. The proposed country park will in the future, through the creation of large blocks of new woodland planting, result in significant enhancement of bat foraging and commuting opportunities.
- 1.13 Both breeding and wintering bird surveys have been undertaken across the proposed development areas and retained Moore Nature Reserve. The breeding bird surveys identified the site as being regionally significant for breeding birds. Three birds listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) were assessed as confirmed or probable breeding species within the proposed site boundary, these are kingfisher, little ringed plover and Cetti's warbler. A number of notable species were also identified on site.
- 1.14 The 2018/2019 winter bird survey results indicate that the proposed development site and surrounding area is used by only one species of conservation concern associated with Mersey Estuary Ramsar/SPA (Teal) but is used by a range of water birds listed as assemblage species associated with Mersey Estuary SPA, including Curlew, lapwing, shelduck, wigeon and great crested grebe. Species specific mitigation strategies will be required to support development of this site.
- 1.15 The proposed Arpley Country Park will offer mitigation for nesting and foraging birds, however a specific mitigation strategy will need to be enacted to avoid harm to schedule 1 species during development.

- 1.16 Water vole surveys undertaken to date have not found any evidence of water vole on site, however a further survey is to be undertaken in mid-September, following which this report will be updated.
- 1.17 No evidence of otter was found during the site survey undertaken by TEP but survey undertaken in support of a new link road found evidence of otter. A Reasonable Avoidance Method Statement (RAMS) will be required to ensure there is no harm to otter during development.
- 1.18 The site contains habitat which is suitable for a wide range of fauna. Once fixed development plans are available and the extent of habitats to be lost or affected is known, the following surveys will be undertaken prior to submittal of a planning application:
- Great crested newt and toad surveys;
 - Scoping survey for invertebrates;
 - Scoping survey for fish;
 - Scoping survey for reptiles;
 - Badger survey; and
 - Red squirrel survey.
- 1.19 These surveys will ensure that the loss of habitat which supports these species and any licences or mitigation required can be identified and appropriate mitigation included within the proposed enhancement areas.
- 1.20 In addition to the replacement of lost habitats via biodiversity offsetting additional mitigation measures which may be required include:
- Bat licence and mitigation for loss of bat roosts;
 - Avoidance of site clearance during the nesting bird season;
 - GCN licence and mitigation scheme;
 - Badger licence and mitigation scheme;
 - Water vole licence and mitigation scheme; and
 - Mitigation schemes for invertebrates, fish, reptiles, red squirrel, polecat, hedgehog or brown hare.

2.0 Introduction

- 2.1 TEP was commissioned by Peel Land and Property Ltd initially in March 2018 to carry out ecological survey and assessment across an area of land in Warrington lying between the village of Moore to the south and Great Sankey to the north.
- 2.2 The proposed location of development, referred to as the **developable area** in this report, comprises three main components, these are detailed below and shown in Figure 1:
- 1:** A strip of undeveloped greenspace at the southern boundary of site;
- 2:** 37ha of Moore Nature Reserve (to the north of the existing Port Warrington), a Nature Reserve established in 1991 on the site of former farmland and sand extraction sites. This is made up of a mosaic of wetlands, woodland and open grassland habitats; and
- 3:** A section of Arpley Meadows Landfill, to the north east of Moore Nature Reserve which is to be developed as a new commercial park covering approximately 30ha. This has been an active landfill site since 1988, however landfill operations ceased in October 2018, following which the site is currently being remediated.
- 2.3 The area where ecological surveys have been undertaken, referred to as the **survey area** in this report, comprises the developable area, along with the retained section of Moore Nature Reserve and undeveloped area of the former Arpley Landfill site; the latter two covering approximately 180ha which will be subject to significant improvements.
- 2.4 Within this report Moore Nature Reserve refers to the nature reserve which is actively managed by FCC. Moore Nature reserve sits within the wider Moore Nature Reserve Local Wildlife Site.
- 2.5 Within the developable area, proposals comprise the construction of a new port facility (Port Warrington) and a mixed use development (Warrington Commercial Park). Fixed development proposals are not currently available, however the illustrative masterplan (Ref: B10173-AEW-XX-XX-DR-A-0112_P3_Proposed Illustrative Masterplan) is shown in Appendix A.
- 2.6 This report assesses the suitability of land for future development, the suitability of the site for removal from the greenbelt and informs the evolving Warrington Local Plan Strategy.
- 2.7 Although the existing Port Warrington site is discussed in this report, this is for context only. It has not been subject to any specific detailed survey as it is already an active port site which is subject to its own obligations. It is currently assumed that this area will be redeveloped in line with the new port and will be subject to any required surveys at the detailed planning stage.
- 2.8 An arboricultural walkover survey and desktop report (TEP Ref: 7815.001) has also been produced and should be read in conjunction with this report.
- 2.9 This ecological assessment has been informed by the following surveys;

- Desk study;
- Extended Phase 1 habitat survey;
- National Vegetation Classification (NVC) survey;
- Preliminary bat roost assessment and desktop study;
- Water vole and otter survey; and
- Breeding and wintering bird survey.

2.10 The objectives of this assessment are to:

- Describe the existing vegetation and give an overview of the habitats present;
- Identify any features of conservation value such as designated sites and protected or notable habitats and species within the site or the wider zone of influence;
- Advise on further survey or mitigation requirements that may be needed to inform the evolving proposal; and
- Outline opportunities for biodiversity enhancement in line with the requirements of the National Planning Policy Framework.

3.0 Site Overview

- 3.1 The site is located within the borough of Warrington with a central grid reference of SJ 58401 86246 (Figure 1). The site is immediately bounded to the north by the River Mersey and residential and industrial development associated with the towns of Penketh and Great Sankey. To the east lies arable land and the west coast mainline rail route with industrial and residential development associated with the town of Latchford. To the west lies extensive farmland and the River Mersey estuary and to the south the site is immediately bordered by the Manchester Ship Canal with the village of Moore present on the opposite bank.
- 3.2 Moore Nature Reserve is dominated by woodland with numerous waterbodies and areas of open grassland. The former Arpley Landfill site has been capped and remediated with new areas of woodland and grassland creation taking place following remediation. Remediation was still ongoing at the time of the surveys.

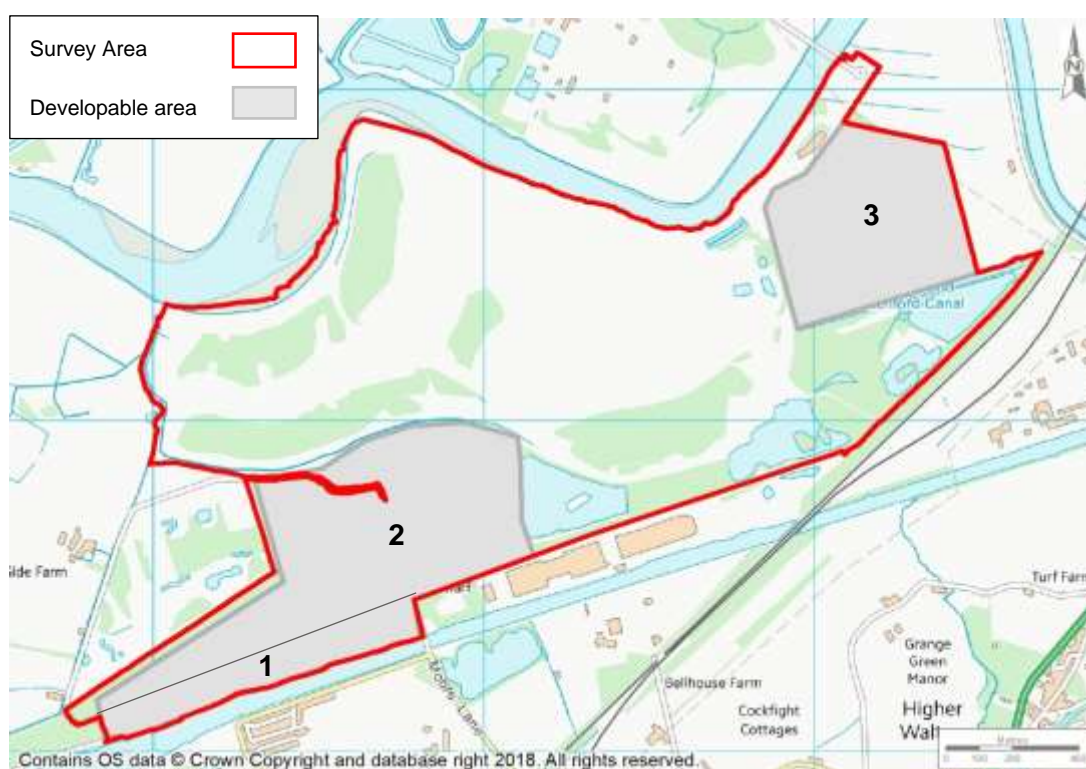


Figure 1 - Site Location Plan showing both the Survey Area and Developable Area (Contains Ordnance Survey data © Crown Copyright and Database Right 2018)

4.0 Methods

Desk Study

- 4.1 Information regarding designated sites, notable habitats and existing protected and notable species records of the past decade, within a 2km minimum radius of the site (distances as specified in table), were gathered from the sources listed in Table 1. Relevant policies from the local plan(s) relating to biodiversity were also identified (Table 1).

Table 1. Desk Study Information Sources

Source	Nature of Information
MAGIC Map ¹	Statutory protected sites and priority habitats to 2km from the site boundary, with international sites to 10km.
rECOrd Environmental Records Centre	Local wildlife sites and citations, species records to 2km from the site.
Warrington Local Plan Core Strategy (21st July 2014)	Any planning policy allocations on the site. Relevant biodiversity policies, local wildlife site designations, wildlife corridors.
Cheshire Region Biodiversity Partnership - Local Biodiversity Action Plan	Local habitat and species action plans
Warrington Council	Copies of ecological reports produced to support the construction of the new Warrington Link Road.
British Trust for Ornithology (BTO)	Wetland Bird Survey (WeBS) Core Count Data

Limitations

- 4.2 Species records can provide a useful indication of the species present within the search area, although the absence of a given species from the dataset cannot be taken to represent actual absence.

¹ Multi-Agency Geographic Information for the Countryside - Searchable mapping website

Extended Phase 1 Habitat Survey

- 4.3 An extended Phase 1 Habitat survey was completed by suitably qualified ecologists across March and April 2018 and across May to August 2019 using the standard JNCC Phase 1 habitat assessment method (2010)². This method records the habitat types present in and immediately surrounding the site, based on the JNCC descriptions. Plant species are identified in accordance with Stace (2010)³ and recorded as target notes using the DAFOR⁴ scale.
- 4.4 The survey method was extended through the additional recording of specific features indicating the presence, or potential presence, of protected species or other species of nature conservation significance, including invasive species, with due consideration for current best practice guidance from CIEEM (CIEEM 2017⁵). Weather conditions during the survey varied from wet and cold to hot and dry across the survey period.

Limitations

- 4.5 Part of the 2018 site survey was undertaken outside the optimum season for Phase 1 habitat survey which runs from April to mid-October inclusive, however, the surveys undertaken across the site in 2019 were undertaken within the optimal survey season and hence this is not a limitation. .
- 4.6 It was not possible to access large sections of woodland, either due to the dense nature of the trees or the presence of waterbodies and unstable ground which made accessing the areas hazardous. This is a constraint to the report and has been taken into account in Section 7.0: Recommendations.

National Vegetation Classification

- 4.7 Areas identified during the extended Phase 1 Habitat survey undertaken by TEP as semi-natural broad-leaved woodland or grassland habitat were subject to detailed survey. Each area was walked over by an experienced botanist (MCIEEM, FISC level 5) during May - July 2019, to make a provisional assessment of the boundaries of different vegetation types (as defined by the National Vegetation Classification system (Rodwell, 1991-2000 and 2006).
- 4.8 Vegetation was then sampled using quadrats according to standard NVC methodology (Rodwell, 2006). Each quadrat was recorded in the field by listing all plants within it along with the abundance of each species and the percentage cover of any bare ground or leaf litter using the Domin scale of abundance. Sufficient quadrats were recorded so as to include all community types occurring within each surveyed area and to allow a robust statistical analysis of the data.

² JNCC (2010) Handbook for Phase 1 Habitat Survey: A technique for environmental audit. Joint Nature Conservation Committee, Peterborough

³ Stace, C. (2010) New Flora of the British Isles. 3rd Ed. Cambridge University Press

⁴ DAFOR = Dominant, Abundant, Frequent, Occasional & Rare

⁵ CIEEM (2017) Guidelines for Preliminary Ecological Appraisal, 2nd Edition. Chartered Institute of Ecology & Environmental Management

- 4.9 The positions of quadrats in open habitats were recorded using a hand-held GPS (Global Positioning System) with an accuracy of approximately 3m. This facilitates presentation of mapping and vegetation data in GIS format as well as traditional paper maps and reports.
- 4.10 Optimal survey times vary depending on the habitat being surveyed. Woodland is best surveyed in the spring when ground flora is present.
- 4.11 Quadrat data was analysed using the computer program TABLEFIT Version 1 (Hill, 1996) to establish the “goodness of fit” to the NVC community types. The output results from TABLEFIT analysis of the quadrats has been analysed by experienced botanist Lynsey Crellin to assess which vegetation types, as defined by the NVC, are represented across the surveyed areas

Limitations

- 4.12 The NVC surveys were undertaken during the optimum period for each habitat type. There were no limitations to these surveys.

Bats

- 4.13 A preliminary roost assessment (PRA) of trees within the survey was undertaken to determine the suitability of trees within the site to provide roosting habitat for bats and to obtain provisional information regarding the bat roosting resources that would be impacted by proposals for the site.
- 4.14 There is extensive tree cover within the site, a small proportion of which includes individual trees within areas of dense/continuous scrub or grassland, while the majority comprises woodlands including semi-natural broad-leaved woodland, stands of broad-leaved regeneration, broad-leaved plantation woodland and wet semi-natural broad-leaved woodland. The woodlands surveyed are not to be retained within proposals.
- 4.15 Numerous trees within the site required PRA survey, and in addition to the density of woodland areas, it was not considered appropriate to individually identify trees within the site determined as having ‘Negligible’ roost habitat suitability with regard to bats.
- 4.16 Due to the inaccessibility of some areas of woodland within the site and the number of trees requiring PRA survey, surveyed woodland areas were also categorised in terms of risk according to likely presence of trees with bat roost habitat suitability. Risk areas were determined based on the age and quality of the woodlands and the likely presence of trees with disease, damage or decay and the Potential Roost Features (PRFs) associated with these characteristics. Risk areas were categorised as negligible, low, moderate or high depending on the likely presence of trees with similar bat roost habitat suitability categorisation.
- 4.17 The PRA was undertaken by a licensed bat consultant on 9th and 15th May and 15th and 16th August 2019.
- 4.18 Close focusing binoculars were used, where appropriate, to search for any field signs of bats or features with bat roosting potential. Most tree roosts are created by one or a combination of the following features:

- old woodpecker holes;
- splits in trunk, bough or large branches;
- rot holes in trunk, bough or large branches;
- holes formed by two boughs or branches growing in contact;
- loose or lifting bark; and
- underneath a covering of dense latticed creeper, usually ivy *Hedera helix*.

4.19 Trees were categorised with reference to the Bat Conservation Trust (BCT) Good Practice Guidelines (Collins, 2016) (see Table 1 below).

Table 2. Bat roost habitat suitability categorisation descriptions and descriptions for categorisation of habitat suitability with regard to commuting and foraging bats.

Roosting Habitats	Commuting/Foraging Habitats
Negligible Suitability	
Negligible potential roost features are present that are likely to be used by bats.	Negligible features on site likely to be used by commuting or foraging bats. A general lack of linear features and low habitat, structural or floristic diversity.
Low Suitability	
<p>A tree of sufficient size and age to contain potential roost features but with none seen from the ground or features seen with only very limited roosting potential.</p> <p>A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).</p>	Habitat that could be used by small numbers of commuting bats (e.g. a gappy hedgerow or an un-vegetated stream) or foraging bats (e.g. a lone tree or small patch of scrub) but which is isolated from the surrounding countryside.
Moderate Suitability	
A structure or tree with one or more potential roost features that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat, but which is unlikely to support a roost of high conservation status (maternity or hibernation).	Continuous habitat connected to the wider landscape that could be used by bats for commuting (e.g. lines of trees or scrub or linked back gardens), or foraging bats (e.g. trees, scrub, water, grassland).
High Suitability	

Roosting Habitats	Commuting/Foraging Habitats
<p>A structure or tree possessing one or more potential roost features that are suitable for use by larger numbers of bats on a regular basis and potentially for longer periods of time, due to their size, shelter, protection, conditions and surrounding habitat.</p>	<p>Continuous high quality habitat that is strongly connected with the wider landscape that is likely to be used regularly by commuting bats (e.g. river valley, vegetated stream, woodland edge, hedgerows with trees) or foraging bats (e.g. broadleaved woodland, grazed parkland, tree-lined watercourses or ponds).</p>

Limitations

- 4.20 The PRA was undertaken during suitable weather conditions on 8th and 15th May and 15th August in good light and dry weather.
- 4.21 During PRA survey on 16th August 2019 the weather conditions provided good light but it rained during the majority of the survey. Poor light can cause PRFs to be missed and rain reduces the chances of viewing any staining and can make identification of PRFs more difficult. The constraint was overcome as where rain affected visibility of PRFs, a precautionary approach to determining bat roost habitat suitability categorisation was taken. Notes were included where visibility may have been affected by poor weather conditions for reference during any future updated PRA of trees within the site. However, in the majority of instances where PRFs could not be fully viewed during the PRA this was a result of the restriction in visibility viewing trees from ground-level due to the size and age of the trees, as well as the foliage present.
- 4.22 Optimal conditions for PRA of trees are often when trees are not in leaf, thus allowing optimal visibility of PRFs. The optimum survey window, according to the BCT 2016 Guidelines (Collins), is between December and March (inclusive). As the PRA of trees was carried out in May and August, this is considered within the sub-optimal season for survey. However, this constraint was overcome as where foliage was still present, a precautionary approach to determining bat roost habitat suitability categorisation was taken and notes included for reference during future updated PRA of trees within the site.
- 4.23 Due to the number of trees requiring survey and the inaccessible nature of some areas due to dense scrub or waterlogging and silty sediment, it was not possible to survey all trees within the site for bat roost habitat suitability. This PRA is aimed at providing baseline data for use during future updated PRA of trees within the site and further surveys will also be undertaken where constraints were identified.

Badger

- 4.24 A full inspection for evidence of badger was not undertaken, however incidental records of badger were noted during the extended Phase 1 habitat survey. Evidence of badger occupation and activity included:

- Setts: including earth mounds, evidence of bedding and runways between setts;
- Latrines: often located close to setts, at territory boundaries or adjacent to favoured feeding areas;
- Prints and paths or trackways;
- Hairs caught on rough wood or fencing;
- Other evidence: including snuffle holes, feeding and playing areas and scratching posts.

Limitations

- 4.25 Large areas of woodland contained dense tree and scrub cover which prevented full access. Therefore, absence of badger within these areas cannot be confirmed. This limitation is discussed in Section 7.0: Recommendations.

Otter

- 4.26 Surveys broadly followed the approach used in the national otter survey except that survey locations targeted stretches of watercourse due to be directly impacted by proposals and up to 200m up and down stream.
- 4.27 Surveyors examined the targeted aquatic habitats by walking along the bank and along the water's edge using binoculars and/or hand searching as appropriate for evidence of otter activity including holts, couches, spraints, feeding remains, runs and footprints.
- 4.28 The otter surveys were undertaken alongside the water vole surveys.

Limitations

- 4.29 Due to the nature of the River Mersey and the highly dangerous mudflats at its edge, direct survey of this habitat was not undertaken, however the edge was viewed from surrounding habitat with binoculars where possible to look for evidence of otter such as footprints.

Water vole

- 4.30 The standard methodology as outlined within the latest guidance by Dean *et al.* (2016)⁶ was followed to complete a thorough search for evidence which would indicate the presence of water vole both on the site and locally. Surveyors examined the targeted aquatic habitats by walking along the bank and along the water's edge using binoculars and/or hand searching as appropriate for evidence of water vole activity including burrows, grazed lawns, latrines & droppings, feeding remains, runs and footprints.
- 4.31 The survey included any ditch due to be directly impacted by proposals and up to 200m up and down stream (access dependent).

⁶ Dean, M., Strachan, R., Gow, D and Andrews, R. (2016) The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). The Mammal Society, London.

- 4.32 As per the current guidance, two surveys are required, one in mid-April to end June and another in July to end September. The surveys should be undertaken at least 2 months apart. The first survey visit was conducted by suitably qualified surveyors between the 17th and 21st June 2019 and the second survey was completed on the 12th September 2019.

Limitations

- 4.33 Due to the heavily overgrown or deep nature of some of the on-site waterbodies there were small sections of watercourse that could not be fully assessed for evidence of water vole. This limitation is discussed in Section 7.0: Recommendations.

Amphibians

Pond Scoping

- 4.34 Ponds present within the survey area were identified during the extended Phase 1 habitat survey. All ponds within 250m of the site boundary have been identified from aerial and OS mapping.

Habitat Suitability Index Assessment

- 4.35 Habitat suitability index (HSI) surveys were undertaken by TEP on 13th June 2019 by suitably qualified ecologists.
- 4.36 HSI is a standard measure of calculating the suitability of a pond to support breeding GCN, based on an assessment of ten characteristics (indices), including size, shading, depth and vegetation profile. The assessment generates a number between 0 and 1 for each of the indices, which are combined to provide an overall assessment of a pond's suitability to support GCN on a categorical scale (Table 3). The assessment has not been designed for or tested on other waterbodies such as ditches.

Table 3: Pond habitat suitability index scoring

HSI Score	Suitability	Predicted GCN Occupancy of Ponds in each Category
< 0.5	poor	3%
0.5 to 0.59	below average	20%
0.6 to 0.69	average	55%
0.7 to 0.79	good	79%
> 0.8	excellent	93%

Limitations

- 4.37 Large areas of woodland contained dense tree and scrub cover which prevented full access. Therefore, absence of ponds within these areas cannot be confirmed. This limitation is discussed in Section 7.0: Recommendations.

Breeding bird surveys

- 4.38 The breeding bird survey was carried out applying methods based on the Breeding Bird Survey (BBS) and Common Bird Census (CBC) methods developed by the British Trust for Ornithology (Gilbert et al. 1998). Weather was recorded during every survey and weather data is presented in the breeding bird survey appendix (Appendix B).
- 4.39 The survey visits were undertaken by suitably experienced surveyors, with each visit carried out in the morning period, starting at least half an hour after sunrise, using a pre-determined transect route to cover the entire site.
- 4.40 The survey dates for the breeding bird surveys are:
- Visit 1: 10th April 2019
 - Visit 2: 22nd to the 23rd April 2019
 - Visit 3: 15th to the 16th May 2019
 - Visit 4: 30th to the 31st May 2019
 - Visit 5: 20th June 2019
 - Visit 6: 26th to the 27th June 2019
 - Visit 7: 9th and 11th July 2019
- 4.41 Bird species and activity patterns were recorded and mapped using standard BTO symbology.
- 4.42 Bird species within the 100m surrounding the proposed site boundary were also recorded during the survey, as a proportion of the bird's foraging or nesting habitat is likely to be within the site.

Limitations

- 4.43 There were no limitations to this survey.

Winter bird surveys

- 4.44 The winter bird survey comprised five walked transect visits undertaken between January and March 2019. Weather was recorded during every survey and weather data is presented in the wintering bird survey appendix (Appendix C).
- 4.45 Survey dates were as follows:
- Visit 1: 30th January 2019
 - Visit 2: 7th February 2019
 - Visit 3: 26th February 2019
 - Visit 4: 11th March 2019
 - Visit 5: 26th March 2019
- 4.46 The transect route was walked throughout the survey area and land surrounding it (up to 500m away). During the transect survey the following bird groups were recorded directly onto the survey map, including details of their activity:
- All waders, wildfowl, raptors and other waterbird species;
 - Red (BRd) and Amber (BAm) List Birds of Conservation Concern (BoCC);

- Section 41 bird species listed on the Natural Environment and Rural Communities (NERC) Act 2006 (S41); and
- Schedule 1 bird species listed on the Wildlife and Countryside Act (1981) (WCA1).

Limitations

- 4.47 Due to the time of commission only half of the wintering bird survey season was covered. This limitation is discussed in Section 7.0: Recommendations.

5.0 Results

Planning Context

- 5.1 The site lies wholly on land within the boundary of Warrington Borough Council. Within the Warrington Local Plan Core Strategy (Adopted 21st July 2014) the site is subject to a number of allocations. The port area to the south of the site is allocated as 'Strategic Opportunity Port Warrington' whilst Moore Nature Reserve is allocated as 'Green Belt', 'Strategic Green Link' and as a 'Local Wildlife Site' and Arpley Landfill is allocated as 'Green Belt' and 'Strategic Green Link'.
- 5.2 Relevant extracts of local planning policy are provided in the desk study (Appendix D). The key policy relevant to this site is Policy QE 5 - Biodiversity and Geodiversity.

Designated Sites

- 5.3 Detailed maps of designated sites are included in the desk study (Appendix D).
- 5.4 Four internationally designated sites are located within 10km of the proposed development site. These are:
- Mersey Estuary Special Protection Area (SPA) and Ramsar site (5.9km south west). The Mersey Estuary SPA is designated as a wetland of international importance for the number and variety of bird species it supports. The Ramsar designation also identifies the site as containing a bird assemblage of international importance. These sites also comprise the Mersey Estuary Site of Special Scientific Interest (SSSI) which is designated for the presence of wildfowl and also for habitats including saltmarsh, intertidal sand and mudflats. The SPA/ Ramsar site has direct connectivity to the proposed development site along the River Mersey corridor.
 - Manchester Mosses Special Area of Conservation (SAC) (8.27km north east) which is designated for the presence of 'Degraded raised bogs still capable of natural regeneration'. This site also includes Risley Moss SSSI and Local Nature Reserve (LNR). Both are designated for the nationally important peat and open water sites within. This SAC lacks any direct connectivity to the proposed development site.
 - Rixton Clay Pits SAC (9.33km east) which is designated for its internationally important GCN population it is also designated as a SSSI and LNR for its population of GCN and also for its calcareous grasslands. This site lacks direct connectivity to the development site.
- 5.5 There are no nationally designated SSSIs within 2km of the proposed development site.
- 5.6 Two LNR's are located within 2km of the proposed development site as follows:
- Oxmoor Wood LNR (1.15km south west) is designated for its grassland, woodland, reedbeds, open water and tall herb communities. This LNR has direct connectivity to the proposed development site along the Manchester Ship Canal.

- Dorchester Park LNR (1.74km south west) is designated for its woodland and grassland habitat. This site has no direct connectivity to the proposed development site.

5.7 Twenty one non-statutory Local Wildlife Sites (LWS) are located within 2km of the proposed development site. Full details are provided in Appendix C with detailed citations gathered for those in closest proximity to the site. These are discussed below:

- Moore Nature Reserve LWS (within the site), designated for its woodland, grassland and reedbed habitats and for the bird species it contains. The citation also refers to a good invertebrate population, good variety of plant species and a large amphibian population.
- Moss Side Farm LWS (immediately adjacent to west of site), designated for its reedbeds and vascular plants and is noted for providing good habitat for farmland birds.
- Norton Marsh and Upper Moss Side LWS (85m west), designated for its grassland, fens, reedbeds, saltmarsh, vascular plants and bird species. The citation also refers to the presence of brown hare and cinnabar moth.
- Upper Mersey Estuary LWS (immediately adjacent to northwest of site) which is designated for its scrub, grassland, open water, coastland, saltmarsh and swamp habitats and is also important for estuarine birds.
- Gatewath LWS (170m north, beyond River Mersey). This is designated for its grassland, fens, swamps, bogs, reedbeds, birds and vascular plants. Specific mention is also made of brown hare, grasshopper warbler and breeding willow tit.
- Manor Park Woodland LWS (170m south beyond Manchester Ship Canal). This is designated for its wet woodland, acid grassland, fens, swamps, bogs and reedbed. The citation also refers to the ditches on site hosting numerous invertebrates.

5.8 SSSI Impact Risk Zones (IRZ) highlight the potential for effects on a SSSI if certain types of development are planned within a specified radius of it. The proposed development site lies within the SSSI IRZs for Woolston Eyes SSSI, Flood Brook Clough SSSI and Mersey Estuary SSSI. The exact use of the development land is yet to be determined however it is likely to be used for port activities or warehousing, neither of which are listed under the SSSI IRZs. Discharge of water or liquid waste of more than 20m³ per day to ground or to surface water such as a beck or stream is however listed under all three SSSI IRZ's and dependant on the future site use, this threshold could be triggered.

Habitats and Flora

5.9 The desk study (Appendix D) identified the following notable habitats and flora within 2km of the proposed development site.

5.10 Notable habitats identified on the MAGIC Map dataset are as follows:

- Deciduous woodland: Scattered across Moore Nature Reserve within the site boundary, and directly adjacent to the south east boundary;
- Coastal Saltmarsh: Present along the northern site boundary; and

- Coastal and Floodplain Grazing Marsh: Located 150m south of the site boundary.

5.11 Records of the following flora were returned within the site:

Protected and notable species:

- Bluebell *Hyacinthoides non scripta*;
- Red hemp nettle *Galeopsis angustifolia*; and
- Freiberg's screw-moss *Tortula freibergii*.

Non-native invasive species:

- Giant hogweed *Heracleum mantegazzianum*;
- Japanese knotweed *Fallopia japonica*;
- Himalayan balsam *Impatiens glandulifera*;
- Giant rhubarb *Gunnera tinctoria*; and
- Rhododendron *Rhododendron ponticum*.

5.12 Records of the following flora were also returned within 2km of the site:

Protected and notable species:

- Juniper *Juniperus communis*;
- Black poplar *Populus nigra*;
- Cornflower *Centaurea cyanus*; and
- Ear lobed dog lichen *Peltigera lepidophora*.

Non-native invasive species:

- Water fern *Azolla filiculoides*;
- False acacia *Robinia pseudoacacia*;
- Japanese rose *Rosa rugosa*;
- Nuttall's waterweed *Elodea nuttallii*;
- Himalayan cotoneaster *Cotoneaster simonsii*;
- Small leaved cotoneaster *Cotoneaster microphyllus*; and
- Wall cotoneaster *Cotoneaster horizontalis*.

5.13 Full results of the Phase 1 habitat survey, which covers the entire survey area, are included in Appendix E, a summary of which is provided below.

5.14 The survey area predominantly comprises a mix of woodland habitats, including wet woodland, plantation broad-leaved woodland and semi-natural broad-leaved woodland, with five large lakes and numerous smaller water bodies, extensive areas of swamp and a number of grassland habitats.

5.15 Six habitats of principal importance as listed under Section 41 (S41) of the Natural Environment and Rural Communities Act 2006 are present within the developable area. These include wet woodland, lowland dry acid grassland, lowland mixed deciduous woodland, native hedgerows, reedbeds and possibly open water, depending on the presence of S41 species such as toad/great crested newts at these locations.

- 5.16 The findings of the woodland NVC survey (Appendix F) suggest that the woodland compartments surveyed have very little affinity with semi-natural woodland vegetation communities. This lack of affinity may be due to a range of factors, including the disturbed nature of the habitat (it is well used recreationally by the local community, including for dog walking) and the historic use of the surrounding land (predominantly shown as farmland in 1945 but subsequently used as a sand quarry and landfill site). It is likely that due to these changes the water table and possibly even soil chemistry (including nutrient levels) will have fluctuated and may have led to shifting woodland communities. In addition to this, Schedule 9 invasive plant species Himalayan balsam is present in varying abundances across many of the quadrats sampled and is likely to be affecting composition of the woodland as it is known to out-compete native species.
- 5.17 The lack of affinity to semi-natural vegetation communities should not be taken to mean that the woodland surveyed does not have intrinsic value. Historic imagery shows that woodland compartments 36, 44, 61 and 68 (See Appendix F) have been present for at least 74 years, and probably significantly longer than that. As noted in the Arboricultural Assessment (TEP Ref: 7815.001) these areas include excellent examples of wet woodland habitat, including veteran trees which are classed as an irreplaceable habitat under the National Planning Policy Framework (NPPF). It is expected that at least one veteran tree will be impacted by the development.
- 5.18 The grassland NVC findings (Appendix G) also indicate very poor goodness-of-fit to any semi-natural community type as defined by the NVC. However when the goodness-of-fit of individual quadrats was looked at, a number of the quadrats were found to have a much closer affinity for recognised NVC communities.
- 5.19 The low goodness of fit to any particular vegetation community is likely to be due to a range of factors. The variation between the quadrats within each parcel suggests patchy or mosaic habitats. In some cases this is due to spatial variations in stages of vegetation succession; most of the areas of grassland were scrubbiest around the margins. The encroachment of scrub is likely to be leading to deterioration of the grassland quality. Much of the site is heavily influenced by anthropogenic disturbance, certain areas are criss-crossed by paths and are subject to eutrophication from dog waste. As the site was previously a sand quarry, at least some of the parcels sampled may be relatively young habitats that have not yet stabilised into a particular vegetation community.
- 5.20 The protected plant species bluebell was identified in numerous locations across the site.
- 5.21 Invasive species identified include Himalayan balsam, Japanese knotweed, giant hogweed, variegated yellow archangel *Lamiastrum galeobdolon subsp. argentatum*, montbretia *Crocsmia x crocosmiiflora*, wall cotoneaster and New Zealand pygmy weed *Crassula helmsii*.

Connectivity with the Wider Landscape

- 5.22 The site has excellent connectivity to the wider area via the River Mersey to the north, the Manchester Ship Canal to the south and the West Coast Main Line to the east.

Fauna

Bats

- 5.23 Bat species recorded within 2km of the site include:
- Common pipistrelle *Pipistrellus pipistrellus*;
 - Soprano pipistrelle *Pipistrellus pygmaeus* ;
 - Pipistrelle species *Pipistrellus* sp.;
 - Brown long-eared *Plecotus auritus*;
 - Daubenton's *Myotis daubentonii* ;
 - Whiskered *Myotis mystacinus*;
 - Noctule *Nyctalus noctula*; and
 - Unknown bat species.
- 5.24 Numerous records of bat species exist within the site, these include:
- Noctule recorded at Arpley Tip and foraging within the grasslands and along Lapwing Lane at Moore Nature Reserve;
 - Common pipistrelle, soprano pipistrelle, pipistrelle species and Daubenton's recorded along Lapwing Lane and near Birchwood Pool in Moore Nature Reserve; and
 - Common pipistrelle, soprano pipistrelle, pipistrelle species, brown long-eared, Daubenton's, whiskered and noctule all recorded within Moore Nature Reserve, with some records associated with Moss Wood, Birch Wood and Pump House Pool.
- 5.25 Moore Nature Reserve contains numerous woodland blocks, scattered trees and scrub, hedgerows and large open water bodies which offer high foraging and commuting potential to bats. In addition, the wider site is bounded to the north by the River Mersey, to the south by the Manchester Ship Canal and to the east by the West Coast Main Line. All these features offer excellent connectivity to the wider area for bats.
- 5.26 The PRA of trees (TEP Ref: 6929.01.028, Appendix H) has been undertaken by TEP. This identified a total of 127 trees with potential to support roosting bats including:
- 29 trees have high roost suitability;
 - 71 trees have moderate roost suitability;
 - 16 trees have low roost suitability; and
 - 11 trees lacking natural PRFs but which have bat boxes installed.
- 5.27 The report also classified the areas of woodland with regard to their likely suitability to support roosting bats, ranging from those with negligible potential to areas of high risk containing mainly trees with 'High' bat roost habitat suitability
- 5.28 Three buildings were noted during the extended Phase 1 habitat survey. Two are small brick buildings containing power/pumping stations, the third is a large red brick building at the site entrance from Moore village which holds the bridge lifting mechanisms. All three buildings have been identified as having potential to support roosting bats.

- 5.29 The desktop records and variety of suitable habitat across the site indicate that the site has potential to support a rich assemblage of bat species, all of which are listed under the Local Biodiversity Action Plan (LBAP).

Badger

- 5.30 Records of badger *Meles meles* were returned both on site and within 2km.
- 5.31 No detailed survey has yet been carried out to establish the presence or absence of badger across the site, however during the course of the extended Phase 1 habitat, NVC and ground based bat surveys a total of six badger setts have been identified within the survey area, of which five are located within the developable area.
- 5.32 The habitats present across the site offer foraging and dispersal habitat for badgers and the banks and woodland blocks offer suitable sett building potential.

Otter

- 5.33 An otter survey of the land to be used during construction of a new link road between Warrington and the M56 motorway has been undertaken by Mott Macdonald for Warrington council (Report ref: 394760EN01) which covers a section of the River Mersey directly adjacent to the survey area covered in this report. This identified otter prints approximately 200m north of the proposed survey area in April 2018.
- 5.34 No other evidence of otter was found on site during detailed on site survey by TEP such as holts or couches or any evidence of feeding remains. It is likely that otters commute and forage along the Mersey corridor.

Water vole

- 5.35 Water vole *Arvicola amphibius* have been recorded both on site and within 2km. No records of otter *Lutra lutra* were returned on site but records were returned within 2km.
- 5.36 The water vole surveys undertaken across the development site found no evidence of water vole being present. A small number of vole feeding stations were identified during survey but are considered likely to be field vole due to the presence of field vole latrines.

Birds

- 5.37 The site's location on the River Mersey corridor and the presence of numerous bird watching hides on site, as well as the presence of extensive suitable habitat, means that a high number of bird records have been returned including birds with the following designations:
- Wildlife and Countryside Act 1981 (as amended), Schedule 1 (WCA1);
 - Wildlife and Countryside Act 1981 (as amended), Schedule 9 (WCA9);
 - Natural Environment and Rural Communities Act 2006, Schedule 41 (S41);
 - Birds of Conservation Concern Red (RBoCC) and Amber (ABoCC); and
 - Cheshire (Local) Biodiversity Action Plan (LBAP).

5.38 Due to the high number of bird records returned only those with the highest designation (WCA1) are described in further detail below. The remaining results are shown in Appendix D.

5.39 Records of the following WCA1 bird species were returned within the site:

- Merlin *Falco columbarius*;
- Black tailed godwit *Limosa limosa*;
- Cetti's warbler *Cettia cetti*;
- Bittern *Botaurus stellaris*;
- Hobby *Falco subbuteo*;
- Mediterranean gull *Larus melanocephalus*;
- Brambling *Fringilla montifringilla*;
- Garganey *Anas querquedula*;
- Goldeneye *Bucephala clangula*;
- Fieldfare *Turdus pilaris*;
- Barn owl *Tyto alba*;
- Little ringed plover *Charadrius dubius*;
- Greenshank *Tringa nebularia*;
- Green sandpiper *Tringa ochropus*;
- Kingfisher *Alcedo atthis*;
- Red kite *Milvus milvus*;
- Pintail *Anas acuta*;
- Peregrine *Falco peregrinus*;
- Redwing *Turdus iliacus*;
- Whooper swan *Cygnus cygnus*;
- Scaup *Aythya marila*; and
- Wood sandpiper *Tringa glareola*.

5.40 Records of the following WCA1 bird species were also returned within 2km of the site:

- Black tern *Chidonias niger*;
- Whimbrel *Numenius phaeopus*; and
- Osprey *Pandion haliaetus*.

5.41 Breeding and winter bird surveys have been undertaken across the developable area and also across the retained area of Moore Nature Reserve as species present in the retained nature reserve may also use the areas to be lost,

5.42 During the breeding bird surveys, the results of which are presented in Appendix B, a total of 88 bird species were recorded within the site boundary and 100m buffer during the breeding bird survey, with 85 bird species were recorded within the site itself. The site has been deemed to be of regional importance for breeding birds.

- 5.43 Thirty five bird species were confirmed to be breeding within the site boundary and 100m buffer. Of these the following are considered notable; black-headed gull (2 confirmed pairs), dunnoek (2 confirmed and 14 probable pairs), gadwall (2 confirmed and 9 probable pairs), kingfisher (1 confirmed pair), lapwing (2 confirmed and 3 probable pairs), lesser spotted woodpecker (1 confirmed pair), mallard (3 confirmed and 6 probable pairs), mute swan (1 confirmed and 1 probable pair), song thrush (1 confirmed and 15 probable pairs) and teal (1 confirmed and 2 probable pairs).
- 5.44 Thirty three probable breeding bird species were recorded within the site and 100m buffer during the breeding bird survey. Of these species the following are considered notable; bullfinch (7 probable pairs), Cetti's warbler (1 probable pair), cuckoo (1 probable pair), greylag goose (2 probable pairs), house sparrow (1 probable pair), kestrel (1 probable pair), linnet (1 probable pair), little ringed plover (1 probable pair), marsh tit (1 probable pair), mistle thrush (2 probable pairs), oystercatcher (1 probable pair), pochard (2 probable pairs), reed bunting (6 probable pairs), shelduck (2 probable pairs), starling (1 probable pairs), stock dove (2 probable pairs), willow tit (1 probable pair) and willow warbler (9 probable pairs).
- 5.45 Three bird species listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) were assessed as confirmed or probable breeding species within the proposed site boundary, these are kingfisher, little ringed plover and Cetti's warbler all of which usually nest close to water. A number of notable bird species associated with nesting in or close to wetland areas were assessed as confirmed or probable breeding species during the survey. These are black-headed gull, gadwall, lapwing, mallard, mute swan, teal, greylag goose, oystercatcher, pochard, reed bunting and shelduck that were observed using the waterbodies and land immediately adjacent to the waterbodies during the breeding bird survey.
- 5.46 Notable bird species associated with nesting in woodland and trees were also assessed as confirmed or probable breeding species at the site. One pair of lesser spotted woodpecker was confirmed to be breeding at the site, with an active nest noted within the semi-natural woodland in the north west of the site noted during survey visits two and three. One probable breeding pair of marsh tit and willow tit were also recorded during the breeding bird survey.
- 5.47 Other notable bird species that were confirmed or likely to have bred in trees and woodland areas including woodland edge include bullfinch, dunnoek, kestrel, song thrush, mistle thrush, stock dove and willow warbler.
- 5.48 The 2018/2019 winter bird survey results (detailed in Appendix C) indicate that the proposed development site and surrounding area is used by only one species of conservation concern associated with the Mersey Estuary Ramsar/SPA (teal) in relatively low numbers, representing less than 1% (115) of the 5-year peak mean (11,729) for the designated site.

- 5.49 The waterbodies associated with Moore Nature Reserve, are used by a range of water birds listed as assemblage species associated with Mersey Estuary SPA, including curlew, lapwing, shelduck and wigeon, albeit in relatively insignificant numbers. Great crested grebe recorded a peak of 15 individuals during the survey which equates to 11% of the assemblage qualifying population of the Mersey Estuary SPA. However, the latest WeBS count (2019) for this species was 48, which equates to 31% of the assemblage population.
- 5.50 Evidence from the WeBS data and from the winter bird survey suggests that these species are still found using the lakes and lagoons within the site. The lakes and lagoons are high value habitat for great crested grebe who will remain faithful to their breeding grounds. Kingfisher was also recorded within the survey area during the winter bird survey visits. The winter surveys also highlighted the use of the site and close environs by other passerine and winter migrant species, in particular bullfinch, Cetti's warbler, lesser spotted woodpecker, green woodpecker, redwing, willow tit and brambling.
- 5.51 The extensive lakes, reedbed habitat and wet woodland noted on site are rare in the local area and are likely to be of high value to local bird species for foraging and nesting. In addition the site is located directly adjacent to the River Mersey at the northern boundary and the Manchester Ship Canal at the southern boundary which provide excellent links to the wider area.

Reptiles

- 5.52 No desktop records of reptiles were returned on site. Only records of red-eared terrapin *Trachemys scripta*, an invasive species listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) were returned on site and within 2km.
- 5.53 A reptile survey of the land to be used for construction of a new link road between Warrington and the M56 motorway has been undertaken by Mott Macdonald for Warrington council in an area 150m north of the survey area (Report ref: 394760EN01). This identified a small population of common lizard with a peak count of 4 individuals found on 21 May 2018.
- 5.54 The survey area covered by Mott Macdonald is separated from the survey area covered in this report by the River Mersey which, except for a vehicular bridge, prevents any connectivity and will act as a major barrier to reptile migration.
- 5.55 No detailed survey has yet been carried out to establish the presence or absence of reptiles across the site. However the woodland, grassland, scrub will provide good foraging and dispersal habitat for reptiles. Wood piles present across the site will provide hibernation habitat and there are numerous banks across the site which offer suitable basking habitat.

Amphibians

- 5.56 Records of the following protected amphibian species were returned within the site:
- Great crested newts (GCN) *Triturus cristatus*; and
 - Common toad *Bufo bufo*.

- 5.57 A great crested newt survey was undertaken by FCC Environmental (who run the Arpley Landfill site) in 2013 to support a planning application for an extension of the landfill use (Planning ref; 2013/22598). This report includes survey of 21 ponds across the survey area. In total five ponds were found to contain GCN, all of which are located within the section of Moore Nature Reserve to be developed.
- 5.58 No detailed survey has been carried out since this date, however TEP has undertaken detailed HSI assessments of all ponds identified on site. The results of this survey is shown in Appendix I.
- 5.59 A total of 22 ponds were holding water at the time of survey and were subject to HSI assessment. Of these the majority were found to have good or average suitability to support GCN.
- 5.60 The majority of these waterbodies are likely to contain at least some potential to support common amphibians and also GCN.

Fish

- 5.61 No fish records were returned on site however records of the following fish species were returned within 2km of the site:
- Herring *Clupea harengus*;
 - Dover sole *Solea solea*;
 - European eel *Anguilla anguilla*; and
 - Plaice *Pleuronectes platessa*.
- 5.62 The fish listed above will be present in the River Mersey to the north of site and possibly in the Manchester Ship Canal to the south. None of the fish species listed above, except European eel, are likely to be found in the lakes and other waterbodies present within the development site, however these waterbodies do have the potential to support other important fish communities.

Invertebrates

- 5.63 Records of the following S41 invertebrate species were returned within the site:
- White letter hairstreak *Satyrrium w-album*;
 - Ringlet *Aphoantopus hyperantus*;
 - Ear moth *Amphipoea oculatea*;
 - Flounced chestnut *Agrochola helvola*;
 - Brown spot pinion *Agrochola litura*;
 - Autumnal rustic *Eugnorisma glareosa*;
 - Centre-barred sallow *Atethmia centrago*;
 - Grey dagger *Acronicta psi*;
 - Crescent *Celaena leucostigma*;
 - Garden tiger *Arctia caja*;
 - Dusky thorn *Ennomos fuscantaria*;
 - Dark-barred twin-spot carpet *Xanthorhoe ferrugata*;
 - Latticed heath *Chiasmia clathrata*;
 - Mottled rustic *Caradrina morpheus*;
 - Dot moth *Melanchnra persicariae*;

- Ghost moth *Hepialus humuli*;
- Cinnabar *Tyria jacobaeae*;
- Small square spot *Diarsia rubi*;
- Rosy rustic *Hydraecia micacea*;
- Shaded broad-bar *Scotopteryx chenopodiata*;
- Oak hook-tip *Watsonalla binaria*;
- White ermine *Spilosoma lubricipeda*;
- Pale eggar *Trichiura crataegi*; and
- Spinach *Eulithis mellinata*.

5.64 Records of the following invertebrate species were also returned within 2km of the site:

- Grizzled skipper *Pyrgus malvae*;
- Green brindled crescent *Allophyes oxyacanthae*;
- Knot grass *Acronicta rumicis*; and
- Mouse moth *Amphipyra tragopoginis*.

5.65 No detailed survey has yet been carried out to establish the composition of invertebrates across the site. However the mix of habitats present across the site including woodland (including large amounts of dead wood), open water bodies and unimproved acid grassland are likely to support a diverse terrestrial and aquatic invertebrate population.

Other mammal species

5.66 Records of the following mammal species were returned within the site:

Protected and notable species:

- Red squirrel *Sciurus vulgaris*;
- Polecat *Mustela putorius*;
- Hedgehog *Erinaceus europeaus*; and
- Brown hare *Lepus europeaus*.

Non-native invasive species:

- Grey squirrel *Sciurus carolinensis*; and
- American mink *Neovision vision*.

5.67 Records of the following mammal species were also returned within of the site:

- Common seal *Phoca vitulina*.

5.68 No detailed survey has yet been carried out to establish the presence or absence of these species across the site, however the general suitability of the site to support these species has been assessed during the extended Phase 1 habitat survey. No incidental records of any of the above species were noted during the onsite surveys.

5.69 The site contains habitat suitable to support both red and grey squirrel. There are a number of pine species *Pinus sp.* within Moore Nature Reserve which are a favoured habitat of red squirrel and there is ample woodland present to support grey squirrel, which are an invasive species.

- 5.70 American mink are generally associated with wetland habitats; rivers, lakes and other watercourses. There is extensive habitat suitable to support American mink across Moore Nature Reserve.
- 5.71 Polecat are generally found in lowland wooded habitats, marshes and along riverbanks. There is suitable habitat present on site to support polecat.
- 5.72 The woodland, scrub and grassland habitats on site provide suitable foraging, commuting and hibernation habitat suitable to support hedgehog.
- 5.73 Brown hare are generally found in arable fields or in open expanses of rough grassland. The site lacks any extensive open grassland habitat suitable to support brown hare, but the woodland areas may offer habitat for resting up in.
- 5.74 There is no habitat present on site suitable to support common seal, however this species may be present in the River Mersey which borders the site to the north.

6.0 Assessment

- 6.1 This section assesses the potential impacts on ecological receptors associated with any development within the surveyed area of the site. Consideration is given to the 'mitigation hierarchy', i.e. that impacts are first avoided or where this is not practicable, mitigated and as a final resort, compensated (off-set).
- 6.2 At the time of writing no detailed proposals are available, however outline proposals are available (Appendix A) which show development of a new port facility (Port Warrington) a new country park (Arpley Country Park) and a new commercial park (Warrington Commercial Park). Approximately half of Moore Nature Reserve is also to be retained.
- 6.3 Significant enhancement is also to be included within the survey area through creation of approximately 138ha of new country park (Arpley Country Park) and enhancement of the retained areas of Moore Nature Reserve (totalling approximately 37ha). These enhancements are in addition to the existing remediation strategy produced by FCC for the Arpley Landfill site (Appendix A).
- 6.4 Access to the site is likely to be off the new Warrington link road, the funding of which is currently under review.
- 6.5 This section should be read in accordance with the detailed Arboricultural Assessment (TEP Ref 7815.001).

Planning Context

- 6.6 The site will be subject to Policy QE 5 of the Warrington Local Plan Core Strategy (adopted 21st July 2014). This states that sites with; UK key habitats, EU protected species, UK Priority species or other species of local importance can only be developed if it can be shown that the reasons for the development clearly outweigh the need to retain habitats or species affected and that mitigating measures can be provided which would reinstate the habitats or provide equally viable alternative refuge sites for the species affected.
- 6.7 Based on the above policy the loss of protected habitats and impacts on protected sites will need to be avoided. Where this cannot be avoided, suitable mitigation will be required which is discussed in further detail in Section 7.0.

Designated Sites

- 6.8 The River Mersey SPA/ Ramsar site has connectivity to the proposed development site along the River Mersey. A habitat Regulations Assessment (HRA) has been undertaken by TEP (Ref: 6929.01.022) which details the likely impacts upon this site and all required mitigation.
- 6.9 The other internationally designated sites within 10km include Manchester Mosses SAC and Rixton Clay Pits SAC. Both of these sites are designated for their habitats. Given the distance between the proposed development site and these SAC's (over 8km) no direct impacts are predicted. No impacts from increased public pressure are anticipated on these SAC's due to their distance from the site.

- 6.10 Oxmoor Wood LNR and Dorchester Park LNR will not be directly affected by development of the site. Likewise it is unlikely they will be indirectly affected by site run-off, pollution incidents or windblown dust and rubbish except in the most extreme events. Being approximately 10 minutes drive from the site, it is possible there will be a small increase in visitor numbers at these LNRs which have the potential to impact their habitats. Mitigation measures to avoid indirect impacts from increased public pressure are detailed in Section 7.0.
- 6.11 Moore Nature Reserve is designated as a LWS. Approximately 44ha of this LWS could be directly impacted as a result of development of this site, leading to a significant loss of woodland and wetland habitats. Retained areas of the LWS could be subject to indirect effects as a result of encroachment from construction machinery, site run-off, pollution events and windblown dust and rubbish. This reserve is a publicly accessible area used primarily by bird watchers and dog walkers. Not only will this loss of public open space increase pressure on all surrounding protected sites, it will have the potential to increase visitor pressure on the reduced area of the Nature Reserve. Mitigation measures for this impact are discussed in Section 7.0.
- 6.12 Moss Side Farm LWS and Upper Mersey Estuary LWS are immediately adjacent to the proposed development site. There is potential for indirect effects as a result of encroachment from construction machinery, site run-off, pollution events and windblown dust and rubbish. There are no direct footpath links to these LWS, therefore increased public pressure is considered unlikely.
- 6.13 Norton Marsh and Upper Moss Side Farm LWS, Gatewarth LWS and Manor Park Woodland LWS all have potential to be impacted by indirect impacts including pollution events and windblown dust and rubbish. The remaining 15 LWSs are considered unlikely to be affected due to the distance from site. Mitigation measures to avoid negative impacts are discussed in Section 7.0
- 6.14 With regard to SSSI IRZ's the need for LPA to contact NE regarding the development will depend on the design and whether it meets any of the triggers such as the discharges previously mentioned.

Habitats and Flora

- 6.15 Six S41 habitats are present within Moore Nature Reserve. These include wet woodland, lowland mixed deciduous woodland, lowland dry acid grassland native hedgerows, reedbed and possibly open water, depending on the presence of S41 species such as toad/great crested newts at these locations. All S41 habitat on site should be retained wherever possible. The current proposals indicate the loss of approximately 37ha of habitat at Moore nature reserve. As retention is not possible at Moore Nature Reserve, these losses must be offset. The level of offset has been determined through creation of a biodiversity offsetting scheme produced by TEP. The findings of this assessment are presented separately in TEP report: 6929.01.032

- 6.16 The large sections of wet woodland and lowland mixed deciduous woodland qualify as S41 and LBAP habitat. These vary greatly in age and contain both dry and wet woodland sections. The most significant sections are those across the centre of the site surrounding Lapwing Lane which contain a number of mature specimens. Currently the majority of woodland between Birchwood Pool and the western boundary is to be lost during development. This woodland is of significant value to local wildlife.
- 6.17 Large sections of native hedgerow, an S41 and LBAP habitat are to be lost across the site. None of the hedgerows qualify as 'important' under the Hedgerow Regulations (1997) due to being younger than 30 years old however as they are priority habitat, mitigation will be required for their loss.
- 6.18 There are numerous ponds spread throughout the site which are to be lost during development which qualify as LBAP habitat and (dependant on the presence of S41 species) may qualify as S41 habitat. Specific survey of the waterbodies will be required to determine the presence of protected and invasive species.
- 6.19 Protected plant species native bluebell was frequently noted within Moore Nature Reserve and signage present indicated that native bluebell have been actively planted across the site. Native bluebell is protected under Schedule 8 of the Wildlife and Countryside Act (1981). Current proposals indicate woodlands containing native bluebell will be lost to development, a mitigation strategy for these losses will be required.
- 6.20 Invasive species were noted across the site. The most prolific is Himalayan balsam. Japanese knotweed, giant hogweed, variegated yellow archangel, montbretia, wall cotoneaster and New Zealand pygmy weed were noted within the developable area. These species are all listed under Section 9 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to grow or otherwise cause these species to spread in the wild. A detailed mapping exercise of the spread of these species will be required to inform a method statement for their management and removal from site.

Fauna

Bats

- 6.21 All British bats are European protected species, afforded full protection under the Conservation of Habitats & Species Regulations 2010 (as amended) and the Wildlife and Countryside Act 1981 (as amended). Bats are protected from killing or injury, and from disturbance at the place of rest. Bat roosts are also protected from obstruction, damage or destruction (whether or not a bat is in occupation at the time)
- 6.22 The site includes continuous high quality habitat that is strongly connected with the wider landscape and is likely to be used regularly by commuting or foraging bats.

- 6.23 The site has several compartments of woodland of varying age and structure and open areas or edge habitats including glades, grassland, lakes, ponds and swamp all of which provide valuable foraging habitats for bats. The site also includes linear features such as formal and informal footpaths and access tracks around woodland compartments and the Manchester Ship Canal to the south and the Mersey Estuary to the north, all of which provide valuable commuting habitat for bats. These habitats and associated features are of high value for supporting commuting and foraging bats within the site and the wider landscape.
- 6.24 The PRA of trees within the site identified a provisional minimum estimate of 127 trees with bat roost habitat suitability ranging from low to high roost habitat suitability
- 6.25 Trees and woodlands within the site will require removal to allow for development within the site. Roost loss within the site will have a significant negative impact on bats present within the wider landscape. Bat roost habitat will be destroyed and offsite roosts impacted by severance of commuting routes and removal of foraging habitat.
- 6.26 The development will result in the loss of habitat including woodland blocks, hedgerows and water bodies which will offer foraging, roosting and commuting potential to a variety of local bat species. Buildings and trees offering bat roosting potential will also be lost during development. It is recommended that these habitats are retained within the development. Where this is not possible, the loss is likely to result in a significant negative impact on bats present across the site. The mitigation measures required and need for further survey are discussed in Section 7.0.

Badger

- 6.27 Badgers and their setts are protected under the Protection of Badgers Act 1992. The Act makes the killing, injury or taking of badgers a legal offence. The Act also makes it an offence to interfere with a badger sett. A badger sett is generally accepted to include the underground tunnels and chambers excavated by badgers, however the 1992 Act defines a sett as “any structure or place which displays signs indicating current use by a badger”.
- 6.28 Badger setts are present on site and there is evidence of setts being currently active. The woodland, grassland, hedgerow and scrub habitats will offer suitable foraging, commuting and sett building potential. Further survey will be required to confirm the extent of badger activity on site. If badger are confirmed to be present on site then habitats suitable to support them should be retained. Where this is not possible detailed mitigation will be required to avoid negative impacts. The need for further survey and potential mitigation options are discussed in Section 7.0.

Otter

- 6.29 Otter are European protected species (EPS). Individuals and their habitats are protected under the Conservation of Habitats & Species Regulations 2010 (as amended). They are also fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 against killing and injury and damage or obstruction to their breeding or resting place. Otter are also included on Section 41 of the NERC Act 2006.

- 6.30 No evidence of otter was identified during the site survey, but otter footprints were identified 200m north of the site during an otter survey undertaken in April 2018. It is possible that otter forage and commute along the Mersey corridor and along the Manchester Ship Canal and although no evidence of otter was found on site it is possible that they use the existing woodland on site for resting. Measures will be required to ensure there is no impact on otter during development as discussed in Section 7.0

Water vole

- 6.31 Water vole are fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 against killing and injury and damage or obstruction to their breeding or resting place. Water vole are also included on Section 41 of the NERC Act 2006.
- 6.32 No evidence of water vole has been identified on site and there are currently no implications with regard to this species.

Birds

- 6.33 Native nesting birds, their nests and eggs are protected under the Wildlife & Countryside Act 1981 (as amended) from damage and destruction, from the time of nest construction to fledging of the young. This protection is increased to include disturbance when birds are at, on or near an 'active' nest for birds listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended).
- 6.34 Three bird species listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) were assessed as confirmed or probable breeding species within the proposed site boundary. These are kingfisher, little ringed plover and Cetti's warbler, all of which usually nest close to water. In total, 81 confirmed, probable and possible breeding bird species recorded within the site and surrounding 100m buffer and the 75 confirmed, probable and possible breeding bird species within the site itself indicates that it is of Regional significance for breeding birds.
- 6.35 The 2018/2019 winter bird survey results indicate that the proposed development site and surrounding area is used by relatively low numbers of teal but relatively high numbers of great crested grebe. It used by a range of water birds listed as assemblage species associated with the Mersey Estuary SPA, including curlew, lapwing, shelduck and wigeon, however in relatively insignificant numbers.
- 6.36 Other notable bird species identified on site include; bullfinch, black-headed gull, gadwall, lapwing, mallard, mute swan, teal, greylag goose, oystercatcher, pochard, reed bunting, shelduck, lesser spotted woodpecker, marsh tit and willow tit.
- 6.37 There is a risk of damage or destruction of a nest if vegetation clearance is carried out in the nesting period (generally considered to be between March to August inclusive although some species nest outside this period). There will also be a requirement to ensure that Schedule 1 birds are not subject to disturbance whilst nesting on site.

- 6.38 Beyond the direct impacts on nesting birds it is likely that extensive woodland and scrub clearance will be required and Lapwing Lake, a number of ponds and reedbeds will be lost. The loss is likely to result in a significant negative impact on bird species and may increase competition in the local area for food and nest sites. Extensive mitigation will be required to account for these losses. The mitigation measures required and need for further survey are discussed in Section 7.0.

Reptiles

- 6.39 Common reptiles (adder, grass snake, common lizard and slow worm) are protected via part of Section 9(1) of the Wildlife & Countryside Act 1981 (as amended) against killing and sale. They are also included on Section 41 of the NERC Act 2006.
- 6.40 The range of habitats on site have the potential to support common and widespread reptiles. Suitable habitats including woodland, hedgerows, scrub, grassland and wetlands should be retained where possible. Where this is not possible detailed mitigation will be required to avoid negative impacts as discussed in Section 7.0.

Amphibians

- 6.41 GCN and their habitats are protected under the Conservation of Habitats & Species Regulations 2010 (as amended) and the Wildlife & Countryside Act 1981 (as amended). GCN are also an LBAP species. Common toad is listed on Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 which identifies species which are of principal importance for the conservation of biodiversity in England.
- 6.42 Numerous ponds are present on site and records of both GCN and common toad were returned in the desktop records. The citation for Moore Nature Reserve also includes mention of a large amphibian population. Breeding amphibian populations are present on site including a breeding population of GCN identified in 2013.
- 6.43 The woodland, grassland and scrub habitats also offer good hibernation, foraging and commuting potential to local amphibians. A number of ponds are to be lost during development and extensive foraging and hibernation habitat will also be lost. It is recommended that these habitats are retained during development. Where this is not possible, the loss is likely to result in a significant negative impact on amphibians present across the site. The measures required to mitigate for any negative impacts and need for further survey are discussed in Section 7.0.

Fish

- 6.44 Herring, Dover sole, plaice and European eel identified in the desktop records are listed under Section 41 of the NERC Act 2006.

- 6.45 The lakes present across the site may support European eel and potentially other notable fish species. Lapwing Lake is to be lost to development within Moore Nature Reserve. A number of woodland ponds are likely to be lost but these are less likely to support populations of notable fish species. Indirect impacts on fish species are possible should site run-off during construction and pollution events during both construction and operation enter retained wetland habitats within the site, the River Mersey or the Manchester Ship Canal. The measures required to mitigate for any negative impacts are discussed in Section 7.0.

Invertebrates

- 6.46 Invertebrates identified in the desktop records are listed under Section 41 of the NERC Act 2006.
- 6.47 Extensive records of S41 invertebrate species have been returned on site and the citation for Moore Nature Reserve identifies a good variety of invertebrates present on site.
- 6.48 Extensive areas of habitat suitable to support invertebrates are likely to be lost during development including both aquatic and terrestrial habitats. It is recommended that these habitats are retained during development where possible. Where this is not possible, the loss is likely to result in a negative impact on invertebrates present across the site. The measures required to mitigate for any negative impacts and need for further survey are discussed in Section 7.0.

Other species

- 6.49 The site contains habitat suitable to support red squirrel which are protected under Schedules 5 of the Wildlife & Countryside Act 1981 (as amended). It is an offence to intentionally kill or injure a red squirrel or intentionally or recklessly damage or destroy any structure or place a red squirrel uses for shelter or protection, or disturb a red squirrel while it occupies such a place. The site also has suitability to support grey squirrel and American mink which are an invasive non-native species listed under Schedule 9 of the Wildlife & Countryside Act 1981 (as amended) which makes it illegal to release these species into the wild.
- 6.50 The presence of red squirrel should be considered during felling activities on site. Measures will be required to ensure no red squirrels or their dreys are harmed as discussed in Section 7.0.
- 6.51 Polecat are listed on Section 41 of the NERC Act 2006. Habitats suitable to support polecat are present on site, which should be retained where possible. Mitigation will be required to ensure there is no negative impact on polecat as detailed in Section 7.0.
- 6.52 Hedgehog are listed on Section 41 of the NERC Act 2006. Habitats present to support hedgehog are present across the site. These should be retained where possible, where this is not possible suitable mitigation will be required as detailed in Section 7.0.

- 6.53 Brown hare were identified in the desktop records as being present on site and are listed on Section 41 of the NERC Act 2006. The site generally lacks habitat suitable to support a population of brown hare, however they are likely to be present in the surrounding arable landscape and may use the site for foraging and resting up. Mitigation measures to avoid impacts on brown hare are detailed in Section 7.0.

7.0 Recommendations

- 7.1 This section sets out appropriate recommendations for impact avoidance, mitigation and enhancement. Further surveys are also described where relevant.
- 7.2 The habitats to be lost during development are of significant ecological value and their value to local wildlife is also extremely high. The retention of all habitats across the site should be the starting point for all recommendations. However it has been assessed by Peel Land and Property that there are overriding reasons of public interest for this development. Given that the requirement is for a new Port Facility, this is the only location which is appropriate, being adjacent to the Manchester Ship Canal and with good links to the local road and rail network.
- 7.3 Therefore, the recommendations below are made under the assumption that development is necessary at this site from a planning point of view. The recommendations set out methods to prevent harm to protected sites and species and, where this is not possible, appropriate mitigation and enhancement should development take place.

Designated Sites

- 7.4 Potential indirect impacts on the River Mersey SPA/Ramsar site as a result of development have been assessed in a separate Habitat Regulations Assessment (HRA) produced by TEP (ref: 6929.01.022). this HRA includes all mitigation required to prevent impacts on the River Mersey SPA/Ramsar and must be adhered to throughout the development.
- 7.5 To prevent impacts on Oxmoor Wood LNR and Dorchester Park LNR pollution events will be prevented through the inclusion of pollution prevention measures implemented through a Construction Environmental Management Plan (CEMP) for construction and via an Environmental Management Plan (EMP) during operation. The CEMP must include standard, best-practice methods on how site run-off will be controlled, how site waste will be managed, how fuel and other spillages will be prevented and must include emergency procedures for any pollution accidents.
- 7.6 Compensation for the habitats lost at Moore Nature Reserve LWS will be required in order to ensure an overall net gain in biodiversity for the development; this is a requirement under the National Planning Policy Framework (NPPF). Biodiversity offsetting has been undertaken and the results of this are detailed in a separate report (Ref: 6929.01.032). All recommendations made in the Biodiversity offsetting strategy must be adhered to throughout development to ensure no net loss of biodiversity.
- 7.7 The loss of approximately 37ha of Moore Nature Reserve with respect to public access and visitors will be mitigated via the remediation of Arpley Landfill to a country park upon cessation of landfill activities. Peel have confirmed their intent to enhance Arpley Landfill beyond the current proposed level of remediation to create Arpley Country Park which will include a new car park, purpose built foot and cycle paths and visitor facilities. Arpley Country Park is of a suitable size to offset the number of visitors displaced from Moore Nature Reserve, which will avoid negative impacts on surrounding protected, public access sites including Oxmoor Wood LNR and Dorchester Park LNR.

- 7.8 The potential for indirect impacts on Moss Side Farm LWS, Upper Mersey Estuary LWS, Norton Marsh and Upper Moss Side Farm LWS, Gatewarth LWS and Manor Park Woodland LWS sites will be mitigated through the production and implementation of a CEMP during construction and EMP during operation.

Habitats and Flora

- 7.9 If works have not commenced by summer 2021 an updated Phase 1 habitat survey must be undertaken prior to the commencement of on-site works to determine if any change to habitats or species composition has occurred. If the facilities are to be developed as a phased approach, this update will be required prior to commencement of each individual phase.
- 7.10 Using the defra Biodiversity Assessment tool⁷, the baseline, or "pre-intervention" score is 2081.39 biodiversity units. This is derived from the 2019 survey results and in making assessments of condition, the fact that the Moore Nature Reserve and the restored Arpley landfill currently only have short-term management arrangements in place, as one of the benefits of the scheme will be long-term management and funding. A biodiversity net gain assessment will be provided separately and in due course.
- 7.11 The majority of mitigation will be included within the retained areas of Moore Nature Reserve and within the newly created Arpley Country Park which will both be subject to significant enhancement and managed in perpetuity following completion of the project. Further mitigation is proposed through retention of green boundary treatments within the port extension to reduce visual, lighting and noise disturbance.
- 7.12 Lapwing Lake which measures approximately 2ha will be lost during development. This is of significant ecological value for the species it supports. The loss of this lake will be partially mitigated for within retained habitat on site, with the aim to create a series of new continuously wet water bodies along the line of the former Runcorn to Latchford canal which runs east to west across the site. Lapwing Lake, along with any other waterbodies to be lost across the site, should be subject to specific survey to identify the presence or absence of invasive and protected species. The survey should involve collection and identification of plant material by suitably qualified botanists (FISC Level 4 or above) using a grapnel. The results of this survey will inform any specific mitigation requirements.
- 7.13 A bluebell translocation strategy will be produced and will be informed by an updated species specific survey when bluebells are in flower (mid-April to June). The mitigation strategy will provide a map showing the location of bluebells, a methodology for translocation and will identify suitable receptor sites.

⁷ Using defra metric 1.0, as version 2.0 is in beta test mode and generated unreliable results when applied to the scheme.

- 7.14 The invasive, non-native Schedule 9 species Himalayan balsam, Japanese knotweed, giant hogweed, variegated yellow archangel, montbretia, wall cotoneaster and New Zealand pygmy weed were all noted on site. A site specific invasive species method statement must be produced detailing how these species will be controlled and removed during development. This method statement should be informed by a detailed site specific survey undertaken during the optimum season (mid-April – October).
- 7.15 Beyond the biodiversity offsetting strategy for the site, which will ensure no net loss of biodiversity, detailed mitigation plans will need to be produced for the habitats to be lost, including long-term management plans. Management plans for retained habitats must also be produced to ensure that their biodiversity value is maintained and enhanced. Long term protection of the retained areas of Moore Nature Reserve and the new country park can be secured through the planning process. Details of how retained habitats adjacent to the development will be protected during clearance and construction works should be provided within the Construction Environmental Management Plan (CEMP).

Bats

- 7.16 The PRA of trees on site identified a large number of trees with potential to support roosting bats.
- 7.17 The GBA should ideally be repeated during the period October to February, when foliage from trees and ivy are lacking and views into the canopies are less obscured.
- 7.18 Aerial inspections by a licensed bat consultant should be undertaken of all trees with roost habitat suitability to verify the presence of a roost, confirm the presence and characterisation of PRFs and confirm tree roost habitat suitability. Localised scrub clearance may be required to facilitate access to certain trees for aerial inspections; for this reason, aerial inspections would ideally be timed during the period October to February to avoid risk of disturbance to bird nesting.
- 7.19 Inspection of bat boxes within the site should also be undertaken as part of the aerial inspections by a licensed bat consultant.
- 7.20 Should bats or residual evidence of bats be identified during aerial inspections, confirmation of roost characteristics including species (via DNA analysis of droppings if no bats are present), the likely roost status (based on PRF characteristics, number of bats/residual evidence found) and roost entry/exit points will be feasible. The findings from the aerial inspections, subject to any health and safety limitations, would therefore be sufficient to inform the baseline for assessment, support conclusions on viability of the site for development and inform masterplanning.
- 7.21 Considering timescales to implementation of development (earliest commencement 2021) and the dynamic nature of bat roosting in trees, completion of nocturnal roost surveys at this early stage is unlikely to be warranted. Nocturnal roost surveys of trees generally provide low confidence in negative results. The scale of the survey area, in combination with the relative abundance of bat roost opportunities, means that bat occupation of tree roosts may vary considerably in the intervening years.

- 7.22 High quality habitats in the site provide valuable features for bats within the site and the wider landscape for foraging and commuting. Activity transect surveys and static monitoring should be undertaken across the site to establish species assemblage, to determine features of particular importance for foraging and commuting bats and to further determine the impacts associated with proposals.
- 7.23 A minimum of five activity transect routes should be designed to encompass all areas of the site to be impacted by proposals and to allow for accessibility of different habitat types. Design of activity transect routes should include daytime ground truthing prior to surveys to ensure accessibility during nocturnal surveys and that sufficient habitats and areas within the site have been encompassed.
- 7.24 Activity transect surveys should include two survey visits per month from April to October in appropriate weather conditions for bats. Flexibility in survey design will be required given the variation in size, shape, and accessibility of different woodland compartments within the site.
- 7.25 Automated static monitoring should also be undertaken in conjunction with the activity transect surveys with sampling points chosen systematically to target the variety of habitats within the site. Three automated static detector locations per transect should be determined and data collected for a minimum of five consecutive nights per month (April to October) in appropriate weather conditions for bats.
- 7.26 Detailed mitigation measures with regard to bats are presented in Appendix H. All measures noted in the appendix should be adhered to during development.

Badger

- 7.27 Evidence of badger setts have been identified on site. Once fixed development plans are made available and the exact extent of habitats to be lost are known, detailed surveys to identify potential impacts on badger will be required prior to submittal of a planning application. This will involve detailed survey to locate all setts within the development boundary or within influencing distance of the development boundary (30m). Each Settle identified will be classified (for example as a main, outlier or subsidiary sett) and its location recorded. Once all setts have been identified they will need to be monitored for a period of 21 days to establish their occupation status.
- 7.28 Where badger setts are identified it is likely they will require closure under licence from Natural England. This licence would identify any compensation measures necessary and may include the creation of new artificial badger setts.
- 7.29 Based on the proposed development framework it is anticipated that there is suitable land and features available either on site within the retained areas of Moore Nature Reserve or within Arpley Country Park to mitigate for any negative impacts on badger. If any main badger setts are found within 30m of development, it is likely a Natural England licence would be required to close the sett and a new artificial sett would need to be created. There is suitable space for this within the retained areas of Moore Nature Reserve and Arpley Country Park.

Otter

- 7.30 Otter footprints have been identified within 200m of the proposed development site but no holt or resting places have been identified on site. Given there is evidence of otter within close proximity to the site and it is likely that otter will forage and commute along both the River Mersey and the Manchester Ship Canal, Reasonable Avoidance Measures (RAMs) will be required to avoid any negative impacts.
- 7.31 This will include an updated survey of woodland for any evidence of otter holts or couches immediately prior to woodland clearance, due to the highly transient nature of this species. If a holt or resting place is identified and cannot be avoided, a EPS licence and appropriate mitigation will be required which may include the construction of an artificial holt and restrictions on construction activities. It is anticipated that if required there is suitable land and features available either on site within the retained areas of Moore Nature Reserve or within Arpley Country Park to mitigate for any negative impacts on otter.

Water vole

- 7.32 Currently there are no implications with regard to water vole, however given the transient nature of this species, updated surveys will be required prior to works commencing to ensure that no water vole have moved into the site during the intervening period.

Birds

- 7.33 Three Schedule 1 species and numerous notable species were identified on site during the breeding bird survey whilst teal and a significant population of great crested grebe were identified during the winter bird surveys. The full mitigation requirements for teal and great crested grebe are detailed within the HRA assessment (TEP ref: 6929.01.022) these must be adhered to in full during development.
- 7.34 To avoid adverse impact on nesting birds, site clearance would need to be completed outside of the nesting period (typically taken to be March to August inclusive). Where this is not practicable, a nesting bird check must be carried out by a suitably qualified ecologist in advance to confirm no active nests are present. In the event that an active nest is identified, works within the surrounding area (radius dependent on species and context) must halt until the chicks have fledged. Given the extent of suitable nesting habitat on site, and the associated risk of encountering nests which restrict construction across a large portion of the site, it is strongly recommended that sensitive programming of works be considered.
- 7.35 In addition to the above it will be necessary to ensure that any Schedule 1 bird species are not subject to disturbance whilst nesting on site. A full breeding bird survey of Arpley Landfill will be required prior to works commencing to convert to a country park in order to ensure no ground nesting birds will be temporarily displaced by onsite activities or to identify any mitigation required.

- 7.36 Based on the proposed development framework it is anticipated that there is suitable land and features available either on site within the retained areas of Moore Nature Reserve or within Arpley Country Park to mitigate for any negative impacts on birds in relation to terrestrial habitat loss. The loss of Lapwing Lake will also need to be mitigated for, this will partially be achieved through the reinstallation of permanent waterbodies along the length of the former Runcorn to Latchford canal, however it is possible that further habitat will be required which will, due to constraints on the capped landfill site, need to be created in the wider area. This lake must be sited as close as possible to its current location within close proximity to the River Mersey.

Reptiles

- 7.37 Once fixed development plans are made available and the exact extent of habitats to be lost are known, a scoping survey will be undertaken to determine the need for and location of detailed reptile surveys.
- 7.38 Reptile surveys should be undertaken within all suitable habitat to be lost and would also need to be undertaken on any areas that reptiles might be translocated into. Reptile surveys should be undertaken between April and May or in September.
- 7.39 Should reptiles be present on site it may be necessary to translocate any reptiles from site into suitable retained habitat. Mitigation will also be required through the creation of replacement habitats for those being lost as a result of the development.
- 7.40 Based on the proposed development framework it is anticipated that there is suitable land and features available either on site within the retained areas of Moore Nature Reserve or within Arpley Country Park to mitigate for any negative impacts on reptiles. There is room for new hibernacula to be created and extensive areas of wildflower planting can be included which will provide a food source for invertebrates and hence increased foraging opportunities for reptiles. Landscaping can also be undertaken to provide south facing banks suitable for reptile basking.

Amphibians

- 7.41 Once fixed development plans are made available and the exact extent of habitats to be lost are known, detailed surveys to identify potential impacts on amphibians will be required prior to submittal of a planning application.
- 7.42 Based on available desktop data and the findings of the HSI assessment it is considered likely that GCN are present on site. Therefore, all ponds on site and within 250m of development must be subject to eDNA surveys to confirm which ponds hold populations of great crested newts. In addition torch surveys should be undertaken to establish which ponds support common toad. The optimum season for eDNA survey is mid-April to June and the optimum season for torch surveys is March - June.
- 7.43 Where GCN are confirmed to be present traditional surveys are likely to be required to establish a population estimate.

- 7.44 Should ponds that support GCN and common toad be lost during development detailed mitigation will be required and works may need to be undertaken under a licence from Natural England. Great crested newt licencing with Natural England is currently undergoing a number of changes with district licencing. The exact methods of mitigation and need for population surveys would be determined with Natural England prior to development but are likely to include either creation of new pond habitat or financial compensation to a suitable scheme offsite. Based on the proposed development framework it is anticipated that there is suitable land and features available either on site within the retained areas of Moore Nature Reserve or within Arpley Country Park to mitigate for any negative impacts on GCN. This can be achieved through creation of dedicated newt ponds within the retained section of Moore Nature Reserve along the line of the former Runcorn to Latchford Canal.

Fish

- 7.45 Lapwing Lake, a large 2ha lake and a number of smaller waterbodies are to be lost during development. Lapwing Lake in particular has potential to support European eel. A detailed fish survey of the lake must be undertaken prior to works commencing to confirm the presence or absence of this and other protected species. Mitigation for fish populations, particularly European eel, within waterbodies to be lost on site is likely to comprise fish rescue during drain down of the feature.
- 7.46 Development at the site may have indirect effects on local fish populations in waterbodies within and outwith the site as a result of pollution events. This risk will be avoided through the production and implementation of a CEMP during construction and EMP during operation, as discussed previously.
- 7.47 Based on the proposed development framework it is anticipated that there is suitable habitat and features available either on site within the retained areas of Moore Nature Reserve or within Arpley Country Park to mitigate for any negative impacts on fish. If a replacement for Lapwing Lake is created this will provide habitat for protected fish species.

Invertebrates

- 7.48 Once fixed development plans are made available and the exact extent of habitats to be lost are known, a scoping survey of the development area will be undertaken by a suitably qualified entomologist (between April and September) in order to determine the need for detailed invertebrate surveys, both terrestrial and aquatic.
- 7.49 Should notable invertebrates or an important invertebrate assemblage be present on site, suitable mitigation for any loss of habitats will be required. This is likely to include offsetting of any habitat losses and may also involve translocation of habitats which contain suitable food plants into areas unaffected by development.
- 7.50 Based on the proposed development framework it is anticipated that there is suitable land and features available either on site within the retained areas of Moore Nature Reserve or within Arpley Country Park to mitigate for any negative impacts on invertebrates. New wildflower planting can be included within the design which will provide a valuable food source for invertebrates.

Other Species

- 7.51 Prior to removal of trees on site it will be necessary to assess trees for the presence of red squirrel and their dreys. Where red squirrel dreys are present these trees can only be removed outside the breeding season (outside of February to August). Replacement red squirrel habitat will also be required in the form of woodland planting using appropriate small seeded tree species including pine.
- 7.52 RAMs will be required during development to ensure that there are no negative impacts on polecat, hedgehog or brown hare. Loss of habitat suitable to support these species should also be mitigated through biodiversity offsetting.

Biodiversity Enhancement

- 7.53 A biodiversity offsetting strategy is to be produced by TEP to outline how mitigation for the loss of habitats on site can be achieved. In addition to the proposed offsetting scheme, there is ample opportunity for enhancement both within the retained areas of Moore Nature Reserve and within the proposed Arpley Country Park. Biodiversity enhancements with regard to specific groups are set out below.

Habitats and Flora

- Within the area of Moore Nature Reserve to be lost there has been a scheme of planting native bluebells within woodland habitat. This scheme will be continued and expanded into the retained areas of Moore Nature Reserve and any woodlands within Arpley Country Park.
- A fund will be set up covering management of the retained areas of Moore Nature reserve which will cover a minimum of the next 25 years of site management.
- All invasive species will be remediated in full within the retained areas of Moore Nature Reserve.
- A scheme of information boards will be set up across the site recording the history of the lost areas of Moore Nature Reserve and detailing the enhancements made alongside information on species likely to be found.

Bats

- A scheme of bat box installation will be undertaken across both retained areas of Moore Nature Reserve and within Arpley Country Park including a minimum of 50 new boxes. The types will be based on the findings of any bat activity surveys.
- A scheme of hedgerow planting will be undertaken where feasible across the new port to maintain connectivity across the site. This will benefit all wildlife.
- Understorey planting will be undertaken within suitable woodland in the retained sections of Moore Nature Reserve. This will provide additional foraging opportunities for local bat species through the increase in invertebrate fauna it is likely to encourage.

Birds

- A scheme of bird box installation will be undertaken across both retained areas of Moore Nature Reserve and within Arpley Country Park including a minimum of 50 new boxes. The types used will be based on the findings of any breeding bird surveys.
- Deadwood piles will be created (using felled woodland) throughout the retained areas of Moore Nature Reserve which will provide both foraging and nesting opportunities for local bird species.
- A new feeding station and corresponding hide will be created within the retained Moore Nature Reserve. This will provide food for local birds during the winter months (October - March) and will also benefit local bird watchers. Any hides within the retained Moore Nature Reserve will also be upgraded and a recording feature created (ideally using a web based form) so that use of the site, and hence the effectiveness of mitigation and enhancement measures, can be monitored.
- A scheme of hedgerow planting will be undertaken where feasible across the new port to maintain connectivity across the site.

Amphibians

- Deadwood piles will be created (using felled woodland) throughout the retained areas of Moore Nature Reserve which will provide both foraging and hibernation opportunities for local amphibians.
- At least five hibernacula will be installed within the retained areas of Moore Nature Reserve,
- Any ponds on site which do not currently support a population of GCN will be subject to specific management measures to make the habitat more favourable for GCN.

Invertebrates

- In order to provide enhancement for invertebrates, a scheme of wildflower planting will be undertaken across Arpley Country Park and within suitable habitats in the retained Moore Nature Reserve.
- Deadwood piles will be created (using felled woodland) throughout the retained areas of Moore Nature Reserve which will provide foraging, basking, breeding and hibernation opportunities for invertebrates.

Reptiles

- Deadwood piles will be created (using felled woodland) throughout the retained areas of Moore Nature Reserve which will provide both foraging and hibernation opportunities for local reptiles.
- new hibernacula will be created and extensive areas of wildflower planting can be included which will provide a food source for invertebrates and hence increased foraging opportunities for reptiles
- Compost heaps and rock piles will be created from onsite management works to benefit grass snake and slow worm.

Badger

- A variety of fruit producing trees and shrubs will be planted within the retained Moore Nature Reserve. This planting will be focused around slopes and hillocks to encourage badgers into these areas where new setts can be created.

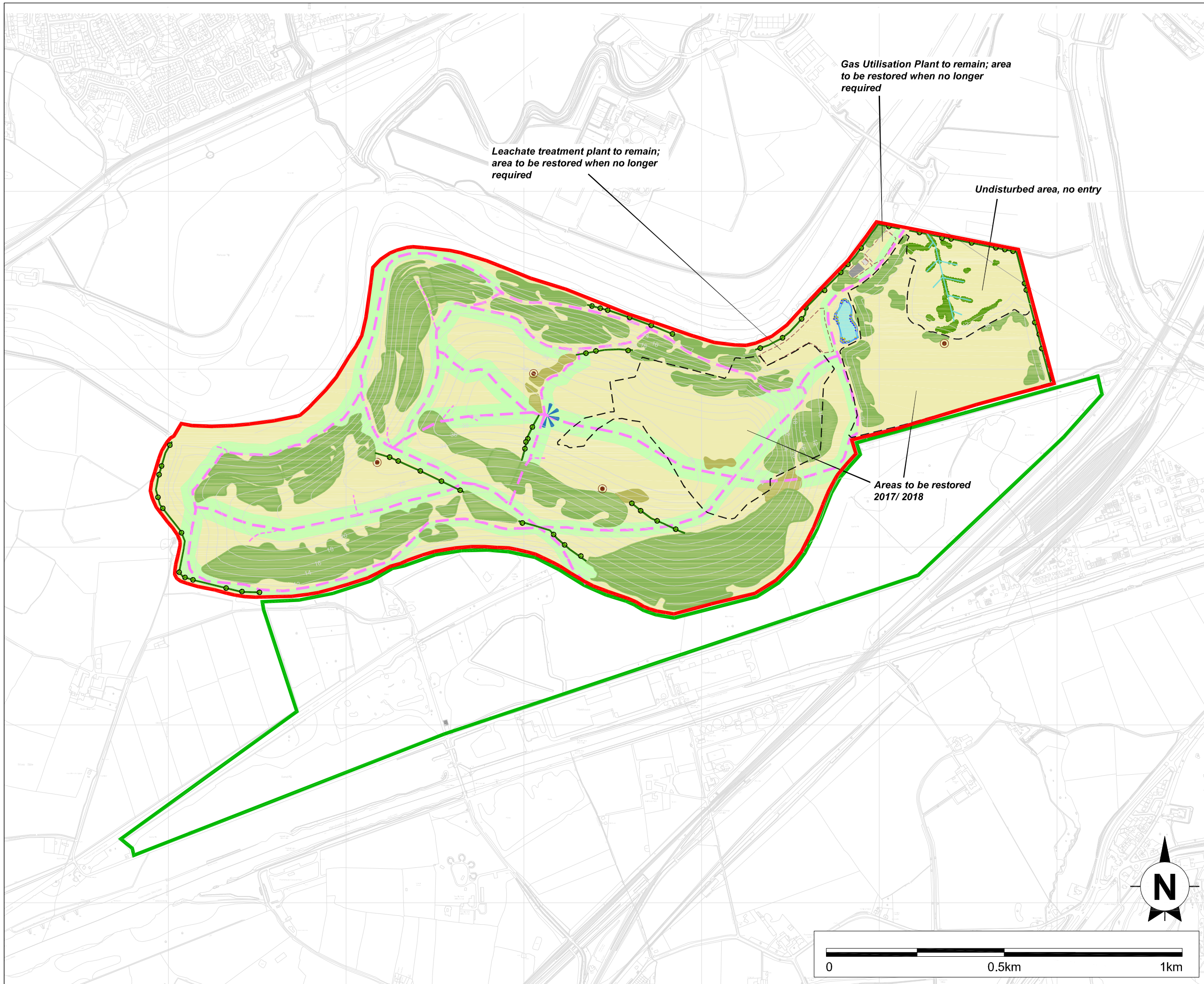
Water Vole

- Creation of new waterbodies will provide additional opportunities for water vole. Within the newly created waterbodies vegetation favoured by water voles will be planted and sections of bank will be profiled to provide burrowing opportunities.

Other Species

- Within new woodland planting, trees favoured by red squirrel will be included within the design including Scot's pine (*Pinus sylvestris*), willow (*Salix spp.*), rowan (*Sorbus aucuparia*), birch (*Betula pendula* or *B. pubescens*), hawthorn (*Crataegus monogyna*) and holly (*Ilex aquifolium*).

APPENDIX A: Indicative Development and Remediation Proposals



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Follow any figured dimensions - do not scale. IF IN DOUBT ASK.

• Revision History • Date

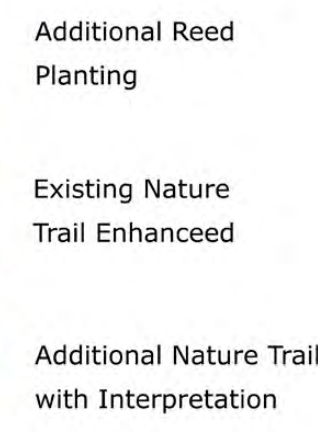
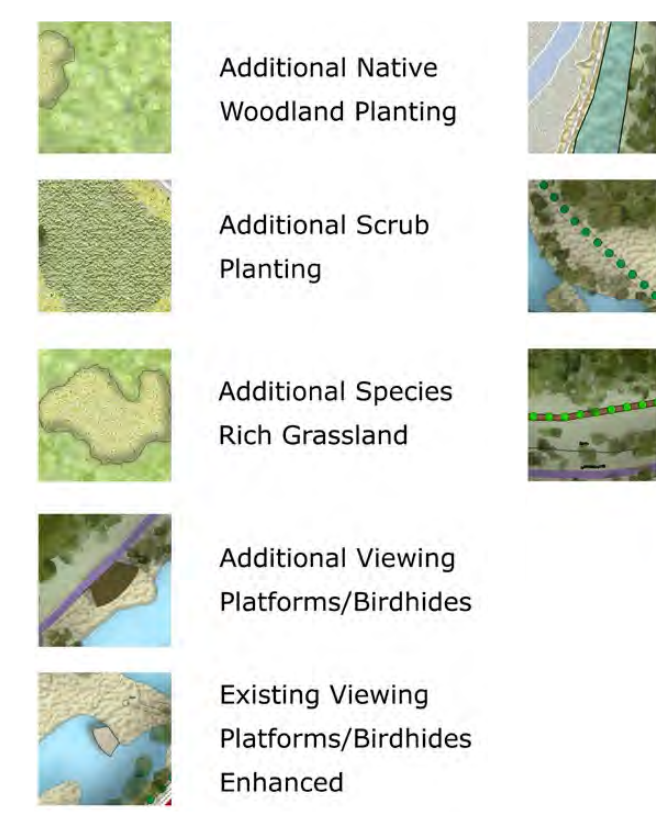
- Key:
- Arpley Landfill site boundary
 - Proposed post-settlement contours (at 2m intervals)
 - Indicative track/ path
 - Maintenance access only
 - Woodland
 - Scrub/ scattered scrub
 - Hedgerow (with trees)
 - Semi-improved grassland
 - Species rich grassland with differential mowing
 - Mixed tall ruderal herb with dense continuous scrub
 - Surface water lagoon
 - Marginal planting on shallow shelf (c.0.3m deep)
 - Ditch
 - Barn owl box
 - * Focal point
 - Moore Nature Reserve

Chester Office: Well House Barn Bretton Ch4 5DH	South Manchester Office: Carridge House 76 Water Lane Worsley M50 5BB	axis
0844 8700 007 • www.axisped.co.uk		
client: FCC		
project: Arpley Landfill Site		
drawing title: Figure 4 Site Closure Landscape Scheme Restoration 2017/18		
date: June 2015	drawn by: AR	checked: AT1
drawing number: 1569-02-004	status: Planning	
scale(s): 1:5000@A1	rev:	
planning environment design		

ARPLEY NATURE PARK

Masterplan Key

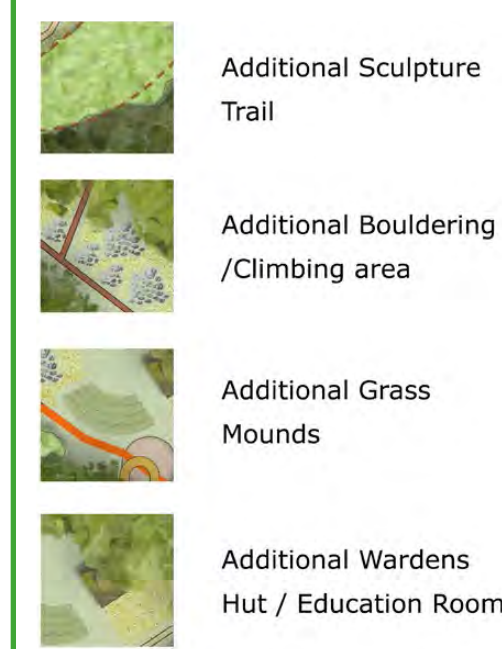
Ecological Enhancement Proposals



Country Park Features

- (A) Links to disused Canal Towpath
- (B) New Viewing Platform / Bird Hides
- (EB) Existing Platform / Bird Hides enhanced

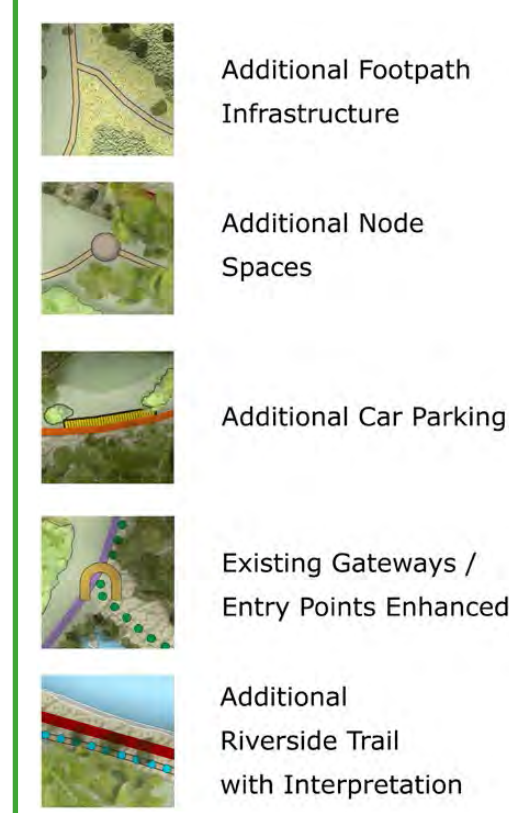
Recreation Enhancement Proposals



Country Park Features

- (C) Forestry School / Outdoor Performance Area
- (D) Young Children's Play
- (E) Adventure Play Area
- (F) Sculpture Trail
- (G) Bouldering Rock Climbing
- (H) Sculptural Feature
- (I) Wardens Hut / Education Room

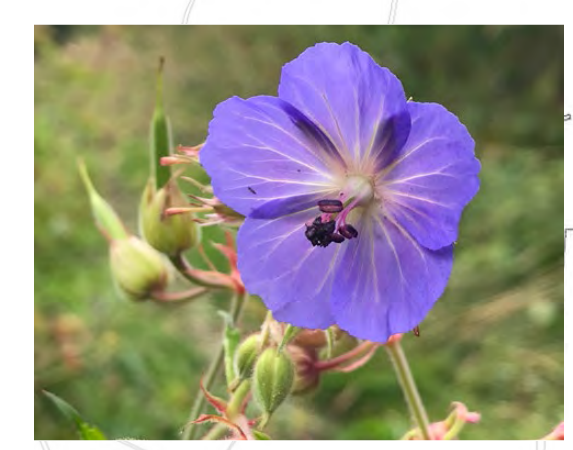
Additional Infrastructure



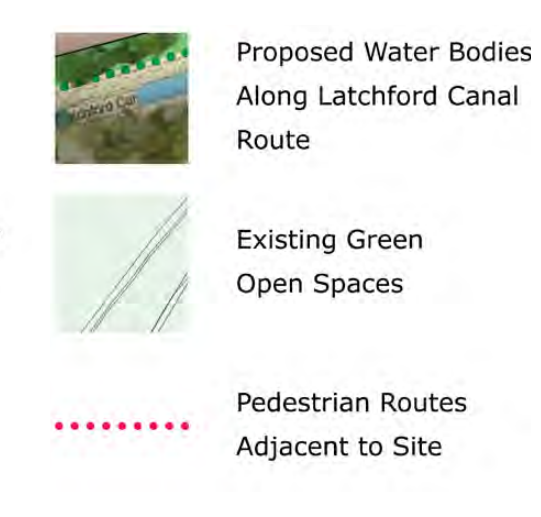
Country Park Features

- (J) Main Country Park Entrances
- (K) Proposed Car Parking
- (L) Secondary Pedestrian Entrances
- (M) Node Spaces
- (N) Gateways

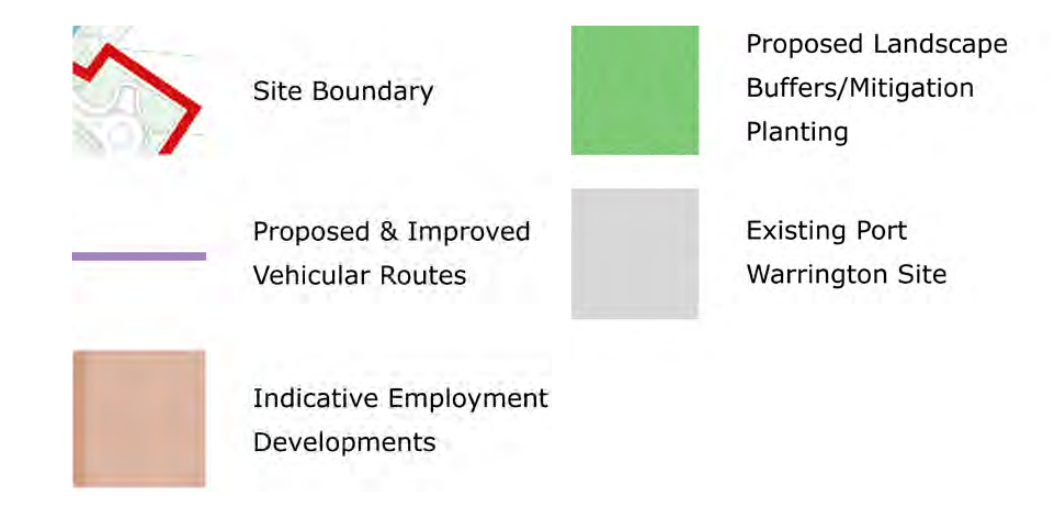
Proposed & Improved Vehicular Routes



Consented Enhancement Proposals

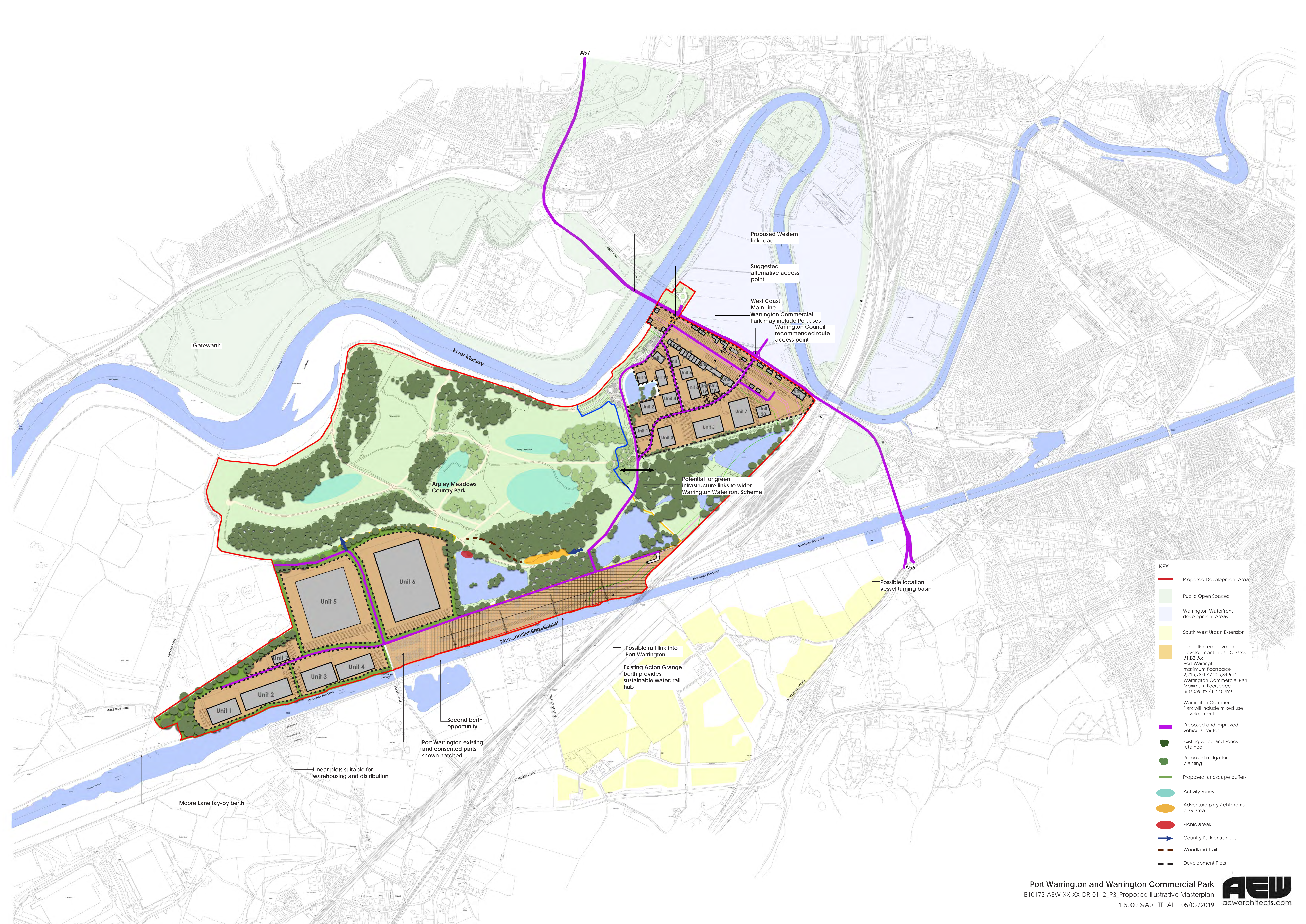


Warrington Waterfront Proposals Key



Project : Warrington Waterfront
 Client : Peel Land and Property
 Drawing Title : Landscape Masterplan Proposal
 Drawing Number : 10315_GA_PL_01





Gatewarth

River Mersey

Arpley Meadows Country Park

Manchester Ship Canal

Moore Lane lay-by berth

Linear plots suitable for warehousing and distribution

Second berth opportunity

Port Warrington existing and consented parts shown hatched

Possible rail link into Port Warrington

Existing Acton Grange berth provides sustainable water: rail hub

Proposed Western link road

Suggested alternative access point

West Coast Main Line

Warrington Commercial Park may include Port uses Warrington Council recommended route access point

Potential for green infrastructure links to wider Warrington Waterfront Scheme

Possible location vessel turning basin

- KEY**
- Proposed Development Area
 - Public Open Spaces
 - Warrington Waterfront development Areas
 - South West Urban Extension
 - Indicative employment development in Use Classes B1, B2, B8:
 - Port Warrington - maximum floorspace 2,215,784ft² / 205,849m²
 - Warrington Commercial Park - Maximum floorspace 887,596 ft² / 82,452m²
 - Warrington Commercial Park will include mixed use development
 - Proposed and improved vehicular routes
 - Existing woodland zones retained
 - Proposed mitigation planting
 - Proposed landscape buffers
 - Activity zones
 - Adventure play / children's play area
 - Picnic areas
 - Country Park entrances
 - Woodland Trail
 - Development Plots

APPENDIX B: Breeding Bird Survey Appendix



THE
ENVIRONMENT
PARTNERSHIP



PORT WARRINGTON BREEDING BIRD SURVEY

TEP Technical Report August 2019



CONTENTS

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4.0	Results	7
5.0	Evaluation and Conclusion.....	22
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1.0 General Details

Site Location	Moore, Warrington, Cheshire
Date(s)	<p>Visit 1 - 10/04/2019</p> <p>Visit 2 – 22/04/2019 & 23/04/2019</p> <p>Visit 3 – 15/05/2019 & 16/05/2019</p> <p>Visit 4 – 30/05/2019 & 31/05/2019</p> <p>Visit 5 – 20/06/2019</p> <p>Visit 6 – 26/06/2019 & 27/06/2019</p> <p>Visit 7 – 09/07/2019 & 11/07/2019</p>
Weather	<p>Visit 1 - Dry with partial cloud cover</p> <p>Visit 2 – Dry and clear on both dates</p> <p>Visit 3 – Dry and clear on both dates</p> <p>Visit 4 – Dry and cloudy on both dates</p> <p>Visit 5 – Light rain showers and partial cloud</p> <p>Visit 6 – Dry and cloudy on both dates</p> <p>Visit 7 – Dry with partial cloud on both dates</p>
Seasonal Constraints	None
Drawing References	<p>G6929.01.043 BBS BOCC, Waders and Wildfowl Visit 1</p> <p>G6929.01.044 BBS BOCC, Waders and Wildfowl Visit 2</p> <p>G6929.01.045 BBS BOCC, Waders and Wildfowl Visit 3</p> <p>G6929.01.046 BBS BOCC, Waders and Wildfowl Visit 4</p> <p>G6929.01.047 BBS BOCC, Waders and Wildfowl Visit 5</p> <p>G6929.01.048 BBS BOCC, Waders and Wildfowl Visit 6</p> <p>G6929.01.049 BBS BOCC, Waders and Wildfowl Visit 7</p>

2.0 Introduction

- 2.1 TEP Limited was commissioned in April 2019 by Peel Investments (North) to undertake a breeding bird survey in relation to a development named Port Warrington in Moore, Warrington.
- 2.2 The drawings for the breeding bird survey include two boundaries, the site boundary (S) and a 100m offset buffer (SBU).
- 2.3 Drawing G6929.01.043 to G6929.01.049 illustrate these boundaries as well as all Red and Amber listed Bird of Conservation Concern (BoCC) species, bird species listed on Schedule 1 of the Wildlife and Countryside Act, bird species of principal importance under Section 41 of the Natural Environment and Communities Act 2006 and all other wading birds, wildfowl and other water bird species. All other bird species recorded during the breeding bird survey are included in Table 1.

