Natural Resources Wales

Stephenson Street Flood Defence Scheme

Preliminary Ecological Appraisal Addendum - Railway Wall

Issue | 2 March 2020

Job number 246344-00

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Contents

Appendices

Figures

Appendix A

A1: Legislative Context

Appendix B

B1: Statutory Designated Sites Citations B2: Non-Statutory Designated Sites Citations B3: SEWBReC Desk Study Birds Records

B2: Non-statutory designated Sites within 2km of the Site boundary.

B3: SEWBReC Desk Study Bird Records

Appendix C

C1: Photographs

C1: Photographs of waterbodies

1 Introduction

1.1 Background

Ove Arup and Partners Limited (Arup) has been commissioned by Natural Resources Wales (NRW) to undertake a Preliminary Ecological Appraisal (PEA)[1] in relation to proposed improvement works to the Stephenson Street flood defence embankment, to reduce flood risk from the River Usk on the Spytty area of Newport.

An existing 1,350 m long flood defence embankment is located on the left (eastern) bank of the River Usk from Stephenson Street at the north to Corporation Road (Bird Port) in the south. This section of flood defence is commonly referred to as Stephenson Street Embankment.

Stephenson Street Embankment (hereafter referred to as the Site) provides tidal flood risk protection to much of the Spytty area of Newport. This includes significant industry, leisure and residential properties. In the embankment's current condition, it would be classified as a failing asset due to subsidence and structural failures. Modelling predicts that defence enhancements are required both along the Stephenson Street Embankment parallel to the River Usk, and to the south at Corporation Road (within Bird Port).

The preferred solution comprises:

1. Stephenson Street Embankment enhancement; two different designs proposed. An earth bund next to the Coronation Park (250 m section) and a sheet piled wall along the remainder of the length (950 m section) until Bird Port.

2. Corporation Road (Bird Port) flood defences, comprising road raising and flood walls.

The proposed works will be divided into two phases. Phase 1 comprising the Stephenson Street Embankment enhancements, and Phase 2 comprising Bird Port works. Additional works are now proposed as part of Phase 2 and which include a flood wall at the Railway site, further to the south of Bird Port, adjacent to Liberty Steel works.

This Preliminary Ecological Appraisal report covers the Phase 2 works. It should be read in conjunction with the previous ecological report which covers the Phase 1 works[2].

This report details ecological baseline conditions, identifies ecological constraints and provides initial recommendations for avoidance and mitigation measures, in

[1] Chartered Institute of Ecology and Environmental Management (CIEEM) (2018). Guidelines for Preliminary Ecological Appraisal. Second Edition. Available online at: https://www.cieem.net/data/files/Publications/Guidelines_for_Preliminary_Ecological_Appraisal_Jan2018_1.pdf (accessed 15/02/19).
[2] Arup (2018) Ecological appraisal report: Stephenson Street

addition to further survey requirements where appropriate. It is not a full Ecological Impact Assessment[3].

1.2 Proposed Works

The proposed improvement works to Stephenson Street flood defence embankment aim to manage flood risk in accordance with the Severn Estuary Flood Risk Management Strategy (i.e. hold the line with a standard of protection of 1:200 year tidal event with sea level rise). The preferred solution is as follows:

- South Section (Bird Port, Corporation Road and Railway Site): combination of raising flood walls and road raising.

Vegetation clearance was undertaken in areas within the Site in February 2019, to facilitate ground investigation work and topographical surveys. Ecological supervision was in place for this work.

1.3 Study Area

A public footpath runs through the centre of the Site, along the existing flood defence embankment and connecting to Corporation Road. To the west of this is saltmarsh and intertidal mud of the River Usk. Towards the southern end of the footpath, near Corporation there are small areas of a scrub, swamp and standing water amongst areas of hardstanding, spoil and a manmade conveyor. Further to the south, along the railway there is woodland, scrub and a mosaic of standing waterbodies.

The Site, northern extent National Grid Reference (NGR) ST 32878 85434, southern extent NGR ST 33592 84742 is shown on Figure 1.

1.4 Objectives

The objective of the work included the following;

- To identify the likely ecological constraints associated with the project;
- Identify any mitigation measures likely to be required;
- Identify any additional surveys that may be required to inform an Ecological Impact Assessment (EcIA); and
- Identify the opportunities offered by the project to deliver ecological enhancement.

[3] CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine. Available online at: https://www.cieem.net/data/files/Guidelines_for_Ecological_Impact_Assessment_in_the_UK_and_Ireland_2018.pdf (accessed 15/02/19).

1.5 Legislative Context

A framework of international (European), national and local legislation and planning policy guidance exists to protect and conserve wildlife and habitats. The following core legislation exists to protect habitats and species of nature conservation importance:

i. The Conservation of Habitats and Species Regulations 2017 (the Habitat Regulations) (as amended) which transposes Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) into UK law;

ii. The Birds Directive (Council Directive 2009/147/EC on the conservation of wild birds) (the Wild Birds Directive);

iii. Wildlife and Countryside Act 1981 (as amended) (WCA);

iv. Environment (Wales) Act 2016 including Section 7 biodiversity lists;

v. The Countryside and Rights of Way Act 2000;

vi. The Hedgerow Regulations 1997; and

vii. Protection of Badgers Act 1992.

These pieces of legislation include a number of offences relating to protected species and requirements for licences to allow construction works to proceed. In addition, the Habitats Regulations set out the requirement for the consideration of the potential effects of a project on European Sites.

Actions which are prohibited by legislation can be made lawful on the approval and granting of a protected species licence from NRW, subject to conditions.

Full details of the legislation are provided in Appendix A.

2 Methods

2.1 Desk study

A desk study was carried out to identify statutory internationally designated sites (European Sites) within 5 km and nationally designated sites within 2 km of the Site centre point. Online searches were carried out using the Multi Agency Geographic Information for the Countryside (MAGIC)[4], Natural Resources Wales website[5] and the Joint Nature Conservation Committee (JNCC) website[6].

A biodiversity records request of data was provided by South East Wales Biodiversity Records Centre (SEWBReC)[7] on 22nd January 2019 to inform the Phase 2 works.

The records included protected and priority species[8] up to 2 km from the Proposed Works and included details of local designations such as Sites of Importance for Nature Conservation (SINCs) within 2 km.

2.2 Field Surveys

2.2.1 Extended Phase 1 Habitat Survey

The aim of the Extended Phase 1 Habitat Survey was to identify the habitats present within the Site and up to 50 m from the Site where access allowed, that may be affected by the Proposed Works. The survey was undertaken broadly following the standard JNCC Phase 1 Habitat Survey methodology[9] on 24th January 2019. Extended Phase 1 Habitat Survey is a standard technique for rapidly obtaining baseline ecological information over a large area of land. It is primarily a mapping technique and uses a standard set of habitat definitions for classifying areas of land on the basis of the vegetation present.