Site Overview

- 2.1 The area of survey includes all Moore Nature Reserve and a section of Arpley Meadows Landfill to the north, which is to be developed as a new commercial park. It is envisaged that development of the Site is likely to commence between 2022 and 2024.
- 2.2 The site is located within the borough of Warrington with a central grid reference of SJ 58401 86246. The site is immediately bounded to the north and west by Arpley Meadows landfill and beyond this the River Mersey and residential and industrial development associated with the towns of Penketh and Great Sankey. To the east lies arable land and the west coast mainline rail route with industrial and residential development associated with the town of Latchford. To the west lies extensive farmland and the River Mersey estuary and the south the site is immediately bordered by the Manchester Ship Canal with the village of Moore present on the opposite bank.
- 2.3 Moore Nature Reserve is dominated by woodland with numerous waterbodies including a number of lakes and large pools, and areas of open grassland.
- 2.4 This assessment is based on the assumption that it is possible that construction or earthmoving works might take place at any location within the red line boundary.

Pre-existing Site Data

- 2.5 Desktop records of protected or notable bird species recorded within a 2km radius of the site were gathered from RECORD. Bird species classed as notable are those listed on any of the following:
 - Schedule 1 of the Wildlife and Countryside Act 1981, as amended (WCA1);
 - Species of principal importance under Section 41 of the Natural Environment and Communities Act 2006 (S41);

- Red and Amber listed Bird of Conservation Concern (BoCC) species (Eaton *et al.* 2015) (BRd/ BAm);
- Bird species listed on the Cheshire Region Biodiversity Action Plan (LBAP).

2.6 The desk study (TEP Ref: 6929.01.002) identified 63 notable bird species within 2km of the site. These bird species are listed below:

- Barn owl (WCA1, LBAP)
- Bittern (WCA1, S41, BRd)
- Black necked grebe (WCA1, BAm, LBAP)
- Black tern (WCA1)
- Black-headed gull (BAm)
- Bullfinch (S41, BAm, LBAP)
- Cetti's warbler (WCA1)
- Common gull (BAm)
- Common tern (BAm)
- Cuckoo (S41, BRd)
- Curlew (S41, BRd)
- Dunnock (S41, BAm)
- Gadwall (BAm)
- Garganey (WCA1, BAm)
- Great black-backed gull (BAm)
- Grey partridge (S41, BRd, LBAP)
- Grey wagtail (BRd)
- Herring gull (BRd)
- Hobby (WCA1)
- House martin (BAm)
- House sparrow (S41, BRd, LBAP)
- Iceland gull (BAm)
- Kestrel (BAm)
- Kingfisher (WCA1, BAm)
- Lapwing (S41, BRd, LBAP)
- Lesser black-backed gull (BAm)
- Lesser spotted woodpecker (S41, BRd)
- Little ringed plover (WCA1)
- Mallard (BAm)
- Marsh harrier (WCA1, BAm)
- Marsh tit (S41, BRd)
- Meadow pipit (BAm)
- Mediterranean gull (WCA1, BAm)
- Merlin (WCA1, BRd)
- Mistle thrush (BRd)
- Osprey (WCA1, BAm)
- Oystercatcher (BAm)
- Peregrine (WCA1)
- Pied flycatcher (BRd)
- Pochard (BRd)
- Red kite (WCA1)
- Redstart (BAm)
- Reed bunting (S41, BAm, LBAP)
- Ring ouzel (S41, BRd)

-
- Ringed plover (BRd)
 - Short-eared owl (BAm)
 - Shoveler (BAm)
 - Skylark (S41, BRd, LBAP)
 - Snipe (BAm)
 - Song thrush (S41, BRd, LBAP)
 - Spotted flycatcher (S41, BRd, LBAP)
 - Starling (S41, BRd, LBAP)
 - Stock dove (BAm)
 - Swift (BAm)
 - Teal (BAm)
 - Tree pipit (S41, BRd)
 - Tree sparrow (S41, BRd, LBAP)
 - Water pipit (BAm)
 - Whinchat (BRd)
 - Willow warbler (BAm)
 - Woodcock (BRd)
 - Yellow wagtail (S41, BRd)
 - Yellowhammer (S41, BRd, LBAP)

3.0 Method

- 3.1 The breeding bird survey was carried out applying methods based on the Breeding Bird Survey (BBS) and Common Bird Census (CBC) methods developed by the British Trust for Ornithology (Gilbert *et al.* 1998).
- 3.2 The survey visits were undertaken by suitably experienced surveyors, with each visit carried out in the morning period, starting at least half an hour after sunrise, using a pre-determined transect route to cover the entire site.
- 3.3 Bird species and activity patterns were recorded and mapped using standard BTO symbology.
- 3.4 Bird species within the 100m surrounding the proposed site boundary were also recorded during the survey, as a proportion of the bird's foraging or nesting habitat is likely to be within the site.

4.0 Results

Visit	Date	Start Time	Finish Time
Visit 1	10/04/2019	06:45 hrs	11:30 hrs
Visit 2	22/04/2019	06:25 hrs	11:25 hrs
	23/04/2019	06:25 hrs	11:25 hrs
Visit 3	15/05/2019	06:00 hrs	11:00 hrs
	16/05/2019	06:20 hrs	11:00 hrs
Visit 4	30/05/2019	06:10 hrs	10:30 hrs
	31/05/2019	06:10 hrs	09:40 hrs
Visit 5	20/06/2019	06:15 hrs	11:15hrs
Visit 6	26/06/2019	Not provided	Not provided
	27/06/2019		
Visit 7	09/07/2019	07:00 hrs	11:00 hrs
	11/07/2019	06:00 hrs	10:45 hrs

Table 1: Counts of bird species recorded during the 2019 breeding bird season, including conservation and likely breeding status*

Species	Visit Number														Status	Likely Breeding Status (No. of pairs)	
	1		2		3		4		5		6		7			SB	SBU
	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U			
Blackbird	19	26	31	34	25	30	25	30	30	33	23	30	33	38		C (4) Pr (6)	C (4) Pr (6)
Blackcap	30	33	53	59	33	39	29	32	26	33	28	41	19	26		C (1) Pr (29)	C (1) Pr (33)
Black-headed Gull	18	27	2	4			1	3			2	2			BAm	C (2)	C (2)
Blue Tit	42	46	28	34	9	9	23	26	18	21	12	16	24	30		C (6) Pr (8)	C (6) Pr (9)
Bullfinch	1	2	11	12	6	6	10	13	4	4	12	12	4	6	S41, BAm, LBAP	Pr (6)	Pr (7)
Buzzard	4	6			3	4	2	2		1	2	2				Pr (1)	Pr (1)
Canada Goose	39	40	54	54	36	36	6	6	22	22	25	32	14	14		C (2) Pr (15)	C (2) Pr (15)

Species	Visit Number														Status	Likely Breeding Status (No. of pairs)	
	1		2		3		4		5		6		7			SB	SBU
	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U			
Carrion Crow	18	19	8	14	5	9	12	12	4	4	4	7	3	3		C(2) Pr (4)	C (2) Pr (7)
Cetti's Warbler	1	1	2	2	1	1					1	1	1	1	WCA1	Pr (1)	Pr (1)
Chaffinch	7	8	14	15	18	18	14	15	9	12	3	5	9	10		C (1) Pr (11)	C (1) Pr (13)
Chiffchaff	29	36	39	52	22	26	21	26	19	22	29	33	22	26		C (2) Pr (22)	C (5) Pr (24)
Coal tit	2	2	1	1			8	8		1	4	5	1	1		C (3)	C (4)
Collared Dove	2	2							1	1		1	1	1		Pr (1)	Pr (1)
Cormorant	4	7	1	1	1	3	1	1	1	4	3	6				Po	Po
Coot	27	27	19	20	24	24	23	24	15	16	33	33	30	30		C (7) Pr (8)	C (7) Pr (8)

Species	Visit Number														Status	Likely Breeding Status (No. of pairs)	
	1		2		3		4		5		6		7			SB	SBU
	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U			
Cuckoo			1	1	1	1		1		2					S41 BRd	Pr (1)	Pr (1)
Curlew							1	1							S41 BRd	N	N
Dunnock	15	16	22	23	8	11	14	15	6	6	20	25	1	5	S41 BAm	C (1) Pr (14)	C (2) Pr (14)
Feral Pigeon		6		12		10	4	4	1	11		10		3		N	Pr (5)
Gadwall	32	40	21	23	13	13	4	5	8	8	14	14	16	16	BAm	C (2) Pr (8)	C (2) Pr (9)
Garden Warbler							2	2								Po	Po
Goldcrest	2	2	2	2	3	3	3	3	14	16	5	5	2	2		Pr (3)	Pr (4)
Goldeneye	1	1													BAm	N	N



Species	Visit Number														Status	Likely Breeding Status (No. of pairs)	
	1		2		3		4		5		6		7			SB	SBU
	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U			
Goldfinch	10	11	7	9		1	11	11	10	10	7	9	5	15		C (1) Pr (3)	C (2) Pr (3)
Goosander							1	1								Po	Po
Grasshopper Warbler									3	3					S41 BRd	Po	Po
Great Crested Grebe	8	8	7	9	9	10	8	10	7	9	4	5	5	5		C (5)	C (6)
Great Spotted Woodpecker	8	9	8	8	6	6	15	17	6	6	2	3	6	6		C (3) Pr (1)	C (3) Pr (1)
Great Tit	52	56	21	24	14	17	5	5	8	8	11	15	7	8		C (3) Pr (9)	C (4) Pr (9)
Green Woodpecker					1	1							2	2		Pr (1)	Pr (1)
Greenfinch	8	8	1	1	1	1	4	4	2	4	3	5	2	2		Pr (2)	Pr (2)

Species	Visit Number														Status	Likely Breeding Status (No. of pairs)	
	1		2		3		4		5		6		7			SB	SBU
	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U			
Greylag Goose	4	4	2	2	1	1	1	1	6	6	4	4			BAm	Pr (2)	Pr (2)
Grey Heron	5	5	7	10	4	5	2	2	1	1	2	2	6	6		C (3)	C (3)
Herring Gull	1	1													S41 BRd	N	N
House Martin	5	5					4	4			1	1			BAm	N	Po
House Sparrow		1	1	1								2			S41 BRd LBAP	Po	Pr (1)
Jackdaw	4	4	9	10		1	3	3					3	3		Pr (2)	Pr (2)
Jay	4	5	3	4	6	7	6	8	2	4	1	1	5	5		C (1) Pr (2)	C (1) Pr (3)
Kestrel	2	4	1	1							2	2			BAm	Pr (1)	Pr (1)

Species	Visit Number														Status	Likely Breeding Status (No. of pairs)	
	1		2		3		4		5		6		7			SB	SBU
	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U			
Kingfisher					1	1	1	1	3	3	2	2	1	1	WCA1 BAm	C (1)	C (1)
Lapwing	8	8	6	11	3	11	2	2	3	3	3	7	18	18	S41 BRd LBAP	C (2) Pr (1)	C (2) Pr (3)
Lesser Black Backed Gull	6	6	2	2		2	3	3			2	3			BAm	N	N
Lesser Spotted Woodpecker	2	2	1	1	1	1	1	1							S41 BRd	C (1)	C (1)
Lesser Whitethroat											1	1	1	1		Pr (1)	Pr (1)
Linnet	2	2			1	1	1	1							S41 BRd LBAP	Pr (1)	Pr (1)
Little Grebe	9	9	11	11	8	8	6	6	7	7	11	11	12	12		C (2) Pr (3)	C (2) Pr (3)
Little Ringed Plover					2	2			1	1					WCA1	Pr (1)	Pr (1)

Species	Visit Number														Status	Likely Breeding Status (No. of pairs)	
	1		2		3		4		5		6		7			SB	SBU
	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U			
Long-tailed Tit	8	11	11	13	8	9	18	18	20	21	2	2	22	27		C (11)	C (12)
Magpie	9	19	5	14	4	7	10	11	6	10	6	8	9	9		C (1) Pr (4)	C (1) Pr (6)
Mallard	20	21	14	19	12	13	11	17	13	15	58	59	36	39	BAm	C (2) Pr (5)	C (3) Pr (6)
Marsh Tit			1	1					2	2					S41 BRd	Pr (1)	Pr (1)
Mistle Thrush	2	2	2	2			1	1							BRd	Pr (2)	Pr (2)
Moorhen	4	4	5	5	1	1	6	6			7	7	2	2		C (1) Pr (2)	C (1) Pr (2)
Mute Swan	3	3	4	4	3	3	5	5	4	4	1	4			BAm	C (1) Pr (1)	C (1) Pr (1)
Nuthatch	5	7	1	1					1	1	11	11				Pr (5)	Pr (5)

Species	Visit Number														Status	Likely Breeding Status (No. of pairs)	
	1		2		3		4		5		6		7			SB	SBU
	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U			
Oystercatcher	18	25	3	4	4	6	6	7	2	2	2	3	2	2	BAm	Pr (1)	Pr (1)
Pheasant		4		2		2	1	4				1		1		Po	Pr (1)
Pied Wagtail			2	2		1	2	2	3	3			2	2		Pr (1)	Pr (1)
Pintail									2	2					BAm	N	N
Pochard			4	4	1	1	3	3					5	5	BRd	Pr (2)	Pr (2)
Redwing	1	1													WCA1 BRd	N	N
Reed Bunting	5	6	6	6	4	5	5	8	6	7	4	5	1	2	S41 BAm LBAP	Pr (4)	Pr (6)
Reed Warbler			5	5	11	12	4	4	6	6	11	11	2	3		C (1) Pr (5)	C (1) Pr (6)



Species	Visit Number														Status	Likely Breeding Status (No. of pairs)	
	1		2		3		4		5		6		7			SB	SBU
	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U			
Robin	39	42	43	47	45	54	27	30	12	20	16	20	25	25		C (2) Pr (31)	C (3) Pr (34)
Sand Martin			1	1		1	4	4			1	1	11	12		Pr (colony)	Pr (colony)
Sedge Warbler						2	4	5	2	5	1	1	5	5		Pr (3)	Pr (5)
Shelduck	20	20	11	13	7	7				8					BAm	Pr (2)	Pr (2)
Shoveler	5	5													BAm	Po	Po
Skylark								1							S41 BRd LBAP	N	Po
Song Thrush	10	12	19	21	17	20	14	16	17	19	17	23	8	9	S41 BRd LBAP	C (1) Pr (12)	C (1) Pr (15)
Sparrowhawk	1	1											1	1		Pr (1)	Pr (1)



Species	Visit Number														Status	Likely Breeding Status (No. of pairs)	
	1		2		3		4		5		6		7			SB	SBU
	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U			
Starling	2	2			1	1					1	1			S41 BRd LBAP	Po	Pr (1)
Stock Dove		2	4	4			6	8			1	2	1	1	BAm	Pr (2)	Pr (2)
Stonechat									6	6						Po	Po
Swallow							3	3	5	7				1		N	Po
Swift						2	28	28	2	2	2	4			BAm	N	Po
Tawny Owl			1	1											BAm	Po	Po
Teal	4	4	9	9							4	4	6	7	BAm	C (1) Pr (2)	C (1) Pr (2)
Tree Sparrow									1	1					S41 BRd LBAP	Po	Po

Species	Visit Number														Status	Likely Breeding Status (No. of pairs)	
	1		2		3		4		5		6		7			SB	SBU
	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U			
Treecreeper	2	2	2	2	3	3	1	1	4	4	1	1	5	5		C (2) Pr (2)	C (2) Pr (2)
Tufted Duck	27	27	40	40	17	17	11	15	9	11	27	27	20	20		Pr (14)	Pr (14)
Whitethroat			8	19	15	23	19	22	21	31	15	19	11	19		C (4) Pr (6)	C (5) Pr (14)
Willow Tit	1	1									1	1	1	1	S41 BRd	Pr (1)	Pr (1)
Willow Warbler	3	3	9	11	9	9	10	10	9	9	9	9	1	2	BAm	Pr (9)	Pr (9)
Woodpigeon	22	24	15	59	13	20	25	27	19	28	15	25	26	28		C (2) Pr (10)	C (2) Pr (12)
Wood Warbler														1	S41 BRd	N	Po
Wren	53	57	46	56	34	44	53	57	55	63	53	66	59	68		C (5) Pr (42)	C (6) Pr (50)

Species	Visit Number														Status	Likely Breeding Status (No. of pairs)	
	1		2		3		4		5		6		7			SB	SBU
	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U	S B	S B U			
Total	59	64	58	61	49	58	61	63	52	56	56	60	51	55			

Status Key: WCA1 = Schedule 1, S41 = Section 41; BRd = BoCC Red List; BAm = BoCC Amber List; LBAP = Local Biodiversity Action Plan Species.

Likely Breeding Status Key: C = Confirmed, Pr = probably breeding within site, Po = possibly breeding within site, N = not breeding within site.

Results Summary

- 4.1 This breeding bird survey has been conducted to identify areas of importance for birds and any constraints concerning birds for any future proposals.
- 4.1 There are historic records of 63 notable species that have been recorded at the site and surrounding area, of which the following bird species were recorded within the site and/or 100m survey buffer during the 2019 breeding bird survey:
- Black-headed gull
 - Bullfinch
 - Cetti's warbler
 - Cuckoo
 - Curlew
 - Dunnock
 - Gadwall
 - Herring gull
 - House martin
 - House sparrow
 - Kestrel
 - Kingfisher
 - Lapwing
 - Lesser black-backed gull
 - Lesser spotted woodpecker
 - Little ringed plover
 - Mallard
 - Marsh tit
 - Mistle thrush
 - Oystercatcher
 - Pochard
 - Reed bunting
 - Shoveler
 - Skylark
 - Song thrush
 - Starling
 - Stock dove
 - Swift
 - Teal
 - Tree sparrow
 - Willow warbler
- 4.2 A total of 88 bird species were recorded within the site boundary and 100m buffer during the breeding bird survey, with 85 bird species recorded within the site itself.
- 4.3 Thirty five bird species were confirmed to be breeding within the site boundary and 100m buffer. Of these the following are considered notable:
- black-headed gull (2 confirmed pairs)
 - dunnock (2 confirmed and 14 probable pairs)
 - gadwall (2 confirmed and 9 probable pairs)

- kingfisher (1 confirmed pair)
- lapwing (2 confirmed and 3 probable pairs)
- lesser spotted woodpecker (1 confirmed pair)
- mallard (3 confirmed and 6 probable pairs)
- mute swan (1 confirmed and 1 probable pair)
- song thrush (1 confirmed and 15 probable pairs); and
- teal (1 confirmed and 2 probable pairs).

4.4 Thirty three probable breeding bird species were recorded within the site and 100m buffer during the breeding bird survey. Of these species the following are considered notable:

- bullfinch (7 probable pairs)
- Cetti's warbler (1 probable pair)
- cuckoo (1 probable pair)
- greylag goose (2 probable pairs)
- house sparrow (1 probable pair)
- kestrel (1 probable pair)
- linnet (1 probable pair)
- little ringed plover (1 probable pair)
- marsh tit (1 probable pair)
- mistle thrush (2 probable pairs)
- oystercatcher (1 probable pair)
- pochard (2 probable pairs)
- reed bunting (6 probable pairs)
- shelduck (2 probable pairs)
- starling (1 probable pairs)
- stock dove (2 probable pairs)
- willow tit (1 probable pair); and
- willow warbler (9 probable pairs).

5.0 Evaluation and Conclusion

- 5.1 The 88 bird species recorded within the site boundary and 100m survey buffer represents a high species diversity with a large number of notable bird species recorded during the survey. The 85 bird species recorded within the site itself also represents a high species diversity.
- 5.2 Fuller (1980) devised a method of classifying the ornithological interest of sites for conservation based on three site attributes: population size, rarity and diversity.
- 5.3 No significant breeding bird concentrations (i.e. 1% or more of the national breeding population) or nationally rare breeding bird species (i.e. between 1 and 1,000 breeding pairs) (Musgrove *et al.* 2013) were recorded during the survey.
- 5.4 Six bird species classed as rare or scarce breeding species within the Cheshire Region (Norman, 2008) were recorded to be confirmed or probable breeders within the site during the 2019 breeding bird survey: cuckoo, gadwall, lesser spotted woodpecker, marsh tit, pochard and willow tit.
- 5.5 The total number of confirmed, probable and possible breeding bird species recorded within a site also indicates its significance. Table 2 includes the breeding diversity criteria devised by Fuller.

Table 2: Significance of the total number of breeding species recorded at a site

Local	County	Regional	National
25-49	50-69	70-84	85+

- 5.6 Based on the above criteria, the 81 confirmed, probable and possible breeding bird species recorded within the site and surrounding 100m buffer and the 75 confirmed, probable and possible breeding bird species within the site itself indicates that it is of Regional significance for breeding birds. This level of importance is also confirmed by the presence of six breeding species which are rare or scarce in Cheshire.
- 5.7 Three bird species listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) were assessed as confirmed or probable breeding species within the proposed site boundary, these are kingfisher, little ringed plover and Cetti's warbler all of which usually nest close to water. All birds are protected under the Wildlife and Countryside Act 1981 (as amended), making it an offence to intentionally take, damage or destroy the nest of any wild bird whilst it is in use. However, additional protection is provided to certain species of bird under Schedule 1 of the Wildlife and Countryside Act 1981. For these species it is an offence to intentionally or recklessly disturb adult birds or dependant young while at or near to an active nest.

- 5.8 Kingfisher nest along large, slow flowing rivers and their tributaries, canals and lakes with suitable banks for nesting and shallow edges for fishing. One breeding pair of kingfisher was confirmed at the site, evidenced by adults with juveniles observed close to the lake in the west of the site during survey visit 5 on 20th June 2019.
- 5.9 Little ringed plover nest on bare ground, usually close to fresh water, on sites including gravel quarries and reservoirs. One probable pair of little ringed plover likely nested close to the water bodies in the south of the proposed site.
- 5.10 Cetti's warbler breeds in dense scrub in damp low-lying places where there is bramble and willow and reed beds close by. One probable pair of Cetti's warbler likely nested close to the water body in the south east of the proposed site.
- 5.11 A number of notable bird species associated with nesting in or close to wetland area were assessed as confirmed or probable breeding species during the survey. These are black-headed gull, gadwall, lapwing, mallard, mute swan, teal, greylag goose, oystercatcher, pochard, reed bunting and shelduck that were observed using the waterbodies and land immediately adjacent to the waterbodies during the breeding bird survey. The loss of these areas will result in a reduction of suitable nesting habitat for these bird species and other species of wildfowl, wader and waterbird species, resulting in displacement from the site to suitable nesting habitats in the wider area.
- 5.12 Notable bird species associated with nesting in woodland and trees were also assessed as confirmed or probable breeding species at the site. One pair of lesser spotted woodpecker was confirmed to be breeding at the site, with an active nest noted within the semi-natural woodland in the north west of the site noted during survey visits two and three. Lesser spotted woodpecker nest in cavities, excavated in rotten wood of alder, willow, poplar and birch trees. Rotting branches are essential for nesting lesser spotted woodpecker, so the species prefers moist to dry broadleaf woodlands.
- 5.13 One probable breeding pair of marsh tit and willow tit were also recorded during the breeding bird survey.
- 5.14 A probable breeding pair of marsh tit were recorded in the north of Moss Wood in the east of the site during survey visit five on 20th June 2019. Marsh tit tend to nest in a hole in a tree or stump and sometimes in a wall or in the ground. This species favours continuous, preferably moist, broadleaf woodland with a well-structured understorey.
- 5.15 An individual willow tit was noted in woodland in the west of the site during three survey visits. During survey visits six and seven an individual willow tit was observed alarm calling. Willow tit nest in damp woodland, copses and open scrub with small rotten boughs or stumps, where they excavate a nest cavity, typically less than 2m from the ground. Birch, willow and elder are favoured.

-
- 5.16 Other notable bird species that were confirmed or likely to have bred in trees and woodland areas including woodland edge of the site include bullfinch, dunnock, kestrel song thrush, mistle thrush, stock dove and willow warbler.
- 5.17 If it is necessary to remove woodland and trees within the site and around the site perimeter, this would reduce the amount of breeding and nesting habitat available for these species and could potentially result in the loss of these species from the site if suitable mitigation is not implemented.
- 5.18 One probable pair of breeding cuckoo were noted at the site during the breeding bird survey. Cuckoo breed in a range of habitats, laying their eggs in the nest of a 'host' bird species. Breeding habitats used by cuckoo include woodland, scrub, rough grassland, moorland, heaths, reed beds and marshes and is dependent on the main 'host' species used. A singing cuckoo was recorded in the west of the site during survey visits two and three undertaken in April and May 2019.
- 5.19 All wild birds and their nests and eggs are protected under the *Wildlife and Countryside Act 1981*, as amended. It is recommended that all tree and vegetation clearance across site avoids the core breeding bird season, March to August inclusive; although bird nesting can take place outside this period. If vegetation clearance works are necessary during the core breeding bird season, or at any time when bird nesting is suspected, a nesting bird check of the affected area by an ecologist is required immediately prior to the clearance works taking place. Extensive clearance of potential bird nesting habitat is not always practical and development programmes should take this constraint into account.

6.0 References

Eaton, M., Aebischer, N., Brown, A., Hearn, R., Lock, L., Musgrove, A., Noble, D., Stroud, D. and Gregory, R., 2015. Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man. *British Birds*, 108, pp.708-746.

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DRAWINGS

G6929.01.043 BBS BOCC, Waders and Wildfowl Visit 1

G6929.01.044 BBS BOCC, Waders and Wildfowl Visit 2

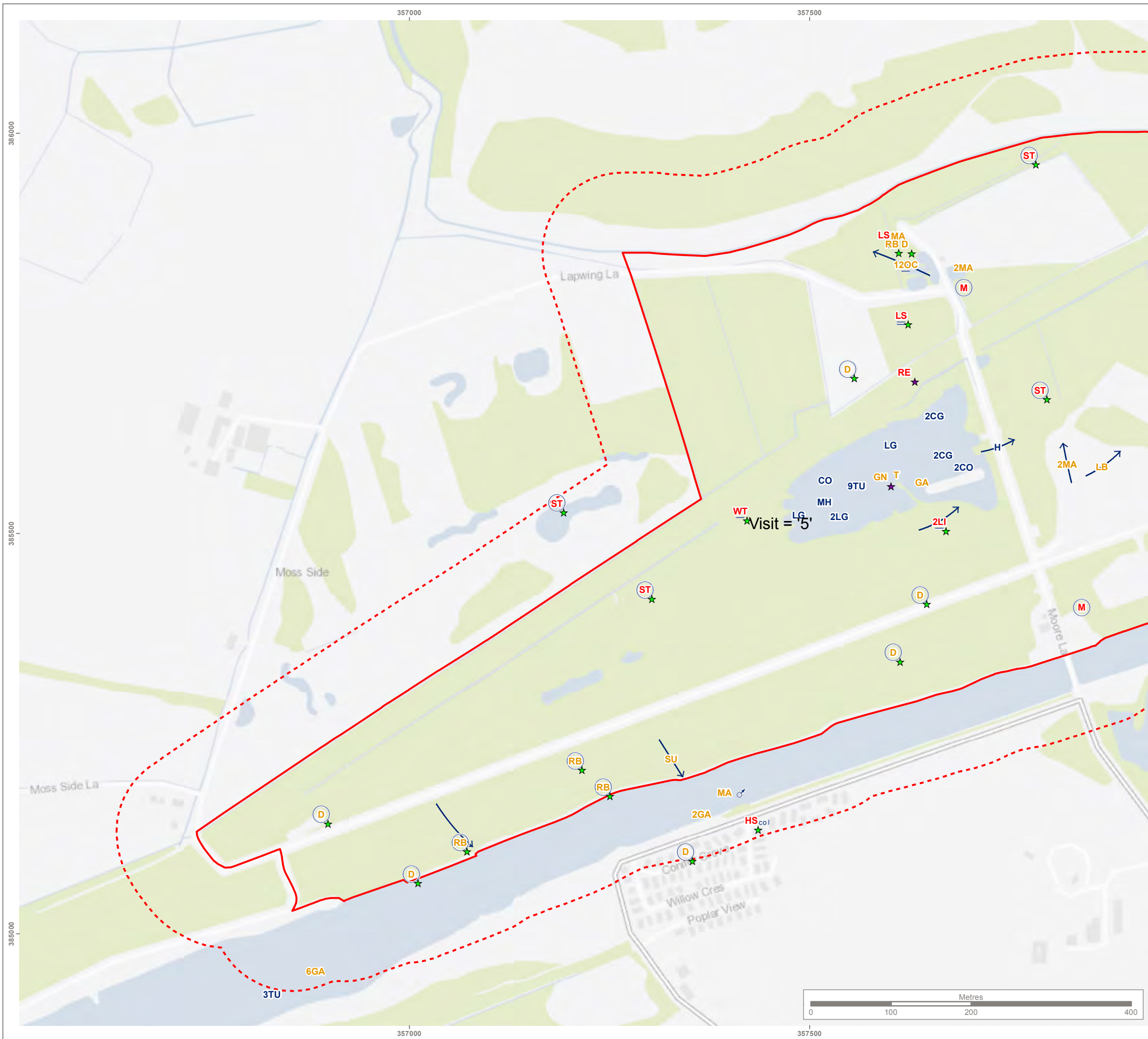
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G6929.01.047 BBS BOCC, Waders and Wildfowl Visit 5

G6929.01.048 BBS BOCC, Waders and Wildfowl Visit 6

G6929.01.049 BBS BOCC, Waders and Wildfowl Visit 7



KEY

- Survey boundary
- Survey boundary - 100m offset
- ★ Section 41 species
- ★ Schedule 1 species
- A bird calling
- A bird in song
- A bird repeatedly giving alarm-calls/other vocalisations
- ♂ A male
- ∞ A colony of birds
- Directional flight line

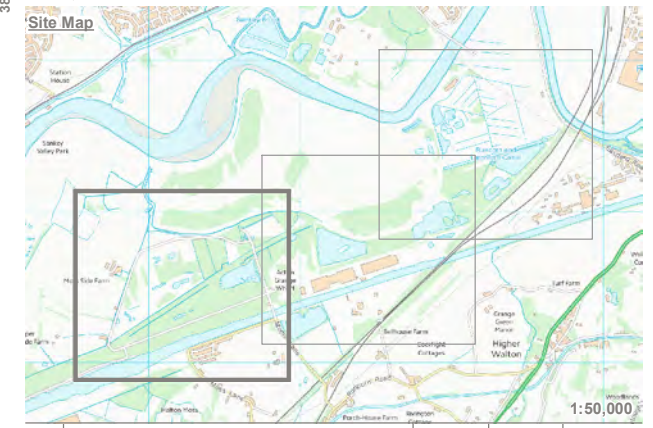
Species List

CG Canada goose	LB Lesser black-backed gull	OC Oystercatcher
CO Coot	LG Little grebe	RB Reed bunting
D Dunnock	LI Linnet	RE Redwing
GA Gadwall	LS Lesser spotted woodpecker	ST Song thrush
GN Goldeneye	M Mistle thrush	SU Shelduck
H Grey heron	MA Mallard	T Teal
HS House sparrow	MH Moorhen	TU Tufted duck
		WT Willow tit

Note

Red Red List Species **Amber** Amber List Species

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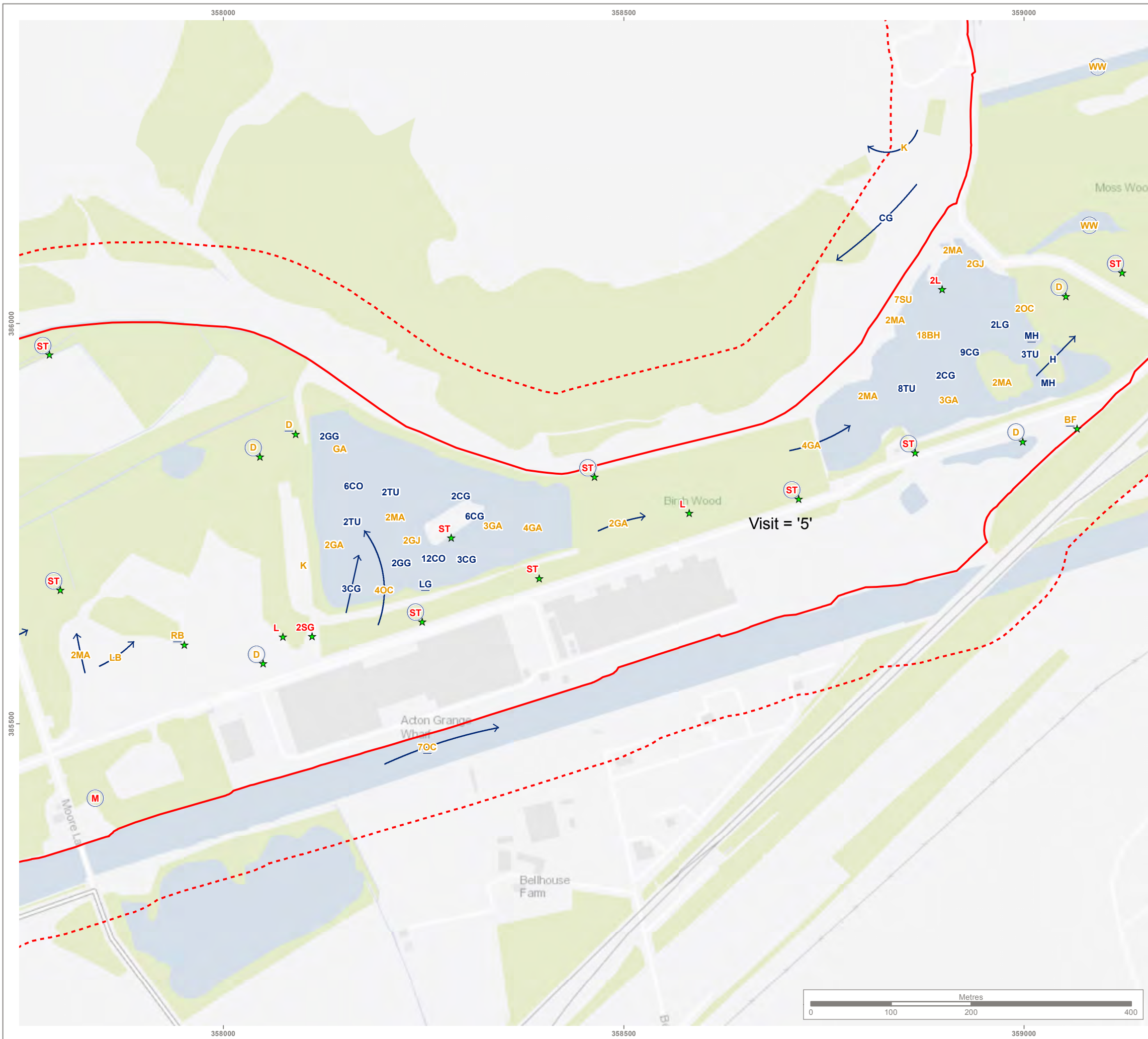
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Tel 01925 844004 e-mail tep@tep.uk.com www.tep.uk.com

Project
Port Warrington, Warrington

Title
Breeding Bird Survey - Birds of Conservation Concern, Waders and Wildfowl. Visit 1 - 10th April 2019

Drawing Number
G6929.01.043.1

Drawn AP	Checked MK/LJ	Approved IH	Scale 1:4,750 @ A3	Date 12/08/2019
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KEY

- Survey boundary
- Survey boundary - 100m offset
- ★ Section 41 species
- A bird calling
- A bird in song
- Directional flight line

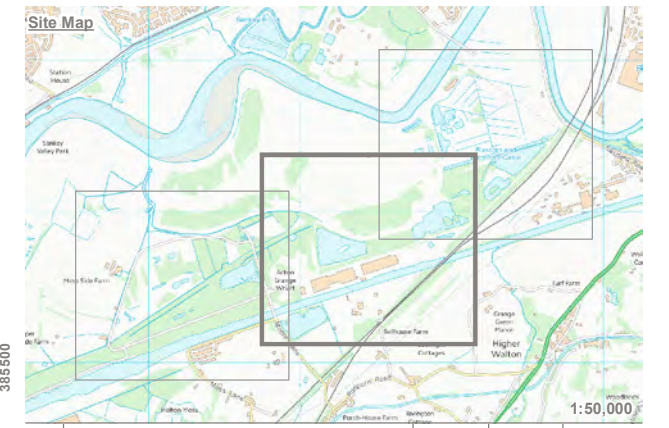
Species List

BF Bullfinch	H Grey heron	MH Moorhen
BH Black-headed gull	K Kestrel	OC Oystercatcher
CG Canada goose	L Lapwing	RB Reed bunting
CO Coot	LB Lesser black-backed gull	SG Starling
D Dunnock	LG Little grebe	ST Song thrush
GA Gadwall	M Mistle thrush	SU Shelduck
GG Great crested grebe	MA Mallard	TU Tufted duck
GJ Greylag goose		WW Willow warbler

Note

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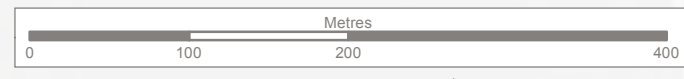
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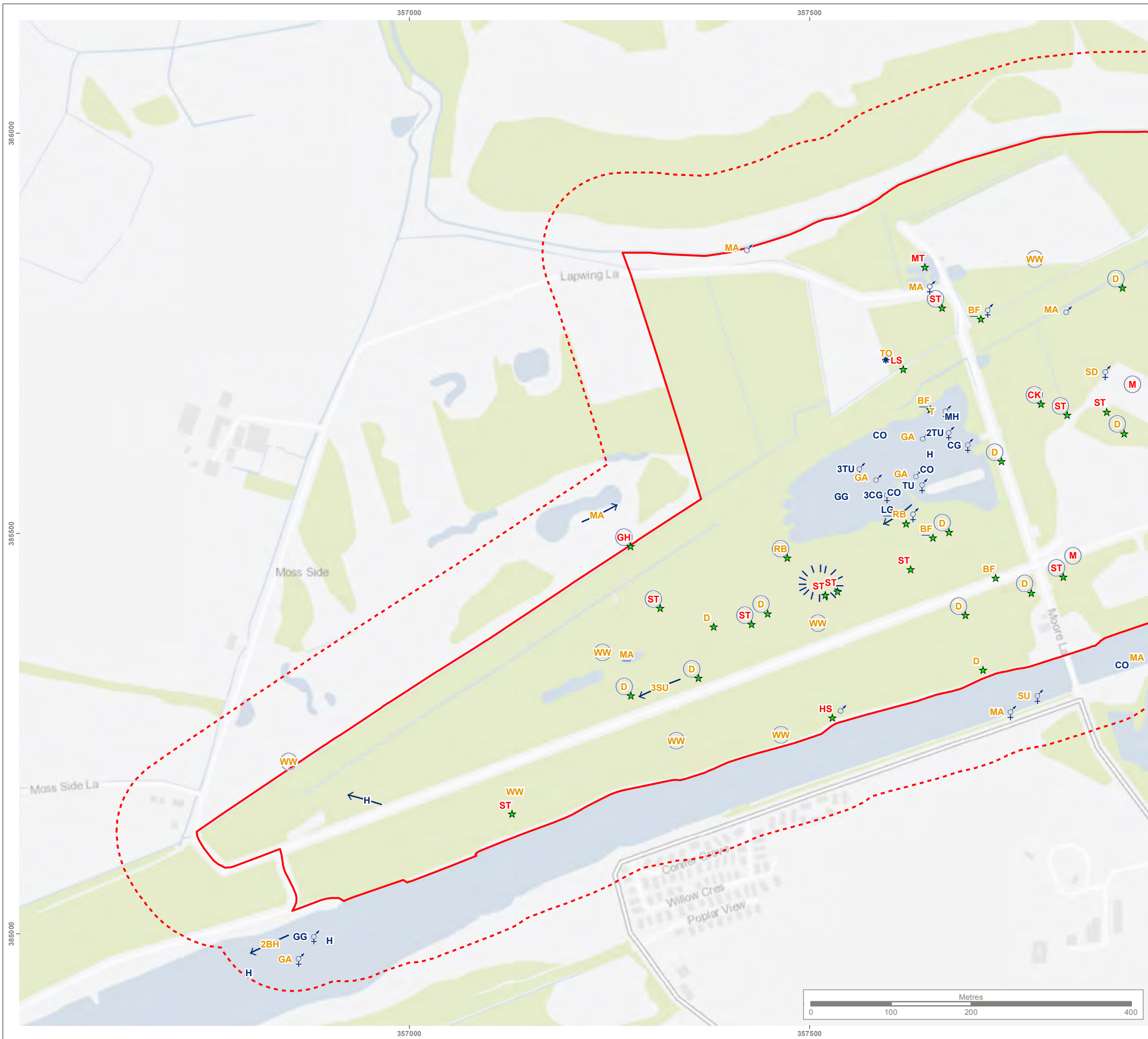
Project
Port Warrington, Warrington

Title
Breeding Bird Survey - Birds of Conservation Concern, Waders and Wildfowl. Visit 1 - 10th April 2019

Drawing Number
G6929.01.043.2 Sheet 2 of 3

Drawn	Checked	Approved	Scale	Date
AP	MK/LJ	IH	1:4,750 @ A3	12/08/2019





KEY

- Survey boundary
- Survey boundary - 100m offset
- ★ Section 41 species
- A bird calling
- A bird in song
- ✱ A nest occupied with eggs/brood
- ☀ An aggressive encounter between two birds
- ♂ A male
- ♀ Male and female pair
- Directional flight line

Species List

BF Bullfinch	H Grey heron	RB Reed bunting
BH Black-headed gull	HS House sparrow	SD Stock dove
CG Canada goose	LG Little grebe	ST Song thrush
CK Cuckoo	LS Lesser spotted woodpecker	SU Shelduck
CO Coot	M Mistle thrush	T Teal
D Dunnock	MA Mallard	TO Tawny owl
GA Gadwall	MH Moorhen	TU Tufted duck
GG Great crested grebe	MT Marsh tit	WW Willow warbler
GH Grasshopper warbler		

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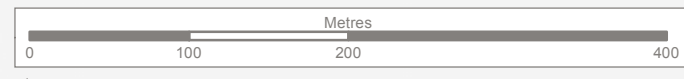
Project
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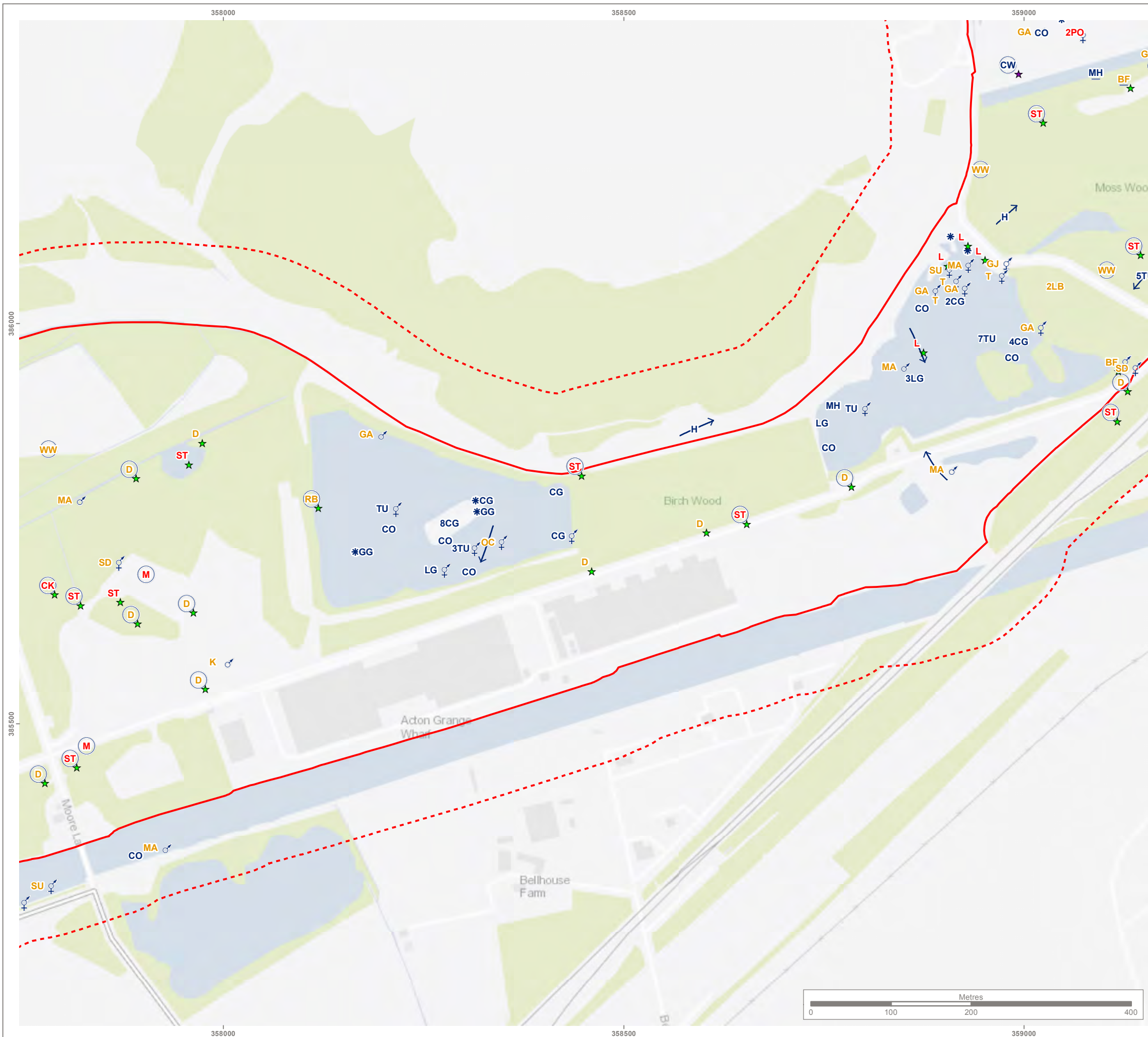
Title
Birds of Conservation Concern, Waders and Wildfowl Visit 2 - 22nd and 23rd April 2019

Drawing Number
G6929.01.044.1

Sheet 1 of 3

Drawn AP	Checked MK/LJ	Approved IH	Scale 1:4,750 @ A3	Date 12/08/2019
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KEY

- Survey boundary
- Survey boundary - 100m offset
- ★ Section 41 species
- ★ Schedule 1 species
- A bird calling
- A bird in song
- * A nest occupied with eggs/brood
- ♀ A female
- ♂ A male
- ♂♀ Male and female pair
- Directional flight line

Species List

BF Bullfinch	H Grey heron	OC Oystercatcher
CG Canada goose	K Kestrel	PO Pochard
CK Cuckoo	L Lapwing	RB Reed bunting
CO Coot	LB Lesser black-backed gull	SD Stock dove
CW Cetti's warbler	LG Little grebe	ST Song thrush
D Dunnock	M Mistle thrush	SU Shelduck
GA Gadwall	MA Mallard	T Teal
GG Great crested grebe	MH Moorhen	TU Tufted duck
GJ Greylag goose		WW Willow warbler

Note

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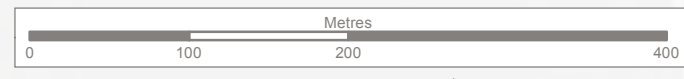
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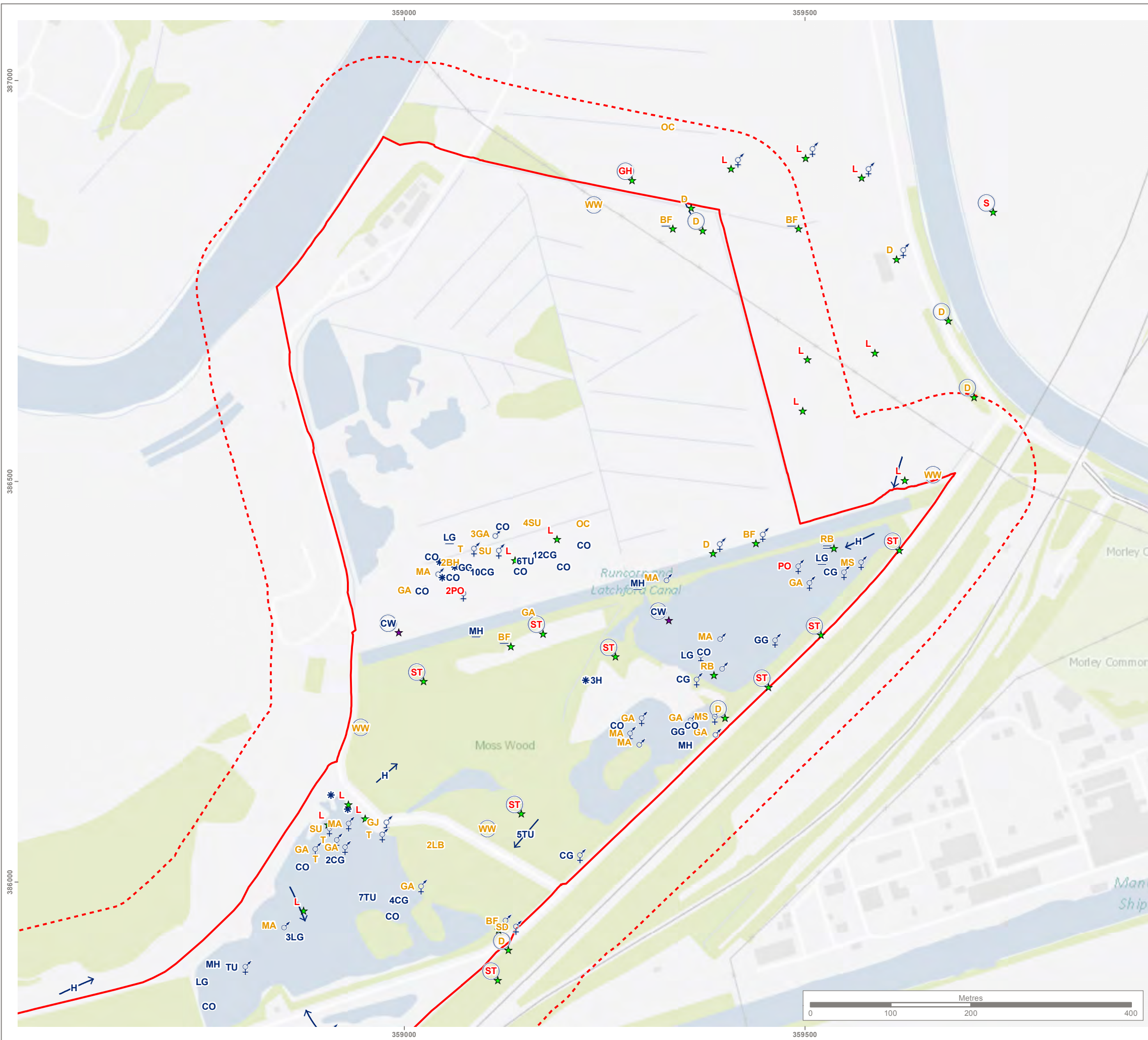
Project
Port Warrington, Warrington

Title
Birds of Conservation Concern, Waders and Wildfowl Visit 2 - 22nd and 23rd April 2019

Drawing Number
G6929.01.044.2 Sheet 2 of 3

Drawn AP	Checked MK/LJ	Approved IH	Scale 1:4,750 @ A3	Date 12/08/2019
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KEY

- Survey boundary
- Survey boundary - 100m offset
- ★ Section 41 species
- ★ Schedule 1 species
- A bird calling
- A bird in song
- A bird repeatedly giving alarm-calls/other vocalisations
- ★ A nest occupied with eggs/brood
- ♀ A female
- ♂ A male
- ♂♀ Male and female pair
- Directional flight line
- Simultaneous registration (different birds)

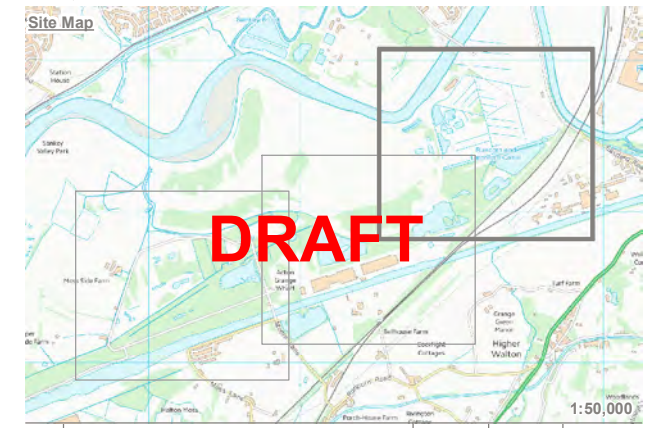
Species List

BF Bullfinch	GJ Greylag goose	PO Pochard
BH Black-headed gull	H Grey heron	RB Reed bunting
CG Canada goose	L Lapwing	S Skylark
CO Coot	LB Lesser black-backed gull	SD Stock dove
CW Cetti's warbler	LG Little grebe	ST Song thrush
D Dunnock	MA Mallard	SU Shelduck
GA Gadwall	MH Moorhen	T Teal
GG Great crested grebe	MS Mute swan	TU Tufted duck
GH Grasshopper warbler	OC Oystercatcher	WW Willow warbler

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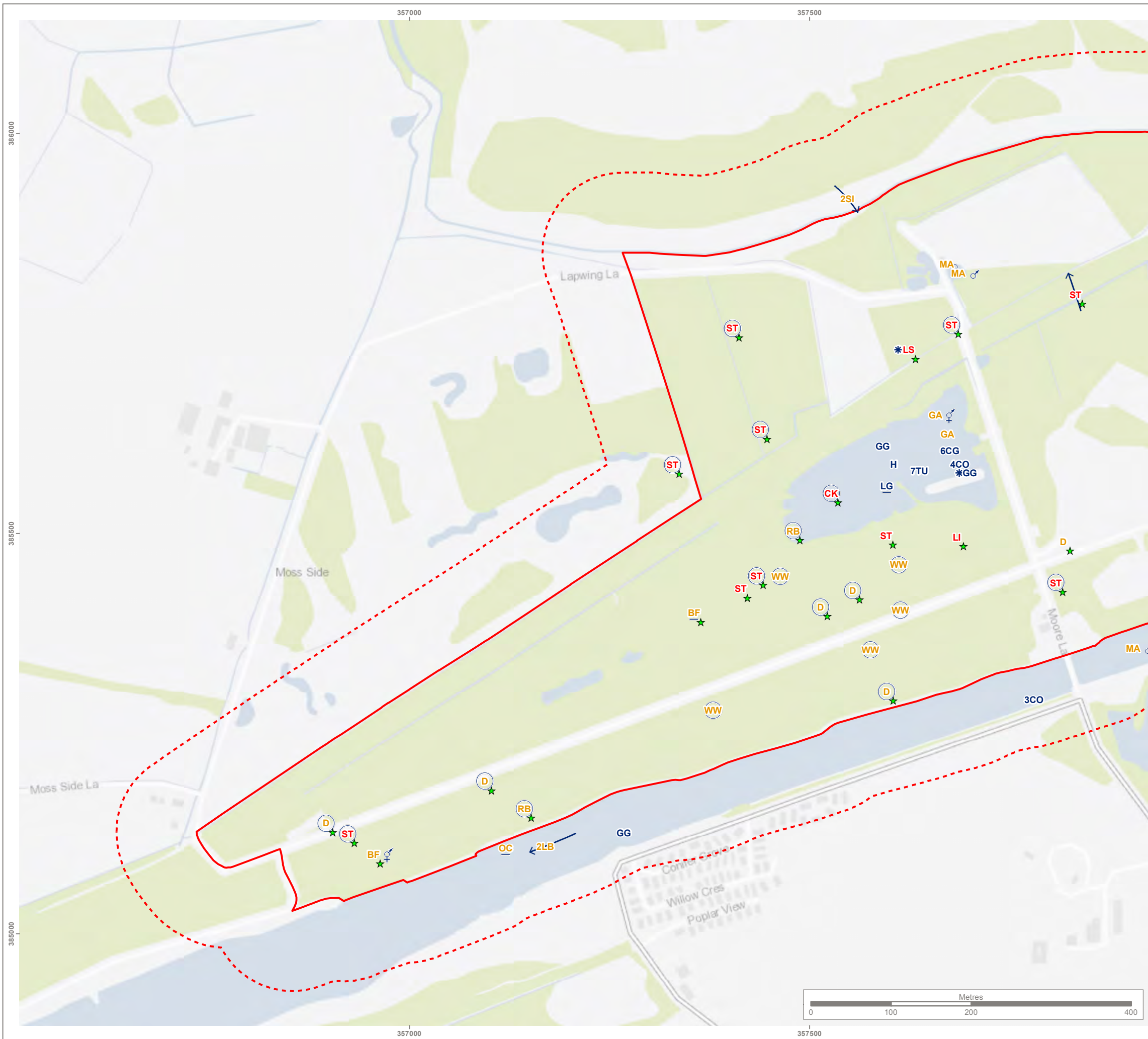
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Project: **Port Warrington, Warrington**

Title: **Birds of Conservation Concern, Waders and Wildfowl Visit 2 - 22nd and 23rd April 2019**

Drawing Number: **G6929.01.044.3** Sheet 3 of 3

Drawn	Checked	Approved	Scale	Date
AP	MK/LJ	IH	1:4,750 @ A3	12/08/2019



KEY

- Survey boundary
- Survey boundary - 100m offset
- ★ Section 41 species
- A bird calling
- A bird in song
- * A nest occupied with eggs/brood
- ♀ A female
- ♂ A male
- ♂ ♀ Male and female pair
- Directional flight line

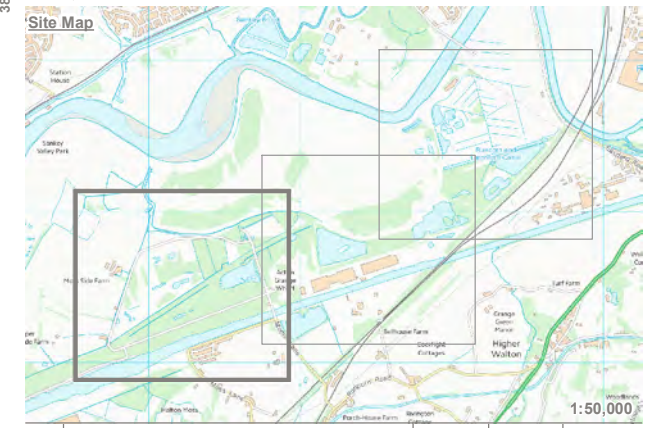
Species List

BF Bullfinch	H Grey heron	OC Oystercatcher
CG Canada goose	LB Lesser black-backed gull	RB Reed bunting
CK Cuckoo	LG Little grebe	SI Swift
CO Coot	LI Linnet	ST Song thrush
D Dunnock	LS Lesser spotted woodpecker	TU Tufted duck
GA Gadwall	MA Mallard	WW Willow warbler
GG Great crested grebe		

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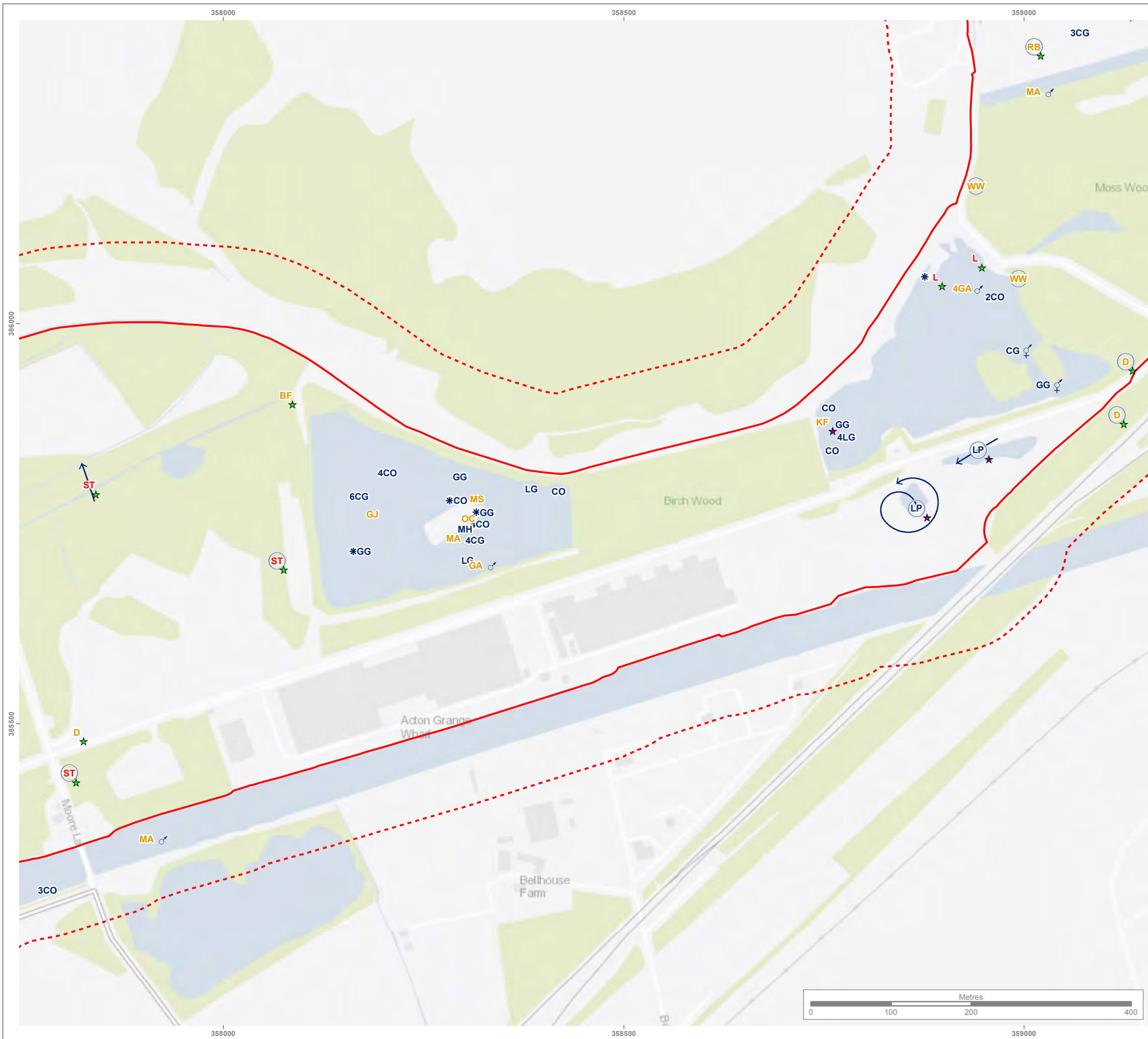
Project
Port Warrington, Warrington

Title
Breeding Bird Survey - Birds of Conservation Concern, Waders and Wildfowl. Visit 3 - 15th May 2019

Drawing Number
G6929.01.045.1

Sheet 1 of 3

Drawn AP	Checked MK/LJ	Approved IH	Scale 1:4,750 @ A3	Date 12/08/2019
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KEY

- Survey boundary
- Survey boundary - 100m offset
- ★ Section 41 species
- ★ Schedule 1 species
- A bird in song
- * A nest occupied with eggs/brood
- ♂ A male
- ♀ Male and female pair
- Directional flight line

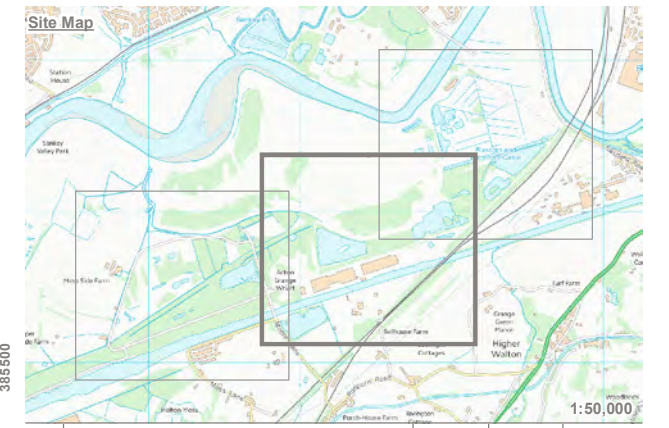
Species List

BF Bullfinch	GJ Greylag goose	MH Moorhen
CG Canada goose	KF Kingfisher	MS Mute swan
CO Coot	L Lapwing	OC Oystercatcher
D Dunnock	LG Little grebe	RB Reed bunting
GA Gadwall	LP Little ringed plover	ST Song thrush
GG Great crested grebe	MA Mallard	WW Willow warbler

Note

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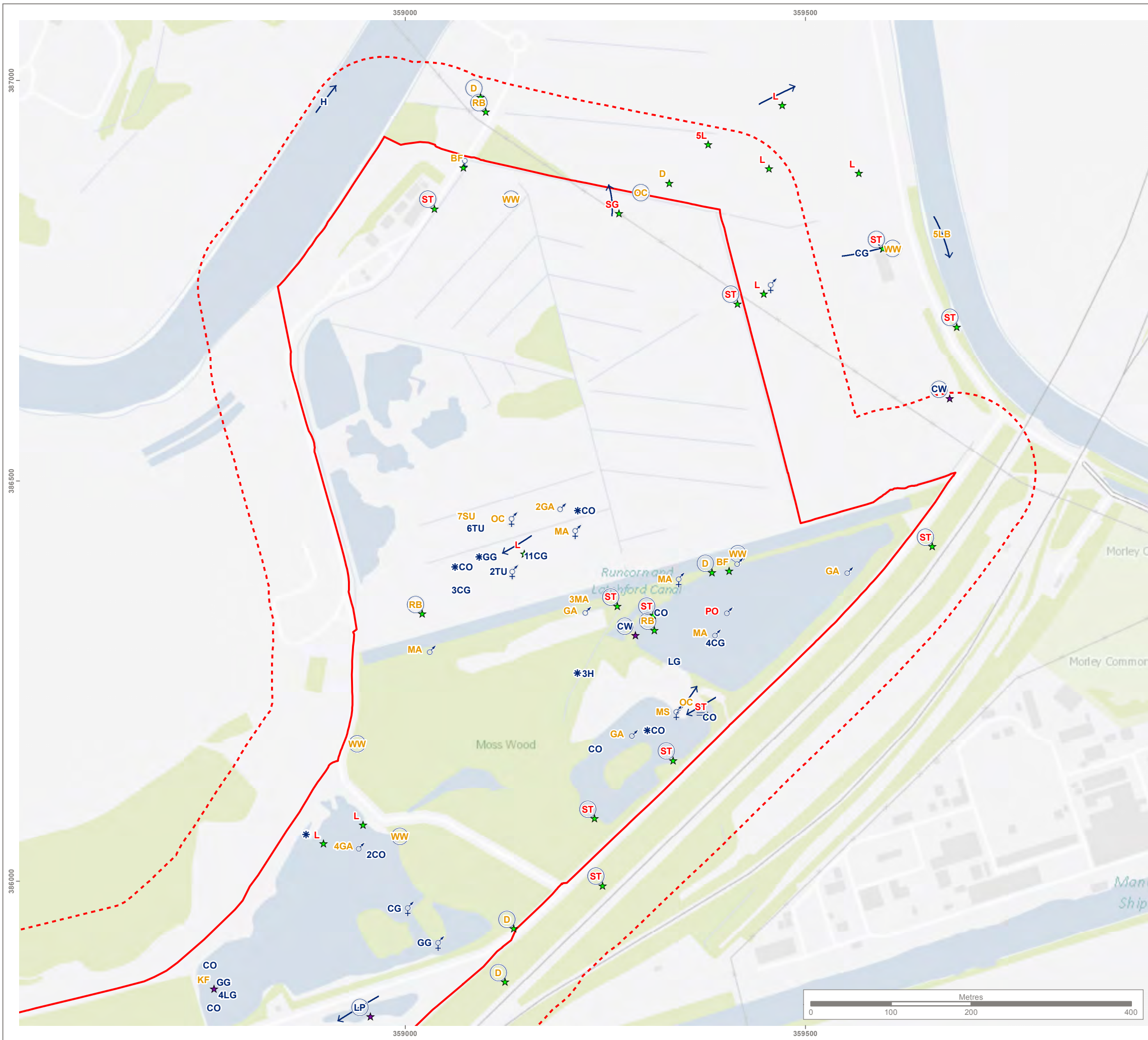
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Project
Port Warrington, Warrington

Title
Breeding Bird Survey - Birds of Conservation Concern, Waders and Wildfowl. Visit 3 - 15th May 2019

Drawing Number
G6929.01.045.2 Sheet 2 of 3

Drawn AP	Checked MK/LJ	Approved IH	Scale 1:4,750 @ A3	Date 12/08/2019
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KEY

- Survey boundary
- Survey boundary - 100m offset
- ★ Section 41 species
- ★ Schedule 1 species
- A bird in song
- A bird repeatedly giving alarm-calls/other vocalisations
- ★ A nest occupied with eggs/brood
- ♀ A female
- ♂ A male
- ♂♀ Male and female pair
- Directional flight line

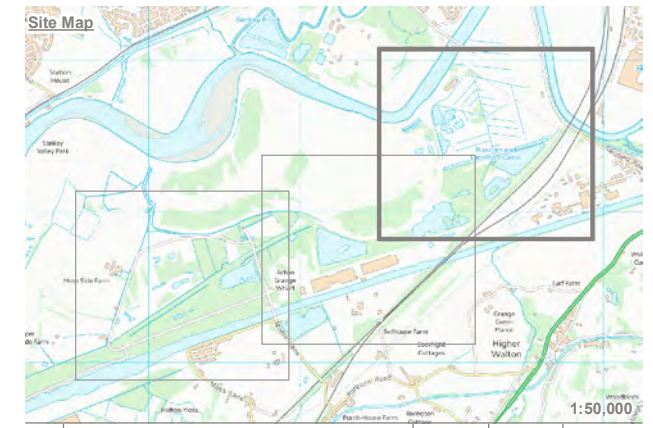
Species List

BF Bullfinch	KF Kingfisher	OC Oystercatcher
CG Canada goose	L Lapwing	PO Pochard
CO Coot	LB Lesser black-backed gull	RB Reed bunting
CW Cetti's warbler	LG Little grebe	SG Starling
D Dunnock	LP Little ringed plover	ST Song thrush
GA Gadwall	MA Mallard	SU Shelduck
GG Great crested grebe	MS Mute swan	TU Tufted duck
H Grey heron		WW Willow warbler

Note

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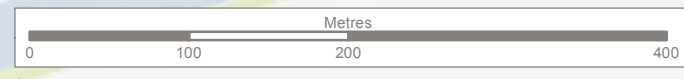
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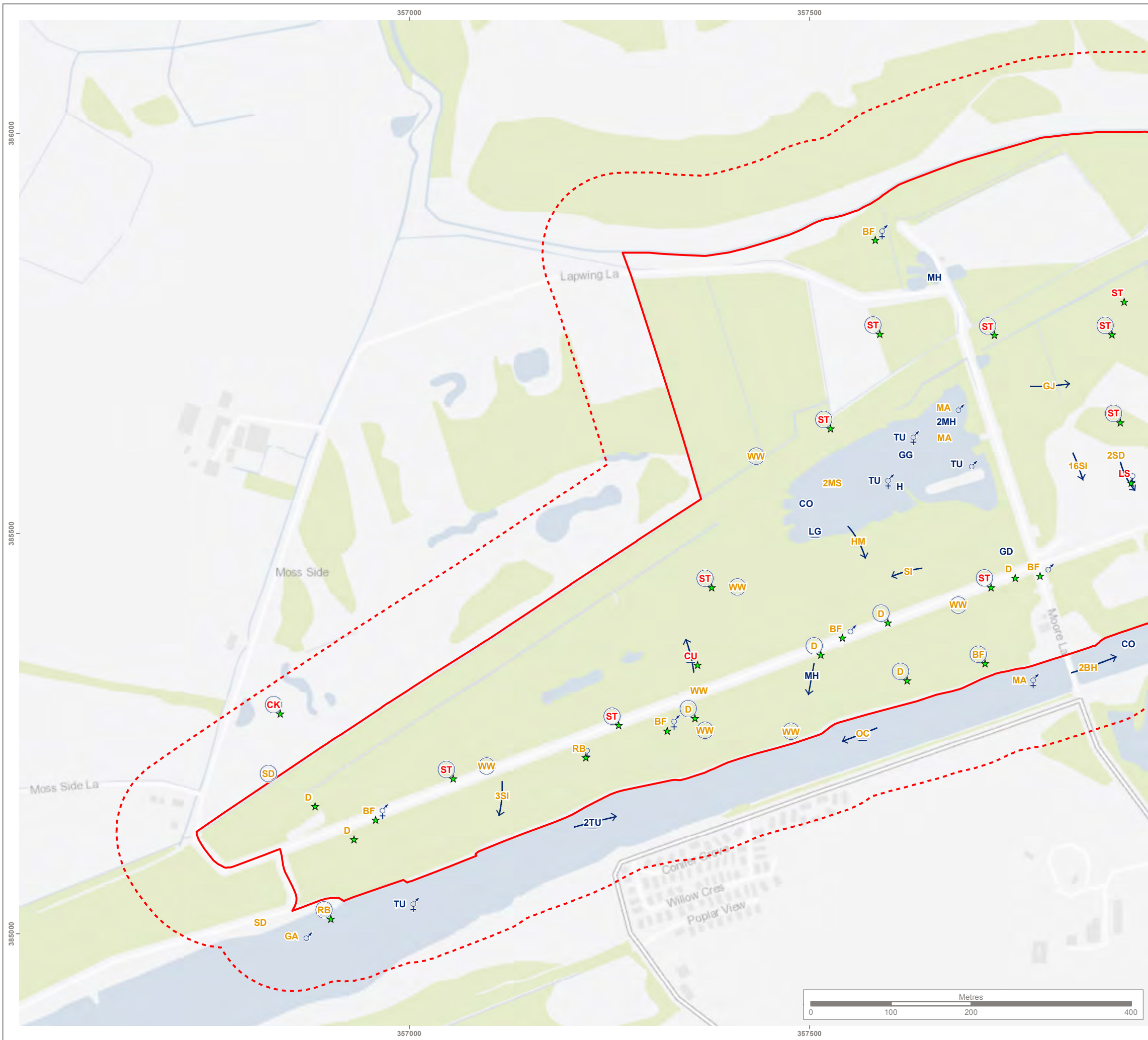
Project
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Title
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Drawing Number
G6929.01.045.3 Sheet 3 of 3

Drawn AP	Checked MK/LJ	Approved IH	Scale 1:4,750 @ A3	Date 12/08/2019
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KEY

- Survey boundary
- Survey boundary - 100m offset
- ★ Section 41 species
- A bird calling
- A bird in song
- ♀ A female
- ♂ A male
- ♂♀ Male and female pair
- Directional flight line

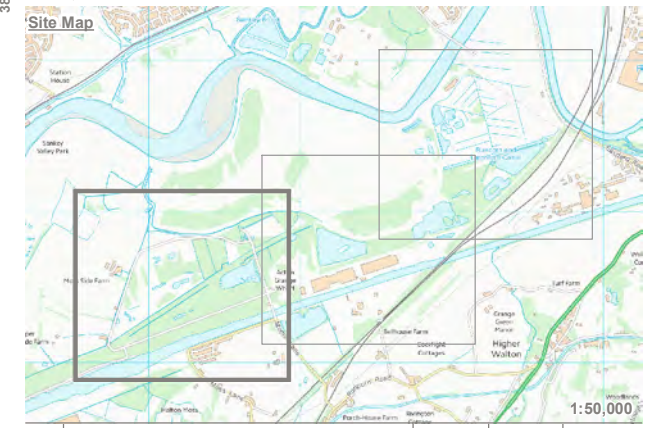
Species List

BF Bullfinch	GG Great crested grebe	MS Mute swan
BH Black-headed gull	GJ Greylag goose	OC Oystercatcher
CK Cuckoo	H Grey heron	RB Reed bunting
CO Coot	HM House martin	SD Stock dove
CU Curlew	LG Little grebe	SI Swift
D Dunnock	LS Lesser spotted woodpecker	ST Song thrush
GA Gadwall	MA Mallard	TU Tufted duck
GD Goosander	MH Moorhen	WW Willow warbler

Note

Red Red List Species **Amber** Amber List Species

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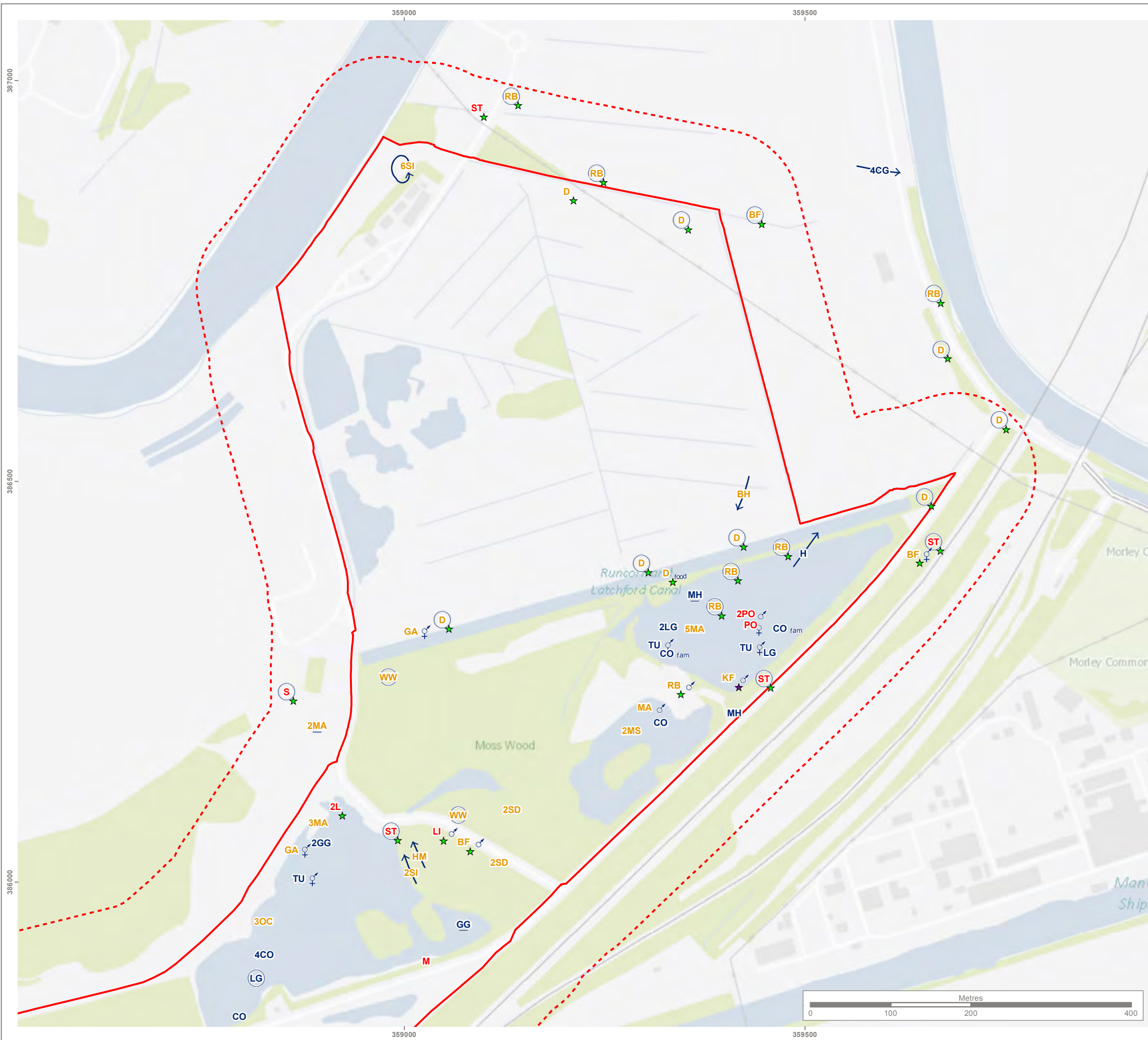
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Project
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Title
Breeding Bird Survey - Birds of Conservation Concern, Waders and Wildfowl. Visit 4 - 30th and 31st May 2019

Drawing Number
G6929.01.046.1 Sheet 1 of 3

Drawn	Checked	Approved	Scale	Date
AP	MK/LJ	IH	1:4,750 @ A3	12/08/2019



KEY

- Survey boundary
- Survey boundary - 100m offset
- ★ Section 41 species
- ★ Schedule 1 species
- A bird calling
- ★ food A bird carrying food
- A bird in song
- ♀ A female
- ♂ A male
- fam Family group of birds
- ♂ ♀ Male and female pair
- Directional flight line

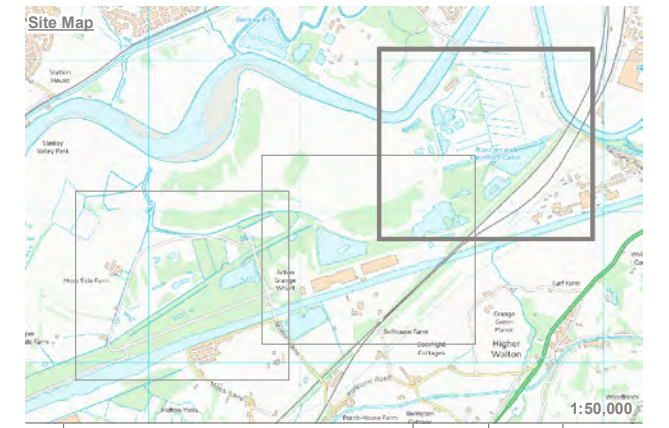
Species List

BF Bullfinch	KF Kingfisher	PO Pochard
BH Black-headed gull	L Lapwing	RB Reed bunting
CG Canada goose	LG Little grebe	S Skylark
CO Coot	LI Linnet	SD Stock dove
D Dunnock	M Mistle thrush	SI Swift
GA Gadwall	MA Mallard	ST Song thrush
GG Great crested grebe	MH Moorhen	TU Tufted duck
H Grey heron	MS Mute swan	WW Willow warbler
HM House martin	OC Oystercatcher	

Note

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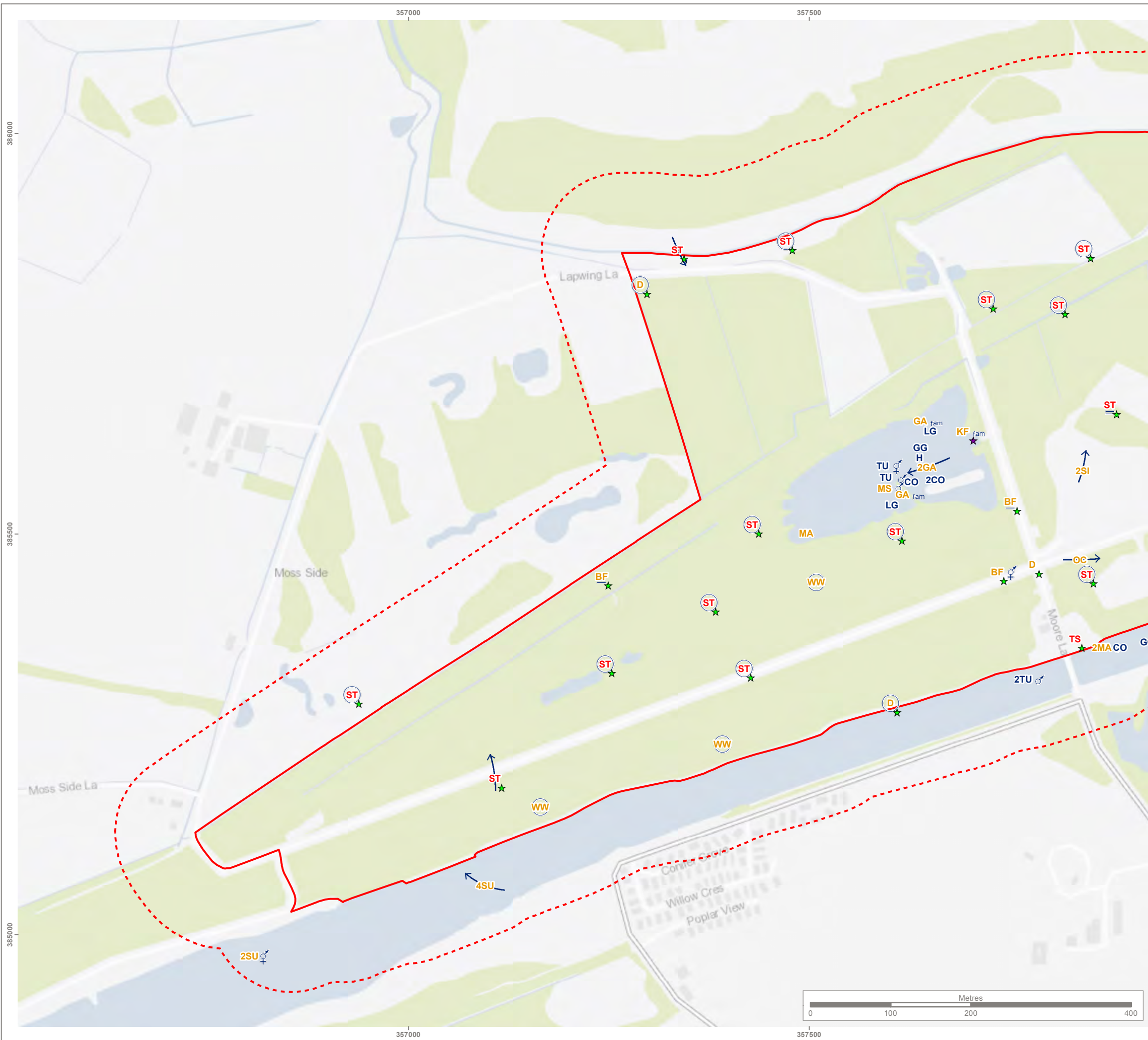
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Project: **Port Warrington, Warrington**

Title: **Breeding Bird Survey - Birds of Conservation Concern, Waders and Wildfowl. Visit 4 - 30th and 31st May 2019**

Drawing Number: **G6929.01.046.3** Sheet 3 of 3

Drawn	Checked	Approved	Scale	Date
AP	MK/LJ	IH	1:4,750 @ A3	12/08/2019



KEY

- Survey boundary
- Survey boundary - 100m offset
- ★ Section 41 species
- ★ Schedule 1 species
- A bird calling
- A bird in song
- A bird repeatedly giving alarm-calls/other vocalisations
- ♂ A male
- fam Family group of birds
- ♂ ♀ Male and female pair
- Directional flight line

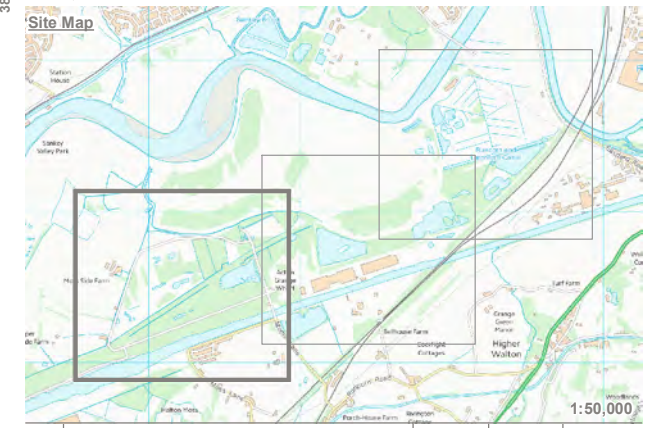
Species List

BF Bullfinch	KF Kingfisher	ST Song thrush
CO Coot	LG Little grebe	SU Shelduck
D Dunnock	MA Mallard	TS Tree sparrow
GA Gadwall	MS Mute swan	TU Tufted duck
GG Great crested grebe	OC Oystercatcher	WW Willow warbler
H Grey heron	SI Swift	

Note

Red Red List Species **Amber** Amber List Species

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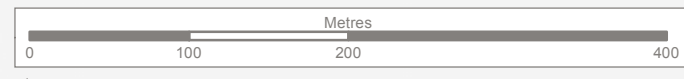
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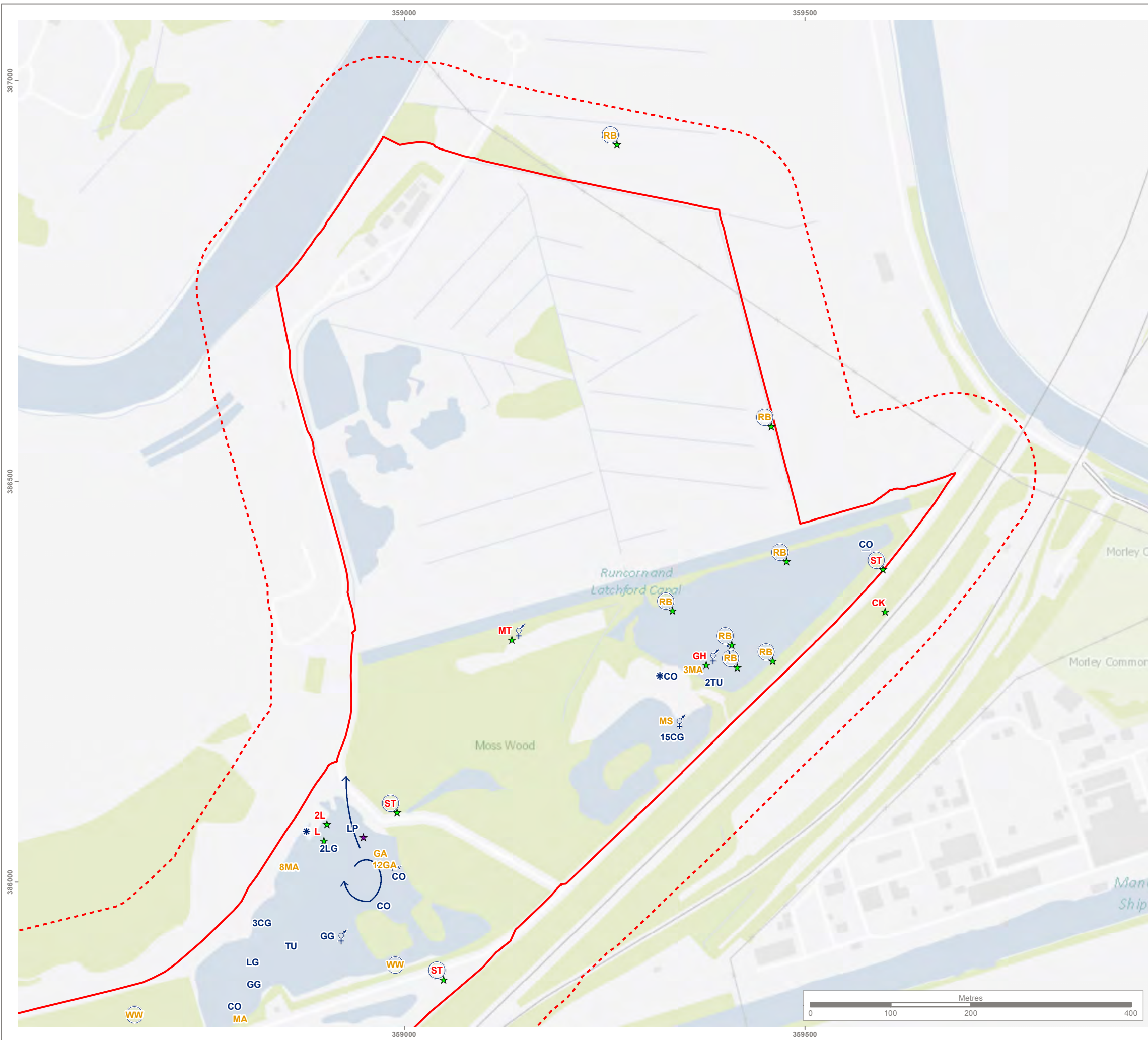
Project
Port Warrington, Warrington

Title
Breeding Bird Survey - Birds of Conservation Concern, Waders and Wildfowl. Visit 5- 20th June 2019

Drawing Number
G6929.01.047.1 Sheet 1 of 3

Drawn AP	Checked MK/LJ	Approved IH	Scale 1:4,750 @ A3	Date 12/08/2019
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KEY

- Survey boundary
- Survey boundary - 100m offset
- ★ Section 41 species
- ★ Schedule 1 species
- A bird calling
- A bird in song
- * A nest occupied with eggs/brood
- juv Juvenile
- ♂ ♀ Male and female pair
- Directional flight line
- - - Simultaneous registration (different birds)

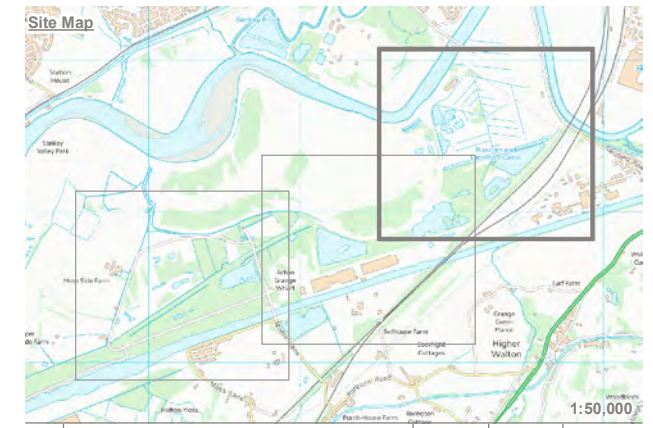
Species List

CG Canada goose	GH Grasshopper warbler	MS Mute swan
CK Cuckoo	L Lapwing	MT Marsh tit
CO Coot	LG Little grebe	RB Reed bunting
GA Gadwall	LP Little ringed plover	ST Song thrush
GG Great crested grebe	MA Mallard	TU Tufted duck
		WW Willow warbler

Note

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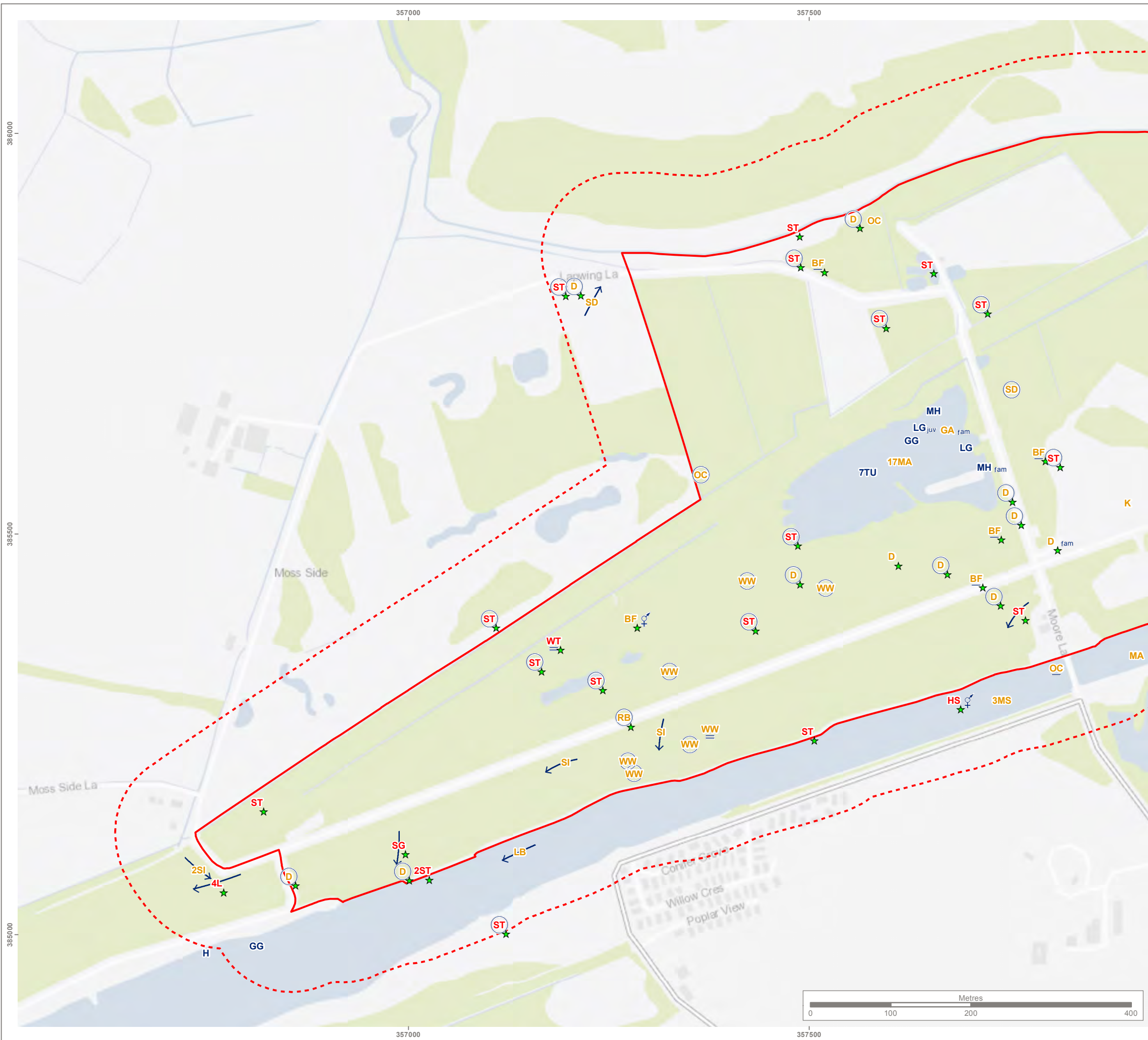
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Project: **Port Warrington, Warrington**

Title: **Breeding Bird Survey - Birds of Conservation Concern, Waders and Wildfowl. Visit 5- 20th June 2019**

Drawing Number: **G6929.01.047.3** Sheet 3 of 3

Drawn	Checked	Approved	Scale	Date
AP	MK/LJ	IH	1:4,750 @ A3	12/08/2019



KEY

- Survey boundary
- Survey boundary - 100m offset
- ★ Section 41 species
- A bird calling
- A bird in song
- A bird repeatedly giving alarm-calls/other vocalisations
- ★ A nest occupied with eggs/brood
- juv Juvenile
- fam Family group of birds
- ♂ ♀ Male and female pair
- Directional flight line

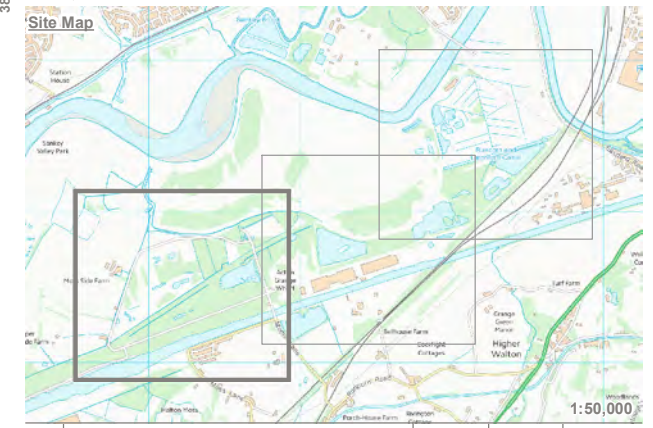
Species List

BF Bullfinch	LB Lesser black-backed gull	SD Stock dove
D Dunnock	LG Little grebe	SG Starling
GA Gadwall	MA Mallard	SI Swift
GG Great crested grebe	MH Moorhen	ST Song thrush
H Grey heron	MS Mute swan	TU Tufted duck
HS House sparrow	OC Oystercatcher	WT Willow tit
K Kestrel	RB Reed bunting	WW Willow warbler
L Lapwing		

Note

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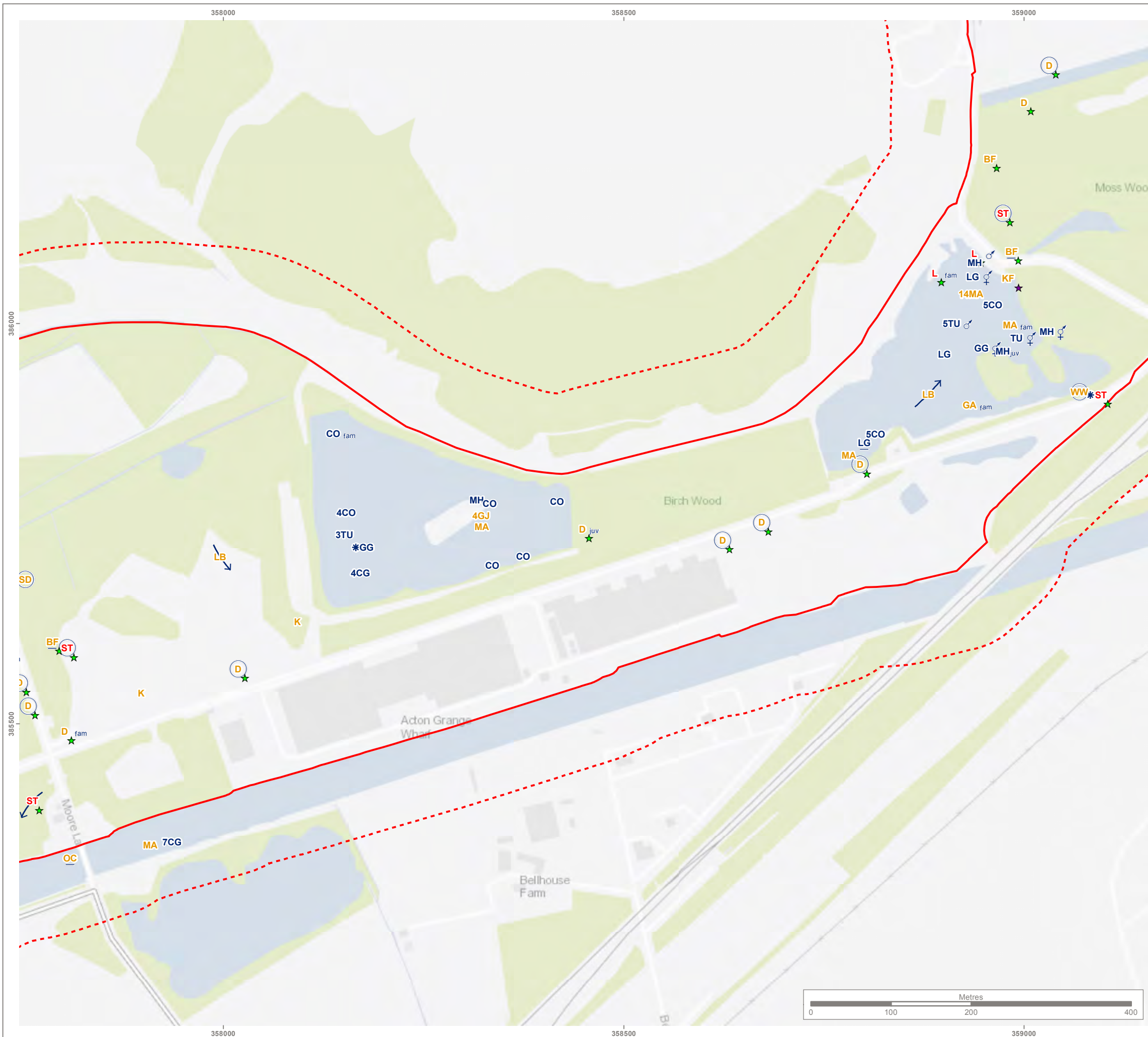
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Project
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Title
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Drawing Number
G6929.01.048.1