The survey also provided an assessment of the potential for habitats present to support legally protected species. Relevant species included all those protected by European or UK law, and notable species including those identified as being of principal importance in Wales, in response to Section 7 of the Environment (Wales) Act 2016 (Appendix A), as follows:

- Any buildings or trees within the boundary were appraised (from the ground only) for their suitability to support breeding, resting and hibernating bats

[4] http://magic.defra.gov.uk/ (accessed 15/02/19).
[5] https://naturalresources.wales/conservation-biodiversity-and-wildlife/find-protected-areas-of-land-and-seas/designated-Sites-search/?lang=en (accessed 15/02/19).
[6] http://jncc.defra.gov.uk (accessed 15/02/19).
[7] http://www.sewbrec.org.uk/home.page (accessed 15/02/19).
[8] EU and UK legally protected species under the Conservation of Habitats and Species Regulations 2017; Wildlife and Countryside Act 1981 (as amended); and species present on the Species of Principal Importance in Wales list in response to Section 7 of the Environment (Wales) Act 2016 (known as Section 7 species).
[9] Joint Nature Conservation Committee, 2010. Handbook for Phase 1 habitat survey – a technique for environmental audit. http://jncc.defra.gov.uk/page-2468 (accessed 15/02/19).

using survey methods based on those outlined in the Bat Conservation Trust's Bat Surveys: Good Practice Guidelines[10].

- Assessing the potential of terrestrial and aquatic habitats to support amphibians, both protected species and species of conservation concern. A Habitat Suitability Index (HSI)[11] was assigned to all waterbodies to assess their potential to support great crested newt (GCN) (*Triturus cristatus*). Further details of this methodology are presented in 2.2.2.
- Searching for signs of badger (*Meles meles*) activity including setts, tracks, foraging holes and latrines within and up to 30m from the Site where possible. Any setts recorded were classified according to published criteria[12].
- Assessing the suitability of habitats for nesting birds (including any old nests);
- Assessing the suitability of habitats for common species of reptiles; adder, (*Vipera berus),* grass snake (*Natrix helvetica),* slow worm (*Anguis fragilis)* and common lizard (*Zootoca vivipara*) based on guidance outlined in the JNCC published Herpetofauna Workers' Manual.
- Assessing the suitability of watercourses for water vole *(Arvicola amphibius*)[13], otter *(Lutra lutra*)[14] and white-clawed crayfish *(Austropotamobius pallipes)*[15] based on published guidance for each species.
- Assessing the suitability of habitats for dormice (*Muscardinus avellalanrius*)[16].
- Assessing the suitability of habitats for notable invertebrates.
- Evidence of the presence of invasive plants listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) and subject to strict legal control, such as Japanese knotweed (*Fallopia japonica*), Himalayan balsam (*Impatiens glandulifera*) and giant hogweed (*Heracleum mantegazzianum*).

All accessible areas of the Site were walked and the relevant habitat types classified according to their vegetation types. Habitat areas greater than 0.1ha were mapped on the Extended Phase 1 Habitat Survey (Figures 2 and 3) and Target Notes (TNs) were used to highlight any features or habitats of interest and that provide suitable habitat for protected species.

[10] Collins, J. (2016). Bat Surveys: Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn.). The Bat Conservation Trust, London.
[11] Odiham et al (2000) in ARG UK Advice Note 5: Great crested newt Habitat Suitability Index
[12] Harris, S., Cresswell, P. and Jefferies, D., 1989. Surveying Badgers. Mammal Society.
[13] Strachan, R. and Moorhouse, T., 2006. Water Vole Conservation Handbook, 2nd Edition.
[14] Chanin, P., 2003. Monitoring the Otter, Lutra lutra. Conserving Natura 2000 Rivers Monitoring Series No. 10., English Nature, Peterborough.
[15]Peay, Stephanie. (2002), Guidance on Habitat for White-clawed Crayfish and its restoration. Environment Agency.
[16] Bright. Paul, Morris. P, Mitchell Jones, T. (2006 updated) The Dormouse Conservation Handbook 2nd ed. English Nature.

2.2.2 Great crested newt surveys

Habitat Suitability Index (HSI) Survey

A search was made for waterbodies with potential to support great crested newts within 250 m of the Site based on Ordnance Survey mapping and during the Extended Phase 1 Habitat Survey in January 2019 (excluding waterbodies covered by the previous ecological appraisal[2]). These were assessed for breeding habitat suitability using the standard HSI[17] methodology by Arup ecologists.

The HSI is a numerical index which ranges from 0 and 1. It is calculated using ten key habitat criteria and is based on the assumption that the habitat quality determines great crested newt presence / absence. Using this standard approach, waterbodies with high scores are more likely to support breeding great crested newt than those with a lower score (See Table 1 below).

However, this system is not sufficiently precise to conclude that any particular waterbody with a high score will support great crested newt or that any waterbody with a low score will not. The waterbodies and drains subject to HSI are shown on the Extended Phase 1 Habitat Survey Plan (Figures 2 and 3).

Table 1: Habitat Suitability Index

HSI	Pond Suitability	Predicted Occupancy
<0.5	Poor	0.03
0.5-0.59	Below Average	0.2
0.6-0.69	Average	0.55
0.7-0.79	Good	0.79
>0.8	Excellent	0.93

Presence / Absence Surveys

Great crested newt presence / absence surveys were undertaken in accordance with best practices guidance[18]. This comprised four surveys between mid-March and mid-June, with at least two surveys being between mid-March and mid-May 2019. The following survey methods were employed:

- Torch survey: A 1 million candlepower Clulite torch was used to search the waterbody margins. Surveyors walked slowly around or along the entire waterbody using the torch to search for any great crested newts.

[17] Amphibian and Reptile Groups of the UK (2010) (ARG UK Advice Note 5, Great crested newt Habitat Suitability Index.
[18] English Nature (2001) Great crested newt mitigation guidelines

- Bottle-trapping: bottle traps made using 2-litre plastic bottle were placed at 45 degree angle within the margins of the waterbodies using bamboo canes tagged with red tape. Bottles were placed at different depths within the water column (where there was access). Bottles were left overnight and collected the following morning – with any animals being carefully removed from the bottle, identified and returned to the waterbody. Considerations were given to animal welfare during these surveys, as detailed in the guidance, including not undertaking surveys at during extreme weather conditions and not being used when air temperatures were <5 °C. Care was taken to ensure all bottles contained an air bubble.
- Egg searching: live and dead vegetation within the waterbodies was searched for great crested newt eggs. Surveyors walked slowly around the margins where possible and checked vegetation within a reachable distance. Any potential eggs were checked by "unwrapping" vegetation, to determine if any eggs were enclosed, and identify whether these were great crested newt eggs.
- Refuge search: habitat features such as logs, bark, rocks and debris (i.e. discarded furniture) present within the site, which may provide refuge to sheltering great crested newt were searched.

Each survey visit, comprised a visit at dusk to set out bottle traps, followed by torching. The following morning bottle traps were checked and collected, and any aquatic vegetation searched for the presence of newt eggs and the surrounding habitat and any potential refuges were searched for great crested newts. In accordance with the best practice guidance, on each visit the ecologist aimed to carry out at least three of the above survey methods where conditions allowed.

Waterbodies 5-12 (within the Phase 2 area) were subject to presence / absence surveys, in addition to 3 and 4 (within the Phase 1 area). These waterbodies are shown on Figure 5. Table 2 below, details the number of bottle traps used for each waterbody during each survey.

Table 2: Methods used for each survey visit including number of bottle traps used.

Waterbody / Date	28th / 29th March	3rd / 4th April	17th / 18th April	24th / 25th April	30th April / 1st May	16th / 17th May
3	*Bt (3), t, es, rs	Bt (3), t, rs	-	Bt (3), t, rs	Bt (3), t, rs	-
4	-	-	Bt (11), t, es, rs	Bt (11), t, rs	Bt (11), t, rs	Bt (11), t, rs
5	*Bt (14), t, es, rs	Bt (36), t, rs	-	Bt (36), t, rs	Bt (36), t, rs	-
6	*Bt (11), t, es, rs	Bt (11), t, rs	-	Bt (11), t, rs	Bt (11), t, rs	-
7	*Bt (1), t, es, rs	Bt (4), t, rs	-	Bt (4), t, rs	Bt (4), t, rs	-
8	*Bt (4), t, es, rs	Bt (9), t, rs	-	Bt (9), t, rs	Bt (9), t, rs	-
9	*Bt (9), t, rs	Bt (6), t, rs	-	Bt (6), t, rs	Bt (6), t, rs	-
10	*rs	rs	-	rs	rs	-
11	*Bt (11), t, rs	Bt (36), t, rs	-	Bt (36), t, rs	Bt (36), t, rs	-
12	*Bt (28), t, es, rs	Bt (22), t, rs	-	Bt (19), t, rs	Bt (19), t, rs	-

***Method used: bottle trap=bt, torching=t, egg-searching=es and refugia searches=rs.**

All of the survey visits were led by Arup ecologist Claire Pooley MCIEEM; who holds a personal great crested newt survey licence for work in Wales (NRW: 78081:OTH:SA:2018) and has over seven years' experience of undertaking great crested newt surveys, completing impact assessments and designing great crested newt mitigation. Other Arup ecologists and ecologists from Wildwood Ecology Ltd (all MCIEEM) also assisted with these surveys under direct supervision of the licensed surveyor.

2.2.3 Biosecurity Measures

The following measures were employed to avoid the spread of amphibian diseases including chytridiomycosis and ranavirus, in accordance with best practice[19]UK Advice Note 4 (ARG UK, 2017):

- Ensuring that all surveyors are aware of disease issues and precautions;
- Use survey equipment and footwear dedicated solely to the target site; and
- Storing field equipment on site where possible.

[19] Amphibian and Reptile Group UK (2017). UK Advice Note 4.

All equipment used and which had come into contact with water or amphibians was disinfected at the end of the surveys, using Virkron©, ensuring that all disinfected solutions were poured directly into a sewerage system and flushed with clean water.

2.2.4 Otters

Due to potential habitat for otter being identified during the Extended Phase 1 Habitat survey further targeted surveys were undertaken to confirm the likely presence or absence of this species within the site. The survey methods adopted for otters was adapted from authoritative sources and best practice survey guidelines[20]. An initial habitat suitability assessment was followed by a presence / absence survey, as described in the following sections. Surveyed waterbodies are shown in Figure 5.

The surveys were led by Arup ecologist Claire Pooley MCIEEM, who is an experienced ecologist familiar with the ecology and field signs of otter.

Habitat Suitability Assessment

This assessment of the habitat suitability indicates how likely otters are to use a site given the habitat condition at the time of the survey.

Habitat suitability assessments were carried out of the waterbodies as shown in Figure 5, on the 17th May and 18th July 2019, with habitats subsequently defined as being of high, moderate or low suitability based on the following criteria:

- Proximity of site to habitats meeting the species' requirements for shelter,
- Foraging and breeding;
- Degree of modification to water-body / watercourse potentially resulting in negative impacts upon otters, e.g. canalisation or realignment;
- Levels of site disturbance, e.g. proximity to public rights of way, farm etc.;
- Vehicle access tracks or road traffic;
- Levels of visible pollution potentially impacting upon prey species; and
- Potential for otters to use culverts, bridges and dry watercourses for foraging, commuting and dispersal.

In addition to the above criteria the following considerations were also included within the assessment:

- Otters are tolerant of a wide range of habitat conditions and may use habitat for a number of reasons (e.g. shelter, foraging and passing through to other more suitable habitats).
- Although a riparian mammal, otters will travel overland to reach other waterbodies. They prefer to shelter where there is little disturbance and

[20] Chanin et al (2003). Ecology of the European Otter. Conserving Natura 2000 Rivers Ecology Series No. 10. English Nature, Peterborough.

some cover provided by bankside vegetation. Otters use terrestrial vegetation as corridors and for breeding (e.g. holts) and this habitat requirement was included in the habitat suitability assessment.

- Habitat features with potential benefit to otter in terms of shelter, foraging and breeding requirements were identified throughout the site; for example nearby woodland, mature trees, fallen trees, dense scrub, canals, pools, lakes, reed beds marshes and bank substrate suitable for creating places of shelter.
- Disturbance is a major factor that may deter otters from using sites with even the highest suitability. Examples of disturbance factors include farm traffic, road traffic, cattle trampling and close proximity to a Public Right of Way that will encourage dog walking.
- Hydrology is another important factor. Otters are known to use a variety of freshwater habitats including main rivers, ponds, reens and ditches. As a general rule it is considered here that larger, deeper watercourses with a moderate to fast flow will provide a more plentiful food source.
- Nevertheless, small streams and ditches are also important foraging habitats since fish can be easier to catch.
- Ponds and reservoirs also provide potential foraging areas; especially in times of flood. In addition, pollution was also considered as a factor of habitat suitability (as recommended by best practice guidance).

Habitat suitability was measured according to the above criteria and defined as high, moderate, low or negligible as outlined in Table 3.