Drawn	Checked	Approved	Scale	Date
AP	MK/LJ	IH	1:4,750 @ A3	12/08/2019



KEY

- Survey boundary
- Survey boundary - 100m offset
- ★ Section 41 species
- ★ Schedule 1 species
- A bird calling
- A bird in song
- ★ A nest occupied with eggs/brood
- ♂ A male
- juv Juvenile
- fam Family group of birds
- ♂ ♀ Male and female pair
- Directional flight line

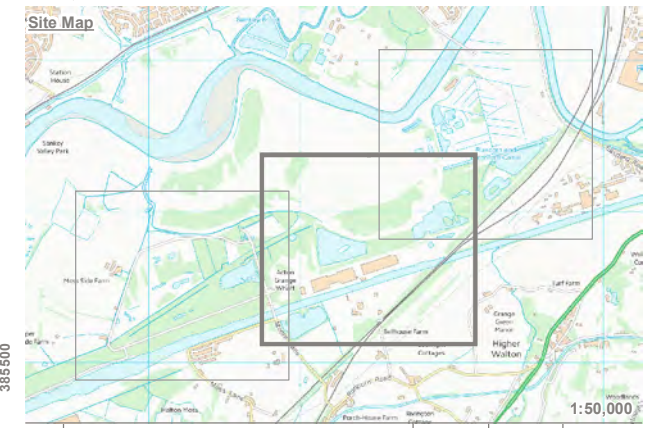
Species List

BF Bullfinch	K Kestrel	MH Moorhen
CG Canada goose	KF Kingfisher	OC Oystercatcher
CO Coot	L Lapwing	SD Stock dove
D Dunnock	LB Lesser black-backed gull	ST Song thrush
GA Gadwall	LG Little grebe	TU Tufted duck
GG Great crested grebe	MA Mallard	WW Willow warbler
GJ Greylag goose		

Note

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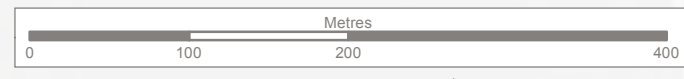
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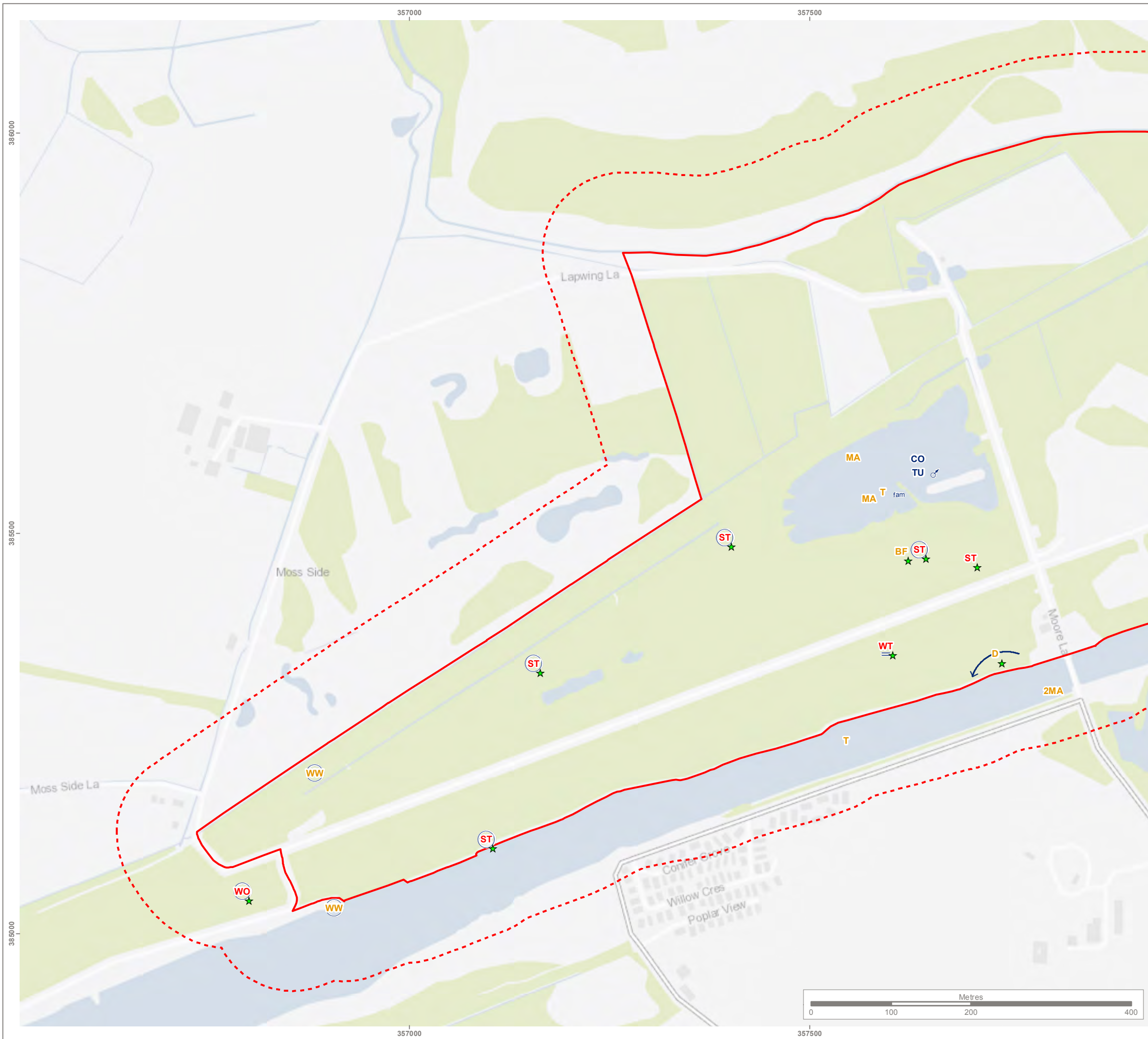
Project
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Title
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Drawing Number
G6929.01.048.2 Sheet 2 of 3

Drawn AP	Checked MK/LJ	Approved IH	Scale 1:4,750 @ A3	Date 12/08/2019
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KEY

- Survey boundary
- Survey boundary - 100m offset
- ★ Section 41 species
- A bird in song
- = A bird repeatedly giving alarm-calls/other vocalisations
- ♂ A male
- fam Family group of birds
- Directional flight line

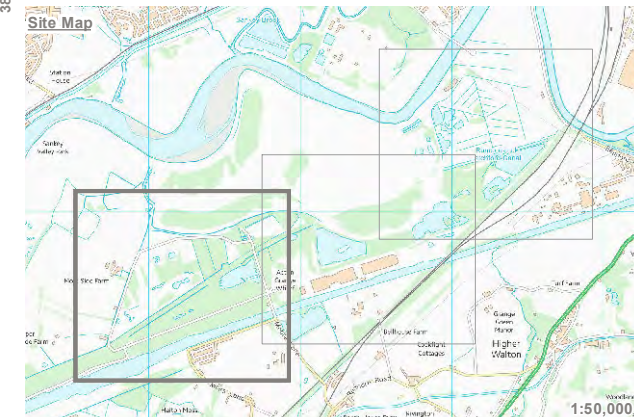
Species List

BF	Bullfinch	MA	Mallard	TU	Tufted duck
CO	Coot	ST	Song thrush	WO	Wood warbler
D	Dunnock	T	Teal	WT	Willow tit
				WW	Willow warbler

Note

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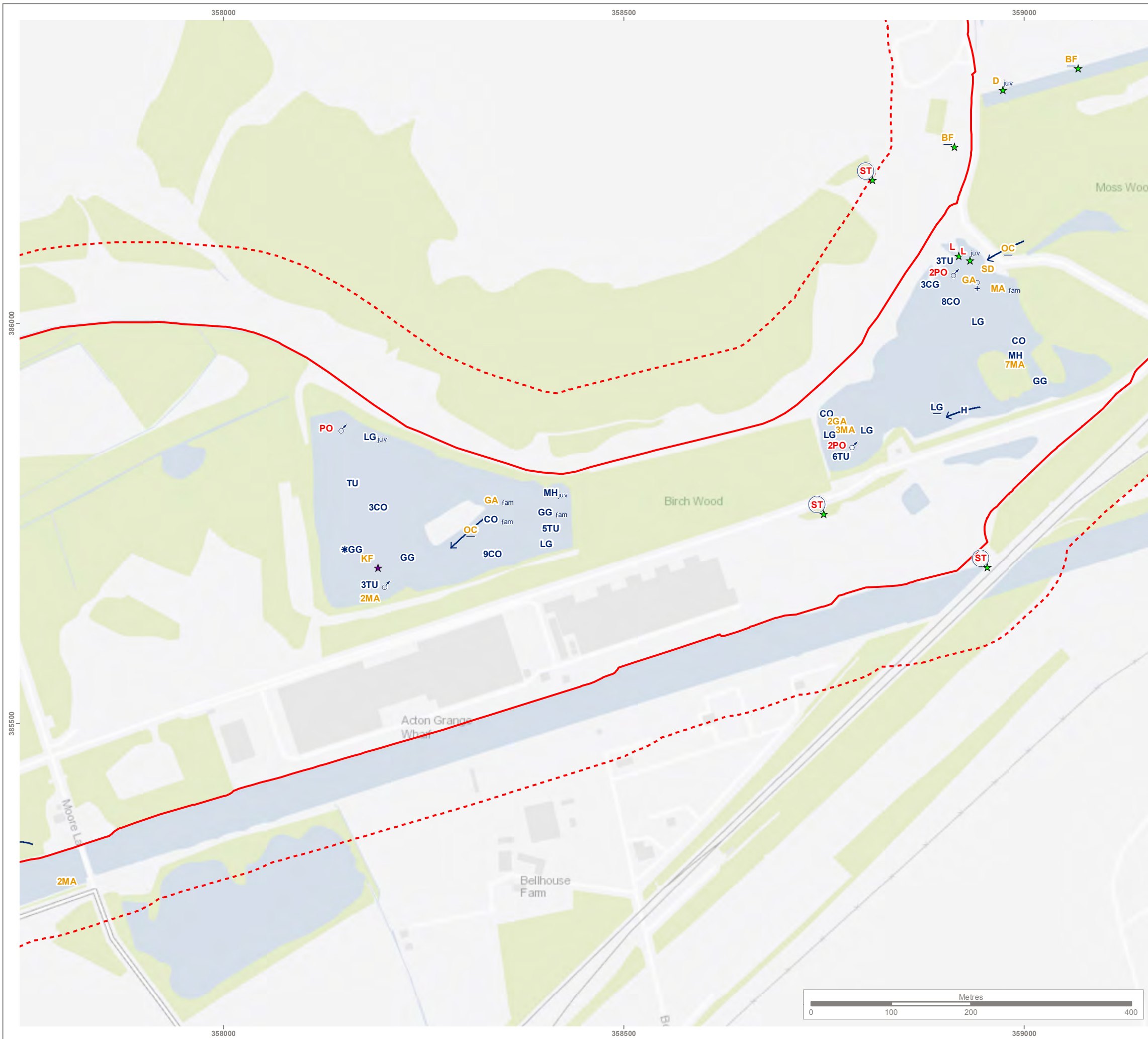
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Project
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Title
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Drawing Number
G6929.01.049.1 Sheet 1 of 3

Drawn	Checked	Approved	Scale	Date
AP	MK/LJ	IH	1:4,750 @ A3	13/08/2019



KEY

- Survey boundary
- Survey boundary - 100m offset
- ★ Section 41 species
- ★ Schedule 1 species
- A bird calling
- A bird in song
- * A nest occupied with eggs/brood
- ♀ A female
- ♂ A male
- juv Juvenile
- fam Family group of birds
- Directional flight line

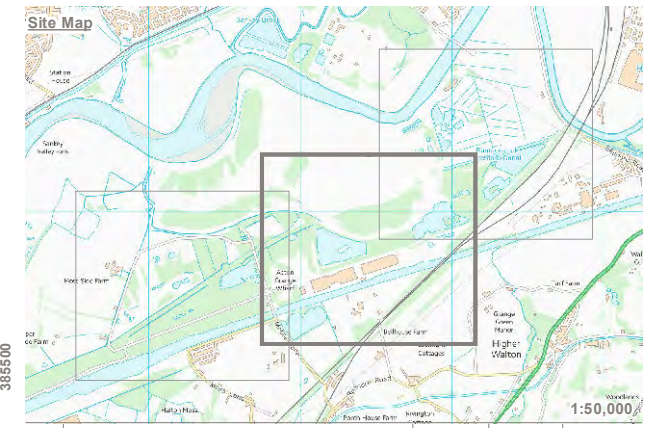
Species List

BF Bullfinch	H Grey heron	OC Oystercatcher
CG Canada goose	KF Kingfisher	PO Pochard
CO Coot	L Lapwing	SD Stock dove
D Dunnock	LG Little grebe	ST Song thrush
GA Gadwall	MA Mallard	TU Tufted duck
GG Great crested grebe	MH Moorhen	

Note

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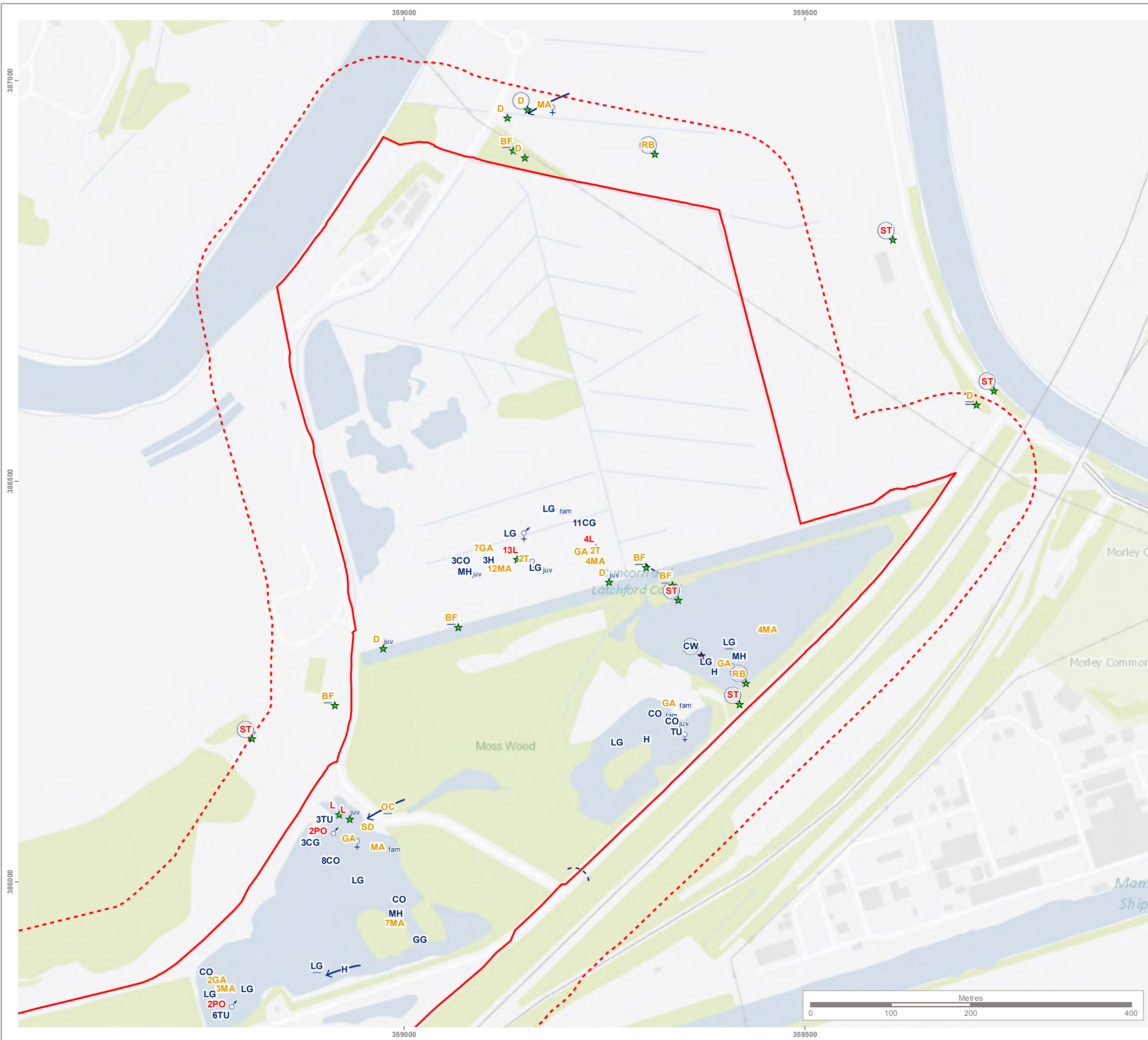
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Drawing Number
G6929.01.049.2 Sheet 2 of 3

Drawn	Checked	Approved	Scale	Date
AP	MK/LJ	IH	1:4,750 @ A3	13/08/2019



KEY

- Survey boundary
- Survey boundary - 100m offset
- ★ Section 41 species
- ★ Schedule 1 species
- A bird in song
- A bird repeatedly giving alarm-calls/other vocalisations
- ♂ A male
- juv Juvenile
- fam Family group of birds
- ♂ ♀ Male and female pair
- Directional flight line
- Simultaneous registration (different birds)
- - - registration (different birds)
- ♀ A female

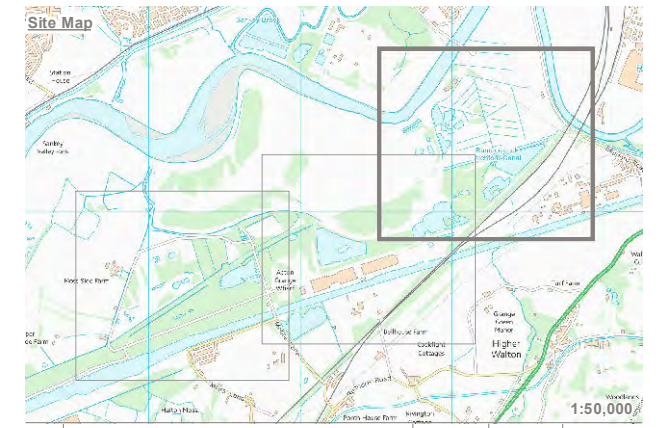
Species List

BF Bullfinch	GG Great crested grebe	OC Oystercatcher
CG Canada goose	H Grey heron	PO Pochard
CO Coot	L Lapwing	RB Reed bunting
CW Cetti's warbler	LG Little grebe	SD Stock dove
D Dunnock	MA Mallard	ST Song thrush
GA Gadwall	MH Moorhen	T Teal
		TU Tufted duck

Note

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Drawing Number
G6929.01.049.3 Sheet 3 of 3

Drawn AP	Checked MK/LJ	Approved IH	Scale 1:4,750 @ A3	Date 13/08/2019
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APPENDIX C: Winter Bird Survey Appendix



THE
ENVIRONMENT
PARTNERSHIP



**PORT WARRINGTON
MOORE, WARRINGTON
PORT WARRINGTON WINTER BIRD SURVEY REPORT**



CONTENTS	PAGE
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2.0 Methodology.....	3
3.0 Results	4
4.0 Discussion and Conclusions.....	14

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Table 2: Populations of qualifying species and assemblage Mersey Estuary SPA	4
Table 3 - WeBS peak counts of birds at Moore Nature Reserve (2005-2010)	7
Table 5: Wintering bird transect survey results.....	9

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APPENDICES

APPENDIX A: Winter Bird Survey Weather Data

DRAWINGS

G6929.018 WBS Visit 1 - 30.01.2019
G6929.019 WBS Visit 1 - 07.02.2019
G6929.020 WBS Visit 1 - 26.02.2019
G6929.021 WBS Visit 1 - 11.03.2019
G6929.022 WBS Visit 1 - 26.01.2019

1.0 Introduction

- 1.1 TEP was commissioned in July 2019 by Peel Investments (North) to undertake a wintering bird survey as part of ongoing ecological services, for the proposed development known as Port Warrington.
- 1.2 The area of survey includes all of Moore Nature Reserve and a section of Arpley Meadows Landfill to the north, which is to be developed as a new commercial park (Refer to Figure 1). It is envisaged that development of the Site is likely to commence between 2021 and 2024.
- 1.3 The objectives of this report are to:
 - Detail the methods and results of the winter bird survey; and
 - Identify features of value within or near to the site for wintering birds, any potential impacts of the development on wintering birds and any potential constraints for development proposals.

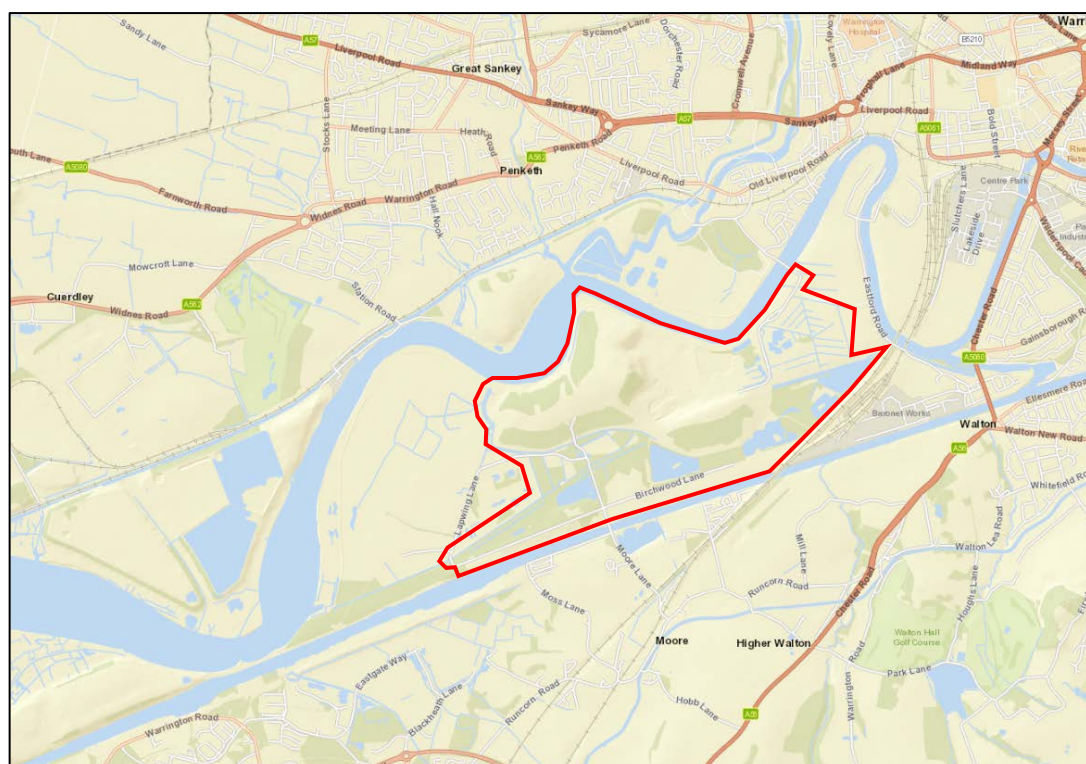


Figure 1: Site Location (© OpenStreetMap contributors)

Site Context

- 1.4 The site is located within the borough of Warrington with a central grid reference of SJ 58401 86246. The site is immediately bounded to the north and west by Arpley Meadows landfill and beyond this the River Mersey and residential and industrial development associated with the towns of Penketh and Great Sankey. To the east lies arable land and the west coast mainline rail route with industrial and residential development associated with the town of Latchford. To the west lies extensive farmland and the River Mersey estuary and to the south the site is immediately bordered by the Manchester Ship Canal with the village of Moore present on the opposite bank.
- 1.5 Moore Nature Reserve is dominated by woodland with numerous waterbodies and areas of open grassland.
- 1.6 This assessment is based on the assumption that it is possible that construction or earthmoving works might take place at any location within the red line boundary shown in Figure 1 above.

2.0 Methodology

Desktop Study

- 2.1 The desk study was undertaken in March 2018 (TEP Ref 6929.01.002). Information regarding protected sites, notable habitats and existing species records within a 5km radius of the proposed site was gathered from the sources listed in Table 1. Internationally designated sites within 10km of the site were also reviewed in January 2019.
- 2.2 Species records can provide a useful indication of the species present within the search area, although the absence of a given species from the dataset cannot be taken to represent actual absence.

Table 1: Ornithological information and consultations

Consultee/ source of information	Nature of information
Multi-Agency Geographic Information for the Countryside (MAGIC) Map	Statutory protected sites
Google Maps	Satellite imagery
Warrington Local Record Centre (rECOrd),	Local wildlife site citations and species records
British Trust for Ornithology (BTO)	Wetland Bird Survey (WeBS) Core Count Data

Winter Bird Survey

- 2.3 The winter bird survey comprised of five walked transect visits undertaken between January and March 2019. Weather was recorded during every survey and weather data is presented in Appendix A.
- 2.4 Survey dates were as follows:
- Visit 1: 30th January 2019
 - Visit 2: 7th February 2019
 - Visit 3: 26th February 2019
 - Visit 4: 11th March 2019
 - Visit 5: 26th March 2019
- 2.5 The transect route was walked throughout the proposed development site and its surrounding area (up to 500m away). During the transect survey the following bird groups were recorded directly onto the survey map, including details of their activity:
- All waders, wildfowl, raptors and other waterbird species;
 - Red (BRd) and Amber (BAm) List Birds of Conservation Concern (BoCC);
 - Section 41 bird species listed on the Natural Environment and Rural Communities (NERC) Act 2006 (S41); and
 - Schedule 1 bird species listed on the Wildlife and Countryside Act (1981) (WCA1).

3.0 Results

Desktop Survey

Statutory Designated Sites

Internationally Designated Sites

- 3.1 There are two internationally designated sites which are designated for their bird populations within 10km of the proposed development:
- Mersey Estuary Special Protection Area (SPA)
 - Mersey Estuary Ramsar
- 3.2 The Mersey Estuary SPA and Ramsar sites occupy the same geographical area and are situated 6km to the south west. These sites are designated for their important wading and wintering bird assemblages.
- 3.3 On 30th June 2004 Natural England published an updated Conservation Objectives list for the Mersey Estuary SPA. The list of qualifying species published is as follows:
- Shelduck (non-breeding)
 - Teal (non-breeding)
 - Pintail (non-breeding)
 - Golden plover (non-breeding)
 - Dunlin (non-breeding)
 - Black-tailed godwit (non-breeding)
 - Redshank (non-breeding)
- 3.4 The populations of qualifying species supported by the Mersey Estuary SPA as stated within the earlier 2004 citation are presented in Table 2.

Table 2: Populations of qualifying species and assemblage supported by the Mersey Estuary SPA as stated within the 2004 citation (see Appendix A)

Species	5-yr peak mean*	% GB**	% Bio ***
Golden plover	3,040	1.2	-
Shelduck	6,746	-	2.2
Teal	11,723	-	2.9
Pintail	1,169	-	1.9
Dunlin	48,789	-	3.7
Black-tailed godwit	976	-	2.8
Redshank (winter)	4,993	-	3.8
Redshank (passage)	4,513	3.5	-

Species	5-yr peak mean*	% GB**	% Bio ***
WWA ‡	104,599	-	-

* 5-yr peak mean (1993/94 – 1997/98), ** % GB population, *** % biogeographical population, ‡Wintering Waterbirds Assemblage

3.5 The waterbirds assemblage associated with the Mersey Estuary SPA includes the same species that the site is designated for as listed within Table 2, as well as curlew, lapwing, great crested grebe, grey plover and wigeon.

3.6 The Mersey Estuary Ramsar is designated for the same species as the Mersey Estuary SPA under Criterion 6. This site is also designated under Criterion 5 for supporting an internationally important assemblage of wintering waterfowl. The designation also lists a number of ‘noteworthy species’ which occur at levels of national importance. These include ringed plover, curlew, spotted redshank and greenshank during the spring and autumn and wigeon during the winter.

Nationally Designated Sites

3.7 There are two nationally designated sites for birds within 10km of the site:

- Mersey Estuary SSSI - Mersey North Bank is located 10km north of the site and is designated for its littoral sediment and species (including birds) supported by this habitat.
- Rixton Clay Pits SSSI located 9km east of the site is habitats, amphibians, invertebrates and importance for wading birds

Locally Designated Sites

3.8 There are three Local Nature Reserves (LNR) within 5km of the proposed development site that are designated for their bird interest:

- Oxmoor Wood LNR lies approximately 1.15km south-west and is designated for its habitats.
- Dorchester Park LNR lies approximately 1.74km south-west and is designated for its mosaic of habitats

Non-Statutory Designated Sites

3.9 There are 10 Local Wildlife Sites within 1km of the site, six of which are adjacent to or in close proximity to the site or are contained within the site and designated for their bird interest:

- Moore Nature Reserve LWS (within site);
- Moss Side Farm LWS;
- Norton Marsh and Upper Moss Side Farm LWS;
- Upper Mersey Estuary LWS;
- Gatewarth LWS; and
- Manor Park Woodland LWS.

Desktop Records

3.10 Records of the following bird species were identified within 1km of the site during the local records search:

- Common tern (BAm)
- Grey plover (BAm)
- Dunlin (BAm)
- Greenshank (WCA1, BAm)
- Barnacle goose (BAm)
- Jack snipe
- Black-necked grebe (WCA1, BAm)
- Black tern (WCA1)
- Garganey (WCA1, BAm)
- Greylag Goose (WCA1, BAm)
- Green sandpiper (WCA1, BAm)
- Little egret
- Little ringed plover (WCA1)
- Golden plover (S42)
- Lapwing (S41, 42, BRd)
- Kestrel (S42, BAm)
- Goldeneye (WCA1, BAm)
- Curlew (S41, 42, BRd)
- Barn owl (WCA1)
- Bittern (WCA1, S41, 42, BAm)
- Little grebe
- Hobby (WCA1)
- Black-tailed godwit (WCA1, S41, BRd)
- Gadwall (BAm)
- Teal (BAm)
- Shoveler (BAm)
- Peregrine (WCA1)
- Tufted duck
- Pochard (BRd)
- Oystercatcher (BAm)
- Pink-footed goose (BAm)
- Scaup (WCA1, S41, BRd)
- Snipe (BAm)
- Smew (BAm)
- Red kite (WCA1)
- Redshank (BAm)
- Ringed plover (S42, BRd)
- Short-eared owl (BAm)
- Whooper swan (WCA1, BAm)
- Pintail (WCA1, BAm)
- Wood sandpiper (WCA1, BAm)

- 3.11 WeBS Core Count data has been retrieved for Moore Nature Reserve (2005-2010) from the British Trust for Ornithology (BTO).
- 3.12 Data indicates that the site and immediate area is used by a range of waterbird species.
- 3.13 The number of gull species recorded dropped dramatically to virtually zero in 2006/7 when the landfill to the north of the site was closed and capped.
- 3.14 The WeBS counts for the most recent five year period within which records are available for Moore Nature Reserve are presented in Table 3.

Table 3 - WeBS peak counts of birds at Moore Nature Reserve (2005-2010)

Species	Peak Count	Year
Canada goose	450	08/09
Greylag goose	18	08/09
Pink-footed goose	2	08/09
Mute swan	8	09/10
Shelduck	8	08/09
Shoveler	55	07/08
Gadwall	91	05/06
Wigeon	49	06/07
Mallard	157	07/08
Teal	70	08/09
Pochard	27	07/08
Tufted duck	81	09/10
Goldeneye	2	05/06
Goosander	1	08/09
Little grebe	17	08/09
Great crested grebe	6	09/10
Bittern	2	08/09
Grey heron	14	08/09

Species	Peak Count	Year
Little egret	1	09/10
Cormorant	4	09/10
Water rail	2	07/08
Moorhen	20	05/06
Coot	250	06/07
Oystercatcher	2	09/10
Lapwing	37	08/09
Woodcock	1	09/10
Snipe	21	08/09
Green sandpiper	1	09/10
Black-headed gull	500	05/06
Common gull	61	06/07
Herring gull	100	05/06
Lesser black-backed gull	300	05/06
Kingfisher	2	08/09

3.15 The WeBS records show that moderate to large numbers of various waterbird species have been recorded to use the site including shoveler, gadwall, mallard, teal, pochard, tufted duck, little grebe and coot.

3.16 Also of note are records of bittern (WCA1, S41, 42, BAm), green sandpiper (WCA1, BAm) and kingfisher (WCA1 and BAm).

Winter Bird Survey

3.17 The results of the winter bird survey are illustrated in Drawings G6929.01.018 to G6929.01.22. Weather data for the transect survey are in Appendix A. Bird counts recorded on the ground within the survey area are presented in Table 5.

3.18 A total of 40 bird species were recorded during the winter bird transect surveys.

Wildfowl

3.19 A total of 10 wildfowl species were recorded including; Canada goose (25*), gadwall (52*/**), goldeneye (2*/**), mallard (35**), mute swan (6**), shelduck (2*/**), shoveler (7**), teal (115**), tufted duck (45**) and wigeon (9*/**)

* Peak count within site boundary; ** Peak count from site boundary to 500m survey buffer.

Waders

3.20 A total of four wader species were recorded including; curlew (4**), lapwing (5*/**), and oystercatcher (2*/**).

Other Water birds

3.21 A total of six other water bird species were recorded including; cormorant (9*/**), coot (79**), grey heron (12**), little grebe (8*/**), great crested grebe (16**), moorhen.

Gulls

3.22 Gull species identified during the survey included black-headed gull (125**), herring gull (3**) and lesser black-backed gull (1**)

Other BoCC/Protected Species

3.23 Sixteen other BoCC species were recorded during the transect surveys including bullfinch, Cetti's warbler, dunnock, kingfisher, green woodpecker, grey wagtail, kestrel, lesser spotted woodpecker, linnet, mistle thrush, redwing, reed bunting, song thrush, stock dove and willow tit.

Table 4: Wintering bird transect survey results

Species	Sector	Visit Number					Peak Count (Date Recorded)
		1	2	3	4	5	
Wildfowl							
Canada Goose	SB			5	19	23	23 (26/03/19)
	SBU					25	25 (26/03/19)
Gadwall	SB	15	52	23	27	14	52 (07/02/19)
	SBU	15	52	24	27	17	52 (07/02/19)
Goldeneye	SB		1		2		2 (11/03/19)
	SBU		1		2		2 (11/03/19)
Mallard	SB	28	30	11	21	17	30 (07/02/19)
	SBU	35	32	15	21	21	35 (30/01/19)

Species	Sector	Visit Number					Peak Count (Date Recorded)
		1	2	3	4	5	
Mute swan	SB	3	1	1	2	2	3 (30/01/19)
	SBU	5	2	1	2	6	6 (26/03/19)
Pochard	SB	7	3	3		1	7 (SB 30/01/19)
	SBU						-
Shelduck	SB			2			2 (26/02/19)
	SBU			2		2	2 (26/02/19)
Shoveler	SB	4	1		4	5	5 (26/03/19)
	SBU	7	1		4	5	7 (30/01/19)
Teal	SB	107	14	16	15	2	107 (30/01/19)
	SBU	115	14	16	15	4	115 (30/01/19)
Tufted Duck	SB	12	23	23	38	42	42 (26/03/19)
	SBU	15	23	23	45	42	45 (11/03/19)
Wigeon	SB	9	6	2			9 (30/01/19)
	SBU	9	6	2			9 (30/01/19)
Waders							
Curlew	SB	3					3 (30/01/19)
	SBU	3		4			4 (26/02/19)
Lapwing	SB					5	5 (26/03/19)
	SBU					5	5 (26/03/19)
Oystercatcher	SB			1	2		2 (11/03/19)
	SBU			1	2		2 (11/03/19)

Species	Sector	Visit Number					Peak Count (Date Recorded)
		1	2	3	4	5	
Other Water Birds							
Cormorant	SB			1	4	6	6 (26/03/19)
	SBU	1		4	6	9	9 (26/03/19)
Coot	SB	54	63	46	58	18	58 (11/03/19)
	SBU	61	73	48	60	79	79 (26/03/19)
Heron	SB	1		7	12	1	12 (11/03/19)
	SBU	1		7	12	4	12 (11/03/19)
Little Grebe	SB	4	6	6	8	6	8 (11/03/19)
	SBU	4	6	6	8	6	8 (11/03/19)
Great Crested Grebe	SB	2	2	2	4	13	13 (26/03/19)
	SBU	2	2	3	4	16	16 (26/03/19)
Moorhen	SB		3	4	5	2	5 (11/03/19)
	SBU		5	4	5	2	5 (11/03/19)
Water Rail	SB		1				1 (07/02/19)
	SBU		1				
Gulls							
Black-headed Gull	SB	101	60	92	118	55	118 (11/03/19)
	SBU	125	67	92	120	67	125 (07/02/19)
Herring Gull	SB						
	SBU					3	3 (26/03/19)
	SB						

Species	Sector	Visit Number					Peak Count (Date Recorded)
		1	2	3	4	5	
Lesser Black-backed Gull	SBU				1	1	1 (SBU 26/03/19)
Other Protected/BoCC Species							
Brambling	SB					1	1 (26/03/19)
	SBU					1	1 (26/03/19)
Bullfinch	SB	8	9	4		2	9 (07/02/19)
	SBU	8	10	6		2	10 (07/02/19)
Cetti's Warbler	SB		1				1 (07/02/19)
	SBU		1				1 (07/02/19)
Dunnock	SB	4	7	8	5	6	8 (26/02/19)
	SBU	5	7	10	7	9	10 (26/02/19)
Kingfisher	SB		1				1 (07/02/19)
	SBU		1				1 (07/02/19)
Green Woodpecker	SB			2			2 (26/02/19)
	SBU			2			2 (26/02/19)
Grey Wagtail	SB			1	1		1 (11/03/19)
	SBU						
Kestrel	SB	1			1	2	2 (26/03/19)
	SBU	1			1	2	2 (26/03/19)
	SB				1	1	1 (26/03/19)

Species	Sector	Visit Number					Peak Count (Date Recorded)
		1	2	3	4	5	
Lesser Spotted Woodpecker	SBU				1	1	1 (26/03/19)
Linnet	SB	6					6 (30/01/19)
	SBU	6					6 (30/01/19)
Mistle Thrush	SB		1				1 (07/02/19)
	SBU		1				1 (07/02/19)
Redwing	SB		3	4	5	2	5 (11/03/19)
	SBU		3	4	5	2	5 (11/03/19)
Reed Bunting	SB			4	1	3	4 (26/02/19)
	SBU	1	1	4	1	3	4 (26/02/19)
Song Thrush	SB	1	4	1	6	5	6 (11/03/19)
	SBU	3	5	1	7	5	7 (11/03/19)
Stock Dove	SB					1	1 (26/03/19)
	SBU					1	1 (26/03/19)
Willow Tit	SB			1	1		1 (11/03/19)
	SBU			1	1		1 (11/03/19)

Sector: SB - Proposed site boundary; SBU - Proposed site boundary and 500m survey buffer. Visit Dates: 1. 30/01/19, 2. 07/02/19, 3. 26/02/19, 4. 11/03/19, 26/03/19.

4.0 Discussion and Conclusions

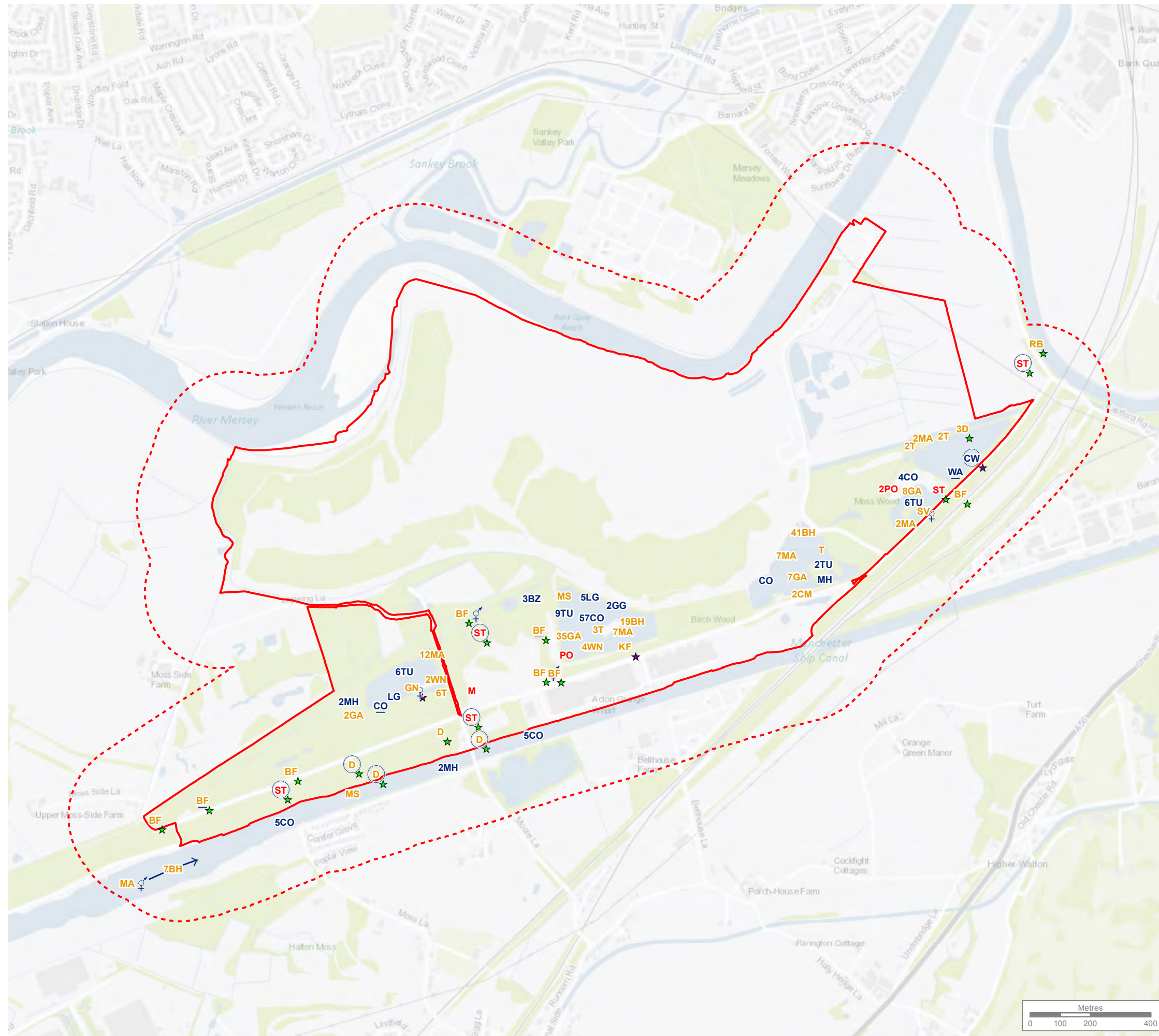
- 4.1 There are several protected sites for bird species and populations within functional distance of the site. These include the internationally designated Mersey Estuary Ramsar/SPA located just over 6km from the site and the locally designated Moore Nature Reserve LWS which is situated within the site.
- 4.2 The 2018/2019 winter bird survey results indicate that the proposed development site and surrounding area is used by two qualifying features of the Mersey Estuary Ramsar/SPA (shelduck and teal) at relatively low numbers, with a peak count of 2 shelduck representing 0.03% of the Mersey Estuary SPA 5-year peak mean (6,746) and 115 teal representing 0.98% of the 5-year peak mean (11,729) for the designated site.
- 4.3 The waterbodies associated with Moore Nature Reserve, are used by a range of water birds listed as assemblage species associated with Mersey Estuary SPA, including Curlew, lapwing, shelduck and wigeon, however in relatively insignificant numbers. Great crested grebe recorded a peak of 15 individuals during the survey which is equivalent to 11% of the assemblage qualifying population of the Mersey Estuary SPA. However, the latest WeBS count (2019) for this species was 48, which equivalent to 31% of the current assemblage population.
- 4.4 Evidence from the WeBS data and from the breeding bird survey suggests that great crested grebe are still found using the lakes and lagoons within the site during the breeding period. It is therefore unlikely that the great crested grebe population that uses Moore Nature Reserve forms part of the Mersey Estuary SPA waterbird assemblage. However the lakes and lagoons are high value habitat for great crested grebe who will remain faithful to their breeding grounds.
- 4.5 The results show that the site and close environs is used by moderate numbers of wintering wildfowl and wader species with the majority contained within the several waterbodies, lagoons and reed beds situated within the site.
- 4.6 The section of the Manchester Ship Canal situated to the south of the site, showed relatively little activity with minimal counts along the banks and the majority of sightings identified as fly through.
- 4.7 The use of the site by gulls has dropped significantly since the closure of the landfill site to the north, with the main species identified being black-headed gull with a peak count of 125, a significant 70% drop in numbers in the ten years since the landfill closure.
- 4.8 Kingfisher (WCA1, BAm) was recorded within the survey area during the winter bird survey visits. Suitable breeding habitat also exists within the site and it is highly probable that kingfisher are actively breeding within the site.
- 4.9 The winter surveys also highlight the use and close environs of the site by other passerine and winter migrant species, in particular bullfinch, Cetti's warbler, lesser spotted woodpecker, green woodpecker, redwing, willow tit and brambling. The loss of woodland within the site would lead to a loss of significant foraging and sheltering habitat for these species.

APPENDIX A: Winter Bird Survey Weather Data

APPENDIX B: Desk based Assessment Report and Species Records

DRAWINGS

G6929.018 WBS Visit 1 - 30.01.2019
G6929.019 WBS Visit 1 - 07.02.2019
G6929.020 WBS Visit 1 - 26.02.2019
G6929.021 WBS Visit 1 - 11.03.2019
G6929.022 WBS Visit 1 - 26.01.2019



KEY

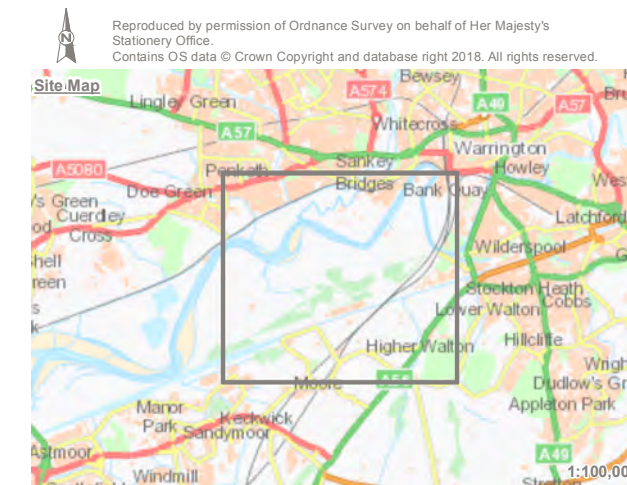
- Port Warrington survey boundary
- Port Warrington survey boundary - 250m offset
- ★ Section 41 species
- ★ Schedule 1 species
- ♀ A female
- ♂ Male and female pair
- A bird calling
- A bird in song
- Directional flight line

Species Codes

- | | |
|------------------------|-----------------|
| BF Bullfinch | M Mistle thrush |
| BH Black-headed gull | MA Mallard |
| BZ Buzzard | MH Moorhen |
| CM Common gull | MS Mute swan |
| CO Coot | PO Pochard |
| CW Cetti's warbler | RB Reed bunting |
| D Dunnock | ST Song thrush |
| GA Gadwall | SV Shoveler |
| GG Great crested grebe | T Teal |
| GN Goldeneye | TU Tufted duck |
| KF Kingfisher | WA Water rail |
| LG Little grebe | WN Wigeon |

Note

Red Red List Species **Amber** Amber List Species



Rev	Description	Drawn	Approved	Date



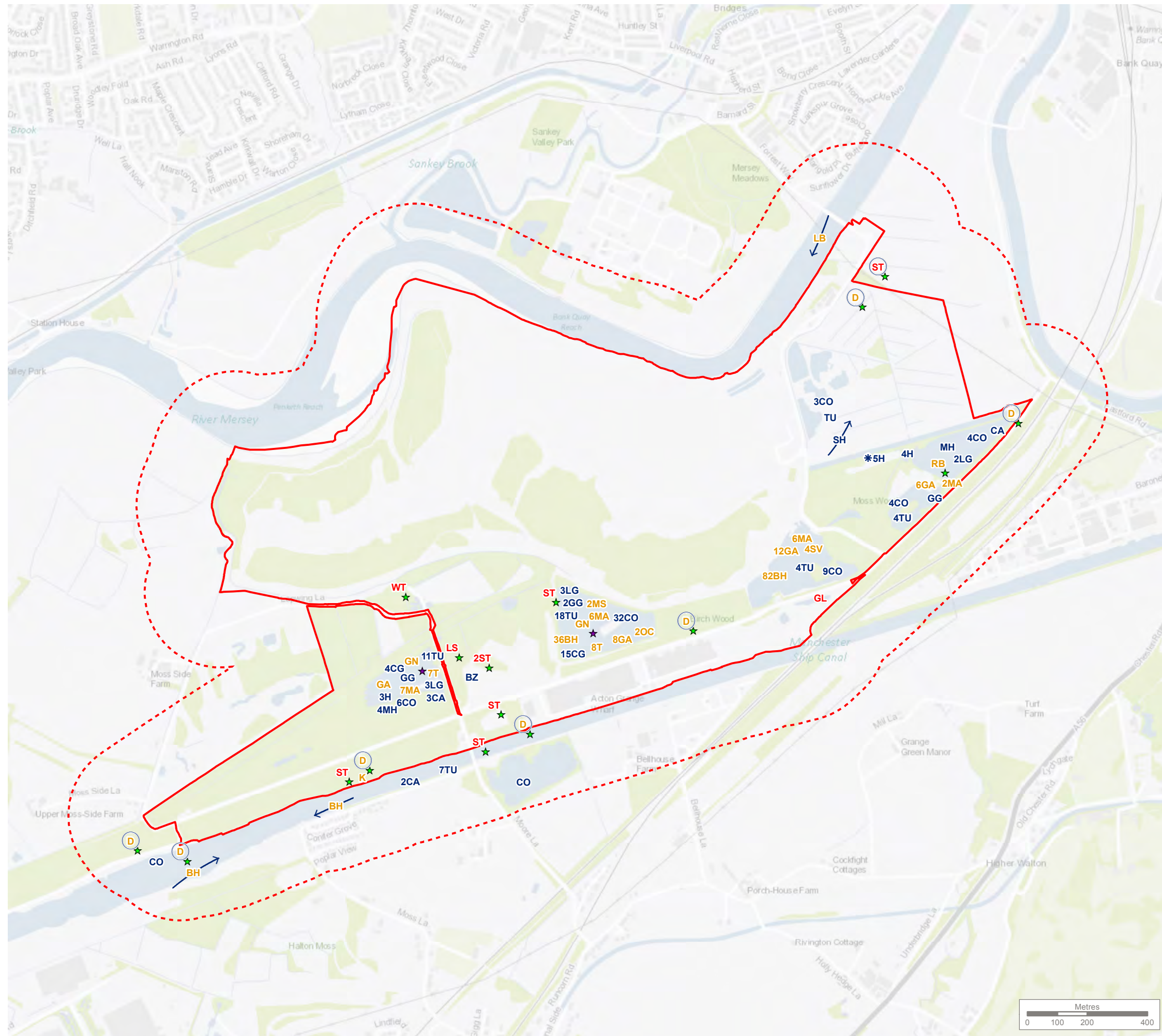
Genesis Centre, Birchwood Science Park, Warrington WA3 7BH
 Tel 01925 844004 e-mail tep@tep.uk.com www.tep.uk.com

Project
Port Warrington, Warrington

Title
**Winter Bird Survey - Port Warrington
 Visit 2 - 06th and 07th February 2019**

Drawing Number
G6929.01.019

Drawn	Checked	Approved	Scale	Date
MK	MS	LJ	1:13,000 @ A3	14/06/2019



KEY

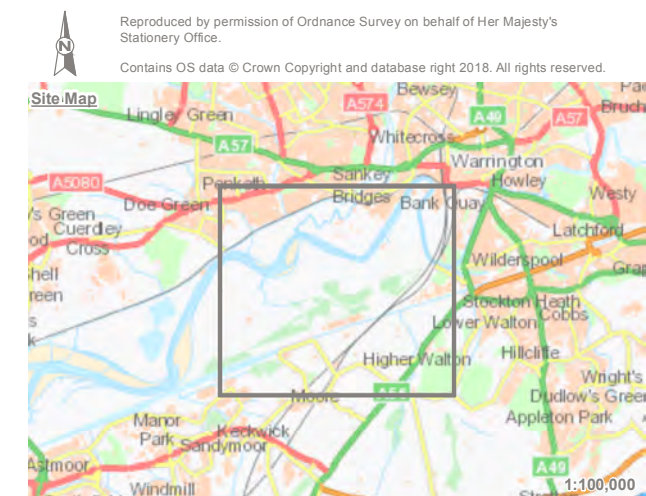
- Port Warrington survey boundary
- Port Warrington survey boundary - 250m offset
- ★ Section 41 species
- ★ Schedule 1 species
- A bird in song
- * A nest occupied with eggs/brood
- Directional flight line

Species Codes

- | | |
|-----------------------------|------------------------------|
| BH Black-headed gull | LS Lesser spotted woodpecker |
| BZ Buzzard | MA Mallard |
| CA Cormorant | MH Moorhen |
| CG Canada goose | MS Mute swan |
| CO Coot | OC Oystercatcher |
| D Dunnock | RB Reed bunting |
| GA Gadwall | SH Sparrowhawk |
| GG Great crested grebe | ST Song thrush |
| GL Grey wagtail | SV Shoveler |
| GN Goldeneye | T Teal |
| H Grey heron | TU Tufted duck |
| K Kestrel | WT Willow tit |
| LB Lesser black-backed gull | |
| LG Little grebe | |

Note

Red Red List Species Amber Amber List Species



Rev	Description	Drawn	Approved	Date



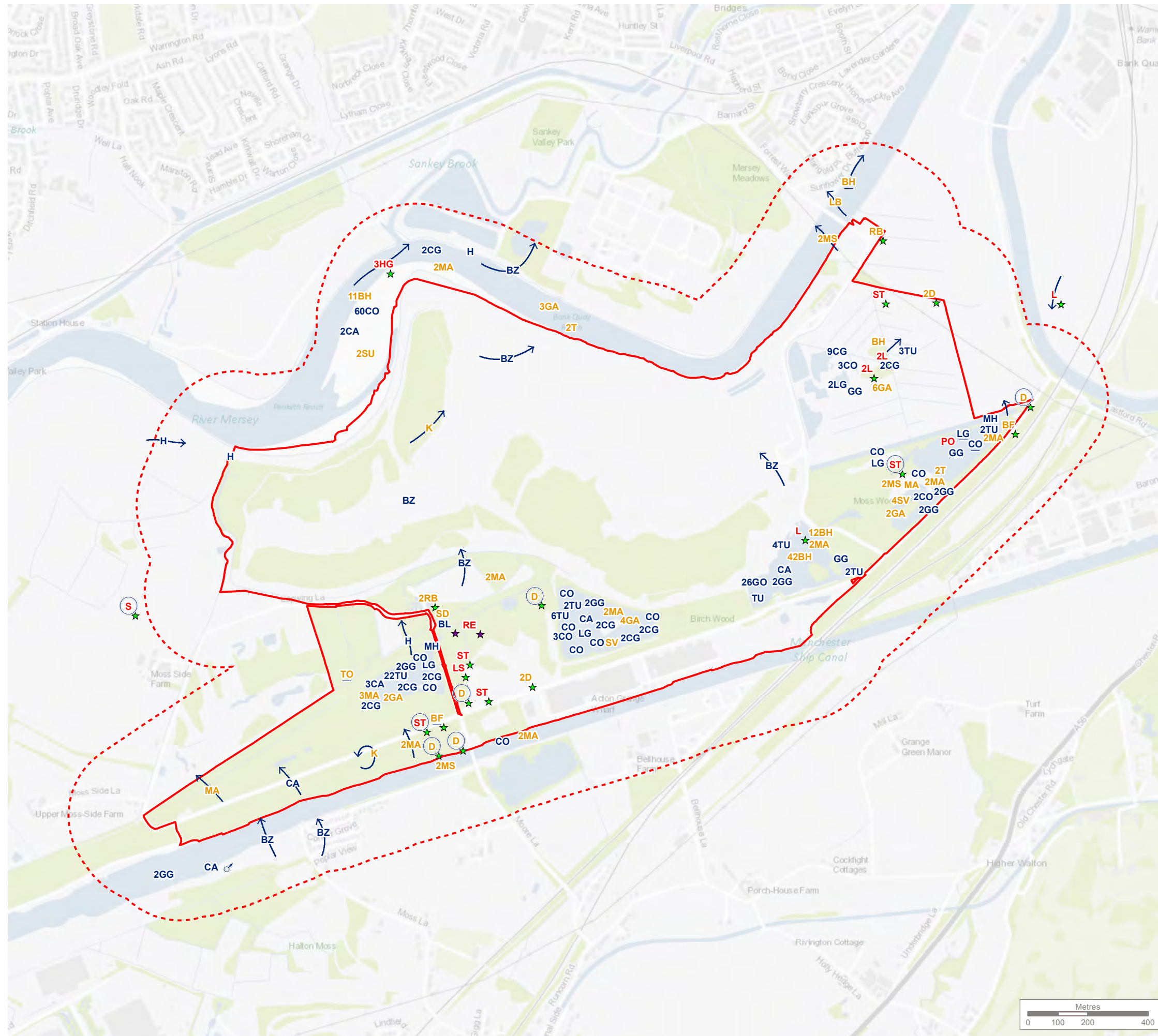
Genesis Centre, Birchwood Science Park, Warrington WA3 7BH
Tel 01925 844004 e-mail tep@tep.uk.com www.tep.uk.com

Project
Port Warrington, Warrington

Title
**Winter Bird Survey - Port Warrington
Visit 4 - 08th and 11th March 2019**

Drawing Number
G6929.01.021

Drawn	Checked	Approved	Scale	Date
MK	MS	LJ	1:13,000 @ A3	14/06/2019



KEY

- Port Warrington survey boundary
- Port Warrington survey boundary - 250m offset
- ★ Section 41 species
- ★ Schedule 1 species
- ♂ A male
- A bird calling
- A bird in song
- Directional flight line

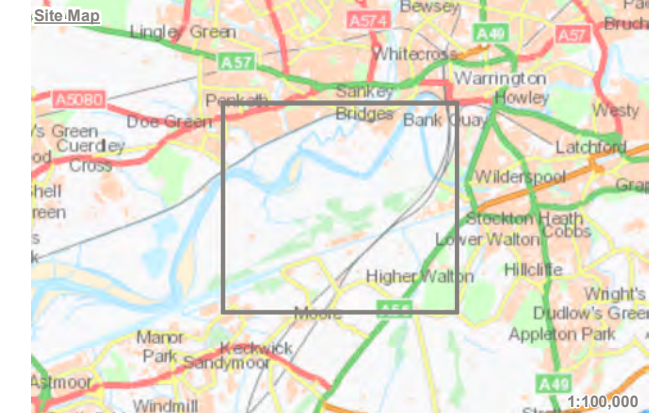
Species Codes

- | | |
|-----------------------------|------------------------------|
| BF Bullfinch | LS Lesser spotted woodpecker |
| BH Black-headed gull | MA Mallard |
| BL Brambling | MH Moorhen |
| BZ Buzzard | MS Mute swan |
| CA Cormorant | PO Pochard |
| CG Canada goose | RB Reed bunting |
| CO Coot | RE Redwing |
| D Dunnock | S Skylark |
| GA Gadwall | SD Stock dove |
| GG Great crested grebe | ST Song thrush |
| GO Goldfinch | SU Shelduck |
| H Grey heron | SV Shoveler |
| HG Herring gull | T Teal |
| K Kestrel | TO Tawny owl |
| L Lapwing | TU Tufted duck |
| LB Lesser black-backed gull | |
| LG Little grebe | |

Note

Red Red List Species Amber Amber List Species

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Rev	Description	Drawn	Approved	Date



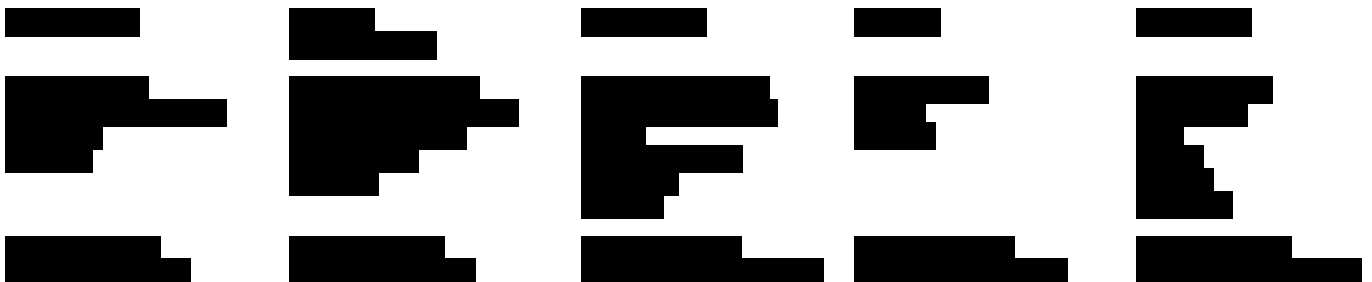
Genesis Centre, Birchwood Science Park, Warrington WA3 7BH
Tel 01925 844004 e-mail tep@tep.uk.com www.tep.uk.com

Project
Port Warrington, Warrington

Title
Winter Bird Survey - Port Warrington
Visit 5 - 26th March 2019

Drawing Number
G6929.01.022

Drawn	Checked	Approved	Scale	Date
MK	MS	LJ	1:13,000 @ A3	14/06/2019



APPENDIX D: Desk Study



PORT WARRINGTON EXTENSION DESK BASED ECOLOGY ASSESSMENT



Document Title	Port Warrington Extension Desk Based Ecology Assessment
Prepared for	Peel Holdings (Land and Property) Limited
Prepared by	TEP - Warrington
Document Ref	6929.01.002

Author	Lizi Langston
Date	13/03/2018
Checked	Ian Holland
Approved	Anne Pritchard

Amendment History					
Version	Date	Modified by	Check / Approved by	Reason(s) issue	Status

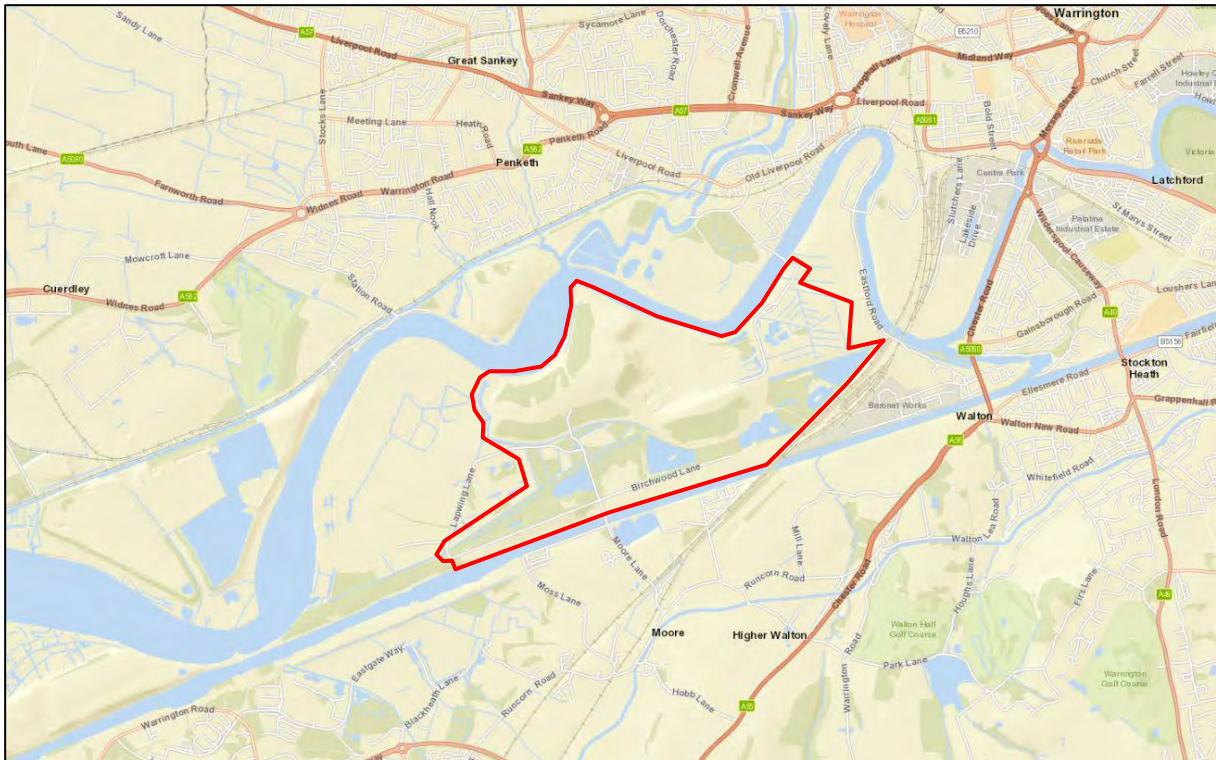
Contents

- Site Location Plan
- Relevant Local Planning Policies
- Site Designations
- Notable Habitats
- Notable Species
- Local BAP Habitats and Species

Site Location Plan

Approximate Central Grid Reference: SJ 58530 86227

Site Location Plan



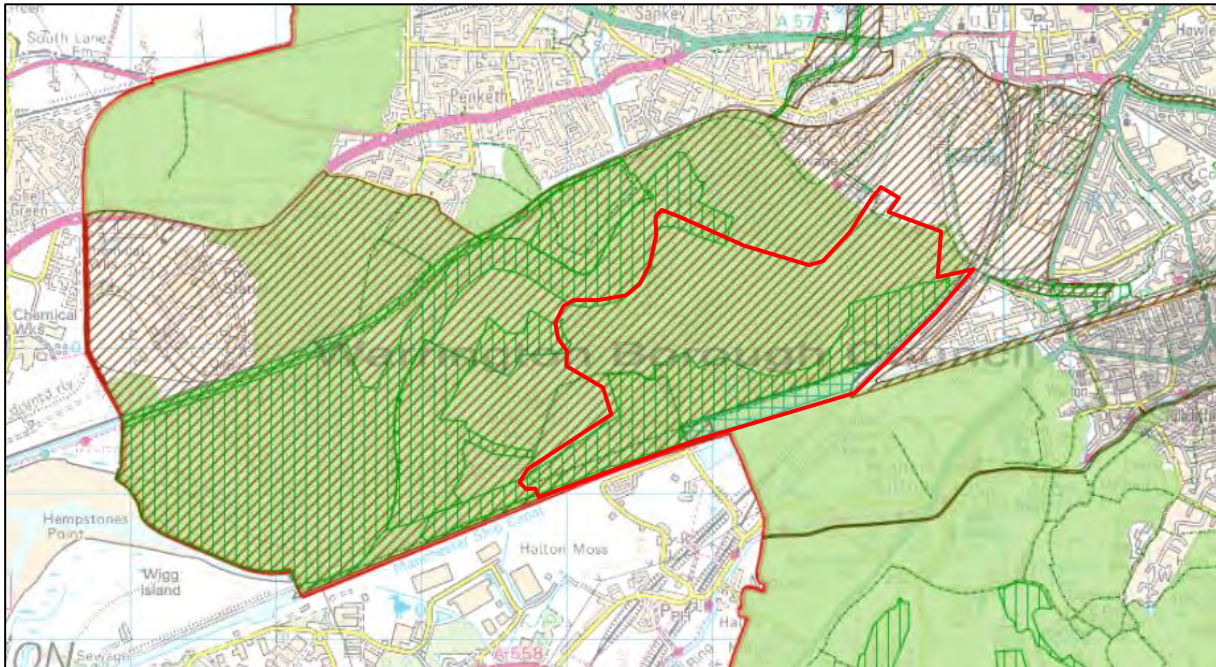
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Key

 Site Boundary

Relevant Local Planning Policies






Warrington Local Plan Core Strategy (21st July 2014)



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Ordnance Survey 100022848

Key

 Site Boundary

-  Green Belt (LPCS CS5)
-  Strategic Green Links (LPCS CS6)
-  Strategic Opportunity Port Warrington (LPCS CS11)
-  Active Travel Greenway Network (LPCS MP3)
-  Local Wildlife Sites (LPCS QE5)

Policy QE 5

Biodiversity and Geodiversity

The Council will work with partners to protect and where possible enhance sites of recognised nature and geological value. These efforts will be guided by the principles set out in National Planning Policy and those which underpin the strategic approach to the care and management of the borough's Green Infrastructure in its widest sense.

Sites and areas recognised for their nature and geological value are shown on the Policies Map and include:

- European Sites of International Importance
- Sites of Special Scientific Interest
- Regionally Important Geological Sites
- Local Nature Reserves
- Local Wildlife Sites
- Wildlife Corridors

The specific sites covered by the above designations at the time of publication are detailed in Appendix 3.

Proposals for development which may affect **European Sites of International Importance** will be subject to the most rigorous examination in accordance with the Habitats Directive. Development or land use change not directly connected with or necessary to the management of the site and which is likely to have significant effects on the site (either individually or in combination with other plans or projects) and which would affect the integrity of the site, will not be permitted unless the Council is satisfied that;

- there is no alternative solution; and
- there are imperative reasons of over-riding public interest for the development or land use change.

Proposals for development in or likely to affect **Sites of Special Scientific Interest (SSSI)** will be subject to special scrutiny. Where such development may have an adverse effect, directly or indirectly, on the SSSI it will not be permitted unless the reasons for the development clearly outweigh the nature conservation value of the site itself and the national policy to safeguard the national network of such sites.

Proposals for development likely to have an adverse effect on **regionally and locally designated sites** will not be permitted unless it can be clearly demonstrated that there are reasons for the development which outweigh the need to safeguard the substantive nature conservation value of the site or feature.

Proposals for development which may adversely affect the integrity or continuity of **UK Key habitats or other habitats of local importance**, or adversely affect **EU Protected Species, UK Priority Species or other species of local importance**, or which are the subject of **Local Biodiversity Action Plans** will only be permitted if it can be shown that the reasons for the development clearly outweigh the need to retain the habitats or species affected and that mitigating measures can be provided which would reinstate the habitats or provide equally viable alternative refuge sites for the species affected.

All development proposals affecting protected sites, wildlife corridors, key habitats or priority species (as identified in Local Biodiversity Action Plans) should be accompanied by information proportionate to their nature conservation value including;

- a site survey where necessary to identify features of nature and geological conservation importance; an assessment of the likely impacts of the proposed development proposals for the protection and management of features identified for retention;
- an assessment of whether the reasons for the development clearly outweigh the nature conservation value of the site, area or species; and
- proposals for compensating for features damaged or destroyed during the development process

Where development is permitted, the Council will consider the use of conditions or planning obligations to ensure the protection and enhancement of the site's nature conservation interest and/or to provide appropriate compensatory measures.

Site Designations

SSSI Impact Risk Zones for Site Only

Source: *MAGIC Maps*

The site is located within the Impact Risk Zone for the following SSSI's:

- Woolston Eyes SSSI, approximately 4.35km north east;
- Flood Brook Clough SSSI, approximately 5.78km south west; and
- Mersey Estuary SSSI, approximately 5.93km south west.

SSSI Impact Risk Zones - to assess planning applications for likely impacts on SSSIs/SACs/SPAs & Ramsar sites (England)

1. DOES PLANNING PROPOSAL FALL INTO ONE OR MORE OF THE CATEGORIES BELOW?

2. IF YES, CHECK THE CORRESPONDING DESCRIPTION(S) BELOW. LPA SHOULD CONSULT NATURAL ENGLAND ON LIKELY RISKS FROM THE FOLLOWING:

All Planning Applications

Infrastructure

Airports, helipads and other aviation proposals.

Wind & Solar Energy

Solar schemes with footprint > 0.5ha, all wind turbines.

Minerals, Oil & Gas

Rural Non Residential

Residential

Rural Residential

Air Pollution

Combustion

Waste

Landfill. Incl: inert landfill, non-hazardous landfill, hazardous landfill.

Composting

Discharges

Any discharge of water or liquid waste of more than 20m³/day to ground (ie to seep away) or to surface water, such as a beck or stream (NB This does not include discharges to mains sewer which are unlikely to pose a risk at this location).

Water Supply

Notes

GUIDANCE - How to use the Impact Risk Zones

[/Metadata for magic/SSSI IRZ User Guidance MAGIC.pdf](#)

1. DOES PLANNING PROPOSAL FALL INTO ONE OR MORE OF THE CATEGORIES BELOW?

2. IF YES, CHECK THE CORRESPONDING DESCRIPTION(S) BELOW. LPA SHOULD CONSULT NATURAL ENGLAND ON LIKELY RISKS FROM THE FOLLOWING:

All Planning Applications

Infrastructure

Airports, helipads and other aviation proposals.

Wind & Solar Energy

Solar schemes with footprint > 0.5ha, all wind turbines.

Minerals, Oil & Gas

Rural Non Residential

Residential

Rural Residential

Air Pollution

Pig & poultry units, slurry lagoons > 750m² & manure stores > 3500t.

Combustion

General combustion processes >50MW energy input. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.

Waste

Landfill. Incl: inert landfill, non-hazardous landfill, hazardous landfill.

Composting

Discharges

Any discharge of water or liquid waste of more than 20m³/day to ground (ie to seep away) or to surface water, such as a beck or stream (NB This does not include discharges to mains sewer which are unlikely to pose a risk at this location).

Water Supply

Notes

GUIDANCE - How to use the Impact Risk Zones

[/Metadata_for_magic/SSSI_IRZ_User_Guidance_MAGIC.pdf](#)

1. DOES PLANNING PROPOSAL FALL INTO ONE OR MORE OF THE CATEGORIES BELOW?

2. IF YES, CHECK THE CORRESPONDING DESCRIPTION(S) BELOW. LPA SHOULD CONSULT NATURAL ENGLAND ON LIKELY RISKS FROM THE FOLLOWING:

All Planning Applications

Infrastructure

Airports, helipads and other aviation proposals.

Wind & Solar Energy

Solar schemes with footprint > 0.5ha, all wind turbines.

Minerals, Oil & Gas

Rural Non Residential

Residential

Rural Residential

Air Pollution

Pig & poultry units, slurry lagoons > 4000m².

Combustion

General combustion processes >50MW energy input. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.

Waste

Landfill. Incl: inert landfill, non-hazardous landfill, hazardous landfill.

Composting

Discharges

Any discharge of water or liquid waste of more than 20m³/day to ground (ie to seep away) or to surface water, such as a beck or stream (NB This does not include discharges to mains sewer which are unlikely to pose a risk at this location).

Water Supply

Notes

GUIDANCE - How to use the Impact Risk Zones

[/Metadata_for_magic/SSSI_IRZ_User_Guidance_MAGIC.pdf](#)

Statutory Designated Wildlife Sites

International designations within 10km
National designations within 2km

Source: MAGIC Maps

Name of Site	Designation	Distance from Site	Reason for Designation
Oxmoor Wood	LNR	1.15km south west	Habitats
Dorchester Park	LNR	1.74km south west	Habitats
Mersey Estuary	Ramsar, SPA, SSSI	5.9km south west	Birds
Manchester Mosses	SAC	8.27km north east	Habitats
Rixton Clay Pits	SAC, SSSI, LNR	9.33km east	Habitats, great crested newts, birds and invertebrates

Non-Statutory Site Designations within 2km of the Site

Source: RECORD

Name of Site	Designation	Distance from Site
Moore Nature Reserve	LWS	On site
Moss Side Farm	LWS	Adjacent to west site boundary
Norton Marsh and Upper Moss Side Farm	LWS	85m west
Upper Mersey Estuary	LWS	Adjacent to northwest site boundary
Gatewarth	LWS	170m north, beyond River Mersey
Manor Park Woodland	LWS	170m south, beyond Manchester Ship Canal
Walton Locks	LWS	360m east
Moore Meadows	LWS	480m south east
Pitts Heath	LWS	810m south
Sankey Canal Central	LWS	950m north
St Helens Canal	LWS	1.1km west
Green Wood	LWS	1.1km south west
Lodge Plantation	LWS	1.1km south west
Oxmoor	LWS	1.2km south west
Norbury Wood and Marsh	LWS	1.4km south west
Sandymoor Wood	LWS	1.62km south west
Rows Wood	LWS	1.67km south
Dorchester Park	LWS	1.73km south west
Appleton Reservoir	LWS	1.77km south east
Latchford Railway Sidings	LWS	1.87km east

Citations are included below for the following sites:

- Moore Nature Reserve LWS;
- Moss Side Farm LWS;
- Norton Marsh and Upper Moss Side Farm LWS;
- Upper Mersey Estuary LWS;
- Gatewarth LWS; and
- Manor Park Woodland LWS.

Map



Site name	Moore Nature Reserve
Site code	WA023
Authority	Warrington Local Wildlife Sites Partnership
Site centroid	SJ5738585369

Site name: Moore Nature Reserve

Site code: WA023

Site map:



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Ordnance Survey 100022848.

Site name: Moore Nature Reserve	Site code: WA023
Ward: Penketh and Cuerdley	Grid reference: SJ570853
Area: 101.2 ha	Ownership: FCC
Date of Notification: 2000	
Date of Revision: 2011	
Status: Local Wildlife Site	

Description:

The western section of this site has a large area of dry acid heath grassland on sand deposits resulting from the construction of the Manchester Ship canal. The acid heath grassland has a rich damp flora and has good bird and butterfly populations.

There is a section of wet deciduous woodland with areas of scrub and grassland. This is a good example of wet woodland which has good ground flora and the grasslands have a good variety of plant species which in turn attracts a good variety of invertebrates.

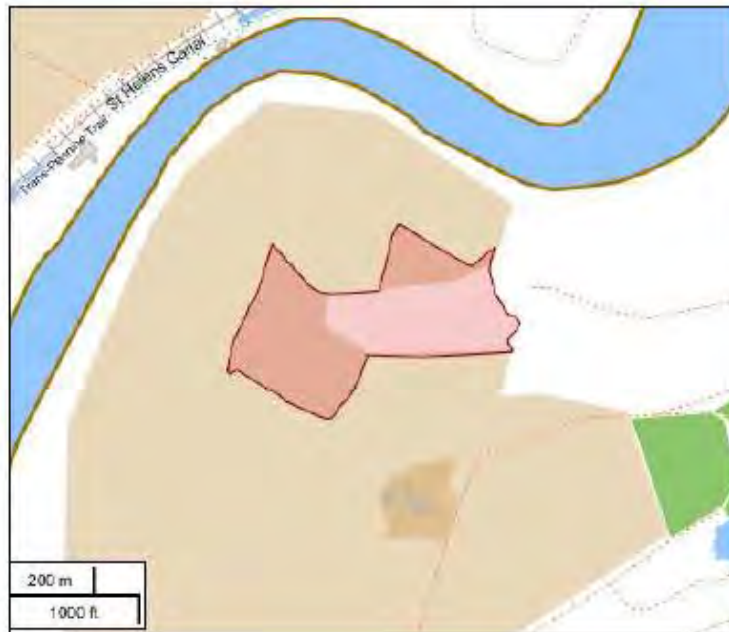
Several ponds in the quarried area have areas of reedbed. A large waterfowl lake has been constructed which also has several areas of reedbed and is overlooked by several hides. This lake attracts a good mix of breeding and wintering waterfowl and dragonfly populations. A large amphibian population uses the site each spring.

The eastern section has a series of excavated ponds with areas of mature woodland and grassland with a range of indicator species present. Reedbed is present in several areas variety of tree species of varying age.

Criteria for selection:	H1 - Lowland Mixed Deciduous Woodland H2 - Wet Woodland H9 - Acid grassland H18 - Reedbeds H26 - Accessible Natural Greenspace S2 - Birds
Most recent survey:	2011
Inventories:	Deciduous Woodland BAP Priority Habitat Inventory for England

Mass Side Farm / WA024

Map



Site name	Mass Side Farm
Site code	WA024
Authority	Warrington Local Wildlife Sites Partnership
Site centroid	SJ5676986041

Site name: Moss Side Farm

Site code: WA024

Site map:



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Ordnance Survey 100022848.

Site name: Moss Side Farm	Site code: WA024
Ward: Penketh and Cuedley	Grid reference: SJ567861
Area: 15 ha	Ownership: Private
Date of Notification: 2011	
Date of Revision:	
Status: Local Wildlife Site	

Description:

This is an intensive arable farm however there is a good ditch network with some native flora. Areas previous set aside host Fleabane, Coltsfoot, Marsh bedstraw, Typha, Reed canary grass and Creeping thistle and provide good habitat for farmland birds including the Grey partridge. Rare Grass vetchling is present on the set aside (not seeded). Small areas of Common reed are beginning to spread onto the set aside land and along the ditches. The set aside land is likely to be providing some buffering of the ditches by reducing nutrient runoff. Numerous species rich hedges line the field system and a eutrophic pond is located by the eastern boundary of the site.

Criteria for selection:	H18 - Reedbeds S13 - Vascular plants
Most recent survey:	19/08/2011
Inventories:	

Norton Marsh and Upper Moss Side Farm / WA025

Map

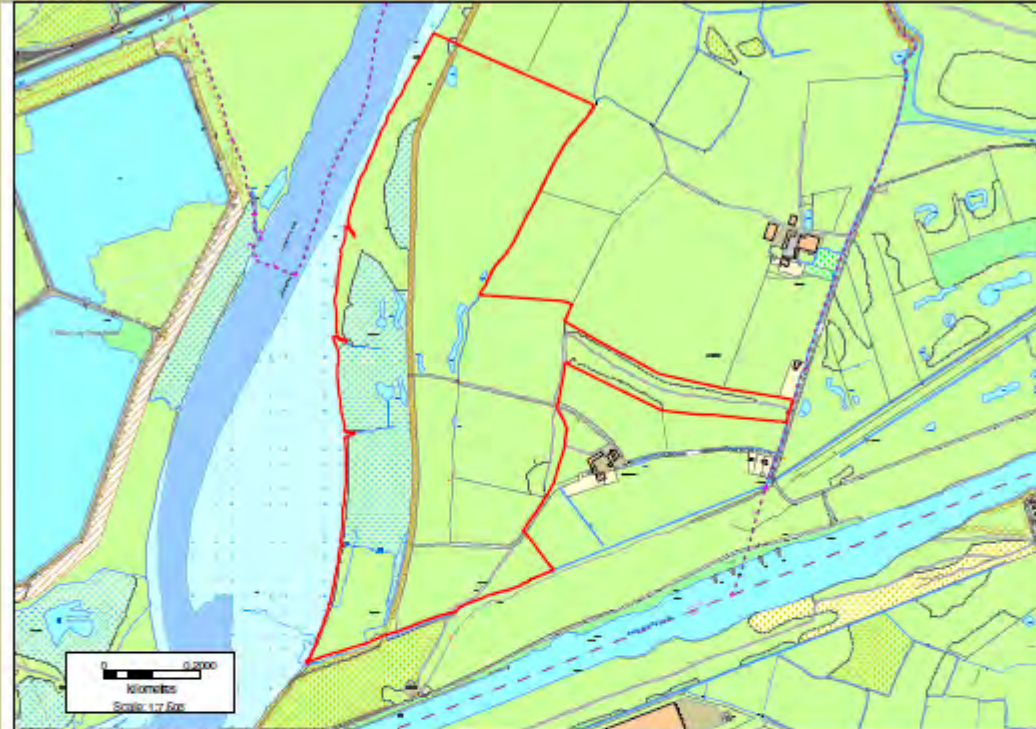


Site name	Norton Marsh and Upper Moss Side Farm
Site code	WA025
Authority	Warrington Local Wildlife Sites Partnership
Site centroid	SJ5601285348

Site name: Norton Marsh and Upper Moss Side
Fields

Site code: WA025

Site map:

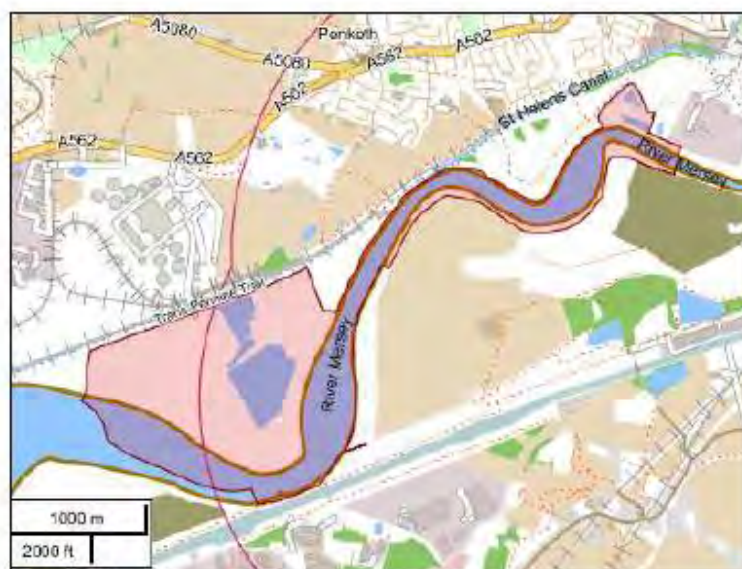


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Ordnance Survey 100022848.

Site name: Norton Marsh and Upper Moss Side Fields	Site code: WA025
Ward: Penketh and Cuerdley	Grid reference: SJ560853
Area: 50.7 ha	Ownership: Forestry Commission
Date of Notification: 2011	
Date of Revision:	
Status: Local Wildlife Site	
Description:	
<p>Norton Marsh and the adjacent Upper Moss Side fields are situated in the upper fringes of the Mersey Estuary, south west of Warrington, and are owned by The Forestry Commission. The site consists of an area of salt-marsh, and a number of fields which used to belong to a nearby farm and which were actively managed as arable land. Two small pools/wader scrapes have been established on the salt-marsh, and a network of ponds has been established in the largest UMS field under the million ponds scheme. The salt-marsh and the fields are separated by an earthbank flood barrier for which the Environment Agency carries out basic maintenance. Conservation grazing of several fields, using a small herd of Longhorn cattle, has been in progress in recent years. The site is known in the local birding community.</p> <p>Over 100 vascular plant species, 20 bird species, 8 mammal and 12 invertebrate species were recorded. A number of these species were UK protected and BAP priority species e.g. Brown Hare, Farmland birds, Cinnabar moth. Several locally scarce vascular plant species were recorded on the salt-marsh.</p> <p>The vegetation is characteristic of upper salt-marsh located high up an estuary, which is not frequently inundated and which is un-grazed.</p>	
Criteria for selection:	<ul style="list-style-type: none"> H11 - Restorable BAP grassland H18 - Fens, Reedbeds H26 - Accessible natural greenspace H28 - Saltmarsh S2 - Birds S13 - Vascular plants
Most recent survey:	July and September 2011
Inventories:	Lowland Mudflats BAP Priority Habitat Inventory for England

Upper Mersey Estuary / WA039

Map

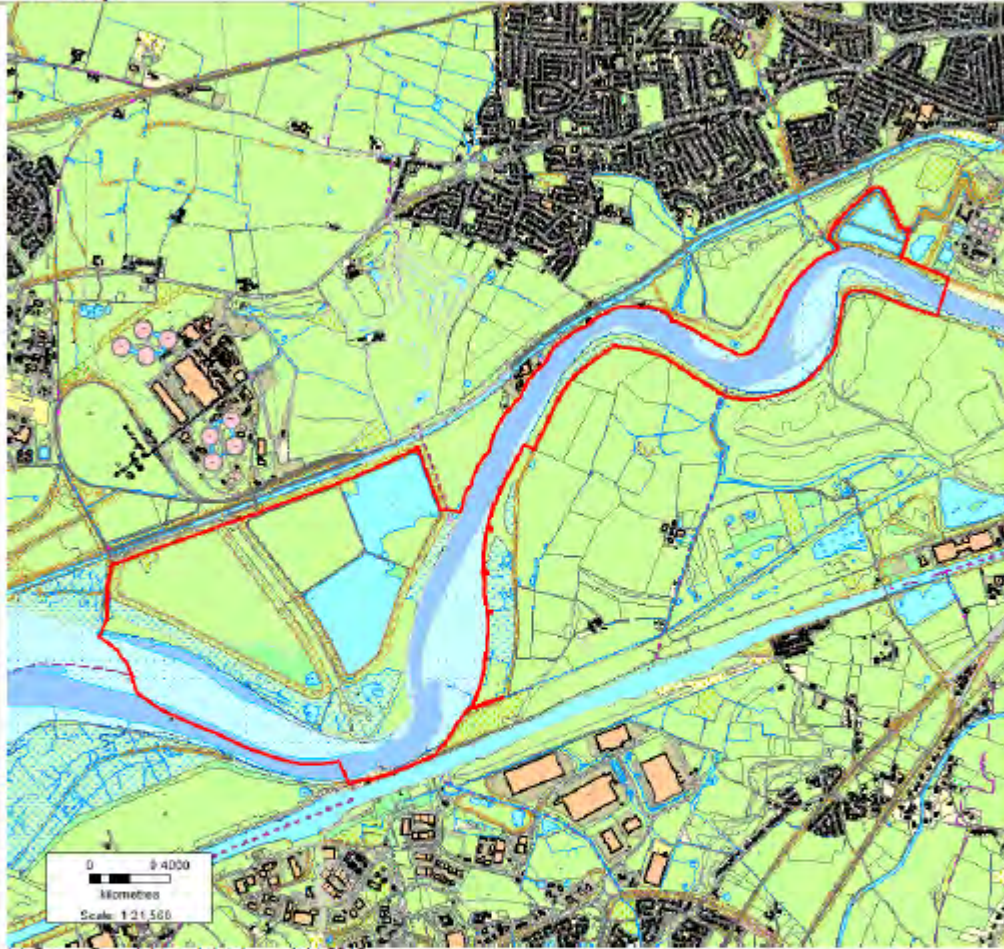


Site name	Upper Mersey Estuary
Site code	WA039
Authority	Warrington Local Wildlife Sites Partnership
Site centroid	SJ5632885944

Site name: Upper Mersey Estuary

Site code: WA039

Site map:

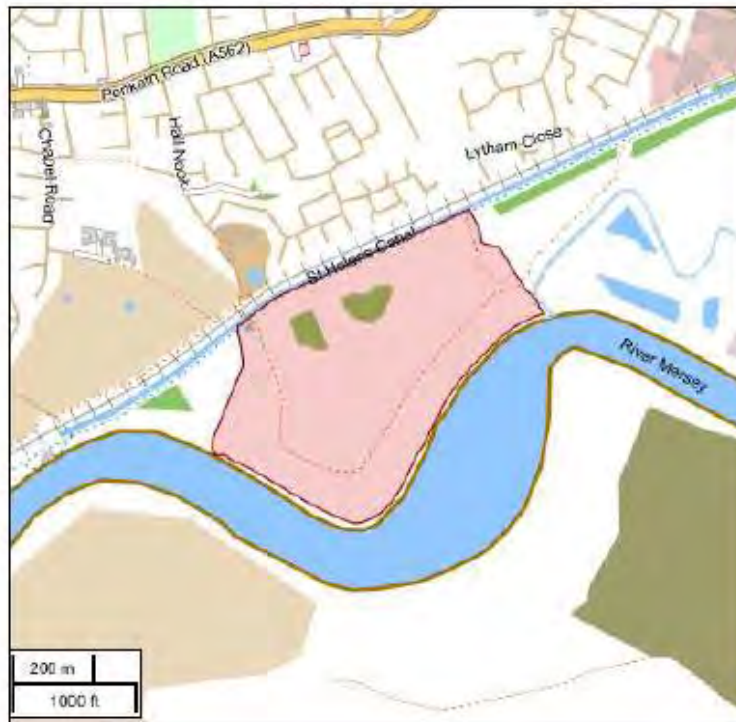


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Ordnance Survey 100022848.

Site name: Upper Mersey Estuary	Site code: WA039
Ward: Penketh and Cuerdley	Grid reference: SJ573865
Area: 316 ha	Ownership: Private, Duchy of Lancaster (below H.W.M.), Warrington Borough Council
Date of Notification: 05/09/2001	
Date of Revision:	
Status: Local Wildlife Site	
Description:	
<p>This site consists of large areas of intertidal sand and mudflats, together with buildings and established saltmarsh. Also included are the settlement lagoons used for the disposal of pulverised fuel ash (PFA) at Fiddler's ferry Power Station, which contain a variety of open water, marsh and wet carr woodland; of particular ecological interest is the artificial calcareous habitat unique in Cheshire.</p> <p>The site is collectively important for estuarine birds throughout the year providing feeding, breeding and roosting sites.</p>	
Criteria for selection: As of 2012 new selection criteria were adopted. All sites will be assessed as part of the ongoing resurveying programme against this updated criteria.	
Habitats:	A2.2 Scrub: scattered B3 Grassland: calcareous G2 Open Water: running water H1 Coastland: intertidal H2.6 Coastland: saltmarsh F1.1 Swamp: single sp. dominant swamp J2.5 Other artificial habitats
Most recent survey:	
Inventories:	Mudflats BAP Priority Habitat Inventory for England

Gatewarth / WA009

Map



Site name	Gatewarth
Site code	WA009
Authority	Warrington Local Wildlife Sites Partnership
Site centroid	SJ5714086864

Site name: Gatewarth

Site code: WA009

Site map:



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Ordnance Survey 100022848.

Site name: Gatewarth	Site code: WA009
Ward: Penketh and Cuerdley	Grid reference: SJ571868
Area: 34.4 ha	Ownership: Warrington Borough Council
Date of Notification: 05/09/2000	
Date of Revision: 2010	
Status: Local Wildlife Site	

Description:

This site is a former landfill site that has vegetated naturally. The central area of the site contains scattered scrub and scattered and dense scrub dominates the middle south facing slopes below the paths. There is immature plantation woodland where white poplar is abundant. There are areas of tall ruderal species dominated by great willowherb, creeping thistle and reed canary grass. Substantial areas of overgrown rank grassland host species such as false oat grass, field horsetail and timothy. There are small areas of neutral unimproved grassland with black knapweed, creeping cinqfoil, wild carrot and fine grasses. Rarer species include lady's bedstraw, orchids and grass vetchling. Significant areas of the site are dominated by common reed. By the river's edge couch grass, false oat grass and creeping thistle are present in mosaic with common reeds.

The site is particularly important for birds including red and amber listed Birds of Conservation Concern and UK BAP species. Particularly notable is the presence of grasshopper warbler and breeding willow tit. Brown hares which are a UK BAP species are also present.

Criteria for selection:	H7 – Neutral Grassland H18 – Fens, Swamps, Bogs and Reedbeds S2 - Birds S13 – Vascular Plant
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Most recent survey:	2010
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Inventories:	Lowland Mudflats BAP Priority Habitat Inventory for England
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Manor Park Woodland / HA025

Map

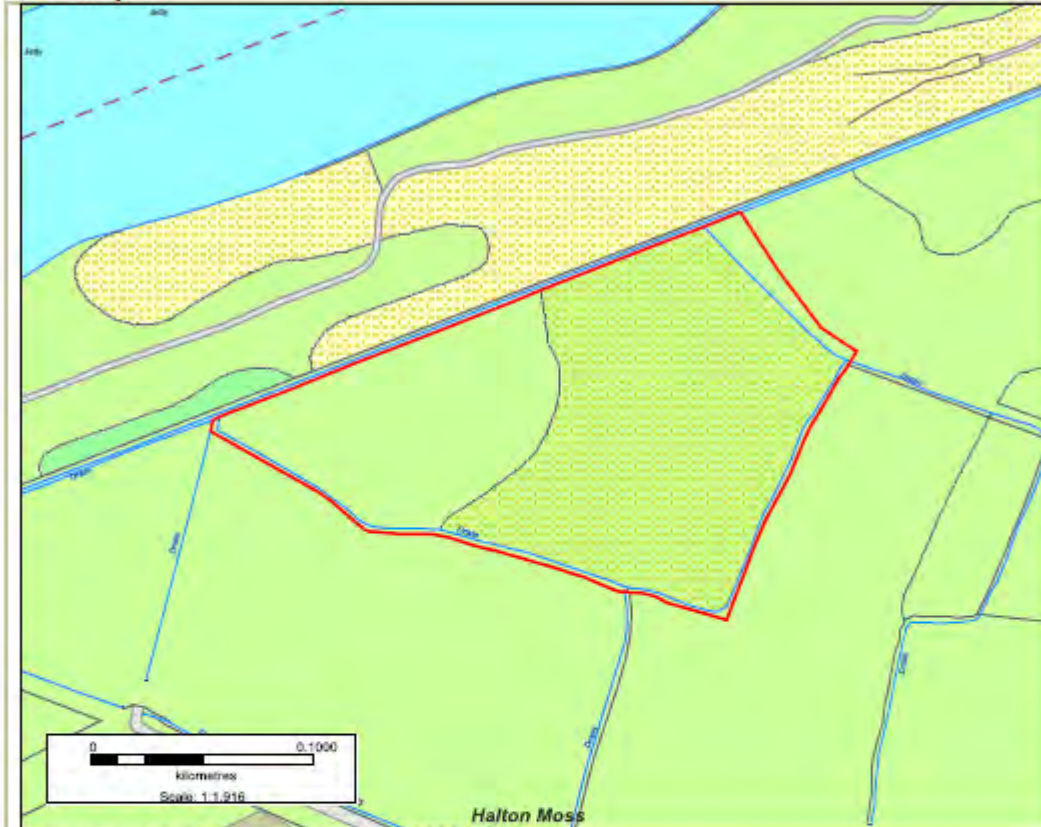


Site name	Manor Park Woodland
Site code	HA025
Authority	Halton Local Wildlife Sites Partnership
Site centroid	SJ5691284737

Site name: Manor Park Woodland

Site code: HA025

Site map:



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Site name: Manor Park Woodland	Site code: HA025
Ward: Moore	Grid reference: SJ568847
Area: 2.78 ha	Ownership: Halton Borough Council
Date of Notification:	
Date of Revision:	
Status: Local Wildlife Site	
Description:	
<p>This young woodland appears to be of secondary origin and is likely to have developed on an area of swamp/reedbed after drainage ditches surrounding the site were dug. The east section of the woodland is more mature and drier than the west, which is dominated by developing scrub vegetation. Certain areas of the woodland appear to have been planted with non-local species such as eating apple. There are several large open areas, particularly by the edge of the wood, which are dominated by common reed and other fen/swamp species. The southern edge of the site has deep drainage ditches and a linear area of acid grassland along a path.</p> <p>The swamp vegetation is particularly rich with a large number of wetland species present in the open areas and around the woodland edge.</p> <p>Drier areas of the developing woodland have a poor ground flora and are dominated by alder with birch, sycamore, elm and occasional sessile oak. Nettle, bramble and cleavers dominate the ground flora in the east.</p> <p>The western area of the site is mainly willow, suckering elm and hawthorn scrub with occasional tall trees such as pioneer birch and a stand of lime trees. The ground flora in the west is richer and reflects the preceding swamp community.</p> <p>The ditches are diverse and host numerous invertebrates and the small areas of grassland by the path have a good variety of typical acid grassland species.</p>	
Criteria for selection: H2 – Wet Woodland H9 – Acid Grassland H18 – Fens, Swamps, Bogs and Reedbeds	
Most recent survey: 28/07/2010	
Inventories:	Coastal and Floodplain Grazing Marsh BAP Priority Habitat Inventory for England

Walton Locks / WA040

Map



Site name	Walton Locks
Site code	WA040
Authority	Warrington Local Wildlife Sites Partnership
Site centroid	SJ6059506373

Moore Meadows / HA027

Map



Site name	Moore Meadows
Site code	HA027
Authority	Halton Local Wildlife Sites Partnership
Site centroid	SJ5717784289

Pitts Heath / HA035

Map



Site name	Pitts Heath
Site code	HA035
Authority	Halton Local Wildlife Sites Partnership
Site centroid	SJ5685584054

Sankey Canal Central / WA048

Map



Site name	Sankey Canal Central
Site code	WA048
Authority	Warrington Local Wildlife Sites Partnership
Site centroid	SJ5907888908

St Helens Canal / WA030

Map



Site name	St Helens Canal
Site code	WA030
Authority	Warrington Local Wildlife Sites Partnership
Site centroid	SJ5590486446

Green Wood / HA015

Map



Site name	Green Wood
Site code	HA015
Authority	Halton Local Wildlife Sites Partnership
Site centroid	SJ5624383888

Lodge Plantation / HA023

Map



Site name	Lodge Plantation
Site code	HA023
Authority	Halton Local Wildlife Sites Partnership
Site centroid	SJ5587783752

Map



Site name	Oxmoor
Site code	HA033
Authority	Halton Local Wildlife Sites Partnership
Site centroid	SJ5586484241

Norbury wood and Marsh / HAO30

Map



Site name	Norbury wood and Marsh
Site code	HAO30
Authority	Halton Local Wildlife Sites Partnership
Site centroid	SJ5522684162

Sandymoor Wood / HA044

Map



Site name	Sandymoor Wood
Site code	HA044
Authority	Halton Local Wildlife Sites Partnership
Site centroid	SJ5630583348

Rows Wood / WA028

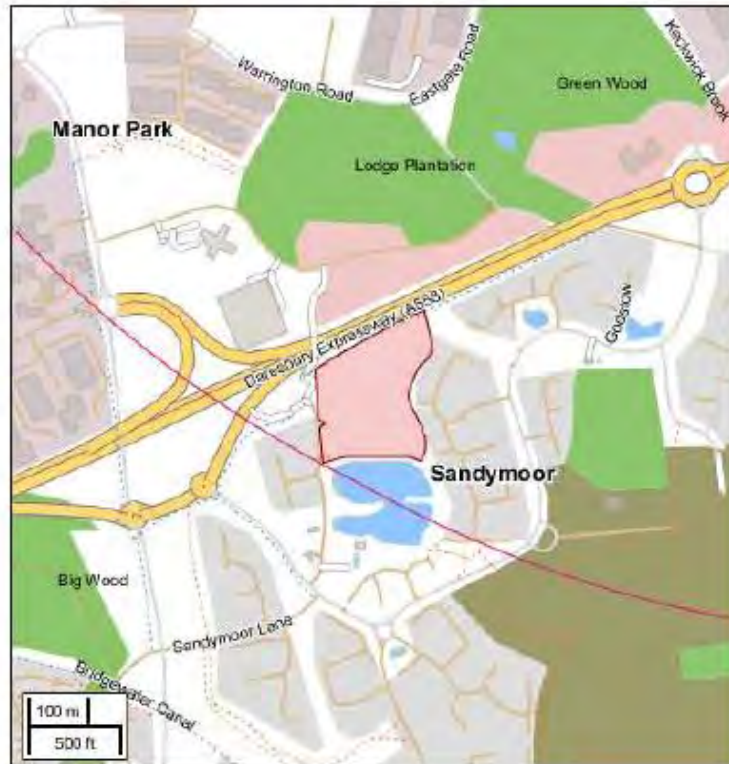
Map



Site name	Rows Wood
Site code	WA028
Authority	Warrington Local Wildlife Sites Partnership
Site centroid	SJ5921983759

Dorchester Park / HA013

Map



Site name	Dorchester Park
Site code	HA013
Authority	Halton Local Wildlife Sites Partnership
Site centroid	SJ5589483451

Latchford Railway Sidings / WA018

Map



Site name	Latchford Railway Sidings
Site code	WA018
Authority	Warrington Local Wildlife Sites Partnership
Site centroid	SJ6161087035

Upper Mersey Eastuary, Intertidal areas / HA049

Map



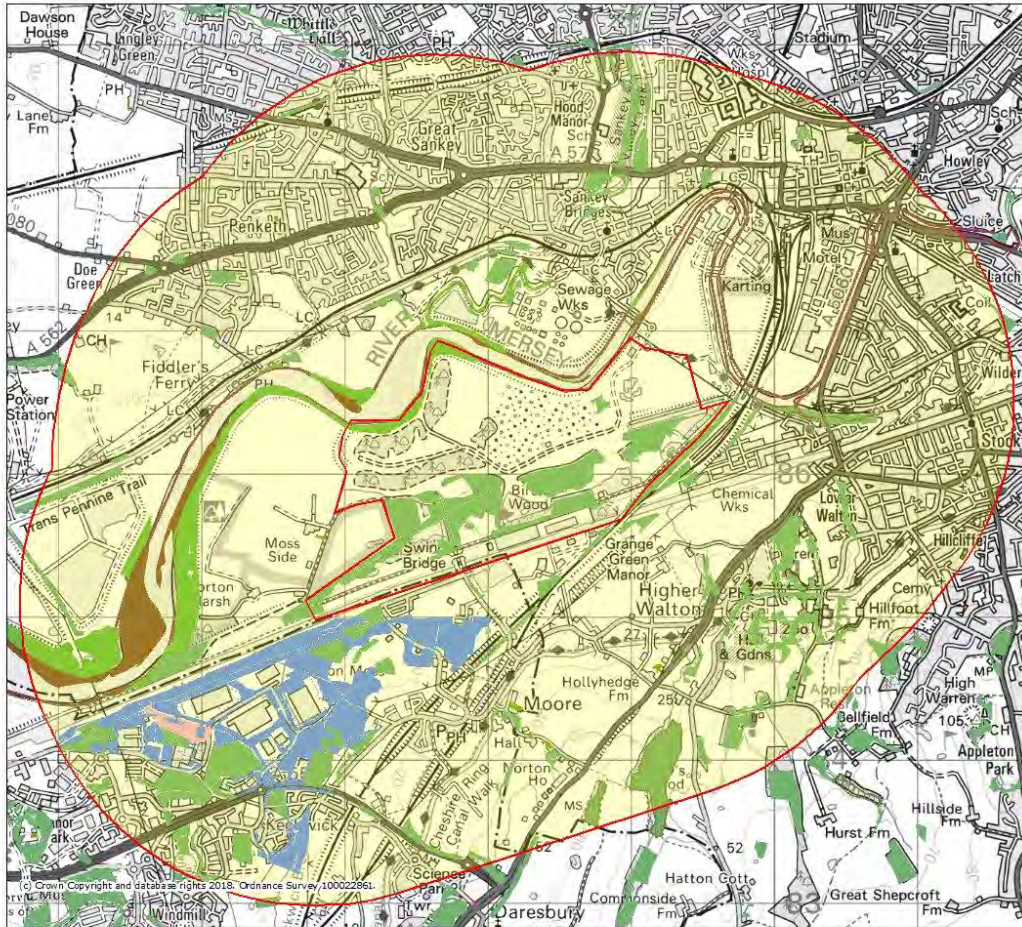
Site name	Upper Mersey Eastuary, Intertidal areas
Site code	HA049
Authority	Halton Local Wildlife Sites Partnership
Site centroid	SJ5311584351

Notable Habitats

Habitat Inventory Data within 2km

Source: MAGIC Maps

MAGiC



Legend

<ul style="list-style-type: none"> Priority Habitat Inventory - Coastal Saltmarsh (England) Priority Habitat Inventory - Coastal Sand Dunes (England) Priority Habitat Inventory - Coastal Vegetated Shingle (England) Priority Habitat Inventory - Maritime Cliffs and Slopes (England) Priority Habitat Inventory - Mudflats (England) Priority Habitat Inventory - Saline Lagoons (England) Saline Lagoons (Wales) Saltmarsh (Wales) Sand Dunes (Wales) Priority Habitat Inventory - Calaminarian Grassland (England) Priority Habitat Inventory - Coastal and Floodplain Grazing Marsh (England) 	<ul style="list-style-type: none"> Priority Habitat Inventory - Good quality semi-improved grassland (Non Priority) (England) Priority Habitat Inventory - Lowland Calcareous Grassland (England) Priority Habitat Inventory - Lowland Dry Acid Grassland (England) Priority Habitat Inventory - Lowland Meadows (England) Priority Habitat Inventory - Purple Moor Grass and Rush Pasture (England) Priority Habitat Inventory - Upland Calcareous Grassland (England) Priority Habitat Inventory - Upland Hay Meadows (England) Priority Habitat Inventory - Lowland Heathland (England) Priority Habitat Inventory - Mountain Heaths and Willow Scrub (England) Priority Habitat Inventory - Upland Heathland (England) 	<ul style="list-style-type: none"> Priority Habitat Inventory - Blanket Bog (England) Priority Habitat Inventory - Lowland Fens (England) Priority Habitat Inventory - Lowland Raised Bog (England) Priority Habitat Inventory - Reedbeds (England) Priority Habitat Inventory - Upland Flushes, Fens and Swamps (England) <p>Ancient Woodland (England)</p> <ul style="list-style-type: none"> Ancient and Semi-Natural Woodland Ancient Replanted Woodland Priority Habitat Inventory - Deciduous Woodland (England) Priority Habitat Inventory - Traditional Orchards (England) Woodpasture and Parkland BAP Priority Habitat (England)
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Projection = OSGB36
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0 0.5 1.0
 km

Notable Species

Extract of Species Data within 2km of the Site

Source: RECORD

Species records which are listed under the following have been included:

- European Protected Species (EPS);
- Protected bird species under Schedule 1 of the Wildlife and Countryside Act 1981, as amended (WCA1);
- Protected animal species under Schedule 5 of the Wildlife and Countryside Act 1981, as amended (WCA5);
- Protected plant species under Schedule 8 of the Wildlife and Countryside Act 1981, as amended (WCA8);
- Invasive non-native species under Schedule 9 of the Wildlife and Countryside Act 1981, as amended (WCA9);
- Species of principal importance under Section 41 of the Natural Environment and Rural Communities Act 2006 (S41); and
- Red and Amber listed Birds of Conservation Concern (BRd/BAm).