Table 3: Habitat Suitability Criteria

Habitat Suitability	Shelter Requirements	Food Supply	Modification & Disturbance	Hydrology	Pollutants
High	Many suitable habitat features adjacent to watercourse.	Suspected presence of abundant prey; particularly fish species.	Minor man-made modification of watercourse habitat and disturbance from the public e.g. dog walking.	Watercourse with fast to moderate flow velocity and more than 1 m deep.	'Good' or above chemical or biological water quality.
Moderate	Several suitable habitat features adjacent to watercourse.	Suspected presence of sufficient prey; particularly fish species.	Intermediate man-made modification of watercourse habitat or disturbance from the public e.g. frequent dog walking.	Watercourse with slow to moderate flow velocity or less than 1 m deep.	'Fair' chemical or biological water quality.
Low	Few suitable habitat features adjacent to the watercourse.	Suspected scarcity of prey.	Major man-made modification of watercourse habitat and disturbance by the public e.g. frequent dog walking.	Watercourse with slow to moderate flow velocity and less than 1m deep.	'Fair' or below chemical or biological water quality.
Negligible	No suitable habitat features.	No prey species present.	Major man-made modification of watercourse habitat and disturbance by the public e.g. frequent dog walking.	Dry with no indication of a water body present on site.	Low water quality with indications of pollution.

Presence / Absence Survey

A presence / absence survey for otter was undertaken on the 17th May 2019 and 18th May 2019.

The field signs that were searched for included: spraints, anal jelly, holts, tar spots, laying–up sites, bank slides, runs, tunnels, prey remains and footprints. Features that have high potential to be attractive to otters were examined, this included: suitable bridges, bases of large trees, dense vegetation, crossings, confluences of waterbodies, culverts and boulders.

Terminology used to describe the resting areas for otters used the standard terminology, such as either a holt (usually a hole in the ground covered by vegetation or under the roots of a bankside tree) or a couch (an uncovered laying

up or nest like structure). Natal dens refer to a hidden, secure place where the female rears her young.

2.2.5 Water Voles

Due to potential habitat for water vole being identified during the Extended Phase 1 Habitat survey further targeted surveys were undertaken to confirm the likely presence or absence of this species within the site. The survey method for water voles was adapted from the best practice survey guidelines in the Water Vole Conservation Handbook[21] and Water Vole Mitigation Handbook[22]. An initial habitat suitability assessment was undertaken followed by a presence / absence survey, as described in the following sections.

Banks of waterbodies were surveyed from a minimum of 2 m from the waters' edge, and where the waterbody was inaccessible a habitat suitability assessment was undertaken from the top of the bank.

The surveys were led by Arup ecologist Claire Pooley MCIEEM, who is an experienced ecologist familiar with the ecology and field signs of water vole.

Habitat Suitability Assessment

Assessment of the habitat suitability indicates how likely water voles are to use a site given the habitat conditions at time of survey. Habitat suitability was assessed from observing the features of each waterbody, with consideration to the ecology and habitat requirements of water voles.

The best sites for water voles according are those that have a highly layered bankside vegetation with tall grasses and stands of willow herb, (*Epilobium* sp.), purple loosestrife (*Lythrum salicaria*), meadowsweet (*Filipendula ulmaria*) or nettles (*Urtica dioica*), often fringed with think stands of rushes, sedges and reed. Each water vole utilises a series of burrows, which can extend 5-6 m from the edge of the bank into the terrestrial habitat. Water voles require dense growth of herbaceous bankside and emergent vegetation, and the promotion of scrub or planting of trees is detrimental to them.

Habitat suitability assessments were carried out at each waterbody within the site, on the 17th May and 18th July 2019, with waterbody subsequently defined as being of high, moderate or low suitability based on the following criteria:

- Rate of water flow;
- Bank profiles;
- Degree of shading from overhanging trees;

[21] Strachan, R., Moorhouse, T., Gelling, M. (2011). Water Vole Conservation Handbook, 3rd Edition.
[22] Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.

- Extent of suitable emergent and bankside herbaceous vegetation in providing shelter, food and nesting material;
- Degree of cattle poaching (i.e. extent of damage to banks resulting from trampling by cattle);
- Levels of site disturbance, e.g. proximity to public rights of way, farm vehicle access tracks or road traffic;
- Potential for the waterbody to dry out;
- Suitability of bank substrates for burrowing; and
- Water quality.

Examples of habitat suitability assessments are as follows:

Table 4: Habitat Suitability Criteria

Habitat Suitability	Description
High	Typical high-quality water vole habitat is a slow-flowing watercourse, less than 3 m wide and 1 m deep with moderately steep banks, minimal shading by trees and shrubs and luxuriant growth of emergent and bankside herbaceous vegetation to provide shelter and an abundance of food and nesting material.
Moderate	Moderate quality water vole habitat would consist of a combination of the features associated with both high and low habitat suitability. For example, the flow and bank type may be suitable; however heavy grazing by livestock may reduce the cover of herbaceous vegetation and trample suitable habitat for burrowing.
Low	Factors which indicate that a habitat is of a low suitability for water vole include heavy shading by overhanging trees and / or shrubs reducing the cover of emergent and bankside vegetation and thus the availability of water vole food plants. Other factors that indicate habitat of low suitability include widely fluctuating water levels, seasonal drying out of the watercourse channel and banks that are unsuitable for burrowing.
Negligible	A negligible habitat suitability would be where there is either no water body present for example, a ditch which has completely overgrown and would not hold water. An example of this would be a ditch which has a double hedge and is no longer managed and therefore the water body has filled in. Settlement pools or ditches which are visibly polluted and low water quality and obviously their purpose is to act as a buffer to collect polluted material from industry.

Presence / Absence Survey

At each waterbody a search for the following field signs was undertaken on the 17th May 2019 and 18th May 2019:

- Faeces & latrines;
- Feeding stations;
- Burrows; and

- Footprints.

Droppings are the most distinctive field sign to indicate recent use of a water body by water voles. Where possible a thorough search (every 1 m) of the bankside vegetation was performed at each water body, where presence had been determined field signs were recorded every 5 m where the bankside vegetation made the channel inaccessible to reduce damage to bankside vegetation.

A walkover survey was also undertaken on 17th January 2020, when vegetation had died back, to more closely examine edges of waterbody 11, and connecting ditch, for the presence of any water vole burrows or other signs.

Raft monitoring

To provide further evidence of water vole presence at the site, artificial latrine sites were created. Three rafts were installed at different locations around the edge of waterbody 11, in the areas where water vole droppings had been previously recorded. The three locations are shown on Figure 8. Each raft comprised of a 60 cm x 30 cm piece of cavity wall insulation. The rafts were sited at the edge of the waterbody, within reedbed, in shallow water. These were tethered in place using string, which attached the raft to a wooden stake, inserted firmly into the ground. Two cameras (Bushnell trail camera) were also installed, approximately 1 m, facing the raft and waterbody. These two camera locations are also shown on Figure 8. The cameras and rafts were left in situ, for just over four weeks between the 20th September 2019 and the 22nd October 2019, before they were checked for signs of water vole activity through a visual check of the rafts for any water vole droppings or feeding remains, in addition to analysing the video footage recorded on the two cameras.

Due to the limitations of the initial period of raft monitoring (as discussed below), two rafts were left in situ, until January 17th 2020, when they were checked again for the presence of any water vole droppings.