Species Summary Report

Species Grid Id Summary Report

AMPHIBIAN

Taxon name	Grid ref. id
Great Crested Newt	3 (2008), 17 (2013-2014), 18 (2014)
Common Toad	12 (2009), 17 (2007-2017), 18 (2008-2012), 22 (2007), 31 (2009-2015), 37 (2010)
Common Frog	4 (2015), 6 (2010), 7 (2008-2015), 9 (2007-2009), 10 (2007-2008), 12 (2009-2012), 16 (2007), 17 (2007-2013), 18 (2012-2015), 22 (2007), 24 (2011), 26 (2011), 31 (2013-2015), 35 (2011), 38 (2011), 42 (2008-2011), 43 (2007-2013)
Smooth Newt	6 (2011-2012), 12 (2009), 13 (2009), 17 (2010-2011), 22 (2007)

BIRD

Taxon name	Grid ref. id
Common Tern	17 (2012)
Black Tern	35 (2010)
Merlin	17 (2014)
Golden Plover	4 (2012-2013), 24 (2013)
Black-tailed Godwit	17 (2014), 23 (2014), 31 (2014)
Herring Gull	17 (2014)
Barnacle Goose	6 (2009), 17 (2012), 23 (2012)
Cetti's Warbler	4 (2009-2016), 5 (2017), 6 (2009-2017), 12 (2012), 19 (2017), 24 (2010), 25 (2012), 31 (2015)
Bittern	2 (2010), 17 (2012-2013), 30 (2009), 31 (2010-2013)
Dark-bellied Brent Goose	42 (2009)
Jack Snipe	17 (2013), 23 (2010)
Hobby	17 (2010), 23 (2010), 31 (2014)
Mediterranean Gull	17 (2012), 18 (2011), 23 (2010-2014)
Lesser Black-backed Gull	17 (2011-2014), 18 (2011-2013), 22 (2014), 23 (2007-2016), 24 (2010-2012), 30 (2010), 31 (2007-2015), 37 (2007-2013), 42 (2008-2011)
Black Swan	17 (2012), 23 (2011-2012)
Black-necked Grebe	23 (2009-2014)
Brambling	7 (2009-2012), 11 (2012-2013), 17 (2010-2013), 23 (2014), 24 (2010)
Marsh Tit	24 (2010)
Garganey	23 (2010), 24 (2010), 31 (2012)
Glaucous Gull	17 (2009), 18 (2014), 22 (2014-2015), 23 (2010-2013), 24 (2010)

Goldeneye	4 (2011), 17 (2010-2015), 22 (2014), 23 (2010-2015), 24 (2007-2012), 31 (2011-2012)
Dunlin	17 (2012), 18 (2012), 23 (2010), 24 (2007)
Fieldfare	4 (2013-2016), 7 (2009-2015), 11 (2010), 12 (2010), 13 (2009-2013), 17 (2010-2014), 18 (2009), 19 (2012), 22 (2015), 23 (2011), 24 (2007-2015), 31 (2010-2013), 33 (2016-2017), 35 (2009), 37 (2010), 42 (2009-2013), 43 (2010)
Grey Partridge	4 (2007), 7 (2009-2012), 12 (2012), 17 (2012-2013), 18 (2009-2012), 19 (2011), 22 (2014-2015), 24 (2007-2012), 29 (2009)
Cuckoo	6 (2012), 16 (2011), 17 (2009-2012), 18 (2007), 19 (2017), 24 (2007-2011), 31 (2009)
Great Black-backed Gull	12 (2012), 17 (2012-2014), 18 (2011-2014), 22 (2015), 23 (2009-2016), 24 (2010-2012), 33 (2013)
Herring Gull	12 (2012), 17 (2012-2015), 18 (2011-2014), 22 (2014-2015), 23 (2009-2015), 24 (2010-2012), 31 (2008-2010), 37 (2007-2013), 42 (2008-2012)
Common Gull	12 (2012), 17 (2012-2015), 18 (2011-2014), 23 (2010-2014), 24 (2010-2012), 31 (2012-2015), 37 (2007-2013), 42 (2008-2013), 43 (2007-2009)
Greylag Goose	4 (2013), 5 (2010-2015), 17 (2007-2015), 18 (2013), 22 (2015), 23 (2009-2015), 24 (2011-2012), 31 (2012-2015)
Black-headed Gull	12 (2011-2012), 15 (2014), 17 (2011-2015), 18 (2011-2014), 20 (2016), 22 (2014-2015), 23 (2007-2017), 24 (2010-2012), 30 (2010), 31 (2010-2013), 33 (2017), 35 (2009-2013), 37 (2007-2013), 42 (2007-2013), 43 (2007-2013)
Kestrel	3 (2013), 4 (2007-2016), 5 (2009), 6 (2009-2015), 7 (2009-2015), 10 (2009-2013), 11 (2010-2013), 12 (2009-2014), 13 (2009-2015), 15 (2014), 17 (2009-2015), 18 (2009-2015), 19 (2012-2013), 22 (2014-2015), 23 (2009-2014), 24 (2007-2012), 25 (2009-2012), 30 (2015), 31 (2009-2012), 33 (2009), 35 (2009), 37 (2007-2013), 42 (2009-2012), 43 (2008-2012)
Gadwall	2 (2009), 3 (2008), 4 (2007-2015), 5 (2009-2015), 6 (2015), 12 (2010-2012), 13 (2009), 17 (2009-2015), 18 (2012-2015), 22 (2014-2015), 23 (2007-2017), 24 (2007-2012), 30 (2009), 31 (2009-2015), 35 (2012), 42 (2009)
Little Grebe	4 (2007-2015), 6 (2015), 12 (2010), 17 (2007-2017), 18 (2010-2015), 19 (2013), 22 (2013-2015), 23 (2007-2017), 24 (2007-2012), 30 (2009-2010), 31 (2009-2015), 35 (2009-2012), 37 (2007-2012), 42 (2010)
Marsh Harrier	12 (2010), 17 (2010-2013), 22 (2014-2015), 23 (2011), 31 (2010)
Little Egret	4 (2009-2013), 5 (2009), 11 (2009), 17 (2010-2015), 22 (2014), 23 (2010-2014), 24 (2010-2011), 31 (2009-2012)
Barn Owl	7 (2009), 9 (2011), 11 (2009-2010), 15 (2007-2017), 18 (2014-2015), 21 (2017), 31 (2014), 35 (2009)
Meadow Pipit	4 (2015), 5 (2010), 9 (2007), 11 (2010-2013), 15 (2007), 17 (2010), 18 (2009-2015), 19 (2012), 22 (2015), 24 (2007-2011), 33 (2010)
House Sparrow	6 (2009-2015), 7 (2009-2014), 9 (2007), 11 (2009), 12 (2011-2012), 13 (2009), 15 (2007-2014), 17 (2015), 18 (2009-2012), 19 (2013), 24 (2010-2015), 25 (2008-2012), 37 (2007-2014), 38 (2013-2014), 42 (2007-2013), 43 (2007-2013)
Lapwing	4 (2007-2015), 5 (2009-2015), 6 (2009-2015), 7 (2012), 9 (2007), 10 (2007-2008), 11 (2009-2012), 12 (2009-2012), 13 (2015), 17 (2009-2015), 18 (2010-2015), 20 (2013), 21 (2010), 22 (2014-2015), 23 (2007-2011), 24 (2007-2013), 28 (2013), 30 (2009-2010), 31 (2009-2015), 32 (2012), 35 (2011)
Mistle Thrush	4 (2007-2015), 6 (2015), 7 (2008-2009), 9 (2007-2015), 11 (2010-2015), 12 (2010-2014), 13 (2009), 15 (2014), 16 (2007), 17 (2009-2015), 18 (2012), 22 (2014-2015), 23 (2009-2012), 24 (2010-2015), 25 (2010), 29

	(2009), 31 (2010-2015), 33 (2010-2016), 42 (2007-2013), 43 (2009-2013)
Little Ringed Plover	20 (2013), 23 (2010-2014), 24 (2007-2014), 31 (2009-2015)
Iceland Gull	17 (2015), 18 (2011-2016), 22 (2014-2015), 23 (2010-2014), 24 (2007-2012)
Greenshank	23 (2011), 24 (2007)
Grasshopper Warbler	4 (2007), 5 (2015), 6 (2009-2010), 10 (2010-2012), 11 (2010), 12 (2010), 13 (2009), 17 (2009-2013), 18 (2008-2015), 24 (2007-2010), 33 (2008)
Canada Goose	4 (2007-2015), 5 (2009-2015), 6 (2009-2015), 11 (2013), 12 (2012), 13 (2009), 17 (2007-2017), 18 (2008-2015), 22 (2013-2015), 23 (2007-2017), 24 (2010-2012), 25 (2009-2010), 26 (2009-2011), 30 (2009-2012), 31 (2009-2015), 33 (2009-2012), 34 (2010-2012), 35 (2009-2011), 37 (2007-2012), 42 (2008-2009), 43 (2009-2011)
Green Sandpiper	4 (2015), 11 (2014), 17 (2013), 23 (2007-2014), 24 (2010), 30 (2009), 31 (2009-2011)
Green Woodpecker	3 (2007), 4 (2015), 17 (2007-2015), 18 (2015), 22 (2014-2015), 23 (2010-2014), 24 (2010-2012), 31 (2010-2017)
Bullfinch	2 (2012-2013), 3 (2008), 4 (2007-2016), 5 (2009-2012), 6 (2009-2012), 10 (2011), 11 (2009-2015), 17 (2009-2017), 18 (2009-2015), 20 (2011), 22 (2007-2015), 23 (2009-2015), 24 (2010-2014), 25 (2015), 30 (2009), 31 (2009-2015), 33 (2013), 37 (2008-2014), 38 (2011), 42 (2007-2013), 43 (2008-2013)
Duncock	2 (2009), 3 (2008), 4 (2007-2015), 5 (2009-2012), 6 (2009-2015), 7 (2009-2013), 9 (2007), 10 (2009-2015), 11 (2009-2014), 12 (2012), 13 (2009), 15 (2007-2014), 16 (2007), 17 (2009-2017), 18 (2009-2015), 19 (2009-2013), 20 (2011), 22 (2007-2015), 23 (2009-2015), 24 (2007-2015), 25 (2009-2012), 29 (2012), 31 (2009-2015), 33 (2016), 36 (2016), 37 (2007-2011), 38 (2007), 42 (2007-2013), 43 (2007-2013), 44 (2007-2008)
Grey Wagtail	1 (2010), 3 (2008), 4 (2007-2015), 6 (2015), 7 (2009-2012), 12 (2010), 13 (2009), 17 (2009-2015), 18 (2015), 19 (2008), 22 (2007), 23 (2009-2014), 24 (2010), 25 (2009), 31 (2009-2010), 33 (2010), 36 (2008), 43 (2010)
Curlew	2 (2009), 4 (2009-2015), 5 (2012-2015), 10 (2010-2013), 11 (2009-2015), 12 (2012), 13 (2013), 17 (2009-2015), 18 (2010-2015), 22 (2007-2015), 23 (2013), 24 (2010-2012), 31 (2013)
Mallard	2 (2012), 4 (2007-2015), 5 (2009-2015), 6 (2010-2015), 9 (2007-2017), 10 (2007), 11 (2012-2013), 12 (2010-2012), 13 (2009), 15 (2007-2014), 16 (2007), 17 (2007-2017), 18 (2009-2015), 19 (2009-2013), 22 (2007-2017), 23 (2007-2017), 24 (2007-2013), 25 (2009-2011), 29 (2009), 30 (2008-2014), 31 (2007-2015), 33 (2012), 35 (2009-2017), 36 (2010-2013), 37 (2007-2017), 38 (2007-2015), 42 (2007-2013), 43 (2009-2012)
Lesser Spotted Woodpecker	4 (2016), 17 (2007-2015), 22 (2014-2015), 23 (2010-2012), 24 (2010-2012), 31 (2011)
Kingfisher	4 (2007-2015), 13 (2009), 15 (2014), 17 (2007-2015), 18 (2009-2015), 22 (2014), 23 (2009-2014), 24 (2010-2011), 25 (2011), 30 (2009-2013), 31 (2007-2015), 33 (2008-2012), 37 (2007-2016)
House Martin	1 (2010), 3 (2013), 4 (2007-2015), 6 (2015-2017), 7 (2012), 9 (2009), 13 (2009-2015), 15 (2014), 17 (2009-2013), 23 (2009-2015), 24 (2010), 33 (2008-2014), 35 (2011), 37 (2007-2012), 38 (2007-2011), 42 (2007-2012), 43 (2007-2012)
Sand Martin	1 (2010), 2 (2012), 3 (2008), 4 (2007-2015), 5 (2015), 6 (2009-2015), 7 (2013), 13 (2009), 17 (2007-2015), 18 (2009-2015), 22 (2012), 23 (2007-2015), 24 (2010-2011), 30 (2008-2013), 31 (2009-2015)
Swallow	1 (2010), 2 (2012-2017), 4 (2007-2015), 5 (2010), 6 (2009-2015), 9 (2007), 10 (2008), 11 (2009-2010), 12 (2010-2015), 13 (2009-2015), 14 (2012-2014), 15 (2014), 16 (2007), 17 (2009-2015), 18 (2009-2015), 19

	(2013), 22 (2010), 23 (2009-2015), 24 (2010-2011), 29 (2007), 30 (2009-2015), 31 (2008-2012), 33 (2010-2013), 35 (2009-2011), 36 (2008-2010), 37 (2007-2010), 42 (2007-2012), 43 (2010-2011)
Song Thrush	2 (2012), 3 (2008), 4 (2007-2015), 5 (2010), 6 (2009-2012), 7 (2007-2017), 9 (2007), 11 (2009-2010), 12 (2010-2012), 13 (2009), 15 (2007-2014), 16 (2007), 17 (2009-2015), 18 (2009-2015), 19 (2012-2013), 22 (2007-2015), 23 (2009-2015), 24 (2007-2012), 25 (2009-2011), 26 (2008-2011), 29 (2011-2012), 30 (2016), 31 (2008-2015), 33 (2010-2013), 35 (2011), 37 (2007-2011), 42 (2007-2013), 43 (2007-2013)
Willow Warbler	2 (2012), 4 (2007-2016), 5 (2009-2017), 6 (2009-2017), 10 (2007), 11 (2009-2015), 12 (2010-2012), 15 (2014), 17 (2007-2015), 18 (2009-2015), 19 (2009-2017), 22 (2015), 23 (2009-2015), 24 (2007-2011), 30 (2009), 31 (2009-2015), 37 (2007-2009), 42 (2007-2013), 43 (2007-2011)
Ring Ouzel	17 (2007)
Wheatear	5 (2015), 17 (2007-2010), 23 (2015), 24 (2007-2010), 31 (2012)
Starling	4 (2009-2015), 5 (2010), 6 (2009-2015), 7 (2009-2015), 12 (2010-2012), 13 (2009), 15 (2014), 17 (2010-2015), 18 (2009-2015), 19 (2013), 22 (2007-2015), 23 (2010-2015), 24 (2010-2015), 25 (2009-2012), 31 (2010-2013), 33 (2010-2017), 37 (2007-2010), 38 (2013), 42 (2007-2013), 43 (2007-2013)
Stock Dove	4 (2007-2015), 5 (2010), 11 (2009-2013), 12 (2010), 17 (2009-2015), 18 (2009-2015), 22 (2007), 23 (2009), 24 (2007-2012), 31 (2009-2015)
Yellowhammer	6 (2009-2012), 11 (2009-2015), 15 (2007-2014), 16 (2007), 17 (2007-2012), 22 (2014-2015), 24 (2007-2010)
Red Kite	17 (2007-2013)
Oystercatcher	3 (2008), 4 (2007-2010), 5 (2015), 6 (2009), 7 (2012), 12 (2009-2012), 13 (2009-2015), 17 (2009-2014), 18 (2010-2013), 22 (2014-2015), 23 (2007-2015), 24 (2010-2013), 30 (2010), 31 (2009-2015), 37 (2008-2011)
Ruddy Duck	17 (2007-2009), 23 (2007-2010), 24 (2010), 31 (2010), 33 (2008)
Pintail	17 (2007), 23 (2011)
Tufted Duck	4 (2007-2015), 6 (2015), 10 (2009), 17 (2007-2017), 22 (2014-2015), 23 (2007-2017), 24 (2010-2012), 30 (2009-2010), 31 (2007-2015), 33 (2008-2010), 35 (2009-2017), 37 (2007-2013), 38 (2007), 42 (2008-2012)
Whitethroat	3 (2013), 4 (2007-2015), 6 (2009-2015), 7 (2015), 10 (2007-2012), 11 (2009-2015), 12 (2012), 13 (2009), 15 (2014), 16 (2007), 17 (2009-2015), 18 (2009-2015), 19 (2009-2017), 22 (2015), 23 (2009-2015), 24 (2007-2011), 25 (2012-2015), 30 (2015), 31 (2009-2015), 33 (2012-2013), 35 (2011), 37 (2008), 42 (2007-2012), 43 (2007-2011)
Whinchat	17 (2010-2012), 23 (2012), 24 (2007), 31 (2010)
Sskylark	4 (2009-2012), 5 (2009), 6 (2009), 9 (2007), 10 (2007-2008), 11 (2009-2015), 12 (2010), 15 (2007-2014), 17 (2009-2014), 18 (2008-2015), 20 (2013), 21 (2010), 24 (2007-2011), 31 (2009-2012), 32 (2012)
Reed Bunting	2 (2010-2012), 3 (2013), 4 (2007-2015), 5 (2009-2017), 6 (2009-2015), 7 (2011-2017), 9 (2007), 10 (2007-2011), 11 (2009-2015), 12 (2009-2012), 13 (2009), 15 (2007-2014), 16 (2007), 17 (2009-2015), 18 (2009-2015), 19 (2008-2013), 22 (2014-2015), 23 (2009-2015), 24 (2007-2012), 25 (2010-2012), 30 (2009-2010), 31 (2009-2015), 37 (2010)
Teal	4 (2007-2015), 5 (2009-2010), 10 (2007-2012), 11 (2010-2013), 17 (2008-2015), 18 (2010-2015), 22 (2014-2015), 23 (2009-2015), 24 (2007-2012), 30 (2009), 31 (2009-2015), 35 (2009-2011), 37 (2007-2013)
Shoveler	5 (2009-2015), 17 (2008-2015), 22 (2014-2015), 23 (2009-2016), 24 (2010-2012), 31 (2009-2015), 35 (2011)

Pochard	4 (2009), 17 (2009-2014), 22 (2014-2015), 23 (2007-2017), 24 (2010-2012), 30 (2009), 31 (2010-2015), 37 (2007-2011)
Woodcock	11 (2009), 17 (2010-2012), 24 (2010-2012), 31 (2010-2015)
Peregrine	4 (2012), 13 (2009-2015), 17 (2011-2014), 23 (2010-2014), 24 (2010-2012), 28 (2012), 31 (2009-2011), 36 (2008), 37 (2009-2014), 42 (2012)
Snipe	4 (2007-2015), 11 (2009), 12 (2009), 17 (2009-2013), 18 (2008), 23 (2009-2015), 24 (2010-2012), 30 (2009), 31 (2009-2013), 42 (2009)
Redwing	4 (2009-2015), 6 (2013), 7 (2011-2015), 11 (2011-2013), 12 (2012-2014), 13 (2013), 17 (2009-2015), 18 (2009-2015), 19 (2012-2013), 20 (2011), 22 (2014-2015), 23 (2010-2015), 24 (2007-2015), 31 (2010-2012), 33 (2016-2017), 35 (2009), 36 (2009), 37 (2010), 38 (2010), 42 (2009-2013), 43 (2008-2013)
Ring-necked Parakeet	24 (2010)
Redshank	4 (2009-2015), 10 (2009), 12 (2012), 17 (2009-2012), 18 (2012-2015), 23 (2010), 24 (2007-2010), 31 (2010)
Pink-footed Goose	4 (2010), 6 (2015), 11 (2010), 17 (2012-2014), 19 (2013), 23 (2010), 24 (2010-2012), 39 (2012)
Whooper Swan	23 (2010), 24 (2010)
Redstart	24 (2011)
Scaup	1 (2010), 4 (2010), 17 (2010), 23 (2010), 31 (2010)
Swift	1 (2010), 4 (2007-2015), 6 (2015), 7 (2015), 13 (2009), 14 (2016), 15 (2014), 17 (2007-2015), 18 (2009-2015), 19 (2013), 23 (2009-2015), 24 (2010), 25 (2009-2012), 29 (2012), 31 (2008-2015), 33 (2008-2012), 37 (2007-2014), 38 (2009-2010), 39 (2009), 41 (2009-2011), 42 (2007-2012), 43 (2008-2012)
Wood Sandpiper	23 (2011)
Ringed Plover	23 (2011)
Tree Pipit	23 (2010)
Yellow Wagtail	17 (2013-2015), 23 (2010-2012), 31 (2010)
Spotted Flycatcher	18 (2008), 23 (2011)
Water Pipit	31 (2010)
Tree Sparrow	7 (2011), 11 (2009), 15 (2014), 22 (2014-2015), 42 (2010)
Yellow-legged Gull	17 (2013), 18 (2014), 23 (2013-2015)
Smew	17 (2013), 23 (2012-2013), 31 (2012-2013)
Whimbrel	11 (2013)
Osprey	5 (2014)
Pied Flycatcher	16 (2013)
Short-eared Owl	12 (2012), 24 (2012)
Sacred Ibis	23 (2012)
Red-crested Pochard	17 (2011), 23 (2011)

BONY FISH (ACTINOPTERYGII)

Taxon name	Grid ref. id
Herring	4 (2012-2014)
Dover Sole	4 (2015)
European Eel	4 (2012-2015), 12 (2009), 19 (2009)
Plaice	4 (2015)

CONIFER

Taxon name	Grid ref. id
Juniper	7 (2013)
Scots Pine	7 (2013), 9 (2007), 26 (2011), 36 (2013), 42 (2015)

FERN

Taxon name	Grid ref. id
Water Fern	25 (2007), 33 (2007), 34 (2007)

FLOWERING PLANT

Taxon name	Grid ref. id
False-acacia	7 (2013)
Common Cudweed	10 (2007)
Narrow-leaved Bitter-cress	30 (2010)
Giant Knotweed	31 (2011)
Galingale	9 (2009)
Large-flowered Hemp-nettle	16 (2008)
Curled Dock	3 (2011)
Annual Beard-grass	33 (2016)
Black Poplar	11 (2010)
Fritillary	9 (2011), 43 (2010)
Himalayan Cotoneaster	26 (2011), 39 (2013)
Grass Vetchling	18 (2008-2015)
Cornflower	12 (2009)
Large-leaved Lime	3 (2011), 25 (2011), 26 (2011), 30 (2007)
Giant-rhubarb	30 (2010)
Giant Hogweed	4 (2015), 6 (2015), 18 (2015), 22 (2007), 25 (2015), 30 (2015), 31 (2015), 37 (2010-2011)
Bluebell	3 (2007-2011), 4 (2007-2015), 7 (2010), 9 (2007-2009), 10 (2007), 15 (2007), 16 (2007), 22 (2007), 23 (2009-2015), 28 (2013), 30 (2010), 36 (2013), 42 (2009)
Japanese Rose	26 (2007-2011), 38 (2015)

Japanese Knotweed	8 (2009), 20 (2007), 23 (2014), 25 (2007-2011), 26 (2011), 29 (2007-2016), 30 (2007), 31 (2007-2011), 32 (2012), 33 (2007-2013), 38 (2015), 39 (2007-2012)
Indian Balsam	4 (2011-2015), 6 (2015), 7 (2010-2013), 9 (2007-2011), 10 (2009-2011), 12 (2012), 13 (2009), 17 (2013), 18 (2015), 19 (2008), 22 (2007-2009), 23 (2009-2014), 25 (2007-2015), 26 (2011), 27 (2009), 30 (2010), 31 (2007-2015), 32 (2011-2012), 33 (2007-2009), 34 (2009), 35 (2011), 37 (2009-2012), 38 (2011-2015)
Bindweed	1 (2007)
Common Cord-grass	1 (2007)
Turkey Oak	17 (2014), 23 (2015), 35 (2011), 41 (2012)
Nuttall's Waterweed	26 (2011)
Rhododendron	3 (2011), 29 (2016), 30 (2016), 39 (2012)
Shepherd's Cress	4 (2008), 31 (2011)
Small Cudweed	31 (2014)
Small-leaved Cotoneaster	44 (2009)
Russian-vine	37 (2009)
Sand Leek	37 (2009)
Red Hemp-nettle	17 (2012)
Wall Cotoneaster	10 (2007)
Wild Clary	4 (2008)

INSECT - BUTTERFLY

Taxon name	Grid ref. id
Grizzled Skipper	37 (2016)
White-letter Hairstreak	17 (2011-2012), 23 (2011-2014)
Ringlet	17 (2014)

INSECT - MOTH

Taxon name	Grid ref. id
Ash Pug	7 (2017)
Ear Moth	17 (2012)
Flounced Chestnut	31 (2011)
Brown-spot Pinion	31 (2011)
Autumnal Rustic	17 (2011), 31 (2011-2012)
Green-brindled Crescent	7 (2011), 20 (2011)
Centre-barred Sallow	17 (2011), 20 (2011), 31 (2012)
Grey Dagger	3 (2008), 18 (2008)
Crescent	3 (2008), 18 (2008), 20 (2011)

Garden Tiger	7 (2012), 18 (2008), 20 (2011)
Angle-barred Pug	7 (2014)
Dusky Thorn	3 (2008), 7 (2013), 17 (2011-2013)
Knot Grass	3 (2008), 7 (2013)
Dark-barred Twin-spot Carpet	7 (2009-2014), 18 (2008)
Bordered Beauty	7 (2013)
Latticed Heath	7 (2013), 18 (2008)
Mottled Rustic	7 (2010-2016), 18 (2008), 20 (2011)
Mouse Moth	13 (2011-2013), 20 (2011)
Dot Moth	7 (2012-2015), 13 (2013), 17 (2011), 18 (2008), 20 (2011), 31 (2011)
Ghost Moth	7 (2012-2016), 17 (2011)
Cinnabar	1 (2010), 2 (2012), 7 (2013-2014), 9 (2007), 10 (2007-2009), 11 (2016), 12 (2010-2012), 13 (2013-2015), 16 (2007), 17 (2010-2013), 18 (2008), 19 (2013), 25 (2010), 31 (2009), 37 (2012), 42 (2007-2012), 43 (2008-2011)
Small Square-spot	7 (2014-2016), 13 (2013), 31 (2011-2012)
Rosy Rustic	7 (2011-2013), 18 (2008), 31 (2011)
Shaded Broad-bar	7 (2012-2015), 17 (2012), 18 (2008), 20 (2011)
Oak Hook-tip	7 (2009-2015), 17 (2013)
White Ermine	3 (2008), 13 (2016), 17 (2011-2012), 31 (2011)
Pale Eggar	17 (2011)
Spinach	31 (2011)

LICHEN

Taxon name	Grid ref. id
Ear-lobed dog-lichen	43 (2007)

MARINE MAMMAL

Taxon name	Grid ref. id
Common Seal	12 (2009)

MOSS

Taxon name	Grid ref. id
Freiberg's Screw-moss	15 (2008), 16 (2008), 22 (2008), 29 (2008), 30 (2008), 36 (2008), 41 (2008)

REPTILE

Taxon name	Grid ref. id
Red-eared Terrapin	19 (2008), 30 (2011), 31 (2008)

TERRESTRIAL MAMMAL

Taxon name	Grid ref. id
Brown Long-eared Bat	3 (2014-2015), 35 (2013), 36 (2013)
Long-eared Bat species	3 (2014)
European Otter	34 (2013-2017), 42 (2012)
Eurasian Red Squirrel	30 (2016), 37 (2017)
Bats	9 (2008), 43 (2011)
Daubenton's Bat	17 (2011), 23 (2010), 31 (2013), 33 (2009)
Common Pipistrelle	3 (2014-2015), 4 (2010), 7 (2011-2015), 13 (2013-2015), 14 (2014), 15 (2014), 29 (2013), 31 (2013), 33 (2015), 35 (2011-2013), 37 (2008-2011), 38 (2012-2014), 39 (2012-2014), 42 (2012)
Eurasian Badger	3 (2012), 4 (2012-2013), 9 (2013), 10 (2011-2017), 11 (2013-2016), 15 (2010), 16 (2008-2012), 17 (2014-2017), 21 (2007-2016), 22 (2011-2013), 23 (2014), 29 (2008-2017), 30 (2014), 31 (2012-2015), 32 (2014), 35 (2010-2013), 36 (2008-2015), 37 (2009-2016), 38 (2013), 40 (2007-2010), 41 (2010-2014), 42 (2010-2013), 43 (2007-2010)
American Mink	4 (2013-2015), 5 (2010), 9 (2011), 10 (2008-2009), 12 (2012), 15 (2009-2011), 30 (2009), 31 (2009), 36 (2008), 37 (2012)
European Water Vole	4 (2009), 6 (2009), 10 (2008-2012), 11 (2009), 13 (2009), 17 (2008), 19 (2009), 31 (2008)
Brown Hare	3 (2015), 4 (2012-2015), 5 (2013), 10 (2012), 11 (2011-2015), 18 (2007-2011), 22 (2015), 23 (2015), 24 (2007), 31 (2015)
Eastern Grey Squirrel	1 (2010), 3 (2008-2013), 4 (2010-2015), 5 (2012), 7 (2008-2015), 9 (2008-2009), 10 (2013-2016), 11 (2010-2012), 12 (2010), 13 (2015), 15 (2013), 16 (2009), 17 (2008-2015), 18 (2008-2015), 19 (2014), 21 (2007), 22 (2007-2015), 23 (2009-2014), 24 (2007-2012), 25 (2010), 26 (2007-2017), 29 (2009-2011), 30 (2010-2016), 31 (2008-2015), 35 (2011), 36 (2011), 37 (2007-2015), 42 (2007-2013), 43 (2007-2013)
West European Hedgehog	5 (2012), 7 (2010-2015), 9 (2007-2012), 10 (2009), 15 (2009), 16 (2007), 19 (2012), 21 (2007), 22 (2007), 26 (2010-2016), 31 (2009), 33 (2017), 37 (2008-2014), 38 (2012-2013), 42 (2008-2011), 43 (2011)
Pipistrelle	7 (2009-2012), 12 (2008), 22 (2007), 23 (2010-2011), 24 (2010-2011), 25 (2009), 30 (2009-2012), 31 (2010), 32 (2014), 34 (2009), 36 (2008), 37 (2010), 39 (2012)
Soprano Pipistrelle	3 (2013-2015), 4 (2010), 7 (2014), 10 (2013), 15 (2014), 17 (2010-2015), 29 (2013), 31 (2009), 35 (2011-2013), 37 (2009-2010)
Noctule Bat	3 (2014), 4 (2010), 7 (2014), 10 (2013), 17 (2012-2015), 31 (2013), 32 (2014), 35 (2013), 36 (2010)
Polecat	17 (2013)
Unidentified Bat	14 (2014), 15 (2014)

Local BAP Habitats and Species

Cheshire Region Biodiversity Partnership

Habitats

- Hedgerows
- Woodland
- Arable field margins
- Coastal and floodplain grazing marsh
- Coastal sand dune
- Coastal marsh
- Dry stone walls
- Lowland fen
- Gardens and allotments
- Heathland
- Lowland raised bog
- Wood-pasture and parkland
- Meres
- Intertidal mudflats
- Ponds
- Reedbeds
- Roadside verges
- Traditional orchards
- Unimproved grassland
- Waxcap grasslands

- Small cetaceans
- Water vole
- Bees and wasps
- Belted beauty
- Club-tailed dragonfly
- Depressed river mussel
- Dingy skipper
- Downy emerald
- Lesser silver water beetle
- Mud snail
- Ringlet
- Sandhill rustic
- Small pearl-bordered fritillary
- Spotted yellow/black leaf beetle
- Variable damsel fly
- White-clawed crayfish
- White letter hairstreak
- Black poplar
- Bluebell
- Isle of Man cabbage
- Ivy-leaved water-crowfoot
- Mackay's horsetail
- River water-crowfoot
- Rock sea-lavender

Species

- Barn owl
- Black necked grebe
- Farmland birds
- Spotted flycatcher
- Great crested newt
- Natterjack toad
- Adder
- Slow-worm
- Atlantic grey seal
- Bats
- Brown hare
- Dormouse
- Harvest mouse
- Otter
- Polecat

APPENDIX E: Habitat Survey Appendix



PORT WARRINGTON MOORE PHASE 1 HABITAT SURVEY APPENDIX



1.0	General Details	Error! Bookmark not defined.
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1.0 Introduction

- 2.1 Peel Land and Property Ltd in association with Peel Ports are looking to enable release of part of Moore Nature Reserve from the greenbelt in order to enable development of a new multi modal port facility and redevelopment of existing facilities at Port Warrington. Peel are also looking to develop an area of landfill to the north east of Moore Nature Reserve into a new commercial park, this area is also included within this report. This report has been produced to determine baseline habitat conditions for the site and its suitability for development.
- 2.2 Approximately 37ha of Moore Nature Reserve is to be lost for this development predominantly in the centre and west of site.

Site Description

- 2.3 Moore Nature Reserve is located in the south of Warrington off Lapwing Lane, adjacent to the village of Moore. The site is immediately bordered to the north by the former Arpley Meadows Landfill and the River Mersey and to the south by The Manchester Ship Canal. To the east lies the West Coast Mainline railway line and beyond a mix of industrial and residential development. To the west lies open farmland.
- 2.4 The commercial park will be located immediately north west of Moore Nature Reserve within an area of the former Arpley Meadows Landfill site.
- 2.5 The wider area is made up of a mix of open green space and industrial and residential development.

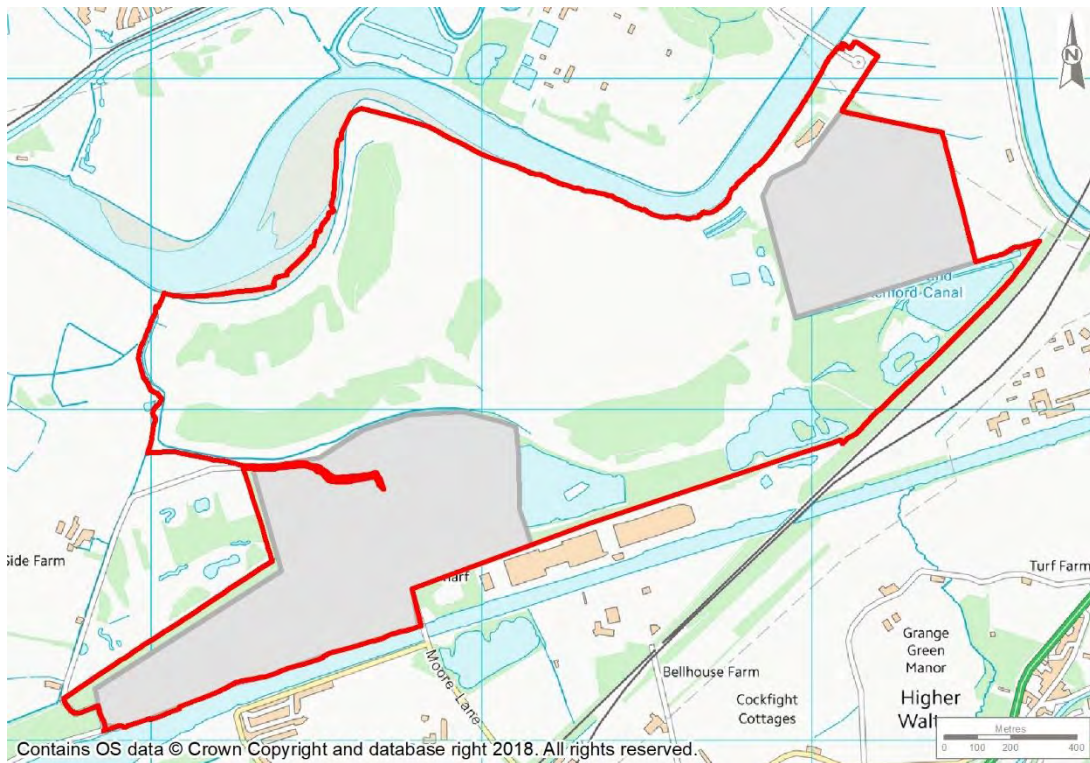


Figure 1: Location of Port Warrington survey area and proposed development areas.

2.0 Methods

- 3.1 Extended Phase 1 habitat surveys were undertaken across May, June, July and August by suitably qualified and experienced surveyors. Weather during the surveys varied from clear and sunny to overcast and rainy.
- 3.2 The survey was carried out in accordance with the Phase 1 habitat assessment methods¹ and Guidelines for Preliminary Ecological Appraisal². This survey provides an overview of key habitats and identifies features of ecological value, as well as the presence, or potential presence, of protected or notable species.

¹ JNCC (2010). Handbook for Phase 1 Habitat Survey: A technique for environmental audit.

² CIEEM (2018). Guidelines for Preliminary Ecological Appraisal.

3.0 Results

- 4.1 Table 3 below details the habitats recorded during the extended Phase 1 habitat survey of the proposed Port Warrington site including habitat descriptions, associated target note numbers and whether habitats are notable or protected under UK legislation.
- 4.2 The Phase 1 habitat survey is illustrated at Drawing G6929.01.001B. The detailed Target Notes Report is included at Appendix A.

Table 3: Port Warrington habitat descriptions and associated target note numbers.

Habitat Type	Protection/ Status	Target Note(s) Number	Habitat Description
Modified neutral grassland ³		TN40, TN47, TN48, TN49, TN74, TN76, TN77, TN78, TN79,	<p>Modified neutral grassland is the most common grassland type across both the Arpley Meadows Landfill site and Moore Nature Reserve.</p> <p>The largest areas of modified neutral grassland are found on the former landfill site where vast areas of modified neutral grassland form a mosaic with swamp, tall ruderal herb and scrub.</p> <p>There is a large area of modified neutral grassland in the centre of the Nature Reserve which forms an enclosed field used for exercising dogs. The fertile nature of this field has led to it being predominantly species poor, with dominant grass species present including perennial ryegrass <i>Lolium perenne</i> False oat-grass <i>Arrhenatherum elatius</i> and cock's-foot <i>Dactylis glomerata</i>. The eastern third comprises short acid grassland dominated by bent grasses, sheep's fescue and white clover. To the west of this dog field is another small area of MG grassland within a woodland clearing which is used as a forest school. This is dominated by moss species, creeping soft grass <i>Holcus mollis</i> and bent grasses <i>Agrostis capillaris</i> and <i>Agrostis stolonifera</i>.</p> <p>There is a long, narrow field of modified neutral grassland in the western corner of Moore Nature Reserve, running alongside the Manchester Ship Canal. Surveyor specific knowledge indicates that the western end of this grassland was seeded in 2004 and the floristic interest reflects this, with a number of less common forbs present including ladies bedstraw <i>Galium verum</i>, dark mullein <i>Verbascum nigrum</i>, oxeye daisy <i>Leucanthemum</i></p>

³ The neutral grassland categories detailed within the Phase 1 Habitat Survey Handbook are concentrated on grassland associated with rural situations (pastures and meadows), as such it was agreed with JNCC in 2005 (P. Gateley, pers. comm.) that neutral grassland habitats that don't easily fit within these categories, usually within urban or industrial areas, can be referred to as modified neutral grassland –

'Modified neutral grassland is not derived from agricultural grassland and the terms semi-improved and improved do not apply. Some modified neutral grassland may be species-rich but many swards are dense, coarse and species-poor. Modified neutral grassland naturally regenerates on disturbed ground and is unmanaged. It most commonly occurs in urban areas and on post-industrial land'.

Habitat Type	Protection/ Status	Target Note(s) Number	Habitat Description
			<p><i>vulgare</i>, salad burnet <i>Poterium sanguisorba</i> and cut-leaved cranesbill <i>Geranium dissectum</i>.</p> <p>There is also a smaller parcel of modified neutral grassland to the north-west of this area. This grassland is called Bird's Foot Trefoil Meadow and has a diverse species list including ladies bedstraw, musk mallow <i>Malva moschata</i> and quaking grass <i>Briza media</i>.</p>
Acid grassland	S41, LBAP	TN69, TN70, TN71, TN73, TN75	<p>The lakes on Moore Nature Reserve are a result of sand extraction and much of the soil across the site is very well-drained and sandy. Certain areas of grassland on the site are particularly sandy, including those found in the east at TN69 and TN70 and in the very west at TN75. These parcels are heavily grazed by rabbits and mostly comprise a short sward, with taller vegetation in places. The grassland was found to hold an unusual species composition including acid soil indicators such as sheep's sorrel <i>Rumex acetosella</i> as well as sand-loving species such as hare's foot clover <i>Trifolium arvense</i>, bee orchid <i>Ophrys apifera</i>, trailing St John's-wort <i>Hypericum humifusum</i> (TN70), Cladonia <i>Cladonia</i> sp., small cudweed <i>Logfia minima</i>, knotted pearlwort <i>Sagina nodosa</i> (TN75) and common cudweed <i>Filago vulgaris</i>. The grassland includes more marshy species around the margins, including rush species <i>Juncus</i> sp., purple loosestrife <i>Lythrum salicaria</i> and marsh thistle <i>Cirsium palustre</i>.</p>
Marshy grassland		TN9	<p>An open area of marshy grassland with scattered scrub and young trees is present in the woodland at TN9. There is also a lot of deadwood scattered across this area and the 2018 habitat survey recorded standing water here, suggesting it becomes flooded in wetter periods. Species recorded in this area include purple loosestrife <i>Lythrum salicaria</i>, soft rush <i>Juncus effusus</i>, yellow flag iris <i>Iris pseudacorus</i>, with scattered downy birch <i>Betula pubescens</i> and grey willow <i>Salix cinerea</i>.</p> <p>The sandy acid grassland at TN70 becomes damper with a higher concentration of marsh loving species towards its northern end. Hard rush <i>Juncus inflexus</i>, marsh thistle <i>Cirsium palustre</i>, and purple loosestrife are frequent in this area.</p>
Tall ruderal herb		TN12, TN34, TN47, TN48, TN74, TN75	<p>Tall ruderal vegetation is frequent across both Arpley Meadows Landfill and Moore Nature Reserve, both on its own and as a mosaic with other habitats. The largest continuous area of this habitat type is found along the south-western boundary of the tip site. This area is dominated by common nettle <i>Urtica dioica</i> with</p>

Habitat Type	Protection/ Status	Target Note(s) Number	Habitat Description
			willowherb species <i>Epilobium sp</i> , and cleavers <i>Galium aparine</i> .
Dense continuous/ scattered scrub		TN9, TN12, TN20, TN34, TN35, TN42, TN47, TN48, TN52, TN57, TN58, TN61, TN66, TN67	<p>In the west of Moore Nature Reserve, pockets of dense continuous scrub surround the open areas of grassland. These scrub pockets are mostly dominated by gorse <i>Ulex europaeus</i> and bramble <i>Rubus fruticosus agg</i> with goat willow <i>Salix caprea</i> and grey willow <i>Salix cinerea</i> occurring frequently.</p> <p>Self-sown young trees and scrub in varying densities are also scattered across much of the grassland, tall ruderal herb and swamp on both the Arpley Meadows Landfill and Moore Nature Reserve sites.</p> <p>In the central and eastern end of site, dense continuous scrub as a separate habitat is rare. There is a strip of dense bramble forming the southern boundary of the dog field on the Nature Reserve and scattered bramble and willow scrub on the parcel of land formerly used to dump the dredgings of the Manchester Ship Canal in the east of the tip site. This parcel of land is a dense mosaic of tall ruderal herb and swamp with young trees and scrub.</p> <p>Across the site further areas of scrub are found within the ground flora and understorey of the extensive woodland cover, again this is largely bramble dominated but hawthorn <i>Crataegus monogyna</i> is also found frequently across the site.</p>
Broad-leaved semi natural woodland	S41, LBAP	TN2, TN3, TN7, TN8, TN11, TN13, TN14, TN15, TN16, TN18, TN20, TN23, TN24, TN25, TN27, TN29, TN30, TN31, TN32, TN33, TN37,	<p>The majority of Moore Nature Reserve is covered by semi-natural broadleaved woodland, which varies in its composition and structure across the site. Much of the woodland across Moore Nature Reserve may have originally been planted but in this assessment has been mapped as semi-natural broadleaved woodland as the boundaries between planted areas and natural regeneration are not clear.</p> <p>Historic aerial photographs show that certain areas of Moore Nature Reserve were wooded in 1945, including the blocks of mature wet woodland in the centre of the site adjacent to Lapwing Lane at (TN7, TN8, TN14) and adjacent to the route of the old canal at TN18. The topography across this part of the site is very uneven and the habitat is a mosaic of wet and dry woodland with standing water in some places. There are frequent mature trees, with ground conditions determining whether oak <i>Quercus sp.</i>, alder <i>Alnus glutinosa</i> or crack willow <i>Salix fragilis</i> is the dominant canopy species in each location.</p>

Habitat Type	Protection/ Status	Target Note(s) Number	Habitat Description
		TN45, TN51, TN54, TN55, TN56, TN58, TN59, TN61, TN62, TN65, TN66.	<p>The 1945 aerial photography shows that the rectangular block of woodland between the two large central lakes at TN27 was also wooded in 1945, however the survey of this woodland block found that it is dominated by young birch trees, with only occasional mature specimens, and it may be that this area has been cleared and replanted or regenerated between 1945 and the present day.</p> <p>To the far west is an expanse of wet woodland of varying age (TN37) dominated by silver birch <i>Betula pendula</i> with abundant goat willow.</p> <p>Further large expanses of younger wet woodland are present in the east of site (TN30 and TN32) both dominated by silver birch, willow species and alder with an understory largely composed of bare ground and moss. This woodland type is also found in a band around the majority of the lake margins.</p> <p>Young wet woodland is present in a mosaic with swamp, tall ruderal herb and scrub on the former dumping ground for the Manchester Ship Canal at TN48. This woodland is dominated by willow species.</p> <p>Native bluebell <i>Hyacinthoides non-scripta</i> is found across the site and there is signage indicating that planting of native bluebells has taken place.</p> <p>Areas identified during the extended Phase 1 Habitat survey undertaken by TEP as semi-natural broad-leaved woodland were subject to detailed survey.</p>
Broadleaved plantation woodland	LBAP	TN1, TN4, TN5, TN22, TN31, TN33, TN38, TN41, TN43, TN53.	<p>The largest areas of plantation are found across Arpley Meadows Landfill in the north of the site, presumably planted as part of the remediation when the landfill was capped. All the trees in this area are semi-mature and are of a similar age. Ash <i>Fraxinus excelsior</i> and silver birch are frequent, with aspen <i>Populus tremula</i>, sycamore <i>Acer pseudoplatanus</i>, goat willow <i>Salix capraea</i> and oak <i>Quercus sp.</i> also occurring. Various other tree and scrub species occur less frequently, including coniferous species.</p> <p>Much of the woodland across Moore Nature Reserve may have originally been planted but has for the most part been mapped as semi-natural broadleaved woodland as the boundaries between planted areas and natural regeneration are not clear. There is a large strip of dense and diverse plantation woodland along the south side of Birchwood Lane at TN33 with smaller blocks dominated by aspen adjacent to this area to the south.</p>

Habitat Type	Protection/ Status	Target Note(s) Number	Habitat Description
Scattered trees		TN9, TN12, TN42, TN47, TN48	<p>In the east of site is an area of grassland with planted scattered pine trees throughout. To the east of this grassland is a small section of scattered trees and scrub with willow, silver birch and English oak all present.</p> <p>Self-sown trees and scrub are also scattered across much of the grassland, tall ruderal herb and swamp on both the Arpley Meadows Landfill and Moore Nature Reserve sites.</p>
Hedgerows	S41, The Hedgerow Regs 1997, LBAP	TN26, TN28	<p>Hedgerows are present across the site, both as a separate distinct habitat, primarily along roads and walkways, and as a habitat intrinsically linked to adjacent habitat at the boundary of woodland blocks.</p> <p>All hedgerows were scoped out for further assessment as they all appear to be significantly younger than 30 years old (a hedgerow must be older than 30 years old to qualify as 'important' under the Hedgerow Regulations (1997)).</p> <p>All hedgerows are hawthorn dominated with other woody species present including field maple <i>Acer campestre</i>, blackthorn <i>Prunus spinosa</i> and holly <i>Ilex aquifolium</i>.</p>
Swamp	S41, LBAP	TN21, TN47, TN48	<p>Areas of swamp are present throughout the site, both on the landfill site and across Moore Nature Reserve. These areas vary from small patches at the edge of ponds to extensive reed beds. The swamp areas comprise a mosaic of reed canary grass <i>Phalaris arundinacea</i>, common reed <i>Phragmites australis</i> and great willowherb <i>Epilobium hirsutum</i> with greater pond-sedge <i>Carex riparia</i>. On the landfill site it also forms a mosaic with tall ruderal herb species such as nettle.</p> <p>The swamp where the site adjoins along the River Mersey is dominated by common reed.</p>
Standing water	S41 (if found to support S41 species such as common toad), LBAP	TN8, TN67	<p>There are five large lakes/lagoons present across Moore Nature Reserve, In the east are 'The Lagoon', 'Eastern Reedbed' and 'Pump House Pool' whilst in the west are Birchwood Pool and Lapwing Lake.</p> <p>Beyond these five large waterbodies, there are numerous ponds present across the site. The woodland is extremely wet in places containing numerous ponds and groups of ponds as well as numerous ephemeral pools.</p> <p>The majority of ponds and lakes were surrounded by swamp vegetation with the exception of heavily shaded ponds which lacked any vegetation.</p>

Habitat Type	Protection/ Status	Target Note(s) Number	Habitat Description
			<p>It was evident that invasive species New Zealand pygmyweed <i>Crassula helmsii</i> was present in a number of the ponds.</p> <p>The ponds have been subject to a Habitat Suitability Index (HSI) assessment which is presented in a separate appendix. Further information on the standing water on site can be found in this assessment.</p>
Running water and ditches		TN2, TN20, TN21, TN62	<p>The site contains a number of dry ditches within the woodland blocks which are both natural and manmade. In the west of site is a narrow wet flowing ditch approximately 2m wide by 0.5m deep.</p> <p>The most significant flowing water is the disused Runcorn and Latchford Canal which runs through the centre of site. In places this is still, forming large chains of pools, however there are still some small sections with a flow to them, particularly at the extremities. The canal basin is dry in the west of the site and a footpath runs along its base.</p>
Quarry			<p>In the north east of site is a large quarry approximately 10-20m deep. It appears to have been quarried for soil which has then been used to cap the former landfill area. In the base of the quarry a large lake has formed.</p>
Buildings			<p>There are a number of small buildings present across the site, primarily bird hides. There are also more substantial buildings in the form of substations.</p>
Hardstanding and bare ground			<p>Areas of hard standing are present at the carpark in the centre of site and also form roads and footpaths throughout. A number of areas of bare ground are also present both around the substations and forming further footpaths and walkways.</p>

Results Summary

4.3

A total of 15 distinct habitats were recorded across the site, including six habitats listed under Section 41 (S41) of the Natural Environment and Rural Communities Act (NERC) 2006 and six habitats listed under Local Biodiversity Action Plans (LBAP). Hedgerows were also recorded although none were found to be 'important' under the Hedgerow Regulations 1997. Significant Habitats recorded include:

- Wet Woodland (S41, LBAP)
- Lowland mixed deciduous woodland (S41, LBAP)
- Lowland dry acid grassland (S41, LBAP);
- Standing water/Ponds (S41, LBAP);



- Native hedgerows (S41, LBAP); and
- Reedbeds (S41, LBAP).

4.0 Conclusions

Habitats

- 5.1 Six S41 and LBAP habitats are present across the site. These include wet woodland, lowland mixed deciduous woodland, native hedgerows, reedbeds, lowland dry acid grassland and possibly open water, depending on the presence of S41 species such as toad/great crested newts at these locations. All S41 habitat on site should be retained wherever possible. The current proposals indicate the loss of approximately 36ha of habitat. As retention is not possible at Moore Nature Reserve, these losses must be offset, the level of offset can be determined through creation of a biodiversity offsetting scheme.
- 5.2 The large sections of wet woodland and lowland mixed deciduous woodland qualify as S41 and LBAP habitat. These vary greatly in age and contain both dry and wet woodland sections. The most significant sections are those across the centre of the site surrounding Lapwing Lane which contain a number of mature specimens. Currently the majority of woodland between Birchwood Pool and the western boundary is to be lost during development. This woodland is of significant value to local wildlife.
- 5.3 To quantify the quality of woodland on site and inform mitigation, a National Vegetation Classification (NVC) woodland survey has been undertaken and is reported in a separate appendix.
- 5.4 There are numerous ponds spread throughout the site which are to be lost during development and (dependant on the presence of S41 species) may qualify as S41 habitat and do qualify as LBAP habitat. Specific survey of the waterbodies will be required to determine the presence of protected and invasive species.
- 5.5 Large sections of native hedgerow, an S41 habitat are to be lost across the site. None of the hedgerows qualify as 'important' under the Hedgerow Regulations (1997) due to being younger than 30 years old. However, as they are priority habitat, mitigation will be required for their loss.
- 5.6 The sections of reedbed qualify as both S41 and LBAP habitats. A number of reedbeds are to be lost during development.

Notable Flora

- 5.7 Protected plant species, native bluebell was frequently noted within Moore Nature Reserve and signage present indicated that native bluebell have been actively planted across the site. Native bluebell is protected under Schedule 8 of the Wildlife and Countryside Act (1981). Current proposals indicate woodlands containing native bluebell will be lost to development, and therefore mitigation strategy for these losses will be required. Where native bluebell are identified, proposals will need to ensure the protection of this species, either in situ or as part of an onsite translocation exercise. A further bluebell survey should be carried out to identify areas of native bluebell for translocation and potential translocation areas. Any native bluebell planting should be within retained or newly created woodland features onsite and should be undertaken during autumn/winter when the bulbs are dormant.

- 5.8 Further detailed survey of the habitats on site will be undertaken during the correct season which will identify any further protected species across the site.

Invasive Species

- 5.9 Invasive species were noted across the site. The most prolific is Himalayan balsam *Impatiens glandulifera*. Giant hogweed *Heracleum mantegazzianum*, Japanese knotweed *Fallopia japonica*, wall cotoneaster *Cotoneaster horizontalis*, Japanese rose *Rosa rugosa*, montbretia *Crocsmia x crocosmiiflora* and variegated yellow archangel *Lamium galeobdolon argentatum* were also found on site as was the aquatic invasive species New Zealand pygmy weed. These species are all listed under Section 9 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to grow or otherwise cause these species to spread in the wild. A method statement for their management and removal will be required.
- 5.10 A full detailed survey of the site during the optimum survey season will be required to inform a detailed invasive species mitigation method statement.

5.0 Recommendations

Habitats

- 6.1 If works have not commenced by summer 2021 an updated Phase 1 habitat survey must be undertaken prior to the commencement of on-site works to determine if any change to habitats or species composition has occurred.
- 6.2 Prior to development the waterbodies and associated aquatic habitat to be lost should be subject to specific survey during the appropriate period (June-July) to identify the presence or absence of invasive and protected species and determine the vegetation communities present. The survey should involve collection and identification of plant material by a suitably qualified botanist (FISC Lvl 4 or above) using a grapnel. The results of this survey will inform any specific mitigation requirements.
- 6.3 Detailed mitigation plans will need to be produced for the habitats to be lost, including long-term management plans. Management plans for retained habitats should also be produced to ensure that their biodiversity value is maintained and enhanced. Details of how retained habitats adjacent to the development will be protected during clearance and construction works should be provided in a Construction Environmental Management Plan (CEMP).

Notable Flora

- 6.4 Protected plant species native bluebell was frequently noted across the site.
- 6.5 Current proposals indicate woodlands containing native bluebell will be lost to development, and therefore a mitigation strategy for these losses will be required. A further bluebell survey should be carried out between mid-April and June to identify areas of native bluebell for translocation and potential receptor sites. Where native bluebell are identified, proposals will need to ensure the protection of this species, either in situ or as part of an onsite translocation exercise. Any native bluebell planting should be within retained or newly created woodland features onsite and should be undertaken during autumn/winter when the bulbs are dormant.

Invasive Species

- 6.6 The invasive, non-native Schedule 9 species giant hogweed, Himalayan balsam, Japanese knotweed, Japanese rose, variegated yellow archangel, montbretia, wall cotoneaster and New Zealand pygmy weed were all noted on site. A site specific invasive species method statement must be produced detailing how these species will be controlled and removed during development. This method statement should be informed by a detailed site specific survey undertaken during the optimum season (mid-April – October).

6.0 References

Joint Nature Conservation Committee (JNCC) (2010) Handbook for Phase 1 habitat survey: A technique for environmental audit.

Chartered Institute of Ecology and Environmental Management (CIEEM) (2017) Guidelines for Preliminary Ecological Appraisal.

Rodwell, J S (2006) National Vegetation Classification: Users' Handbook. Joint Nature Conservation Committee, Peterborough.



APPENDIX A

Port Warrington Target Notes Report

Port Warrington Target Notes Report

KEY - D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

Target Note 1

Plantation woodland around site office.

<i>Betula pendula</i>	Silver Birch	F
<i>Crataegus monogyna</i>	Hawthorn	F
<i>Heracleum sphondylium</i>	Hogweed	F
<i>Populus tremula</i>	Aspen	F
<i>Rosa canina</i> agg.	Dog Rose	F
<i>Urtica dioica</i>	Nettle	F
<i>Arctium minus</i>	Lesser Burdock	O
<i>Cornus sanguinea</i>	Dogwood	O
<i>Lamium galeobdolon argentatum</i>	Variegated Archangel	O
<i>Populus nigra italica</i>	Lombardy Poplar	O
<i>Hippophae rhamnoides</i>	Sea Buckthorn	R
<i>Prunus avium</i>	Wild Cherry	R

Target Note 2

...Some text removed as confidential... Linear woodland along dry ditches.

<i>Betula pendula</i>	Silver Birch	
<i>Heracleum mantegazzianum</i>	Giant Hogweed	
<i>Lamium galeobdolon argentatum</i>	Variegated Archangel	
<i>Salix caprea</i>	Goat Willow	
<i>Salix fragilis</i>	Crack Willow	

Target Note 3

Wet woodland with bare ground beneath.

<i>Salix caprea</i>	Goat Willow	D
<i>Heracleum sphondylium</i>	Hogweed	F
<i>Sambucus nigra</i>	Elder	F
<i>Betula pendula</i>	Silver Birch	O
<i>Crataegus monogyna</i>	Hawthorn	O
<i>Dryopteris filix-mas</i>	Male-fern	O
<i>Galium aparine</i>	Cleavers	O
<i>Salix viminalis</i>	Osier	O
<i>Urtica dioica</i>	Nettle	O
<i>Rubus fruticosus</i> agg.	Bramble	R

Target Note 4

Plantation woodland with bare ground beneath, rabbit burrows ...some text removed as confidential...

<i>Galium aparine</i>	Cleavers	F
<i>Salix caprea</i>	Goat Willow	F
<i>Sambucus nigra</i>	Elder	F
<i>Urtica dioica</i>	Nettle	F
<i>Betula pendula</i>	Silver Birch	O
<i>Fraxinus excelsior</i>	Ash	O
<i>Heracleum sphondylium</i>	Hogweed	O
<i>Quercus robur</i>	English Oak	O
<i>Acer platanoides</i>	Norway Maple	R
<i>Corylus avellana</i>	Hazel	R
<i>Dryopteris filix-mas</i>	Male-fern	R
<i>Epipactis helleborine</i>	Broad-leaved Helleborine	R
<i>Larix</i> sp.	Larch species	R
<i>Pinus sylvestris</i>	Scots Pine	R
<i>Prunus avium</i>	Wild Cherry	R
<i>Silene dioica</i>	Red Campion	R
<i>Sorbus aucuparia</i>	Rowan	R

Target Note 5

Plantation woodland dominated by ash, limited ground flora. Much rabbit activity.

<i>Fraxinus excelsior</i>	Ash	D
<i>Sorbus aucuparia</i>	Rowan	R
<i>Betula pendula</i>	Silver Birch	
<i>Crataegus monogyna</i>	Hawthorn	
<i>Heracleum sphondylium</i>	Hogweed	
<i>Ilex aquifolium</i>	Holly	
<i>Quercus robur</i>	English Oak	
<i>Rosa canina</i> agg.	Dog Rose	
<i>Sambucus nigra</i>	Elder	
<i>Urtica dioica</i>	Nettle	

Target Note 6

...Some text removed as confidential...

Target Note 7

Mature, oak dominant semi-natural woodland. Numerous old oaks with bat potential.

<i>Quercus robur</i>	English Oak	D
<i>Alnus glutinosa</i>	Alder	F
<i>Ceratocarpus claviculata</i>	Climbing Corydalis	F
<i>Dryopteris dilatata</i>	Broad Buckler-fern	F
<i>Rubus fruticosus</i> agg.	Bramble	F
<i>Silene dioica</i>	Red Campion	F
<i>Betula pubescens</i>	Downy Birch	O
<i>Chamaenerion angustifolium</i>	Rosebay Willowherb	O
<i>Impatiens glandulifera</i>	Himalayan Balsam	O
<i>Salix cinerea</i>	Grey Willow	O
<i>Acer pseudoplatanus</i>	Sycamore	R
<i>Corylus avellana</i>	Hazel	R
<i>Sorbus aucuparia</i>	Rowan	R

Target Note 8

Wet woodland with mature oaks, elders, willows and ephemeral pools. Ponds a continuation of wet areas in the wood.

<i>Carex</i> sp.	Sedge species	D
<i>Epilobium</i> sp.	Willowherb species	A
<i>Iris pseudacorus</i>	Yellow Flag Iris	R
<i>Betula pendula</i>	Silver Birch	
<i>Impatiens glandulifera</i>	Himalayan Balsam	
<i>Juncus effusus</i>	Soft Rush	
<i>Lemna minor</i>	Common Duckweed	
<i>Ranunculus repens</i>	Creeping Buttercup	
<i>Salix cinerea</i>	Grey Willow	
<i>Salix fragilis</i>	Crack Willow	
<i>Solanum dulcamara</i>	Bittersweet	
<i>Urtica dioica</i>	Nettle	

Target Note 9

Open area of marshy grassland with scattered scrub and young trees, possibly previously open water. Numerous dead trees and branches.

<i>Betula pubescens</i>	Downy Birch	A
<i>Salix cinerea</i>	Grey Willow	A
<i>Epilobium montanum</i>	Broad-leaved Willowherb	F
<i>Stellaria alsine</i>	Bog Stitchwort	F
<i>Urtica dioica</i>	Nettle	F
<i>Lemna minor</i>	Common Duckweed	O
<i>Iris pseudacorus</i>	Yellow Flag Iris	R
<i>Juncus effusus</i>	Soft Rush	
<i>Lythrum salicaria</i>	Purple Loosestrife	

Target Note 10

...some text removed as confidential...

Target Note 11

Semi-natural broadleaved woodland with limited ground flora. Mostly dominated by Himalayan Balsam.

<i>Acer pseudoplatanus</i>	Sycamore	D
		F
<i>Betula pubescens</i>	Downy Birch	F
<i>Fraxinus excelsior</i>	Ash	F
<i>Impatiens glandulifera</i>	Himalayan Balsam	F
<i>Urtica dioica</i>	Nettle	F
<i>Crataegus monogyna</i>	Hawthorn	O
<i>Galium aparine</i>	Cleavers	O
<i>Moss sp.</i>	Moss species	O
<i>Quercus robur</i>	English Oak	O
<i>Sambucus nigra</i>	Elder	O
<i>Silene dioica</i>	Red Campion	O
<i>Veronica hederifolia hederifolia</i>	Ivy-leaved Speedwell	O
<i>Hyacinthoides non-scripta</i>	Bluebell	R

Target Note 12

Area of tall ruderal herb/scrub mosaic with scattered trees.

<i>Rubus fruticosus agg.</i>	Bramble	A
<i>Urtica dioica</i>	Nettle	A
<i>Chamaenerion angustifolium</i>	Rosebay Willowherb	F
<i>Silene dioica</i>	Red Campion	F
<i>Alnus glutinosa</i>	Alder	O
<i>Betula pendula</i>	Silver Birch	O
<i>Betula pubescens</i>	Downy Birch	O
<i>Dryopteris filix-mas</i>	Male-fern	O
<i>Sambucus nigra</i>	Elder	O
<i>Quercus robur</i>	English Oak	O

Target Note 13

Canopy dominated by semi-mature alders, youngish open woodland.

<i>Alnus glutinosa</i>	Alder	D
<i>Mentha aquatica</i>	Water Mint	R
<i>Quercus robur</i>	English Oak	R
<i>Salix fragilis</i>	Crack Willow	R
<i>Acer pseudoplatanus</i>	Sycamore	
<i>Ceratocarpus claviculata</i>	Climbing Corydalis	
<i>Chamaenerion angustifolium</i>	Rosebay Willowherb	
<i>Dryopteris dilatata</i>	Broad Buckler-fern	
<i>Filipendula ulmaria</i>	Meadowsweet	
<i>Fraxinus excelsior</i>	Ash	
<i>Holcus lanatus</i>	Yorkshire-fog	
<i>Rubus fruticosus agg.</i>	Bramble	

Target Note 14

Open woodland with mature alders

<i>Alnus glutinosa</i>	Alder	D
<i>Dryopteris dilatata</i>	Broad Buckler-fern	A
<i>Rubus fruticosus agg.</i>	Bramble	A
<i>Quercus robur</i>	English Oak	F
<i>Acer pseudoplatanus</i>	Sycamore	O
<i>Chamaenerion angustifolium</i>	Rosebay Willowherb	O
<i>Epilobium montanum</i>	Broad-leaved Willowherb	O
<i>Holcus lanatus</i>	Yorkshire-fog	O
<i>Ranunculus repens</i>	Creeping Buttercup	O
<i>Silene dioica</i>	Red Campion	O
<i>Urtica dioica</i>	Nettle	O
<i>Cardamine flexuosa</i>	Wavy Bitter-cress	R
<i>Ceratocarpus claviculata</i>	Climbing Corydalis	R
<i>Crataegus monogyna</i>	Hawthorn	R
<i>Fraxinus excelsior</i>	Ash	R
<i>Hyacinthoides x massartiana</i>	Hybrid Bluebell	R

<i>Impatiens glandulifera</i>	Himalayan Balsam	R
<i>Juncus effusus</i>	Soft Rush	R
<i>Salix fragilis</i>	Crack Willow	R
<i>Sorbus aucuparia</i>	Rowan	R

Target Note 15

Semi-natural broadleaved mosaic woodland with some mature trees. Mature oaks along bank adjacent to lake, strip of birches along track, willow and alder dominant along margins of lake.

<i>Betula pendula</i>	Silver Birch	A
<i>Rubus fruticosus agg.</i>	Bramble	A
<i>Alnus glutinosa</i>	Alder	F
<i>Corylus avellana</i>	Hazel	O
<i>Salix cinerea</i>	Grey Willow	O
<i>Acer pseudoplatanus</i>	Sycamore	R
<i>Circaea lutetiana</i>	Enchanter's Nightshade	R
<i>Digitalis purpurea</i>	Foxglove	R
<i>Glechoma hederacea</i>	Ground-ivy	R
<i>Salix fragilis</i>	Crack Willow	R
<i>Crataegus monogyna</i>	Hawthorn	
<i>Dryopteris dilatata</i>	Broad Buckler-fern	
<i>Hyacinthoides x massartiana</i>	Hybrid Bluebell	
<i>Quercus robur</i>	English Oak	

Target Note 16

Dense, young woodland, limited ground flora. Some lower lying wetter areas. In centre dominated by willow species. Very uneven hummocky ground in places - dominated by very tall hawthorn here. Areas closest to lake dominated by stands of silver birch with limited ground flora. Few mature trees, limited bat roosting potential.

<i>Betula pendula</i>	Silver Birch	D
		A
<i>Crataegus monogyna</i>	Hawthorn	F
<i>Fraxinus excelsior</i>	Ash	F
<i>Quercus robur</i>	English Oak	F
<i>Dryopteris dilatata</i>	Broad Buckler-fern	O
<i>Dryopteris filix-mas</i>	Male-fern	O
<i>Impatiens glandulifera</i>	Himalayan Balsam	O
<i>Salix caprea</i>	Goat Willow	O
<i>Salix cinerea</i>	Grey Willow	O
<i>Sambucus nigra</i>	Elder	O
<i>Urtica dioica</i>	Nettle	O
<i>Asplenium scolopendrium</i>	Hart's-tongue	R
<i>Dryopteris affinis ssp. borneri</i>	Scaly Male-fern	R
<i>Epipactis helleborine</i>	Broad-leaved Helleborine	R
<i>Filipendula ulmaria</i>	Meadowsweet	R
<i>Viola riviniana</i>	Wood-dog-violet	R

Target Note 17

...some text removed as confidential...

Target Note 18

Patch of wet woodland dominated by large old crack willows - bat potential. Limited access due to fallen trees.

<i>Salix fragilis</i>	Crack Willow	D
<i>Crataegus monogyna</i>	Hawthorn	F
<i>Dryopteris dilatata</i>	Broad Buckler-fern	F
<i>Sambucus nigra</i>	Elder	F
<i>Urtica dioica</i>	Nettle	F
<i>Ficaria verna</i>	Lesser Celandine	O
<i>Glechoma hederacea</i>	Ground-ivy	O
<i>Impatiens glandulifera</i>	Himalayan Balsam	O
<i>Silene dioica</i>	Red Campion	O
<i>Iris pseudacorus</i>	Yellow Flag Iris	R

Target Note 19

Strip of silver birches along track.

<i>Betula pendula</i>	Silver Birch	D
<i>Lolium perenne</i>	Perennial Ryegrass	A
<i>Dryopteris dilatata</i>	Broad Buckler-fern	F
<i>Chamaenerion angustifolium</i>	Rosebay Willowherb	O
<i>Ficaria verna</i>	Lesser Celandine	O
<i>Quercus robur</i>	English Oak	O
<i>Salix caprea</i>	Goat Willow	O
<i>Sambucus nigra</i>	Elder	O
<i>Veronica hederifolia hederifolia</i>	Ivy-leaved Speedwell	O

Target Note 20

Wide dry ditch running parallel to old canal with low quality wet woodland. More like tall scrub in basin and young oak + birch woodland on top of bank.

<i>Crataegus monogyna</i>	Hawthorn	D
<i>Impatiens glandulifera</i>	Himalayan Balsam	A
<i>Sambucus nigra</i>	Elder	A
<i>Epilobium montanum</i>	Broad-leaved Willowherb	F
<i>Ranunculus repens</i>	Creeping Buttercup	F
<i>Urtica dioica</i>	Nettle	F
<i>Betula pendula</i>	Silver Birch	O
<i>Quercus robur</i>	English Oak	O
<i>Salix cinerea</i>	Grey Willow	O
<i>Sorbus aucuparia</i>	Rowan	R

Target Note 21

Section of wide wet ditch dominated by common reed with reed swamp at either end.

<i>Phragmites australis</i>	Reed	D
<i>Impatiens glandulifera</i>	Himalayan Balsam	F

Target Note 22

Area of young, probably plantation woodland.

<i>Betula pendula</i>	Silver Birch	A
<i>Urtica dioica</i>	Nettle	A
<i>Acer campestre</i>	Field Maple	O
<i>Populus sp.</i>	Poplar species	O
<i>Pteridium aquilinum</i>	Bracken	O
<i>Salix cinerea</i>	Grey Willow	O
<i>Silene dioica</i>	Red Campion	O
<i>Corylus avellana</i>	Hazel	R
<i>Crataegus monogyna</i>	Hawthorn	R
<i>Digitalis purpurea</i>	Foxglove	R
<i>Impatiens glandulifera</i>	Himalayan Balsam	R
<i>Prunus avium</i>	Wild Cherry	R
<i>Sorbus aucuparia</i>	Rowan	R

Target Note 23

Strip of scrubby wet woodland with mature oak at North end.

<i>Alnus glutinosa</i>	Alder	F
<i>Salix cinerea</i>	Grey Willow	F
<i>Chamaenerion angustifolium</i>	Rosebay Willowherb	O
<i>Dryopteris dilatata</i>	Broad Buckler-fern	O
<i>Impatiens glandulifera</i>	Himalayan Balsam	O
<i>Quercus robur</i>	English Oak	O
<i>Salix fragilis</i>	Crack Willow	O
<i>Silene dioica</i>	Red Campion	O
<i>Ceratocarpus claviculata</i>	Climbing Corydalis	R

Target Note 24

Strip of semi-mature wet woodland along margin of lake.

<i>Betula pendula</i>	Silver Birch	D
<i>Fraxinus excelsior</i>	Ash	O
<i>Salix caprea</i>	Goat Willow	O
<i>Salix viminalis</i>	Osier	O
<i>Prunus spinosa</i>	Blackthorn	R
<i>Quercus robur</i>	English Oak	R

Target Note 25

Mature woodland on and adjacent to steep bank. Sycamores dominant on bank, silver birch dominant on adjacent flatter area. Includes occasional mature/old trees as possible bat potential. Bluebells in one small patch.

<i>Acer pseudoplatanus</i>	Sycamore	A
<i>Betula pendula</i>	Silver Birch	A
<i>Hedera helix</i>	Ivy	A
<i>Rubus fruticosus agg.</i>	Bramble	A
<i>Quercus robur</i>	English Oak	F
<i>Urtica dioica</i>	Nettle	F
<i>Alliaria petiolata</i>	Garlic Mustard	O
<i>Ceratocarpus claviculata</i>	Climbing Corydalis	O
<i>Dryopteris dilatata</i>	Broad Buckler-fern	O
<i>Dryopteris filix-mas</i>	Male-fern	O
<i>Fraxinus excelsior</i>	Ash	O
<i>Pteridium aquilinum</i>	Bracken	O
<i>Corylus avellana</i>	Hazel	R
<i>Hyacinthoides non-scripta</i>	Bluebell	R

Target Note 26

Young, recently planted hedge less than 30 years old.

<i>Acer campestre</i>	Field Maple
<i>Alnus glutinosa</i>	Alder
<i>Corylus avellana</i>	Hazel
<i>Crataegus monogyna</i>	Hawthorn
<i>Frangula alnus</i>	Alder Buckthorn
<i>Prunus avium</i>	Wild Cherry
<i>Ulmus glabra</i>	Wych Elm

Target Note 27

Predominantly young birch woodland with occasional more mature trees.

<i>Betula pendula</i>	Silver Birch	D
<i>Moss sp.</i>	Moss species	F
<i>Rubus fruticosus agg.</i>	Bramble	F
<i>Acer pseudoplatanus</i>	Sycamore	O
<i>Betula pubescens</i>	Downy Birch	O
<i>Ceratocarpus claviculata</i>	Climbing Corydalis	O
<i>Dryopteris dilatata</i>	Broad Buckler-fern	O
<i>Fraxinus excelsior</i>	Ash	O
<i>Hyacinthoides non-scripta</i>	Bluebell	R
<i>Pteridium aquilinum</i>	Bracken	R

Target Note 28

Youngish (less than 30 years) hawthorn-dominated hedge along road.

<i>Crataegus monogyna</i>	Hawthorn	D
<i>Acer pseudoplatanus</i>	Sycamore	R
<i>Betula pendula</i>	Silver Birch	R
<i>Quercus cerris</i>	Turkey Oak	R
<i>Alnus cordata</i>	Italian Alder	

Target Note 29

Young, dense woodland along lake edge, possibly planted, at least partially.

<i>Quercus robur</i>	English Oak	R
<i>Acer pseudoplatanus</i>	Sycamore	
<i>Alnus glutinosa</i>	Alder	

<i>Betula pendula</i>	Silver Birch
<i>Pinus sp.</i>	Pine species
<i>Salix species</i>	Willow species

Target Note 30

Broadleaved, semi-natural woodland. Very sandy soil in places. Young woodland around margins, more mature in centre.

<i>Betula pendula</i>	Silver Birch	D
<i>Aesculus hippocastanum</i>	Horse-chestnut	R
<i>Corylus avellana</i>	Hazel	R
<i>Hyacinthoides non-scripta</i>	Bluebell	R
<i>Rhododendron ponticum</i>	Rhododendron	R
<i>Betula pubescens</i>	Downy Birch	
<i>Ceratocarpus claviculata</i>	Climbing Corydalis	
<i>Dryopteris affinis ssp. borrieri</i>	Scaly Male-fern	
<i>Dryopteris dilatata</i>	Broad Buckler-fern	
<i>Impatiens glandulifera</i>	Himalayan Balsam	
<i>Quercus robur</i>	English Oak	
<i>Rubus fruticosus agg.</i>	Bramble	
<i>Salix caprea</i>	Goat Willow	
<i>Salix cinerea</i>	Grey Willow	
<i>Sambucus nigra</i>	Elder	

Target Note 31

Strip of woodland along Runcorn and Latchford canal. Partially on steep bank. Marsh-loving trees such as willow predominantly along canal margins. Occasional old trees but mostly young regeneration or plantation woodland.

<i>Betula pendula</i>	Silver Birch	D
<i>Impatiens glandulifera</i>	Himalayan Balsam	D
<i>Rubus fruticosus agg.</i>	Bramble	F
<i>Fraxinus excelsior</i>	Ash	R
<i>Acer pseudoplatanus</i>	Sycamore	
<i>Crataegus monogyna</i>	Hawthorn	
<i>Galium aparine</i>	Cleavers	
<i>Prunus spinosa</i>	Blackthorn	
<i>Quercus robur</i>	English Oak	
<i>Salix caprea</i>	Goat Willow	
<i>Salix cinerea</i>	Grey Willow	
<i>Sambucus nigra</i>	Elder	
<i>Urtica dioica</i>	Nettle	

Target Note 32

Wet woodland along south bank of canal and lake margins.

<i>Salix cinerea</i>	Grey Willow	A
<i>Alnus glutinosa</i>	Alder	F
<i>Rubus fruticosus agg.</i>	Bramble	F
<i>Salix caprea</i>	Goat Willow	F
<i>Betula pendula</i>	Silver Birch	O
<i>Dryopteris filix-mas</i>	Male-fern	O
<i>Salix fragilis</i>	Crack Willow	O
<i>Salix viminalis</i>	Osier	O
<i>Corylus avellana</i>	Hazel	R

Target Note 33

Linear woodland along road. Dense, all tree, similar age, probably plantation.

<i>Betula pendula</i>	Silver Birch	D
<i>Alnus glutinosa</i>	Alder	O
<i>Crataegus monogyna</i>	Hawthorn	O
<i>Quercus robur</i>	English Oak	O
<i>Sambucus nigra</i>	Elder	O
<i>Alnus incana</i>	Grey Alder	R
<i>Prunus avium</i>	Wild Cherry	R

Salix fragilis

Crack Willow

R

Target Note 34

Mosaic of bramble scrub, tall ruderal herb and bracken along bank. Occasional Japanese Knotweed. Develops into tall hawthorn scrub further to the west.

Target Note 35

Grey willow scrub with occasional scattered trees. Area of gorse scrub to the north.

Salix cinerea

Grey Willow

D

Salix caprea

Goat Willow

O

Target Note 36

Stand of aspen, white willow and goat willow

Populus tremula

Aspen

Salix alba

White Willow

Salix caprea

Goat Willow

Target Note 37

Woodland with mosaic of tree types. Youngish with few mature trees. Oak more common on banks, alder and ash more frequent in hollows. ...some text removed as confidential...

Alnus glutinosa

Alder

Betula pendula

Silver Birch

Carpinus betulus

Hornbeam

Dryopteris dilatata

Broad Buckler-fern

Dryopteris filix-mas

Male-fern

Fraxinus excelsior

Ash

Galium aparine

Cleavers

Glechoma hederacea

Ground-ivy

Prunus avium

Wild Cherry

Quercus robur

English Oak

Rubus fruticosus agg.

Bramble

Salix caprea

Goat Willow

Urtica dioica

Nettle

Target Note 38

Semi-mature woodland plantation. Trees in rows.

Betula pendula

Silver Birch

Fraxinus excelsior

Ash

Prunus avium

Wild Cherry

Quercus robur

English Oak

Salix cinerea

Grey Willow

Target Note 39

Mosaic of modified neutral grassland and marshy grassland with scattered young trees and scrub.

Lycopus europaeus

Gypsywort

R

Alnus glutinosa

Alder

Centaurium erythraea

Common Centaury

Cirsium palustre

Marsh Thistle

Dysenterica pulicaria

Fleabane

Epilobium montanum

Broad-leaved Willowherb

Festuca ovina

Sheep's Fescue

Holcus lanatus

Yorkshire-fog

Jacobaea vulgaris

Common Ragwort

Lotus pedunculatus

Marsh Bird's-foot Trefoil

Lysimachia punctata

Dotted Loosetrife

Lythrum salicaria

Purple Loosestrife

Prunella vulgaris

Selfheal

Rubus fruticosus agg.

Bramble

Sagina procumbens

Procumbent Pearlwort

Salix caprea

Goat Willow

Stellaria alsine

Bog Stitchwort

Trifolium repens

White Clover

Target Note 40

Modified neutral grassland on bank

<i>Pilosella aurantiacum</i>	Orange Hawkweed	R
<i>Agrostis capillaris</i>	Common Bent	
<i>Aira caryophyllea</i>	Silver hair-grass	
<i>Arrhenatherum elatius</i>	False Oat-grass	
<i>Betula pubescens</i>	Downy Birch	
<i>Carex hirta</i>	Hairy Sedge	
<i>Centaureum erythraea</i>	Common Centaury	
<i>Crepis capillaris</i>	Smooth Hawk's-beard	
<i>Cynosurus cristatus</i>	Crested Dog's-tail	
<i>Dysenterica pulicaria</i>	Fleabane	
<i>Epilobium montanum</i>	Broad-leaved Willowherb	
<i>Ervilla hirsuta</i>	Hairy Tare	
<i>Festuca rubra</i>	Red Fescue	
<i>Filago germanica</i>	Common Cudweed	
<i>Geranium dissectum</i>	Cut-leaved Cranesbill	
<i>Geranium molle</i>	Dove's-foot Cranesbill	
<i>Holcus lanatus</i>	Yorkshire-fog	
<i>Hypericum perforatum</i>	Perforate St John's-wort	
<i>Hypochaeris radicata</i>	Common Cat's-ear	
<i>Jacobaea vulgaris</i>	Common Ragwort	
<i>Juncus inflexus</i>	Hard Rush	
<i>Lysimachia punctata</i>	Dotted Loosetrife	
<i>Odontites verna</i>	Red Bartsia	
<i>Phragmites australis</i>	Reed	
<i>Pilosella officinarum</i>	Mouse-ear Hawkweed	
<i>Plantago lanceolata</i>	Ribwort Plantain	
<i>Prunella vulgaris</i>	Selfheal	
<i>Salix caprea</i>	Goat Willow	
<i>Tragopogon pratensis</i>	Goat's-beard	
<i>Trifolium dubium</i>	Lesser Trefoil	
<i>Trifolium medium</i>	Zigzag Clover	
<i>Trifolium pratense</i>	Red Clover	
<i>Trifolium repens</i>	White Clover	
<i>Ulex europaeus</i>	Gorse	
<i>Vicia cracca</i>	Tufted Vetch	

Target Note 41

Young plantation woodland.

<i>Cornus sanguinea</i>	Dogwood	D
<i>Urtica dioica</i>	Nettle	D
<i>Galium aparine</i>	Cleavers	A
<i>Crataegus monogyna</i>	Hawthorn	F
<i>Populus tremula</i>	Aspen	F
<i>Quercus robur</i>	English Oak	O
<i>Acer pseudoplatanus</i>	Sycamore	R
<i>Betula pendula</i>	Silver Birch	R
<i>Rosa canina</i> agg.	Dog Rose	R
<i>Salix caprea</i>	Goat Willow	R
<i>Sorbus aucuparia</i>	Rowan	R

Target Note 42

Grassland with scattered young trees and scrub.

<i>Crataegus monogyna</i>	Hawthorn	F
<i>Prunus avium</i>	Wild Cherry	F
<i>Quercus robur</i>	English Oak	O
<i>Sorbus aucuparia</i>	Rowan	O

Target Note 43

Semi-mature plantation woodland

<i>Acer pseudoplatanus</i>	Sycamore	A
<i>Populus tremula</i>	Aspen	A
<i>Urtica dioica</i>	Nettle	A
<i>Fraxinus excelsior</i>	Ash	F
<i>Salix caprea</i>	Goat Willow	O
<i>Alnus glutinosa</i>	Alder	R
<i>Corylus avellana</i>	Hazel	R
<i>Prunus avium</i>	Wild Cherry	R
<i>Quercus robur</i>	English Oak	R
<i>Epilobium montanum</i>	Broad-leaved Willowherb	
<i>Poa trivialis</i>	Rough Meadow-grass	
<i>Rubus fruticosus</i> agg.	Bramble	
<i>Salix cinerea</i>	Grey Willow	

Target Note 44

Dense area of tall scrub.

<i>Alnus glutinosa</i>	Alder
<i>Cornus sanguinea</i>	Dogwood
<i>Salix caprea</i>	Goat Willow
<i>Salix cinerea</i>	Grey Willow

Target Note 45

Area of semi-natural broad-leaved woodland dominated by willow species. Scattered willow trees and scrub. Giant hogweed and Himalayan balsam present in adjacent areas.

<i>Salix fragilis</i>	Crack Willow	D
<i>Urtica dioica</i>	Nettle	D
<i>Phragmites australis</i>	Reed	F
<i>Salix caprea</i>	Goat Willow	F
<i>Salix cinerea</i>	Grey Willow	F
<i>Salix viminalis</i>	Osier	O
<i>Salix alba</i>	White Willow	R

Target Note 46

Modified neutral grassland, long unmanaged sward.

<i>Agrostis stolonifera</i>	Creeping Bent	A
<i>Festuca rubra</i>	Red Fescue	A
<i>Holcus lanatus</i>	Yorkshire-fog	F
<i>Lathyrus pratensis</i>	Meadow Vetchling	F
<i>Potentilla reptans</i>	Creeping Cinquefoil	F
<i>Trifolium repens</i>	White Clover	F
<i>Carex otrubae</i>	False Fox-sedge	O
<i>Cerastium fontanum</i>	Common Mouse-ear	O
<i>Cirsium arvense</i>	Creeping Thistle	O
<i>Cirsium vulgare</i>	Spear Thistle	O
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	O
<i>Plantago lanceolata</i>	Ribwort Plantain	O
<i>Prunella vulgaris</i>	Selfheal	O
<i>Ranunculus repens</i>	Creeping Buttercup	O
<i>Rumex crispus</i>	Curled Dock	O
<i>Vicia cracca</i>	Tufted Vetch	O
<i>Dysenterica pulicaria</i>	Fleabane	R
<i>Geranium dissectum</i>	Cut-leaved Cranesbill	R
<i>Jacobaea vulgaris</i>	Common Ragwort	R
<i>Juncus inflexus</i>	Hard Rush	R
<i>Medicago lupulina</i>	Black Medick	R
<i>Myosotis discolor</i>	Changing Forget-me-not	R
<i>Phalaris arundinacea</i>	Reed Canary-grass	R
<i>Potentilla anserina</i>	Silverweed	R
<i>Sonchus asper</i>	Prickly Sow-thistle	R
<i>Stellaria graminea</i>	Lesser Stitchwort	R

Target Note 47

Modified neutral grassland, swamp and tall ruderal mosaic in varying ratios, occasional scattered trees and scrub.

<i>Agrostis stolonifera</i>	Creeping Bent	F
<i>Arrhenatherum elatius</i>	False Oat-grass	F
<i>Cirsium arvense</i>	Creeping Thistle	F
<i>Epilobium hirsutum</i>	Great Willowherb	F
<i>Festuca rubra</i>	Red Fescue	F
<i>Holcus lanatus</i>	Yorkshire-fog	F
<i>Lolium perenne</i>	Perennial Ryegrass	F
<i>Phalaris arundinacea</i>	Reed Canary-grass	F
<i>Phragmites australis</i>	Reed	F
<i>Cynosurus cristatus</i>	Crested Dog's-tail	O
<i>Heracleum sphondylium</i>	Hogweed	O
<i>Jacobaea vulgaris</i>	Common Ragwort	O
<i>Juncus effusus</i>	Soft Rush	O
<i>Medicago lupulina</i>	Black Medick	O
<i>Melilotus sp.</i>	Melilot species	O
<i>Plantago lanceolata</i>	Ribwort Plantain	O
<i>Poa pratensis</i>	Smooth Meadow-grass	O
<i>Cirsium vulgare</i>	Spear Thistle	R
<i>Dysenterica pulicaria</i>	Fleabane	R
<i>Helminthotheca echioides</i>	Bristly Oxtongue	R
<i>Scrophularia auriculata</i>	Water Figwort	R

Target Note 48

Mosaic of tall, dense vegetation, tall ruderal herb, scrub, young trees, modified neutral grassland and swamp. Much young willow regeneration.

<i>Agrostis stolonifera</i>	Creeping Bent	A
<i>Phalaris arundinacea</i>	Reed Canary-grass	A
<i>Salix fragilis</i>	Crack Willow	A
<i>Cirsium arvense</i>	Creeping Thistle	F
<i>Elymus repens</i>	Common Couch	F
<i>Epilobium hirsutum</i>	Great Willowherb	F
<i>Salix caprea</i>	Goat Willow	F
<i>Urtica dioica</i>	Nettle	F
<i>Artemisia vulgaris</i>	Mugwort	O
<i>Cirsium vulgare</i>	Spear Thistle	O
<i>Eupatorium cannabinum</i>	Hemp-agrimony	O
<i>Juncus effusus</i>	Soft Rush	O
<i>Juncus inflexus</i>	Hard Rush	O
<i>Rubus fruticosus agg.</i>	Bramble	O
<i>Rumex crispus</i>	Curled Dock	O
<i>Salix alba</i>	White Willow	O
<i>Salix cinerea</i>	Grey Willow	O
<i>Salix viminalis</i>	Osier	O
<i>Galeopsis sp.</i>	Hemp-nettle species	R
<i>Helminthotheca echioides</i>	Bristly Oxtongue	R
<i>Jacobaea vulgaris</i>	Common Ragwort	R
<i>Lythrum salicaria</i>	Purple Loosestrife	R
<i>Arctium minus</i>	Lesser Burdock	
<i>Erigeron canadensis</i>	Canadian Fleabane	
<i>Melilotus officinalis</i>	Ribbed Melilot	
<i>Persicaria maculosa</i>	Redshank	
<i>Vicia cracca</i>	Tufted Vetch	

Target Note 49

Small area of modified neutral grassland with shorter sward and more diverse species.

<i>Agrostis stolonifera</i>	Creeping Bent	A
<i>Festuca rubra</i>	Red Fescue	A
<i>Holcus lanatus</i>	Yorkshire-fog	F
<i>Hypochaeris radicata</i>	Common Cat's-ear	F
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	F
<i>Melilotus sp.</i>	Melilot species	F

<i>Carex otrubae</i>	False Fox-sedge	O
<i>Centaurea nigra</i>	Knapweed	O
<i>Dactylis glomerata</i>	Cock's-foot	O
<i>Deschampsia cespitosa</i>	Tufted Hair-grass	O
<i>Dysenterica pulicaria</i>	Fleabane	O
<i>Lolium perenne</i>	Perennial Ryegrass	O
<i>Medicago lupulina</i>	Black Medick	O
<i>Odontites verna</i>	Red Bartsia	O
<i>Plantago lanceolata</i>	Ribwort Plantain	O
<i>Potentilla reptans</i>	Creeping Cinquefoil	O
<i>Rumex crispus</i>	Curled Dock	O
<i>Trifolium hybridum</i>	Alsike Clover	O
<i>Trifolium repens</i>	White Clover	O
<i>Vicia cracca</i>	Tufted Vetch	O
<i>Achillea millefolium</i>	Yarrow	R
<i>Carex flacca</i>	Glaucous Sedge	R
<i>Cirsium vulgare</i>	Spear Thistle	R
<i>Juncus inflexus</i>	Hard Rush	R
<i>Potentilla anserina</i>	Silverweed	R
<i>Trifolium pratense</i>	Red Clover	R

Target Note 50

Large poplars with bird boxes along boundary. Woodland includes more bare ground and oak and silver birch most frequent. Broad buckler-fern abundant throughout.

<i>Betula pendula</i>	Silver Birch
<i>Dryopteris dilatata</i>	Broad Buckler-fern
<i>Quercus robur</i>	English Oak

Target Note 51

Semi-mature to young woodland, possibly an area of regeneration as trees are of a similar age but not structured like plantation woodland. Ground flora includes scattered nettles, broad-leaved willowherb and grasses, broad buckler-fern with large areas of bare ground with leaf litter. 5-8m canopy.

<i>Betula pendula</i>	Silver Birch	F
<i>Quercus robur</i>	English Oak	F
<i>Salix alba</i>	White Willow	F
<i>Acer pseudoplatanus</i>	Sycamore	O
<i>Alnus glutinosa</i>	Alder	O
<i>Crataegus monogyna</i>	Hawthorn	O
<i>Sambucus nigra</i>	Elder	O
<i>Urtica dioica</i>	Nettle	O
<i>Sorbus aucuparia</i>	Rowan	R
<i>Dryopteris dilatata</i>	Broad Buckler-fern	
<i>Epilobium montanum</i>	Broad-leaved Willowherb	

Target Note 52

Islands for wildfowl, largest has mature alders and crack willows, grey willow and birch scrub. Some bare ground and worn by wildfowl on smaller islands, larger includes dog rose, birch, elder, bramble and hawthorn scrub.

<i>Alnus glutinosa</i>	Alder
<i>Betula pendula</i>	Silver Birch
<i>Crataegus monogyna</i>	Hawthorn
<i>Rosa canina</i> agg.	Dog Rose
<i>Rubus fruticosus</i> agg.	Bramble
<i>Salix cinerea</i>	Grey Willow
<i>Salix fragilis</i>	Crack Willow
<i>Sambucus nigra</i>	Elder

Target Note 53

Young grey willow plantation woodland with scattered leaf litter and rabbit warrens.

<i>Salix cinerea</i>	Grey Willow	F
<i>Betula pendula</i>	Silver Birch	O

<i>Salix alba</i>	White Willow	O
<i>Sambucus nigra</i>	Elder	O
<i>Corylus avellana</i>	Hazel	R
<i>Prunus avium</i>	Wild Cherry	R
<i>Dryopteris dilatata</i>	Broad Buckler-fern	
<i>Urtica dioica</i>	Nettle	

Target Note 54

Young to semi-mature woodland possibly colonised as regeneration.

<i>Betula pendula</i>	Silver Birch	D
<i>Salix cinerea</i>	Grey Willow	A
<i>Quercus robur</i>	English Oak	O

Target Note 55

Woodland on embankment appears to be self-seeded in places, though likely to have been planted along the footpath.

Target Note 56

Similar in structure to previous woodland in other areas with English oak present along Lapwing Lane though with younger birch and alder either side of the mature trees along the lane. The groundflora includes similar species composition to other woodland.

<i>Dryopteris dilatata</i>	Broad Buckler-fern	F
<i>Quercus robur</i>	English Oak	F
<i>Rubus fruticosus agg.</i>	Bramble	F
<i>Urtica dioica</i>	Nettle	F
<i>Acer pseudoplatanus</i>	Sycamore	O
<i>Alnus glutinosa</i>	Alder	O
<i>Betula pendula</i>	Silver Birch	O
<i>Crataegus monogyna</i>	Hawthorn	O
<i>Digitalis purpurea</i>	Foxglove	O
<i>Geranium robertianum</i>	Herb-Robert	O
<i>Sambucus nigra</i>	Elder	O
<i>Silene dioica</i>	Red Campion	O

Target Note 57

Open glade with areas of bramble scrub and birch and alder regeneration, some scattered mature hawthorns and alder trees.

<i>Chamaenerion angustifolium</i>	Rosebay Willowherb	A
<i>Holcus lanatus</i>	Yorkshire-fog	A
<i>Agrostis stolonifera</i>	Creeping Bent	F
<i>Angelica sylvestris</i>	Wild Angelica	O
<i>Dryopteris dilatata</i>	Broad Buckler-fern	O
<i>Moss sp.</i>	Moss species	O
<i>Silene dioica</i>	Red Campion	O
<i>Urtica dioica</i>	Nettle	O
<i>Alnus glutinosa</i>	Alder	
<i>Betula pendula</i>	Silver Birch	
<i>Crataegus monogyna</i>	Hawthorn	
<i>Rubus fruticosus agg.</i>	Bramble	
<i>Sambucus nigra</i>	Elder	

Target Note 58

Young oak, with larger alder along lake edge. Ground flora similar to other areas of woodland on embankment, scrub dominated other side of embankment.

<i>Betula pendula</i>	Silver Birch	D
<i>Dryopteris dilatata</i>	Broad Buckler-fern	A
<i>Urtica dioica</i>	Nettle	A
<i>Holcus lanatus</i>	Yorkshire-fog	F
<i>Rubus fruticosus agg.</i>	Bramble	F
<i>Chamaenerion angustifolium</i>	Rosebay Willowherb	O

<i>Crataegus monogyna</i>	Hawthorn	O
<i>Dryopteris filix-mas</i>	Male-fern	O
<i>Galium aparine</i>	Cleavers	O
<i>Lolium perenne</i>	Perennial Ryegrass	O
<i>Rosa canina</i> agg.	Dog Rose	O
<i>Sambucus nigra</i>	Elder	O
<i>Ulex europaeus</i>	Gorse	O
<i>Euonymus europaeus</i>	Spindle	R
<i>Prunus spinosa</i>	Blackthorn	R

Target Note 59

Appears similar to other areas though more semi-mature trees/younger. Possibly regeneration woodland around older trees, no veterans.

<i>Alnus glutinosa</i>	Alder
<i>Betula pendula</i>	Silver Birch
<i>Crataegus monogyna</i>	Hawthorn
<i>Fraxinus excelsior</i>	Ash
<i>Quercus robur</i>	English Oak
<i>Salix cinerea</i>	Grey Willow
<i>Sambucus nigra</i>	Elder

Target Note 60

Young alder coppice.

<i>Betula pendula</i>	Silver Birch	O
<i>Crataegus monogyna</i>	Hawthorn	O
<i>Silene dioica</i>	Red Campion	O
<i>Urtica dioica</i>	Nettle	O
<i>Dryopteris dilatata</i>	Broad Buckler-fern	R
<i>Fraxinus excelsior</i>	Ash	R
<i>Alnus glutinosa</i>	Alder	
<i>Corylus avellana</i>	Hazel	
<i>Quercus robur</i>	English Oak	

Target Note 61

Oak dominated woodland of similar age with elder and hawthorn shrub in the understorey scattered. Ground flora is dominated by broad buckler-fern with bramble and rosebay willowherb. Leaf litter and bare ground also. Line of dense hawthorn scrub in east of compartment.

<i>Acer pseudoplatanus</i>	Sycamore	O
<i>Alnus glutinosa</i>	Alder	O
<i>Betula pendula</i>	Silver Birch	O
<i>Chamaenerion angustifolium</i>	Rosebay Willowherb	O
<i>Crataegus monogyna</i>	Hawthorn	O
<i>Dryopteris dilatata</i>	Broad Buckler-fern	O
<i>Ilex aquifolium</i>	Holly	O
<i>Rubus fruticosus</i> agg.	Bramble	O
<i>Sambucus nigra</i>	Elder	O
<i>Hyacinthoides sp.</i>	Bluebell species	R

Target Note 62

Line of mature oak and alder following remnant ditch. Groundflora consistent within other compartments though bare ground and leaf litter is present along the ditch. Trees are less mature along the track in the north of the woodland. 8-10m canopy. Rabbit warrens along ditch.

<i>Alnus glutinosa</i>	Alder
<i>Betula pendula</i>	Silver Birch
<i>Carex remota</i>	Remote Sedge
<i>Chamaenerion angustifolium</i>	Rosebay Willowherb
<i>Crataegus monogyna</i>	Hawthorn
<i>Deschampsia cespitosa</i>	Tufted Hair-grass
<i>Dryopteris dilatata</i>	Broad Buckler-fern
<i>Holcus lanatus</i>	Yorkshire-fog

<i>Lolium perenne</i>	Perennial Ryegrass
<i>Quercus robur</i>	English Oak
<i>Rubus fruticosus agg.</i>	Bramble
<i>Salix fragilis</i>	Crack Willow
<i>Sambucus nigra</i>	Elder
<i>Urtica dioica</i>	Nettle

Target Note 63

<i>Anthriscus sylvestris</i>	Cow Parsley
<i>Cirsium arvense</i>	Creeping Thistle
<i>Crataegus monogyna</i>	Hawthorn
<i>Dactylis glomerata</i>	Cock's-foot
<i>Galium aparine</i>	Cleavers
<i>Heracleum sphondylium</i>	Hogweed
<i>Lolium perenne</i>	Perennial Ryegrass
<i>Phalaris arundinacea</i>	Reed Canary-grass
<i>Phragmites australis</i>	Reed
<i>Rubus fruticosus agg.</i>	Bramble
<i>Rumex obtusifolius</i>	Broad-leaved Dock
<i>Sambucus nigra</i>	Elder
<i>Silene dioica</i>	Red Campion
<i>Taraxacum officinale agg.</i>	Dandelion
<i>Typha latifolia</i>	Greater Reed mace
<i>Urtica dioica</i>	Nettle

Target Note 64

<i>Rubus fruticosus agg.</i>	Bramble	D
<i>Reynoutria japonica</i>	Japanese Knotweed	R
<i>Alnus glutinosa</i>	Alder	
<i>Betula pendula</i>	Silver Birch	
<i>Calystegia sp.</i>	Bindweed species	
<i>Chamaenerion angustifolium</i>	Rosebay Willowherb	
<i>Cirsium arvense</i>	Creeping Thistle	
<i>Galium aparine</i>	Cleavers	
<i>Lamium album</i>	White Dead-nettle	
<i>Lolium perenne</i>	Perennial Ryegrass	
<i>Ranunculus repens</i>	Creeping Buttercup	
<i>Rosa canina agg.</i>	Dog Rose	
<i>Rumex obtusifolius</i>	Broad-leaved Dock	
<i>Salix cinerea</i>	Grey Willow	
<i>Urtica dioica</i>	Nettle	

Target Note 65

Crack willow and alder trees ranging from young to mature. English oak, elder and silver birch also present though more in understorey. Ground flora is dominated by nettle. Embankment has dominant silver birch a lot more birch and elder within woodland making access more restricted.

<i>Alnus glutinosa</i>	Alder
<i>Asplenium scolopendrium</i>	Hart's-tongue
<i>Betula pendula</i>	Silver Birch
<i>Crassula helmsii</i>	New Zealand Pygmy weed
<i>Dryopteris dilatata</i>	Broad Buckler-fern
<i>Dryopteris filix-mas</i>	Male-fern
<i>Ficaria verna</i>	Lesser Celandine
<i>Galium aparine</i>	Cleavers
<i>Glechoma hederacea</i>	Ground-ivy
<i>Lolium perenne</i>	Perennial Ryegrass
<i>Moss sp.</i>	Moss species
<i>Myosotis sp.</i>	Forget-me-not species
<i>Quercus robur</i>	English Oak
<i>Rubus fruticosus agg.</i>	Bramble
<i>Salix fragilis</i>	Crack Willow
<i>Sambucus nigra</i>	Elder

<i>Silene dioica</i>	Red Campion
<i>Urtica dioica</i>	Nettle
<i>Veronica chamaedrys</i>	Germander Speedwell

Target Note 66

Young woodland region with scrub and leaf litter. Footpath within. Embankment veins the lake to the north. Willow on southern side of the embankment.

<i>Urtica dioica</i>	Nettle	D
<i>Betula pendula</i>	Silver Birch	A
<i>Acer campestre</i>	Field Maple	F
<i>Crataegus monogyna</i>	Hawthorn	F
<i>Dryopteris dilatata</i>	Broad Buckler-fern	F
<i>Quercus robur</i>	English Oak	F
<i>Rosa canina</i> agg.	Dog Rose	F
<i>Alnus glutinosa</i>	Alder	O
<i>Corylus avellana</i>	Hazel	O
<i>Dryopteris filix-mas</i>	Male-fern	O
<i>Fraxinus excelsior</i>	Ash	O
<i>Holcus lanatus</i>	Yorkshire-fog	O
<i>Lolium perenne</i>	Perennial Ryegrass	O
<i>Pinus</i> sp.	Pine species	O
<i>Populus</i> sp.	Poplar species	O
<i>Prunus avium</i>	Wild Cherry	O
<i>Sorbus aucuparia</i>	Rowan	O
<i>Ulex europaeus</i>	Gorse	O
<i>Frangula alnus</i>	Alder Buckthorn	R
<i>Crassula helmsii</i>	New Zealand Pygmy weed	
<i>Galium aparine</i>	Cleavers	
<i>Reynoutria japonica</i>	Japanese Knotweed	
<i>Rosa rugosa</i>	Japanese Rose	
<i>Rubus fruticosus</i> agg.	Bramble	
<i>Salix caprea</i>	Goat Willow	

Target Note 67

Pond surrounded by scrub.

<i>Alnus glutinosa</i>	Alder
<i>Chamaenerion angustifolium</i>	Rosebay Willowherb
<i>Crataegus monogyna</i>	Hawthorn
<i>Juncus inflexus</i>	Hard Rush
<i>Rosa canina</i> agg.	Dog Rose
<i>Rubus fruticosus</i> agg.	Bramble
<i>Salix cinerea</i>	Grey Willow
<i>Ulex europaeus</i>	Gorse

Target Note 68

Giant Hogweed - TF 1861339791

<i>Heracleum mantegazzianum</i>	Giant Hogweed
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Target Note 69

"Inland sand dune grassland" Parcel to south-west of tracks. Very flat with scattered pine trees and regenerating birch. Areas of bare sandy soil where rabbits have been digging.

<i>Betula pubescens</i>	Downy Birch	F
<i>Holcus lanatus</i>	Yorkshire-fog	F
<i>Pinus</i> sp.	Pine species	F
<i>Centaurium erythraea</i>	Common Centaury	O
<i>Cerastium fontanum</i>	Common Mouse-ear	O
<i>Cirsium arvense</i>	Creeping Thistle	O
<i>Epilobium montanum</i>	Broad-leaved Willowherb	O
<i>Hypericum perforatum</i>	Perforate St John's-wort	O
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	O
<i>Peltigera canina</i>	Dog Lichen	O

<i>Plantago lanceolata</i>	Ribwort Plantain	O
<i>Potentilla erecta</i>	Tormentil	O
<i>Prunella vulgaris</i>	Selfheal	O
<i>Ranunculus repens</i>	Creeping Buttercup	O
<i>Rubus fruticosus agg.</i>	Bramble	O
<i>Sagina procumbens</i>	Procumbent Pearlwort	O
<i>Trifolium dubium</i>	Lesser Trefoil	O
<i>Carex hirta</i>	Hairy Sedge	R
<i>Carex leporina</i>	Oval Sedge	R
<i>Cirsium palustre</i>	Marsh Thistle	R
<i>Crepis capillaris</i>	Smooth Hawk's-beard	R
<i>Epipactis helleborine</i>	Broad-leaved Helleborine	R
<i>Geranium dissectum</i>	Cut-leaved Cranesbill	R
<i>Juncus inflexus</i>	Hard Rush	R
<i>Logfia minima</i>	Lesser Cudweed	R
<i>Logfia minima</i>	Small Cudweed	R
<i>Oenothera sp.</i>	Evening-primrose species	R
<i>Persicaria maculosa</i>	Redshank	R
<i>Pilosella officinarum</i>	Mouse-ear Hawkweed	R
<i>Quercus cerris</i>	Turkey Oak	R
<i>Quercus robur</i>	English Oak	R
<i>Reseda luteola</i>	Weld	R
<i>Rumex acetosella</i>	Sheep's Sorrel	R
<i>Sonchus asper</i>	Prickly Sow-thistle	R
<i>Trifolium arvense</i>	Hare's-foot Clover	R
<i>Veronica arvensis</i>	Wall Speedwell	R
<i>Viola arvensis</i>	Field Pansy	R

Target Note 70

"Inland sand dune grassland". Parcel to north-east of track.

Flat with scattered pine trees and regenerating birch. Areas of bare sandy soil where rabbits have been digging. Grassland is much lusher with a taller sward and more birch regeneration at the northern end. Ground appears damper here.

<i>Festuca ovina</i>	Sheep's Fescue	A
		F
<i>Betula pubescens</i>	Downy Birch	F
<i>Holcus lanatus</i>	Yorkshire-fog	F
<i>Pinus sp.</i>	Pine species	F
<i>Cladonia sp.</i>	Cladonia species	O
<i>Crepis capillaris</i>	Smooth Hawk's-beard	O
<i>Epilobium montanum</i>	Broad-leaved Willowherb	O
<i>Juncus inflexus</i>	Hard Rush	O
<i>Logfia minima</i>	Lesser Cudweed	O
<i>Logfia minima</i>	Small Cudweed	O
<i>Potentilla anserina</i>	Silverweed	O
<i>Prunella vulgaris</i>	Selfheal	O
<i>Rubus fruticosus agg.</i>	Bramble	O
<i>Salix caprea</i>	Goat Willow	O
<i>Trifolium repens</i>	White Clover	O
<i>Cirsium palustre</i>	Marsh Thistle	R
<i>Dipsacus fullonum</i>	Teasel	R
<i>Dysenterica pulicaria</i>	Fleabane	R
<i>Filago germanica</i>	Common Cudweed	R
<i>Geranium dissectum</i>	Cut-leaved Cranesbill	R
<i>Hypericum humifusum</i>	Trailing St John's-wort	R
<i>Lysimachia arvensis</i>	Scarlet Pimpernel	R
<i>Lythrum salicaria</i>	Purple Loosestrife	R
<i>Myosotis discolor</i>	Changing Forget-me-not	R
<i>Ophrys apifera</i>	Bee Orchid	R
<i>Pilosella officinarum</i>	Mouse-ear Hawkweed	R
<i>Potentilla erecta</i>	Tormentil	R
<i>Sonchus asper</i>	Prickly Sow-thistle	R
<i>Trifolium arvense</i>	Hare's-foot Clover	R
<i>Trifolium campestre</i>	Hop Trefoil	R

<i>Veronica officinalis</i>	Heath Speedwell	R
<i>Viola arvensis</i>	Field Pansy	R

Target Note 71

Roughly 10m bund dividing 2 lakes. Overlooked by hide. Grassland appears unmanaged with medium height sward. See Target note 40 for species list.

Target Note 72

Western end of BFT meadow. Parcel 5. Towards western end of meadow. Sward is taller with more St John's wort, marsh thistle, evening primrose and ragwort.

<i>Lotus corniculatus</i>	Bird's-foot Trefoil	A
<i>Centaurium erythraea</i>	Common Centaury	R
<i>Achillea millefolium</i>	Yarrow	
<i>Agrostis stolonifera</i>	Creeping Bent	
<i>Alchemilla species</i>	Lady's-mantle species	
<i>Carex flacca</i>	Glaucous Sedge	
<i>Cerastium fontanum</i>	Common Mouse-ear	
<i>Cirsium arvense</i>	Creeping Thistle	
<i>Cirsium palustre</i>	Marsh Thistle	
<i>Crepis capillaris</i>	Smooth Hawk's-beard	
<i>Festuca ovina</i>	Sheep's Fescue	
<i>Festuca rubra</i>	Red Fescue	
<i>Geranium dissectum</i>	Cut-leaved Cranesbill	
<i>Hypericum perforatum</i>	Perforate St John's-wort	
<i>Jacobaea vulgaris</i>	Common Ragwort	
<i>Luzula multiflora</i>	Heath Woodrush	
<i>Oenothera sp.</i>	Evening-primrose species	
<i>Prunella vulgaris</i>	Selfheal	
<i>Rumex crispus</i>	Curled Dock	

Target Note 73

Small area of patchy grassland and ephemeral vegetation in centre of parcel 5. Appears to be sandstone/sand substrate.

<i>Bellis perennis</i>	Daisy
<i>Centaurium erythraea</i>	Common Centaury
<i>Cladonia sp.</i>	Cladonia species
<i>Crepis capillaris</i>	Smooth Hawk's-beard
<i>Filago germanica</i>	Common Cudweed
<i>Hypericum perforatum</i>	Perforate St John's-wort
<i>Jacobaea vulgaris</i>	Common Ragwort
<i>Juncus inflexus</i>	Hard Rush
<i>Leontodon hispidus</i>	Rough Hawkbit
<i>Lotus corniculatus</i>	Bird's-foot Trefoil
<i>Oenothera sp.</i>	Evening-primrose species
<i>Peltigera canina</i>	Dog Lichen
<i>Plantago coronopus</i>	Buck's-horn Plantain
<i>Prunella vulgaris</i>	Selfheal
<i>Rubus fruticosus agg.</i>	Bramble
<i>Rumex acetosella</i>	Sheep's Sorrel
<i>Vulpia bromoides</i>	Squirreltail Fescue

Target Note 74

Eastern end of 'Bird's Foot Trefoil Meadow'. Tussocky area of grassland, diverse. Becoming encroached by scrub and tall ruderal herb and forms a mosaic in some places. Good for invertebrates. Humming bird hawk moth seen here plus various butterflies, beetles and hoverflies. Ant hills also found.

<i>Achillea millefolium</i>	Yarrow
<i>Agrostis capillaris</i>	Common Bent
<i>Agrostis stolonifera</i>	Creeping Bent
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass
<i>Arrhenatherum elatius</i>	False Oat-grass

<i>Briza media</i>	Quaking-grass
<i>Chamaenerion angustifolium</i>	Rosebay Willowherb
<i>Cirsium arvense</i>	Creeping Thistle
<i>Cirsium palustre</i>	Marsh Thistle
<i>Crepis capillaris</i>	Smooth Hawk's-beard
<i>Deschampsia cespitosa</i>	Tufted Hair-grass
<i>Epilobium hirsutum</i>	Great Willowherb
<i>Festuca ovina</i>	Sheep's Fescue
<i>Festuca rubra</i>	Red Fescue
<i>Filago germanica</i>	Common Cudweed
<i>Galium album</i>	Hedge Bedstraw
<i>Galium verum</i>	Lady's Bedstraw
<i>Geranium molle</i>	Dove's-foot Cranesbill
<i>Holcus lanatus</i>	Yorkshire-fog
<i>Hypericum perforatum</i>	Perforate St John's-wort
<i>Juncus inflexus</i>	Hard Rush
<i>Lotus corniculatus</i>	Bird's-foot Trefoil
<i>Malva moschata</i>	Musk Mallow
<i>Phleum pratense</i>	Timothy
<i>Prunella vulgaris</i>	Selfheal
<i>Rubus fruticosus agg.</i>	Bramble
<i>Rumex acetosella</i>	Sheep's Sorrel
<i>Stellaria graminea</i>	Lesser Stitchwort
<i>Trifolium repens</i>	White Clover
<i>Urtica dioica</i>	Nettle

Target Note 75

Parcel 5. Short sward of grassland with patches of tall ruderal vegetation. Surrounded by encroaching scrub. Occasional small ponds. Undulating terrain. Rabbit activity including warrens.

<i>Achillea millefolium</i>	Yarrow
<i>Agrostis stolonifera</i>	Creeping Bent
<i>Arrhenatherum elatius</i>	False Oat-grass
<i>Bellis perennis</i>	Daisy
<i>Centaureum erythraea</i>	Common Centaury
<i>Cerastium fontanum</i>	Common Mouse-ear
<i>Chamaenerion angustifolium</i>	Rosebay Willowherb
<i>Cirsium vulgare</i>	Spear Thistle
<i>Cladonia sp.</i>	Cladonia species
<i>Crataegus monogyna</i>	Hawthorn
<i>Crepis capillaris</i>	Smooth Hawk's-beard
<i>Dryopteris filix-mas</i>	Male-fern
<i>Epilobium montanum</i>	Broad-leaved Willowherb
<i>Festuca ovina</i>	Sheep's Fescue
<i>Festuca rubra</i>	Red Fescue
<i>Filago germanica</i>	Common Cudweed
<i>Geranium dissectum</i>	Cut-leaved Cranesbill
<i>Geranium molle</i>	Dove's-foot Cranesbill
<i>Holcus lanatus</i>	Yorkshire-fog
<i>Holcus mollis</i>	Creeping Soft-grass
<i>Jacobaea vulgaris</i>	Common Ragwort
<i>Logfia minima</i>	Small Cudweed
<i>Lotus corniculatus</i>	Bird's-foot Trefoil
<i>Luzula multiflora</i>	Heath Woodrush
<i>Lysimachia arvensis</i>	Scarlet Pimpernel
<i>Myosotis sp.</i>	Forget-me-not species
<i>Plantago coronopus</i>	Buck's-horn Plantain
<i>Potentilla erecta</i>	Tormentil
<i>Prunella vulgaris</i>	Selfheal
<i>Prunus spinosa</i>	Blackthorn
<i>Rubus fruticosus agg.</i>	Bramble
<i>Rumex acetosella</i>	Sheep's Sorrel
<i>Sagina nodosa</i>	Knotted Pearlwort
<i>Trifolium dubium</i>	Lesser Trefoil
<i>Trifolium repens</i>	White Clover

Urtica dioica
Veronica arvensis

Nettle
Wall Speedwell

Target Note 76

Area of species rich neutral grassland. Area had soil profile inverted Circa 10 years ago and sown with a mix. Very sandy free draining soil. Evidence of disturbance by rabbits. Little to no management. Largely dominated by lady's bedstraw and red fescue; ribwort. Bordered on all sides by scrub.

<i>Festuca rubra</i>	Red Fescue	D
<i>Galium verum</i>	Lady's Bedstraw	D
<i>Achillea millefolium</i>	Yarrow	A
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	A
<i>Plantago lanceolata</i>	Ribwort Plantain	A
<i>Centaureum erythraea</i>	Common Centaury	F
<i>Dactylis glomerata</i>	Cock's-foot	F
<i>Poterium sanguisorba</i>	Salad Burnet	F
<i>Agrostis stolonifera</i>	Creeping Bent	O
<i>Cirsium vulgare</i>	Spear Thistle	O
<i>Cynosurus cristatus</i>	Crested Dog's-tail	O
<i>Holcus lanatus</i>	Yorkshire-fog	O
<i>Hypericum perforatum</i>	Perforate St John's-wort	O
<i>Hypochaeris radicata</i>	Common Cat's-ear	O
<i>Jacobaea vulgaris</i>	Common Ragwort	O
<i>Juncus inflexus</i>	Hard Rush	O
<i>Leucanthemum vulgare</i>	Oxeye daisy	O
<i>Medicago lupulina</i>	Black Medick	O
<i>Odontites verna</i>	Red Bartsia	O
<i>Plantago major</i>	Greater Plantain	O
<i>Poa annua</i>	Annual Meadow-grass	O
<i>Prunella vulgaris</i>	Selfheal	O
<i>Ranunculus repens</i>	Creeping Buttercup	O
<i>Taraxacum officinale agg.</i>	Dandelion	O
<i>Trifolium pratense</i>	Red Clover	O
<i>Trifolium repens</i>	White Clover	O
<i>Vicia sativa</i>	Common Vetch	O
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	R
<i>Bromus hordeaceus</i>	Soft Brome	R
<i>Cerastium fontanum</i>	Common Mouse-ear	R
<i>Cirsium arvense</i>	Creeping Thistle	R
<i>Cytisus scoparius</i>	Broom	R
<i>Dysenterica pulicaria</i>	Fleabane	R
<i>Elymus repens</i>	Common Couch	R
<i>Epilobium hirsutum</i>	Great Willowherb	R
<i>Equisetum arvense</i>	Field Horsetail	R
<i>Galium album</i>	Hedge Bedstraw	R
<i>Galium aparine</i>	Cleavers	R
<i>Geranium molle</i>	Dove's-foot Cranesbill	R
<i>Geranium pratense</i>	Meadow Cranesbill	R
<i>Geranium pyrenaicum</i>	Hedgerow Cranesbill	R
<i>Heracleum sphondylium</i>	Hogweed	R
<i>Impatiens glandulifera</i>	Himalayan Balsam	R
<i>Lathyrus pratensis</i>	Meadow Vetchling	R
<i>Leontodon hispidus</i>	Rough Hawkbit	R
<i>Lolium perenne</i>	Perennial Ryegrass	R
<i>Myosotis discolor</i>	Changing Forget-me-not	R
<i>Oenothera sp.</i>	Evening-primrose species	R
<i>Ophrys apifera</i>	Bee Orchid	R
<i>Phleum pratense</i>	Timothy	R
<i>Potentilla anserina</i>	Silverweed	R
<i>Potentilla reptans</i>	Creeping Cinquefoil	R
<i>Primula veris</i>	Cowslip	R
<i>Quercus robur</i>	English Oak	R
<i>Rosa arvensis</i>	Field Rose	R
<i>Rubus fruticosus agg.</i>	Bramble	R
<i>Rumex crispus</i>	Curled Dock	R

<i>Scorzoneroides autumnalis</i>	Autumn Hawkbit	R
<i>Tragopogon pratensis</i>	Goat's-beard	R
<i>Ulex europaeus</i>	Orse	R
<i>Verbascum nigrum</i>	Dark Mullein	R
<i>Veronica serpyllifolia</i>	Thyme-leaved Speedwell	R
<i>Vicia cracca</i>	Tufted Vetch	R
<i>Vicia sepium</i>	Bush Vetch	R

Target Note 77

Area of grassland nearest the car park commonly used for dog walking. Scattered heath area to the west eutrophied containing stands of meadowsweet and nettle and rosebay and false oat-grass. The eastern third is short acid grassland dominated by bent grasses, sheep's fescue and white clover. Evidence of grazing by rabbits. Bordered to the north and east by mature oak woodland and the south

<i>Agrostis capillaris</i>	Common Bent	D
<i>Agrostis stolonifera</i>	Creeping Bent	A
<i>Arrhenatherum elatius</i>	False Oat-grass	A
<i>Carex hirta</i>	Hairy Sedge	A
<i>Chamaenerion angustifolium</i>	Rosebay Willowherb	A
<i>Filipendula ulmaria</i>	Meadowsweet	A
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	A
<i>Rumex acetosella</i>	Sheep's Sorrel	A
<i>Trifolium repens</i>	White Clover	A
<i>Achillea millefolium</i>	Yarrow	F
<i>Cerastium fontanum</i>	Common Mouse-ear	F
<i>Cirsium arvense</i>	Creeping Thistle	F
<i>Dactylis glomerata</i>	Cock's-foot	F
<i>Equisetum arvense</i>	Field Horsetail	F
<i>Festuca rubra</i>	Red Fescue	F
<i>Holcus lanatus</i>	Yorkshire-fog	F
<i>Holcus mollis</i>	Creeping Soft-grass	F
<i>Jacobaea vulgaris</i>	Common Ragwort	F
<i>Luzula campestris</i>	Field Woodrush	F
<i>Odontites verna</i>	Red Bartsia	F
<i>Scorzoneroides autumnalis</i>	Autumn Hawkbit	F
<i>Stellaria graminea</i>	Lesser Stitchwort	F
<i>Taraxacum officinale agg.</i>	Dandelion	F
<i>Urtica dioica</i>	Nettle	F
<i>Vicia cracca</i>	Tufted Vetch	F
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	O
<i>Campanula rotundifolia</i>	Harebell	O
<i>Cirsium vulgare</i>	Spear Thistle	O
<i>Cynosurus cristatus</i>	Crested Dog's-tail	O
<i>Heracleum sphondylium</i>	Hogweed	O
<i>Hypochaeris radicata</i>	Common Cat's-ear	O
<i>Lathyrus pratensis</i>	Meadow Vetchling	O
<i>Lolium perenne</i>	Perennial Ryegrass	O
<i>Petasites hybridus</i>	Butterbur	O
<i>Phalaris arundinacea</i>	Reed Canary-grass	O
<i>Poa annua</i>	Annual Meadow-grass	O
<i>Poa pratensis</i>	Smooth Meadow-grass	O
<i>Rubus fruticosus agg.</i>	Bramble	O
<i>Rumex acetosa</i>	Common Sorrel	O
<i>Rumex obtusifolius</i>	Broad-leaved Dock	O
<i>Angelica sylvestris</i>	Wild Angelica	R
<i>Arctium minus</i>	Lesser Burdock	R
<i>Calystegia sepium</i>	Hedge Bindweed	R
<i>Centaurea nigra</i>	Knapweed	R
<i>Epilobium montanum</i>	Broad-leaved Willowherb	R
<i>Galium aparine</i>	Cleavers	R
<i>Juncus tenuis</i>	Slender Rush	R
<i>Plantago major</i>	Greater Plantain	R
<i>Pteridium aquilinum</i>	Bracken	R
<i>Ranunculus repens</i>	Creeping Buttercup	R
<i>Sambucus nigra</i>	Elder	R

<i>Silene dioica</i>	Red Campion	R
<i>Tragopogon pratensis</i>	Goat's-beard	R

Target Note 78

Area of grassland, probably unimproved. Dominated by common bent and *Holcus mollis*. There is a well-worn path towards the centre showing an area of bare ground. The area is bordered by mature woodland to the north, west and south and plantation woodland to the east. There is a large mature oak towards the centre and scattered bracken in the south. There is a stand of rosebay in the north-west

<i>Agrostis capillaris</i>	Common Bent	D
<i>Agrostis stolonifera</i>	Creeping Bent	F
<i>Galium saxatile</i>	Heath Bedstraw	F
<i>Holcus lanatus</i>	Yorkshire-fog	F
<i>Holcus mollis</i>	Creeping Soft-grass	F
<i>Stellaria graminea</i>	Lesser Stitchwort	F
<i>Arrhenatherum elatius</i>	False Oat-grass	O
<i>Chamaenerion angustifolium</i>	Rosebay Willowherb	O
<i>Festuca rubra</i>	Red Fescue	O
<i>Juncus effusus</i>	Soft Rush	O
<i>Lolium perenne</i>	Perennial Ryegrass	O
<i>Luzula campestris</i>	Field Woodrush	O
<i>Persicaria amphibia</i>	Amphibious Bistort	O
<i>Poa annua</i>	Annual Meadow-grass	O
<i>Prunus spinosa</i>	Blackthorn	O
<i>Pteridium aquilinum</i>	Bracken	O
<i>Quercus robur</i>	English Oak	O
<i>Rubus fruticosus agg.</i>	Bramble	O
<i>Rumex acetosa</i>	Common Sorrel	O
<i>Rumex acetosella</i>	Sheep's Sorrel	O
<i>Cerastium fontanum</i>	Common Mouse-ear	R
<i>Ceratocarpus claviculata</i>	Climbing Corydalis	R
<i>Digitalis purpurea</i>	Foxglove	R
<i>Dryopteris dilatata</i>	Broad Buckler-fern	R
<i>Juncus tenuis</i>	Slender Rush	R

Target Note 79

Area of mixed wet grassland and dryer mature grassland. Contains a pond and bits of continuous scrub, some of which is Japanese knotweed. Occasional willow species dotted throughout. Pond is 50% dominated by *Typha*. Meadow a mix of hard rush and creeping bent. The upper elevations are dryer and dominated by lady's bedstraw and bird's-foot trefoil.

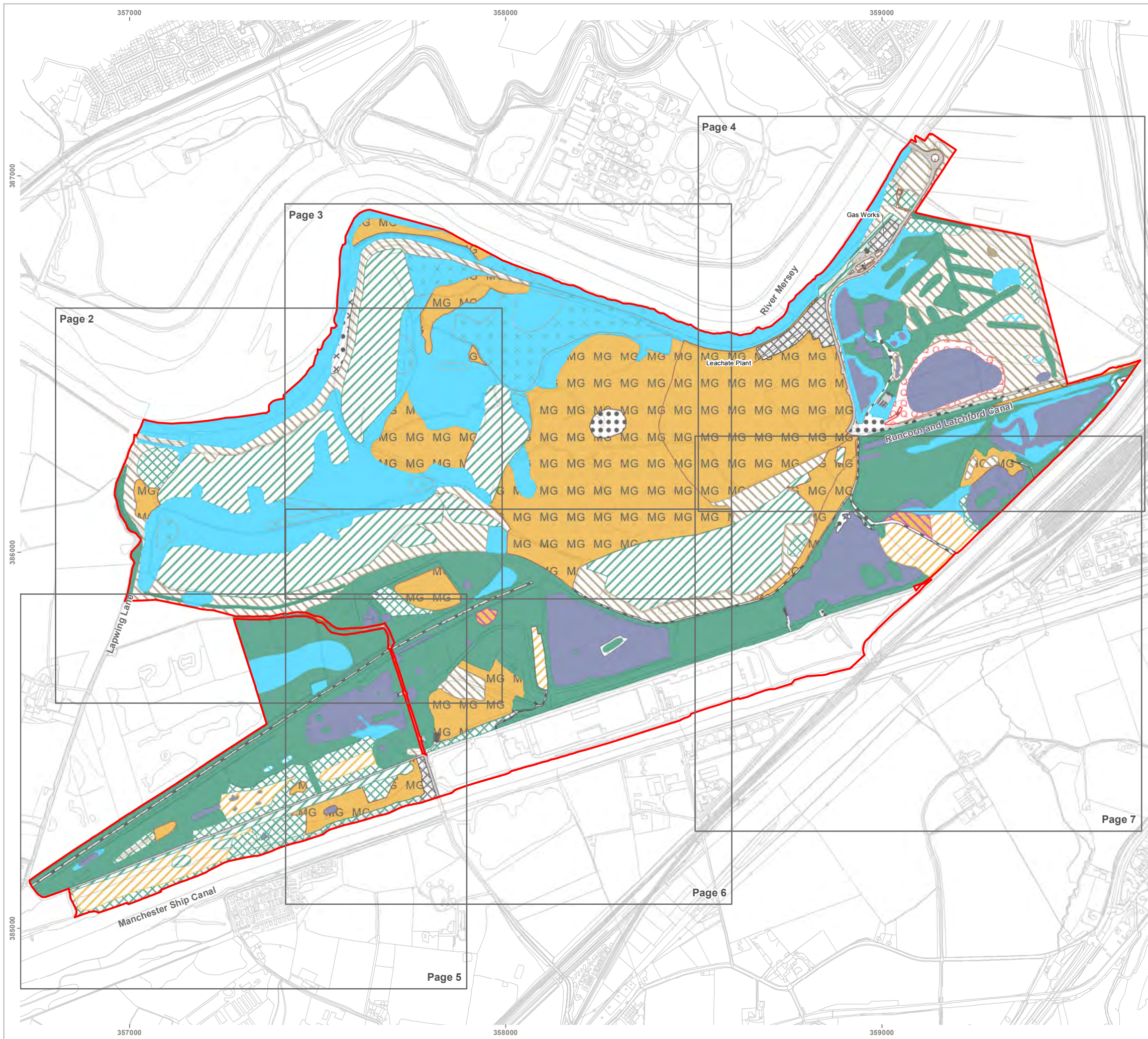
<i>Galium verum</i>	Lady's Bedstraw	D
<i>Agrostis stolonifera</i>	Creeping Bent	A
<i>Crassula helmsii</i>	New Zealand Pygmy-weed	A
<i>Festuca rubra</i>	Red Fescue	A
<i>Juncus inflexus</i>	Hard Rush	A
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	A
<i>Potentilla anserina</i>	Silverweed	A
<i>Trifolium dubium</i>	Lesser Trefoil	A
<i>Typha angustifolia</i>	Small Reed mace	A
<i>Cerastium fontanum</i>	Common Mouse-ear	F
<i>Cirsium arvense</i>	Creeping Thistle	F
<i>Jacobaea vulgaris</i>	Common Ragwort	F
<i>Odontites verna</i>	Red Bartsia	F
<i>Plantago lanceolata</i>	Ribwort Plantain	F
<i>Plantago major</i>	Greater Plantain	F
<i>Prunella vulgaris</i>	Selfheal	F
<i>Reynoutria japonica</i>	Japanese Knotweed	F
<i>Rubus fruticosus agg.</i>	Bramble	F
<i>Salix cinerea ssp. oleifolia</i>	Common Sallow	F
<i>Trifolium repens</i>	White Clover	F
<i>Achillea millefolium</i>	Yarrow	O
<i>Chamaenerion angustifolium</i>	Rosebay Willowherb	O
<i>Cynosurus cristatus</i>	Crested Dog's-tail	O
<i>Dactylis glomerata</i>	Cock's-foot	O

<i>Eleocharis palustris</i>	Common Spike-rush	O
<i>Epilobium hirsutum</i>	Great Willowherb	O
<i>Equisetum arvense</i>	Field Horsetail	O
<i>Galium palustre</i>	Marsh Bedstraw	O
<i>Holcus lanatus</i>	Yorkshire-fog	O
<i>Hypericum perforatum</i>	Perforate St John's-wort	O
<i>Impatiens glandulifera</i>	Himalayan Balsam	O
<i>Juncus articulatus</i>	Jointed Rush	O
<i>Lathyrus pratensis</i>	Meadow Vetchling	O
<i>Lemna trisulca</i>	Ivy-leaved Duckweed	O
<i>Lolium perenne</i>	Perennial Ryegrass	O
<i>Oenothera sp.</i>	Evening-primrose species	O
<i>Phalaris arundinacea</i>	Reed Canary-grass	O
<i>Potamogeton natans</i>	Broad-leaved Pondweed	O
<i>Ranunculus flammula</i>	Lesser Spearwort	O
<i>Ranunculus repens</i>	Creeping Buttercup	O
<i>Rosa arvensis</i>	Field Rose	O
<i>Rumex crispus</i>	Curled Dock	O
<i>Rumex obtusifolius</i>	Broad-leaved Dock	O
<i>Urtica dioica</i>	Nettle	O
<i>Vicia cracca</i>	Tufted Vetch	O
<i>Carex hirta</i>	Hairy Sedge	R
<i>Carex pendula</i>	Pendulous Sedge	R
<i>Centaureum erythraea</i>	Common Centaury	R
<i>Cirsium vulgare</i>	Spear Thistle	R
<i>Cornus sanguinea</i>	Dogwood	R
<i>Crococsmia x crocosmiiflora</i>	Montbretia	R
<i>Dipsacus fullonum</i>	Teasel	R
<i>Epilobium palustre</i>	Marsh Willowherb	R
<i>Erythraea hirsuta</i>	Hairy Tare	R
<i>Geranium molle</i>	Dove's-foot Cranesbill	R
<i>Glyceria fluitans</i>	Floating Sweet-grass	R
<i>Lapsana communis</i>	Nipplewort	R
<i>Malva moschata</i>	Musk Mallow	R
<i>Myosotis discolor</i>	Changing Forget-me-not	R
<i>Myriophyllum sp.</i>	Water-milfoil species	R
<i>Persicaria maculosa</i>	Redshank	R
<i>Phleum pratense</i>	Timothy	R
<i>Symphytum x uplandicum</i>	Russian Comfrey	R
<i>Taraxacum officinale agg.</i>	Dandelion	R
<i>Trifolium campestre</i>	Hop Trefoil	R
<i>Tripleurospermum inodorum</i>	Scentless Mayweed	R



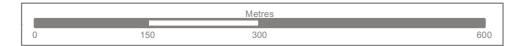
DRAWINGS

G6929.01.001B Phase 1 Habitat Survey Drawing

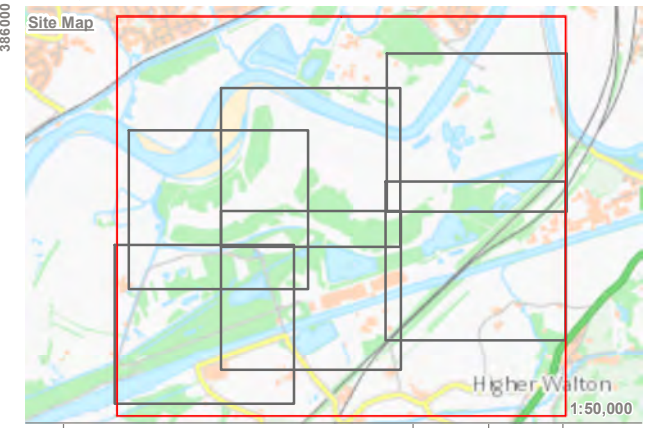


Key

- Survey boundary
- Semi-natural broad-leaved woodland
- Plantation broad-leaved woodland
- Dense/continuous scrub
- Swamp with scattered scrub
- Unimproved acid grassland
- Semi-improved acid grassland
- Modified neutral grassland
- Species-poor modified neutral grassland
- Marsh/marshy grassland
- Continuous bracken
- Tall ruderal
- Swamp
- Ephemeral pool
- Standing water
- Shingle
- Quarry
- Bare ground with ephemeral/short perennial
- Introduced shrub
- Building
- Bare ground
- Hardstanding
- Not surveyed



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A	Updates to habitat areas	MK	LC	31/08/2019
Rev	Description	Drawn	Approved	Date

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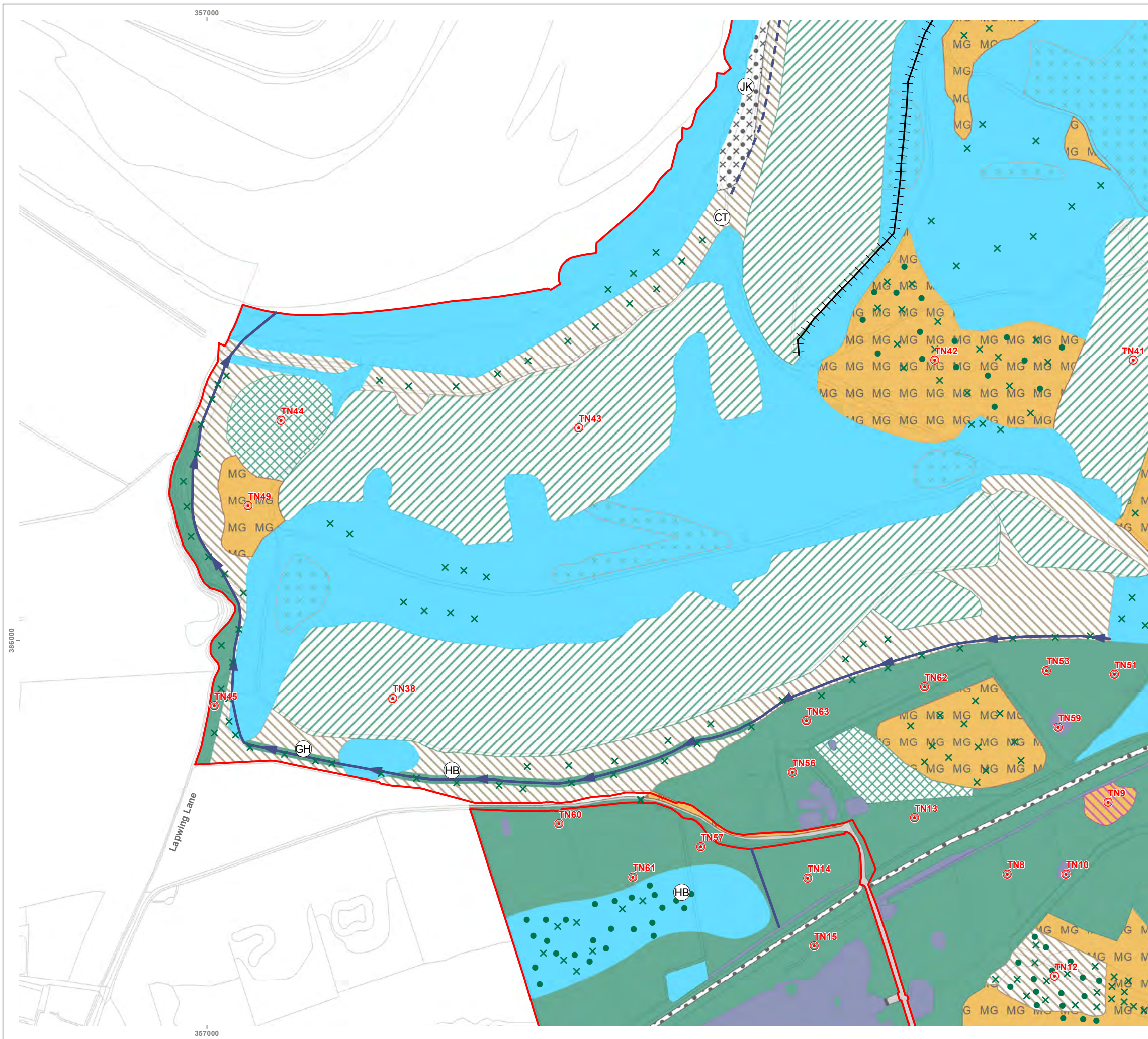
Genesis Centre, Birchwood Science Park, Warrington WA3 7BH
 Tel 01925 844004 e-mail tep@tep.uk.com www.tep.uk.com

Project
Port Warrington, Warrington

Title
Phase 1 Habitat Survey - Overview

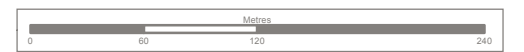
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G6929.001B.1 Sheet 1 of 7

Drawn	Checked	Approved	Scale	Date
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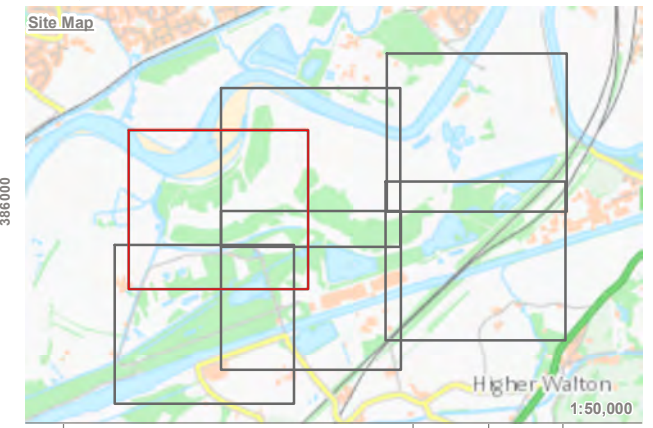


Key

- Survey boundary
- Target note
- Cotoneaster
- Giant hogweed
- Himalayan balsam
- Japanese knotweed
- x Scattered scrub
- Scattered broad-leaved tree
- Standing water
- Running water
- Fence
- Dry ditch
- Semi-natural broad-leaved woodland
- Plantation broad-leaved woodland
- Dense/continuous scrub
- Swamp with scattered scrub
- Modified neutral grassland
- Marsh/marshy grassland
- Tall ruderal
- Swamp
- Standing water
- Bare ground with ephemeral/short perennial
- Hardstanding
- Building



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Rev	Description	Drawn	Approved	Date
A	Updates to habitat areas	MK	LC	31/08/2019

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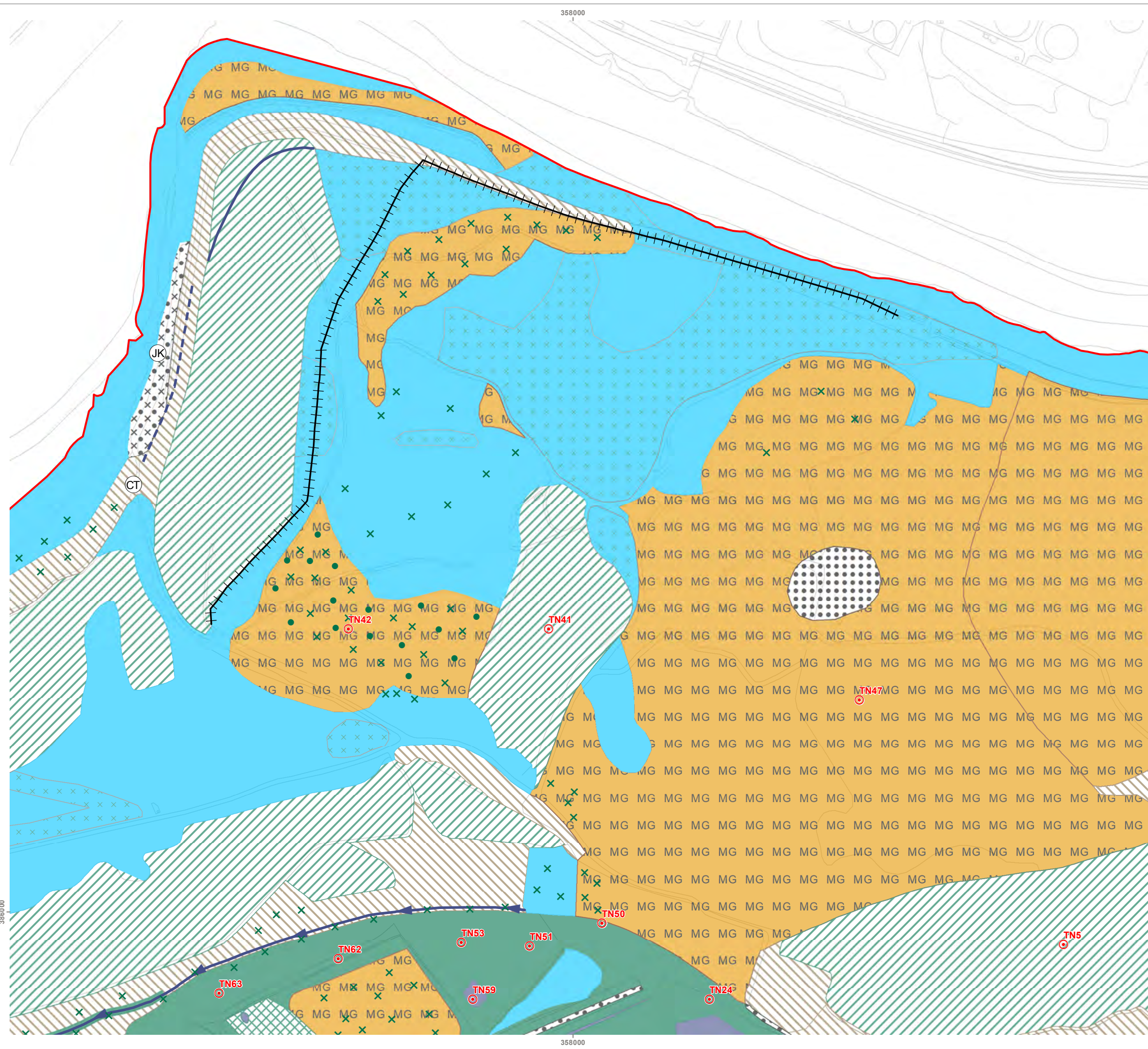
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Project
Port Warrington, Warrington

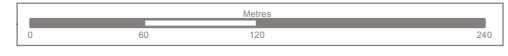
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Phase 1 Habitat Survey - Detailed Part 3

Drawing Number
G6929.001B.2 Sheet 2 of 7

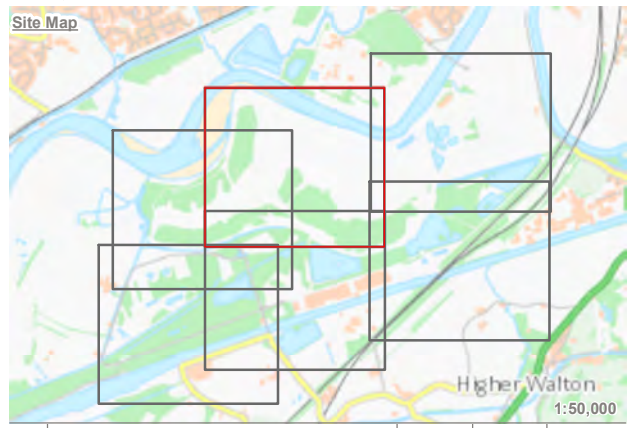
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JO	LC	IH	1:4,000 @ A3	15/09/2019



- Key**
- Survey boundary
 - Target note
 - CT Cotoneaster
 - JK Japanese knotweed
 - x Scattered scrub
 - Scattered broad-leaved tree
 - Standing water
 - Running water
 - Fence
 - Dry ditch
 - Semi-natural broad-leaved woodland
 - Plantation broad-leaved woodland
 - Dense/continuous scrub
 - Swamp with scattered scrub
 - Modified neutral grassland
 - Tall ruderal
 - Swamp
 - Standing water
 - Bare ground with ephemeral/short perennial
 - Bare ground



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Rev	Description	Drawn	Approved	Date
A	Updates to habitat areas	MK	LC	31/08/2019

TEP | **THE ENVIRONMENT PARTNERSHIP**

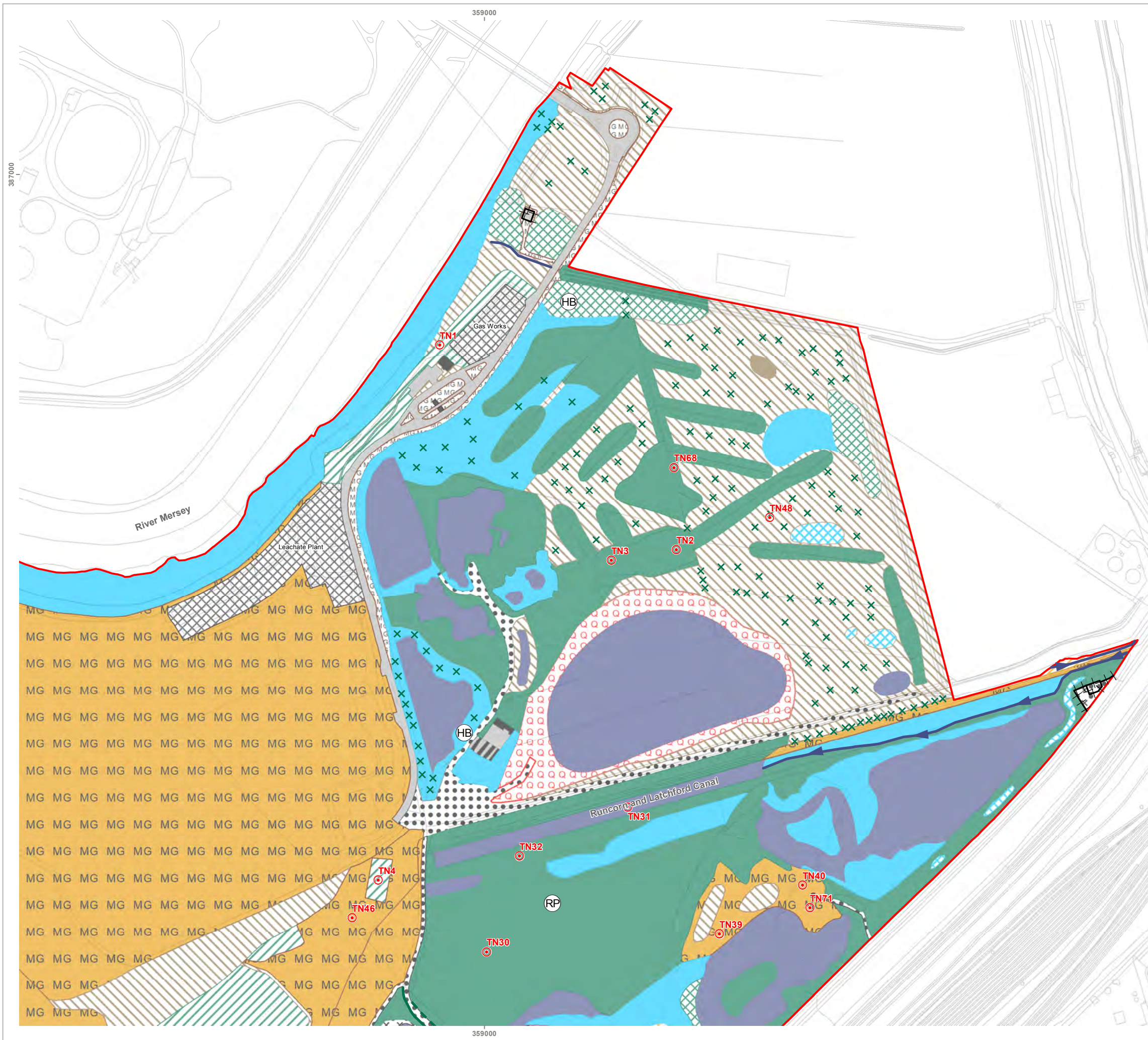
Genesis Centre, Birchwood Science Park, Warrington WA3 7BH
 Tel 01925 844004 e-mail tep@tep.uk.com www.tep.uk.com

Project
Port Warrington, Warrington

Title
Phase 1 Habitat Survey - Detailed Part 2

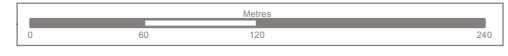
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G6929.001B.3 Sheet 3 of 7

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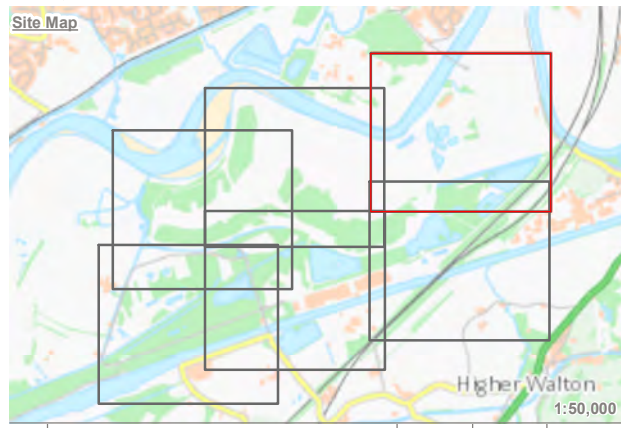


Key

- Survey boundary
- Target note
- Himalayan balsam
- Rhododendron ponticum
- x Scattered scrub
- Standing water
- ▶ Running water
- Species-poor intact hedge
- Species-poor defunct hedge
- Fence
- Semi-natural broad-leaved woodland
- Plantation broad-leaved woodland
- Dense/continuous scrub
- Swamp with scattered scrub
- Unimproved acid grassland
- Modified neutral grassland
- Species-poor modified neutral grassland
- Marsh/marshy grassland
- Continuous bracken
- Tall ruderal
- Swamp
- Ephemeral pool
- Standing water
- Quarry
- Bare ground with ephemeral/short perennial
- Introduced shrub
- Building
- Bare ground
- Hardstanding
- Not surveyed



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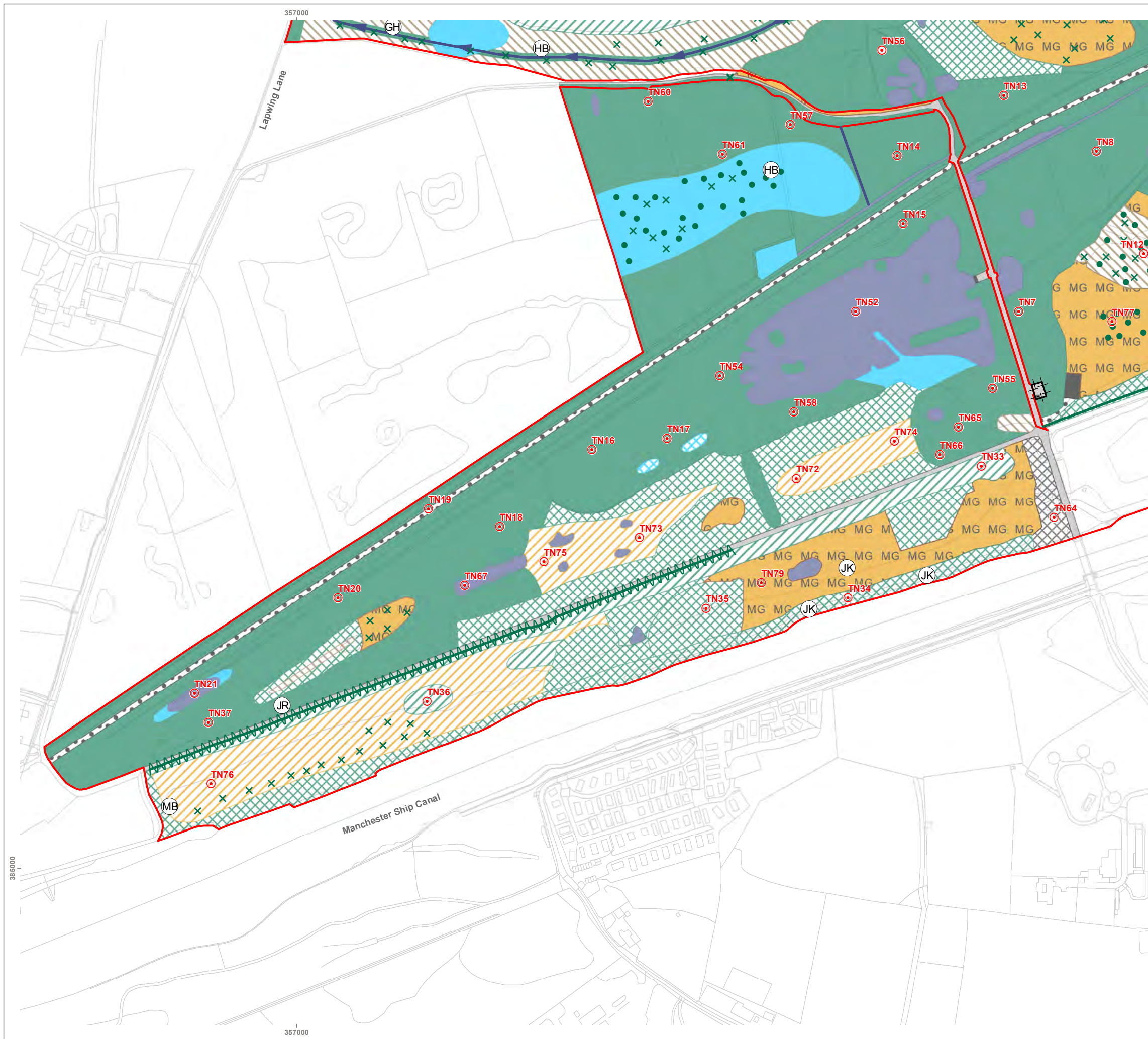
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Project
Port Warrington, Warrington

Title
Phase 1 Habitat Survey - Detailed Part 1

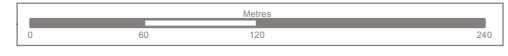
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G6929.001B.4 Sheet 4 of 7

Drawn	Checked	Approved	Scale	Date
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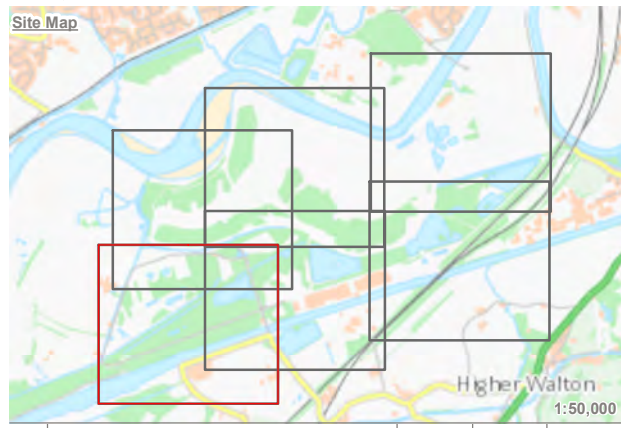


Key

Survey boundary	Building
Target note	Bare ground
Giant hogweed	Hardstanding
Himalayan balsam	Not surveyed
Japanese knotweed	
Japanese rose	
Montbretia	
Scattered scrub	
Scattered broad-leaved tree	
Standing water	
Running water	
Native species-rich intact hedge	
Species-poor intact hedge	
Fence	
Semi-natural broad-leaved woodland	
Plantation broad-leaved woodland	
Dense/continuous scrub	
Unimproved acid grassland	
Modified neutral grassland	
Tall ruderal	
Swamp	
Ephemeral pool	
Standing water	



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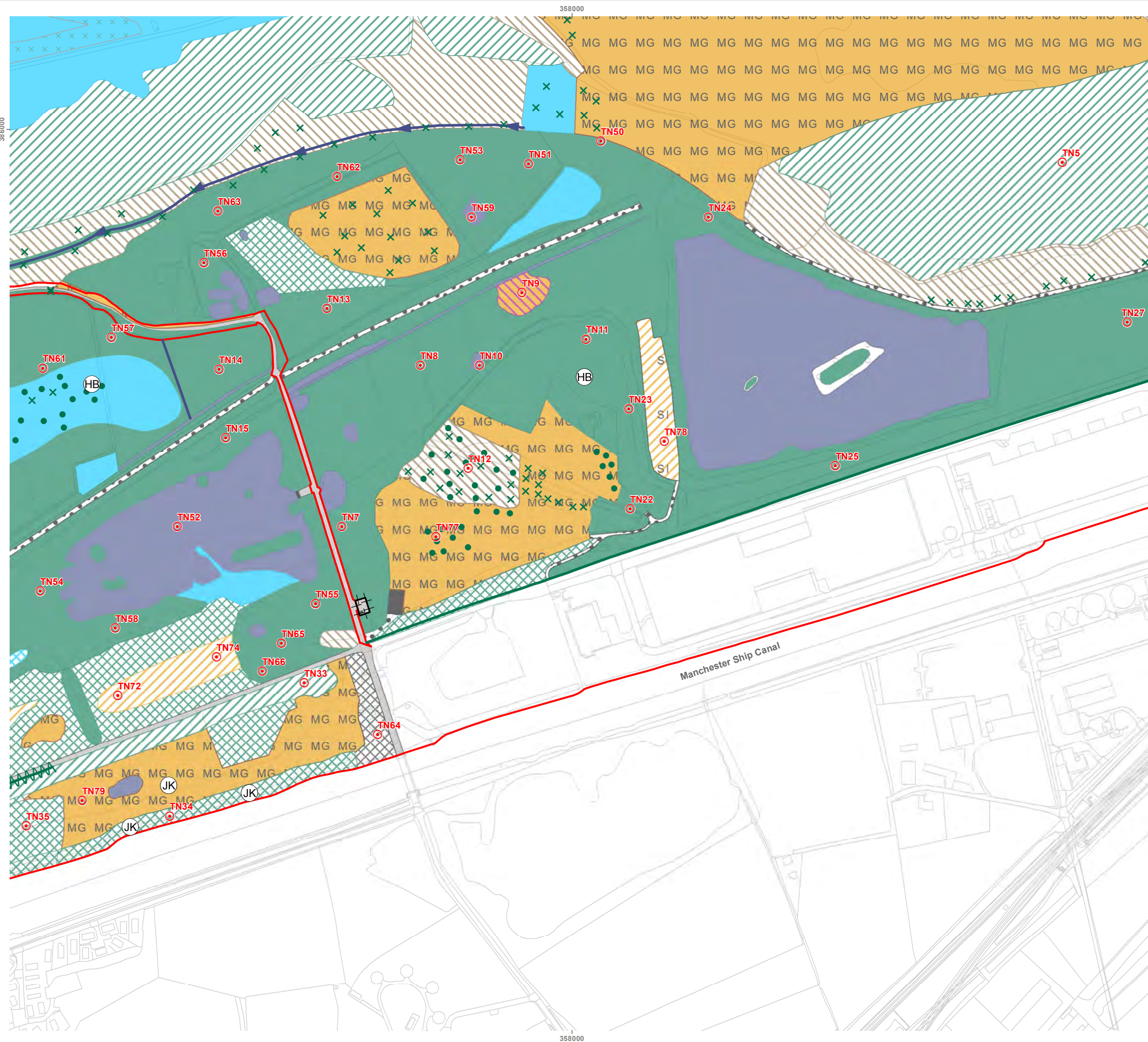
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Project
Port Warrington, Warrington

Title
Phase 1 Habitat Survey - Detailed Part 6

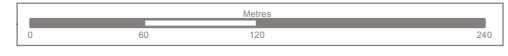
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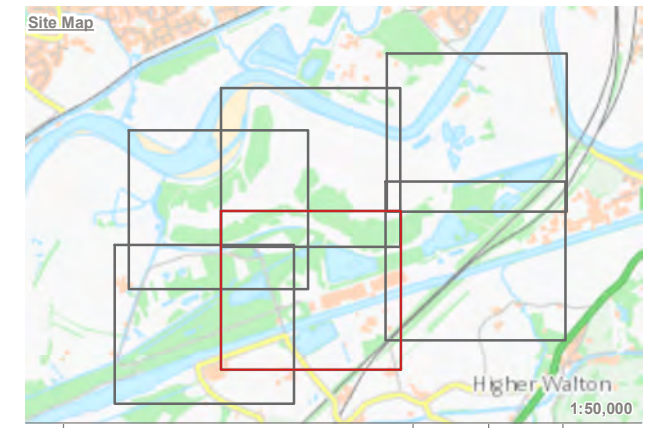


Key

- Survey boundary
- Target note
- Himalayan balsam
- Japanese knotweed
- x Scattered scrub
- Scattered broad-leaved tree
- Standing water
- Running water
- ~ Native species-rich intact hedge
- Species-poor intact hedge
- Fence
- Semi-natural broad-leaved woodland
- Plantation broad-leaved woodland
- Dense/continuous scrub
- Swamp with scattered scrub
- Unimproved acid grassland
- Semi-improved acid grassland
- Modified neutral grassland
- Marsh/marshy grassland
- Tall ruderal
- Swamp
- Ephemeral pool
- Standing water
- Shingle
- Building
- Bare ground
- Hardstanding
- Not surveyed



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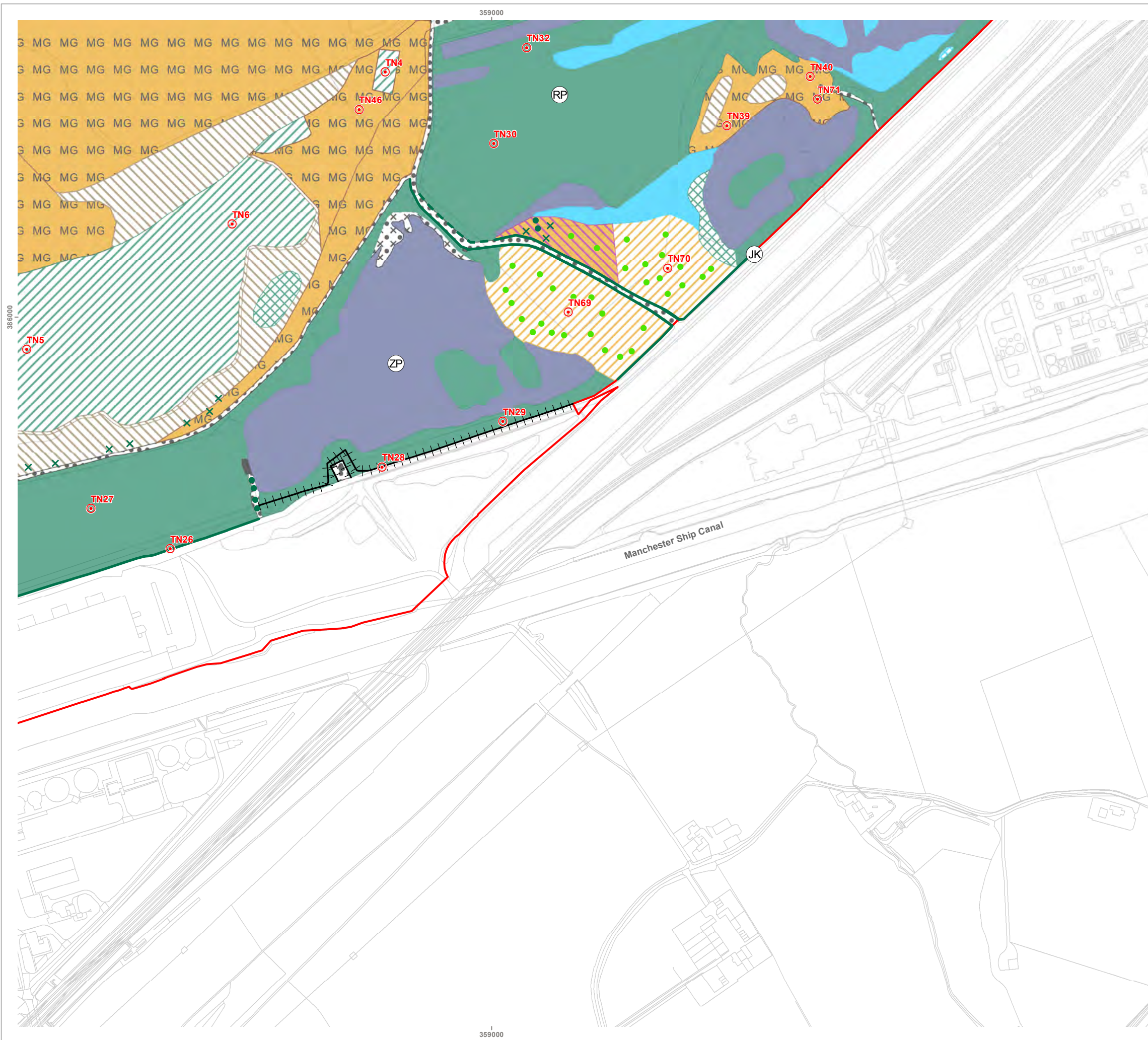
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Project
Port Warrington, Warrington

Title
Phase 1 Habitat Survey - Detailed Part 5

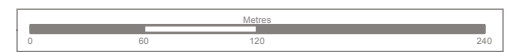
Drawing Number G6929.001B.6	Sheet 6 of 7
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Drawn JO	Checked LC	Approved IH	Scale 1:4,000 @ A3	Date 15/09/2019
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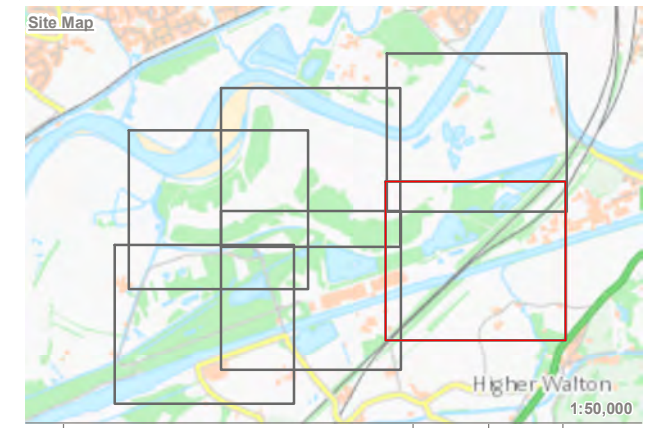


Key

- Survey boundary
- Target note
- JK Japanese knotweed
- RP Rhododendron ponticum
- ZP New Zealand pygmyweed
- x Scattered scrub
- Scattered broad-leaved tree
- Scattered coniferous tree
- Species-poor intact hedge
- Species-poor defunct hedge
- Fence
- Semi-natural broad-leaved woodland
- Plantation broad-leaved woodland
- Dense/continuous scrub
- Unimproved acid grassland
- MG Modified neutral grassland
- Marsh/marshy grassland
- Tall ruderal
- Swamp
- Ephemeral pool
- Standing water
- Bare ground with ephemeral/short perennial
- Building
- Bare ground



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Title
Phase 1 Habitat Survey - Detailed Part 4

Drawing Number
G6929.001B.7 Sheet 7 of 7

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APPENDIX F: Woodland NVC survey Appendix



THE
ENVIRONMENT
PARTNERSHIP



PORT WARRINGTON

MOORE

WOODLAND NATIONAL VEGETATION
CLASSIFICATION SURVEY



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APPENDIX B: Quadrat Data and TABLEFIT Explanation

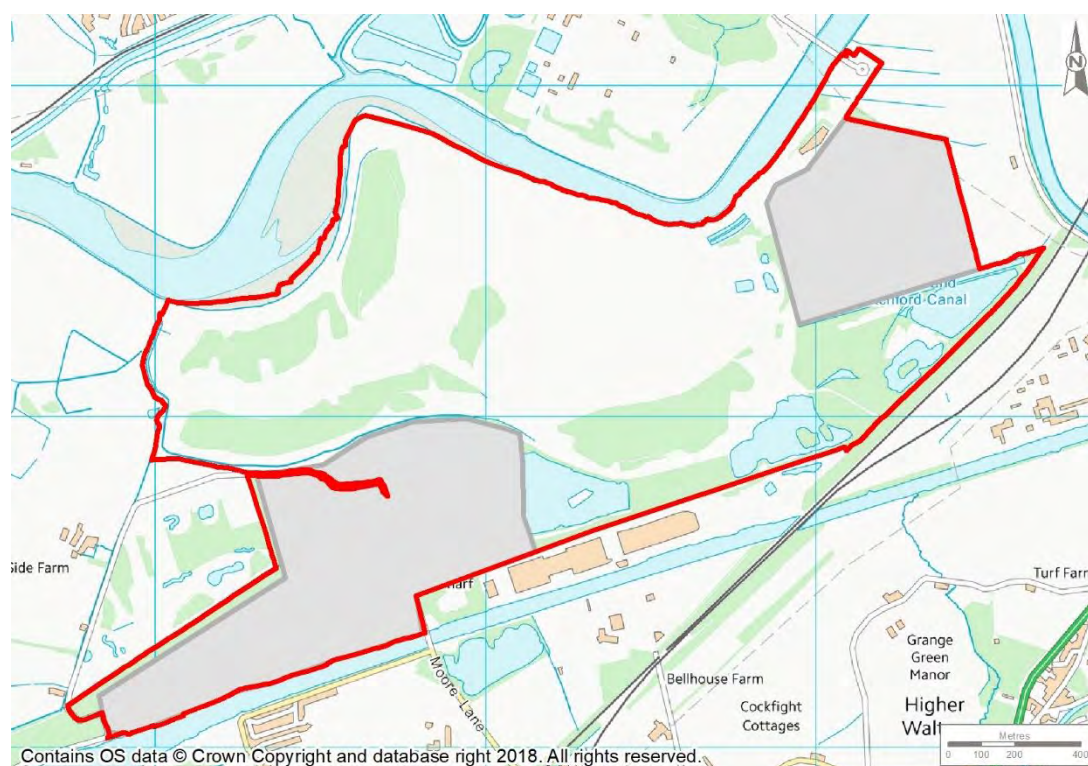
DRAWINGS

Drawing 1 – G6929.01.054 Woodland NVC Survey

1.0 Introduction and Site Description

- 1.1 TEP was commissioned in April 2019 by Peel Land and Property Ltd. to carry out a detailed survey of woodland habitat across the Moore Nature Reserve and Arpley Meadows Landfill sites.
- 1.2 This assessment has been requested to provide ecological information to inform reallocation of the land in the Local Plan to enable construction of a new port on the site. This report has the following objectives:
- to describe the existing woodland vegetation onsite and identify whether these features qualify as habitats of biodiversity importance;
 - to advise on mitigation requirements that may be needed prior to development of the site; and
 - to outline opportunities to provide biodiversity enhancement within site proposals.
- 1.3 Moore Nature Reserve is located in the south of Warrington off Lapwing Lane, adjacent to the village of Moore. The site is immediately bordered to the north by Arpley Meadows Landfill and the River Mersey and to the south by the Manchester Ship Canal. To the east lies the West Coast Mainline railway line and beyond a mix of industrial and residential development. To the west lies open farmland.

Figure 1: Location of Port Warrington survey area and proposed development areas.



2.0 Methods

- 2.1 Areas identified during the extended Phase 1 Habitat survey undertaken by TEP as semi-natural broad-leaved woodland were subject to detailed survey. Woodland parcels were selected for NVC survey if they contained mature trees and were dominated by native tree species. Other areas were target noted in detail. See the Extended Phase 1 Habitat Survey report TEP Report Ref. 6929.01.026 for semi-natural woodland distribution and detailed target notes. Each area was walked over by experienced botanists during May 2019, to make a provisional assessment of the boundaries of different vegetation types (as defined by the National Vegetation Classification system (Rodwell, 1991-2000 and 2006).
- 2.2 Vegetation was then sampled using quadrats according to standard NVC methodology (Rodwell, 2006). Each quadrat was recorded in the field by listing all plants within it along with the abundance of each species and the percentage cover of any bare ground or leaf litter using the Domin scale of abundance. Sufficient quadrats were recorded so as to include all community types occurring within each surveyed area and to allow a robust statistical analysis of the data.
- 2.3 The positions of quadrats in open habitats were recorded using a hand-held GPS (Global Positioning System) with an accuracy of approximately 3m. This facilitates presentation of mapping and vegetation data in GIS format as well as traditional paper maps and reports.
- 2.4 Optimal survey times vary depending on the habitat being surveyed. Woodland is best surveyed in the spring when ground flora is present.
- 2.5 Quadrat data was analysed using the computer program TABLEFIT Version 1 (Hill, 1996) to establish the “goodness of fit” to the NVC community types. The output results from TABLEFIT analysis of the quadrats has been analysed by experienced botanists to assess which vegetation types, as defined by the NVC, are represented across the surveyed areas.

3.0 Results

- 3.1 The raw quadrat data and TABLEFIT analysis for each quadrat is presented in Appendix A including an explanatory note regarding quadrat data and TABLEFIT analysis. A summary of the best fit NVC community for each compartment within each of the area/s of woodland surveyed, with a description of the best fit NVC communities present is provided within Table 1 below.
- 3.2 Compartment numbering follows that used in the Arboricultural Walkover Survey and Desktop Assessment (TEP Report ref. 6929.02.001) and locations are illustrated in NVC Survey Drawing G6929.01.054.

Table 1 Summary of best fit NVC communities - per compartment

Compartment number	NVC community (closest match)	NVC community description (closest match)	Goodness of fit
13	W16a	<i>Quercus robur</i> sub-community of <i>Quercus</i> spp. - <i>Betula</i> spp. <i>Deschampsia flexuosa</i> woodland	34 (Very poor)
36	W10a	Typical sub-community of <i>Quercus robur</i> - <i>Pteridium aquilinum</i> - <i>Rubus fruticosus</i> woodland	46 (Very poor)
36a	W6	<i>Alnus glutinosa</i> - <i>Urtica dioica</i> woodland	48 (very poor)
44 and 68	W6	<i>Alnus glutinosa</i> - <i>Urtica dioica</i> woodland	53 (Poor)
74	OV27c	<i>Rubus fruticosus</i> agg. - <i>Dryopteris dilatata</i> subcommunity of <i>Epilobium angustifolium</i> open habitat community	45 (Very poor)

- 3.3 None of the compartments show a stronger than 'Poor' goodness-of-fit with any particular NVC community as shown in Table 1. A number of quadrats were taken across each compartment and Table 2 shows the closest NVC community match for each quadrat taken, when the quadrats were processed individually by TABLEFIT.

Table 2 Summary of best fit NVC communities - per quadrat

Compartment number	Quadrat number	NVC community (closest match)	NVC community description (closest match)	Goodness of fit
13	1	OV27c	<i>Rubus fruticosus</i> agg. - <i>Dryopteris dilitata</i> subcommunity of <i>Epilobium angustifolium</i> open habitat community	45 (Very poor)
	2	OV27c	<i>Rubus fruticosus</i> agg. - <i>Dryopteris dilitata</i> subcommunity of <i>Epilobium angustifolium</i> open habitat community	37 (Very poor)
	3	OV27c	<i>Rubus fruticosus</i> agg. - <i>Dryopteris dilitata</i> subcommunity of <i>Epilobium angustifolium</i> open habitat community	26 (Very poor)
	4	OV27c	<i>Rubus fruticosus</i> agg. - <i>Dryopteris dilitata</i> subcommunity of <i>Epilobium angustifolium</i> open habitat community	23 (Very poor)
	5	W10a	Typical sub-community of <i>Quercus robur</i> - <i>Pteridium aquilinum</i> - <i>Rubus fruticosus</i> woodland	28 (Very poor)
36	1	OV27c	<i>Rubus fruticosus</i> agg. - <i>Dryopteris dilitata</i> subcommunity of <i>Epilobium angustifolium</i> open habitat community	39 (Very poor)
	2	W10a	Typical sub-community of <i>Quercus robur</i> - <i>Pteridium aquilinum</i> - <i>Rubus fruticosus</i> woodland	39 (Very poor)

Compartment number	Quadrat number	NVC community (closest match)	NVC community description (closest match)	Goodness of fit
	3	W10a	Typical sub-community of <i>Quercus robur</i> - <i>Pteridium aquilinum</i> - <i>Rubus fruticosus</i> woodland	48 (Very poor)
	4	W6	<i>Alnus glutinosa</i> - <i>Urtica dioica</i> woodland	57 (Poor)
	5	W6	<i>Alnus glutinosa</i> - <i>Urtica dioica</i> woodland	34 (Very poor)
36a	1	W6	<i>Alnus glutinosa</i> - <i>Urtica dioica</i> woodland	37 (Very poor)
	2	W6	<i>Alnus glutinosa</i> - <i>Urtica dioica</i> woodland	40 (Very poor)
	3	W6	<i>Alnus glutinosa</i> - <i>Urtica dioica</i> woodland	32 (Very poor)
	4	W6	<i>Alnus glutinosa</i> - <i>Urtica dioica</i> woodland	47 (Very poor)
	5	MG10c	<i>Iris pseudoacorus</i> sub-community of <i>Holcus lanatus</i> - <i>Juncus effusus</i> rush-pasture	26 (Very poor)
44 and 68	1	OV27c	<i>Rubus fruticosus</i> agg. - <i>Dryopteris dilatata</i> subcommunity of <i>Epilobium angustifolium</i> open habitat community	40 (Very poor)
	2	W6	<i>Alnus glutinosa</i> - <i>Urtica dioica</i> woodland	32 (Very poor)

Compartment number	Quadrat number	NVC community (closest match)	NVC community description (closest match)	Goodness of fit
	3	W6	<i>Alnus glutinosa</i> - <i>Urtica dioica</i> woodland	44 (Very poor)
	4	OV27c	<i>Rubus fruticosus</i> agg. - <i>Dryopteris dilatata</i> subcommunity of <i>Epilobium angustifolium</i> open habitat community	41 (Very poor)
	5	OV27c	<i>Rubus fruticosus</i> agg. - <i>Dryopteris dilatata</i> subcommunity of <i>Epilobium angustifolium</i> open habitat community	40 (Very poor)
74	1	OV27c	<i>Rubus fruticosus</i> agg. - <i>Dryopteris dilatata</i> subcommunity of <i>Epilobium angustifolium</i> open habitat community	38 (Very poor)

- 3.4 Even when processed individually, none of the quadrats had a stronger than 'Poor' goodness-of-fit to any particular semi-natural vegetation community.
- 3.5 However, the majority of the quadrats showed an affinity (although weak) to one of only three habitat types; NVC community OV27c, W6 or W10a, suggesting that the woodland may be a mosaic of these habitat types.

4.0 Conclusions

- 4.1 The majority of Moore Nature Reserve is covered by semi-natural broadleaved woodland, which varies in its species composition and age structure across the site. Much of the woodland across Moore Nature Reserve may have originally been planted but the boundaries between planted areas and natural regeneration are not well defined.
- 4.2 Historic aerial photographs show that certain areas of Moore Nature Reserve were wooded in 1945, including the blocks of mature wet woodland in the centre of the site adjacent to Lapwing Lane (Compartments 36, 44 and 68) and adjacent to the route of the old canal at Compartment 61. The topography across this part of the site is very uneven and the habitat is a mosaic of wet and dry woodland with standing water in some places. There are frequent mature trees, with ground conditions determining whether oak, alder or crack willow is the dominant canopy species in each location.
- 4.3 The findings of the NVC survey suggest that the woodland compartments surveyed have very little affinity with semi-natural woodland vegetation communities. This lack of affinity may be due to a range of factors, including the disturbed nature of the habitat (it is well used recreationally by the local community, including for dog walking), the historic use of the surrounding land (predominantly shown as farmland in 1945 but subsequently used as a sand quarry and landfill site). It is likely that due to these changes, the water table and possibly even soil chemistry (including nutrient levels) will have fluctuated and may have led to shifting woodland communities. In addition to this, Schedule 9 invasive plant species Himalayan balsam *Impatiens glandulifera* was present in varying abundances across many of the quadrats sampled and is likely to be affecting composition of the woodland as it is known to out-compete native species.
- 4.4 The lack of affinity to semi-natural vegetation communities should not be taken to mean that the woodland surveyed does not have intrinsic value. Historic imagery shows that woodland compartments 36, 44, 61 and 68 have been present for at least 74 years, and probably significantly longer than that. As noted in the arboricultural assessment, these areas include excellent examples of wet woodland habitat, including veteran trees which are classed as an irreplaceable habitat under the National Planning Policy Framework (NPPF).
- 4.5 The woodland habitat is of significant ecological value and provides potential foraging, refuge and commuting habitat for small mammals, invertebrates and birds. Preliminary bat assessments have been undertaken which have shown that the mature woodland areas are of high value for roosting bats.

5.0 Recommendations

- 5.1 Where practical, loss of woodland habitat should be avoided, particularly at Compartments 36, 44, 61 and 68. Significant mitigation will be required to offset woodland loss in these areas.
- 5.2 An ecological mitigation plan will need to be produced which will identify areas of woodland to be lost and provide details regarding the areas assigned for replacement planting and the proposed species mixes. A long term management plan will be required to guide management of newly planted areas as well as existing areas of woodland to maximise their biodiversity value.
- 5.3 To enhance existing and newly planted woodland, consideration should be given to planting native bulbs and plugs of woodland ground flora species, ideally of local stock. This will increase floral diversity within the woodland habitat and provide greater opportunities for invertebrates.
- 5.4 Control of invasive species onsite will also improve the existing woodland habitat through promoting the growth of native woodland ground flora species. A management plan for the control of invasive weeds such as Himalayan balsam populations scattered across the site will need to be produced and followed.

APPENDIX A: NVC Survey Data and TABLEFIT Analysis

Tablefit Output and Results Report

Compartment 13

Semi-natural broadleaved woodland, predominantly birch. Young woodland at margins and more open mature birch and oak woodland in centre with wetland areas. Much plastic waste on floor. Much rabbit activity. Very sandy soil in places.

<i>Betula pendula</i>	Silver Birch	D
<i>Aesculus hippocastanum</i>	Horse-chestnut	R
<i>Corylus avellana</i>	Hazel	R
<i>Hyacinthoides non-scripta</i>	Bluebell	R
<i>Rhododendron ponticum</i>	Rhododendron	R
<i>Betula pubescens</i>	Downy Birch	
<i>Ceratocarpus claviculata</i>	Climbing Corydalis	
<i>Dryopteris affinis ssp. borreri</i>	Scaly Male-fern	
<i>Dryopteris dilatata</i>	Broad Buckler-fern	
<i>Impatiens glandulifera</i>	Himalayan Balsam	
<i>Quercus robur</i>	English Oak	
<i>Rubus fruticosus agg.</i>	Bramble	
<i>Salix caprea</i>	Goat Willow	
<i>Salix cinerea</i>	Grey Willow	
<i>Sambucus nigra</i>	Elder	

Tablefit results by Compartment

W16a	34		46	34	45	80	Que spp-Bet spp-Des fle	Quercus robur
W10	29		45	46	29	73	Que rob-Pte aqu-Rub fru	
W10a	29		49	49	25	63	Que rob-Pte aqu-Rub fru	Typical
W10d	27		47	32	32	68	Que rob-Pte aqu-Rub fru	Holcus lanatus
W10b	26		38	40	30	78	Que rob-Pte aqu-Rub fru	Anemone nemoros

Tablefit results by Quadrat

Quadrat 1

Species List

Bare Ground	8
Quercus robur, Canopy	8
Betula pendula, Canopy	7
Chamaenerion angustifolium	4
Ceratocarpus claviculata	3
Dryopteris dilatata	3
Rubus fruticosus agg.	3

TableFit Results

OV27c	45		78	74	27	42	Chamerion tall herb	Rub fru-Dry dil
W10a	37		61	73	22	60	Que rob-Pte aqu-Rub fru	Typical
W10	34		56	67	21	67	Que rob-Pte aqu-Rub fru	
W10d	31		61	50	20	54	Que rob-Pte aqu-Rub fru	Holcus lanatus

Quadrat 2

Species List

Bare Ground	8
Betula pendula, Canopy	8
Quercus robur, Canopy	7
Alnus glutinosa, Canopy	5
Dryopteris dilatata	4
Ceratocarpus claviculata	3
Chamaenerion angustifolium	3
Rubus fruticosus agg.	3
Sambucus nigra, Understorey	1

TableFit Results

OV27c 37 | 78 55 27 33| Chamerion tall herb Rub fru-Dry dil
 W10a 32 | 61 55 22 50| Que rob-Pte aqu-Rub fru Typical
 W 6 31 | 68 53 16 39| Aln glut-Urtic dio wood
 W10 29 | 56 50 21 53| Que rob-Pte aqu-Rub fru

Quadrat 3**Species List**

Quercus robur, Canopy 8
 Betula pendula, Canopy 7
 Bare Ground 6
 Alnus glutinosa, Canopy 5
 Moss sp. 5
 Ceratocapnos claviculata 3
 Chamaenerion angustifolium 3
 Epilobium montanum 3
 Impatiens glandulifera 3
 Rubus fruticosus agg. 3
 Sambucus nigra, Understorey 2
 Dryopteris dilatata 1

TableFit Results

OV27c 26 | 78 40 18 20| Chamerion tall herb Rub fru-Dry dil
 W10a 26 | 61 40 22 36| Que rob-Pte aqu-Rub fru Typical
 W 6 24 | 68 38 16 29| Aln glut-Urtic dio wood
 W10 23 | 56 37 20 40| Que rob-Pte aqu-Rub fru

Quadrat 4**Species List**

Quercus robur, Canopy 8
 Betula pendula, Canopy 7
 Bare Ground 6
 Ceratocapnos claviculata 4
 Chamaenerion angustifolium 4
 Dryopteris dilatata 4
 Moss sp. 4
 Impatiens glandulifera 3
 Sambucus nigra, Understorey 2
 Corylus avellana, Understorey 1

TableFit Results

OV27c 23 | 65 34 24 24| Chamerion tall herb Rub fru-Dry dil
 W10 22 | 49 39 19 41| Que rob-Pte aqu-Rub fru
 W10a 21 | 48 39 19 35| Que rob-Pte aqu-Rub fru Typical
 W16a 18 | 47 28 23 35| Que spp-Bet spp-Des fle Quercus robur

Quadrat 5**Species List**

Betula pendula, Canopy 8
 Bare Ground 7
 Quercus robur, Canopy 6
 Ceratocapnos claviculata 4
 Digitalis purpurea 3
 Impatiens glandulifera 3
 Moss sp. 3
 Dryopteris dilatata 1
 Rubus fruticosus agg. 1

Sambucus nigra, Understorey

TableFit Results

W10a 28 | 61 49 18 42| Que rob-Pte aqu-Rub fru Typical
W10 25 | 56 45 17 45| Que rob-Pte aqu-Rub fru
W16a 23 | 56 33 21 45| Que spp-Bet spp-Des fle Quercus robur
W10d 22 | 61 33 17 40| Que rob-Pte aqu-Rub fru Holcus lanatus

Compartment 36

Mature, oak dominant semi-natural woodland. Numerous old oaks with bat potential. Groundflora dominated by bramble and ferns. Oak and alder are the dominant species with occasional sycamore and sliver birch. Quadrats are sampled within the drier woodland areas around the boundaries of the compartment. A linear area of wet woodland is present within the centre where alder is more dominant.

<i>Quercus robur</i>	English Oak	D
<i>Alnus glutinosa</i>	Alder	F
<i>Ceratocarpus claviculata</i>	Climbing Corydalis	F
<i>Dryopteris dilatata</i>	Broad Buckler-fern	F
<i>Rubus fruticosus</i> agg.	Bramble	F
<i>Silene dioica</i>	Red Campion	F
<i>Betula pubescens</i>	Downy Birch	O
<i>Chamaenerion angustifolium</i>	Rosebay Willowherb	O
<i>Impatiens glandulifera</i>	Himalayan Balsam	O
<i>Salix cinerea</i>	Grey Willow	O
<i>Acer pseudoplatanus</i>	Sycamore	R
<i>Corylus avellana</i>	Hazel	R
<i>Sorbus aucuparia</i>	Rowan	R

Tablefit results by Compartment

W10a 46 | 54 51 52 87| Que rob-Pte aqu-Rub fru Typical
W10 40 | 51 49 42 100| Que rob-Pte aqu-Rub fru
W 6d 38 | 49 64 36 67| Aln glut-Urtic dio wood Sambucus nigra
OV27c 35 | 69 51 25 46| Chamerion tall herb Rub fru-Dry dil
W 6 33 | 63 51 25 51| Aln glut-Urtic dio wood

Tablefit results by Quadrat

Quadrat 1

Species List

Rubus fruticosus agg.	9
Quercus robur, Canopy	8
Alnus glutinosa, Canopy	4
Dryopteris dilatata	4
Bare Ground	3
Ceratocarpus claviculata	3
Impatiens glandulifera	3
Chamaenerion angustifolium	2
Silene dioica	1

TableFit Results

OV27c 39 | 78 55 29 43| Chamerion tall herb Rub fru-Dry dil
W10 25 | 49 44 20 64| Que rob-Pte aqu-Rub fru
W 6 25 | 51 39 25 44| Aln glut-Urtic dio wood
W10a 24 | 47 42 21 54| Que rob-Pte aqu-Rub fru Typical

Quadrat 2

Species List

Quercus robur, Canopy	9
Bare Ground	7

Impatiens glandulifera	7
Acer pseudoplatanus,	5
Ilex aquifolium, Understorey	5
Rubus fruticosus agg.	4
Sambucus nigra, Understorey	3
Dryopteris dilatata	2

TableFit Results

W10	39		63	65	26	64		Que rob-Pte aqu-Rub fru	
W10a	33		57	63	22	50		Que rob-Pte aqu-Rub fru	Typical
OV27d	29		56	56	23	35		Chamerion tall herb	Ace pse-Sam nig
W10e	29		50	75	15	56		Que rob-Pte aqu-Rub fru	Ace pse-Oxa

Quadrat 3

Species List

Rubus fruticosus agg.	10
Betula pendula, Canopy	6
Quercus robur, Canopy	6
Acer pseudoplatanus,	2
Betula pendula, Understorey	2
Urtica dioica	2
Dryopteris dilatata	1

TableFit Results

W10a	48		68	81	31	86		Que rob-Pte aqu-Rub fru	Typical
W10	44		63	76	29	87		Que rob-Pte aqu-Rub fru	
W10d	35		61	50	27	70		Que rob-Pte aqu-Rub fru	Holcus lanatus
W 6e	35		61	62	25	46		Aln glut-Urtic dio wood	Betula pubesc

Quadrat 4

Species List

Alnus glutinosa, Canopy	8
Rubus fruticosus agg.	7
Chamaenerion angustifolium	6
Sambucus nigra, Understorey	4
Urtica dioica	4
Dryopteris dilatata	3
Silene dioica	3
Bare Ground	2
Epilobium montanum	1

TableFit Results

W 6	57		89	73	38	76		Aln glut-Urtic dio wood	
OV27c	48		88	61	39	49		Chamerion tall herb	Rub fru-Dry dil
W 6d	48		70	89	27	80		Aln glut-Urtic dio wood	Sambucus nigra

Quadrat 5

Species List

Quercus robur, Canopy	9
Bare Ground	8
Sambucus nigra, Understorey	6
Betula pendula, Canopy	5
Dryopteris dilatata	5
Poa trivialis	5
Alnus glutinosa, Canopy	2
Chamaenerion angustifolium	2
Moss sp.	2
Rubus fruticosus agg.	2

TableFit Results

W 6	34		76	53	19	41		Aln glut-Urtic dio wood	
OV27c	32		78	49	25	27		Chamerion tall herb	Rub fru-Dry dil

Compartment 36a

Band of wet woodland through centre of compartment 36 with mature oaks, elders, willows and ephemeral pools. Much standing deadwood and open areas of marshy grassland. Some areas of standing water. Ponds a continuation of wet areas in the wood.

<i>Carex sp.</i>	Sedge species	D
<i>Epilobium sp.</i>	Willowherb species	A
<i>Iris pseudacorus</i>	Yellow Flag Iris	R
<i>Betula pendula</i>	Silver Birch	
<i>Impatiens glandulifera</i>	Himalayan Balsam	
<i>Juncus effusus</i>	Soft Rush	
<i>Lemna minor</i>	Common Duckweed	
<i>Ranunculus repens</i>	Creeping Buttercup	
<i>Salix cinerea</i>	Grey Willow	
<i>Salix fragilis</i>	Crack Willow	
<i>Solanum dulcamara</i>	Bittersweet	
<i>Urtica dioica</i>	Nettle	

Tablefit results by Compartment

W 6	48		79	41	68	50	Aln glut-Urtic dio wood
W 6a	38		72	42	51	38	Aln glut-Urtic dio wood Typical
W 7	33		37	43	52	56	Aln glu-Fra exc-Lys nem
W 5a	32		40	49	54	40	Alnus gl-Carex panicul Phragmit austr

Tablefit results by Quadrat**Quadrat 1****Species List**

Carex sp.	8
Salix cinerea, Understorey	7
Alnus glutinosa, Canopy	6
Quercus robur, Canopy	6
Salix fragilis, Canopy	6
Juncus effusus	5
Urtica dioica	5
Cardamine flexuosa	4
Epilobium montanum	4
Galium aparine	3
Lythrum salicaria	3
Solanum dulcamara	3
Impatiens glandulifera	2
Lycopus europaeus	1

TableFit Results

W 6	37		89	41	39	40	Aln glut-Urtic dio wood
W 6a	34		83	44	31	32	Aln glut-Urtic dio wood Typical
W 6b	30		68	44	28	32	Aln glut-Urtic dio wood Salix fragilis
W 6d	23		53	37	24	33	Aln glut-Urtic dio wood Sambucus nigra

Quadrat 2**Species List**

Alnus glutinosa, Canopy	6
Quercus robur, Canopy	6
Betula pubescens, Understorey	5
Juncus effusus	5
Salix fragilis, Canopy	5
Urtica dioica	5
Cardamine flexuosa	4
Epilobium montanum	4

Lythrum salicaria	4
Salix caprea, Canopy	4
Salix cinerea, Understorey	4
Galium aparine	3
Solanum dulcamara	3
Iris pseudacorus	2
Stachys sylvatica	2
Dryopteris dilatata	1
Lycopus europaeus	1

TableFit Results

W 6	40		100	40	43	39	Aln glut-Urtic dio wood	
W 6b	30		75	41	28	30	Aln glut-Urtic dio wood	Salix fragilis
W 5b	28		42	61	31	41	Alnus gl-Carex panicul	Lysim vulgaris

Quadrat 3

Species List

Betula pubescens, Canopy	8
Betula pubescens, Understorey	8
Juncus effusus	8
Quercus robur, Canopy	7
Salix cinerea, Understorey	7
Urtica dioica	7
Epilobium montanum	5
Cardamine flexuosa	4
Ceratocarpus claviculata	4
Impatiens glandulifera	4
Ranunculus repens	4
Galium aparine	3
Lythrum salicaria	3

TableFit Results

W 6	32		68	35	46	35	Aln glut-Urtic dio wood	
W 2	29		47	34	46	43	Sal cin-Bet pub-Phr aus	
W 7	26		35	42	46	39	Aln glu-Fra exc-Lys nem	
W 4	26		68	27	38	36	Bet pubesc-Molinia wood	
W 1	24		71	34	25	28	Salix cin-Gal palu wood	

Quadrat 4

Species List

Salix cinerea, Understorey	8
Alnus glutinosa, Canopy	7
Juncus effusus	7
Quercus robur, Canopy	7
Urtica dioica	5
Cardamine flexuosa	4
Epilobium montanum	4
Lythrum salicaria	4
Solanum dulcamara	4
Galium aparine	3
Iris pseudacorus	1

TableFit Results

W 6	47		89	53	43	52	Aln glut-Urtic dio wood	
W 6a	42		83	57	34	41	Aln glut-Urtic dio wood	Typical
W 6b	41		73	60	32	42	Aln glut-Urtic dio wood	Salix fragilis
W 5a	29		46	63	25	45	Alnus gl-Carex panicul	Phragmit austr

Quadrat 5

Species List

Alnus glutinosa, Canopy	9
Epilobium montanum	7

Juncus effusus	7
Cardamine flexuosa	3
Solanum dulcamara	3
Iris pseudacorus	2
Ranunculus repens	2

TableFit Results

MG10c 26 | 46 62 23 36| Holc lana-Junc effusus Iris pseudacor
W 7 25 | 31 64 26 65| Aln glu-Fra exc-Lys nem
W 7b 24 | 34 77 19 64| Aln glu-Fra exc-Lys nem Car rem-Cir

Compartment 44 and 68

Area of wet woodland dominated by mature alders with English Oak. Open character.

<i>Alnus glutinosa</i>	Alder	D
<i>Dryopteris dilatata</i>	Broad Buckler-fern	A
<i>Rubus fruticosus agg.</i>	Bramble	A
<i>Quercus robur</i>	English Oak	F
<i>Acer pseudoplatanus</i>	Sycamore	O
<i>Chamaenerion angustifolium</i>	Rosebay Willowherb	O
<i>Epilobium montanum</i>	Broad-leaved Willowherb	O
<i>Holcus lanatus</i>	Yorkshire-fog	O
<i>Ranunculus repens</i>	Creeping Buttercup	O
<i>Silene dioica</i>	Red Campion	O
<i>Urtica dioica</i>	Nettle	O
<i>Cardamine flexuosa</i>	Wavy Bitter-cress	R
<i>Ceratocarpus claviculata</i>	Climbing Corydalis	R
<i>Crataegus monogyna</i>	Hawthorn	R
<i>Fraxinus excelsior</i>	Ash	R
<i>Hyacinthoides x massartiana</i>	Hybrid Bluebell	R
<i>Impatiens glandulifera</i>	Himalayan Balsam	R
<i>Juncus effusus</i>	Soft Rush	R
<i>Salix fragilis</i>	Crack Willow	R
<i>Sorbus aucuparia</i>	Rowan	R

Tablefit results by Compartment

W 6 53 | 66 54 59 70| Aln glut-Urtic dio wood
W 6d 42 | 52 68 44 64| Aln glut-Urtic dio wood Sambucus nigra
W 5b 42 | 21 70 66 81| Alnus gl-Carex panicul Lysim vulgaris
W 5 38 | 26 61 59 72| Alnus gl-Carex panicul
OV27c 37 | 69 51 35 40| Chamerion tall herb Rub fru-Dry dil

Tablefit results by Quadrat

Quadrat 1

Species List

Alnus glutinosa, Canopy	8
Dryopteris dilatata	7
Quercus robur, Canopy	6
Rubus fruticosus agg.	5
Acer pseudoplatanus,	4
Moss sp.	3
Chamaenerion angustifolium	2
Betula pubescens, Understorey	1
Hedera helix	1
Salix cinerea, Understorey	1

TableFit Results

OV27c 40 | 88 49 38 37| Chamerion tall herb Rub fru-Dry dil
W 4a 39 | 80 64 17 43| Bet pubesc-Molinia wood Dry dil-Run fru

W 6 37 | 76 47 29 50| Aln glut-Urtic dio wood

Quadrat 2

Species List

Alnus glutinosa, Canopy	8
Dryopteris dilatata	8
Quercus robur, Canopy	6
Rubus fruticosus agg.	4
Moss sp.	3

TableFit Results

W 6 32 51 63 23 62 Aln glut-Urtic dio wood	
W10 28 49 71 13 60 Que rob-Pte aqu-Rub fru	
OV27c 27 43 54 32 39 Chamerion tall herb	Rub fru-Dry dil
W10a 25 47 68 12 49 Que rob-Pte aqu-Rub fru	Typical

Quadrat 3

Species List

Alnus glutinosa, Canopy	8
Dryopteris dilatata	8
Quercus robur, Canopy	6
Rubus fruticosus agg.	6
Sambucus nigra, Understorey	4
Moss sp.	3

TableFit Results

W 6 44 68 70 28 68 Aln glut-Urtic dio wood	
W 6d 35 52 86 21 70 Aln glut-Urtic dio wood	Sambucus nigra
W10 26 49 59 15 56 Que rob-Pte aqu-Rub fru	
OV27c 26 43 45 35 37 Chamerion tall herb	Rub fru-Dry

Quadrat 4

Species List

Alnus glutinosa, Canopy	8
Dryopteris dilatata	8
Quercus robur, Canopy	5
Moss sp.	4
Ceratocarpus claviculata	3
Chamaenerion angustifolium	3
Holcus lanatus	3
Rubus fruticosus agg.	1
Sambucus nigra, Understorey	1

TableFit Results

OV27c 41 88 54 35 37 Chamerion tall herb	Rub fru-Dry dil
W 6 30 68 47 18 44 Aln glut-Urtic dio wood	
OV27a 26 70 44 15 21 Chamerion tall herb	Hol lan-Fes ovi

Quadrat 5

Species List

Alnus glutinosa, Canopy	7
Dryopteris dilatata	7
Quercus robur, Canopy	7
Rubus fruticosus agg.	7
Moss sp.	4
Sambucus nigra, Understorey	4
Silene dioica	2
Chamaenerion angustifolium	1

TableFit Results

OV27c 40 78 55 35 37 Chamerion tall herb	Rub fru-Dry dil
W 6 38 68 53 28 57 Aln glut-Urtic dio wood	

Compartment 74

Semi-mature young oak woodland with occasional alder and silver birch. Understorey includes occasional scattered hawthorn, elder and sycamore. Ground flora includes rosebay willowherb and dominant broad buckler fern. Bare ground with leaf litter and branch debris also abundant.