2.3 Limitations

The Extended Phase 1 Habitat survey was conducted in January, outside of the optimal period for botanical surveys (April to October), however, the survey recorded sufficient floral species to be able to provide an indicative assessment of the habitats on Site, as required within a PEA.

Due to health and safety concerns, dense vegetation, security fencing and lack of landowner permissions, not all of the areas within the Site were accessible to survey as part of the Extended Phase 1 Habitat and HSI survey. In these areas the detectability of some species was limited; e.g. otters, water voles and badgers. It was considered possible to obtain sufficient information to undertake an accurate HSI, however.

Full access was later provided to undertake targeted surveys for great crested newt, water vole and otter on all waterbodies between mid-March and mid-May. This also allowed these areas to be inspected for other species such as badger,

which may not have been picked up during the initial Extended Phase 1 Habitat survey.

Access was not possible to Waterbody 4 during the first two great crested newt surveys visits due to difficulty in obtaining landowner permission, however, additional visits were made to ensure this waterbody was subject to the required number of surveys for a presence / absence survey.

It was not possible to safely access the entire perimeter of Waterbodies 10 and 11, due to the amount of silt / sediment around the margins, steep banks and dense scrub. As such during great crested newt surveys, the placement of bottle traps and torching was largely limited to the western side of Waterbody 11 and no bottle trapping or torching was undertaken at Waterbody 10. For the water vole and otter surveys however, the entire perimeter was walked, and the majority of the margins were surveyed (at least from the top of the bank), including at some locations using binoculars from a safe location.

There was a limited amount of aquatic vegetation within the majority of waterbodies, although there was a large amount of dead vegetation including leaves and or reeds which due to its density was difficult to inspect thoroughly as required for great crested newt egg-searches. Also, as discussed above it was difficult to safely access the entire perimeter of the two larger waterbodies (10 and 11). As such egg searching was only undertaken during the first visit on some of the waterbodies. However, at least three survey methods were employed for all waterbodies within the exception of Waterbody 10 (due to health and safety concerns), during each survey visit.

Water vole activity monitoring using artificial latrines / rafts commenced on the 20th September 2019. Best practice survey guidelines[13] recognises the optimum survey season to be between mid-April and the end of September, although it is acknowledged that there will be seasonal variation in activity in relation to changing climate. Water voles can breed between April and October, and due to the mild climate at the time of the survey, it is considered water voles could still be active during October, and therefore marking up breeding territories through the use of latrines. As such, undertaking monitoring through the use of artificial latrines / rafts at his time, at this time, is not considered to be a limitation.

During the site visit on the 22nd October 2019, to check the rafts for water vole signs, and retrieve the two cameras for further analysis, it was evident the water level in waterbody 11 had risen (by approximately 4 inches). As such both cameras had been partially submerged and the cameras had not recorded any video footage past this time (4th October 2020). In addition, droppings which were found on one of the rafts (on the eastern edge of the waterbody), and could potentially have been from water vole, had been soaked by water presumably from the heavy rainfall during previous days/weeks (and as video footage showed, as a result of being submerged by otters playing with the raft).

It should be stressed that the findings presented in this study represent those at the time of survey and reporting, and data collected from available sources. Ecological surveys are limited by factors which affect the presence of species, such as temporal weather conditions, migration patterns and behaviour.

The weather is not considered to be a limitation, as all surveys were undertaken during optimal weather conditions. Every effort has been made to ensure that the findings of the study present as accurate an interpretation as possible of the species and habitats within the study area.

3 Results

3.1 Desk Study

3.1.1 Statutory Designated Sites

The search using MAGIC highlighted four European Sites and three national statutory designated Sites within 5 km and 2 km of the Site boundary respectively. All statutory designated Sites and their proximity to the Site are listed in Table 5 below and shown on Figure 4. Further details of each designation citation are provided in Appendix B.

Table 5: Statutory designated Sites within 5 km and 2 km of the Site boundary, for international and national Sites, respectively

Site Name	Approximate Distance from the Site
Internationally Designated Sites	
River Usk Special Area of Conservation (SAC)	150 m west
Severn Estuary Ramsar Site	1.6 km south (hydrologically connected via the River Usk)
Severn Estuary SAC	1.6 km south (hydrologically connected via the River Usk)
Severn Estuary Special Protection Area (SPA)	1.6 km south (hydrologically connected via the River Usk)
Nationally Designated Sites	
River Usk SSSI	150 m west
Gwent Levels- Nash and Goldcliff SSSI	690 m east (hydrologically connected via the River Usk/Severn Estuary)
Newport Wetlands (National Nature Reserve (NNR))	1.2 km south (hydrologically connected via the River Usk)

3.1.2 Non-Statutory Designated Sites

There are six non-statutory designated sites within 2 km of the Site, all of which are Sites of Importance for Nature Conservation (SINCs). All non-statutory designated Sites and their proximity to the Site are listed in Table 6 below and

shown on Figure 4. Further details of each designation are provided in Appendix B.

Table 6: Non-Statutory Designated Sites within 2 km of the Site boundary

Site Name	Approximate Distance from the Site
Solutia SINC	Immediately east of the site
Alpha Steel SINC	Immediately east of the site
Marshall's SINC	150 m west
Julian's Gout Land SINC	635 m south east of the site
Gwent Wetland Reserve SINC	1.2 km south of the Site
Monkey Island SINC	1.6 m north east of the Site

Solutia SINC supports a series of improved and semi-improved grasslands with traditional ditches and ponds, supporting a range of species including nesting birds such as Cetti's warbler (*Cettia cetti)* and invertebrates including hairy dragonfly (*Brachyton prantense).*

Alpha Steel is an Area of former levels, scrub, and other habitat such as support a range of species including scarce moth species, birds such as Cetti's warbler, plants including orchids: marsh helleborine (*Epicactis palustris),* bee orchid (*Ophrys apifera),* pyramidal orchid (*Anacamptis pyramidalis),* and spotted orchid sp. (*Dactylorhiza* spp*).*

Marshall's SINC is notified for its mosaic of habitats including scrub and tall ruderal, post-industrial land, neutral grassland and wetland along the banks of the Usk.

The remaining SINCs within 2 km are over 600 m away from the Proposed Works.

3.1.3 Protected and Notable Species

SEWBReC provided data on protected and notable species within 2 km of the Site boundary. Reptiles, amphibians and mammal records are detailed in Table 7 below.

Table 7: Summary of protected reptile, amphibian, mammal records within 2 km of the Site boundary from the last ten years. Distances are approximate.