<i>Acer pseudoplatanus</i>	Sycamore	O
<i>Alnus glutinosa</i>	Alder	O
<i>Betula pendula</i>	Silver Birch	O
<i>Chamaenerion angustifolium</i>	Rosebay Willowherb	O
<i>Crataegus monogyna</i>	Hawthorn	O
<i>Dryopteris dilatata</i>	Broad Buckler-fern	O
<i>Ilex aquifolium</i>	Holly	O
<i>Rubus fruticosus</i> agg.	Bramble	O
<i>Sambucus nigra</i>	Elder	O
<i>Hyacinthoides</i> sp.	Bluebell species	R

Tablefit results by Compartment

OV27c	45 65	61	71	31	Chamerion tall herb	Rub fru-Dry dil
W10	30 42	61	24	90	Que rob-Pte aqu-Rub fru	
OV27	21 61	28	48	16	Chamerion tall herb	
W10a	18 31	50	17	55	Que rob-Pte aqu-Rub fru	Typical
W 8d	18 25	50	20	68	Fra exc-Ace cam-Mer per	Hedera helix

Tablefit results by Quadrat

Quadrat 1

Species List

Bare Ground	10
Quercus robur, Canopy	10
Chamaenerion angustifolium	5
Crataegus monogyna,	5
Dryopteris dilatata	5
Ilex aquifolium	1

TableFit Results

OV27c	38 65	61	30	44	Chamerion tall herb	Rub fru-Dry dil
W10	24 42	61	14	66	Que rob-Pte aqu-Rub fru	
OV27	17 61	28	15	22	Chamerion tall herb	
W10a	16 31	50	12	44	Que rob-Pte aqu-Rub fru	Typical

APPENDIX B: Quadrat Data and TABLEFIT Explanation

Quadrat Data and TABLEFIT Explanation

- 1.1 When recording and analysing vegetation there are two significant properties of the vegetation types that help define the different communities and sub-communities. Firstly there is abundance, this refers to the dominance of any particular plant within a stand, that is to say the proportion of ground that the plant occupies. For the purposes of NVC analysis the cover abundance is recorded using the Domin scale, where Domin is an abbreviation of dominance. The scale runs from 1, where there may be only one or two individuals in any given sample area to 10 where the dominant species may well occupy 100 % of the plot; as, for example, Common Reed in a dense reedbed. The full scale is as follows:

Percentage cover		Domin value
91 -100%		10
76 - 90%		9
51 - 75%		8
34 - 50%		7
26 - 33%		6
11 - 25%		5
4 - 10%		4
	Many individuals	3
< 4%	Several individuals	2
	Few individuals	1

- 1.2 These percentage bands give an approximation of the abundance of each species in a quadrat in the field. Whilst it is frequent for the upper limits of each band to exceed 100% when the score for each plant is accumulated, especially in layered vegetation such as woodlands, the total upper percentage cannot be less than 100% unless other features such as bare ground, leaf litter or open water are recorded, a quick calculation in the field prevents species being under-recorded.
- 1.3 The second way that plant species can make their presence felt in any NVC community is by frequency, also known as constancy. Common Reed is expected to be dominant in a set of reedbed samples and it is also very likely to be constant; that is occurring in a high percentage of the samples. On the other hand a species such as Hemp Agrimony often occurs with reeds and can be at very low levels of abundance. It is quite possible for Hemp Agrimony to be present at a Domin level of 2 in eight out of ten reedbed samples. In this case Hemp Agrimony (occurring in 80% of the samples) would also be a constant species, that is to say it is almost as equally frequent as Common Reed, although nowhere near as abundant. The combinations of abundance and frequency are used to define NVC communities and in this case reedbeds with constant Hemp Agrimony would more likely be S26 type than S4 which is more of a

reed monoculture. The definitions of frequency are as follows, depending on what percentage of samples a particular species is recorded in:

Percentage occurrence	Description	Frequency Class
81 -100%	Constant	V
61 - 80%	Constant	IV
41 - 60%	Frequent	III
21 - 40%	Occasional	II
1 -20%	Scarce	I

- 1.4 In the NVC floristic tables, published for every vegetation community and sub-community described in the National Vegetation Classification, the frequency is always expressed at a Roman numeral (from **I -V**) with the range of dominances recorded (Domin 1 -10) expressed in Arabic numerals, say (7 - 9) for a more dominant species and (1 - 2) for a much less dominant species. In recognising many NVC communities the frequency of a species can be just as significant as the dominance.
- 1.5 When entering data into TABLEFIT, or other similar programmes such as MATCH, MAVIS or TURBOVEG, it usually only the Domin levels of each species that are known, the frequency can then be worked out once a full dataset has been entered; how this is done varies from programme to programme. It is possible to work out frequency values for each species in advance of allocating NVC types if so desired. In that case the manual dichotomous keys in each of the five volumes of the NVC can be utilised, having first drawn up floristic tables specific to the site to compare with the floristic tables nationally.
- 1.6 **TABLEFIT** version 1.0 is a tried and tested vegetation analysis programme compiled by Dr Mark Hill of the Institute of Terrestrial Ecology in 1996. **TABLEFIT** has been adopted as standard by TEP ecologists. When NVC samples have been collected, using the approved methodology, the species and Domin data are entered and the programme makes an objective analysis of which vegetation community it most closely matches. However, as the 2000 review of the NVC shows, the classification system is still evolving to some extent and there are some communities that occur in the British Isles that have not yet been classified, this has an effect on the accuracy of some of the output and it is very frequent, for example, for inland grasslands dominated by Red Fescue to be spuriously analysed as Maritime Grasslands even though far from any coastal influence. Therefore, the **TABLEFIT** output needs to be interpreted carefully, especially when the goodness-of-fit rating descends to Fair or lower (Poor and Very Poor). Whilst the **TABLEFIT** output is always useful as a guide, the manual keys, the community descriptions and the floristic tables are just as useful and they should all be used together to help an experienced ecologist make the best interpretation.

- 1.7 The **TABLEFIT** goodness-of-fit rating can range from 0 to 100, with increasing closeness of fit with ascending scores, the ratings are as follows:

Goodness-of-fit	Rating
80 - 100	Very good
70 - 79	Good
60 - 69	Fair
50 - 59	Poor
0 - 49	Very poor

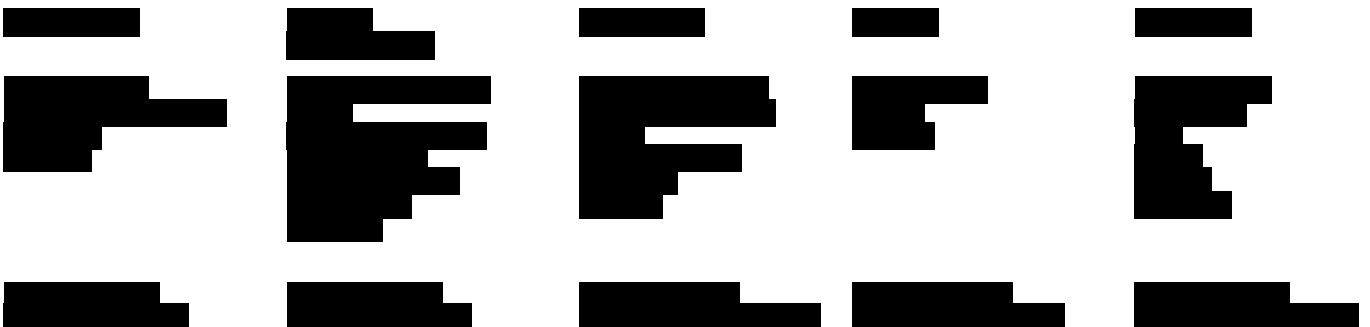
- 1.8 Even when a very good rating is indicated it is always worth checking through the community descriptions and floristic tables to double check, but these higher ratings are more often than not accurate and provide a very useful tool in helping to identify NVC community types.
- 1.9 However there are many instances where the top rating of the five best fits should not simply be accepted, in some cases different communities have very similar scores or the scores are simply too low to give any confidence. There are many factors involved: there may well be zones of transition between communities that have been sampled, or in the case of many sites that we are called on to survey, the vegetation is still simply too young to have developed fully into one of the semi-natural community types that the NVC was designed to define. **TABLEFIT** analysis can be very useful in recognising different communities in transition and sometimes a transitional type is identified and mapped as such. Many samples of developing vegetation simply cannot be identified to sub-community level and are allocated as undifferentiated communities with no sub-community suffix. The experience of the ecological surveyors is important as they will be able to balance the dominant and frequent species recorded from site and compare various floristic tables and descriptions to arrive at logical conclusions.
- 1.10 The **TABLEFIT** output indicates the NVC community type of the top five matches in the first column, the second column then gives the overall 'goodness-of-fit' rating, this is not a percentage but a classification derived from the average of four individual values that are also included in the output table.
- 1.11 The first column of these four values relates to the fit of the species composition of each sample with the NVC data nationally, but with increased weighting for the species with higher frequency values (**III-V**).
- 1.12 The second column is the mean constancy of species in the sample, as a proportion of what would be expected for each community. For species-poor sample this column 2 number tends to be low, but column 1 value would be high.

- 1.13 In the third column the figures represent dominance satisfaction, that is to say it checks that species that are expected to have a high Domin value in that community do in fact fulfil that characteristic. This number can be high in samples with a single dominant where that species is present at high Domin levels.
- 1.14 For the final column the species are weighted by the 0.75 power of their cover value to give a weighted mean constancy

TABLEFIT carries out all these background calculations and leaves us with simply the 'goodness-of-fit' value to help with interpretation of the field data.

DRAWINGS

Drawing 1 – G6929.01.054 Woodland NVC Survey



APPENDIX G: Grassland NVC Survey Appendix



PORT WARRINGTON

MOORE

**GRASSLAND NATIONAL VEGETATION
CLASSIFICATION SURVEY**



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1.0 Introduction

- 2.1 National Vegetation Classification (NVC) surveys were undertaken within areas of grassland habitat across the Port Warrington site. NVC surveys assist with analysing species composition within habitats to provide further understanding of vegetation communities present on site and inform mitigation.
- 2.2 Details of the extended Phase 1 habitat survey undertaken across the site are provided in the TEP Technical Report 6929.01.026. Parcel and quadrat locations are shown on drawing G6929.01.053.

2.0 Methods

- 3.1 In order to gain an understanding of the potential impacts on grassland habitats at the site all areas of grassland were target noted in detail (see the Phase 1 habitat survey technical report for target notes) and the areas of more diverse grassland were subject to an NVC survey. These areas were walked over by an experienced botanist to make a provisional assessment of the boundaries of different vegetation types (as defined by the National Vegetation Classification system (Rodwell, 1991-2000 and 2006) forming a series of provisional zones, or parcels.
- 3.2 Within each provisional zone, the vegetation was sampled using quadrats for grassland of the recommended size (2m x 2m) according to standard NVC methodology (Rodwell, 2006). Each quadrat was recorded in the field by listing all plants within it along with the abundance of each species and the percentage cover of any bare ground or leaf litter using the Domin scale of abundance. Sufficient quadrats were recorded so as to include all community types occurring within each surveyed area and to allow a robust statistical analysis of the data. A search was made for any nationally or locally notable plant species, including protected species or those listed on Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.
- 3.3 The survey was undertaken by experienced botanists during July and August 2019 when grassland vegetation would be visible.
- 3.4 Quadrat data was analysed using the computer program TABLEFIT to establish the “goodness of fit” to the NVC community types. The output results from TABLEFIT analysis of the quadrats has been analysed by experienced botanists to assess which vegetation types, as defined by the NVC, are represented.

3.0 Results

- 3.1 The raw quadrat data and TABLEFIT analysis for each quadrat is presented in Appendix A including an explanatory note regarding quadrat data and TABLEFIT analysis. Parcel locations are detailed in Drawing G6929.01.053.
- 3.2 A summary of the best fit NVC community for each grassland parcel and a description of the NVC communities present is provided in Table 1 below.

Table 1: Summary of best fit NVC communities – per parcel

Parcel number	NVC community (closest match)	NVC community description (closest match)	Goodness-of-fit
1	U1d	<i>Anthoxanthum odoratum</i> – <i>Lotus corniculatus</i> sub community of <i>Festuca ovina</i> - <i>Agrostris capillaris</i> - <i>Rumex acetosella</i> grassland	33 (Very poor)
2	OV39	<i>Asplenium trichomanes</i> - <i>Asplenium ruta-muraria</i> community	17 (Very poor)
3	MG5b	<i>Galium verum</i> sub-community of <i>Cynosurus cristatus</i> – <i>Centaurea nigra</i> grassland	26 (Very Poor)
4	W24a	<i>Galium verum</i> sub community of <i>Rubus fruticosus</i> - <i>Holcus lanatus</i> underscrub	16 (Very poor)
5	U1d	<i>Anthoxanthum odoratum</i> – <i>Lotus corniculatus</i> sub community of <i>Festuca ovina</i> - <i>Agrostris capillaris</i> - <i>Rumex acetosella</i> grassland	12 (Very poor)
6	MC9c	<i>Achillea millefolia</i> subcommunity of <i>Festuca rubra</i> - <i>Holcus lanatus</i> maritime grassland	25 (Very poor)
7	MC9c	<i>Achillea millefolia</i> subcommunity of <i>Festuca rubra</i> - <i>Holcus lanatus</i> maritime grassland	47 (Very poor)

- 3.3 When the quadrats were analysed together for each parcel, the grassland vegetation communities sampled during the survey were found to have a very poor goodness-of-fit to any semi-natural community type as defined by the NVC (Table 1). However when the goodness-of-fit of individual quadrats was looked at, a number of the

quadrats were found to have a much closer affinity for recognised NVC communities (Table 2).

Table 2: Summary of best fit NVC communities – per quadrat

Parcel number	Quadrat number	NVC community (closest match)	NVC community description (closest match)	Goodness-of-fit
1	1	CG10b	Carex pulicaris-Carex panacea sub-community of Festuca ovina-Agrostris capillaris-Thymus praecox grassland	37 (Very poor)
	2	U1b	Typical sub-community of Festuca ovina - Agrostris capillaris - Rumex acetosella grassland	44 (Very poor)
	3	U1d	Anthoxanthum odoratum – Lotus corniculatus sub community of Festuca ovina - Agrostris capillaris - Rumex acetosella grassland	36 (Very poor)
	4	U1d	Anthoxanthum odoratum – Lotus corniculatus sub community of Festuca ovina - Agrostris capillaris - Rumex acetosella grassland	33 (Very poor)
	5	U1d	Anthoxanthum odoratum – Lotus corniculatus sub community of Festuca ovina - Agrostris capillaris - Rumex acetosella grassland	34 (Very poor)
2	1	U1c	Erodium cicutarium-Teesdalia nudicaulis sub-community of Festuca ovina - Agrostris capillaris - Rumex acetosella grassland	38 (Very poor)
	2	U1d	Anthoxanthum odoratum – Lotus corniculatus sub community of Festuca ovina -	41 (Very poor)

Parcel number	Quadrat number	NVC community (closest match)	NVC community description (closest match)	Goodness-of-fit
			Agrostris capillaris - Rumex acetosella grassland	
	3	U1d	Anthoxanthum odoratum – Lotus corniculatus sub community of Festuca ovina - Agrostris capillaris - Rumex acetosella grassland	53 (Poor)
	4	U1c	Erodium cicutarium-Teesdalia nudicaulis sub-community of Festuca ovina - Agrostris capillaris - Rumex acetosella grassland	31 (Very poor)
	5	U1d	Anthoxanthum odoratum – Lotus corniculatus sub community of Festuca ovina - Agrostris capillaris - Rumex acetosella grassland	34 (Very poor)
3	1	MG5b	Galium verum sub-community of Cynosurus cristatus – Centaurea nigra grassland	49 (Very poor)
	2	MC9c	Achillea millefolia subcommunity of Festuca rubra - Holcus lanatus maritime grassland	48 (Very poor)
	3	MG5	Cynosurus cristatus – Centaurea nigra grassland	40 (Very poor)
4	1	MG11	Festuca rubra-Agrostis stolonifera-Potentilla anserina grassland	41 (Very poor)
	2	W24a	Galium verum sub community of Rubus fruticosus - Holcus lanatus underscrub	63 (Fair)
	3	W24	Rubus fruticosus - Holcus lanatus underscrub	44 (Very poor)
5	1	U1d	Anthoxanthum odoratum – Lotus corniculatus sub community of Festuca ovina -	41 (Very poor)

Parcel number	Quadrat number	NVC community (closest match)	NVC community description (closest match)	Goodness-of-fit
			Agrostris capillaris - Rumex acetosella grassland	
	2	U1d	Anthoxanthum odoratum – Lotus corniculatus sub community of Festuca ovina - Agrostris capillaris - Rumex acetosella grassland	20 (Very poor)
	3	W24a	Galium verum sub community of Rubus fruticosus - Holcus lanatus underscrub	18 (Very poor)
	4	U4b	Holcus lanatus – Trifolium repens subcommunity of Festuca ovina - Agrostris capillaris - Galium saxatile grassland	25 (Very poor)
	5	MC5	Armeria maritima-Cerastium diffusum ssp. diffusum maritime therophyte community	7 (Very poor)
	6	U1d	Anthoxanthum odoratum – Lotus corniculatus sub community of Festuca ovina - Agrostris capillaris - Rumex acetosella grassland	24 (Very poor)
6	1	MC9c	Achillea millefolia subcommunity of Festuca rubra - Holcus lanatus maritime grassland	40 (Very poor)
	2	MC9c	Achillea millefolia subcommunity of Festuca rubra - Holcus lanatus maritime grassland	69 (Fair)
	3	MC9c	Achillea millefolia subcommunity of Festuca rubra - Holcus lanatus maritime grassland	65 (Fair)

Parcel number	Quadrat number	NVC community (closest match)	NVC community description (closest match)	Goodness-of-fit
7	1	MC9c	Achillea millefolia subcommunity of Festuca rubra - Holcus lanatus maritime grassland	65 (Fair)
	2	MC9c	Achillea millefolia subcommunity of Festuca rubra - Holcus lanatus maritime grassland	81 (Very good)
	3	SD8a	Typical subcommunity of Festuca rubra-Galium verum fixed dune grassland	72 (Good)
	4	MC11	Festuca rubra-Daucus carota ssp. gummifer maritime grassland	60 (Fair)
	5	MC9c	Achillea millefolia subcommunity of Festuca rubra - Holcus lanatus maritime grassland	60 (Fair)

- 3.4 Parcels 1 and 2 were historically recorded as an inland sand dune grassland community however neither the parcel as a whole or the individual quadrats have more than a 'poor' goodness-of-fit to any NVC community. The parcels' individual quadrats have the closest affinity to various sub-communities of U1 - *Festuca ovina* - *Agrostis capillaris* - *Rumex acetosella* calcifugous (acid) grassland community.
- 3.5 The grassland in Parcel 5 is similar in appearance to Parcels 1 and 2, with short, sparse, rabbit grazed vegetation and a sandy soil composition. The vegetation here is a mosaic of grassland, bare ground and tall ruderal herb, with scrub encroaching around the margins and marshier vegetation towards the ponds. As with Parcels 1 and 2, neither the individual quadrats nor the parcel as a whole has a strong affinity to any particular vegetation community, however, three of the six quadrats showed the best goodness-of-fit to U1 - the *Festuca ovina* - *Agrostis capillaris* - *Rumex acetosella* calcifugous grassland community.
- 3.6 Parcel 3 is an area of grassland with a tall sward, overlooked by a bird hide on the bund between the two easternmost lakes. This grassland appears to have been

seeded and is diverse, although does not have an affinity for any semi-natural vegetation community, but closest match (although very poor) is MG5b *Galium verum* sub-community of *Cynosurus cristatus* – *Centaurea nigra* grassland, as shown in Table 1

- 3.7 Parcel 4 is an area of tall vegetation at the western end of Bird’s Foot Trefoil meadow. This area is adjacent to Parcel 6 and appears to be a less diverse, possible more unmanaged version of the community at Parcel 6. It has no affinity with any semi-natural vegetation type, but the closest match (although very poor) is W24a - *Galium verum* sub community of *Rubus fruticosus* - *Holcus lanatus underscrub*, as shown in Table 1.
- 3.8 Although Parcel 7 showed a very poor goodness of fit to MC9c - the *Achillea millefolia* subcommunity of *Festuca rubra* - *Holcus lanatus* maritime grassland, each of the individual quadrats had a ‘fair’, ‘good’ or ‘very good’ affinity with maritime grassland communities, mostly the *Achillea millefolia* subcommunity of *Festuca rubra* - *Holcus lanatus* maritime grassland. Parcel 7 is known to have been seeded with a grassland mix after the topsoil had been inverted approximately 10 years ago. It appears that the subsoil was sandy in composition and has led to the development of a community which most closely resembles a maritime habitat.
- 3.9 Similar to Parcel 7, Parcel 6 (Bird’s Foot Trefoil Meadow) overall had a ‘very poor’ affinity with MC9c - the *Achillea millefolia* subcommunity of *Festuca rubra* - *Holcus lanatus* maritime grassland, but two out of three of the quadrats sampled had a ‘fair’ goodness of fit to this same NVC community.

4.0 Conclusions

- 5.1 The low goodness of fit to any particular vegetation community is likely to be due to a range of factors. The variation between the quadrats within each parcel suggests patchy or mosaic habitats. In some cases this is due to spatial variations in stages of vegetation succession; most of the areas of grassland were more scrubby around the margins. The encroachment of scrub is likely to be leading to deterioration of the grassland quality. Much of the site is heavily influenced by anthropogenic disturbance, certain areas are criss-crossed by paths and are subject to eutrophication from dog waste. As the site was previously a sand quarry, at least some of the parcels sampled may be relatively young habitats that have not yet stabilised into a particular vegetation community.
- 5.2 Parcels 1 and 2 were historically recorded as an inland sand dune grassland habitat. Anecdotally, the grassland in this area has suffered from unsuccessful and heavy-handed attempts to manage the scrub which is colonising the habitat. This may be the reason that the grassland does not currently have a strong affinity with any semi-natural grassland community.

- 5.3 None of the grassland areas surveyed are protected under Annex 1 of the the Habitats Directive (2017), but parcels 1, 2, 5, 6 and 7 would qualify as lowland acid grassland which is listed as a priority habitat under Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006). All of the Parcels selected for NVC survey are particularly diverse and provide a variety of niches for a range of invertebrates and other animals.

5.0 Recommendations

- 5.4 It is recommended that all of the grassland in the parcels surveyed should be retained or translocated if necessary. These areas should be protected through maintenance of current hydrology and fencing to prevent encroachment by machinery and vehicles. They should also be enhanced through a combination of the measures outlined below. It may also be appropriate to fence some areas during the operation phase of development to protect them from encroachment.
- 5.5 All parcels of grassland surveyed have the potential to be enhanced and managed to improve their biodiversity interest, through measures such as scrub control, reduction of nutrient load from animal waste, seeding or plug planting with locally appropriate grassland species and implementing a management regime which supports biodiversity. This may include measures such as scrub control in certain areas and mowing in late summer after plants have set seed.

6.0 References

Joint Nature Conservation Committee (1992) British Plant Communities Volume 3: Grasslands and Montane Communities. Cambridge University Press, Cambridge.

Joint Nature Conservation Committee (2000) British Plant Communities Volume 5: Maritime Communities and Vegetation of Open Habitats. Cambridge University Press, Cambridge.

Rodwell, J S (2006) National Vegetation Classification: Users' Handbook. Joint Nature Conservation Committee, Peterborough.



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APPENDIX A

NVC Survey Data and TABLEFIT Analysis

Parcel 1

(Target Note 69)

Parcel Species List

KEY - D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

"Inland sand dune grassland" Parcel to south-west of tracks. Very flat with scattered pine trees and regenerating birch. Areas of bare sandy soil where rabbits have been digging.

<i>Betula pubescens</i>	Downy Birch	F
<i>Holcus lanatus</i>	Yorkshire-fog	F
<i>Pinus sp.</i>	Pine species	F
<i>Centaureum erythraea</i>	Common Centaury	O
<i>Cerastium fontanum</i>	Common Mouse-ear	O
<i>Cirsium arvense</i>	Creeping Thistle	O
<i>Epilobium montanum</i>	Broad-leaved Willowherb	O
<i>Hypericum perforatum</i>	Perforate St John's-wort	O
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	O
<i>Peltigera canina</i>	Dog Lichen	O
<i>Plantago lanceolata</i>	Ribwort Plantain	O
<i>Potentilla erecta</i>	Tormentil	O
<i>Prunella vulgaris</i>	Selfheal	O
<i>Ranunculus repens</i>	Creeping Buttercup	O
<i>Rubus fruticosus agg.</i>	Bramble	O
<i>Sagina procumbens</i>	Procumbent Pearlwort	O
<i>Trifolium dubium</i>	Lesser Trefoil	O
<i>Carex hirta</i>	Hairy Sedge	R
<i>Carex leporina</i>	Oval Sedge	R
<i>Cirsium palustre</i>	Marsh Thistle	R
<i>Crepis capillaris</i>	Smooth Hawk's-beard	R
<i>Epipactis helleborine</i>	Broad-leaved Helleborine	R
<i>Geranium dissectum</i>	Cut-leaved Cranesbill	R
<i>Juncus inflexus</i>	Hard Rush	R
<i>Logfia minima</i>	Lesser Cudweed	R
<i>Logfia minima</i>	Small Cudweed	R
<i>Oenothera sp.</i>	Evening-primrose species	R
<i>Persicaria maculosa</i>	Redshank	R
<i>Pilosella officinarum</i>	Mouse-ear Hawkweed	R
<i>Quercus cerris</i>	Turkey Oak	R
<i>Quercus robur</i>	English Oak	R
<i>Reseda luteola</i>	Weld	R
<i>Rumex acetosella</i>	Sheep's Sorrel	R
<i>Sonchus asper</i>	Prickly Sow-thistle	R
<i>Trifolium arvense</i>	Hare's-foot Clover	R
<i>Veronica arvensis</i>	Wall Speedwell	R
<i>Viola arvensis</i>	Field Pansy	R

Tablefit results by parcel

U 1d 33 | 44 27 52 64| Fes ovi-Agr cap-Rum ac| Ant odo-Lot cor
 U 1b 30 | 60 21 46 58| Fes ovi-Agr cap-Rum ac| Typical
 U 1c 30 | 30 29 52 64| Fes ovi-Agr cap-Rum ac| Ero cic-Tee nud
 U 1 29 | 54 24 42 61| Fes ovi-Agr cap-Rum ac|

U 1a 25 | 27 14 53 59| Fes ovi-Agr cap-Rum acl Cor acu-Cla arb

Tablefit results by quadrat

Quadrat 1

Species List

Festuca ovina	8
Agrostis capillaris	4
Bare Ground	4
Cirsium vulgare	4
Crepis capillaris	4
Myosotis sp.	4
Potentilla erecta	4
Prunella vulgaris	4
Rubus fruticosus agg.	4
Centaurium erythraea	3
Cerastium fontanum	3
Epilobium montanum	3
Festuca rubra	3
Holcus lanatus	3
Lotus pedunculatus	3
Sagina procumbens	3
Trifolium repens	3
Hypericum perforatum	2
Jacobaea vulgaris	2
Juncus effusus	2
Cirsium arvense	1
Erigeron canadensis	1
Hypochaeris radicata	1
Juncus sp.	1
Lysimachia arvensis	1
Ranunculus repens	1
Salix caprea	1
Veronica officinalis	1

TableFit Results

CG10b 37 | 38 31 70 54| Fest ovi-Agro cap-Thym Car pul-Car pan

CG10 35 | 45 32 56 57| Fest ovi-Agro cap-Thym

U 1b 33 | 69 15 97 37| Fes ovi-Agr cap-Rum acl Typical

U 4b 32 | 68 34 43 43| Fes ovi-Agr cap-Gal sax Hol lan-Tri

Quadrat 2

Species List

Festuca ovina	8
Betula pubescens	5
Prunella vulgaris	5
Agrostis capillaris	4
Bare Ground	4

Centaurium erythraea	3
Cerastium fontanum	3
Cladonia sp.	3
Crepis capillaris	3
Festuca rubra	3
Holcus lanatus	3
Jacobaea vulgaris	3
Sagina procumbens	3
Trifolium arvense	3
Cirsium arvense	2
Epilobium hirsutum	2
Juncus sp.	2
Lotus pedunculatus	2
Rumex acetosella	2
Sonchus asper	2
Trifolium campestre	2
Deschampsia cespitosa	1
Viola arvensis	1

TableFit Results

U 1b 44 | 88 25 98 44| Fes ovi-Agr cap-Rum acI Typical
 U 1 43 | 76 27 89 46| Fes ovi-Agr cap-Rum acI
 U 1d 43 | 61 29 81 51| Fes ovi-Agr cap-Rum acI Ant odo-Lot
 cor
 U 1c 40 | 47 34 76 50| Fes ovi-Agr cap-Rum acI Ero cic-Tee

Quadrat 3

Species List

Cladonia sp.	8
Festuca ovina	6
Bare Ground	4
Betula pubescens	4
Centaurium erythraea	4
Jacobaea vulgaris	4
Rumex acetosella	4
Epilobium montanum	3
Lotus corniculatus	3
Oenothera sp.	3
Prunella vulgaris	3
Ranunculus repens	2
Sagina procumbens	2
Trifolium arvense	2
Cirsium vulgare	1
Lysimachia arvensis	1
Myosotis discolor	1
Viola arvensis	1

TableFit Results

U 1d 36 | 48 30 89 40| Fes ovi-Agr cap-Rum acI Ant odo-Lot
 cor
 U 1 31 | 60 26 69 34| Fes ovi-Agr cap-Rum acI

U 1b 28 | 61 21 73 31| Fes ovi-Agr cap-Rum acl Typical
 U 1c 25 | 27 26 71 35| Fes ovi-Agr cap-Rum acl Ero cic-Tee

Quadrat 4

Species List

Epilobium montanum	6
Festuca ovina	6
Bare Ground	4
Betula pubescens	4
Sagina procumbens	4
Centaurium erythraea	3
Hypericum humifusum	3
Jacobaea vulgaris	3
Prunella vulgaris	3
Rubus fruticosus agg.	3
Holcus lanatus	2
Ranunculus repens	2
Rumex acetosella	2
Veronica officinalis	2
Viola arvensis	2
Cerastium fontanum	1
Cirsium arvense	1
Cirsium vulgare	1
Crepis capillaris	1
Pilosella officinarum	1

TableFit Results

U 1d 33 | 52 31 72 35| Fes ovi-Agr cap-Rum acl Ant odo-Lot
 cor
 U 1c 30 | 40 34 71 34| Fes ovi-Agr cap-Rum acl Ero cic-Tee
 nud
 U 1 30 | 66 26 60 32| Fes ovi-Agr cap-Rum acl

Quadrat 5

Species List

Festuca ovina	6
Bare Ground	5
Cladonia sp.	5
Lysimachia arvensis	4
Sagina procumbens	4
Betula pubescens	3
Centaurium erythraea	3
Cerastium fontanum	3
Cirsium vulgare	3
Epilobium montanum	3
Lotus corniculatus	3
Prunella vulgaris	3
Rubus fruticosus agg.	3
Rumex acetosella	3
Peltigera canina	2
Viola arvensis	2
Erigeron canadensis	1

Trifolium arvense

1

TableFit Results

U 1d 34 | 48 30 81 38| Fes ovi-Agr cap-Rum acl Ant odo-Lot
cor

U 1 31 | 60 26 65 34| Fes ovi-Agr cap-Rum acl

U 1b 28 | 61 21 71 30| Fes ovi-Agr cap-Rum acl Typical

U 1c 27 | 31 29 71 35| Fes ovi-Agr cap-Rum acl Ero cic-Tee

Parcel 2

(Target Note 70)

Parcel Species List

KEY - D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

"Inland sand dune grassland". Parcel to north-east of track. Flat with scattered pine trees and regenerating birch. Areas of bare sandy soil where rabbits have been digging. Grassland is much lusher with a taller sward and more birch regeneration at the northern end. Ground appears damper here.

<i>Festuca ovina</i>	Sheep's Fescue	A
		F
<i>Betula pubescens</i>	Downy Birch	F
<i>Holcus lanatus</i>	Yorkshire-fog	F
<i>Pinus sp.</i>	Pine species	F
<i>Cladonia sp.</i>	Cladonia species	O
<i>Crepis capillaris</i>	Smooth Hawk's-beard	O
<i>Epilobium montanum</i>	Broad-leaved Willowherb	O
<i>Juncus inflexus</i>	Hard Rush	O
<i>Logfia minima</i>	Lesser Cudweed	O
<i>Logfia minima</i>	Small Cudweed	O
<i>Potentilla anserina</i>	Silverweed	O
<i>Prunella vulgaris</i>	Selfheal	O
<i>Rubus fruticosus agg.</i>	Bramble	O
<i>Salix caprea</i>	Goat Willow	O
<i>Trifolium repens</i>	White Clover	O
<i>Cirsium palustre</i>	Marsh Thistle	R
<i>Dipsacus fullonum</i>	Teasel	R
<i>Dysenterica pulicaria</i>	Fleabane	R
<i>Filago germanica</i>	Common Cudweed	R
<i>Geranium dissectum</i>	Cut-leaved Cranesbill	R
<i>Hypericum humifusum</i>	Trailing St John's-wort	R
<i>Lysimachia arvensis</i>	Scarlet Pimpernel	R
<i>Lythrum salicaria</i>	Purple Loosestrife	R
<i>Myosotis discolor</i>	Changing Forget-me-not	R
<i>Ophrys apifera</i>	Bee Orchid	R
<i>Pilosella officinarum</i>	Mouse-ear Hawkweed	R
<i>Potentilla erecta</i>	Tormentil	R
<i>Sonchus asper</i>	Prickly Sow-thistle	R

<i>Trifolium arvense</i>	Hare's-foot Clover	R
<i>Trifolium campestre</i>	Hop Trefoil	R
<i>Veronica officinalis</i>	Heath Speedwell	R
<i>Viola arvensis</i>	Field Pansy	R

Tablefit results by parcel

OV39 17 | 4 5 48 47| Aspl tri-A ruta crevice
 U 1b 16 | 46 25 14 75| Fes ovi-Agr cap-Rum acI Typical
 OV37b 16 | 14 19 32 61| F ov-Min vern metI gras Ach mil-Eup off
 U 1d 16 | 33 32 15 80| Fes ovi-Agr cap-Rum acI Ant odo-Lot cor
 U 1c 16 | 27 40 16 80| Fes ovi-Agr cap-Rum acI Ero cic-Tee nud

Quadrat 1

Species List

Cladonia sp.	6
Festuca ovina	5
Prunella vulgaris	4
Agrostis capillaris	3
Crepis capillaris	3
Logfia minima	3
Moss sp.	3
Trifolium arvense	3
Cerastium fontanum	2
Holcus lanatus	2
Peltigera canina	2
Trifolium dubium	2
Ulex europaeus	2
Centaurium erythraea	1
Jacobaea vulgaris	1
Rumex acetosella	1

TableFit Results

U 1c 38 | 56 57 51 36| Fes ovi-Agr cap-Rum acI Ero cic-Tee nud
 U 1d 35 | 65 42 50 33| Fes ovi-Agr cap-Rum acI Ant odo-Lot cor
 U 1b 33 | 88 34 46 29| Fes ovi-Agr cap-Rum acI Typical

Quadrat 2

Species List

Festuca ovina	8
Betula pubescens	4
Centaurium erythraea	3
Cirsium arvense	3
Crepis capillaris	3
Holcus lanatus	3
Jacobaea vulgaris	3
Prunella vulgaris	3
Salix caprea	3
Trifolium arvense	3

Trifolium dubium	3
Cerastium fontanum	2
Festuca rubra	2
Trifolium repens	2
Cirsium vulgare	1
Hypericum perforatum	1
Plantago lanceolata	1

TableFit Results

U 1d 41 | 48 30 70 57| Fes ovi-Agr cap-Rum acI Ant odo-Lot
cor
 U 1c 40 | 37 35 71 57| Fes ovi-Agr cap-Rum acI Ero cic-Tee
nud
 U 1b 38 | 61 21 82 48| Fes ovi-Agr cap-Rum acI Typical

Quadrat 3

Species List

Festuca ovina	8
Cladonia sp.	6
Agrostis capillaris	3
Betula pubescens	3
Crepis capillaris	3
Epilobium montanum	3
Festuca rubra	3
Holcus lanatus	3
Peltigera canina	3
Rumex acetosella	3
Trifolium arvense	3
Cerastium fontanum	2
Sagina procumbens	2
Trifolium dubium	2
Cirsium arvense	1
Jacobaea vulgaris	1

TableFit Results

U 1d 53 | 65 42 82 59| Fes ovi-Agr cap-Rum acI Ant odo-Lot
cor
 U 1b 52 | 88 34 95 50| Fes ovi-Agr cap-Rum acI Typical
 U 1c 51 | 53 54 77 58| Fes ovi-Agr cap-Rum acI Ero cic-Tee
nud

Quadrat 4

Species List

Festuca ovina	7
Betula pubescens	4
Cladonia sp.	4
Potentilla erecta	4
Cerastium fontanum	3
Epilobium montanum	3
Peltigera canina	3

Prunella vulgaris	3
Centaurium erythraea	2
Crepis capillaris	2
Holcus lanatus	2
Logfia minima	2
Sagina procumbens	2
Trifolium arvense	2
Cirsium arvense	1
Dysenterica pulicaria	1
Geranium dissectum	1
Juncus effusus	1
Salix cinerea	1

TableFit Results

U 1c 31 | 27 23 72 49| Fes ovi-Agr cap-Rum acl Ero cic-Tee
nud
U 1d 29 | 32 17 68 47| Fes ovi-Agr cap-Rum acl Ant odo-Lot
cor
U 1b 28 | 37 11 83 41| Fes ovi-Agr cap-Rum acl Typical

Quadrat 5

Species List

Cladonia sp.	6
Festuca ovina	5
Rumex acetosella	4
Trifolium arvense	4
Agrostis capillaris	3
Epilobium montanum	3
Filago germanica	3
Logfia minima	3
Prunella vulgaris	3
Rubus fruticosus agg.	3
Betula pubescens	2
Carex hirta	2
Centaurium erythraea	2
Cerastium fontanum	2
Crepis capillaris	2
Hypericum humifusum	2
Lotus corniculatus	2
Lysimachia arvensis	1
Viola arvensis	1

TableFit Results

U 1d 34 | 57 31 65 37| Fes ovi-Agr cap-Rum acl Ant odo-Lot
cor
U 1 33 | 76 31 52 35| Fes ovi-Agr cap-Rum acl
U 1e 31 | 78 27 60 30| Fes ovi-Agr cap-Rum acl Gal sax-Pot
ere

Parcel 3

(Target Notes 71 and 40)

Roughly 10m bund dividing 2 lakes. Overlooked by hide. Grassland appears unmanaged with medium height sward.

Parcel Species List

KEY - D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

<i>Pilosella aurantiacum</i>	Orange Hawkweed	R
<i>Agrostis capillaris</i>	Common Bent	
<i>Aira caryophylla</i>	Silver hair-grass	
<i>Arrhenatherum elatius</i>	False Oat-grass	
<i>Betula pubescens</i>	Downy Birch	
<i>Carex hirta</i>	Hairy Sedge	
<i>Centaurium erythraea</i>	Common Centaury	
<i>Crepis capillaris</i>	Smooth Hawk's-beard	
<i>Cynosurus cristatus</i>	Crested Dog's-tail	
<i>Dysenterica pulicaria</i>	Fleabane	
<i>Epilobium montanum</i>	Broad-leaved Willowherb	
<i>Ervilla hirsuta</i>	Hairy Tare	
<i>Festuca rubra</i>	Red Fescue	
<i>Filago germanica</i>	Common Cudweed	
<i>Geranium dissectum</i>	Cut-leaved Cranesbill	
<i>Geranium molle</i>	Dove's-foot Cranesbill	
<i>Holcus lanatus</i>	Yorkshire-fog	
<i>Hypericum perforatum</i>	Perforate St John's-wort	
<i>Hypochaeris radicata</i>	Common Cat's-ear	
<i>Jacobaea vulgaris</i>	Common Ragwort	
<i>Juncus inflexus</i>	Hard Rush	
<i>Lysimachia punctata</i>	Dotted Loosetrife	
<i>Odontites verna</i>	Red Bartsia	
<i>Phragmites australis</i>	Reed	
<i>Pilosella officinarum</i>	Mouse-ear Hawkweed	
<i>Plantago lanceolata</i>	Ribwort Plantain	
<i>Prunella vulgaris</i>	Selfheal	
<i>Salix caprea</i>	Goat Willow	
<i>Tragopogon pratensis</i>	Goat's-beard	
<i>Trifolium dubium</i>	Lesser Trefoil	
<i>Trifolium medium</i>	Zigzag Clover	
<i>Trifolium pratense</i>	Red Clover	
<i>Trifolium repens</i>	White Clover	
<i>Ulex europaeus</i>	Gorse	
<i>Vicia cracca</i>	Tufted Vetch	

Tablefit results by parcel

MG 5b 26 | 30 66 27 94| Cynos cris-Centaur nigr Galium verum
 MG 5 25 | 33 69 21 100| Cynos cris-Centaur nigr
 MG 5a 25 | 32 69 20 100| Cynos cris-Centaur nigr Lath pratensis
 MC 9c 24 | 34 43 28 68| Fest rubra-Holcu lanat Achill millef

MG 8 23 | 25 43 30 86| Cynos cris-Caltha palu

Tablefit results by quadrat

Quadrat 1

Species List

Trifolium medium	7
Festuca rubra	6
Agrostis capillaris	4
Cynosurus cristatus	4
Holcus lanatus	4
Festuca ovina	3
Lotus corniculatus	3
Pilosella officinarum	3
Plantago lanceolata	3
Arrhenatherum elatius	1
Pilosella aurantiacum	1

TableFit Results

MG 5b 49 | 44 83 61 67| Cynos cris-Centaur nigr Galium verum
 MC 9c 48 | 51 57 76 51| Fest rubra-Holcu lanat Achill millef
 MG 5 45 | 47 84 48 71| Cynos cris-Centaur nigr
 U 4b 44 | 52 65 54 54| Fes ovi-Agr cap-Gal sax Hol lan-Tri rep

Quadrat 2

Species List

Festuca rubra	9
Agrostis capillaris	3
Crepis capillaris	3
Cynosurus cristatus	3
Epilobium montanum	3
Filago germanica	3
Holcus lanatus	3
Lotus corniculatus	3
Prunella vulgaris	2
Aira caryophyllea	1
Bellis perennis	1
Lysimachia arvensis	1
Odontites verna	1

TableFit Results

MC 9c 48 | 40 37 76 77| Fest rubra-Holcu lanat Achill millef
 SM16d 43 | 42 13 96 65| Juncus gerardii Festuca rubra
 MC 8a 40 | 50 14 89 60| Fest rubra-Armer marit Typical
 MC 8d 39 | 58 28 55 70| Fest rubra-Armer marit Holcus lanatus

Quadrat 3

Species List

Cynosurus cristatus	6
Festuca rubra	6
Pilosella officinarum	6
Equisetum arvense	4
Trifolium dubium	4
Agrostis capillaris	3
Aira caryophyllea	3
Centaurium erythraea	3
Holcus lanatus	3
Hypochaeris radicata	3
Trifolium medium	3
Trifolium repens	3
Arrhenatherum elatius	1
Ulex europaeus	1

TableFit Results

MG 5 40 | 44 61 49 63| Cynos cris-Centaur nigr
 MG 5a 38 | 41 60 49 62| Cynos cris-Centaur nigr Lath pratensis
 MG 6 38 | 59 45 46 51| Lolium per-Cynos cris
 MG 6a 37 | 64 46 42 46| Lolium per-Cynos cris Typical

Parcel 4

(Target Note 72)

Parcel Species List

KEY - D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

Western end of 'Bird's Foot Trefoil Meadow'. Sward is taller than adjacent Parcel 6 with more St John's wort, marsh thistle, evening primrose and ragwort.

<i>Lotus corniculatus</i>	Bird's-foot Trefoil	A
<i>Centaurium erythraea</i>	Common Centaury	R
<i>Achillea millefolium</i>	Yarrow	
<i>Agrostis stolonifera</i>	Creeping Bent	
<i>Alchemilla species</i>	Lady's-mantle species	
<i>Carex flacca</i>	Glaucous Sedge	
<i>Cerastium fontanum</i>	Common Mouse-ear	
<i>Cirsium arvense</i>	Creeping Thistle	
<i>Cirsium palustre</i>	Marsh Thistle	
<i>Crepis capillaris</i>	Smooth Hawk's-beard	
<i>Festuca ovina</i>	Sheep's Fescue	
<i>Festuca rubra</i>	Red Fescue	
<i>Geranium dissectum</i>	Cut-leaved Cranesbill	
<i>Hypericum perforatum</i>	Perforate St John's-wort	
<i>Jacobaea vulgaris</i>	Common Ragwort	
<i>Luzula multiflora</i>	Heath Woodrush	

Tablefit results by parcel

W24a 16 | 38 41 8 66| Rub fr-Hol la underscb Cir arv-Cir vul
 W24 13 | 36 36 6 67| Rub fr-Hol la underscb
 MG 9 11 | 35 32 3 54| Holc lana-Desch cespit
 MG11 11 | 39 26 5 59| Fes rub-Agr sto-Pot ans
 MG12a 9 | 30 31 3 62| Festuca arundinacea Lol per-Hol lan

Tablefit results by quadrat

Quadrat 1

Species List

Festuca rubra	8
Agrostis stolonifera	6
Hypericum perforatum	6
Holcus lanatus	4
Rubus fruticosus agg.	4
Carex flacca	3
Cirsium arvense	3
Festuca ovina	3
Geranium dissectum	3
Lotus corniculatus	3
Rumex crispus	3
Cerastium fontanum	2
Luzula campestris	2
Rumex acetosella	2
Alchemilla vulgaris agg.	1
Crepis capillaris	1
Oenothera sp.	1
Rosa sp.	1

TableFit Results

MG11 41 | 76 29 59 61| Fes rub-Agr sto-Pot ans
 MG12 37 | 55 30 57 57| Festuca arundinacea
 MC 8d 37 | 71 25 64 49| Fest rubra-Armer marit Holcus lanatus
 MC 9d 37 | 47 27 71 50| Fest rubra-Holcu lanat Primul vulgar

Quadrat 2

Species List

Rubus fruticosus agg.	6
Agrostis stolonifera	5
Holcus lanatus	5
Stellaria graminea	5
Geranium dissectum	4
Hypericum perforatum	4
Juncus inflexus	4
Cirsium arvense	3
Lotus corniculatus	3
Poa trivialis	3
Arrhenatherum elatius	2
Crepis capillaris	2
Jacobaea vulgaris	2
Rumex crispus	2

Chamaenerion angustifolium 1

TableFit Results

W24a 63 | 81 54 100 55| Rub fr-Hol la underscb Cir arv-Cir
vul
W24 56 | 79 48 88 50| Rub fr-Hol la underscb
MG10b 43 | 69 43 70 38| Holc lana-Junc effusus Junc inflexus
MG10 29 | 55 34 46 37| Holc lana-Junc effusus

Quadrat 3

Species List

Festuca rubra	6
Holcus lanatus	6
Hypericum perforatum	5
Potentilla erecta	5
Rubus fruticosus agg.	5
Agrostis stolonifera	3
Anthoxanthum odoratum	3
Arrhenatherum elatius	3
Juncus inflexus	3
Lotus corniculatus	3
Prunella vulgaris	3
Centaurea nigra	2
Cerastium fontanum	2
Cirsium arvense	2
Cirsium palustre	2
Crepis capillaris	2
Geranium dissectum	2
Rumex acetosella	2
Trifolium repens	2
Alchemilla vulgaris agg.	1
Oenothera sp.	1

TableFit Results

W24 44 | 72 32 84 45| Rub fr-Hol la underscb
W24a 44 | 75 36 83 40| Rub fr-Hol la underscb Cir arv-Cir
vul
MC 9 41 | 71 31 66 47| Fest rubra-Holcu lanat
MC 9e 39 | 64 33 58 50| Fest rubra-Holcu lanat Anthox odorat

Parcel 5

(Target Notes 73 and 75)

Parcel Species List

KEY - D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

Short sward of grassland with patches of tall ruderal vegetation. Surrounded by encroaching scrub. Occasional small ponds. Undulating terrain. Rabbit activity including warrens.

<i>Achillea millefolium</i>	Yarrow
<i>Agrostis stolonifera</i>	Creeping Bent
<i>Arrhenatherum elatius</i>	False Oat-grass
<i>Bellis perennis</i>	Daisy
<i>Centaureum erythraea</i>	Common Centaury
<i>Cerastium fontanum</i>	Common Mouse-ear
<i>Chamaenerion angustifolium</i>	Rosebay Willowherb
<i>Cirsium vulgare</i>	Spear Thistle
<i>Cladonia sp.</i>	Cladonia species
<i>Crataegus monogyna</i>	Hawthorn
<i>Crepis capillaris</i>	Smooth Hawk's-beard
<i>Dryopteris filix-mas</i>	Male-fern
<i>Epilobium montanum</i>	Broad-leaved Willowherb
<i>Festuca ovina</i>	Sheep's Fescue
<i>Festuca rubra</i>	Red Fescue
<i>Filago germanica</i>	Common Cudweed
<i>Geranium dissectum</i>	Cut-leaved Cranesbill
<i>Geranium molle</i>	Dove's-foot Cranesbill
<i>Holcus lanatus</i>	Yorkshire-fog
<i>Holcus mollis</i>	Creeping Soft-grass
<i>Jacobaea vulgaris</i>	Common Ragwort
<i>Logfia minima</i>	Lesser Cudweed
<i>Logfia minima</i>	Small Cudweed
<i>Lotus corniculatus</i>	Bird's-foot Trefoil
<i>Luzula multiflora</i>	Heath Woodrush
<i>Lysimachia arvensis</i>	Scarlet Pimpernel
<i>Myosotis sp.</i>	Forget-me-not species
<i>Plantago coronopus</i>	Buck's-horn Plantain
<i>Potentilla erecta</i>	Tormentil
<i>Prunella vulgaris</i>	Selfheal
<i>Prunus spinosa</i>	Blackthorn
<i>Rubus fruticosus agg.</i>	Bramble
<i>Rumex acetosella</i>	Sheep's Sorrel
<i>Sagina nodosa</i>	Knotted Pearlwort
<i>Trifolium dubium</i>	Lesser Trefoil
<i>Trifolium repens</i>	White Clover
<i>Urtica dioica</i>	Nettle
<i>Veronica arvensis</i>	Wall Speedwell

Tablefit results by parcel

U 1d 12 | 43 27 8 29| Fes ovi-Agr cap-Rum acI Ant odo-Lot cor
W24a 11 | 46 27 0 11| Rub fr-Hol la underscb Cir arv-Cir vul
U 4b 10 | 38 31 0 22| Fes ovi-Agr cap-Gal sax Hol lan-Tri rep
W24 9 | 45 24 0 0| Rub fr-Hol la underscb
MG 1d 9 | 36 30 0 12| Arrhenatherum elatius Pastin sativa

Tablefit results by quadrat

Quadrat 1

Species List

Rumex acetosella

6

Arrhenatherum elatius	5
Festuca ovina	5
Lotus corniculatus	4
Prunella vulgaris	4
Achillea millefolium	3
Cerastium fontanum	3
Crepis capillaris	3
Geranium dissectum	3
Holcus mollis	3
Hypericum perforatum	3
Luzula multiflora	3
Trifolium dubium	3
Cirsium arvense	2
Cirsium vulgare	2
Geranium molle	2
Rubus fruticosus agg.	2
Veronica arvensis	2
Dactylis glomerata	1
Epilobium montanum	1
Galium verum	1
Holcus lanatus	1
Oenothera sp.	1

TableFit Results

U 1d 41 | 73 33 64 46| Fes ovi-Agr cap-Rum acl Ant odo-Lot
cor
MG 1d 38 | 77 46 47 32| Arrhenatherum elatius Pastin sativa
MG 1 36 | 86 39 50 29| Arrhenatherum elatius
U 1c 29 | 50 35 45 41| Fes ovi-Agr cap-Rum acl Ero cic-Tee

Quadrat 2

Species List

Prunella vulgaris	7
Vulpia bromoides	7
Agrostis capillaris	4
Centaurium erythraea	3
Cerastium fontanum	3
Cladonia sp.	3
Crepis capillaris	3
Holcus lanatus	3
Jacobaea vulgaris	3
Lotus corniculatus	3
Luzula multiflora	3
Rumex acetosella	3
Epilobium montanum	2
Filago germanica	2
Geranium molle	2
Sagina nodosa	2
Bellis perennis	1
Trifolium dubium	1
Veronica arvensis	1

TableFit Results

U 1d 20 | 58 31 22 24| Fes ovi-Agr cap-Rum acl Ant odo-Lot
cor
U 4b 17 | 43 30 27 27| Fes ovi-Agr cap-Gal sax Hol lan-Tri
rep
U 1f 17 | 62 22 37 15| Fes ovi-Agr cap-Rum acl Hypoch

Quadrat 3

Species List

Vulpia bromoides	8
Prunella vulgaris	7
Luzula campestris	5
Rumex acetosella	5
Centaureum erythraea	3
Cerastium fontanum	3
Crepis capillaris	3
Epilobium montanum	3
Holcus mollis	3
Lotus corniculatus	3
Cirsium vulgare	2
Holcus lanatus	2
Jacobaea vulgaris	2
Moss sp.	2
Rubus fruticosus agg.	2
Sagina nodosa	2
Trifolium repens	2
Achillea millefolium	1
Chamaenerion angustifolium	1
Crataegus monogyna	1
Oenothera sp.	1

TableFit Results

W24a 18 | 69 33 5 12| Rub fr-Hol la underscb Cir arv-Cir
vul
OV 2 16 | 17 9 60 30| Briz min-Sil gall weed
W24 15 | 66 29 5 3| Rub fr-Hol la underscb
U 4b 15 | 53 34 3 20| Fes ovi-Agr cap-Gal sax Hol lan-Tri

Quadrat 4

Species List

Luzula campestris	8
Moss sp.	8
Potentilla erecta	8
Stellaria graminea	7
Rumex acetosella	6
Cerastium fontanum	5
Prunella vulgaris	5
Vulpia bromoides	5
Agrostis capillaris	4
Myosotis sp.	4
Arrhenatherum elatius	3

Epilobium sp.	3
Holcus lanatus	3
Rubus fruticosus agg.	3
Crataegus monogyna	2
Geranium dissectum	2
Jacobaea vulgaris	2
Trifolium repens	2
Centaurium erythraea	1
Cirsium vulgare	1
Galium aparine	1
Rumex conglomeratus	1

TableFit Results

U 4b 25 | 58 36 29 33| Fes ovi-Agr cap-Gal sax Hol lan-Tri
rep
W24 21 | 79 33 28 7| Rub fr-Hol la underscb
W24a 21 | 75 34 21 8| Rub fr-Hol la underscb Cir arv-Cir

Quadrat 5

Species List

Bare Ground	6
Hypericum perforatum	6
Plantago coronopus	4
Centaurium erythraea	3
Crepis capillaris	3
Filago germanica	3
Prunella vulgaris	3
Cladonia sp.	2
Oenothera sp.	2
Peltigera canina	2

TableFit Results

MC 5 7 | 20 19 19 23| Armer mar-Cerast diffus
MC 5a 6 | 24 14 16 18| Armer mar-Cerast diffus Desmaz marina
CG 7d 5 | 20 30 0 18| Fest ovi-Hier pil-Thym Fra ves-Eri
ace
MC10b 4 | 14 20 12 20| Fest rubra-Plantago spp Carex panicea

Quadrat 6

Species List

Moss sp.	8
Lotus corniculatus	5
Prunella vulgaris	4
Rumex acetosella	4
Trifolium repens	4
Agrostis capillaris	3
Cerastium fontanum	3
Chamaenerion angustifolium	3
Holcus lanatus	3
Jacobaea vulgaris	3
Vulpia bromoides	3
Centaurium erythraea	2
Crepis capillaris	2

Epilobium montanum	2
Luzula multiflora	2
Oenothera sp.	2
Rubus fruticosus agg.	2
Trifolium dubium	2
Achillea millefolium	1
Rosa sp.	1

TableFit Results

U 1d 24 | 62 34 27 31| Fes ovi-Agr cap-Rum acI Ant odo-Lot
cor

U 4b 24 | 58 40 23 27| Fes ovi-Agr cap-Gal sax Hol lan-Tri
rep

MG 5a 21 | 40 40 25 38| Cynos cris-Centaur nigr Lath pratensis

Parcel 6

(Target Note 74)

Parcel Species List

KEY - D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

Eastern end of Bird's Foot Trefoil Meadow'. Tussocky area of grassland, diverse. Becoming encroached by scrub and tall ruderal herb and forms a mosaic in some places. Good for invertebrates. Humming bird hawk moth seen here plus various butterflies, beetles and hoverflies. Ant hills also found.

<i>Achillea millefolium</i>	Yarrow
<i>Agrostis capillaris</i>	Common Bent
<i>Agrostis stolonifera</i>	Creeping Bent
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass
<i>Arrhenatherum elatius</i>	False Oat-grass
<i>Briza media</i>	Quaking-grass
<i>Chamaenerion angustifolium</i>	Rosebay Willowherb
<i>Cirsium arvense</i>	Creeping Thistle
<i>Cirsium palustre</i>	Marsh Thistle
<i>Crepis capillaris</i>	Smooth Hawk's-beard
<i>Deschampsia cespitosa</i>	Tufted Hair-grass
<i>Epilobium hirsutum</i>	Great Willowherb
<i>Festuca ovina</i>	Sheep's Fescue
<i>Festuca rubra</i>	Red Fescue
<i>Filago germanica</i>	Common Cudweed
<i>Galium album</i>	Hedge Bedstraw
<i>Galium verum</i>	Lady's Bedstraw
<i>Geranium molle</i>	Dove's-foot Cranesbill
<i>Holcus lanatus</i>	Yorkshire-fog
<i>Hypericum perforatum</i>	Perforate St John's-wort
<i>Juncus inflexus</i>	Hard Rush
<i>Lotus corniculatus</i>	Bird's-foot Trefoil
<i>Malva moschata</i>	Musk Mallow
<i>Phleum pratense</i>	Timothy

<i>Prunella vulgaris</i>	Selfheal
<i>Rubus fruticosus agg.</i>	Bramble
<i>Rumex acetosella</i>	Sheep's Sorrel
<i>Stellaria graminea</i>	Lesser Stitchwort
<i>Trifolium repens</i>	White Clover
<i>Urtica dioica</i>	Nettle

Tablefit results by parcel

MC 9c 25 | 43 50 18 90| Fest rubra-Holcu lanat Achill millef
 MG 5b 22 | 34 69 14 92| Cynos cris-Centaur nigr Galium verum
 MG11c 22 | 48 34 21 52| Fes rub-Agr sto-Pot ans Honken peploid
 MC 9 20 | 49 44 7 69| Fest rubra-Holcu lanat
 SD 8b 19 | 35 51 11 94| Fest rubra-Galium verum Luzula campestr

Quadrat 1

Species List

Stellaria graminea	7
Festuca rubra	5
Rumex acetosella	5
Achillea millefolium	4
Chamaenerion angustifolium	4
Holcus lanatus	4
Phleum pratense	4
Agrostis capillaris	3
Agrostis stolonifera	3
Crepis capillaris	3
Galium verum	3
Geranium molle	3
Holcus mollis	3
Lotus corniculatus	3
Cerastium fontanum	2
Prunella vulgaris	2
Rubus fruticosus agg.	2
Trifolium dubium	2
Jacobaea vulgaris	1
Pilosella officinarum	1

TableFit Results

MC 9c 40 | 69 42 58 38| Fest rubra-Holcu lanat Achill millef
 MG 5b 35 | 52 54 46 41| Cynos cris-Centaur nigr Galium verum
 U 1d 34 | 78 45 32 32| Fes ovi-Agr cap-Rum acl Ant odo-Lot
 cor
 U 4b 34 | 62 42 48 33| Fes ovi-Agr cap-Gal sax Hol lan-Tri

Quadrat 2

Species List

Festuca rubra	7
Galium verum	6
Lotus corniculatus	6
Briza media	4

Centaurea nigra	4
Phleum pratense	4
Anthoxanthum odoratum	3
Cynosurus cristatus	3
Holcus lanatus	3
Luzula campestris	3
Poa trivialis	3
Rumex acetosa	3
Cerastium fontanum	2
Plantago lanceolata	2
Trifolium repens	2

TableFit Results

MC 9c 69 | 77 63 85 68| Fest rubra-Holcu lanat Achill millef
 MG 5b 65 | 71 97 61 89| Cynos cris-Centaur nigr Galium verum
 SD 8b 64 | 68 70 70 77| Fest rubra-Galium verum Luzula
 campestr
 MG 5 61 | 75 98 50 83| Cynos cris-Centaur nigr

Quadrat 3

Species List

Festuca rubra	7
Galium verum	6
Lotus corniculatus	6
Holcus lanatus	5
Phleum pratense	4
Poa trivialis	4
Stellaria graminea	4
Rumex acetosa	3
Agrostis stolonifera	2
Briza media	2
Cerastium fontanum	2
Luzula multiflora	2
Plantago lanceolata	2
Ranunculus acris	2
Cirsium arvense	1
Malva moschata	1
Rubus fruticosus agg.	1

TableFit Results

MC 9c 65 | 69 49 87 76| Fest rubra-Holcu lanat Achill millef
 MC 9d 57 | 77 46 79 60| Fest rubra-Holcu lanat Primul vulgar
 SD 8 55 | 67 46 67 73| Fest rubra-Galium verum
 MC 9 55 | 88 48 63 60| Fest rubra-Holcu lanat
 SD 8a 52 | 69 37 74 65| Fest rubra-Galium verum Typical

Parcel 7

(Target Note 76)

Parcel Species List

KEY - D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare

Area of species rich neutral grassland. Area had soil profile inverted Circa 10 years ago and sown with a mix. Very sandy free draining soil. Evidence of disturbance by rabbits. Little to no management. Largely dominated by lady's bedstraw and red fescue; ribwort. Bordered on all sides by scrub.

<i>Festuca rubra</i>	Red Fescue	D
<i>Galium verum</i>	Lady's Bedstraw	D
<i>Achillea millefolium</i>	Yarrow	A
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	A
<i>Plantago lanceolata</i>	Ribwort Plantain	A
<i>Centaureum erythraea</i>	Common Centaury	F
<i>Dactylis glomerata</i>	Cock's-foot	F
<i>Poterium sanguisorba</i>	Salad Burnet	F
<i>Agrostis stolonifera</i>	Creeping Bent	O
<i>Cirsium vulgare</i>	Spear Thistle	O
<i>Cynosurus cristatus</i>	Crested Dog's-tail	O
<i>Holcus lanatus</i>	Yorkshire-fog	O
<i>Hypericum perforatum</i>	Perforate St John's-wort	O
<i>Hypochaeris radicata</i>	Common Cat's-ear	O
<i>Jacobaea vulgaris</i>	Common Ragwort	O
<i>Juncus inflexus</i>	Hard Rush	O
<i>Leucanthemum vulgare</i>	Oxeye daisy	O
<i>Medicago lupulina</i>	Black Medick	O
<i>Odontites verna</i>	Red Bartsia	O
<i>Plantago major</i>	Greater Plantain	O
<i>Poa annua</i>	Annual Meadow-grass	O
<i>Prunella vulgaris</i>	Selfheal	O
<i>Ranunculus repens</i>	Creeping Buttercup	O
<i>Taraxacum officinale agg.</i>	Dandelion	O
<i>Trifolium pratense</i>	Red Clover	O
<i>Trifolium repens</i>	White Clover	O
<i>Vicia sativa</i>	Common Vetch	O
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	R
<i>Bromus hordeaceus</i>	Soft Brome	R
<i>Cerastium fontanum</i>	Common Mouse-ear	R
<i>Cirsium arvense</i>	Creeping Thistle	R
<i>Cytisus scoparius</i>	Broom	R
<i>Dysenterica pulicaria</i>	Fleabane	R
<i>Elymus repens</i>	Common Couch	R
<i>Epilobium hirsutum</i>	Great Willowherb	R
<i>Equisetum arvense</i>	Field Horsetail	R
<i>Galium album</i>	Hedge Bedstraw	R
<i>Galium aparine</i>	Cleavers	R
<i>Geranium molle</i>	Dove's-foot Cranesbill	R
<i>Geranium pratense</i>	Meadow Cranesbill	R
<i>Geranium pyrenaicum</i>	Hedgerow Cranesbill	R
<i>Heracleum sphondylium</i>	Hogweed	R
<i>Impatiens glandulifera</i>	Himalayan Balsam	R
<i>Lathyrus pratensis</i>	Meadow Vetchling	R
<i>Leontodon hispidus</i>	Rough Hawkbit	R
<i>Lolium perenne</i>	Perennial Ryegrass	R
<i>Myosotis discolor</i>	Changing Forget-me-not	R
<i>Oenothera sp.</i>	Evening-primrose species	R

<i>Ophrys apifera</i>	Bee Orchid	R
<i>Phleum pratense</i>	Timothy	R
<i>Potentilla anserina</i>	Silverweed	R
<i>Potentilla reptans</i>	Creeping Cinquefoil	R
<i>Primula veris</i>	Cowslip	R
<i>Quercus robur</i>	English Oak	R
<i>Rosa arvensis</i>	Field Rose	R
<i>Rubus fruticosus agg.</i>	Bramble	R
<i>Rumex crispus</i>	Curled Dock	R
<i>Scorzoneroidea autumnalis</i>	Autumn Hawkbit	R
<i>Tragopogon pratensis</i>	Goat's-beard	R
<i>Ulex europaeus</i>	Gorse	R
<i>Verbascum nigrum</i>	Dark Mullein	R
<i>Veronica serpyllifolia</i>	Thyme-leaved Speedwell	R
<i>Vicia cracca</i>	Tufted Vetch	R
<i>Vicia sepium</i>	Bush Vetch	R

Tablefit results by parcel

MC 9c 47 | 48 72 49 100| Fest rubra-Holcu lanat Achill millef
 SD 8a 44 | 52 58 46 100| Fest rubra-Galium verum Typical
 MC11c 41 | 46 58 44 86| Fest rubra-Daucus carot Sanguis minor
 SD 8 40 | 44 63 42 100| Fest rubra-Galium verum

Tablefit results by quadrat

Quadrat 1

Species List

Festuca rubra	8
Galium verum	7
Plantago lanceolata	6
Ornithopus perpusillus	5
Achillea millefolium	4
Centaurium erythraea	4
Medicago lupulina	3
Poterium sanguisorba	3
Agrostis stolonifera	2
Anthoxanthum odoratum	2
Cerastium fontanum	2
Holcus lanatus	2
Hypericum perforatum	2

TableFit Results

MC 9c 65 | 63 59 82 77| Fest rubra-Holcu lanat Achill millef
 SD 8 60 | 57 51 78 86| Fest rubra-Galium verum
 SD 8a 58 | 60 42 79 81| Fest rubra-Galium verum Typical
 MC 9 52 | 73 54 57 60| Fest rubra-Holcu lanat
 MC 9d 47 | 56 43 68 56| Fest rubra-Holcu lanat Primul vulgar

Quadrat 2

Species List

Galium verum	8
Festuca rubra	7

Lotus corniculatus	6
Achillea millefolium	5
Potentilla reptans	4
Plantago lanceolata	3
Dactylis glomerata	2
Holcus lanatus	2
Anthoxanthum odoratum	1
Poterium sanguisorba	1
Vicia sativa	1

TableFit Results

MC 9c 81 | 74 83 90 100| Fest rubra-Holcu lanat Achill millef
 SD 8a 70 | 73 61 79 98| Fest rubra-Galium verum Typical
 MC11c 64 | 78 74 58 73| Fest rubra-Daucus carot Sanguis minor
 SD 8 62 | 60 64 72 100| Fest rubra-Galium verum
 MC 9d 58 | 66 62 70 62| Fest rubra-Holcu lanat Primul vulgar

Quadrat 3

Species List

Festuca rubra	8
Lotus corniculatus	7
Galium verum	6
Plantago lanceolata	6
Prunella vulgaris	5
Agrostis stolonifera	4
Cerastium fontanum	4
Anthoxanthum odoratum	3
Lolium perenne	2

TableFit Results

SD 8a 72 | 64 66 90 86| Fest rubra-Galium verum Typical
 SD 8 69 | 57 74 86 93| Fest rubra-Galium verum
 MC 9c 64 | 51 70 84 83| Fest rubra-Holcu lanat Achill millef
 SD 8b 61 | 49 84 73 97| Fest rubra-Galium verum Luzula
 campestr

Quadrat 4

Species List

Galium verum	9
Festuca rubra	6
Dactylis glomerata	5
Lotus corniculatus	5
Trifolium pratense	4
Elymus repens	2

TableFit Results

MC11 60 | 63 71 78 60| Fest rubra-Daucus carot
 SD 8a 55 | 49 74 64 94| Fest rubra-Galium verum Typical
 MC11c 51 | 46 81 61 76| Fest rubra-Daucus carot Sanguis minor
 MC 9c 51 | 40 82 64 91| Fest rubra-Holcu lanat Achill millef
 SD 8b 47 | 30 78 65 98| Fest rubra-Galium verum Luzula campestr

Quadrat 5

Species List

Galium verum	8
Ornithopus perpusillus	7
Festuca rubra	6
Odontites verna	5
Holcus lanatus	4
Plantago lanceolata	4
Cynosurus cristatus	3
Dactylis glomerata	3
Anthoxanthum odoratum	2
Trifolium repens	2

TableFit Results

MC 9c 60 | 60 74 73 66| Fest rubra-Holcu lanat Achill millef
 SD 8a 55 | 64 59 65 64| Fest rubra-Galium verum Typical
 MG 5b 54 | 52 100 61 75| Cynos cris-Centaur nigr Galium verum
 MC 9 50 | 70 66 54 46| Fest rubra-Holcu lanat
 SD 8 49 | 53 62 58 69| Fest rubra-Galium verum

Quadrat Data and TableFit Explanation

- 1.1 When recording and analysing vegetation there are two significant properties of the vegetation types that help define the different communities and sub-communities. Firstly there is abundance, this refers to the dominance of any particular plant within a stand, that is to say the proportion of ground that the plant occupies. For the purposes of NVC analysis the cover abundance is recorded using the Domin scale, where Domin is an abbreviation of dominance. The scale runs from 1, where there may be only one or two individuals in any given sample area to 10 where the dominant species may well occupy 100 % of the plot; as, for example, Common Reed in a dense reedbed. The full scale is as follows:

Percentage cover	Domin value
91 - 100%	10
76 - 90%	9
51 - 75%	8
34 - 50%	7
26 - 33%	6
11 - 25%	5
4 - 10%	4
< 4%	3
Many individuals	3
Several individuals	2
Few individuals	1

- 1.2 These percentage bands give an approximation of the abundance of each species in a quadrat in the field. Whilst it is frequent for the upper limits of each band to exceed 100% when the score for each plant is accumulated, especially in layered vegetation such as woodlands, the total upper percentage cannot be less than 100% unless other features such as bare ground, leaf litter or open water are recorded, a quick calculation in the field prevents species being under-recorded.
- 1.3 The second way that plant species can make their presence felt in any NVC community is by frequency, also known as constancy. Common Reed is expected to be dominant in a set of reedbed samples and it is also very likely to be constant; that is occurring in a high percentage of the samples. On the other hand a species such as Hemp Agrimony often occurs with reeds and can be at very low levels of abundance. It is quite possible for Hemp Agrimony to be present at a Domin level of 2 in eight out of ten reedbed samples. In this case Hemp Agrimony (occurring in 80% of the samples) would also be a constant species, that is to say it is almost as equally frequent as Common Reed, although nowhere near as abundant. The combinations of abundance and frequency are used to define NVC communities and in this case reedbeds with constant Hemp Agrimony would more likely be S26 type than S4 which is more of a reed monoculture. The definitions of frequency are as follows, depending on what percentage of samples a particular species is recorded in:

Percentage occurrence	Description	Frequency Class
81 - 100%	Constant	V
61 - 80%	Constant	IV

41 - 60%	Frequent	III
21 - 40%	Occasional	II
1 -20%	Scarce	I

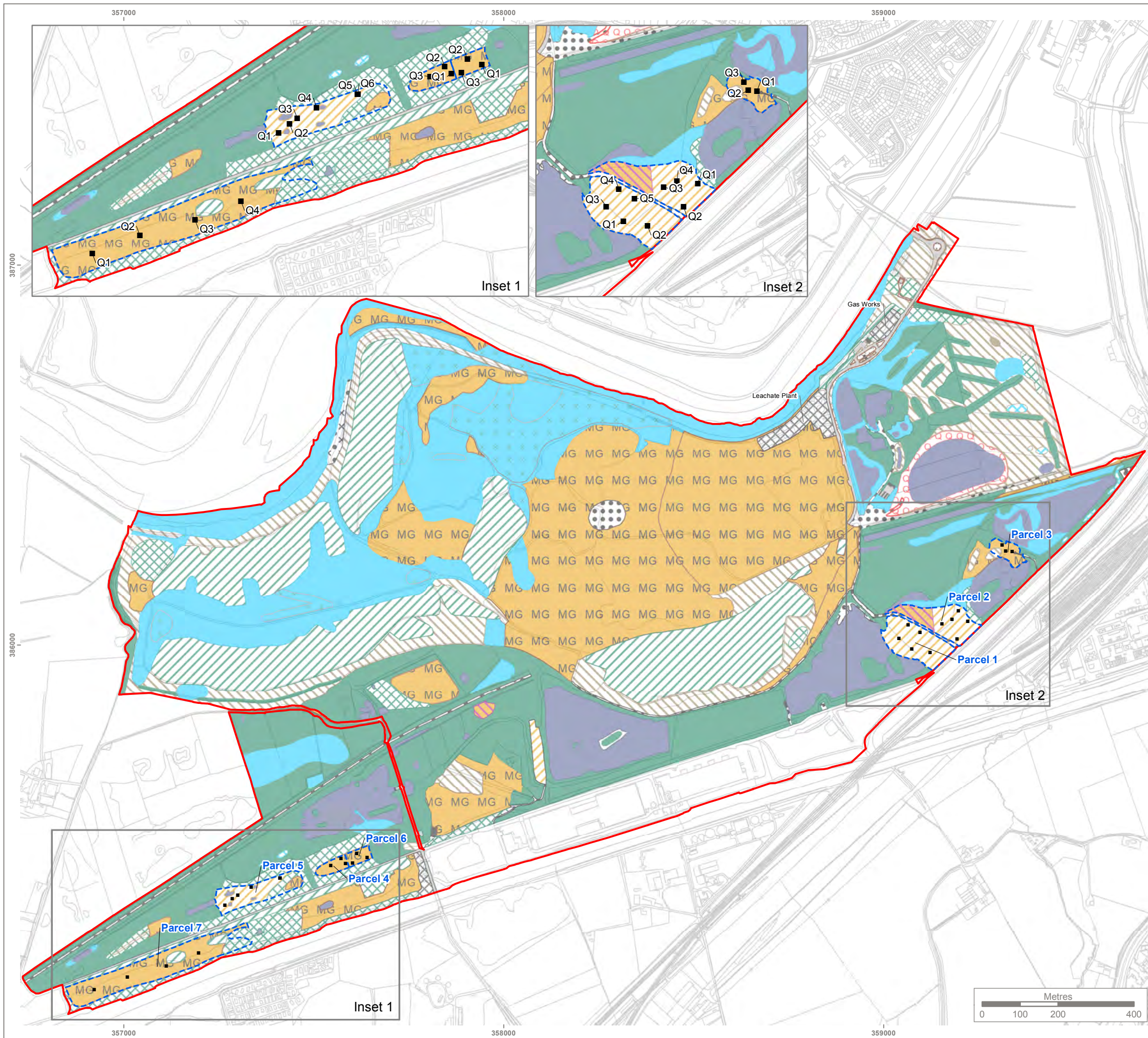
- 1.4 In the NVC floristic tables, published for every vegetation community and sub-community described in the National Vegetation Classification, the frequency is always expressed at a Roman numeral (from I -V) with the range of dominances recorded (Domin 1 -10) expressed in Arabic numerals, say (7 - 9) for a more dominant species and (1 - 2) for a much less dominant species. In recognising many NVC communities the frequency of a species can be just as significant as the dominance.
- 1.5 When entering data into TableFit, or other similar programmes such as MATCH, MAVIS or TURBOVEG, it usually only the Domin levels of each species that are known, the frequency can then be worked out once a full dataset has been entered; how this is done varies from programme to programme. It is possible to work out frequency values for each species in advance of allocating NVC types if so desired. In that case the manual dichotomous keys in each of the five volumes of the NVC can be utilised, having first drawn up floristic tables specific to the site to compare with the floristic tables nationally.
- 1.6 TableFit version 1.0 is a tried and tested vegetation analysis programme compiled by Dr Mark Hill of the Institute of Terrestrial Ecology in 1996. TableFit has been adopted as standard by TEP ecologists. When NVC samples have been collected, using the approved methodology, the species and Domin data are entered and the programme makes an objective analysis of which vegetation community it most closely matches. However, as the 2000 review of the NVC shows, the classification system is still evolving to some extent and there are some communities that occur in the British Isles that have not yet been classified, this has an effect on the accuracy of some of the output and it is very frequent, for example, for inland grasslands dominated by Red Fescue to be spuriously analysed as Maritime Grasslands even though far from any coastal influence. Therefore, the TableFit output needs to be interpreted carefully, especially when the goodness-of-fit rating descends to Fair or lower (Poor and Very Poor). Whilst the TableFit output is always useful as a guide, the manual keys, the community descriptions and the floristic tables are just as useful and they should all be used together to help an experienced ecologist make the best interpretation.
- 1.7 The TableFit goodness-of-fit rating can range from 0 to 100, with increasing closeness of fit with ascending scores, the ratings are as follows:

Goodness-of-fit	Rating
80 - 100	Very good
70 - 79	Good
60 - 69	Fair
50 - 59	Poor
0 - 49	Very poor

-
- 1.8 Even when a very good rating is indicated it is always worth checking through the community descriptions and floristic tables to double check, but these higher ratings are more often than not accurate and provide a very useful tool in helping to identify NVC community types.
 - 1.9 However there are many instances where the top rating of the five best fits should not simply be accepted, in some cases different communities have very similar scores or the scores are simply too low to give any confidence. There are many factors involved: there may well be zones of transition between communities that have been sampled, or in the case of many sites that we are called on to survey, the vegetation is still simply too young to have developed fully into one of the semi-natural community types that the NVC was designed to define. TableFit analysis can be very useful in recognising different communities in transition and sometimes a transitional type is identified and mapped as such. Many samples of developing vegetation simply cannot be identified to sub-community level and are allocated as undifferentiated communities with no sub-community suffix. The experience of the ecological surveyors is important as they will be able to balance the dominant and frequent species recorded from site and compare various floristic tables and descriptions to arrive at logical conclusions.
 - 1.10 The TableFit output indicates the NVC community type of the top five matches in the first column, the second column then gives the overall 'goodness-of-fit' rating, this is not a percentage but a classification derived from the average of four individual values that are also included in the output table.
 - 1.11 The first column of these four values relates to the fit of the species composition of each sample with the NVC data nationally, but with increased weighting for the species with higher frequency values (III-V).
 - 1.12 The second column is the mean constancy of species in the sample, as a proportion of what would be expected for each community. For species-poor sample this column 2 number tends to be low, but column 1 value would be high.
 - 1.13 In the third column the figures represent dominance satisfaction, that is to say it checks that species that are expected to have a high Domin value in that community do in fact fulfil that characteristic. This number can be high in samples with a single dominant where that species is present at high Domin levels.
 - 1.14 For the final column the species are weighted by the 0.75 power of their cover value to give a weighted mean constancy
 - 1.15 TableFit carries out all these background calculations and leaves us with simply the 'goodness-of-fit' value to help with interpretation of the field data.



DRAWINGS
G6929.01.053 GRASSLAND NVC SURVEY PARCEL
LOCATIONS

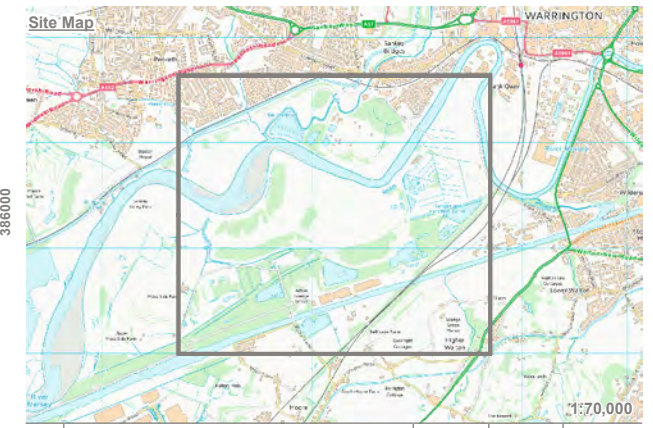


KEY

- Survey boundary
- Quadrat location
- Parcel
- Semi-natural broad-leaved woodland
- Plantation broad-leaved woodland
- Dense/continuous scrub
- Swamp with scattered scrub
- Unimproved acid grassland
- Semi-improved acid grassland
- Modified neutral grassland
- Species-poor modified neutral grassland
- Marsh/marshy grassland
- Continuous bracken
- Tall ruderal
- Swamp
- Ephemeral pool
- Standing water
- Shingle
- Quarry
- Bare ground with ephemeral/short perennial
- Introduced shrub
- Building
- Bare ground
- Hardstanding
- Not surveyed



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Rev	Description	Drawn	Approved	Date

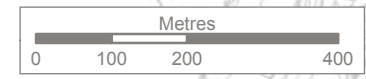
Peel L&P
 REALISING POSSIBILITY
TEP THE ENVIRONMENT PARTNERSHIP
 Genesis Centre, Birchwood Science Park, Warrington WA3 7BH
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Project
 Warrington Waterfront: Port Warrington, Warrington Commercial Park, Moore Nature Reserve and Arpley Country Park.

Title
 Grassland National Vegetation Classification Survey

Drawing Number
 G6929.01.053

Drawn	Checked	Approved	Scale	Date
JO	AH	LC	1:10,000 @ A3	11/09/2019





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APPENDIX H: Preliminary Bat Appraisal



PORT WARRINGTON EXTENSION MOORE, WARRINGTON PRELIMINARY APPRAISAL FOR BATS



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APPENDICES

APPENDIX A: Desk Study Data Search

APPENDIX B: Preliminary Ground-based Roost Assessment of Trees Data Table

DRAWINGS

Drawing B10173-AEW-XX-XX-DR-A-0112_P3 - Proposed Illustrative Development
Framework Zonal Plan 05/02/2019

Drawing G6929.01.050 - Preliminary Ground-level Roost Assessment of Trees

Drawing G6929.01.051 - Bat Tree Roost Risk Assessment Areas

Executive Summary

1. TEP was commissioned by Peel Land and Property Ltd in March 2018 to carry out an Ecological Impact Assessment (EclA) of Moore Nature Reserve and Arpley Landfill. The EclA was required to identify the suitability of the land identified within the proposed Illustrative Development Framework Zonal Plan, for development. The EclA also assessed the suitability of the land for removal from the greenbelt and was required to inform the evolving Warrington Local Plan Strategy. The area of land assessed under the EclA for potential future development is hereafter referred to as 'the site'.
2. A preliminary appraisal for bats including a desk study, Preliminary Roost Assessment (PRA) and assessment of the foraging and commuting habitat within the site in relation to bats, was required to generate an adequate baseline for a high-level evaluation of the importance of the site for bats. The PRA comprised a ground-based appraisal (GBA) of trees and assessment of potential roost habitat suitability within inaccessible compartments, in areas of the site identified for potential future development. The preliminary appraisal provides a high-level assessment of the likely impacts and implications of future development of the site on bats roosting, foraging and commuting within the site and the surrounding landscape.
3. This report details issues directly relating to the preliminary appraisal for bats. Desk study information has been reviewed in relation to bat species and potential roosting, foraging and commuting habitats only. The desk study information and analysis does not relate to any wider issues concerning other protected species or impacts on designated or notable sites and habitats. For full analysis of desk study information the EclA should be consulted.
4. The proposed Illustrative Development Framework Zonal Plan identifies development of areas that would require removal of the majority of trees and woodland compartments. Large areas of mature woodland within Moore Nature Reserve Local Wildlife Site would require removal within the proposed Illustrative Development Framework Zonal Plan. These areas of mature woodland within the site should be retained and alternative developable areas identified either within the site or the surrounding locality. Habitats within the site should be retained unless there are demonstrated imperative reasons of overriding public interest for development to be permitted. Where overriding public interest is identified further works will be required to provide a detailed impact assessment and identify the appropriate mitigation.
5. An area of Arpley Landfill to the north of the site, is proposed to act as a biodiversity offsetting area for the loss of habitats within the site. This area is proposed to be enhanced as Arpley Country Park.
6. To complete the determination of bat roost suitability of trees, further aerial inspections by an appropriately licensed bat consultant will be required. Aerial inspections are needed to permit close examination of potential roost features (PRFs) identified from the GBA, using an endoscope, bat detectors and sampling any

droppings found, to confirm presence or likely absence of a bat roost and the final roost suitability of the tree.

7. Trees confirmed to retain moderate or high bat roost suitability and any trees confirmed to support bat roosts by the aerial inspection will likely require nocturnal roost surveys. Any trees identified from the GBA to have moderate or high bat roost suitability but which cannot be subject to aerial inspection may also require nocturnal roost survey.
8. High quality habitats (woodlands and water) are present in the site which provide valuable features for bats for foraging and commuting within the site and the wider landscape. Activity transect surveys and static monitoring should be undertaken across the site to establish species assemblage, to determine features of particular importance for foraging and commuting bats and to further determine the impacts associated with any future development proposals.

1.0 Introduction

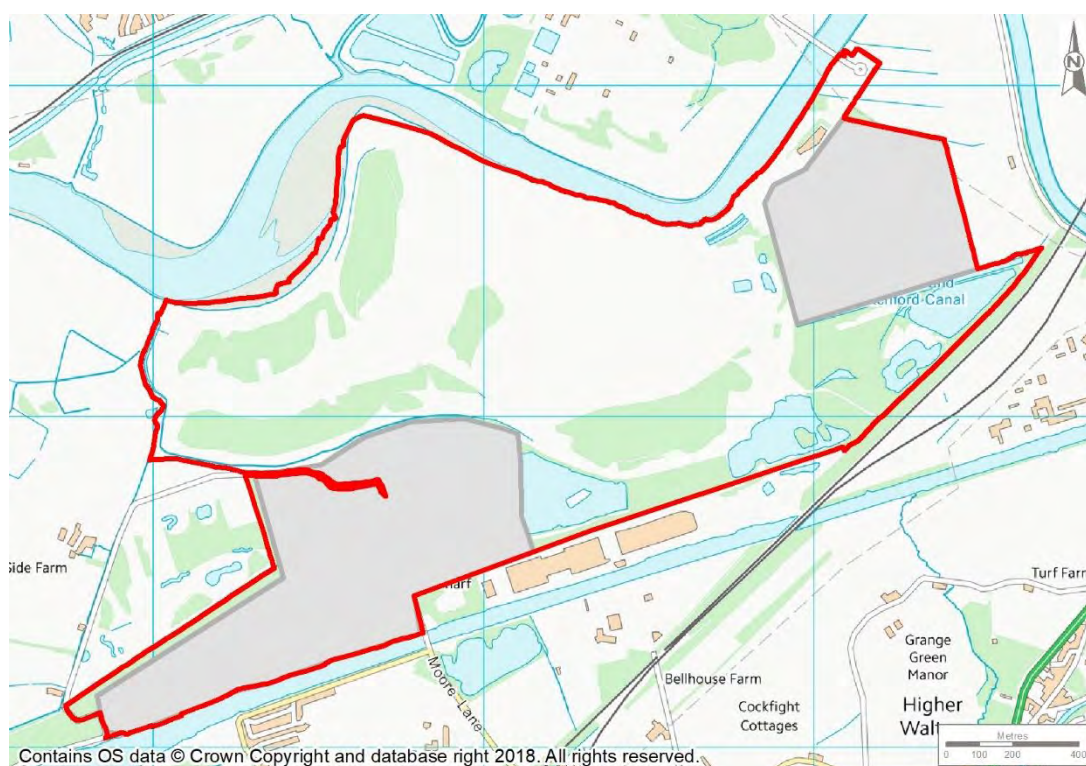
- 1.1 TEP was commissioned by Peel Land and Property Ltd in March 2018 to carry out an Ecological Impact Assessment (EclA) of land within and around Moore Nature Reserve and Arpley Landfill. The EclA was required to identify the suitability of the land identified within the proposed Illustrative Development Framework Zonal Plan for development. The EclA also assessed the suitability of the land for removal from the greenbelt and was required to inform the evolving Warrington Local Plan Strategy. The area of land assessed under the EclA for potential future development is hereafter referred to as 'the site'.
- 1.2 The site is made up of three main components:
- A strip of undeveloped greenspace (at the southern boundary of the site).
 - Approximately 37ha of Moore Nature Reserve (to the north of the Port Warrington site) - established in 1991 on former farmland and sand extraction sites. This is made up of a mosaic of wetlands, woodland and open grassland habitats; and
 - A section of Arpley Landfill (to the north-east of Moore Nature Reserve) - an area which is to be developed as a new 'Business Hub' covering approximately 30ha. This has been an active landfill site since 1988, however landfill operations are due to cease in October 2018, following which the site will be remediated.
- 1.3 Bats are legally protected as a European Protected Species (EPS) under the Conservation of Habitats and Species Regulations (2017). All bats and their roosts are also protected under the Wildlife and Countryside Act (1981) as amended (WCA5). It is an offence to:
- Disturb a bat or groups of bats in their roost;
 - Damage or destroy a bat roosting place, even if there are no bats present at the time;
 - To obstruct access to a bat roost; and
 - To capture, injure or kill a bat or possess, advertise, sell or exchange a bat, or part of a bat dead or alive.
- 1.4 To support the EclA, a preliminary appraisal for bats including a desk study, a Preliminary Roost Assessment (PRA) of trees and assessment of the foraging and commuting habitat within the site in relation to bats, was undertaken. The PRA comprised a ground-based appraisal (GBA) of trees and assessment of potential roost habitat suitability within inaccessible compartments, in areas of the site identified for potential future development. The preliminary appraisal for bats within areas proposed for future development was therefore required to:
- Allow a high-level evaluation of the importance of the site for bats;
 - To identify likely impacts upon bat roost habitat within the site;
 - To assess the value of habitats within the site for supporting bat foraging and commuting within the site and the local landscape; and

- To identify appropriate future survey and monitoring recommendations and potential requirements for mitigation as a result of the impacts caused by proposals.
- 1.5 The scope of the PRA included compartments within Moore Nature Reserve LWS, where the majority of more mature trees and woodland are situated. An area of Arpley Landfill to the north-west of the site was also included in the scope of the PRA, though the majority of trees and woodland in this area consisted of young broad-leaved plantation woodland screening and scrub. These areas are suggested for development within the proposed Illustrative Development Framework Zonal Plan, as a new commercial park and it is envisaged that, following removal of the site from the greenbelt, development may commence between 2020 and 2025.
- 1.6 Fixed development proposals are not currently available, however the AEW Architects Proposed Illustrative Development Framework Zonal Plan Drawing - B10173-AEW-XX-XX-DR-A-0112_P3, shows that approximately 37ha of Moore Nature Reserve are proposed for development into new port infrastructure or warehousing to complement the existing Port Warrington site. A 30ha commercial park is also to be created within the north-east of the former Arpley Landfill site.
- 1.7 An area of Arpley Landfill to the north of the site as shown on AEW Architects Drawing - B10173-AEW-XX-XX-DR-A-0112_P3, is proposed to act as a biodiversity offsetting area for the loss of habitats within the site. This area is proposed to be enhanced as Arpley Country Park.
- 1.8 This report has been informed by field survey, the Arboricultural Walkover Survey and Desktop Report (TEP Ref: 6909.02.001 V3.0) and desk study information obtained from RECORD Local Biological Records Centre, MAGIC Maps and satellite and aerial imagery. The Arboricultural Walkover Survey and Desktop Report (TEP Ref: 6909.02.001 V3.0) should be read in conjunction with this report.
- 1.9 The objectives of this report are to identify:
- Suitable bat roost habitat (trees) within the site;
 - Other habitat features of importance to bats within the site and the wider zone of influence;
 - Requirements for further surveys that may be needed to inform any future development proposals
 - Preliminary implications of illustrative development proposals in regard to bats in terms of relevant legislation and conservation status
 - Appropriate recommendations (as far as possible for this preliminary stage) for avoidance and design options to minimise potential impacts on bats; and
 - Compensation and enhancement measures (as far as possible for this preliminary stage) that may be required to maintain the Favourable Conservation Status (FCS) of local bat populations and net biodiversity value within the site.

2.0 Site Description

- 2.1 The site is located within the borough of Warrington, with a central grid reference of SJ 58401 86246. There is extensive tree cover within the site, a small proportion of which includes individual trees within areas of dense/continuous scrub or grassland, but the majority of which comprises woodlands, including semi-natural broad-leaved woodland, stands of broad-leaved regeneration, broad-leaved plantation woodland and wet semi-natural broad-leaved woodland. Moore Nature Reserve is dominated by woodland with numerous waterbodies and areas of open grassland. The site outline is shown in red in Figure 1 below, in the context of the wider landscape.

Figure 1. Site Location Plan - showing the site and the proposed future developable areas that were surveyed during the PRA (Contains Ordnance Survey data © Crown Copyright and Database Right 2018).



- 2.2 Other habitats present within the site include modified neutral grassland, acid and marshy grassland, tall ruderal herb, dense/continuous and scattered scrub, swamp, standing water including ponds and lakes and ditches.

Wider Landscape

- 2.3 Arpley Landfill continues to the north and west of the site and the River Mersey and residential and industrial development associated with the towns of Penketh and Great Sankey lie beyond.

- 2.4 Arable land and the west coast mainline rail route, with industrial and residential development associated with the town of Latchford lies to the east. Extensive farmland and the River Mersey Estuary are located to the west. The site is immediately bordered by the Manchester Ship Canal with the village of Moore present on the opposite bank to the south.

3.0 Methods

3.1 Surveys undertaken to provide an initial assessment of suitability of the site for supporting roosting, foraging and commuting bats within the locality included:

- A desk study data search; and
- A ground-based appraisal (GBA) of tree roost suitability.

Desk Study

3.2 Bat records within 2km of the site were requested from RECORD Local Biological Records Centre (serving Cheshire, Halton, Warrington and Wirral) in July 2019. Data included species records, mapped approximate locations of bat records and maps of locally designated sites. The data can be viewed at Appendix A.

3.3 The Multi-Agency Geographic Information for the Countryside (MAGIC) Map was also used during the desk study data search to identify statutory protected sites within the wider landscape. Google Maps and Google Earth Map data ©2019 Google Satellite imagery, were also used to evaluate connectivity of the site to the wider landscape and view how the woodlands within the site had developed over time.

3.4 The desk study data search was used to identify the pre-recorded presence of bats within the local landscape, in order to understand likely bat assemblages and highlight potential key features within the desk study search area that may be of relevance to assessing the value of the site with regard to bats.

Daytime Ground-based Roost Appraisal of Trees

3.5 The PRA was undertaken by a licensed bat consultant on 9th and 15th May and 15th and 16th August 2019.

3.6 The PRA comprised a ground-based appraisal (GBA) of all trees within the site. Where trees with potential roost suitability were identified, close focusing binoculars were used, where appropriate, to aid the search for any field signs of bats or features with bat roosting potential. Most tree roosts are created by one or a combination of the following features:

- old woodpecker holes;
- splits in trunk, bough or large branches;
- rot holes in trunk, bough or large branches;
- holes formed by two boughs or branches growing in contact;
- loose or lifting bark; and
- underneath a covering of dense latticed creeper, usually ivy *Hedera helix*.

3.7 Trees were categorised with reference to the Bat Conservation Trust (BCT) Good Practice Guidelines (Collins, 2016) (see Table 1 below).

Table 1. Bat roost habitat suitability categorisation descriptions and descriptions for categorisation of habitat suitability with regard to commuting and foraging bats.

Tree Roost Suitability	Characteristics	Potential Roost Features (PRF)
Negligible	Typically small / young trees which have not developed any potential features described above.	No PRFs are present.
Low	A tree of sufficient size and age to contain PRFs but possibly with none seen from the ground, or PRF observed with only very limited roosting opportunities (as per BS 8596:2015)	One or more PRF that could be used by individual bats opportunistically, but which is not suitable to be used on a regular basis or by larger numbers of bats.
Moderate	Large / mature trees with one of more features such as woodpecker holes, sheltered rot holes, vertical or horizontal cracks in stems or branches, other hollows or cavities, partially detached platey bark, partially detached or overlapping mature ivy (>50mm stem diameters) or other suitable cavity or cavity forming feature.	A tree with one or more PRF that could be used by bats but which are unlikely to support a roost of high conservation status (i.e. not suitable for maternity or hibernation use).
High		A tree with one of more PRF that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time (e.g. maternity/hibernation) due to their size, shelter, protection, conditions and surrounding habitat.

3.8 Considering the density of trees within woodland areas especially, it was not considered appropriate to individually identify trees within the site determined as having negligible bat roost suitability. Data are presented only for those trees assessed to have low, moderate or high roost suitability.

Appraisal of Foraging and Commuting Habitat

3.9 Habitats within the site were also reviewed in accordance with the BCT 2016 Guidelines as to the suitability of the site to support foraging and commuting bats. For details of categorisation of foraging and commuting habitats for bats see Table 2 below.

Table 2. Habitat suitability categorisation descriptions for commuting and foraging bats.

Suitability	Commuting/ Foraging Habitats
Negligible	Negligible features on site likely to be used by commuting or foraging bats. A general lack of linear features and low habitat, structural or floristic diversity.

Suitability	Commuting/ Foraging Habitats
Low	Habitat that could be used by small numbers of commuting bats (e.g. a gappy hedgerow or an un-vegetated stream) or foraging bats (e.g. a lone tree or small patch of scrub) but which is isolated from the surrounding countryside. Suitable but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or patch of scrub.
Moderate	Continuous habitat connected to the wider landscape that could be used by bats for commuting (e.g. lines of trees or scrub or linked back gardens), or for foraging (e.g. trees, scrub, water, grassland).
High	Continuous high quality habitat that is strongly connected with the wider landscape that is likely to be used regularly by commuting bats (e.g. river valley, vegetated stream, woodland edge, hedgerows with trees) or foraging bats (e.g. broadleaved woodland, grazed parkland, tree-lined watercourses or ponds). Site is close to and connected to known roosts.

Survey Constraints

- 3.10 Optimal conditions for identifying tree PRFs when trees are not in leaf. According to the BCT Guidelines (Collins, 2016), the recommended survey window for GBA is between December and March (inclusive). As the PRA of trees was carried out in May and August, this is considered sub-optimal season for survey. Poor light and dense foliage (including ivy cover) can cause PRFs to be missed from ground-based vantage points. Rain shortly before or during the GBA reduces light and can limit the chances of viewing any staining or other external field signs, making identification of PRFs more difficult.
- 3.11 During the GBA survey on 16th August 2019 the weather conditions provided good light but it rained during the majority of the survey. Most instances where PRFs could not be fully assessed during the GBA were a result of restricted visibility of trees from ground-level due to the size and age of the trees, as well as the foliage present.
- 3.12 These constraints (rain and timing of the survey resulting from reduced visibility into tree canopies) were overcome by adopting a precautionary approach to assessing bat roost suitability. Notes were also included where detectability of PRF may have been affected for reference during any future update or further surveys.
- 3.13 Some areas of woodland and trees within the site were inaccessible due to dense scrub or waterlogging and trees within these areas could therefore not be closely accessed for the GBA to identify roost suitability on an individual tree by tree basis. The PRA has taken this constraint into consideration by assessing woodland areas and groups of trees according to their risk of containing trees with bat roost suitability.

- 3.14 Risk areas were determined based on the age and quality of the woodlands, woodland area or tree group. This was further informed by the findings of the Arboricultural Walkover in addition to the presence of trees with Potential Roost Features (PRFs) confirmed by the GBA. Risk areas were categorised as negligible, low, moderate or high depending on the likely presence of trees with corresponding bat roost suitability.

4.0 Results

Desk Study

Designated Sites and Important Habitats

- 4.1 A 10km radius search was also applied, in line with the BCT 2016 Guidelines (Collins), to determine the presence and relevance of nature conservation sites for which bats form a main reason for designation. No sites were identified within 10km of the site which were designated due to the bat populations they supported or had bat species referenced within site citations.
- 4.2 There are several designated and notable sites within 10km of the site which comprise habitats that may be used by bats within the wider landscape as habitat resources for roosting, foraging and commuting. Further information regarding designated wildlife sites is presented in the Ecological Assessment Report (TEP Ref: 6929.01.001). In summary, these include:
- Mersey Estuary Special Protection Area (5.9km southwest) - a large sheltered estuary incorporating extensive saltmarsh and intertidal habitats with some areas of rocky shoreline within a rural and industrial environment that creates a significant landscape corridor;
 - Manchester Mosses Special Area of Conservation (SAC) (8.27km northeast) - large extents of raised bogs, with additional wetland habitats, grasslands, scrub and woodlands that will provide foraging habitats and local commuting networks;
 - Rixton Clay Pits SAC (9.3km east) - extensive mosaics of standing water, scrub, woodland and calcareous grasslands which will provide important foraging habitats;
 - Oxmoor Wood Local Nature Reserve (LNR) (1.2km southwest) - comprising grassland, woodland and wetlands with direct connectivity to the site along Manchester Ship Canal;
 - Dorchester Park LNR (1.7km southwest) - comprising woodland and grassland which offer foraging habitats, with no major landscape corridor but a permeable landscape between the LNR and the site;
 - 21 Local Wildlife Sites (LWS), including Moore Nature Reserve within the site, Moss Side Farm and Upper Mersey Estuary are located immediately adjacent to the site and three other LWS within 1km from the site, all of which contain habitats that will provide important foraging habitats for bats in addition to local commuting networks.
- 4.3 Although none of the designated wildlife sites identified within 10km of the site include bats or bat habitats as reasons for their designation, the habitats they support will be used as part of a mosaic of roosting, foraging and commuting resources within the wider landscape by local bat populations.

Species and Roost Records

- 4.4 Data provided by RECORD Local Biological Records Centre (serving Cheshire, Halton, Warrington and Wirral) identified several species of bat recorded within 2km of the site. All bat species are protected under The Conservation of Habitats and Species Regulations 2017 (HabRegs2) (including European Protected Species (EPS)) and Schedule 5 of the Wildlife and Countryside Act 1981, as amended (WCA5).
- 4.5 Some bat species recorded within 2km of the site are also protected under the legislation below. Full details of bat records are given at Appendix A.
- Species of principal importance under Section 41 of the Natural Environment and Rural Communities Act 2006 (S41); and
 - Habitats and other notable species listed under the Local Biodiversity Action Plan (LBAP).
- 4.6 The at species recorded within 2km of the site include:
- Common pipistrelle *Pipistrellus pipistrellus* (S41, WCA5, HabRegs2);
 - Soprano pipistrelle *Pipistrellus pygmaeus* (LBAP, S41, WCA5, HabRegs2);
 - Pipistrelle species *Pipistrellus* sp. (S41, WCA5, HabRegs2);
 - Brown long-eared *Plecotus auritus* (LBAP, S41, WCA5, HabRegs2);
 - Daubenton's *Myotis daubentonii* (LBAP, S41, WCA5, HabRegs2);
 - Whiskered *Myotis mystacinus* (LBAP, S41, WCA5, HabRegs2);
 - Noctule *Nyctalus noctula* (LBAP, S41, WCA5, HabRegs2); and
 - Unknown bat species (WCA5, HabRegs2).
- 4.7 Of these, records for the following bat species were identified within the site:
- Noctule recorded at Arpley Tip and foraging within the grasslands and along Lapwing Lane at Moore Nature Reserve;
 - Common pipistrelle, soprano pipistrelle, pipistrelle species and Daubenton's bat recorded along Lapwing Lane and near Birchwood Pool in Moor Nature Reserve; and
 - Common pipistrelle, soprano pipistrelle, pipistrelle species, brown long-eared bat, Daubenton's bat, whiskered bat and noctule all recorded within Moore Nature Reserve, with some records associated with Moss Wood, Birch Wood and Pump House Pool.
- 4.8 No pre-existing records for bat roosts were identified within the site. Sixteen records of bat roosts, including several records for the same species roosting at the same site, were identified within 2km of the site. Roost records included:
- brown long-eared bat - Manor Farm House (approximately 1.68km south-west) and Walton Hall (1.3km south-east);
 - common pipistrelle bat - Manor Farm House (approximately 1.68km south-west), Walton Hall (1.3km south-east) and an unnamed site (1.50km north);
 - soprano pipistrelle - Manor Farm House (approximately 1.68km south-west) and Walton Hall (1.3km south-east); and
 - pipistrelle species - unnamed site 1.67km north-west.

4.9 Licencing data for European Protected Species (EPS) were also checked using the MAGIC Maps website. Two EPS Mitigation Licences are within a 2km buffer zone surrounding the site, a further seven are located between 2-5km of the site. EPS Mitigation Licences located within 5km of the site are detailed in Table 3 below. Breeding sites and roosts identified within the EPS Mitigation Licences are likely to have been used by bat populations that would also likely be supported by the site for foraging, commuting and roosting habitat.

Table 3. Granted European Protected Species Applications (England) within 5km of the site as detailed on the MAGIC Maps website.

Reference of Granted Application	Species on the Licence	Licence Start to End Date	Impacts Permitted by Licence	Orientation & Distance from Site
EPSM2009-1303	Common pipistrelle, soprano pipistrelle, brown long-eared bat	01/11/2009 - 31/10/2011	Damage of a breeding site & resting place	1.34km south-east
EPSM2009-654	Brown long-eared bat	19/04/2010 - 30/09/2011	Destruction of a breeding site & resting place	1.38km north-west.
2014-5319-EPS-MIT	Soprano pipistrelle	06/02/2015 - 05/02/2020	Destruction of a resting place	2.48km south-east
EPSM2010-2438	Common & soprano pipistrelles, brown long-eared, whiskered bat, Brandt's bat	22/12/2011 - 30/09/2016	Destruction of a breeding site & resting place	2.60km north
2015-8449-EPS-MIT to MIT-2	Brown long-eared bat	15/06/2015 - 30/06/2020	Destruction of a resting place	3.05km south-west
2015-15019-EPS-MIT to MIT-6	Common pipistrelle, soprano pipistrelle, brown long-eared bat	24/03/2016 - 30/09/2028	Destruction of a breeding site & resting place	3.21km south-west
2017-30673-EPS-MIT	Common pipistrelle	09/08/2017 - 31/12/2022	Destruction of a resting place.	3.85km south-west
2016-22136-EPS-MIT	Common pipistrelle	03/03/2016 - 31/08/2017	Unknown	4.54km north-east
2017-31589-EPS-BDX	Soprano pipistrelle	01/10/2017 - 31/10/2017	Damage and destruction of a breeding site & resting place	4.64km east

4.10 Records give a useful indication of the distribution of bat species in the locality, although absence of records cannot be taken to represent actual absence in the field.

- 4.11 Species recorded within the wider landscape are likely to use the site not only for roosting but also for foraging and commuting. The Core Sustainance Zones (CSZ) for species recorded within the site locality as sited in the BCT Guidelines (Collins, 2016) include:
- Common pipistrelle - 2km
 - Soprano pipistrelle - 3km
 - Pipistrelle species - 2-3km
 - Brown long-eared - 3km
 - Daubenton's - 2km
 - Whiskered/Brandt's - 1km
 - Noctule - 4km
- 4.12 The site therefore falls within the CSZ from known roost sites, including maternity roosts, for soprano pipistrelle, common pipistrelle and brown-long eared bats identified through the records search and previously granted EPS licences. While no pre-existing roost records of noctule, Daubenton's bat or whiskered/Brandt's bat were identified within 2km from the site, given the habitats present and the size of the site, the site is highly likely to be a valuable roosting, foraging and commuting resource within the wider landscape for these species.
- 4.13 Common and soprano pipistrelles generally use tree roosts for smaller roosts such as for mating or day roosts, with maternity colonies found mainly in buildings. However, soprano pipistrelle nursery roosts have been located within tree holes and bat boxes in addition to these habitats being used for mating roosts. Pipistrelle roosts within buildings have been found to be selected based on surrounding habitats in particular presence of woodland and water (Davidson-Watts, 2007). Soprano pipistrelles are also frequently found hibernating within tree roosts (Dietz and Keifer, 2016). Pipistrelles are generalists in terms of habitat preference for foraging and commuting though, soprano pipistrelles are more dependent on woodlands and waterbodies than common pipistrelle.
- 4.14 Brown long-eared bats use tree roost habitat for maternity roosts, hibernation roosts and smaller roosts. Brown long-eared bats are known to use a variety of PRFs associated with trees for roosting including loose bark, rot holes, woodpecker holes and bat and bird boxes. Foraging grounds are often located within a few hundred metres of summer roosts and habitats preferred include woodlands, open grassland and parks (Dietz and Keifer, 2016).
- 4.15 Daubenton's bat roosts are often found in hollow trees, with nursery colonies formed in the summer particularly in tree holes and bat boxes in addition to within cavities in bridges or sometimes buildings. Tree roosts can occasionally be used for hibernation. Daubenton's frequently forage over water and within woodlands with roosts often located within trees near glades, along woodland footpaths and trails and at the woodland edge (Dietz and Keifer, 2016).
- 4.16 Whiskered/Brandt's species can roost in trees in the summer. Brandt's are more strongly associated with woodlands and water sources than whiskered, though both species can be found roosting in tree holes, cracks and bat boxes and foraging around woodland edges and areas of still open water (Dietz and Keifer, 2016).

4.17 Noctule roosts are almost exclusively found in tree holes, but sometimes found in bat boxes or buildings (Altringham, 2003). For summer roosts, woodpecker holes have been found to be heavily favoured (Dietz and Keifer, 2016). Willow, alder and oak trees, which are abundant species within the site are frequently used particularly when close to woodland edges or along roads and tracks. Tree roosts can also be used for hibernation during the winter. Nursery roosts can frequently be changed between trees within areas up to 200ha.

Daytime Ground-based Roost Appraisal of Trees

4.18 The site includes several compartments of woodland, which are on predominantly level ground, though the topography is raised along the Manchester Ship Canal and the former Runcorn and Latchford Canal which traverse Moore Nature Reserve from west to east. The site steeply slopes in sections towards the larger central lakes and wet semi-natural broad-leaved woodlands within Moore Nature Reserve. The woodlands have various open areas such as glades, grasslands, lakes, ponds and swamp habitat providing edge habitats ideal for bat foraging. The site also includes linear features such as formal and informal footpaths and access tracks around woodland compartments. These features will provide corridors for bat foraging and commuting within the site.

4.19 The GBA of trees within the site identified a provisional 116 trees with low to high bat roost habitat suitability (Table 1). Eleven trees had roost habitat suitability due to the presence of bat boxes. Approximate tree locations and roost suitability are illustrated at Drawing G6929.01.050.

4.20 Full details of assessed trees and their identified PRFs are reported at Appendix B, but in summary, of the 127 trees identified by the GBA to have bat roost suitability:

- 29 trees have high roost suitability;
- 71 trees have moderate roost suitability;
- 16 trees have low roost suitability; and
- 11 trees lacking natural PRFs but which have bat boxes installed.

4.21 This baseline data provides a preliminary estimate of the roost habitat resources provided within the site. The bat boxes within the site have likely been installed to enhance the roosting opportunities within the LWS as part of the wider conservation objectives for the LWS. There are no records of EPS Mitigation Licences within the LWS or evidence that the bat boxes have been implemented as part of mitigation and compensation for roost loss elsewhere.

4.22 A summary of general further survey requirements depending on roost habitat suitability categorisation is provided in Table 4 below.

Table 4. Evaluation of bat roost habitat suitability of trees and required levels of further survey.

Roost Habitat Suitability	Further Survey Requirements if Trees are to be Impacted by Future Proposals
Negligible	No further survey required.

Roost Habitat Suitability	Further Survey Requirements if Trees are to be Impacted by Future Proposals
Low	<p>Aerial inspection to further assess PRFs and confirm roost suitability and presence/likely absence of a bat roosts where PRFs could not be fully assessed from a ground-based vantage point. Aerial inspection undertaken during the winter to better assess PRFs.</p> <p>Where aerial inspection is not feasible, precautionary soft felling/pruning measures must be adhered to under supervision of a licensed bat ecologist.</p>
Moderate	<p>Aerial inspection to further assess PRFs and confirm roost suitability and presence/likely absence of a bat roost.</p> <p>Subject to aerial inspection verifying roost status (or being inaccessible for aerial inspection): Two separate nocturnal roost survey visits, including one dusk emergence survey and a separate dawn re-entry survey undertaken between May to September with at least one survey undertaken between May to August.</p>
High	<p>Aerial inspection to further assess PRFs and confirm roost suitability and presence/likely absence of a bat roost.</p> <p>Subject to aerial inspection verifying roost status (or being inaccessible for aerial inspection): Three separate nocturnal roost survey visits, including at least one dusk emergence survey and a separate dawn re-entry survey (the third visit being either a dusk emergence or dawn re-entry survey) undertaken between May to September with at least two surveys undertaken between May to August.</p>

Risk Areas

- 4.23 Risk areas, determined based on the age and quality of the woodlands and predominant characteristics of trees present within, are illustrated at Drawing G6929.01.051.

Negligible Risk Area

- 4.24 Negligible risk areas were identified as mainly containing or being likely to contain trees with 'Negligible' bat roost habitat suitability. Trees noted within these areas generally exhibited no PRFs and were young and small in size often forming areas of scrub, regeneration or coppice.
- 4.25 Negligible risk areas included individual young and scrubby trees scattered around woodland edges or within areas of young developing woodland, which also had dense scrub. In these areas species frequently comprised hawthorn *Crataegus monogyna*, elder *Sambuccus nigra*, willow species *Salix* sp., birch species *Betula* sp. and in wetter areas alder *Alnus glutinosa*.

- 4.26 Negligible risk areas included a compartment of young developing woodland and dense scrub in the south of Moore Nature Reserve adjacent to the Manchester Ship Canal, compartments of scrub and young developing woodland around the edge of the large lake in the south-west of the site, scattered trees and scrub within the north of Moore Nature Reserve around areas of swamp and ponds and scattered smaller, younger trees within open grassland areas.
- 4.27 Other compartments noted as negligible risk areas frequently included areas of young broad-leaved plantation and regeneration, with species such as alder, grey willow *Salix cinerea*, English oak *Quercus robur*, birch and sycamore *Acer pseudoplatanus*. Compartments with young broad-leaved plantation and regeneration woodland structure included compartments in the south, east and north of Moore Nature Reserve.
- 4.28 Areas of regeneration woodland developing with dense/continuous scrub with occasional more mature trees were present within the south and west of Moor Nature Reserve particularly along a bridleway and footpath leading west from Lapwing Lane in parallel to the Manchester Ship Canal. Small areas of regeneration woodland were also present in the south-east corner of Moore Nature Reserve. These areas of regeneration woodland were frequently dominated by grey willow and other scrub species such as hawthorn, birch and gorse *Ulex europaeus*.

Figure 2. Example of negligible risk area in the south of Moore Nature Reserve



Figure 3. Example of negligible risk area in the north of Moore Nature Reserve.



Low Risk Area

- 4.29 Low risk areas were identified as mainly containing or being likely to contain trees with up to low bat roost suitability. Trees noted within these areas generally exhibited small PRFs suitable for use by individual bats or had no obvious PRFs but were of a size where small PRFs may be present.
- 4.30 Low risk areas included compartments with regeneration and coppice woodland structure often including alder, willow and birch species with small areas noted in the west, north-west and north-east of Moore Nature Reserve. Areas of young woodland developing from scrub were also included within the low risk category, such as a compartment along a footpath in the south-east of Moore Nature Reserve with some mature wild cherry *Prunus avium*, hawthorn and alder amongst developing scrub.
- 4.31 Areas of scrub and regeneration woodland identified as low risk included compartments in the north and in the centre of Moore Nature Reserve around one of the large lakes and along Lapwing Lane, which had occasional more mature crack willows *Salix fragilis*, English oak and alder growing amongst dense willow, elder and hawthorn scrub.
- 4.32 Scattered trees within low risk areas such as those growing on small islands within ponds and at the edge of lakes, often included crack willows which were large in size but had no obvious PRFs.

Figure 4. Example of low risk area in the south-west of Moore Nature Reserve



- 4.33 Some low risk areas included blocks of semi-natural broad-leaved woodland that had semi-mature trees mainly including birch, willow, alder and sycamore that had no obvious PRFs but were of a size where PRFs may be present. These compartments included a distinct band of birch trees along a footpath running parallel with the former Runcorn and Latchford Canal in the south-west of Moore Nature Reserve (Figure 4), a large area of woodland on the south-east corner of the western lake and woodland bands around the western lake with mature alder and crack willows. A sycamore dominated woodland on a steep embankment along the former Runcorn and Latchford Canal in the centre of Moore Nature Reserve was also identified as a low risk area, as whilst the trees were more mature within the woodland and of a size and age where PRFs may be more likely to develop, no obvious PRFs were noted.

Moderate Risk Areas

- 4.34 Moderate risk areas were identified as mainly containing or being likely to contain trees with at least moderate bat roost habitat suitability. Trees noted within these areas generally exhibited several small PRFs or individual larger PRFs suitable for use by small numbers of bats. In some circumstances trees were of an age and size where PRFs may be present and absence could not be confirmed from a ground-level inspection.
- 4.35 Moderate risk areas included compartments with semi-natural broad-leaved woodland with dense scrub making some areas less accessible for survey.

- 4.36 Compartments identified as having moderate risk areas included a belt of woodland within the west of the site dominated by birch, alder and willow with larger more mature trees, which were difficult to access due to the surrounding scrub and ponds, a compartment in the east of the site with several mature alders bounding a strip of grassland and smaller compartments of semi-mature to mature oak dominated woodland in the north and centre of the site, in places bounding footpaths and Lapwing Lane. These areas of woodland were not as well established as older stands in the north and centre of Moore Nature Reserve but were likely to host trees with characteristics such as dead wood and failed stems, creating PRFs suitable for use by small numbers of bats.

Figure 5. Example of moderate risk area in the north of Moore Nature Reserve where semi-mature to mature oak woodland is present.



- 4.37 Moderate risk areas also included compartments in the north of Moore Nature Reserve dominated by English oak and alder, with glades and clearings created by ponds and swamp habitat within and adjacent to these areas.

High Risk Areas

- 4.38 High risk areas were identified as mainly containing or being likely to contain trees with high bat roost habitat suitability. Trees noted within these areas generally exhibited numerous small PRFs or a few larger PRFs suitable for use by larger numbers of bats or PRFs that were assessed as providing suitable habitat for roosts with high conservation significance (maternity or hibernation roosts).
- 4.39 In some circumstances GBA was not possible due to dense scrub understorey or waterlogging and silty sediment surrounding trees restricting access. In these instances high risk areas were determined due to the presence of trees with a structure, age and size similar to trees assessed as having high roost habitat suitability within the same locality.

- 4.40 The more mature areas of semi-natural broad-leaved woodland included areas of wet woodland containing standing deadwood and were dominant in the north and centre of Moore Nature Reserve, associated with the former Runcorn and Latchford Canal. These compartments of woodland can be viewed within the site on 1945 maps presented on Google Earth and are the clearly more established areas of woodland within the site.

Figure 6. Example of high risk area in the centre of Moore Nature Reserve where wet woodland is present with standing dead wood and areas where inaccessible during PRA survey.



- 4.41 A compartment of wet semi-natural broad-leaved woodland in the east of the Moore Nature Reserve had several standing dead oaks *Quercus* sp. and birch *Betula* sp., which could not be accurately mapped as they were inaccessible due to scrub, and waterlogging, but which were identified by distant view (using binoculars) to support likely PRFs such as woodpecker activity and branch failures. This compartment of woodland also included high quality oak and birch with structural diversity and numerous large, mature trees.
- 4.42 The high risk area in the north-west corner of Moore Nature Reserve included a compartment of established alder dominated woodland with some birch, English oak and grey willow. This compartment is an exceptionally good wet woodland with abundant ferns and mosses, standing water and many areas inaccessible. Trees were frequently noted with branch cavities, dead wood and some veteran characteristics and provided a woodland with a varied structure and complexity of high quality, valuable habitat.
- 4.43 A smaller high risk area is present in the north of Moore Nature Reserve where several mature alders are present within a mixed broad-leaved woodland. A high risk area was also noted within an alder and oak dominated compartment of woodland surrounding ponds and swamp habitat within the north of Moore Nature Reserve.

Appraisal of Foraging and Commuting Habitat

- 4.44 The site includes continuous high quality habitat that is strongly connected with the wider landscape and is likely to be used regularly by commuting or foraging bats. Habitats present within the site are described in the TEP Habitat Survey Appendix Technical Report (Report Ref: 6929.01.026) and illustrated on the associated Phase 1 Habitat Map Drawing G6929.01.001B.1-7.
- 4.45 The site has several compartments of woodland of varying age and structure and open areas or edge habitats including glades, grassland, lakes, ponds and swamp all of which provide valuable foraging habitats for bats. The site also includes linear features such as formal and informal footpaths and access tracks around woodland compartments and the Manchester Ship Canal to the south and the Mersey Estuary to the north, all of which provide valuable commuting habitat for bats. These habitats and associated features are of high value for supporting commuting and foraging bats within the site and the wider landscape.

5.0 Conclusions

Desk Study

Designated Sites and Important Habitats

- 5.1 The Ecological Impact Assessment (TEP Ref: 6929.01.001) provides full details of the impact assessment upon statutory and non-statutory designated wildlife sites. Warrington Local Plan Core Strategy (July 2014) identifies that proposals for future development likely to have an adverse effect on regionally and locally designated sites, will not be permitted unless the reasons for the development clearly outweigh the need to safeguard the substantive nature conservation value of the site.
- 5.2 Specific to impacts relating to bat roosts in trees, there are no pathways whereby the possible loss of tree bat roosts and tree roost habitat within the site would result in likely significant effects upon the Mersey Estuary SPA, Manchester Mosses SAC or Rixton Claypits SAC.
- 5.3 The designated sites and notable habitats identified during the desk study do comprise habitats of high foraging value to bats including, woodlands, grasslands, reedbeds, swamp and waterbodies. It is therefore feasible, given the CSZs for certain species and the generally dynamic nature of bat roosting in trees that the possible loss of bat roosts and the loss of bat roost and supporting habitats from within the site may adversely impact upon a number of designated wildlife sites. In summary:
- Moore Nature Reserve LWS is located within the site and will be directly affected by proposals through loss of habitat and potential loss of bat roosts;
 - Two LWS (Moss Side Farm and Upper Mersey Estuary) lie immediately adjacent to the site and may be adversely affected should roost sites be present within either LWS that rely upon foraging habitats within the site or should loss of habitat within the site result in damage, degradation or habitat fragmentation within either LWS;
 - Oxmoor Wood LNR is directly connected to the site via the landscape corridor formed by the Manchester Ship Canal. While the LNR is at sufficient distance that direct impacts are unlikely as a consequence of the proposals, indirect effects such as fragmentation may result in addition to loss of foraging habitat within the CSZ for a range of bat species.

Species and Roost Records

- 5.4 Several bat species and confirmed roosts, including maternity roosts were recorded within 2km of the site. Species recorded within the wider landscape are likely to use the site not only for roosting but also for foraging and commuting. Additionally, should bat roosts be present within the site, these roost sites would be likely to form part of bat colonies that are more widely dispersed, using multiple roost sites which may include building, trees and other roost sites in the surrounding landscape.

Daytime Ground-based Roost Appraisal of Trees

- 5.5 The PRA of trees within the site identified a provisional minimum estimate of 127 trees with bat roost habitat suitability ranging from low to high roost habitat suitability in accordance with the BCT 2016 Guidelines (Collins). Due to the abundance and density of the woodland areas within the site there are likely to be additional trees within the site with bat roost suitability which could not be individually identified during the PRA.
- 5.6 Trees and woodlands within the site will require removal to allow for development within the site. Roost loss within the site will have a significant negative impact on bats present within the wider landscape. Bat roost habitat will be destroyed and offsite roosts impacted by severance of commuting routes and removal of foraging habitat.
- 5.7 Warrington Local Plan Core Strategy (July 2014) identifies that proposals for development likely to have an adverse effect on locally designated sites, will not be permitted unless the reasons for the development clearly outweigh the need to safeguard the substantive nature conservation value of the site.

Risk Areas

High and Moderate Risk Areas

- 5.8 High and moderate risk areas identified during the PRA of trees within the site suggest that the areas likely to contain more unrecorded trees with high or moderate bat roost suitability are located within the more mature stands of semi-natural broad-leaved woodland in the north-west and centre of Moore Nature Reserve LWS. These areas have been present within the site for a longer period of time and trees have therefore had time to develop characteristics associated with supporting bat roosts. Woodpecker activity is more abundant in these areas of woodland due to the increased abundance of standing deadwood, most likely a result of waterlogging as well as the age of the trees. Woodpecker activity increases the roosting resources within these areas of the site in addition to PRFs developing due to damage, disease and decay overtime.
- 5.9 Given the age and character of the trees present within high and moderate risk areas and the complexities of the wet woodland in which the trees are generally located, it would not be possible to replace these areas of woodland within meaningful timeframes.

Low and Negligible Risk Areas

- 5.10 Low and negligible risk areas may not have been identified as having as a majority proportion of trees with moderate or high bat roost suitability, but these areas remain high value habitats for supporting bat foraging and commuting. Low and negligible risk areas include younger, less developed woodland and areas of dense/continuous scrub with open grassland areas, reedbeds, swamp, linear corridors along footpaths and waterbodies all of which provide valuable foraging and commuting resources for bats.

- 5.11 Some negligible risk areas also provide connectivity with the wider landscape to the east, west and north. If left to develop overtime, these areas of woodland would eventually provide roosting resources for bats once trees reached an age where decay, disease and damage provided PRFs.
- 5.12 Development of high, moderate and low risk areas within the site will have a significant negative impact on bats in the wider landscape. Development of these areas within Moore Nature Reserve LWS would be contrary to planning policy given the nature conservation value of the LWS.

Appraisal of Foraging and Commuting Habitat

- 5.13 The site includes continuous high quality habitat that is strongly connected with the wider landscape and is likely to be used regularly by commuting or foraging bats within the site and the wider landscape.
- 5.14 Proposals for future development of the site will include removal of habitats of high value for supporting commuting and foraging bats including blocks of woodland, grassland, scrub and waterbodies. Proposals for the site will impact bat foraging and commuting within the site and the wider landscape. Particularly as Moore Nature Reserve LWS includes some of the larger, more connected stands of woodland within the wider landscape. Habitat loss within the site is likely to result in a significant negative impact on bats present within the wider landscape.

Proposed Mitigation and Compensation

- 5.15 An area of Arpley Landfill to the north of the site as shown on AEW Architects Drawing - B10173-AEW-XX-XX-DR-A-0112_P3, is proposed to act as a biodiversity offsetting area for the loss of habitats within the site. This area is proposed to be enhanced as Arpley Country Park.
- 5.16 Existing woodlands within the proposed biodiversity offsetting area include semi-mature broad-leaved plantation woodland, which is currently not diverse in structure and possesses poor ground flora and no understorey. Woodlands within this area include higher proportions of ash, birch and willow species and much less oak and alder as is characteristic within the woodlands at Moore Nature Reserve LWS. Even over a considerable timeframe, these areas of woodland are unlikely to replicate the woodland habitats to be lost within the site because species composition is different and, furthermore, the identified offsetting area being a capped former landfill means that trees may not be able to naturally develop to maturity as root zones become restricted.
- 5.17 If the need for future development of the site outweighs the need to safeguard the nature conservation value of Moore Nature Reserve LWS, mitigation, compensation and enhancement measures will need to be designed and implemented within the proposed biodiversity offsetting area. The mitigation, compensation and enhancement measures will need to ensure that the proposed biodiversity offsetting area will replicate the roosting, foraging and commuting habitats lost with regard to bats.

6.0 Recommendations

- 6.1 This section sets out the recommendations for appropriate further survey, mitigation and enhancement based on the potential impacts set out in Section 5.0.

Trees with Bat Roost Suitability

- 6.2 The mitigation hierarchy requires that potential impacts are first avoided and where this is not possible, are minimised before mitigation is considered. Trees and woodland risk areas identified as having bat roost habitat suitability should be retained within development proposals where possible. High suitability / risk areas should be prioritised, followed by those with moderate suitability / risk, then low suitability / risk.
- 6.3 Proposed future development within the site would not facilitate retention of the majority of trees and woodland compartments surveyed. Large areas of more mature woodland within Moore Nature Reserve LWS would require removal. Future proposals should be designed to avoid high risk areas of woodland. Further surveys in regard to bats will be required to establish more defined impacts on bat populations within the site and the wider landscape and to enable suitably detailed mitigation and compensation to be determined should development be permitted.
- 6.4 The GBA should ideally be repeated during the period October to February, when foliage from trees and ivy are lacking and views into the canopies are less obscured.
- 6.5 Aerial inspections by a licensed bat consultant should be undertaken of all trees with roost habitat suitability to verify the presence of a roost, confirm the presence and characterisation of PRFs and confirm tree roost habitat suitability. Localised scrub clearance may be required to facilitate access to certain trees for aerial inspections; for this reason, aerial inspections would ideally be timed during the period October to February to avoid risk of disturbance to bird nesting.
- 6.6 Inspection of bat boxes within the site should also be undertaken as part of the aerial inspections by a licensed bat consultant.
- 6.7 Should bats or residual evidence of bats be identified during aerial inspections, confirmation of roost characteristics including species (via DNA analysis of droppings if no bats are present), the likely roost status (based on PRF characteristics, number of bats/residual evidence found) and roost entry/exit points will be feasible. The findings from the aerial inspections, subject to any health and safety limitations, would therefore be sufficient to inform the baseline for the EclA, support conclusions on viability of the site for development and inform masterplanning.
- 6.8 Considering timescales to implementation of proposed future development (earliest commencement 2020) and the dynamic nature of bat roosting in trees, completion of nocturnal roost surveys at this early stage is unlikely to be warranted. Nocturnal roost surveys of trees generally provide low confidence in negative results. The scale of the survey area, in combination with the relative abundance of bat roost opportunities, means that bat occupation of tree roosts may vary considerably in the intervening years.

- 6.9 For individual trees identified by the GBA to have roost habitat suitability, where aerial inspections may not be possible due to health and safety constraints, these trees may require nocturnal roost surveys. A minimum of two nocturnal surveys between May and August for trees with moderate suitability and up to three surveys for trees with high suitability, would be required to confirm likely absence of a bat roost at the time of survey). Multiple survey visits to individual trees should ideally be spaced at least two weeks apart. While current guidance (Collins, 2016) for nocturnal roost surveys of trees and structures recommends particular combinations of dusk emergence and dawn re-entry surveys, nocturnal surveys of trees are problematic with regards visibility (particularly when located within woodland) and surveys should therefore be designed specific to each tree.

Habitats with High Foraging and Commuting Suitability

- 6.10 High quality habitats in the site provide valuable features for bats within the site and the wider landscape for foraging and commuting. Activity transect surveys and static monitoring should be undertaken across the site to establish species assemblage, to determine features of particular importance for foraging and commuting bats and to further determine the impacts associated with proposals.
- 6.11 A minimum of five activity transect routes should be designed to encompass all areas of the site to be impacted by proposals and to allow for accessibility of different habitat types. Design of activity transect routes should include daytime ground truthing prior to surveys to ensure accessibility during nocturnal surveys and that sufficient habitats and areas within the site have been encompassed.
- 6.12 Activity transect surveys should include two survey visits per month from April to October in appropriate weather conditions for bats. Flexibility in survey design will be required given the variation in size, shape, and accessibility of different woodland compartments within the site.
- 6.13 Automated static monitoring should also be undertaken in conjunction with the activity transect surveys with sampling points chosen systematically to target the variety of habitats within the site. Three automated static detector locations per transect should be determined and data collected for a minimum of five consecutive nights per month (April to October) in appropriate weather conditions for bats.

Additional Considerations

- 6.14 Mitigation and compensation for any future development proposed within the site would need to be designed following surveys to establish more defined impacts on bat populations within the site and the wider landscape. Suggestions below are not detailed and will require refinement and modification depending on further survey and any future development proposals.

Mitigating for Roost Habitat Loss and Enhancing Net Roost Habitat Availability

- 6.15 Loss of roost habitat for bats due to the removal of trees, should be negated via the provision of replacement roost boxes and appropriate mitigation during felling. Replacement roost boxes should be incorporated into mitigation areas prior to any works within the site to allow for bats within the locality to find these resources.

- 6.16 Replacement roost boxes should include a variety of designs that will support a variety of species and roost types. Any bat boxes within the site if confirmed as being absent of roosts should be translocated to the mitigation site.
- 6.17 Replacement roosts should act to replicate the size, height and aspects of tree roosts lost. Boxes should be sited in a variety of locations, ideally with multiple boxes on trees to provide a range of roost conditions. Boxes should be situated near features to provide suitable flight-lines such as woodland edge habitat or linear scrub and hedgerow features and should have an entrance close to appropriate habitat.
- 6.18 Most bat species prefer to fly in dark areas straight into vegetation. All replacement roost habitat should be positioned away from sources of external lighting or where light spillage may influence use of a box.
- 6.19 Positioning and specification of any boxes should be agreed at an early stage with the project ecologist to ensure that they are fully considered in the overall scheme design.
- 6.20 Additional mitigation design may incorporate removal of sections of trees with PRFs within the site and translocation to the proposed biodiversity offsetting area. These tree sections could potentially be attached to other trees without PRFs to enhance the roost provision within the proposed biodiversity offsetting area.

Mitigating for Foraging and Commuting Habitat Loss and Maintaining Habitat Connectivity and Quality

- 6.21 Future development proposals must include biodiversity offsetting enhancements to support foraging and commuting bats within the locality. Strategic positioning of habitat features designed to enhance the proposed biodiversity offsetting area for bats, such as establishing flight routes or reinstating foraging habitats will need to be determined in any future detailed design.
- 6.22 Provision of similar habitats to those lost as a result of proposals should include creation of ponds and lakes, with management of woodland areas to increase diversity in woodland structure and ensure development of mature trees. Woodlands should be managed to incorporate glades and scrub buffer areas around woodland edges with species incorporated to enhance invertebrate prey diversity, this may include planting of night scented shrubs.
- 6.23 Bat boxes located within woodlands should be positioned in areas where conditions such as temperature and humidity will be maintained by surrounding vegetation structure e.g. on trees sheltered by surrounding tree or scrub cover.
- 6.24 Areas planted with wildflower mixes and managed as tall grassland to increase the invertebrate assemblage and therefore the prey availability for bats within the site.
- 6.25 New tree and hedgerow planting should be designed to provide linear features connecting blocks of woodland, which may be used by commuting bats and to connected habitats with the wider landscape. Trees will also provide foraging resources across the site, providing trees are allowed to mature.

- 6.26 Ponds, ditches and scrapes should be incorporated into the biodiversity offsetting area. Management of ponds should be maintained to ensure biodiversity is promoted and sustained within the biodiversity offsetting scheme.

Sensitive Lighting Schemes

- 6.27 Maintenance of dark corridors along woodland edge habitats, retained treelines and new hedges will maintain connectivity within the site, particularly to the most valuable habitats for bats (e.g. ponds, scrub and linear field boundary features). Artificial lighting can prevent bats from using commuting routes and using roosts due to disturbance. Artificial lighting can also cause congregation of prey under lighting therefore reducing availability for more light sensitive species such as *Myotis* species and brown long-eared. Dark corridors can be maintained through the implementation of a sensitive lighting scheme.
- 6.28 Direct lighting around trees should be avoided as light falling on any potential roosts would make bats unlikely to use them and disturb bats if already present.
- 6.29 A sensitive lighting scheme must be included within any future development proposals and should adopt the following principals:
- Avoid lighting on key habitat and important features altogether;
 - Where lighting is required, dark buffer zones between habitats and lighting should be used with illuminance limits and zonation;
 - Light spill should be screened through soft landscaping and installation of walls, fences and bunding;
 - Narrow spectrum bulbs should be used, that do not emit UV light (peaking higher than 550nm) e.g. warm white spectrum lights (<2700Kelvin) or LED luminaires;
 - Downward directional luminaires should be used to retain darkness above and using only luminaires with an upward light ratio of 0% and with good optical control; and
 - Any external security lighting should be set on motion-sensors and short (1min) timers.
- 6.30 Artificial lighting may be required during construction, for example, where working hours extend beyond daylight hours (particularly during winter) or where security lighting is required. Lighting should only be used where and when necessary and should be appropriate, i.e. at levels that are visible and serve the intended function but that do not light excessive areas or provide light at times beyond the functional requirement.

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Legislation and Policy

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Altringham, J. D. (2003). *British Bats*. Collins New Naturalist Library, Volume 93. Harper Collins, London.

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APPENDIX A: Desk Study Data Search

RECORD

The Biodiversity Information System for Cheshire, Halton, Warrington and Wirral

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President: Professor Gordon McGregor Reid

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In addition you can search through the document for any particular text by using the standard Microsoft shortcut (Ctrl + F) and enter the text you are looking for.

Interpretation of the data

- **Species maps:** The species maps show the location of protected, notable and Invasive non-native species grouped by taxon. The numbers in brackets adjacent to the species names relate to the grid ID shown on the maps. Records with a grid reference accuracy of 10m square or above are minimised to a 100m square. Where there are more than 100 grid IDs on a map the grid references will be minimised to 1km. The full grid reference can be found within the full record in this report or in the excel spreadsheet of raw data.
- **Attribute data:** Where available all attribute data is provided with the records. Sex and life stage information as well as the record type all allow greater interpretation of information available. However it is not always possible to provide this information.
- **Species designation Status:** The species designation information provided within this enquiry output is based on the best available information provided through the JNCC: *Conservation designations of UK Taxa* list. Information on the limitations to this list is available here: (<http://jncc.defra.gov.uk/page-3408>)
- **Site/habitat data:** Due to changes in the NBN web services we are currently unable to provide site and observation data from the NBN, this does not affect local sites. Information for statutory sites can be found at <http://www.natureonthemap.naturalengland.org.uk/MagicMap.aspx> and sites and NBN taxa observations at <https://spatial.nbnatlas.org>. (please be aware of the NBN Atlas guidance for using data <https://nbnatlas.org/help/guidance-using-data/>).

319145

Port Warrington

SJ5807286358 - bats 2km



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Whiskered Bat (<i>Myotis mystacinus</i>) (9,30)	16
Noctule Bat (<i>Nyctalus noctula</i>) (1,2,4,6,7,10,13,14,27,29,30,32,33,41,43,45,51,52,54,55,57,62,72)	16
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Designated Species Summary

Taxa	Designation name	Occurrence in Cheshire tetrads between 1998-2019 (%)	Occurrence in Cheshire tetrads all years (%)
Bats (Chiroptera)	Wildlife and Countryside Act - Schedule 5, NERC S41, Conservation (Habs and Sp) Regulations 2010 - Schedule 2	18%	24%
Brown Long-eared Bat (<i>Plecotus auritus</i>)	Local Biodiversity Action Plan Species, Wildlife and Countryside Act - Schedule 5, NERC S41, Conservation (Habs and Sp) Regulations 2010 - Schedule 2, UK BAP Priority Species	37%	44%
Common Pipistrelle (<i>Pipistrellus pipistrellus</i>)	Wildlife and Countryside Act - Schedule 5, NERC S41, Conservation (Habs and Sp) Regulations 2010 - Schedule 2	51%	52%
Daubenton's Bat (<i>Myotis daubentonii</i>)	Local Biodiversity Action Plan Species, Wildlife and Countryside Act - Schedule 5, NERC S41, Conservation (Habs and Sp) Regulations 2010 - Schedule 2	12%	16%
Long-eared Bat species (<i>Plecotus</i>)	Wildlife and Countryside Act - Schedule 5, NERC S41, Conservation (Habs and Sp) Regulations 2010 - Schedule 2	2%	2%
Noctule Bat (<i>Nyctalus noctula</i>)	Local Biodiversity Action Plan Species, Wildlife and Countryside Act - Schedule 5, NERC S41, Conservation (Habs and Sp) Regulations 2010 - Schedule 2, UK BAP Priority Species	29%	34%
Pipistrelle (<i>Pipistrellus pipistrellus</i>)	Local Biodiversity Action Plan Species, Wildlife and Countryside Act - Schedule 5, Conservation (Habs and Sp) Regulations 2010 - Schedule 2	38%	55%
Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>)	Local Biodiversity Action Plan Species, Wildlife and Countryside Act - Schedule 5, NERC S41, Conservation (Habs and Sp) Regulations 2010 - Schedule 2, UK BAP Priority Species	42%	42%
Unidentified Bat (<i>Myotis</i>)	Wildlife and Countryside Act - Schedule 5, NERC S41, Conservation (Habs and Sp) Regulations 2010 - Schedule 2	25%	34%
Whiskered Bat (<i>Myotis mystacinus</i>)	Local Biodiversity Action Plan Species, Wildlife and Countryside Act - Schedule 5, NERC S41, Conservation (Habs and Sp) Regulations 2010 - Schedule 2	4%	9%

Brown Long-eared Bat (*Plecotus auritus*) (6,30,60,62,63)

RECORD

Location	Grid ref.	Grid ID	Date	Sex/Stage	Abundance	Record type
Manor Farm House	SJ55858369	6	23/07/2015	None	1	Roost
Moore Nature Reserve	SJ5785	30	1999	Adult	Present	Field Record
Walton Gardens, Walton, Warrington	SJ599851	60	07/06/2016	None	1	Field Record
Walton Hall	SJ600850	63	03/2013-03/2013	None	Present	Field Record
Manor Farm House	SJ55858369	6	15/06/2014	None	1	Roost
Manor Farm House	SJ55858369	6	04/08/2015	None	1	Roost
Manor Farm House	SJ55858369	6	23/07/2015	None	10	Field Record
WALTON HALL, WALTON LEA ROAD, WARRINGTON, CHESHIRE, WA4 6SN	SJ60018495	62	04/03/2013	None	Present	Roost
Manor Farm House	SJ55858369	6	04/08/2015	None	10	Field Record
Walton Gardens, Walton, Warrington	SJ599851	60	19/05/2016	None	Present	Field Record

Daubenton's Bat (*Myotis daubentonii*) (10,29,30,38,40,44,45,49,50,51,52,53,57,64,67,77)

RECORD

Location	Grid ref.	Grid ID	Date	Sex/Stage	Abundance	Record type
Appleton Reservoir, Walton, Warrington	SJ601844	67	23/07/2002	None	6	Field Record
Mill Brook Pool	SJ593862	53	04/09/2013	None	Present	Field Record
Wetland Nature Reserve, Sankey Valley Park, Warrington	SJ592887	52	13/08/2002	None	8 Passes/4	Field Record
Birchwood Pool - Moore	SJ583857	40	08/10/2010	None	1	Field Record
Walton Hall Gardens, Bridgewater Canal, Warrington	SJ600852	64	23/07/2002	None	5	Field Record
St. Helen's Canal, Sankey Valley Park Section	SJ591889	51	09/08/2005	None	Present	Aural Bat Detector
Bewsey &	SJ591885	49	06/08/2003	None	Present	Aural Bat

Whitecross - CP						Detector
Appleton Reservoir	SJ601844	67	23/07/2002	None	2+	Field Record
Lapwing Lake Wildfowl Scrape	SJ577857	29	27/04/2011	None	Present	Aural Bat Detector
Viaduct, Sankey Valley Park, Warrington	SJ590890	45	22/08/2002	None	1	Field Record
	SJ55918421	10	2006	Adult	Common	Field Record
Moore NR	SJ5986	57	23/07/2004	None	3	Field Record
Moore Nature Reserve	SJ5785	30	1999	Adult	Present	Field Record
Viaduct, Sankey Valley Park, Warrington	SJ590890	45	13/08/2002	None	1	Field Record
St. Helen's Canal, Sankey Valley Park Section	SJ591888	50	23/08/2006	None	Present	Aural Bat Detector
Birchwood Pool, Moore NR	SJ582858	38	22/06/2002	None	10+	Field Record
canal, waterways	SJ59058880	44	26/08/2009	None	2	Aural Bat Detector
Bridgewater Canal, Walton	SJ604852	77	23/07/2002	None	1	Field Record
Wetland Nature Reserve, Sankey Valley Park, Warrington	SJ592887	52	22/08/2002	None	5	Field Record

Long-eared Bat species (Plecotus) (6)

RECORD

Location	Grid ref.	Grid ID	Date	Sex/Stage	Abundance	Record type
Daresbury, Manor Farm House	SJ55858369	6	16/06/2014	None	1	Roost

Common Pipistrelle (Pipistrellus pipistrellus)

(4,5,6,7,9,11,12,18,19,20,21,22,23,24,26,27,28,33,36,42,47,48,54,57,59,60,62,66,67,69,70,74,75,76,77,81,84,85,87,93)

RECORD

Location	Grid ref.	Grid ID	Date	Sex/Stage	Abundance	Record type
Fairfield & Howley - CP, Bridge Street Quarter, Warrington	SJ60918810	87	08/05/2014	None	1	Pass (Bat)
Bridgewater Canal, Walton	SJ604852	77	23/07/2002	None	1	Field Record
Chapel Brow Farm, Great Sankey, WA1 5RE	SJ56858846	18	24/07/2014	None	Present	Aural Bat Detector

Norbury Marsh	SJ557843	5	17/05/2002	None	1	Field Record
Dorchester Park	SJ559835	9	09/05/2002			Field Record
	SJ602864	74	02/04/2008	None	Present	Aural Bat Detector
Hobb Lane, Warrington	SJ582842	36	2005	None	Present	Field Record
Chapel Brow Farm, Great Sankey, WA1 5RE	SJ56858846	18	08/08/2014	None	Present	Aural Bat Detector
Penketh & Cuedley - CP, Penketh	SJ560876	12	07/07/2013	Adult	1	Field Records
Chapel Brow Farm, Great Sankey, WA1 5RE	SJ56858845	18	24/07/2014	None	Present	Pass (Bat)
79 station rd penketh	SJ55978724	11	09/06/2011	None	42	Aural Bat Detector
Middle Moss Wood, Moore NR	SJ577855	28	22/06/2002	None	2+	Field Record
The Park, Penketh	SJ558873	7	28/03/2004	None	1	Field Record
Penketh & Cuedley - CP, Penketh	SJ558873	7	18/10/2015	Adult	1	Field Records
Appleton - CP	SJ601843	66	2003	None	Present	Field Record
Moore NR	SJ5986	57	23/07/2004	None	1	Field Record
Pump House Pool, Moore NR	SJ591861	47	22/06/2002	None	1	Field Record
Land proposed for residential development, south of the A558 inDaresbury, Halton	SJ570836	21	15/07/2014	None	Low Levels	Aural Bat Detector
Moore SQ	SJ580852	33	04/09/2004	None	1	Field Record
36 The Park, Penketh, Warrington, Cheshire, WA5 2SG	SJ55808733	7	19/07/2014	None	5	Field Record
WALTON HALL, WALTON LEA ROAD, WARRINGTON, CHESHIRE, WA4 6SN	SJ59998492	59	01/05/2013	None	Present	Pass (Bat)
Hobb Lane, Warrington	SJ582842	36	2004	None	Present	Field Record
Penketh & Cuedley - CP, Penketh	SJ558873	7	31/10/2015	Adult	1	Field Records
Appleton	SJ60308430	75	27/03/2011	None	1	Aural Bat

Reservoir						Detector
WALTON HALL, WALTON LEA ROAD, WARRINGTON, CHESHIRE, WA4 6SN	SJ60018492	62	01/05/2013	None	Present	Field Record
Daresbury, Manor Farm House	SJ55858369	6	15/06/2014	None	1	Roost
south edge	SJ594863	54	04/09/2013	None	Present	Field Record
Bridge Street Quarter, Warrington	SJ60808809	85	03/07/2014	None	1	Pass (Bat)
Penketh & Cuerdley - CP, Penketh	SJ558873	7	10/11/2015	Adult	1	Field Records
Bewsey & Whitecross - CP, Bridge Street Quarter, Warrington	SJ60768789	81	08/05/2014	None	1	Pass (Bat)
Bridge Street Quarter, Warrington	SJ60808809	85	23/08/2012	None	1	Pass (Bat)
Horizon Centre, Loushers Lane, Warrington	SJ615868	93	26/07/2012	None	Present	Field Record
Land proposed for residential development, south of the A558 in Daresbury, Halton	SJ57098315	19	30/07/2014	None	Present	Field Record
WALTON HALL, WALTON LEA ROAD, WARRINGTON, CHESHIRE, WA4 6SN	SJ60018492	62	01/05/2013	None	1	Emerging (Bats)
Fairfield & Howley - CP, Bridge Street Quarter, Warrington	SJ60838796	84	08/05/2014	None	1	Pass (Bat)
Penketh & Cuerdley - CP, Penketh	SJ560876	12	04/04/2015	Adult	1	Field Records
Daresbury, Oxmoor LNR	SJ557842	4	10/08/2010	Adult	1	Field Observation/Bat Detector
Bridge Street Quarter, Warrington	SJ60838796	84	04/09/2012	None	6	Pass (Bat)
Walton	SJ602845	70	23/07/2002	None	3	Field Record
Land proposed for residential development, south of the	SJ57118361	22	30/07/2014	None	Present	Field Record

A558 inDaresbury, Halton						
Lapwing Lane Pool, Moore NR	SJ575855	27	04/09/2004	None	1	Field Record
Norbury Marsh	SJ557843	5	15/05/2002	Adult	1	Field Record
Hobb Lane, Warrington	SJ582842	36	2004	None	Present	Field Record
Walton Gardens, Walton, Warrington	SJ599851	60	19/05/2016	None	Present	Field Record
79 station rd penketh	SJ55978724	11	23/06/2011	None	42	Aural Bat Detector
Moore NR	SJ5986	57	23/07/2004	None	5+	Field Record
Appleton Reservoir	SJ601844	67	23/07/2002	None	1	Field Record
Bewsey & Whitecross - CP, 38 Delamere Street	SJ59198844	48	28/08/2015	None	2	Roost
Daresbury, Manor Farm House	SJ55858369	6	16/06/2014	None	1	Roost
WALTON HALL, WALTON LEA ROAD, WARRINGTON, CHESHIRE, WA4 6SN	SJ60008498	62	01/05/2013	None	3	Emerging (Bats)
Norbury Marsh	SJ557843	5	15/05/2002	None	1	Field Record
Dorchester Park LNR	SJ559835	9	09/05/2002	Adult	2	Field Record
Horizon Centre, Loushers Lane, Warrington	SJ615868	93	29/08/2012	None	Present	Field Record
Bridge Street Quarter, Warrington	SJ60838796	84	03/07/2014	None	1	Pass (Bat)
WALTON HALL, WALTON LEA ROAD, WARRINGTON, CHESHIRE, WA4 6SN	SJ60008498	62	01/05/2013	None	Present	Field Record
Great Sankey, Warrington	SJ572885	24	22/06/2003	None	17	Field Record
Chapel Brow Farm, Liverpool Road, Great Sankey, WA5 1RE.	SJ5685788468	18	24/07/2014	None	Present	Field Record
Penketh	SJ558873	7	19/06/2002	None	1	Field Record
Land proposed for residential development, south of the	SJ57448334	26	29/05/2014	None	Present	Field Record

A558 inDaresbury, Halton						
old runcorn latchford canal	SJ60188639	69	29/03/2011	Adult	1	Aural Bat Detector
Hobb Lane, Warrington	SJ582842	36	2005	None	Present	Field Record
Moss Wood, Moore NR	SJ590862	42	22/06/2002	None	2	Field Record
Land proposed for residential development, south of the A558 inDaresbury, Halton	SJ57078331	20	06/2014-06/2014	None	Present	Aural Bat Detector
Bridge Street Quarter, Warrington	SJ60838796	84	04/07/2014	None	1	Pass (Bat)
Fairfield & Howley - CP, Bridge Street Quarter, Warrington	SJ60838796	84	30/08/2012	None	1	Pass (Bat)
Land proposed for residential development, south of the A558 inDaresbury, Halton	SJ57078331	20	07/2014-07/2014	None	Present	Aural Bat Detector
Walton	SJ604850	76	23/07/2002	None	1	Field Record
Chapel Brow Farm, Liverpool Road, Great Sankey, WA5 1RE.	SJ5685788468	18	08/08/2014	None	1	Pass (Bat)
Daresbury, Manor Farm House	SJ55858369	6	04/08/2015	None	2	Field Record
Dorchester Park LNR	SJ559835	9	09/05/2002	None	2	Field Record
Land proposed for residential development, south of the A558 inDaresbury, Halton	SJ57298306	23	29/05/2014	None	Present	Field Record
Daresbury, Manor Farm House	SJ55858369	6	23/07/2015	None	1	Pass (Bat)
Oxmoor LNR	SJ557842	4	07/08/2004	None	1+	Field Record

Bats (Chiroptera) (15,83,86,88,89)

RECORD

Location	Grid ref.	Grid ID	Date	Sex/Stage	Abundance	Record type
Latchford West - CP, Birch wood, North of loushers Lane, Warrington	SJ609869	86	26/06/2013	None	Present	Field Record
249, Wilderspool Avenue, Warrington	SJ61098706	89	02/09/2013	None	Present	Field Record
Latchford West - CP, Wilderspool Causeway - WA4 6QL	SJ610867	88	23/06/2001	None	1	Field Record
Sandymoor	SJ565836	15	01/01/2008	None	Present	Field Record
Latchford West - CP, Wilderspool Causeway - WA4 6QL	SJ610867	88	23/06/2001	None	1	Field Record
Latchford West - CP, 245, Wilderspool causeway, Warrington	SJ610870	89	26/09/2011	None	1	Field Record
249, Wilderspool Avenue, Warrington	SJ61098706	89	26/08/2013	None	2	Field Record
Latchford West - CP, 249, Wilderspool Avenue, Warrington	SJ61098706	89	29/08/2013	None	Present	Field Record
Latchford West - CP, Landseer Avenue, Warrington	SJ608864	83	25/07/2013	None	Present	Field Record

Pipistrelle (*Pipistrellus pipistrellus*)

(7,8,11,16,24,25,30,31,34,37,39,40,41,43,45,46,52,58,59,60,61,68,71,73,80,82,92)

RECORD

Location	Grid ref.	Grid ID	Date	Sex/Stage	Abundance	Record type
Birchwood Pool - Moore	SJ583857	40	08/10/2010	None	Present	Field Record
Houghs Lane, walton, Warrington	SJ602846	71	23/07/2002	None	8	Field Record
rangers office foyer, heritage yard	SJ59948513	60	24/08/2012	Juvenile	Present	Field Record
Moore Nature Reserve	SJ5886	41	17/03/2010	None	Present	Field Record
Moore Nature Reserve	SJ5886	41	17/09/2010	None	Present	Aural Bat Detector
Penketh & Cuerdley - CP,	SJ565865	16	16/04/2008	None	1	Field Record

Penketh							
Moore Nature Reserve	SJ5886	41	17/03/2010	None	Present	Field Record	
baronet rd	SJ6020186251	73	12/10/2010	None	1	Aural Bat Detector	
Old Conservative Hall, Stockton Heath	SJ613863	92	08/08/2004	None	Present	Field Record	
Moore Nature Reserve	SJ5886	41	08/04/2011	None	Present	Field Record	
Sankey Bridges Wetland	SJ58278753	39	12/08/2009	None	1	Aural Bat Detector	
Penketh & Cuerdley - CP, Penketh	SJ558873	7	05/04/2018	Adult	1	Field Record	
Penketh & Cuerdley - CP, Penketh	SJ565865	16	16/04/2008	None	1	Field Record	
Viaduct, Sankey Valley Park, Warrington	SJ590890	45	13/08/2002	None	8	Field Record	
Morley Common, Warrington	SJ59968629	61	17/10/2010	None	1	Field Record	
Bewsey & Whitecross - CP, Evelyn Street Primary School, Warrington, WA5 1BD	SJ59068780	43	11/06/2014	None	3	Pass (Bat)	
Penketh & Cuerdley - CP, Penketh	SJ565865	16	23/04/2008	None	1	Field Record	
st john's church yard	SJ59808526	58	10/07/2009	None	1	Aural Bat Detector	
Walton Gardens, Walton, Warrington	SJ599849	59	22/07/2003	None	Present	Field Record	
Moore Nature Reserve	SJ5886	41	08/04/2011	None	Present	Field Record	
Brian Avenue	SJ613863	92	08/08/2004	None	Present	Field Record	
by rangers office	SJ59968513	60	25/01/2009	Adult	1	Field Record	
Burtonwood Airfield (Disused), Burtonwood	SJ573886	25	27/08/2003-07/09/2003	Adult	1	Field Record	
St. Helen's Canal, Sankey Valley Park Section	SJ59018910	46	26/08/2009	None	Present	Aural Bat Detector	
Penketh & Cuerdley - CP, Penketh	SJ565865	16	16/04/2008	None	1	Field Record	
Evelyn Street Primary School, Warrington, WA5	SJ59068780	43	01/07/2014	None	2	Pass (Bat)	

1BD						
Penketh & Cuerdley - CP, Sensitive. Lat long is approximate.	SJ5787	31	11/08/2017	None	2	Field Record
Moore Nature Reserve	SJ5785	30	1999	Adult	Present	Field Record
Long Moss and Wood, Moore, Warrington	SJ580857	34	27/04/2011	None	10	Aural Bat Detector
2 Mapplewell Crescent, Great Sankey	SJ573886	25	10/08/2003-13/08/2003	None	2	Field Record
The Park, Penketh	SJ558874	8	24/10/2012	Adult	1	Field Records
Burtonwood Airfield (Disused), Burtonwood	SJ573886	25	27/08/2003-07/09/2003	Adult	1	Field Record
Old Conservative Hall, Stockton Heath	SJ613863	92	08/08/2004	None	Present	Field Record
Birchwood Pool - Moore	SJ583857	40	08/10/2010	None	Present	Field Record
Great Sankey, Warrington	SJ572885	24	22/06/2003	None	17	Field Record
Burtonwood Airfield (Disused), Burtonwood	SJ573886	25	27/08/2003-07/09/2003	Adult	1	Field Record
Penketh & Cuerdley - CP, Penketh	SJ565865	16	23/04/2008	None	1	Field Record
Penketh & Cuerdley - CP, The Park, Penketh	SJ558873	7	03/11/2009	Adult	1	Field Records
79 Station Rd Penketh	SJ55978724	11	12/06/2012	None	54	Roost
top of Bridge st town centre	SJ60628819	80	23/08/2012	None	3	Field Record
Moore Nature Reserve	SJ5886	41	17/09/2010	None	Present	Aural Bat Detector
Moore - CP	SJ582843	37	14/04/2007	None	Present	Field Record
Wetland Nature Reserve, Sankey Valley Park, Warrington	SJ592887	52	22/08/2002	None	2	Field Record
Long Moss and Wood, Moore, Warrington	SJ580857	34	27/04/2011	None	10	Aural Bat Detector
by rangers office	SJ59968513	60	25/01/2009	Adult	1	Field Record
Hatton, Stretton	SJ6085	82	13/10/2008	Adult	Various	Field Record

& Walton - CP, Walton Lea Rd						
Mapplewell Crescent, Great Sankey	SJ573886	25	27/08/2003-07/09/2003	None	1	Field Record
Penketh & Cuerdley - CP, Penketh	SJ565865	16	23/04/2008	None	1	Field Record
Penketh & Cuerdley - CP, Sensitive. Lat long is approximate.	SJ5787	31	11/08/2017	None	Present	Field Record
crematourium woodland	SJ601854	68	04/08/1999	Adult	7	Field Record
Brian Avenue	SJ613863	92	08/08/2004	None	Present	Field Record

Whiskered Bat (*Myotis mystacinus*) (9,30)

RECORD

Location	Grid ref.	Grid ID	Date	Sex/Stage	Abundance	Record type
Dorchester Park LNR	SJ559835	9	09/05/2002	None	1	Field Record
Moore Nature Reserve	SJ5785	30	1999	Adult	Present	Field Record
Dorchester Park	SJ559835	9	09/05/2002			Field Record
Dorchester Park LNR	SJ559835	9	09/05/2002	Adult	1	Field Record

Noctule Bat (*Nyctalus noctula*) (1,2,4,6,7,10,13,14,27,29,30,32,33,41,43,45,51,52,54,55,57,62,72)

RECORD

Location	Grid ref.	Grid ID	Date	Sex/Stage	Abundance	Record type
Arpley Tip	SJ5886	41	22/06/2002	None	1	Field Record
Penketh & Cuerdley - CP, Arable field adjacent to Station Road	SJ563868	14	22/08/2017	None	1	Field Record
south edge	SJ594863	54	04/09/2013	None	Present	Field Record
	SJ55918421	10	2006	Adult	Regular	Field Record
Bewsey & Whitecross - CP, Evelyn Street Primary School, Warrington, WA5 1BD	SJ59068780	43	01/07/2014	None	1	Pass (Bat)
Manor Farm House	SJ55858369	6	16/06/2014	None	1	Pass (Bat)
Moore NR	SJ5986	57	23/07/2004	None	1	Field Record
Moore SQ	SJ580852	33	04/09/2004	None	1	Field Record
Wetland Nature	SJ592887	52	13/08/2002	None	2	Field Record

Reserve, Sankey Valley Park, Warrington							
Moore Nature Reserve	SJ5785	30	1999	Adult	Present	Field Record	
Manor Farm House	SJ55858369	6	15/06/2014	None	1	Pass (Bat)	
Grasslands South, Moore NR	SJ579856	32	18/08/2012	Adult	1	Field Records	
Grasslands (S), Moore NR	SJ579856	32	30/08/2013	Adult	2	Field Records	
Oxmoor LNR	SJ554842	2	29/09/2011	None	1	Field Record	
Viaduct, Sankey Valley Park, Warrington	SJ590890	45	13/08/2002	None	2	Field Record	
Daresbury, Oxmoor LNR	SJ557842	4	10/08/2010	Adult	1	Field Observation/Bat Detector	
St. Helen's Canal, Sankey Valley Park Section	SJ591889	51	09/08/2005	None	Present	Aural Bat Detector	
Wetland Nature Reserve, Sankey Valley Park, Warrington	SJ592887	52	22/08/2002	None	1	Field Record	
Lapwing Lane Pool, Moore NR	SJ575855	27	04/09/2004	None	2	Field Record	
walton hall, walton lea rd, higher walton, warrington	SJ6002084954	62	01/05/2013	None	1	Field Record	
Lapwing Lake Wildfowl Scrape	SJ577857	29	08/04/2015	None	Present	Field Record	
Compartment D - Pond, Walton Hall Park & Gardens, Warrington	SJ602853	72	18/07/2010	Adult	5	Field Record	
Moore NR	SJ5986	57	25/08/2002	None	2	Field Record	
Walton Golf Course	SJ597846	55	23/07/2002	None	1	Field Record	
Green Wood, Runcorn	SJ563841	13	23/09/2013	Adult	2	Field Records	
Viaduct, Sankey Valley Park, Warrington	SJ590890	45	22/08/2002	None	2	Field Record	
Castlefields, Norbury Wood	SJ552842	1	10/08/2010	Adult	1	Field Observation/Bat Detector	
36 The Park, Penketh, Warrington, Cheshire, WA5 2SG	SJ55808733	7	19/07/2014	None	2	Field Record	

Soprano Pipistrelle (*Pipistrellus pygmaeus*)
(1,3,4,5,6,7,9,13,17,21,29,35,38,56,59,60,62,65,66,73,75,78,79,90,91)

RECORD

Location	Grid ref.	Grid ID	Date	Sex/Stage	Abundance	Record type
Castlefields, Norbury Wood	SJ552842	1	10/08/2010	Adult	1	Field Observation/Bat Detector
eastford rd, moore NR/Morley common	SJ597865	56	19/03/2009	None	3	Aural Bat Detector
Dorchester Park LNR	SJ559835	9	30/03/2002	Adult	3	Field Record
Dorchester Park, Runcorn	SJ559835	9	31/03/2002	None	2	Field Record
Daresbury, Oxmoor LNR	SJ557842	4	10/08/2010	Adult	1	Field Observation/Bat Detector
36 The Park, Penketh, Warrington, Cheshire, WA5 2SG	SJ55808733	7	19/07/2014	None	2	Field Record
Penketh & Cuerdley - CP, Penketh	SJ558873	7	05/04/2018	Adult	1	Field Record
Norbury Marsh	SJ557843	5	15/05/2002	None	2	Field Record
Moore Lodge, Hobbs Lane, Moore	SJ581843	35	01/06/2001-31/08/2001	None	160+	Field Record
Appleton - CP	SJ601843	66	2003	None	Present	Field Record
Birchwood Pool, Moore NR	SJ582858	38	22/06/2002	None	2	Field Record
path between houses and lock (Trans Penine Trial)	SJ60658642	79	16/03/2009	None	3	Aural Bat Detector
Hatton, Stretton & Walton - CP	SJ605850	78	11/07/2002			Field Record
Manor Farm House	SJ55858369	6	04/08/2015	None	2	Field Record
WALTON HALL, WALTON LEA ROAD, WARRINGTON, CHESHIRE, WA4 6SN	SJ60018492	62	01/05/2013	None	Present	Pass (Bat)
WALTON HALL, WALTON LEA ROAD, WARRINGTON, CHESHIRE, WA4 6SN	SJ60008498	62	01/05/2013	None	Present	Emerging (Bats)
Sandymoor, Runcorn	SJ566837	17	04/08/2003	None	Present	Field Record

164, Walton Road, Lower Walton, Warrington	SJ613859	90	11/07/2002	None	283	Field Record
Manor Farm House	SJ55858369	6	15/06/2014	None	1	Roost
Manor Farm House	SJ55858369	6	04/08/2015	None	Present	Roost
eastford rd end	SJ60008641	65	15/03/2009	None	3	Aural Bat Detector
Appleton Reservoir	SJ60308430	75	27/03/2011	None	1	Aural Bat Detector
Walton Gardens, Walton, Warrington	SJ599851	60	07/06/2016	None	1	Field Record
Green Wood, Runcorn	SJ563841	13	23/09/2013	Adult	1	Field Records
Norbury Marsh	SJ557843	5	15/05/2002	Adult	2	Field Record
Dorchester Park LNR	SJ559835	9	09/05/2002	Adult	1	Field Record
Dorchester Park	SJ559835	9	09/05/2002			Field Record
Lapwing Lake Wildfowl Scrape	SJ577857	29	20/05/2010	None	4	Field Record
Walton, Warrington	SJ605850	78	11/07/2002	None	283	Field Record
Land proposed for residential development, south of the A558 in Daresbury, Halton	SJ570836	21	15/07/2014	None	Low Levels	Aural Bat Detector
Manor Farm House	SJ55858369	6	23/07/2015	None	Present	Roost
Hatton, Stretton & Walton - CP	SJ581843	35	03/05/2002			Field Record
Lodge Plantation, Runcorn	SJ557837	3	23/09/2013	Adult	1	Field Records
Dorchester Park LNR	SJ559835	9	30/03/2002	None	3	Field Record
Dorchester Park	SJ559835	9	30/03/2002			Field Record
Stockton Heath - CP	SJ613861	91	10/09/2001			Field Record
WALTON HALL, WALTON LEA ROAD, WARRINGTON, CHESHIRE, WA4 6SN	SJ59998492	59	01/05/2013	None	Present	Field Record
baronet rd	SJ6020186251	73	12/10/2010	None	1	Aural Bat Detector

Manor Farm House	SJ55858369	6	16/06/2014	None	1	Roost
Dorchester Park LNR	SJ559835	9	09/05/2002	None	1	Field Record
Manor Farm House	SJ55858369	6	23/07/2015	None	2	Pass (Bat)
Norbury Marsh, Runcorn Dorchester Park, Runcorn	SJ557843	5	17/05/2002	None	2	Field Record
Moore	SJ581843	35	03/05/2002	None	167	Field Record
Lapwing Lake Wildfowl Scrape	SJ577857	29	08/04/2015	None	Present	Field Record
Stockton Heath, Warrington	SJ613861	91	10/09/2001	None	1	Field Record

Unidentified Bat (Myotis) (18,20,21,23)

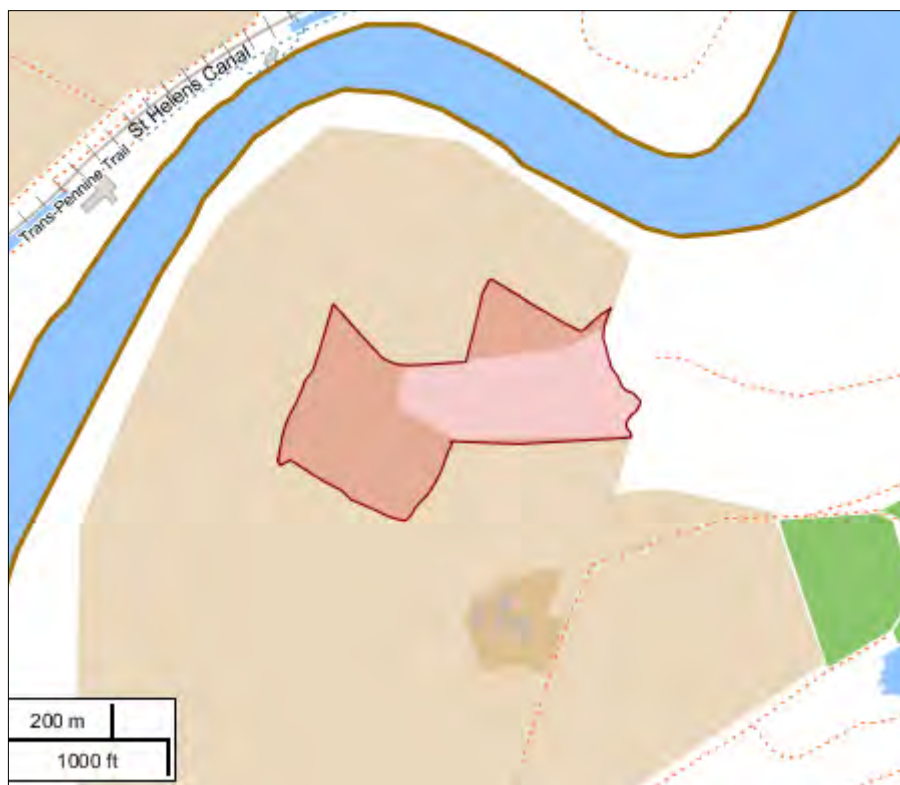
RECORD

Location	Grid ref.	Grid ID	Date	Sex/Stage	Abundance	Record type
Land proposed for residential development, south of the A558 in Daresbury, Halton	SJ570836	21	15/07/2014	None	Low Levels	Aural Bat Detector
Chapel Brow Farm, Liverpool Road, Great Sankey, WA5 1RE.	SJ5685788468	18	08/08/2014	None	1	Pass (Bat)
Land proposed for residential development, south of the A558 in Daresbury, Halton	SJ57078331	20	06/2014-06/2014	None	Present	Aural Bat Detector
Land proposed for residential development, south of the A558 in Daresbury, Halton	SJ57078331	20	07/2014-07/2014	None	Present	Aural Bat Detector
Land proposed for residential development, south of the A558 in Daresbury, Halton	SJ57298306	23	29/05/2014	None	Present	Field Record

Local Wildlife Sites

Moss Side Farm / WA024

Map



Site name	Moss Side Farm
Site code	WA024
Authority	Warrington Local Wildlife Sites Partnership
Site centroid	SJ5676986041

Map



Site name	Norton Marsh and Upper Moss Side Farm
Site code	WA025
Authority	Warrington Local Wildlife Sites Partnership
Site centroid	SJ5601285348

Map



Site name	Dorchester Park
Site code	HA013
Authority	Halton Local Wildlife Sites Partnership
Site centroid	SJ5589483451

Map



Site name	Green Wood
Site code	HA015
Authority	Halton Local Wildlife Sites Partnership
Site centroid	SJ5624383888

Map



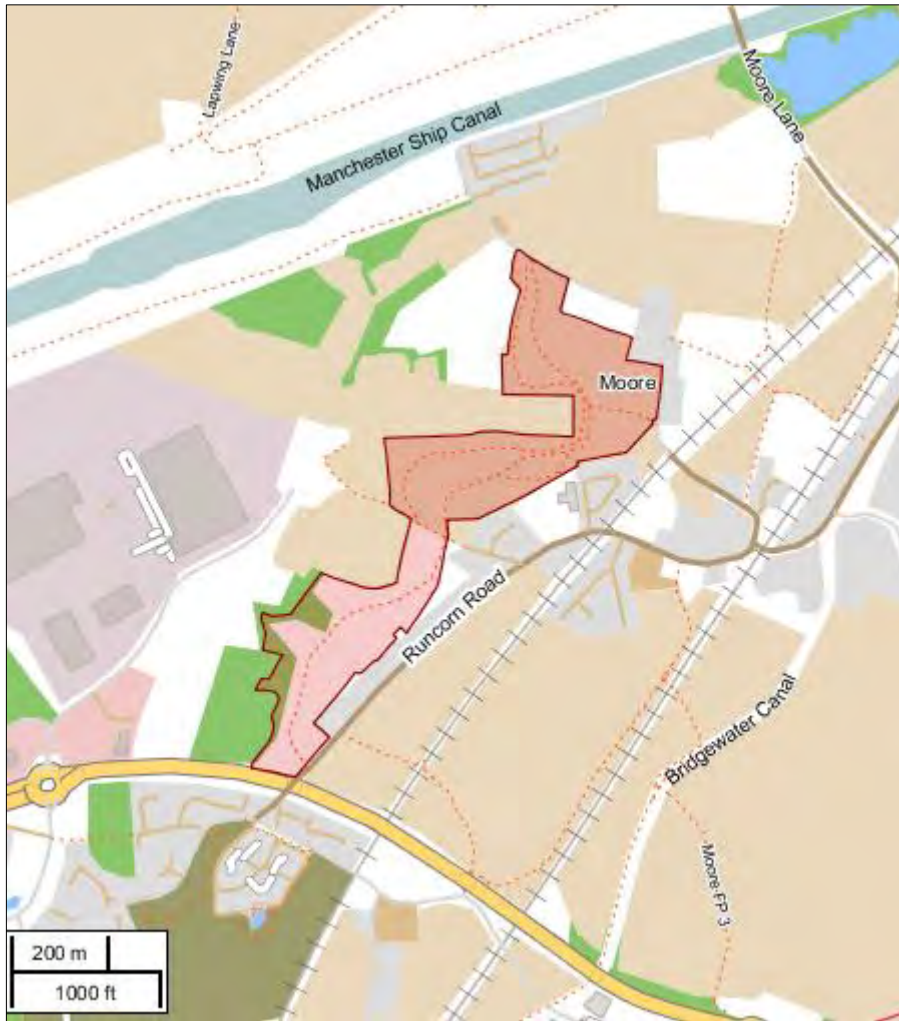
Site name	Lodge Plantation
Site code	HA023
Authority	Halton Local Wildlife Sites Partnership
Site centroid	SJ5587783752

Map



Site name	Manor Park Woodland
Site code	HA025
Authority	Halton Local Wildlife Sites Partnership
Site centroid	SJ5691284737

Map



Site name	Moore Meadows
Site code	HA027
Authority	Halton Local Wildlife Sites Partnership
Site centroid	SJ5717784289

Map



Site name	Oxmoor
Site code	HA033
Authority	Halton Local Wildlife Sites Partnership
Site centroid	SJ5586484241

Map



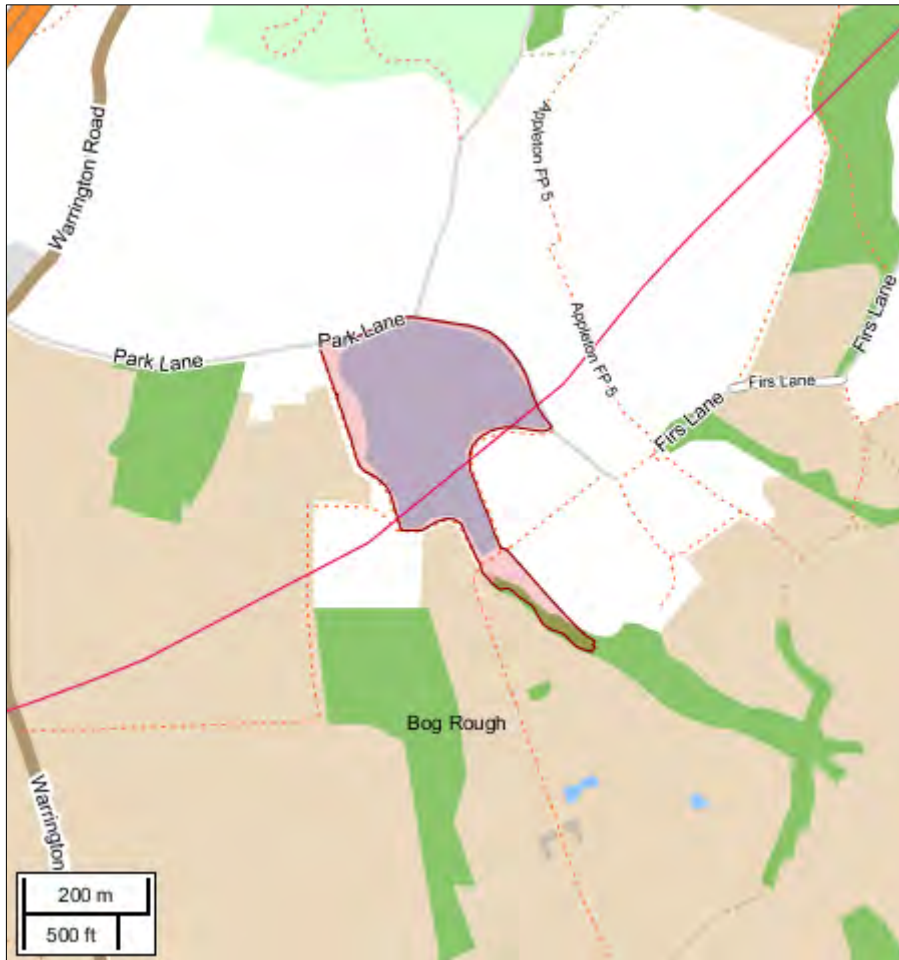
Site name	Sandymoor Wood
Site code	HA044
Authority	Halton Local Wildlife Sites Partnership
Site centroid	SJ5630583348

Map



Site name	Upper Mersey Eastuary, Intertidal areas
Site code	HA049
Authority	Halton Local Wildlife Sites Partnership
Site centroid	SJ5311584351

Map



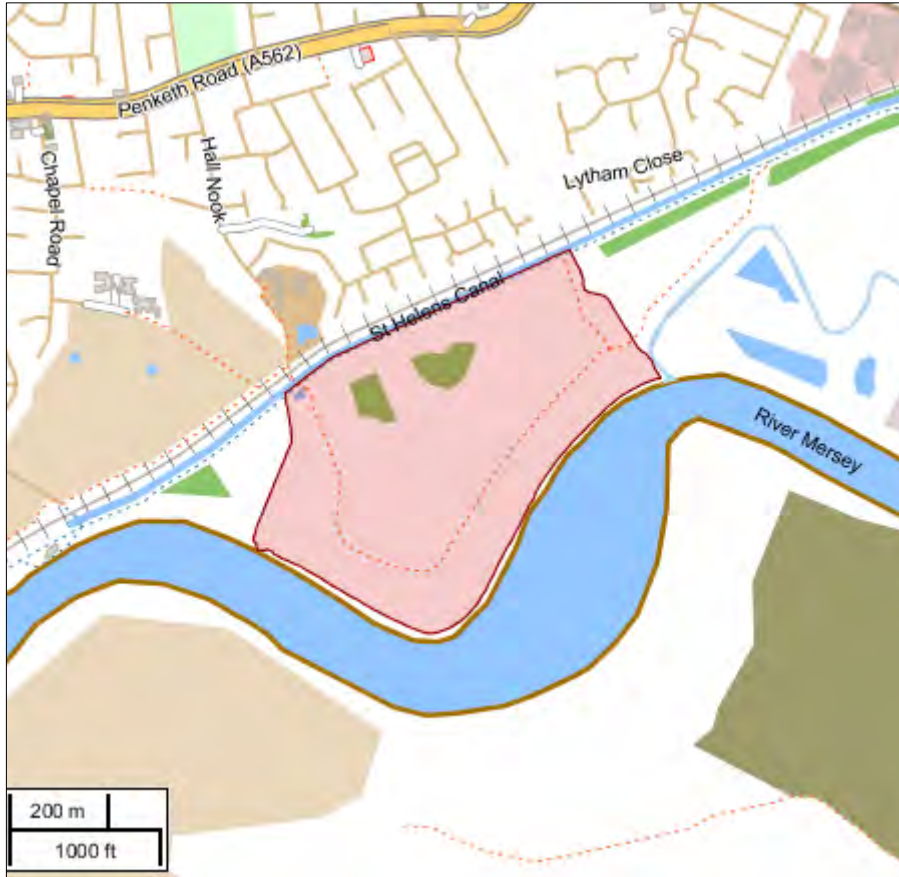
Site name	Appleton Reservoir
Site code	WA001
Authority	Warrington Local Wildlife Sites Partnership
Site centroid	SJ6023484127

Map



Site name	St Helens Canal
Site code	WA030
Authority	Warrington Local Wildlife Sites Partnership
Site centroid	SJ5590486446

Map



Site name	Gatewarth
Site code	WA009
Authority	Warrington Local Wildlife Sites Partnership
Site centroid	SJ5714086864

Map



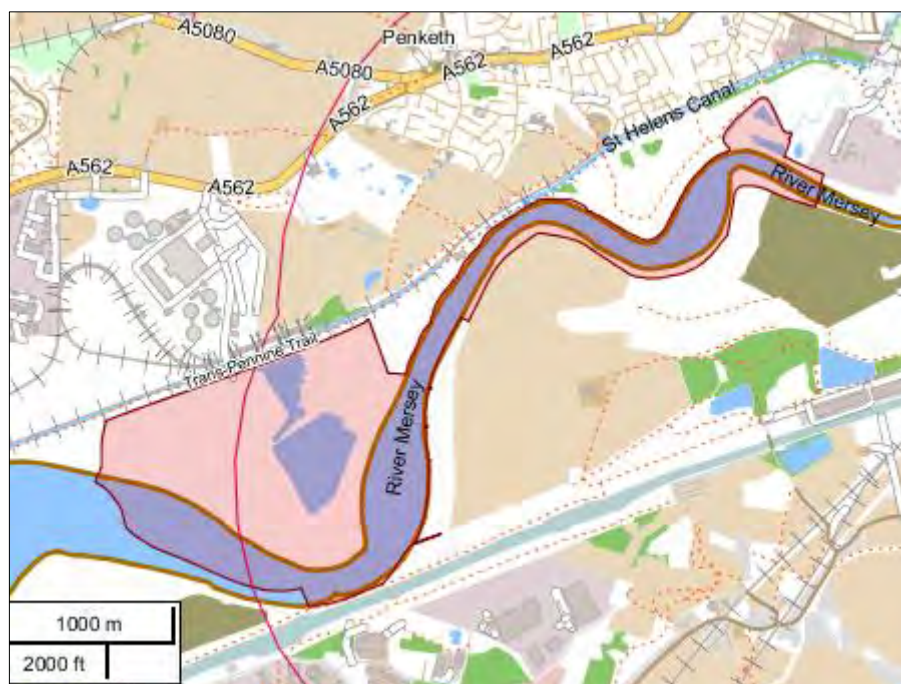
Site name	Latchford Railway Sidings
Site code	WA018
Authority	Warrington Local Wildlife Sites Partnership
Site centroid	SJ6161087035

Map



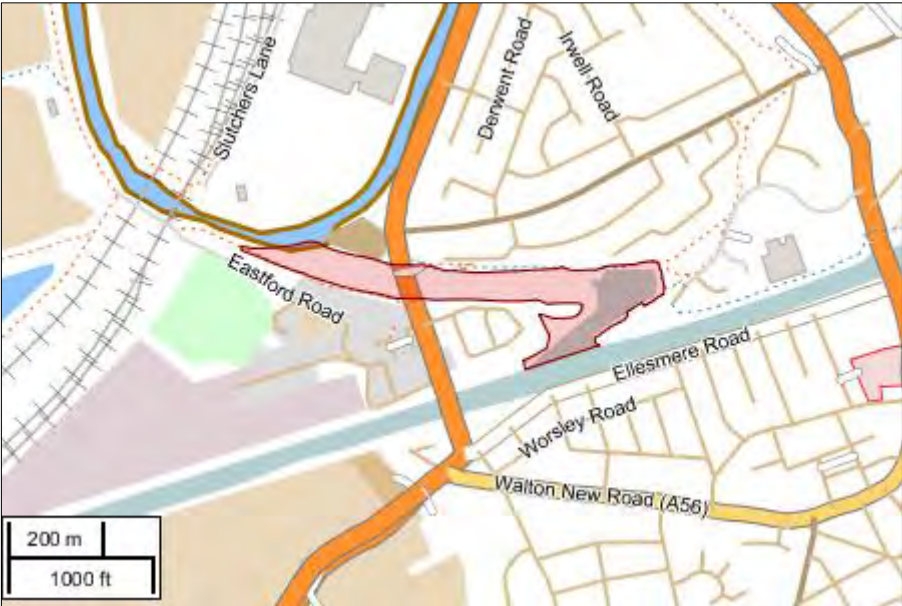
Site name	Rows Wood
Site code	WA028
Authority	Warrington Local Wildlife Sites Partnership
Site centroid	SJ5921983759

Map



Site name	Upper Mersey Estuary
Site code	WA039
Authority	Warrington Local Wildlife Sites Partnership
Site centroid	SJ5632885944

Map



Site name	Walton Locks
Site code	WA040
Authority	Warrington Local Wildlife Sites Partnership
Site centroid	SJ6059586373

Map



Site name	Norbury wood and Marsh
Site code	HA030
Authority	Halton Local Wildlife Sites Partnership
Site centroid	SJ5522684162

Map



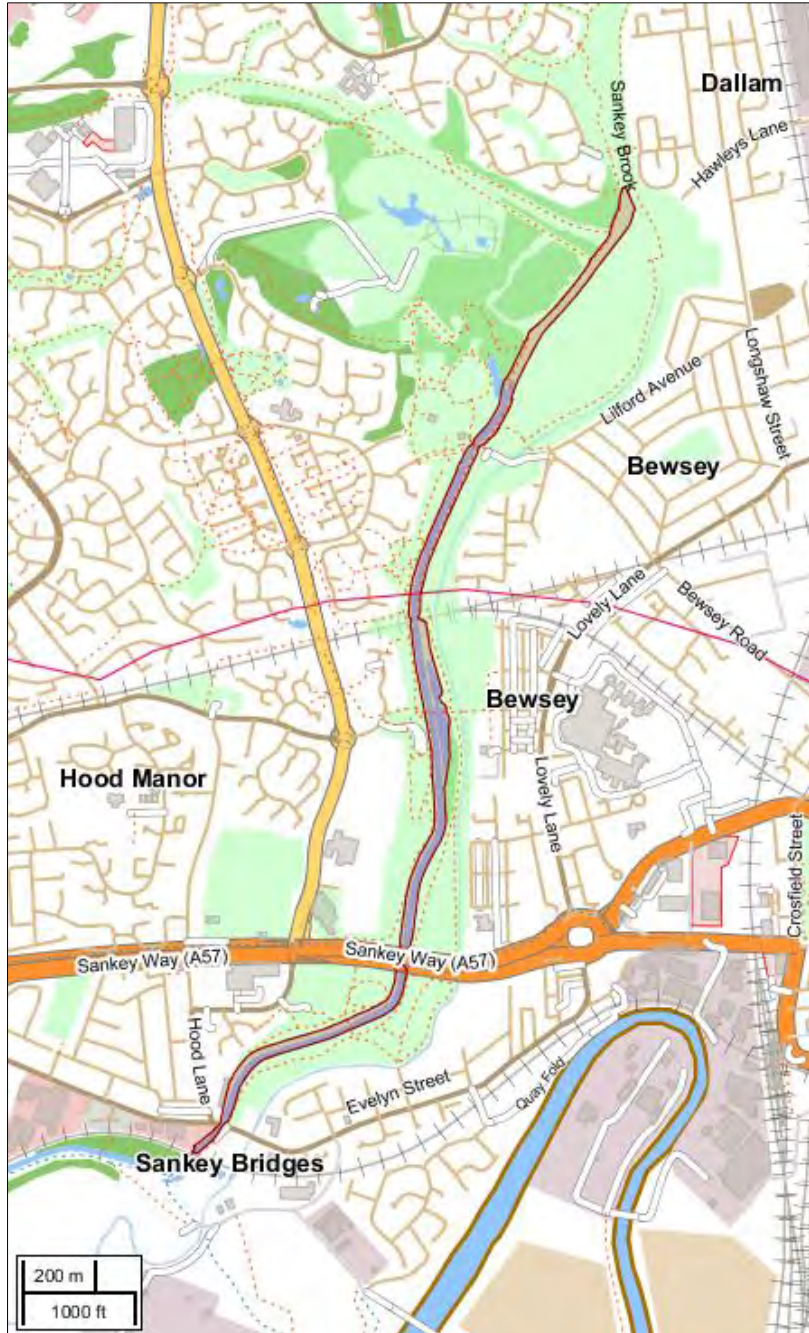
Site name	Pitts Heath
Site code	HA035
Authority	Halton Local Wildlife Sites Partnership
Site centroid	SJ5685584054

Map



Site name	Moore Nature Reserve
Site code	WA023
Authority	Warrington Local Wildlife Sites Partnership
Site centroid	SJ5738585369

Map



Site name	Sankey Canal Central
Site code	WA048
Authority	Warrington Local Wildlife Sites Partnership
Site centroid	SJ5907888908

Regionally Important Geodiversity Sites

There are no Cheshire Regionally Important Geodiversity Sites within this search area

Statutory Sites


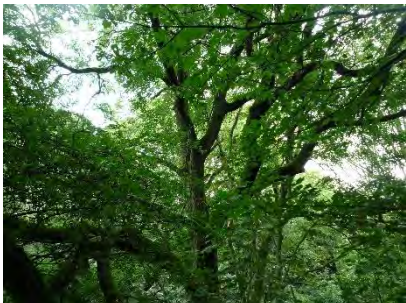

Due to changes to the NBN we are currently unable to provide Statutory Site location maps. You can access these by visiting the NBN Atlas <https://spatial.nbnatlas.org> or MagicMap <http://www.natureonthemap.naturalengland.org.uk/MagicMap.aspx> (please be aware of the NBN Atlas guidance for using data <https://nbnatlas.org/help/guidance-using-data>).

Other Sites of Conservation Interest




There are no Other Sites of Conservation Interest within this search area.



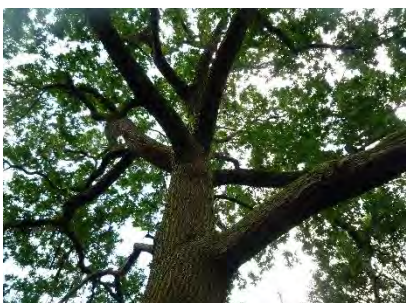
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APPENDIX B: Preliminary Ground-based Roost Assessment of Trees Data Table


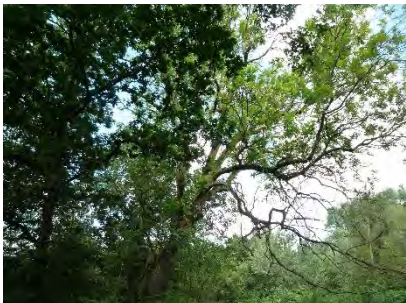
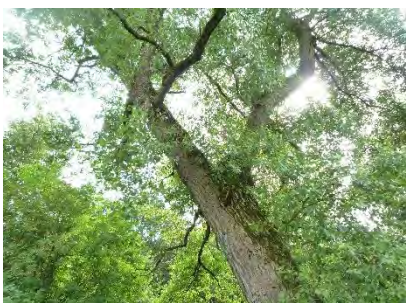
Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
1	<i>Alnus glutinosa</i>	View obscured slightly due to accessibility constraints and foliage cover. Located at the edge of the footpath just outside the proposed development area boundary at the south-west corner of the lake.	SJ 58110 85614	Dead wood, possible trunk cavities.	W, SE	4.0		Moderate
2	<i>Fraxinus excelsior</i>	Canopy obscuring view in places. PRFs may be present. Located at the edge of the footpath just outside the proposed development boundary at the south-west corner of the lake. Some small pruning wounds and knot holes where smaller branches have fallen.	SJ 58111 85608	Size and age, possibility of some PRFs being present, visibility restricted due to access constraints and dense foliage.	Not visible from ground.	Not visible from ground.		Moderate
3	<i>Crataegus monogyna</i>	Located within scrub understorey. PRF created from trunk cavity.	SJ 58109 85628	Trunk cavity/Tear out, possible rams-horn feature.	NE	1.0 - 2.0		Moderate




¹ GPS accuracy approximately 3m, unless otherwise stated


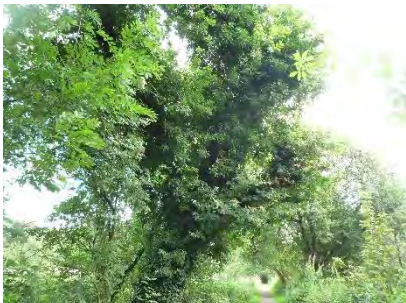

Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
4	<i>Quercus robur</i>	No PRF apparent from a ground-level vantage point but of a size and age where there are likely to be PRF present. Recent pruning may also develop into PRF suitable for individual bats.	SJ 58108 85618	Size and age where PRFs are likely to be present.	Not visible from ground.	Not visible from ground.		Low
5	<i>Prunus avium</i>	Crossed branches creating possible weld features, some storm damage and recent breaks. Difficult to fully access due to surrounding scrub. Visibility restricted due to dense surrounding scrub and canopy cover.	SJ 58093 85633	Size and age where PRFs are likely to be present.	Not visible from ground.	Not visible from ground.		Moderate
6	<i>Alnus glutinosa</i>	Difficult to view fully, a couple of small breaks on main stem branch. Two small woodpecker holes are present, one bird box is also present at 2.5m NW.	SJ 58080 85687	Some decay, transverse snags, small woodpecker holes.	SW, NE	3.0, 3.5		High



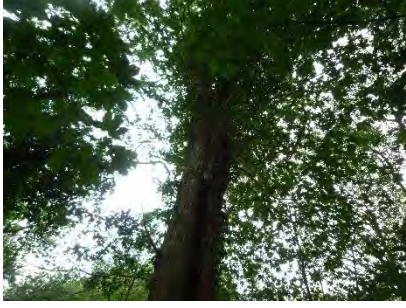
Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
7	<i>Alnus glutinosa</i>	A single woodpecker hole is present. There is possible decay in the tree as the crown has degraded and is becoming a single trunk. Located within a group of alders which may develop additional PRF.	SJ 58074 85700	Single woodpecker hole.	NW	3.0		High
8	<i>Alnus glutinosa</i>	Some woodpecker activity starting in the tree but no true holes visible from the ground at the time of survey. A small bat box is installed onto the tree.	SJ 58071 85736	Size and age where PRFs may be present. [Bat box present]	NE	4.0		Bat box present
9	<i>Quercus robur</i>	No PRF apparent from a ground-level vantage point but of a size and age where there are likely to be PRF present.	SJ 58071 85740	Size and age where PRFs may be present.	Not visible from ground.	Not visible from ground.		Low




Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
10	<i>Betula pendula</i>	Decay in trunk split, possibly generated from butt-rot, appears damp but decay may lead to a cavity extending upwards within the main trunk at 3.0m.	SJ 58091 85856	Trunk cavity present.	SW	0.0 - 3.0		Moderate
11	<i>Betula pendula</i>	Fluting is present within the tree trunk and larger branches. Fluting does not appear narrow enough to provide PRFs but these features would need checking to ensure there are no cavities.	SJ 58075 85896	Fluting.	S-SW	2.0 - 3.0		Low
12	<i>Betula pendula</i>	Fluting is present within the tree trunk and larger branches. Fluting does not appear narrow enough to provide PRFs but these features would need checking to ensure there are no cavities.	SJ 58070 85899	Fluting, some decay in two small upper broken branches though small and unlikely to provide roost habitat.	E-S	5.0		Low




Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
13	<i>Betula pendula</i>	Tree is leaning on an alder and appears to be a dead stem which has fallen from the wet woodland area. There is a trunk cavity present though it appears to be damp and exposed to the elements.	SJ 58049 85890	Trunk cavity with decay.	E	2.0 - 4.0		Moderate
14	<i>Fraxinus excelsior</i>	No PRF apparent from a ground-level vantage point but of a size and age where there are likely to be PRF present. Canopy cover is obscuring the visibility in places.	SJ 58044 85906	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate
15	<i>Populus sp.</i>	No PRF apparent from a ground-level vantage point but of a size and age where there are likely to be PRF present. Canopy cover is obscuring the visibility in places.	SJ 58062 85970	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate



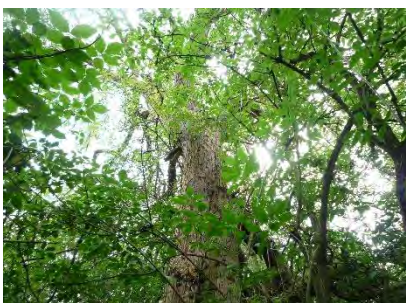
Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
16	<i>Populus sp.</i>	No PRF apparent from a ground-level vantage point but of a size and age where there are likely to be PRF present. Canopy cover is obscuring the visibility in places. Single small bat box installed on tree.	SJ 58042 85973	Size and age where PRFs may be present. [Bat box present]	N	4.0		Moderate
17	<i>Alnus glutinosa</i>	Decaying tree, some nesting material in a cavity, main trunk cavity opens up at the top of the tree. Two broken and rotting main branches.	SJ 58010 85972	Trunk cavities and decay present in trunk and branches.	NE, W, SE	4.0 - 6.0, 3.0, 4.0		High
18	<i>Quercus robur</i>	Several PRFs where pruning wounds have developed on main branches. Additional PRF likely to be present further up in canopy but visibility is obscured from the ground.	SJ 58011 85974	Broken, cracked main branches and pruning wounds.	NW, N, S	4.0, 3.0, 3.0		Moderate




Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
19	<i>Alnus glutinosa</i>	Trunk split present though it may not lead to an internal cavity.	SJ 57981 885938	Trunk split present.	E	2.5		Moderate
20	<i>Quercus robur</i>	Difficult to view from all angles and foliage may be obscuring PRFs. PRFs may be present. Ivy cover noted though does not provide roosting habitat in itself as dense lattice plates are not present. Tree has been pruned in the past so may have PRFs if any pruning wounds have been created.	SJ 57950 85886	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate
21	<i>Quercus robur</i>	Broken decaying branch from branch failure and pruning wound over the footpath. Small cavity in hazard beam along small branch. Tree is of a size and age where there is a likelihood of additional PRFs being present.	SJ 57946 85884	Small hazard beam and branch split present. Size and age where other PRFs may be present. Foliage restricting visibility.	S, SW	4.0, 5.0		Moderate


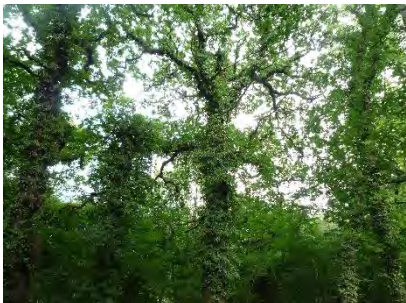

Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
22	<i>Quercus robur</i>	Possibility of PRFs created from pruning wounds however, visibility is obscured by ivy cover and canopy foliage. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates not present. Broken decaying branches in canopy. Tree is of a size and age where there is possibility of PRFs being present.	SJ 57932 85882	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate
23	<i>Quercus robur</i>	Possible deadwood in canopy providing PRFs however, visibility is obscured by ivy cover and canopy foliage. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates not present. Tree is of a size and age where there is some possibility of PRFs being present.	SJ 57927 85879	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate
24	<i>Quercus robur</i>	Tree has deadwood and the rotting heartwood is exposed within a narrow trunk cavity.	SJ 57931 85886	Trunk cavity present (possible frost crack).	SE	0.0 - 4.0		Moderate




Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
25	<i>Fraxinus excelsior</i>	Possible deadwood in canopy providing PRFs however, visibility is obscured by ivy cover and canopy foliage. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates not present. Tree is of a size and age where there is some possibility of PRFs being present.	SJ 57919 85878	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate
26	<i>Quercus robur</i>	Possible deadwood in canopy providing PRFs however, visibility is obscured by ivy cover and canopy foliage. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates not present. Tree is of a size and age where there is some possibility of PRFs being present.	SJ 57919 85877	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate
27	<i>Quercus robur</i>	Bird nesting material in cavity but decay may lead down into trunk and some deadwood/broken branches in canopy.	SJ 57881 85900	Large trunk cavity and decay.	SE	1.0 - 2.0, 3.0 - 5.0		High


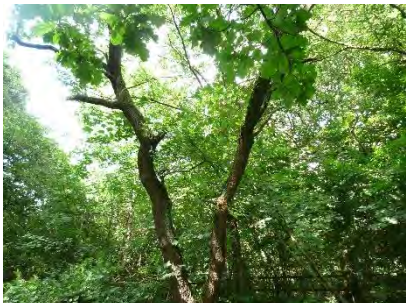
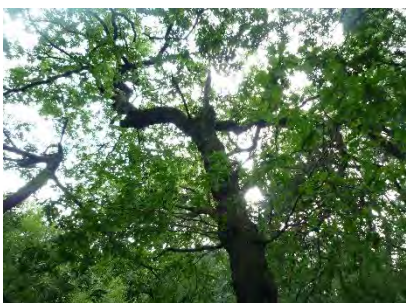
Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
28	<i>Alnus glutinosa</i>	Decay in main branch where it has broken as a transverse snag, possible large cavity in branch stem. PRF is facing a pond within an opening in the woodland surrounding.	SJ 57902 85928	Main branch cavity.	W	4.0		High
29	<i>Alnus glutinosa</i>	Decay in main branch where it has broken with a wound in the limb/hazard beam feature developing. PRF is facing a pond within an opening in the woodland surrounding.	SJ 57901 85928	Wound in branch limb/hazard beam.	NE	2.5		Moderate
30	<i>Quercus robur</i>	Branch cavity and small hazard beam present. Tree is of a size and age where there is some possibility of additional PRFs being present.	SJ 57816 85993	Branch cavity and small hazard beam present.	E, N	4.0, 2.0 - 3.0		Moderate




Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
31	<i>Alnus glutinosa</i>	Decay may be present within the main trunk of the tree. Part of the trunk cavity may be open from the top following the split down.	SJ 557809 85978	Trunk cavity and trunk split present.	NW, NW	1.5, 2.0 - 3.5		High
32	<i>Salix fragilis</i>	Tree is of a size and age where there is some possibility of PRFs being present however, visibility is obscured by canopy foliage. Some recent storm damage is present in smaller snapped branches but these have yet to develop into PRFs.	SJ 57797 85973	Size and age where PRFs may be present. Visibility is restricted by canopy foliage and surrounding dense scrub.	Not visible from ground.	Not visible from ground.		Moderate
33	<i>Salix fragilis</i>	Tree is of a size and age where there is some possibility of PRFs being present however, visibility is obscured by canopy foliage. Some recent storm damage is present in smaller snapped branches but these have yet to develop into PRFs.	SJ 57792 85972	Size and age where PRFs may be present. Visibility is restricted by canopy foliage and surrounding dense scrub.	Not visible from ground.	Not visible from ground.		Moderate


Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
34	<i>Alnus glutinosa</i>	Some decay in the main branch stem where it has broken. A knot hole is present though it may not provide a large cavity. Located next to a ditch within the woodland.	SJ 57736 85951	Knot hole, broken branch/decay.	SW, S, S	3.5, 3.5, 4.0		Moderate
35	<i>Quercus robur</i>	Tree is of a size and age where there is some possibility of PRFs being present. Some ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present. Visibility is also restricted by canopy foliage.	SJ 57603 85887	Size and age where PRFs may be present. Foliage and ivy cover restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate
36	<i>Quercus robur</i>	Tree is of a size and age where there is some possibility of PRFs being present. Some ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present. Visibility is restricted by canopy foliage.	SJ 57614 85883	Size and age where PRFs may be present. Foliage and ivy cover restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate




Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
37	<i>Quercus robur</i>	Tree is of a size and age where there is some possibility of PRFs being present. Some ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present. Visibility is restricted by canopy foliage.	SJ 57624 85877	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate
38	<i>Quercus robur</i>	Tree is of a size and age where there is some possibility of PRFs being present. Some ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present. Visibility is restricted by canopy foliage.	SJ 57630 85864	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate
39	<i>Quercus robur</i>	PRF twists up main tree stem forming a helical split. The heartwood is exposed and decaying. Possible roost space nearer the top where the heartwood has shrunk back from the bark and there is a small cavity at the top. Woodpecker activity evident though no holes created yet.	SJ 57608 85871	Helical split/Trunk cavity and decay present.	S-NE	0.0 - 5.0		Moderate




Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
40	<i>Quercus robur</i>	Possible trunk cavity which may extend upwards. Deadwood in canopy. Some small splits in branches.	SJ 57604 85851	Trunk cavity, dead split limb and split branch present.	E, NE, N	3.0, 6.0, 2.5		Moderate
41	<i>Quercus robur</i>	Recent trunk damage where main branch has split away that may extend upwards and provide a small PRF though being recent damage, it is unlikely to have developed a large cavity yet, as decay has not set in.	SJ 57629 85854	Trunk damage.	E	3.0		Low
42	<i>Quercus robur</i>	Trunk cavity may extend from base upwards and into heartwood. Ivy cover is present which may obscure PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present. Old broken branches are present and the tree appears in decline with limited canopy remaining. Located at the edge of a pond.	SJ 57637 85856	Ivy cover restricting visibility. Trunk cavity.	N	0.0 - 2.0		Moderate




Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
43	<i>Quercus robur</i>	Narrow desiccation crack is evident externally but it is possible decay internally has created a hollow cavity within the trunk as heartwood is exposed with stripped bark. No plate bark associated.	SJ 57634 85849	Split present in exposed trunk heartwood.	N	2.5 - 4.5		Moderate
44	<i>Alnus glutinosa</i>	The tree has a knot hole which may provide roost space and is located at the edge of a pond.	SJ 57646 85841	Knot hole present.	S	5.0		Moderate
45	<i>Quercus robur</i>	PRFs may be present as the tree had some small decaying and broken branches within the canopy.	SJ 57636 85841	Decayed broken small branches present.	N (upwards)	4.5		Low


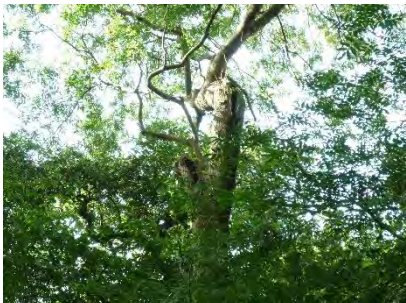
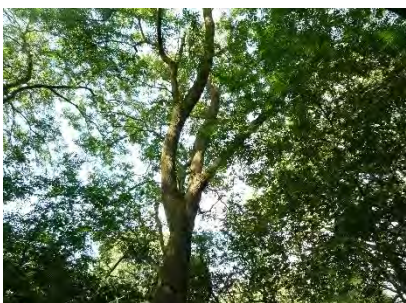
Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
46	<i>Pinus sylvestris</i>	The tree has decay within its main trunk allowing creation of a woodpecker hole. Two older woodpecker holes are also present where the tree has rotted away though create no PRF as there is no cavity formed. A hazard beam is also present in a small branch within the canopy.	SJ 57630 85839	A single woodpecker hole is present. Hazard beam with a split in the limb on the upper side is also present.	N, NE	4.0, 5.5		High
47	<i>Quercus robur</i>	Possible deadwood in canopy. Tree is of a size and age where there is possibility of PRFs being present. Visibility is obscured by ivy cover and canopy foliage. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present.	SJ 57622 85805	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate
48	<i>Quercus robur</i>	Possible deadwood in canopy. Tree is of a size and age where there is possibility of PRFs being present. Visibility is obscured by ivy cover and canopy foliage. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present.	SJ 57622 85803	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate



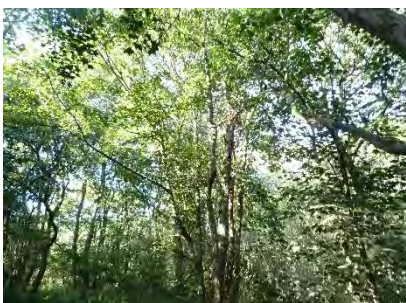
Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
49	<i>Quercus robur</i>	A trunk cavity is present which appears slightly upwards facing possibly a tear out but may provide a PRF. The tree is located at the edge of a pond and footpath. Broken branches appear to be present in the canopy though are not fully visible.	SJ 57664 85827	Trunk cavity is present. Visibility is obscured by canopy foliage.	E	2.5		Moderate
50	<i>Quercus robur</i>	No obvious PRFs present but visibility is obscured by ivy cover and canopy foliage. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates not present. Tree is of a size and age where there is some possibility of PRFs being present. Tree is located next to a pond and track.	SJ 57653 85805	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.	No photo available.	Moderate
51	<i>Quercus robur</i>	Small broken branch present in canopy, no other PRFs noted.	SJ 57644 85799	Small broken branch present.	E	4.0	No photo available.	Low



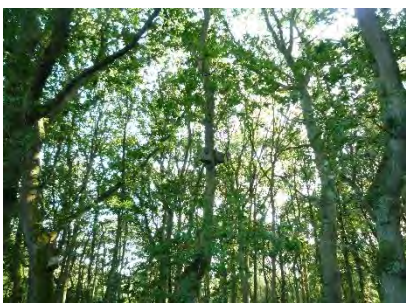
Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
52	<i>Fraxinus excelsior</i>	Some dieback is evident. Due to the size and age of the tree and the presence of disease it is possible PRFs are present, though none were noted on visible branches. Visibility is obscured by ivy cover and canopy foliage. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates not present.	SJ 57597 85794	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate
53	<i>Quercus robur</i>	Trunk cavity and dead branch within the canopy that may provide cavities suitable for small numbers of roosting bats.	SJ 57590 85795	Trunk cavity and dead branch with splits present.	E, N	2.0, 3.0		Moderate
54	<i>Quercus robur</i>	Possibility of PRFs being present due to the size and age of the tree however, visibility is obscured by ivy cover and canopy foliage. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present.	SJ 57582 85795	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate




Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
55	<i>Quercus robur</i>	Some small branches of aerial dead wood within the canopy though these are unlikely to have larger cavities. If PRFs are present they are likely small and only suitable for use by individual bats.	SJ 57572 85802	Size and age where PRFs may be present.	Not visible from ground.	Not visible from ground.		Low
56	<i>Quercus robur</i>	Possibility of PRFs being present due to the size and age of the tree. A recent tear out is present though it does not appear to have any depth or provide a PRF as decay has yet to establish.	SJ 57543 85812	A recent tear out. Possibly other PRF but visibility is obscured from the ground.	W	3.0		Low
57	<i>Quercus robur</i>	No observable PRFs from ground-level vantage point but possibility of PRFs being present due to the size and age of the tree.	SJ 57530 85822	Size and age where PRFs may be present.	Not visible from ground.	Not visible from ground.		Low




Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
58	<i>Quercus robur</i>	Tree is of a size and age where PRFs may be present, though none were visible from a ground-level vantage point.	SJ 57503 85826	Size and age where PRFs may be present.	Not visible from ground.	Not visible from ground.		Low
59	<i>Alnus glutinosa</i>	Possible there is decay in the trunk as a woodpecker hole is present and tree is now standing dead wood next to pond.	SJ 57367 85814	Woodpecker hole present.	NW	4.0		High
60	<i>Alnus glutinosa</i>	Possible there is decay in the trunk as there are two woodpecker holes present. Tree is located within an area adjacent to a pond.	SJ 57351 85796	Woodpecker holes and trunk decay present.	W, W	2.0, 4.0		High




Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
61	<i>Fraxinus excelsior</i>	The tree is dying and a PRF is present where a gap between the bark and heartwood has developed. The heartwood is rotting.	SJ 57340 85808	Lifted bark present.	W	0.0 - 2.0		Moderate
62	<i>Fraxinus excelsior</i>	Slightly upward facing trunk and branch PRF which may provide a large cavity if decay extends into trunk/main branch.	SJ 57301 85817	Trunk cavities present extending into main branches.	SW	4.0		High
63	<i>Fraxinus excelsior</i>	Possibly shallow woodpecker hole present which may provide a cavity behind.	SJ 57307 85819	Woodpecker hole present.	S	5.5		Moderate




Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
64	<i>Alnus glutinosa</i>	There are three woodpecker holes with the tree which appears to be decaying. A trunk split is also present which may provide a PRF cavity.	SJ 57339 85748	Three woodpecker holes present and trunk cavity also present.	W, W	4.0, 5.0, 6.5, 5.0 - 6.5		High
65	<i>Alnus glutinosa</i>	The tree appears to be decaying. Four woodpecker holes are present and there are two trunk cavities where the decay has set in.	SJ 57421 85716	Four woodpecker holes, two trunk cavities also present.	SE, NE, SW, N, S, SW	4.0, 4.0, 3.0, 5.5, 3.5, 5.0		High
66	<i>Alnus glutinosa</i>	The tree has a woodpecker hole.	SJ 57460 85724	Single woodpecker hole present.	N	2.0, 2.25, 3.0		High



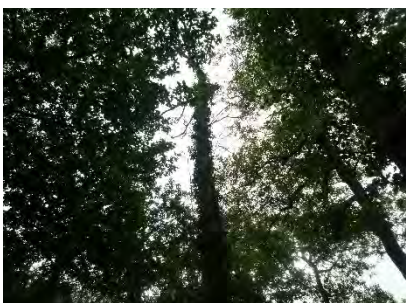
Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
67	<i>Quercus robur</i>	Bat box present.	SJ 57458 85749	Bat box present.	S	2.5		Bat box present.
68	<i>Quercus robur</i>	Hazard beam present with PRF created within split in wood.	SJ 57493 85774	Hazard beam present.	S	2.0		Moderate
69	<i>Quercus robur</i>	Three bat boxes present.	SJ 57504 85764	Three bat boxes present.	SW, S, SE	4.0		Bat boxes present.