Species / Group	Status [23]	Summary of Records	Year of nearest record[24]
Amphibians and Reptiles			
Great crested newt *(Triturus cristatus)*	EPS, WCA, Section 7	Thirteen records with the closest 463 m east in the Solutia site, Newport Docks.	Most recent record in 2015.
Common frog (*Rana temporaria*)	WCA, Section 7	One record at 843 m east in the Solutia site	2017
Common toad *(Bufo bufo*)	WCA, Section 7	Two records. The closest at 843 m east in the Solutia site	Most recent in 2017.
Slow worm *(Anguis fragilis)*	WCA, Section 7	One record 1.8 km north west in Maes Glas Landfill Site.	2015
Common lizard (*Zootoca vivipara)*	WCA, Section 7	Two records with the closest 1.1 km west in Newport Docks.	Most recent record 2011.
Grass snake (*Natrix helvetica*)	WCA, Section 7	Three records with the closest at 1.1 km east at Pye Corner	Most recent record in 2017.
Bats			
Noctule bat (*Nyctalus noctula)*	EPS, WCA, Section 7	One record 1.1 km north west in Newport Docks.	2012
Brown long-eared bat *(Plecotus auritus)*	EPS, WCA, Section 7	One record of a roost 1.9 km south west in Hains Court	2011
Common pipistrelle *(Pipistrellus pipistrellus)*	EPS, WCA, Section 7	Four records with the closest 1.2 km west in Newport Docks.	Most recent in 2017
Whiskered bat (*Myotis mystacinus*)	EPS, WCA, Section 7	Closest record is 1.2 km north of the site.	2017
Natterer's bat *(Myotis nattereri)*	EPS, WCA, Section 7	One record 1.4 km north east	2011
Mammals			

[23] EPS = European Protected Species as listed under Schedule 2 of the Conservation of Habitats and Species Regulations (2010)
WCA = Species protected under Schedule 5 (animals) or Schedule 8 (plants) of the Wildlife and Countryside Act (1981) as amended
Section 7 = Species listed in Section 7 of the Environment (Wales) Act 2016
[24] Only records from the last ten years are used.

Species / Group	Status [23]	Summary of Records	Year of nearest record[24]
Grey Seal (*Halichoerus grypus*)	EPA, WCA, Section 7	One record 1.4 km north west of the site.	2018
Otter (*Lutra lutra)*	EPS, WCA, Section 7	The record is at 1.4 km north west of the site.	2008
Water vole (*Arvicola amphibius*)	WCA, Section 7	No records were provided by SEWBReC for recent water vole but information supplied by Welsh Government indicates that water vole are present 1 km to the east of the site.	2018
Badger (*Meles meles)*	BA	One record with the closest 1.3 km east in Nash Road. Records supplied by the Welsh Government from surveys associated with the new proposed M4 corridor suggest there are badger setts along the railway line, and 200 m to the east of the Site	2016
Hedgehog *(Erinaceus europaeus)*	WCA, section 7	SEWBReC returned five records with the closest 1013 m north east on Nash Road.	2017

3.1.3.1 Birds

SEWBReC provided records of ten birds listed on Schedule 1 of the Wildlife and Countryside Act 1981 within the 2 km search area from the last 10 years. Of these (listed in Appendix B in full), two are considered to have to potential to breed locally, Cetti's warbler and little ringed plover (*Charadrius dubius).*

SEWBReC also provided numerous records of Section 7 birds. These are listed in full in Appendix B.

3.1.3.2 Section 7 Species

SEWBReC returned data on Section 7 species within the 2 km search area. These included flowering plants: Deptford pink (*Dianthus armeria*), divided sedge (*Carex divisa)*, yellow bird's-nest (*Monotropa hypopitys* subsp. *hypophegea*), and cornflower (*Centaurea cyanus*).

Fish species included: European eel (*Anguilla anguilla*), whiting (*Merlangius merlangus*) and smelt (*Osmerus eperlanus*).

There are numerous Section 7 moth and butterfly species records, including small square spot (*Diarsia rubi*), shaded broad bar (*Scotopteryx chenopodiata*), rosy rustic (*Hydraecia micacea*), grayling (*Hipparchia semele*), ghost moth (*Hepialus humuli*), august thorn (*Ennomos quercinaria*), large wainscot (*Rhizedra lutosa*), centre barred sallow (*Atethmia centrago*), sallow (*Cirrhia icteritia*), small heath (*Coenonympha pamphilus*), grizzled skipper (*Pyrgus malvae*), latticed heath (*Chiasmia clathrata*), mottled rustic (*Caradrina morpheus*), rustic (*Hoplodrina blanda*), garden tiger (*Arctia caja*), ear moth (*Amphipoea oculea*), dot moth (*Melanchra persicariae*) and cinnabar moth (*Tyria jacobaeae*).

Other insects include shrill carder bee (*Bombus sylvarum*) and brown-banded carder bee (*Bombus humilis*).

3.1.4 M4 Surveys

As part of the proposed new M4 corridor around Newport (CAN), numerous ecological surveys were undertaken. A summary of the key findings of these surveys is provided below, taken from reports within appendices of the M4 CAN Environmental Statement[25].

A number of badger setts were recorded on the railway line (secondary setts. inactive) and immediately north of waterbody 6 (secondary setts, active and inactive), approximately 200m east of the railway line.

Bat activity (bat passes per survey visit) was recorded at three locations immediately north of Waterbody 6, with two of these (on the railway line, and approximately 150 m east) having more than 15000 bat passes, and one (central location, approximately 75 m east of the railway) having between 500 and 1500 passes.

The majority of the waterbodies within the Site, were not accessible (either due to health and safety constraints or lack of landowner permissions) and a number were also dry at the time of the survey. One of the waterbodies adjacent to the railway was subject to an eDNA survey, and great crested newts were found to be absent. The closest great crested newt was found to the south of Tatton Farm (approximately 1.9 km east of the Site).

[25] Available online at: https://beta.gov.wales/m4-corridor-around-newport-environmental-statement and https://beta.gov.wales/m4-corridor-around-newport-environmental-statement-appendices (accessed 15.02.19)

The closest dormouse surveys were undertaken at Pye corner to the east of the Site (approximately 900 m) and no dormouse were recorded.

Signs of otter presence were recorded in waterbodies, north west of the site within the Marshall's site, but none from the Site itself, and no signs of water vole were recorded.

3.2 Field Survey

3.2.1 Habitats – Extended Phase 1 Survey

A total of eleven habitats were identified within the Study Area; these are shown in Figures 2 and 3 – Extended Phase 1 Habitat Survey and summarised below.

The Wales Coastal Path runs from Stephenson Street in the north, down to corporation Road in the south. The Site lies at the southern end of the path, and either side is largely surrounded by buildings, hardstanding along with small areas of scrub and amenity grassland. The coastal path itself has a tarmac surface.