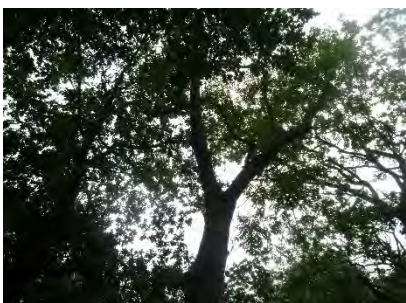
Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
70	<i>Quercus robur</i>	Large cavity in main branch stem, slightly upwards facing within woodland, likely extends along branch. Mature tree.	SJ 57423 85392	Trunk cavity present.	NW	2.5		High
71	<i>Quercus robur</i>	Bat box present.	SJ 57429 85596	Bat box present.	N	2.5		Bat box present.
72	<i>Alnus glutinosa</i>	Some branches broken and decaying, tree is of a size and age where more PRFs may be present but not visible from a ground-level vantage point, particularly as there is decay present in some branches. Bird Box #37 is located on the tree.	SJ 57442 85602	Decay in some main branches and possible branch cavities present.	N, W	2.5, 2.5		Moderate




Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
73	<i>Alnus glutinosa</i>	The tree is decaying. Branch rot holes or possible pruning wounds are present in addition to a broken branch.	SJ 57434 85619	Branch rot holes or possible pruning wounds, broken branch.	W, N	5.0, 5.0		Moderate
74	<i>Alnus glutinosa</i>	There are some small wounds/pruning wounds though they appear shallow and not likely to lead to a cavity these PRFs would need checking.	SJ 57434 85624	Branch rot holes/pruning wounds and broken branches present.	S, E	4.0, 4.0, 2.0, 2.5		Low
75	<i>Crataegus monogyna</i>	Weld between two leading stems providing small PRF possibly suitable to support individual bats.	SJ 57441 85628	Leading stem weld.	S	3.5		Low




Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
76	<i>Alnus glutinosa</i>	Two small branch cavities/wounds.	SJ 57437 85630	Two branch cavities/wounds present.	E	2.0, 2.5		Low
77	<i>Pinus sylvestris</i>	Possible trunk cavity present which may support an internal cavity as the tree appears to be dying/dead as branches are no longer present. Small tree.	SJ 57433 85632	Trunk cavity present.	E-SE	3.0		Moderate
78	<i>Alnus glutinosa</i>	The tree includes a single, woodpecker hole and the main trunk appears to be decaying.	SJ 57395 85644	Woodpecker hole and main stem decay present.	E, E	5.5, 5.5 - 7.0		High


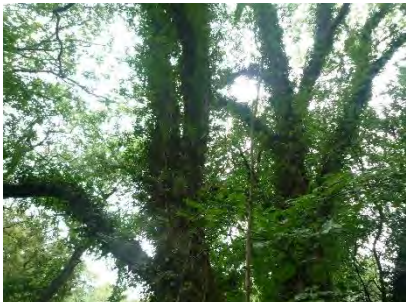

Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
79	<i>Alnus glutinosa</i>	The tree includes a single woodpecker hole and the main trunk appears to be decaying.	SJ 57377 85649	Woodpecker hole and main stem decay present.	E	2.5		High
80	<i>Betula pendula</i>	The tree includes multiple woodpecker holes and the main trunk appears to be decaying.	SJ 57450 85602	Woodpecker holes present.	S	3.0, 4.0, 5.0		High
81	<i>Alnus glutinosa</i>	Single decaying stem in a multi-stemmed tree. A woodpecker hole is present with a likely large chamber behind.	SJ 57517 85697	Woodpecker hole present.	N	2.0		High




Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
82	<i>Alnus glutinosa</i>	Three bat boxes present.	SJ 57583 85771	Three bat boxes present.	N, E, SW	4.0		Bat boxes present.
83	<i>Alnus glutinosa</i>	The tree includes multiple woodpecker holes and the main trunk appears to be decaying. The tree has no canopy and is standing dead wood.	SJ 57616 85744	Woodpecker holes present.	NW	5.0 - 6.5		High
84	<i>Alnus glutinosa</i>	The tree is decaying and no longer has a canopy, with no branches present. PRF possibly obscured by dead ivy present on the main stem.	SJ 57616 85735	PRFs possibly obscured by covering of dead ivy stems.	Not visible from ground.	Not visible from ground.		Moderate



Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
85	<i>Alnus glutinosa</i>	Dead tree which is difficult to identify but looking at surrounding trees it may have been an alder. The bark is peeling away and provides a PRF. A woodpecker hole is also present.	SJ 57656 85767	Lifting bark. Woodpecker hole present.	SW	5.0		High
86	<i>Quercus robur</i>	Tree is located near a ditch and opens onto glade/cleared open patch within the surrounding woodland. A woodpecker hole is present and there is also a trunk cavity, which may provide roost habitat suitable to support large numbers of bats.	SJ 57644 85788	Woodpecker hole and trunk cavity present.	SW, W	3.5, 3.0		High
87	<i>Fraxinus excelsior</i>	Tree has several PRFs and may be suitable to support large numbers of roosting bats. The tree has PRFs within a split branch, a trunk cavity and two woodpecker holes.	SJ 57654 85785	Branch cavities, woodpecker hole and trunk cavity present.	NW, W, SE	6.7, 5.0, 1.5 - 3.0		High



Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
88	<i>Quercus robur</i>	Tree is of a size and age where PRFs may be present, though none were visible from a ground-level vantage point.	SJ 57554 85779	Size and age where PRFs may be present.	Not visible from ground.	Not visible from ground.		Low
89	<i>Quercus robur</i>	Possibility of PRFs being present due to the size and age of the tree however, visibility is obscured by canopy foliage. There is some dead wood within the canopy but this does not provide PRFs.	SJ 57574 85792	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate
90	<i>Quercus robur</i>	Possibility of PRFs being present due to the size and age of the tree however, visibility is obscured by canopy foliage. There is some dead wood within the canopy but this does not provide PRFs.	SJ 57575 85795	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate



Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
91	<i>Quercus robur</i>	Possibility of PRFs being present due to the size and age of the tree however, visibility is obscured by canopy foliage. There is some dead wood within the canopy but from ground position this does not appear to provide PRFs.	SJ 57577 85797	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate
92	<i>Fraxinus excelsior</i>	Possibility of PRFs being present due to the size and age of the tree however, visibility is obscured by canopy foliage and leafy ivy. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present. There is some dead wood within the canopy but from ground position this does not appear to provide PRFs.	SJ 57597 85797	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate
93	<i>Quercus robur</i>	Possibility of PRFs being present due to the size and age of the tree however, visibility is obscured by canopy foliage and leafy ivy. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present.	SJ 57617 85801	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate



Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
94	<i>Fraxinus excelsior</i>	Possibility of PRFs being present due to the size and age of the tree however, visibility is obscured by canopy foliage and leafy ivy. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present.	SJ 57732 85752	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate
95	<i>Fraxinus excelsior</i>	Possibility of PRFs being present due to the size and age of the tree however, visibility is obscured by canopy foliage and leafy ivy. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present.	SJ 57736 85751	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate
96	<i>Fraxinus excelsior</i>	Possibility of PRFs being present due to the size and age of the tree however, visibility is obscured by canopy foliage and leafy ivy. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present. There is some dead wood within the canopy but from ground position this does not appear to provide PRFs.	SJ 57744 85726	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate

Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
97	<i>Quercus robur</i>	Possibility of PRFs being present due to the size and age of the tree however, visibility is obscured by canopy foliage and leafy ivy. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present. There is some dead wood within the canopy but from ground position this does not appear to provide PRFs.	SJ 57790 85758	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate
98	<i>Quercus robur</i>	Possibility of PRFs being present due to the size and age of the tree however, visibility is obscured by canopy foliage and leafy ivy. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present.	SJ 58038 85902	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate
99	<i>Fraxinus excelsior</i>	Possibility of PRFs being present due to the size and age of the tree however, visibility is obscured by canopy foliage and leafy ivy. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present.	SJ 58036 85905	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate



Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
100	<i>Fraxinus excelsior</i>	Possibility of PRFs being present due to the size and age of the tree however, visibility is obscured by canopy foliage. A single large branch wound is present which may provide a cavity suitable for roosting bats.	SJ 57778 85493	Branch wound present.	SE	7.0	No photo available.	Moderate
101	<i>Alnus glutinosa</i>	Three bat boxes present. Tree is located near to Moor Nature Reserve car park.	SJ 57783 85475	Three bat boxes present.	NW, NE, SW	4.0		Bat box present.
102	<i>Quercus robur</i>	A single large trunk cavity and some branch damage is present which may provide a cavity suitable for roosting bats. Possibility of additional PRFs being present due to the size and age of the tree however, visibility is obscured by canopy foliage.	SJ 57535 85805	Mature trunk cavity, branch damage, tree is of a size and age where there is possibility of other PRFs being present.	NW, E	2.0		Moderate



Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
103	<i>Quercus robur</i>	A single large trunk cavity and some branch damage is present which may provide a cavity suitable for roosting bats. Possibility of other PRFs being present due to the size and age of the tree however, visibility is obscured by canopy foliage.	SJ 57543 85794	Mature trunk cavity, branch damage, tree is of a size and age where there is possibility of PRFs being present.	NW, E	2.0 - 2.5		High
104	<i>Quercus robur</i>	Three bat boxes present.	SJ 575048575 9	Three bat boxes present though they are slightly rotted and have been pecked at slightly by woodpeckers.	NW, NE, SW	4.0	No photo available.	Moderate
105	<i>Quercus robur</i>	Bat box present.	SJ 57460 85749	Bat box present.	SW	3.0		Moderate


Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
106	<i>Alnus glutinosa</i>	Dead standing trunk with woodpecker holes present. Tree is decaying.	SJ 57390 85766	Three woodpecker holes present within deadwood standing stem.	S	5.0		High
107	<i>Alnus glutinosa</i>	Bat box present on mature alder near car park.	SJ57746 85495	Bat box present.	N	4.0		Bat box present.
108	<i>Alnus glutinosa</i>	Tree is likely to have decaying heartwood in places as there are two woodpecker holes present within the trunk.	SJ 57788 85661	Two woodpecker holes present.	SW	2.5	No photo available.	High



Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
109	<i>Alnus glutinosa</i>	Tree is likely to have decaying heartwood in places as the stem is standing dead wood. Three woodpecker holes are present within the trunk.	SJ 578048568 2	Three woodpecker holes present.	W	2.0 - 3.0		High
110	<i>Alnus glutinosa</i>	Tree is likely to have decaying heartwood in places as it consists of three dead stems. Two woodpecker holes are present within the trunk.	SJ 57822 85697	Two woodpecker holes present.	W, S	2.0, 2.5	No photo available.	High
111	<i>Salix fragilis</i>	Tree is likely to have decaying heartwood in places as there is a woodpecker hole present within the trunk.	SJ 57925 85866	Woodpecker hole present.	E	2.0		High

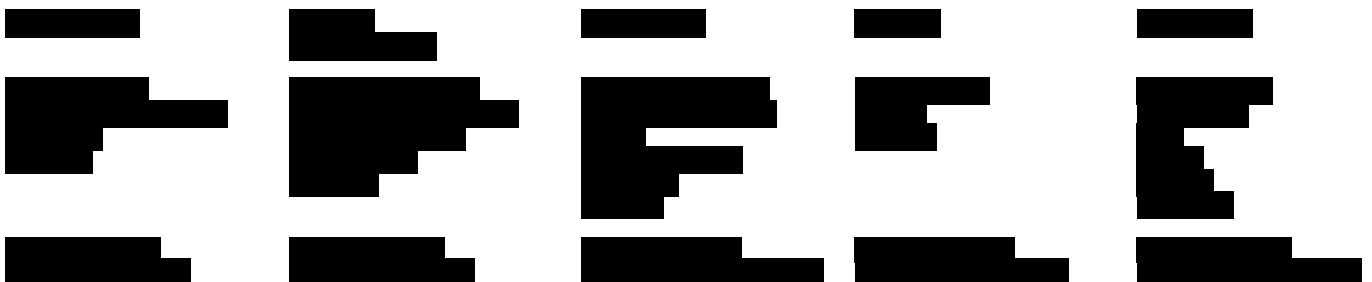
Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
112	<i>Quercus robur</i>	Mature tree of size and age likely to provide PRFs, visibility is obscured by canopy foliage and leafy ivy. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present.	SJ 57922 85865	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.	No photo available.	Moderate
113	<i>Quercus robur</i>	Mature tree of size and age likely to provide PRFs, visibility is obscured by canopy foliage and leafy ivy. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present.	SJ 57922 85869	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.	No photo available.	Moderate
114	<i>Fraxinus excelsior</i>	Mature tree of size and age likely to provide PRFs, visibility is obscured by canopy foliage and leafy ivy. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present.	SJ 57922 85868	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.	No photo available.	Moderate

Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
115	<i>Betula pendula</i>	Mature tree of size and age likely to provide PRFs, visibility is obscured by canopy foliage and leafy ivy. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present. Fluting provides main PRFs.	SJ 58070 85893	Fluting.	Not visible from ground.	Not visible from ground.		Moderate
116	<i>Betula pendula</i>	Mature tree of size and age likely to provide PRFs, visibility is obscured by canopy foliage and leafy ivy. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present.	SJ 58072 85895	Fluting	Not visible from ground.	Not visible from ground.		Moderate
117	<i>Quercus robur</i>	Single large broken branch that may provide a PRF. Mature tree of size and age likely to provide additional PRFs, visibility is obscured by canopy foliage and leafy ivy. Ivy cover may be obscuring PRFs, though does not provide roosting habitat in itself as dense lattice plates are not present.	SJ 58088 85888	Single broken branch. Tree is of a size and age where there is some possibility of PRFs being present.	S	3.0	No photo available.	Moderate

Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
118	<i>Quercus robur</i>	Mature tree of size and age likely to provide PRFs, visibility is obscured by canopy foliage and leafy ivy.	SJ 58062 85868	Size and age where PRFs may be present.	Not visible from ground.	Not visible from ground.	No photo available.	Low
119	<i>Alnus glutinosa</i>	Larger woodpecker hole present within tree trunk. Mature tree.	SJ 58046 85879	Woodpecker hole present.	E	4.0	No photo available.	High
120	<i>Alnus glutinosa</i>	Dead silver birch leaning against alder tree. Tree has a small trunk cavity possibly created by a tear out.	SJ 58047 85883	Trunk cavity, tear out present.	SW	4.0		Moderate
121	n/a	Large bat tube present within oak dominated woodland.	SJ 58011 85767	Large bat tube present.	SW	3.0		Bat tube present.

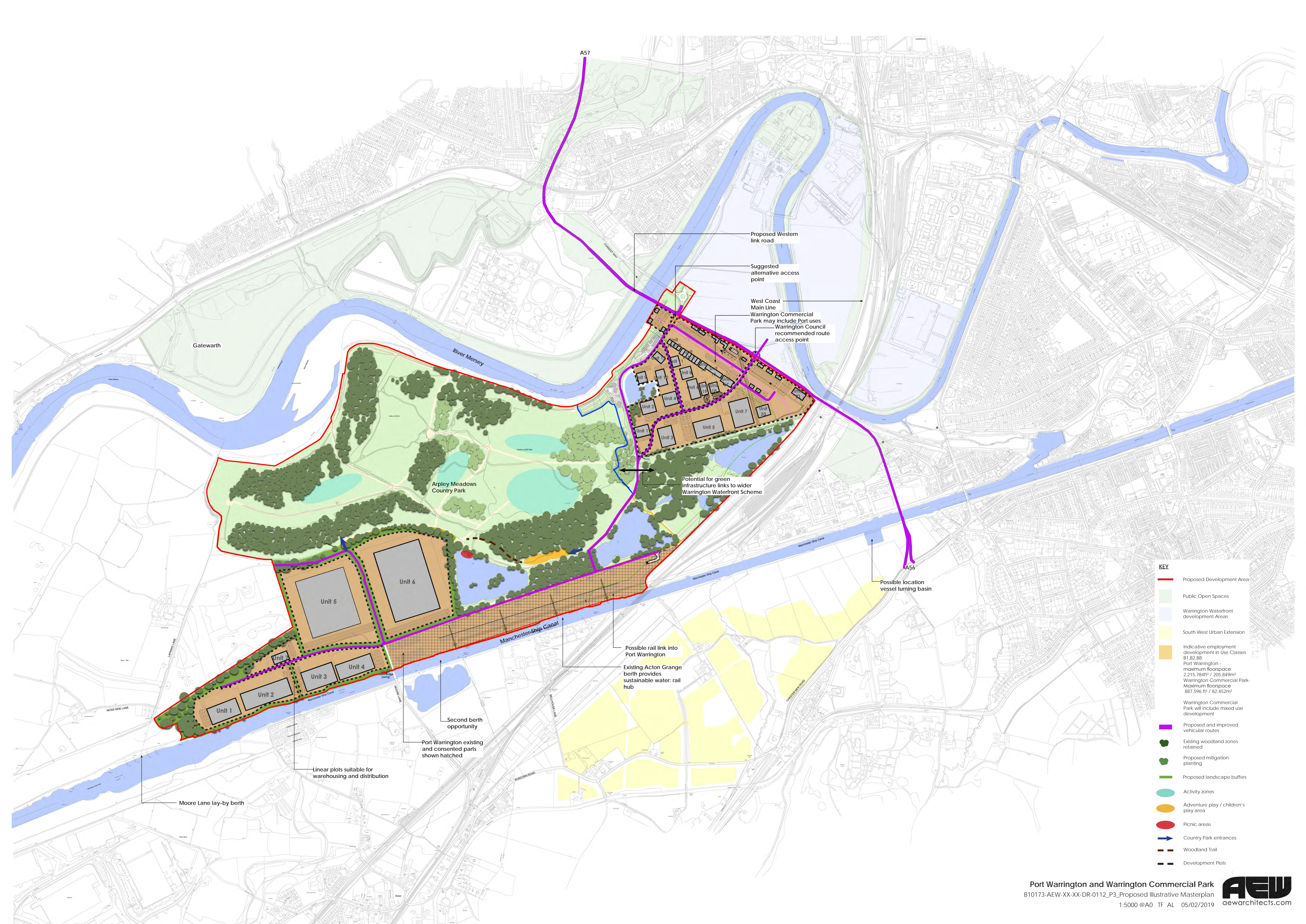
Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
122	<i>Quercus robur</i>	Mature, tree of size and age likely to provide PRFs, visibility is obscured by canopy foliage and leafy ivy.	SJ 58012 85976	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.		Moderate
123	<i>Quercus robur</i>	Mature tree of size and age likely to provide PRFs, visibility is obscured by canopy foliage and leafy ivy.	SJ 57819 85989	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.	No photo available.	Moderate
124	<i>Alnus glutinosa</i>	Mature tree of size and age likely to provide PRFs, visibility is obscured by canopy foliage and leafy ivy.	SJ 57811 85974	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.	No photo available.	Moderate
125	<i>Quercus robur</i>	Mature tree of size and age likely to provide PRFs, visibility is obscured by canopy foliage and leafy ivy.	SJ 58008 85980	Size and age where PRFs may be present. Foliage restricting visibility.	Not visible from ground.	Not visible from ground.	No photo available.	Moderate

Tree ID Number	Trees Species	Notes	Grid Reference ¹	Nature of Feature	PRF Orientation	PRF Height (m)	Photo	Roost Habitat Suitability
126	<i>Betula pendula</i>	Semi-mature to mature tree is located along the footpath associated with the route of the former Runcorn and Latchford Canal. Woodpecker holes in trunk and main branch fork. Tree may have decay within heartwood due to woodpecker activity. Rare within the surrounding location as the majority of trees have no obvious PRFs.	SJ 57158 85378	Three woodpecker holes present.	N, NE, W	4.5, 5.0, 6.0		High
127	<i>Salix fragilis</i>	Semi-mature to mature tree with a large horizontal split/transverse snap in a main branch facing north-east to south-west as the cavity is open either side of the branch and daylight is visible through it. The break appears fairly recent though may provide roost space either side of the PRF within the branch if decay has set in.	SJ 59062 86753	Transverse snap.	NW-SE	2.0		Moderate



DRAWINGS

**Drawing B10173-AEW-XX-XX-DR-A-0112_P3 - Proposed Illustrative
Development Framework Zonal Plan 05/02/2019**
Drawing G6929.01.050 - Preliminary Ground-level Roost Assessment of Trees
Drawing G6929.01.051 - Bat Tree Roost Risk Assessment Areas



Gatewarth

River Mersey

Arpley Meadows Country Park

Proposed Western link road

Suggested alternative access point

West Coast Main Line

Warrington Commercial Park may include Port uses

Warrington Council recommended route access point

Potential for green infrastructure links to wider Warrington Waterfront Scheme

Possible location vessel turning basin

Manchester Ship Canal

Possible rail link into Port Warrington

Existing Acton Grange berth provides sustainable water: rail hub

Second berth opportunity

Port Warrington existing and consented parts shown hatched

Linear plots suitable for warehousing and distribution

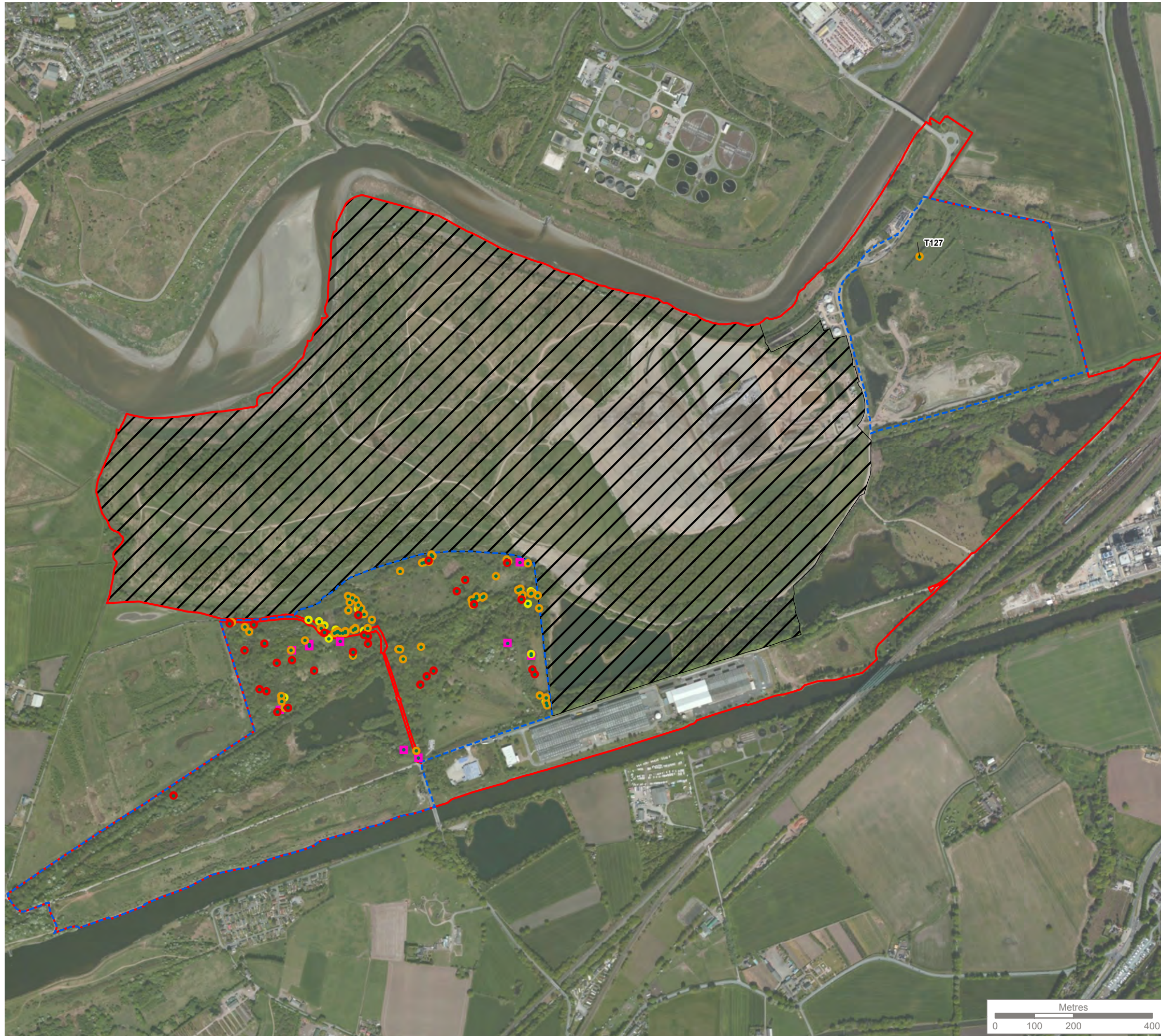
Moore Lane lay-by berth

- KEY**
- Proposed Development Area
 - Public Open Spaces
 - Warrington Waterfront development Areas
 - South West Urban Extension
 - Indicative employment development in Use Classes B1, B2, B8:
 - Port Warrington - maximum floorspace 2,215,784ft² / 205,849m²
 - Warrington Commercial Park - Maximum floorspace 887,596 ft² / 82,452m²
 - Warrington Commercial Park will include mixed use development
 - Proposed and improved vehicular routes
 - Existing woodland zones retained
 - Proposed mitigation planting
 - Proposed landscape buffers
 - Activity zones
 - Adventure play / children's play area
 - Picnic areas
 - ➔ Country Park entrances
 - Woodland Trail
 - Development Plots

357000








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KEY

-  Site boundary
-  Survey area of Preliminary Roost Assessment
-  Proposed biodiversity offsetting area
-  Tree with bat box present
-  Tree with high roost potential
-  Tree with moderate roost potential
-  Tree with low roost potential

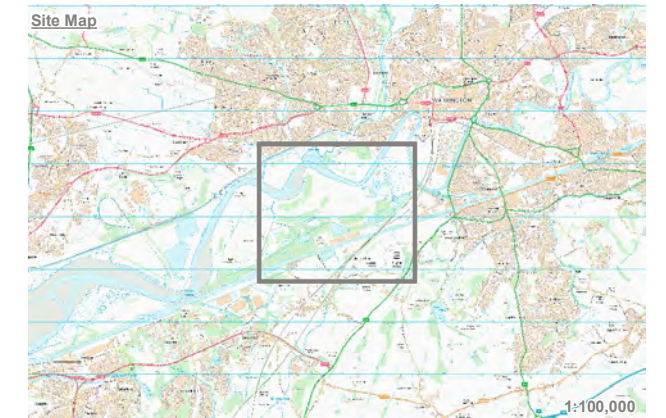
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Site Map



Rev	Description	Drawn	Approved	Date



THE ENVIRONMENT PARTNERSHIP
 Genesis Centre, Birchwood Science Park, Warrington WA3 7BH
 Tel 01925 844004 e-mail tep@tep.uk.com www.tep.uk.com

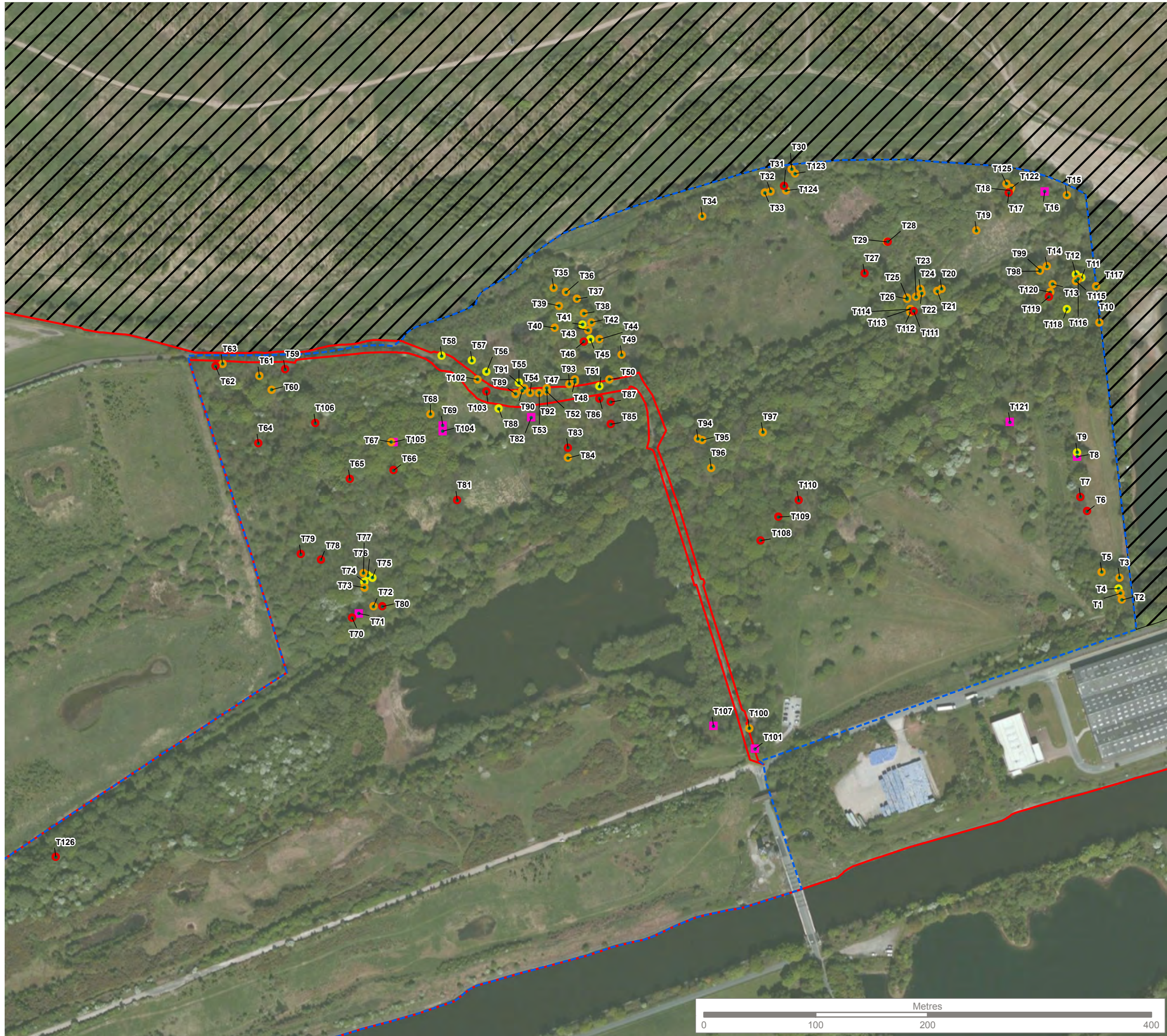
Project
Warrington Waterfront: Port Warrington, Warrington Commercial Park, Moore Nature Reserve and Arpley Country Park.

Title
Preliminary Ground-level Bat Roost Assessment of Trees

Drawing Number
G6929.01.050.1 Sheet 1 of 2

Drawn	Checked	Approved	Scale	Date
JO	LR	IH	1:10,000 @ A3	13/09/2019





KEY

- Site boundary
- Survey area of Preliminary Roost Assessment
- Proposed biodiversity offsetting area
- Tree with bat box present
- Tree with high roost potential
- Tree with moderate roost potential
- Tree with low roost potential

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 Tel 01925 844004 e-mail tep@tep.uk.com www.tep.uk.com

Project
Warrington Waterfront: Port Warrington, Warrington Commercial Park, Moore Nature Reserve and Arpley Country Park.

Title
Preliminary Ground-level Bat Roost Assessment of Trees

Drawing Number
G6929.01.050.2 Sheet 2 of 2

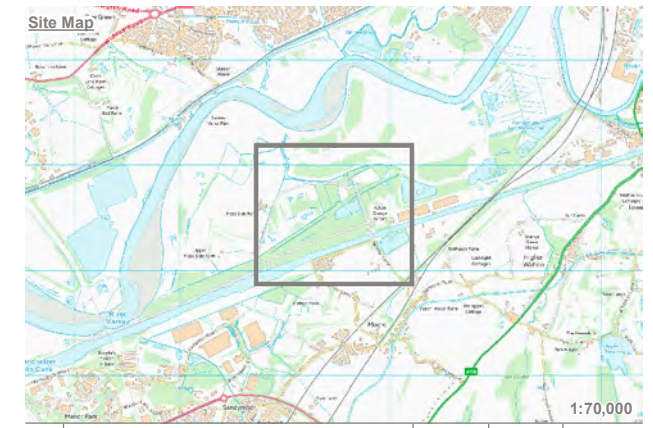
Drawn	Checked	Approved	Scale	Date
JO	LR	IH	1:3,500 @ A3	13/09/2019



KEY

- Site boundary
- Survey area of Preliminary Roost Assessment
- High risk areas - areas with more trees with moderate or high bat roost habitat suitability, higher proportion of mature trees with potential for roost features and inaccessible areas to survey
- Moderate risk areas - areas with more trees with moderate or low bat roost habitat suitability, trees of an age and size present with potential for roost features
- Low risk areas - areas with semi-mature to mature trees in good health with surrounding scrub and overall trees with low bat roost habitat suitability; no obvious features, but potential for roost features to develop
- Negligible risk areas - areas within young or semi-mature trees with no potential roost features currently, including areas with scrub and grassland
- Not within survey area

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Project
Warrington Waterfront: Port Warrington, Warrington Commercial Park, Moore Nature Reserve and Arpley Country Park.

Title
Bat Risk Assessment Areas

Drawing Number G6929.01.051.1	Sheet 1 of 2
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Drawn JO	Checked LR	Approved IH	Scale 1:5,000 @ A3	Date 13/09/2019
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387000

387000



KEY

- Site boundary
- Survey area of Preliminary Roost Assessment
- Moderate risk areas - areas with more trees with moderate or low bat roost habitat suitability, trees of an age and size present with potential for roost features
- Negligible risk areas - areas within young or semi-mature trees with no potential roost features currently, including areas with scrub and grassland
- Not within survey area



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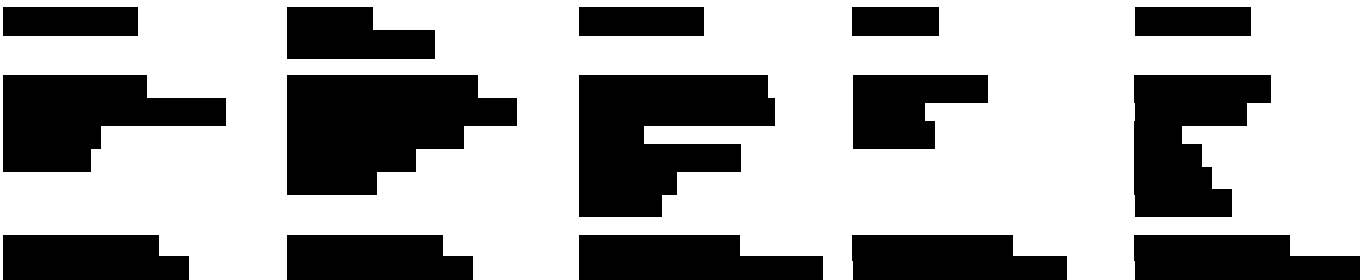
Project
Warrington Waterfront: Port Warrington, Warrington Commercial Park, Moore Nature Reserve and Arpley Country Park.

Title
Bat Risk Assessment Areas

Drawing Number G6929.01.051.2	Sheet 2 of 2
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APPENDIX I: HSI survey of ponds



PORT WARRINGTON MOORE HABITAT SUITABILITY INDEX APPENDIX



CONTENTS

1.0	Summary	1
2.0	Method	2
3.0	Results	4
4.0	Further Requirements	14

DRAWINGS

G6929.01.052 – Pond Location Plan

1.0 Summary

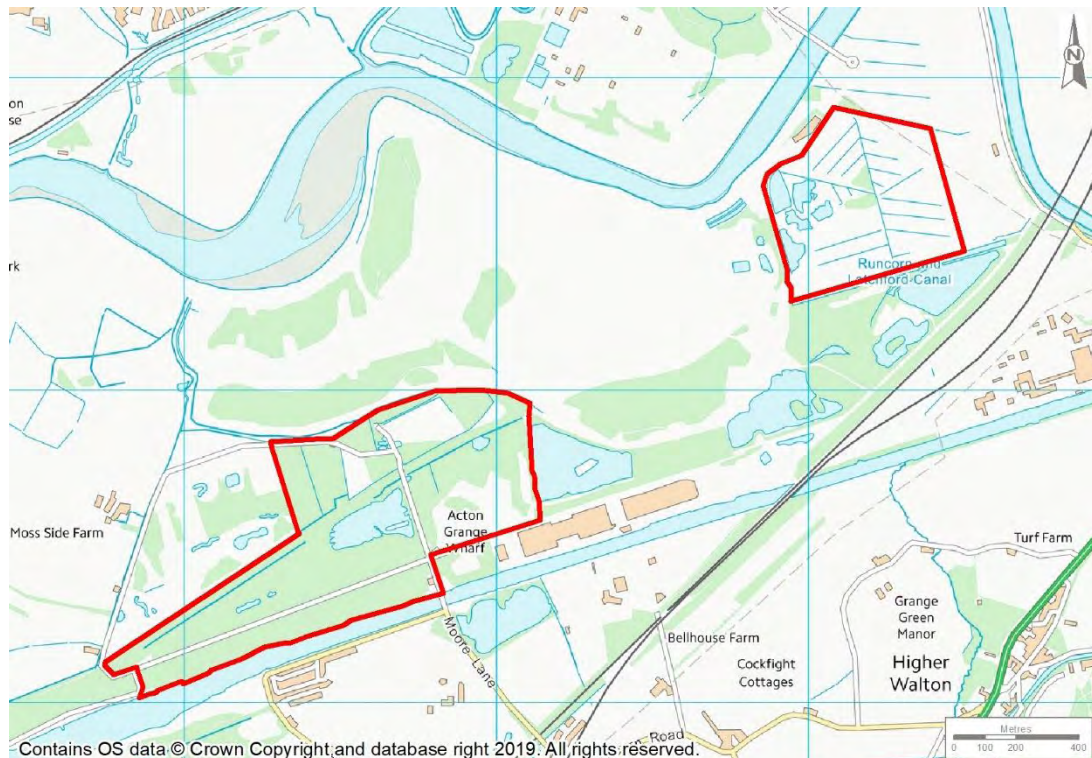
- 1.1 All accessible ponds within influencing distance of the proposed development at the proposed Port Warrington development, Moore, were assessed for their suitability to support amphibians, in particular great crested newts (GCN).
- 1.2 A total of 22 suitable waterbodies were identified and surveyed. Habitat Suitability Index (HSI) Assessments were carried out on each of these within the appropriate season.
- 1.3 The HSI results indicated that the ponds ranged from poor to excellent for their suitability to support breeding GCN.
- 1.4 To inform a planning application, initially it is recommended that eDNA survey is undertaken on each pond to determine presence or absence. Those which return a positive result for GCN should then be subject to traditional population surveys.

2.0 Method

Scope

- 2.1 TEP was commissioned in May 2019 by Peel land and Property to undertake a habitat suitability assessment of suitable waterbodies at the site of the proposed Port Warrington development in Moore, Warrington.
- 2.2 The site is located within the borough of Warrington with a central grid reference of SJ 58401 86246. The site is immediately bounded to the north and west by Arpley Meadows landfill and beyond this the River Mersey and residential and industrial development associated with the towns of Penketh and Great Sankey. To the east lies arable land and the west coast mainline rail route with industrial and residential development associated with the town of Latchford. To the west lies extensive farmland and the River Mersey estuary and to the south the site is immediately bordered by the Manchester Ship Canal with the village of Moore present on the opposite bank.
- 2.3 The development boundary and wider site context are shown in **Figure 1** below.

Figure 1: development boundary and local context



- 2.4 A review of mapping and satellite imagery along with a site walkover survey was undertaken to identify all ponds within influencing distance of the site. Influencing distance for GCN is 500m from the site boundary, except where barriers to amphibian migration exist. The site is constrained by the River Mersey to the north and by the Manchester Ship canal to the south which both act as barriers to amphibian migration.
- 2.5 Within the 500 m radius, 22 ponds were identified as requiring assessment. The locations of the ponds are illustrated on Drawing **G6929.01.052**. It should be noted

that the five larger lakes on Moore Nature Reserve were not subject to HSI due to the difficulty with accessing the margins to perform a full assessment and their large surface area indicating their unsuitability for great crested newt.

- 2.6 The surveys are designed to determine whether great crested newt (GCN) *Triturus cristatus* may be breeding in ponds within the site or within ranging distance of the site. This information is required to inform development proposals including the design of any mitigation and consideration of any relevant legislation and policies.

Habitat Suitability Index (HSI) Assessments

- 2.7 HSI surveys were undertaken by TEP on 13th June 2019 by suitably qualified ecologists.
- 2.8 HSI¹ is a standard measure of calculating the suitability of a pond to support breeding GCN, based on an assessment of ten characteristics (indices), including size, shading, depth and vegetation profile. The assessment generates a number between 0 and 1 for each of the indices, which are combined to provide an overall assessment of a pond's suitability to support GCN on a categorical scale (**Table 1**). The assessment has not been designed for or tested on other waterbodies such as ditches.

Table 1: Pond habitat suitability index scoring

HSI Score	Suitability	Predicted GCN Occupancy of Ponds in each Category
< 0.5	poor	3%
0.5 to 0.59	below average	20%
0.6 to 0.69	average	55%
0.7 to 0.79	good	79%
> 0.8	excellent	93%



1: ARG UK Advice Note 5 (May 2010) Great Crested Newt Habitat Suitability Index




3.0 Results




Habitat Suitability Index (HSI) Assessments




- 3.1 Pond descriptions and photographs (where available) are provided in **Table 2**. The results of the HSI surveys are presented in **Table 3**.
- 3.2 The suitability of the surveyed ponds to support GCN ranged from Average to Good.





Table 2: Pond descriptions and photos




Pond	Description & grid reference	Photograph
1	Large pond on the tip site with reed swamp margins & scattered scrub. More like a lagoon than a pond. Would be dangerous to survey as likely deep and would sink if trying to eDNA. Would need a health and safety second and life jacket and throw rope if attempting eDNA.	
2	As per pond 1 but with blanket weed.	




Pond	Description & grid reference	Photograph
3	<p>Former borrow pit filled with water. Very steep embankments, likely deep water (unknown depth) large pit from previous excavations. Possibly too large for traditional surveys.</p>	
4	<p>Pond has dried, was previously linear feature along track. Has dried to shallow pool surrounded by greater reed mace, hard rush and common reed. Spoil heaps adjacent. Uneven margin with rubble and waste.</p>	
5	<p>Linear pond with wall on eastern bank. At least 2ft deep. Within area of swamp and grey willow scrub. Feature floods into adjacent willow carr to east forming shallow pools within woodland. Unknown depth and vertical banks.</p>	

Pond	Description & grid reference	Photograph
6	<p><i>Crassula helmsii</i> present. Large pond surrounded by common reed beds & willow scrub. Unknown depth with little emergent vegetation. Undulating banks. Inaccessible banks in places due to willow scrub</p>	
7	<p>Irregular shaped pond surrounded by swamp. Limited access to banks due to vegetation, eDNA tricky. Unknown depth.</p>	
8	<p>Small oval pond dominated by blanket weed with high earth bank adjacent.</p>	

Pond	Description & grid reference	Photograph
9	Dry pond with greater reedmace and common reed.	
10	Wet area in woodland, appears shallow. Numerous alders growing out of water. Heavily vegetated around margins, limited access.	
11	Area of standing water in woodland with willow scrub & trees growing out of water. Hard to estimate true size. Marshy margins, access difficult.	

Pond	Description & grid reference	Photograph
12	<p>Roundish pond adjacent to track surrounded by woodland. Alder, ash, English oak on banks, crack willow, greater reedmace, reed sweetgrass. Unknown depth.</p>	
13	<p>Small, shallow looking pond in woodland surrounded by dense vegetation. Access may be difficult due to dense vegetation and barbed wire fence adjacent to road.</p>	
14	<p>Network of areas of standing water in woodland, possible water vole signs – large feeding stations. Reed canary grass, grey willow, soft rush. Pond does not have a defined margin, more a mosaic of swamp and standing water. Joins to deep ditch on west side.</p>	
15	<p>Pond in open area of grassland with good diversity of aquatic flora – greater reedmace, water starwort, water crowfoot.</p>	

Pond	Description & grid reference	Photograph
16	Pond with good diversity of aquatic flora. With at least 60% of its surface covered by common reed. Water crowfoot sp., greater reedmace.	
17	Pond with crassula, surrounded by trees and scrub & fenced. Contains crassula and greater reedmace.	
18	Woodland pond with islands of trees.	

Pond	Description & grid reference	Photograph
19	Long pond at edge of woodland. Difficult to access due to vegetation. Need to climb fence to access.	
20	Tear shaped pond within area of acid grassland. Banks are gently sloping with young grey willow and downy birch along the northern bank. Emergent vegetation includes dominant common reed with two stands present within the centre of the pond.	
21	Small woodland pond bounded by a public footpath. Surrounded by alder, oak and willow with some emergent willowherb and common reed along the southern and western banks.	


Pond	Description & grid reference	Photograph
22	<p>Small open pond within acid grassland compartment. Greater reedmace is emergent around the edge of the pond and likely to dominate the pond when fully grown. Dead stems of previous years reedmace are abundant within the water.</p>	

Table 3: HSI assessment results

Pond Ref	SI1 Location		SI2 Pond Area (m ²)		SI3 Permanence		SI4 Water Quality		SI5 Shade		SI6 Waterfowl		SI7 Fish		SI8 Pond Density		SI9 Terrestrial Habitat		SI10 Macrophyte Cover		Overall HSI	
	Measure	Score	Measure	Score	Measure	Score	Measure	Score	Measure	Score	Measure	Score	Measure	Score	Measure	Score	Measure	Score	Measure	Score	HSI	Suitability
1	A (optimal)	1	2000	0.8	Never	0.9	Moderate	0.67	5	1	Minor	0.67	Possible	0.67	10	0.95	Good	1	0	0.3	0.76	Good
2	A (optimal)	1	1800	0.83	Never	0.9	Moderate	0.67	5	1	Minor	0.67	Possible	0.67	10	0.95	Good	1	0	0.3	0.76	Good
3	A (optimal)	1	>2000	0	Sometimes	0.5	Moderate	0.67	5	1	Minor	0.67	Possible	0.67	10	0.95	Good	1	0	0.3	0.70	Good
4	A (optimal)	1	<50	0.05	Sometimes	0.5	Moderate	0.67	0	1	Absent	1	Absent	1	10	0.95	Good	1	90	0.9	0.65	Average
5	A (optimal)	1	100	0.2	Never	0.9	Moderate	0.67	90	0.4	Minor	0.67	Possible	0.67	10	0.95	Good	1	0	0.3	0.60	Average
6	A (optimal)	1	2000	0.8	Never	0.9	Moderate	0.67	30	1	Minor	0.67	Minor	0.67	10	0.95	Good	1	5	0.35	0.72	Good
7	A (optimal)	1	1300	0.91	Never	0.9	Moderate	0.67	75	0.7	Minor	0.67	Possible	0.67	10	0.95	Good	1	60	0.9	0.83	Excellent
8	A (optimal)	1	50	0.1	Sometimes	0.5	Poor	0.33	0	1	Minor	0.67	Possible	0.67	10	0.95	Good	1	0	0.3	0.54	Below Average
9	A (optimal)	1												10	0.95	Good	1					DRY
10	A (optimal)	1	600	1	Sometimes	0.5	Moderate	0.67	60	1	Minor	0.67	Possible	0.67	10	0.95	Good	1	10	0.4	0.75	Good
11	A (optimal)	1	1600	0.86	Sometimes	0.5	Moderate	0.67	90	0.4	Minor	0.67	Possible	0.67	10	0.95	Good	1	5	0.35	0.67	Average

Pond Ref	SI1 Location		SI2 Pond Area (m ²)		SI3 Permanence		SI4 Water Quality		SI5 Shade		SI6 Waterfowl		SI7 Fish		SI8 Pond Density		SI9 Terrestrial Habitat		SI10 Macrophyte Cover		Overall HSI	
	Measure	Score	Measure	Score	Measure	Score	Measure	Score	Measure	Score	Measure	Score	Measure	Score	Measure	Score	Measure	Score	Measure	Score	HSI	Suitability
12	A (optimal)	1	200	0.4	Never	0.9	Moderate	0.67	70	0.8	Minor	0.67	Possible	0.67	10	0.95	Good	1	10	0.4	0.71	Good
13	A (optimal)	1	<50	0.05	Sometimes	0.5	Moderate	0.67	70	0.8	Minor	0.67	Possible	0.67	10	0.95	Good	1	10	0.4	0.54	Below Average
14	A (optimal)	1	1000	0.95	Sometimes	0.5	Moderate	0.67	60	1	Minor	0.67	Possible	0.67	10	0.95	Good	1	10	0.4	0.75	Good
15	A (optimal)	1	300	0.6	Rarely	1	Good	1	5	1	Minor	0.67	Possible	0.67	10	0.95	Good	1	30	0.6	0.83	Excellent
16	A (optimal)	1	200	0.4	Rarely	1	Good	1	15	1	Minor	0.67	Possible	0.67	10	0.95	Good	1	50	0.8	0.82	Excellent
17	A (optimal)	1	100	0.2	Sometimes	0.5	Good	1	70	0.8	Minor	0.67	Possible	0.67	10	0.95	Good	1	60	0.9	0.71	Good
18	A (optimal)	1	2000	0.8	Never	0.9	Moderate	0.67	5	1	Minor	0.67	Possible	0.67	10	0.95	Good	1	0	0.3	0.76	Good
19	A (optimal)	1	1800	0.83	Sometimes	0.5	Moderate	0.67	90	0.4	Minor	0.67	Possible	0.67	10	0.95	Good	1	10	0.4	0.67	Good
20	A (optimal)	1	50	0.1	Sometimes	0.5	Moderate	0.67	30	1	Minor	0.67	Absent	1	10	0.95	Good	1	45	0.75	0.66	Average
21	A (optimal)	1	150	0.3	Rarely	1	Moderate	0.67	70	0.8	Minor	0.67	Possible	0.67	10	0.95	Good	1	15	0.45	0.71	Good
22	A (optimal)	1	<50	0.05	Sometimes	0.5	Moderate	0.67	0	1	Minor	0.67	Absent	1	10	0.95	Good	1	20	0.5	0.59	Below Average

4.0 Further Requirements

- 4.1 Table 4 below shows the number of ponds with each level of potential to support GCN.

Table 4: Number of ponds with each overall HSI Suitability

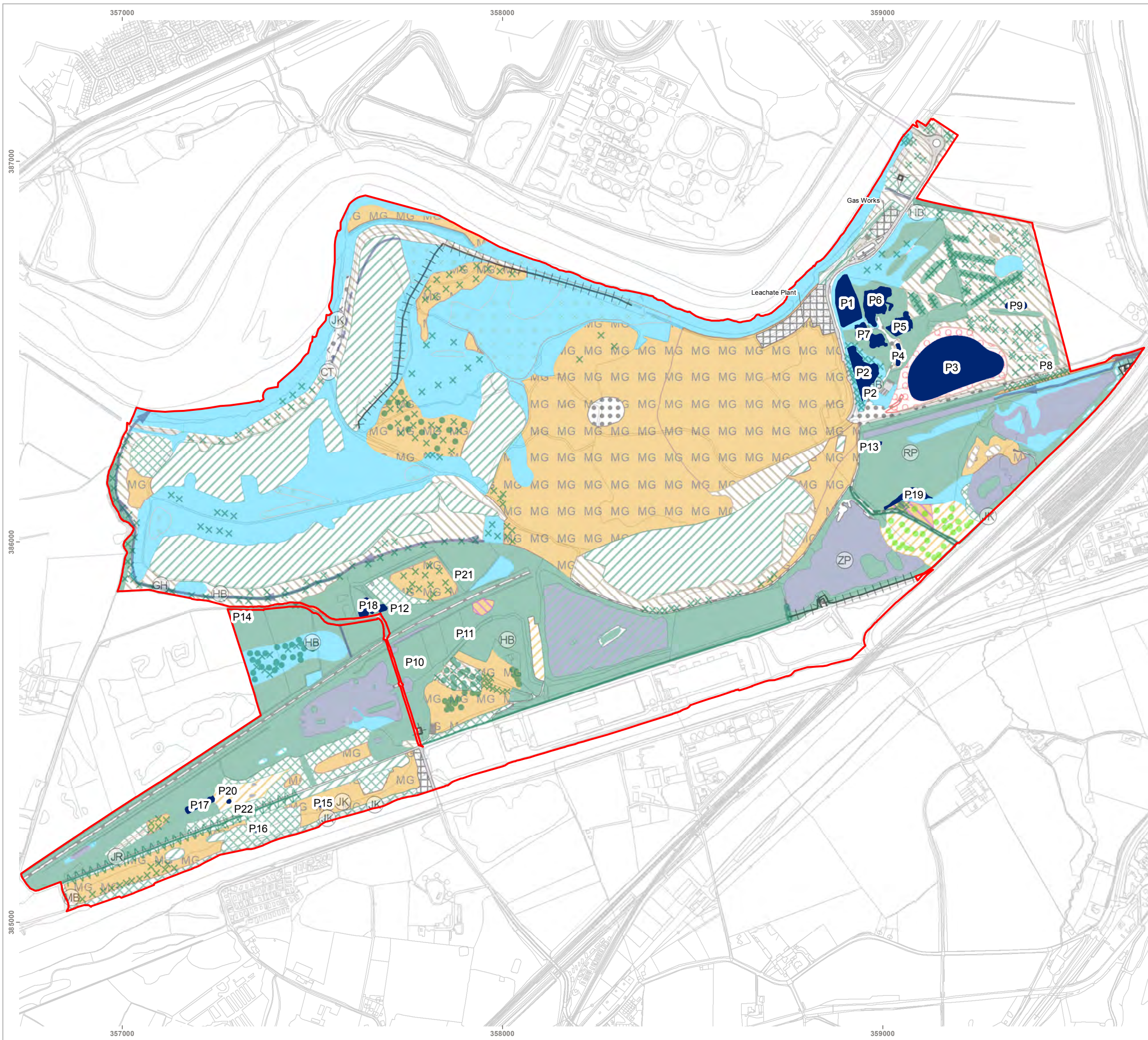
Overall HSI Suitability	Number of ponds
Dry	1
Below Average	3
Average	4
Good	11
Excellent	3

- 4.2 It has been identified that the majority of ponds on site have good suitability to support GCN with a total of 18 ponds having average or above suitability to support GCN.
- 4.3 It should be noted that the HSI does not provide an accurate prediction of great crested newt occupation, but does allow a useful evaluation of the suitability and availability of breeding habitat for great crested newts within the study area. It also provides insight for the conservation status of a great crested newt population; for example if a population occurs within ponds with suboptimal suitability this may indicate the population is vulnerable. If occupation is not found within ponds with good or excellent suitability, yet other ponds are occupied in the locality, this might indicate some form of barrier to dispersal.
- 4.4 HSI does not offer an alternative to pond surveys, however. It is recognised that a 'poor' score does not necessarily preclude the potential for the presence of great crested newts. This is consistent with recommendations from ARG that state 'However, the [HSI] system is not sufficiently precise to conclude that any particular pond with a high score will support newts, or that any pond with a low score will not do so.'
- 4.5 Based on this information, it is recommended that all ponds within the survey area identified are surveyed for great crested newts to inform a planning application, regardless of their HSI score. Initially eDNA survey should be undertaken on suitable waterbodies to determine presence or absence of GCN. Where GCN are confirmed it will then be necessary to undertake traditional amphibian survey to establish the population size.

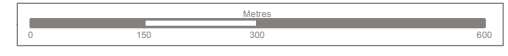


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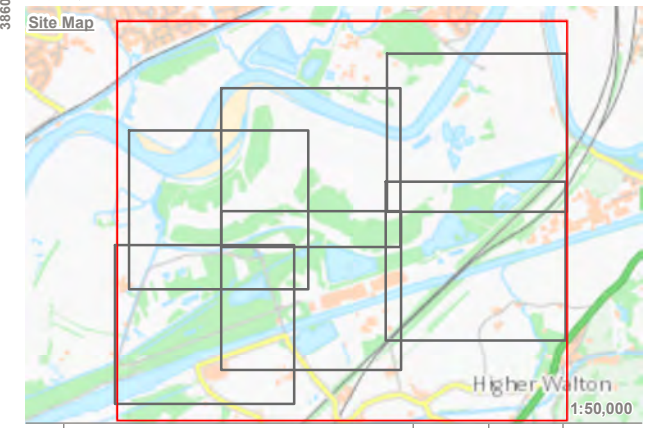
DRAWINGS



Key
 Standing water



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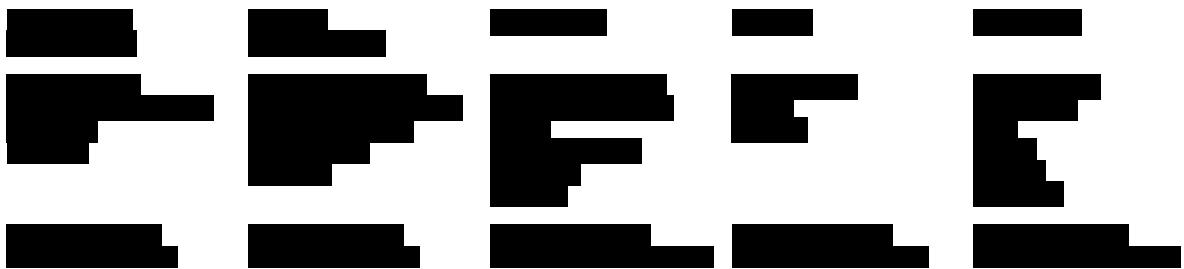
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 Tel 01925 844004 e-mail tep@tep.uk.com www.tep.uk.com

Project
Port Warrington, Warrington

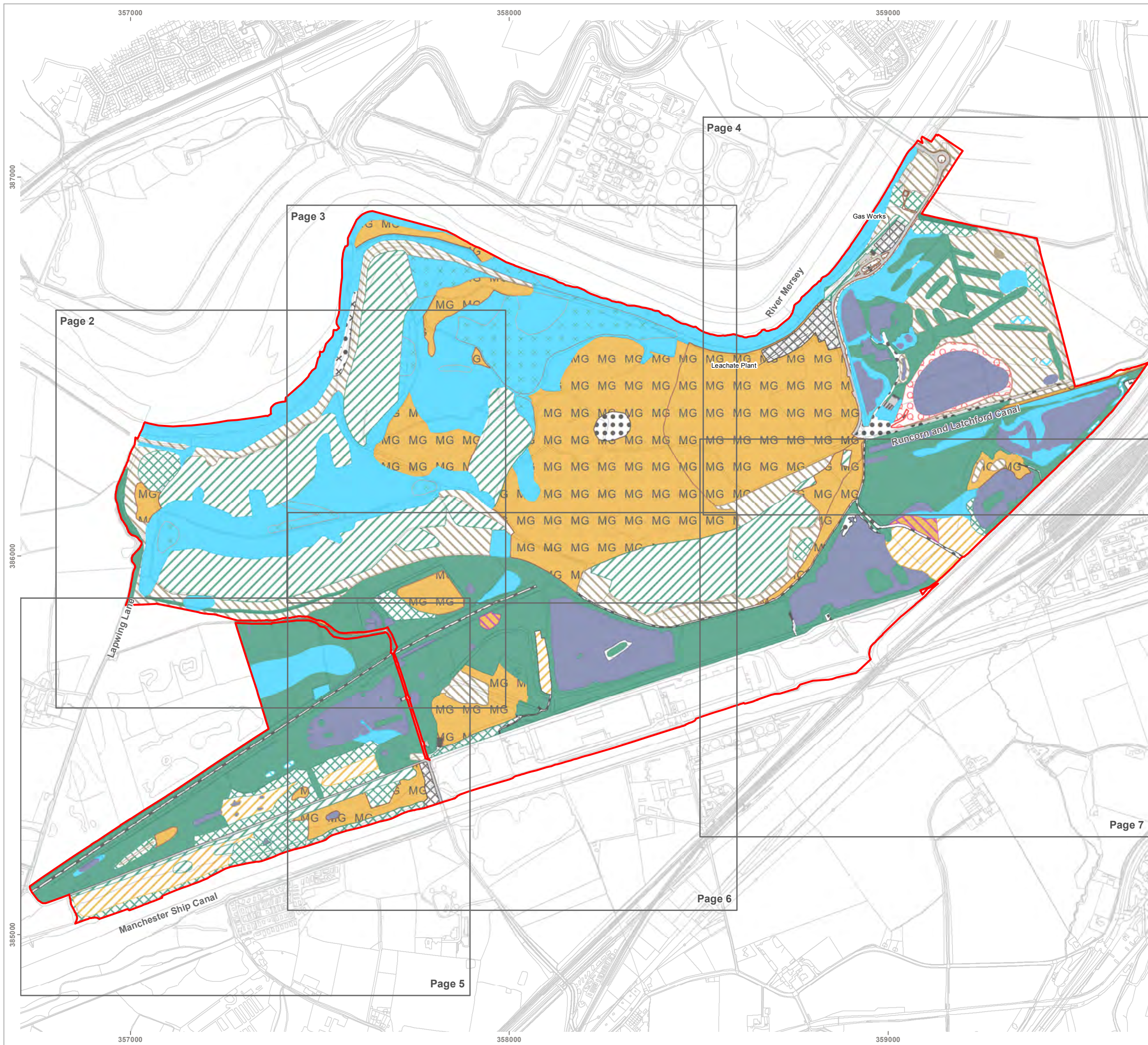
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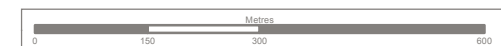


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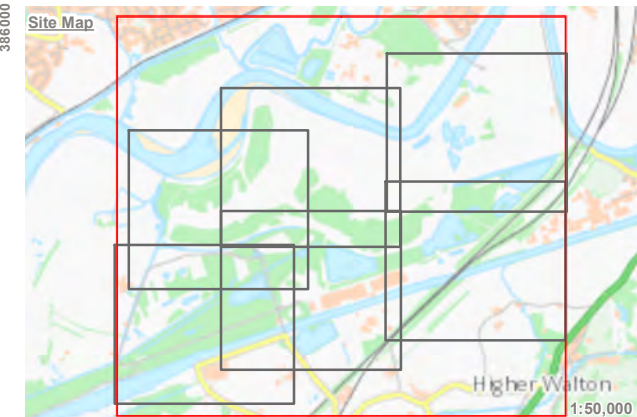


Key

- Survey boundary
- Semi-natural broad-leaved woodland
- Plantation broad-leaved woodland
- Dense/continuous scrub
- Swamp with scattered scrub
- Unimproved acid grassland
- Semi-improved acid grassland
- Modified neutral grassland
- Species-poor modified neutral grassland
- Marsh/marshy grassland
- Continuous bracken
- Tall ruderal
- Swamp
- Ephemeral pool
- Standing water
- Shingle
- Quarry
- Bare ground with ephemeral/short perennial
- Introduced shrub
- Building
- Bare ground
- Hardstanding
- Not surveyed



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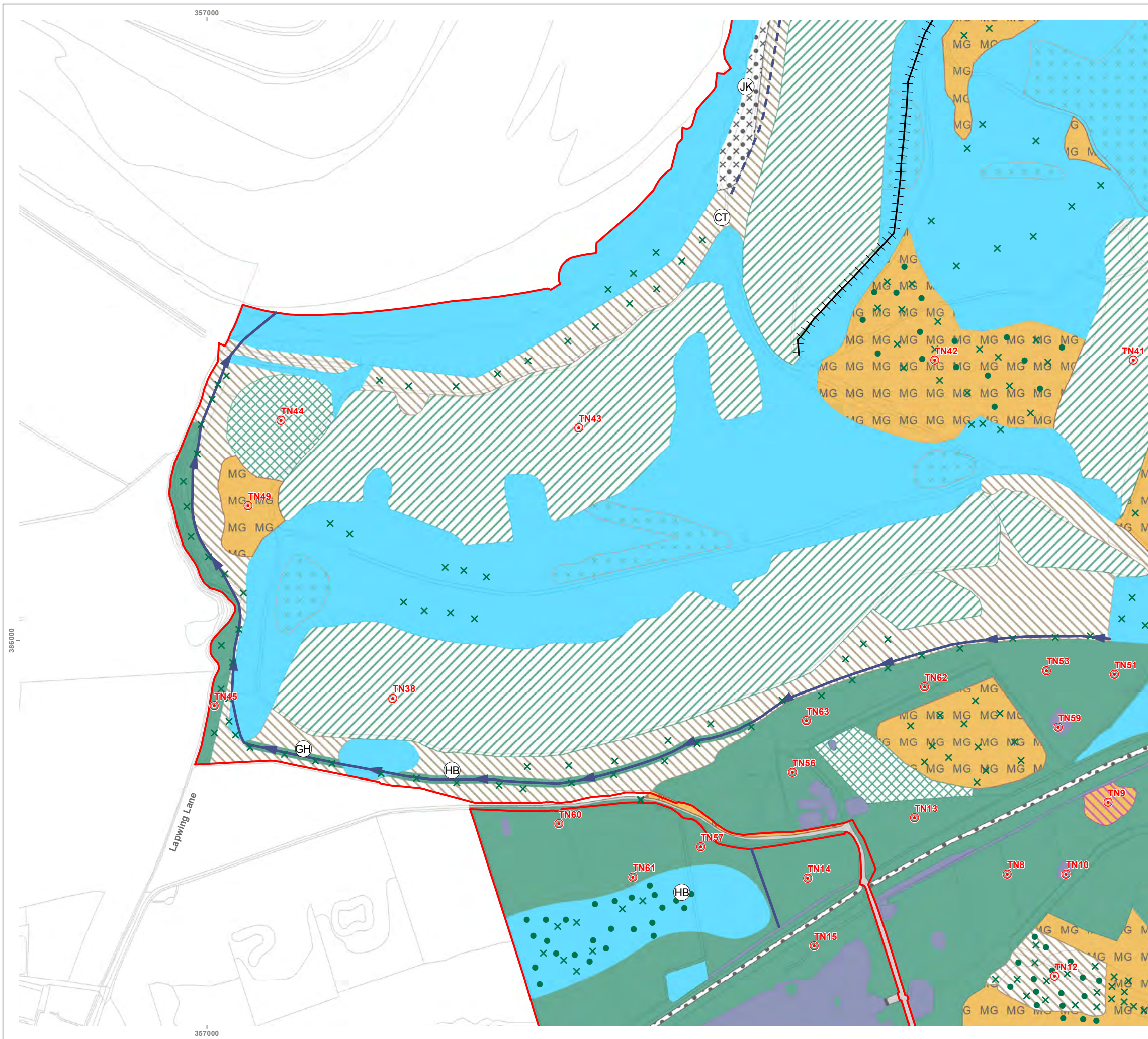
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Project
Port Warrington, Warrington

Title
Phase 1 Habitat Survey - Overview

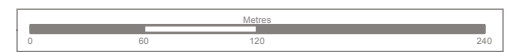
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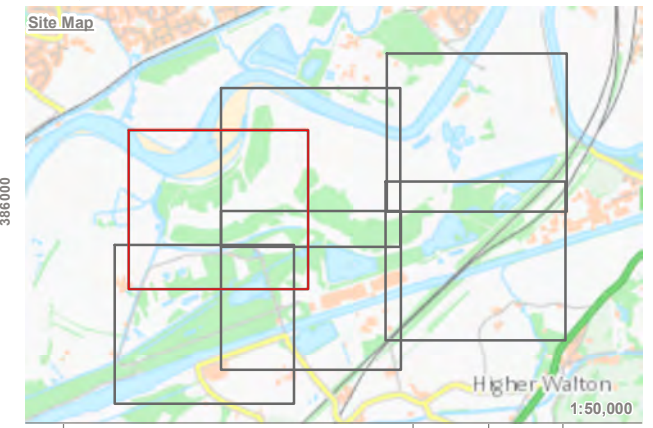


Key

- Survey boundary
- Target note
- Cotoneaster
- Giant hogweed
- Himalayan balsam
- Japanese knotweed
- x Scattered scrub
- Scattered broad-leaved tree
- Standing water
- Running water
- Fence
- Dry ditch
- Semi-natural broad-leaved woodland
- Plantation broad-leaved woodland
- Dense/continuous scrub
- Swamp with scattered scrub
- Modified neutral grassland
- Marsh/marshy grassland
- Tall ruderal
- Swamp
- Standing water
- Bare ground with ephemeral/short perennial
- Hardstanding
- Building



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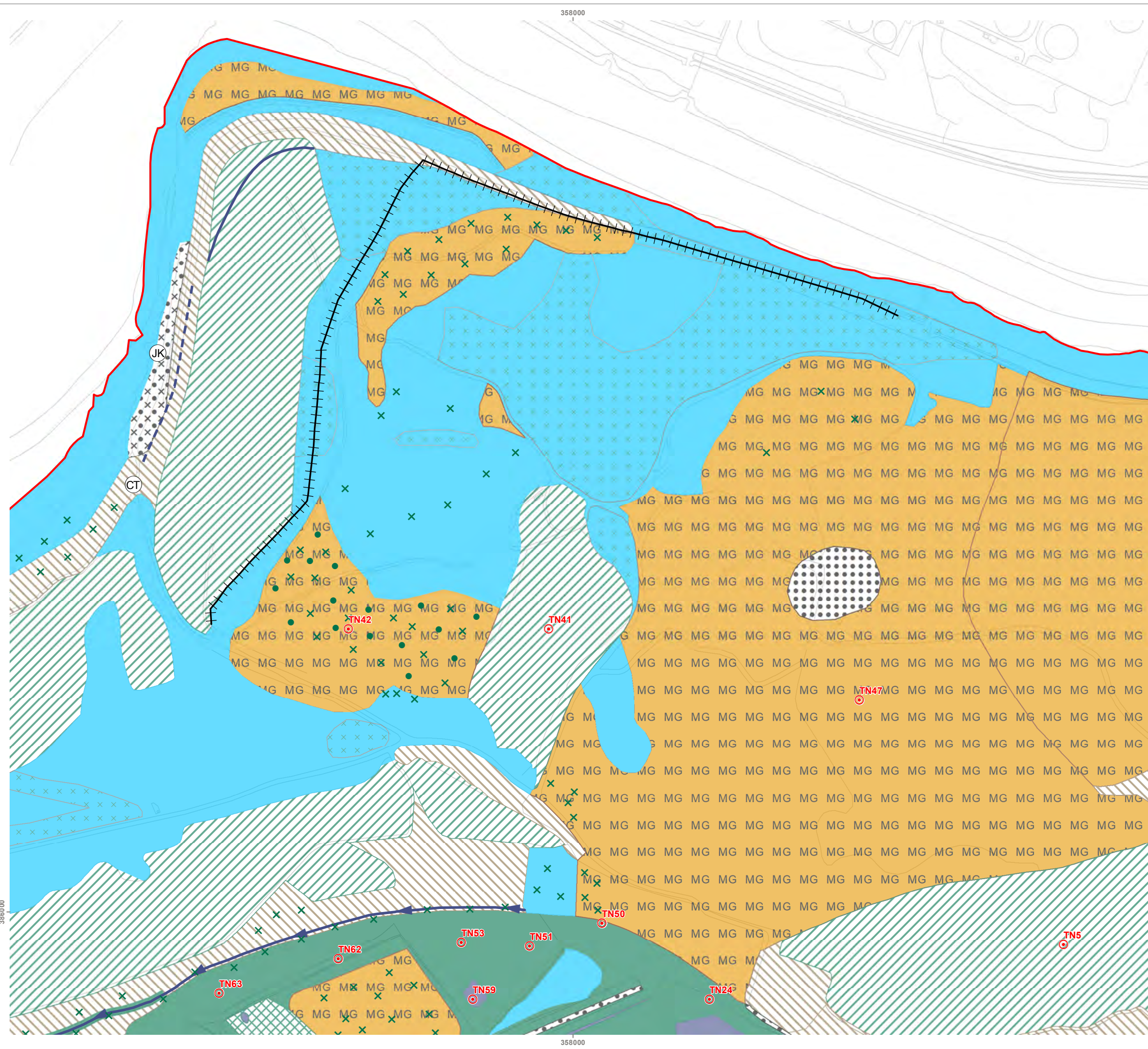
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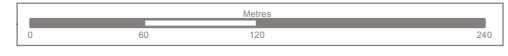
Project
Port Warrington, Warrington

Title
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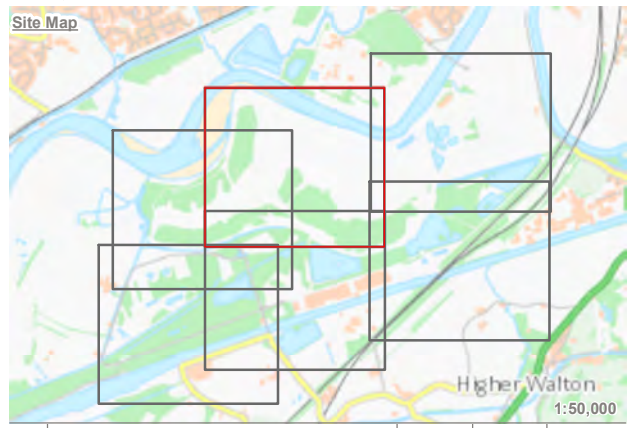
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- Key**
- Survey boundary
 - Target note
 - CT Cotoneaster
 - JK Japanese knotweed
 - x Scattered scrub
 - Scattered broad-leaved tree
 - Standing water
 - Running water
 - Fence
 - Dry ditch
 - Semi-natural broad-leaved woodland
 - Plantation broad-leaved woodland
 - Dense/continuous scrub
 - Swamp with scattered scrub
 - Modified neutral grassland
 - Tall ruderal
 - Swamp
 - Standing water
 - Bare ground with ephemeral/short perennial
 - Bare ground



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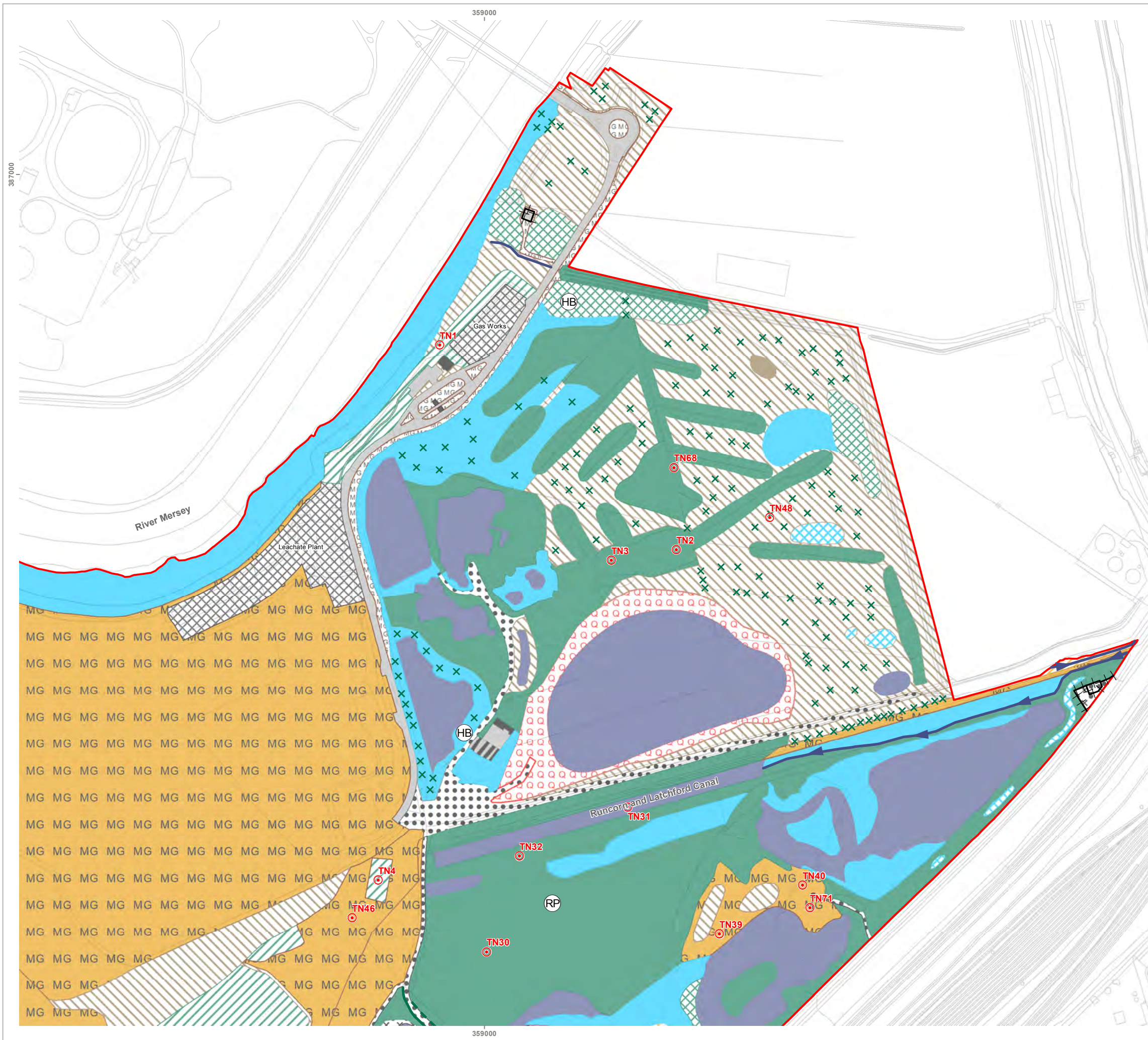
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Project
Port Warrington, Warrington

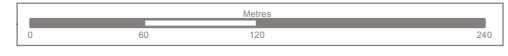
Title
Phase 1 Habitat Survey - Detailed Part 2

Drawing Number
G6929.001B.3 Sheet 3 of 7

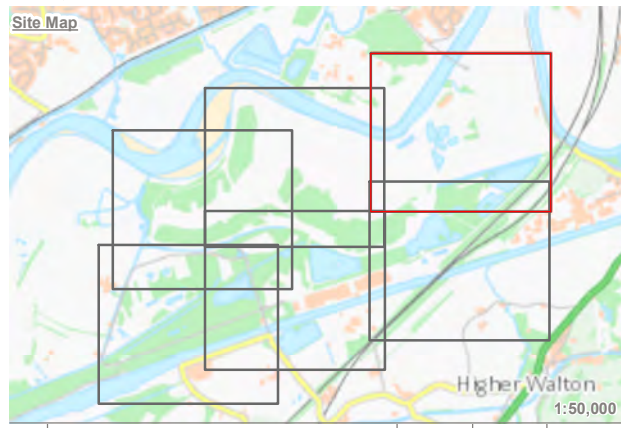
Drawn	Checked	Approved	Scale	Date
JO	LC	IH	1:4,000 @ A3	15/09/2019



- Key**
- Survey boundary
 - Target note
 - Himalayan balsam
 - Rhododendron ponticum
 - x Scattered scrub
 - Standing water
 - ➔ Running water
 - Species-poor intact hedge
 - Species-poor defunct hedge
 - Fence
 - Semi-natural broad-leaved woodland
 - Plantation broad-leaved woodland
 - Dense/continuous scrub
 - Swamp with scattered scrub
 - Unimproved acid grassland
 - Modified neutral grassland
 - Species-poor modified neutral grassland
 - Marsh/marshy grassland
 - Continuous bracken
 - Tall ruderal
 - Swamp
 - Ephemeral pool
 - Standing water
 - Quarry
 - Bare ground with ephemeral/short perennial
 - Introduced shrub
 - Building
 - Bare ground
 - Hardstanding
 - Not surveyed



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Rev	Description	Drawn	Approved	Date
A	Updates to habitat areas	MK	LC	31/08/2019

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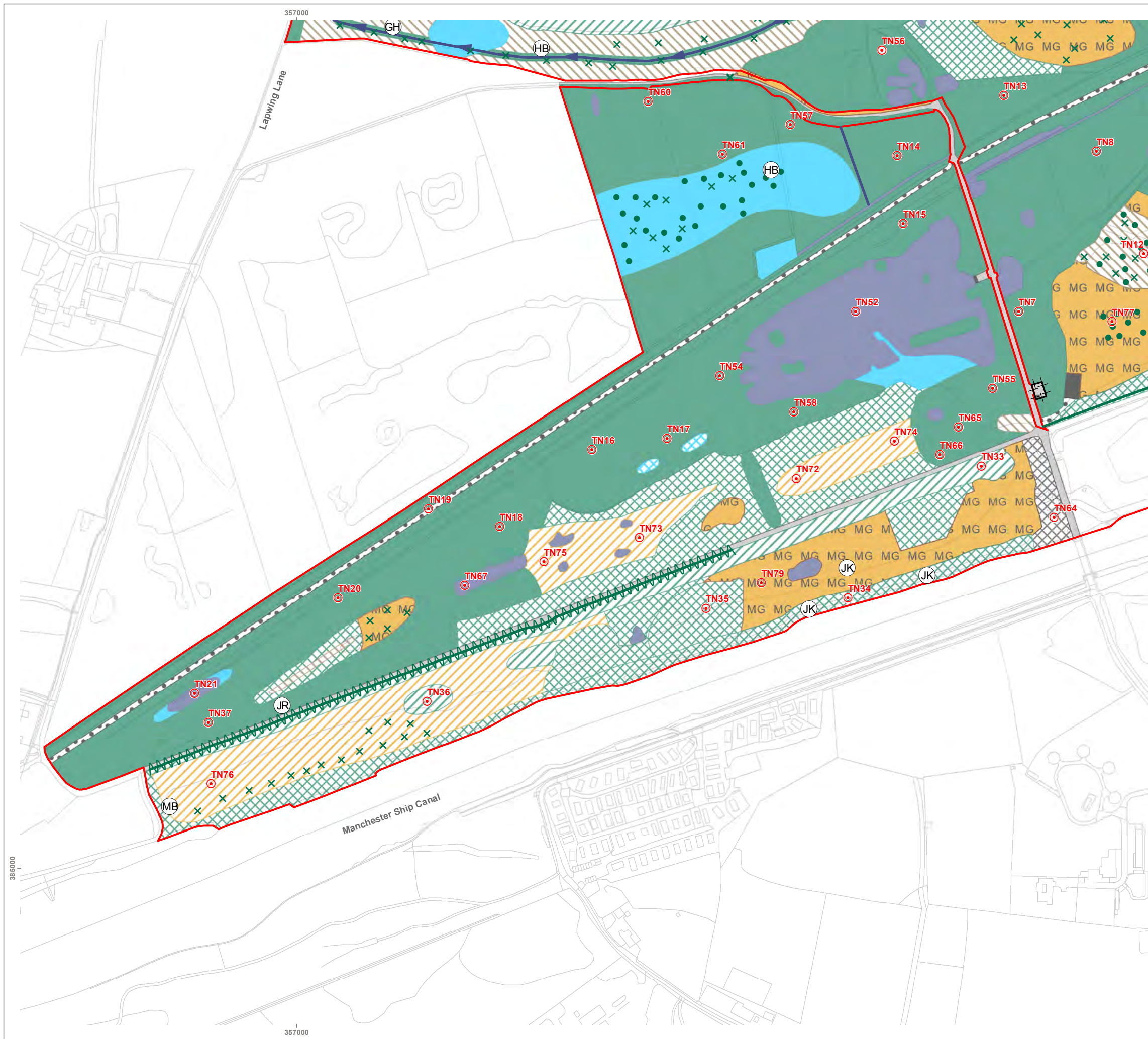
Genesis Centre, Birchwood Science Park, Warrington WA3 7BH
 Tel 01925 844004 e-mail tep@tep.uk.com www.tep.uk.com

Project
Port Warrington, Warrington

Title
Phase 1 Habitat Survey - Detailed Part 1

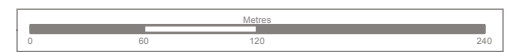
Drawing Number
G6929.001B.4 Sheet 4 of 7

Drawn	Checked	Approved	Scale	Date
JO	LC	IH	1:4,000 @ A3	15/09/2019

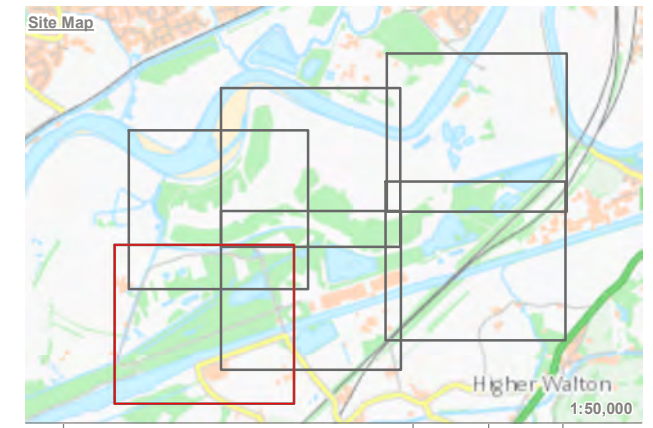


Key

- Survey boundary
- Target note
- Giant hogweed
- Himalayan balsam
- Japanese knotweed
- Japanese rose
- Montbretia
- x Scattered scrub
- Scattered broad-leaved tree
- Standing water
- Running water
- ~ Native species-rich intact hedge
- Species-poor intact hedge
- Fence
- Semi-natural broad-leaved woodland
- Plantation broad-leaved woodland
- Dense/continuous scrub
- Unimproved acid grassland
- Modified neutral grassland
- Tall ruderal
- Swamp
- Ephemeral pool
- Standing water
- Building
- Bare ground
- Hardstanding
- Not surveyed



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Rev	Description	Drawn	Approved	Date
A	Updates to habitat areas	MK	LC	31/08/2019

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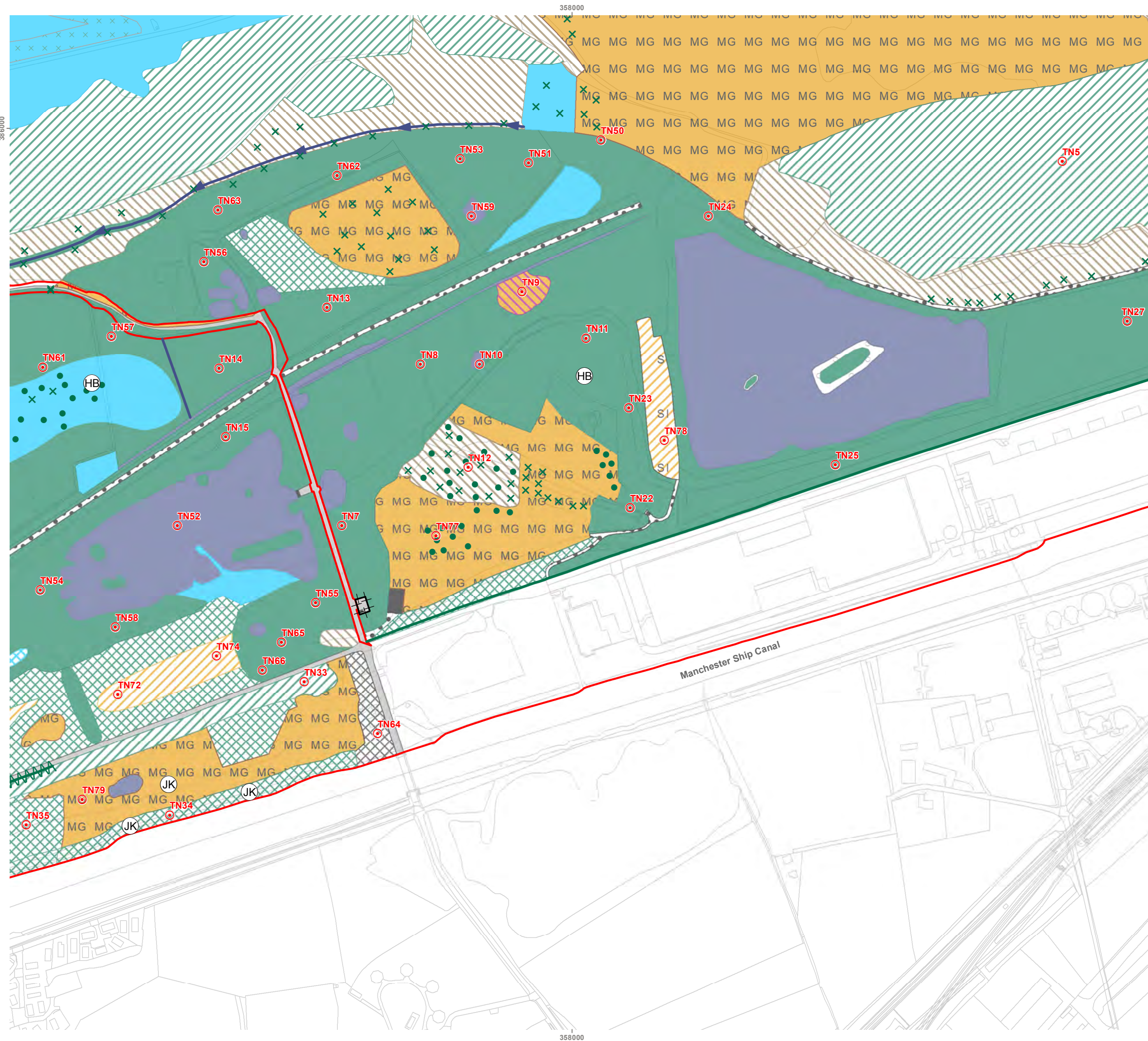
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 Tel 01925 844004 e-mail tep@tep.uk.com www.tep.uk.com

Project
Port Warrington, Warrington

Title
Phase 1 Habitat Survey - Detailed Part 6

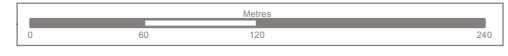
Drawing Number
G6929.001B.5 Sheet 5 of 7

Drawn	Checked	Approved	Scale	Date
JO	LC	IH	1:4,000 @ A3	15/09/2019

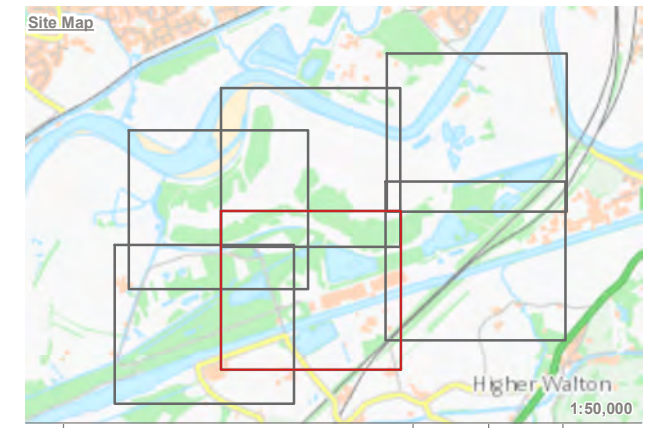


Key

- Survey boundary
- Target note
- Himalayan balsam
- Japanese knotweed
- x Scattered scrub
- Scattered broad-leaved tree
- Standing water
- Running water
- Native species-rich intact hedge
- Species-poor intact hedge
- Fence
- Semi-natural broad-leaved woodland
- Plantation broad-leaved woodland
- Dense/continuous scrub
- Swamp with scattered scrub
- Unimproved acid grassland
- Semi-improved acid grassland
- Modified neutral grassland
- Marsh/marshy grassland
- Tall ruderal
- Swamp
- Ephemeral pool
- Standing water
- Shingle
- Building
- Bare ground
- Hardstanding
- Not surveyed



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Rev	Description	Drawn	Approved	Date
A	Updates to habitat areas	MK	LC	31/08/2019

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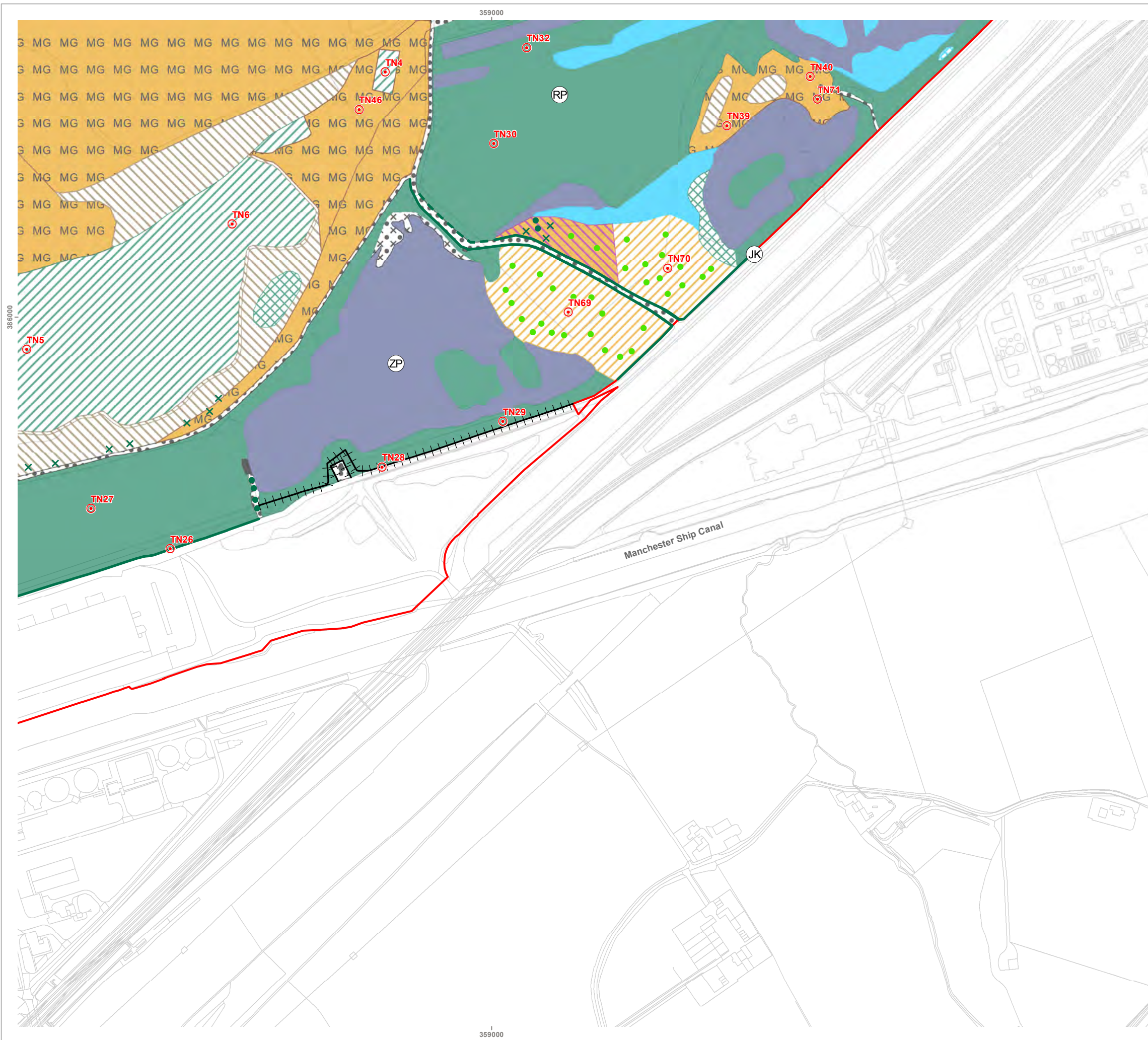
Genesis Centre, Birchwood Science Park, Warrington WA3 7BH
 Tel 01925 844004 e-mail tep@tep.uk.com www.tep.uk.com

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Port Warrington, Warrington

Title
Phase 1 Habitat Survey - Detailed Part 5

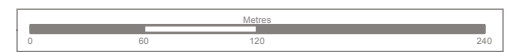
Drawing Number G6929.001B.6	Sheet 6 of 7
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Drawn JO	Checked LC	Approved IH	Scale 1:4,000 @ A3	Date 15/09/2019
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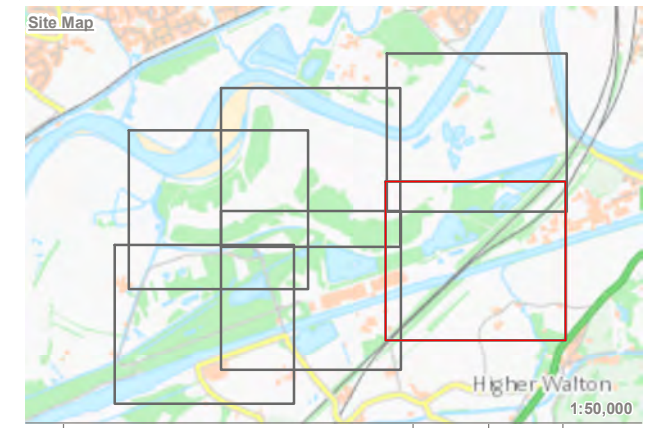


Key

- Survey boundary
- Target note
- Japanese knotweed
- Rhododendron ponticum
- New Zealand pygmyweed
- x Scattered scrub
- Scattered broad-leaved tree
- Scattered coniferous tree
- Species-poor intact hedge
- Species-poor defunct hedge
- ++ Fence
- Semi-natural broad-leaved woodland
- Plantation broad-leaved woodland
- Dense/continuous scrub
- Unimproved acid grassland
- Modified neutral grassland
- Marsh/marshy grassland
- Tall ruderal
- Swamp
- Ephemeral pool
- Standing water
- Bare ground with ephemeral/short perennial
- Building
- Bare ground



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Rev	Description	Drawn	Approved	Date
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Title
Phase 1 Habitat Survey - Detailed Part 4

Drawing Number
G6929.001B.7 Sheet 7 of 7

Drawn	Checked	Approved	Scale	Date
JO	LC	IH	1:4,000 @ A3	15/09/2019