Extending from the southern end of Corporation road is an active railway line, connecting the port terminal in the north and power station in the south. Either side of the railway is broadleaved plantation with alder (*Alnus glutinosa*), silver birch (*Betula pendula*) and willow (*Salix* sp). A number of small waterbodies are scattered within the woodland including ponds, ditch and rain-filled concrete chamber (Waterbodies 5-8 (shown in Photographs 1-6)). A concrete storage pond (Waterbody 9) which was largely dry at the time of the survey is present to the west of the railway line, adjacent to a larger waterbody (Waterbody 12), which supports a mosaic of open water and swamp with dense common reed (*Phragmites australis*). Two larger waterbodies (Waterbody 10 and 11) occur east of the railway line which are interconnected. Both held a small amount of water at the time of the survey. The north western corner also supports swamp, and north of this is an area of semi-natural broadleaved woodland with oak (*Quercus* sp), hawthorn (*Crataegus monogyna*), bramble (*Rubus fruticosus* agg.) and honeysuckle. one of the waterbodies supported any aquatic vegetation at the time of the survey. Waterbody 10 was very discoloured and appeared to be heavily polluted (anecdotally due to contamination by aluminium smelting).

3.2.2 Target Notes

The target notes mapped on Figure 2 are as follows:

- TN1 = Railway line
- TN2 = Ditch
- TN3 = Ephemeral pool.

The target notes mapped on Figure 3 are as follows:

- TN1 = Railway Line

- TN2 = Japanese knotweed.

3.2.3 Invasive Non-Native Plants

The Site was searched for evidence of invasive non-native plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981. Japanese knotweed was identified in two areas on the Marshall's site (TN2 on Figure 3).

3.3 Species

3.3.1 Amphibians – Great crested newts

The waterbodies across the Site provide suitable breeding habitat for common amphibian species, e.g. common frog, common toad, palmate newt (*Lissotriton helveticus*), smooth newt (*Lissotriton vulgaris*) and great crested newt.

HSI were created for each waterbody on Site and the details of the HSI scores are reported in Table 8 below.

Table 8: HSI for Waterbodies on Site.

Waterbody Number	HSI Score	Classification of HSI Score	Location
5	0.66	Average	ST 33579 85023
6	0.65	Average	ST 33587 85053
7	0.65	Average	ST 33536 85117
8	0.68	Average	ST 33500 85199
9	0.46	Poor	ST 33511 84966
10	0.45	Poor	ST 33739 84980
11	0.44	Poor	ST 33739 84836
12	0.57	Below average	ST 33566 84831

Fingertip searching by an appropriately qualified ecologist to check for the presence of amphibians, including great crested newt, was carried out ahead of vegetation clearance works in February 2019, and none were found.

3.3.2 Presence / Absence Surveys

No great crested newts were recorded in any of the waterbodies during the presence / absence surveys (as shown in table 9 below, and Figures 6 and 7). Smooth newts were recorded from Waterbodies 3, 4, 5, 9, 11 and 12. No population surveys are therefore required for great crested newt, and great crested newts are not considered to be a constraint to the proposed works. Juvenile smooth newts were also recorded at Waterbody 4 and 9 confirming that a breeding population of smooth newts is present at these locations.

Table 9: Results of great crested newt presence / absence surveys (also summarised in Figure 6 and 7).

Waterbody / Dates	28th / 29th March	3rd / 4th April	17th / 18th April	24th / 25th April	30th April / 1st May	16th / 17th May	Comments / additional information
3	0	0	-	1 male smooth newt (bottles)	4 smooth newts (1 f / 3 m) in bottles	-	None
4	-	-	2 juvenile smooth or palmate newts under refugia	3 juvenile smooth or palmate newts under refugia	2 juvenile smooth or palmate newts under refugia	3 juvenile smooth or palmate newts under refugia	Stickleback and shrimp present
5	0	9 smooth newts (bottles)	-	2 male and 1 female smooth newt (bottle)	3 male and 1 female smooth newts (bottles)	-	Great Diving beetle present
6	0	0	-	0	0	-	None
7	0	0	-	0	0	-	None
8	0	0	-	0	0	-	None
9	Approx. 50 smooth newts with juveniles (torching) / 1 female and 1 male smooth (bottles)	Approx. 50 smooth newts with juveniles (torching) /1 female and 1 male smooth newt (bottles)	-	Approx. 20 smooth with juveniles (torching)	10 smooth newts with juveniles (torching)	-	Dragonfly larvae present
10	0	0	-	0	0	-	None
11	1 smooth (torching) / 4 male smooth newts (bottles)	2 male smooth (bottles)	-	0	1 smooth (torching) / 1 female and 1 male smooth (bottles)	-	None
12	0	0	-	1 smooth (torching)/ 1 female newt (bottle)	0	-	Diving beetle / water scorpion present

3.3.3 Bats

No potential roost features in trees or structures were identified within the Site during the Extended Phase 1 Habitat Survey. Industrial developments and residential housing are present in the wider area which may support roosting bats. Roosting bats are not considered to be a constraint to the proposed works.

The Site has potential to support foraging and commuting bats that may be roosting in the surrounding area due to the presence of dense scrub, waterbodies and linear features; e.g. scrub along the public footpath.

3.3.4 Badgers

No signs of badger were observed on Site during the Extended Phase 1 Habitat Survey. It was not possible to inspect dense areas of scrub, and therefore the presence of badger setts within these areas cannot be ruled out due to the presence of badger setts approximately 200 m east of the railway line.

Badger footprints were recorded along the western margin of waterbody 10 on two of the four great crested newt surveys.

3.3.5 Birds

There is a variety of habitat including scrub and swamp on Site to support a range of breeding birds. There is the potential for Schedule 1 species such as Cetti's warbler to nest within swamp habitat in the Site.

3.3.6 Dormice

The brambles and scrub on Site provide suitable foraging and nesting habitats for dormice. However, fragmentation from other potential dormouse habitat including those with dormouse records within the wider area due to barriers such as roads, rivers and rail means dormouse are unlikely to occur within the Site. Furthermore, M4 surveys undertaken in the area of the Site did not find any evidence of this species being present.

3.3.7 Reptiles

The mosaic of habitats, including scrub and also wetland areas, provide suitable habitat for reptiles specifically common lizard, slow worm and grass snake.

3.3.8 Otters and Water Vole

No signs of otter or water vole were observed during the Extended Phase 1 Habitat Survey, or during ecological watching briefs required for vegetation clearance works. Both species have been recorded in connecting habitat, with water vole records being recorded at Pye Corner approximately 1 km east and Otter being record approximately 500 m north west of the site.

Signs of otter were recorded during the great crested newt surveys in the form of otter prints along the margins of Waterbody 10 (4th April 2019) (as shown in

Figure 5) and during the otter survey (on the 17th May 2019) a spraint along a ditch running south from Waterbody 11 (as shown in Figure 5). No otter resting or breeding places were recorded, and the habitat being open woodland with little understorey or disturbed areas are likely to be suboptimal for this. Any presence is considered likely to be limited to foraging and or commuting otter, travelling through the site.

Habitat Suitability / Presence and Absence Surveys

The results of the Habitat Suitability assessment and presence / absence surveys are detailed below in Table 10.

Table 10: Results of Otter Habitat Suitability and presence / absence survey. Results are also shown in Figure 5.

Waterbody Number	Habitat Suitability	Presence / absence
5	Low	No signs.
6	Low	No signs.
7	Low	No signs.
8	Low	No signs.
9	Low	No signs.
10	Low	Otter footprints in mud / silt along western edge of the waterbody.
11	Low	No signs around waterbody. An otter spraint was recorded on culvert crossing over connecting stream to the south, approximately 500 m southeast of the works.
12	Low	No signs.

No signs of water vole were recorded during the initial presence / absence survey (17th May 2019). The majority of waterbodies were assessed as having negligible suitability, although Waterbody 11 was assessed as having low suitability due to presence of steeper earth banks and riparian vegetation. Burrows were observed in a ditch to the south of Waterbody 11 but it's possible that these may have been created by rat. During the first survey visit (17th May 2019), a footprint was recorded between Waterbodies 5 and 6 which is considered to be from a European Mink (*Mustela lutreola*). The presence of mink also reduces the suitability of habitats for water vole, due to the likely predation risk.

The results of the Habitat Suitability assessment and presence / absence surveys are detailed below in Table 11

Table 11: Results of water vole Habitat Suitability and presence / absence survey. Results are also shown in Figure 5.

Waterbody Number	Habitat Suitability	Presence / absence
5	Negligible	No signs.
6	Negligible	No signs.
7	Negligible	No signs.
8	Negligible	No signs.
9	Negligible	No signs.
10	Low	No signs.
11	Moderate	Likely water vole droppings / latrines and feeding remains recorded within dense reedbeds along the eastern and northern edges of the waterbody, approximately 280 m and 400 m southeast of the works. Potential water vole burrows were found in a ditch south of waterbody 11, 420 m southeast of the works, (but could also possibly be rat burrows).
12	Negligible	No signs

During the second presence / absence survey (18th July 2019), similar to the previous survey, the majority of waterbodies were assessed as being unsuitable for water vole. Waterbody 11 was assessed as having low suitability for water vole, due to the noticeable increase in the amount of riparian vegetation around the margins of the reedbed, since the previous survey. Likely water vole droppings and likely feeding remains were recorded at various locations in reedbeds along eastern and northern margins of the waterbody, the closest of which was approximately 280 m southeast of the proposed works. The waterbodies that are closer than 280 m to the proposed works are unsuitable for water vole and therefore it is unlikely that signs of water vole will be present any closer to the works. No burrows or nests were recorded however. The droppings were slightly smaller than typical adult water voles (with some being approximately 8 mm and others slightly smaller), however, they had the general appearance of droppings of this species. The feeding remains were similar, in that some were smaller remains which could be from other smaller vole species such as bank vole however, there were larger remains of common reed, which were more likely to have been chewed by water vole due to their size. Photos of both the likely water vole droppings and feeding remains are included in Appendix C.

A further survey in January 2020, found no signs of water vole burrows in Waterbody 11, or the connecting ditch.

Artificial Latrines / Raft Monitoring

As discussed in limitations, the cameras had been partially submerged by the increased water levels within waterbody 11 and had stopped recording past that point (4th October 2020). The video footage until that point, was analysed and no water voles were observed. There were three recordings of otter however (at camera 1), two on the 20th September and one on the 2nd October 2019.

There were a number of vole type droppings, on the raft on the eastern side of the waterbody, which had been soaked by water, and therefore cannot be confirmed as being from water vole. Their size and distribution suggest that they may be from water vole however. Photographs are included in Appendix C.

A further survey in January 2020, and inspection of the two remaining rafts, found no evidence of water vole droppings.

3.3.9 Invertebrates

Areas of wetland and woodland within the Site are likely to support at least a moderate range of invertebrate species, potentially including Section 7 species.

During great crested newt surveys, Waterbody 9 was observed to provide good breeding habitat for dragonfly species.

3.3.10 Other Mammals

It is likely that small mammals such as rabbit (*Oryctolagus cuniculus*) would occur within the Site in wooded / scrub habitats, and potentially more notable species such as the European hedgehog (*Erinaceus europaeus*), a Section 7 species.

3.3.11 Fish

The presence of freshwater fish is considered likely within waterbodies in the Site, which provide a permanent water source. Stickleback fish were found in Waterbody 4 during the great crested newt surveys.

None of the waterbodies provide obvious connectivity for most migratory fish species, though European eel may use the waterbodies.

4 Recommendations

Recommendations for further consultation, further species surveys or general best practice mitigation to minimise impacts of the Proposed Works on habitat and species are stated below, in line with PEA guidance. Measures to enhance biodiversity are also recommended in this section.

4.1 Pre-construction

Designated Sites

- A Habitat Regulation Assessment (HRA) should assess potential pathways for effect on internationally designated sites within 10 km of the Site. As a result of new case law as ruled by the European Court of Justice (ECJ, 2018)[26], mitigation measures cannot be included within the Screening Stage of HRA, and therefore any potential pathways for effect will need to be evaluated within an Appropriate Assessment. The HRA report will require consultation and agreement with Conservation Staff in NRW.
- For any planning applications, the Local Planning Authority (LPA) will also require a copy of the Appropriate Assessment as it assumed they would become the 'competent authority'.
- Consultation should be undertaken with relevant teams within NRW regarding impacts on the River Usk SSSI; and
- The LPA should be consulted regarding impacts on Solutia, Alpha Steel and Marshall's SINCs.

Habitats

An arboricultural survey should be undertaken if any mature trees on Site and on proposed access routes are to be affected.

Species

4.1.1 Water Vole Surveys

No water vole burrows or nests have been found in proximity to the proposed works. Due to their mobile nature, a pre-construction survey of 30m from the works should be undertaken to confirm the presence / absence of water vole nests/burrows.

[26] ECJ (2018). People over Wind, Case C323/17 European Court of Justice, 12th April 2018.

If any water vole resting or breeding places are found and are likely to be disturbed by the works, it may be necessary to temporarily exclude and displace these species from the works area under licence from NRW.

4.1.2 Badger Pre-Works Check

Given the mobile nature of this species and dense scrub present, ecological supervision is recommended for any vegetation clearance ahead of construction to ensure no setts are present.

If any setts are found and could be damaged by the works, a licence will be required from Welsh Government. The impact of any vibration effects should also be considered.

4.2 Construction

General

A toolbox talk should be given to all contractors on Site by a suitably qualified ecologist prior to works, detailing the potential for protected species on Site, the working methods to be employed and the procedure to follow should any species be identified. A record of attendance should be kept on Site, which contractors should sign to indicate they have understood the toolbox talk.

All vegetation clearance should be carried out under an ecological watching brief, due to the likely presence of reptiles.

Access should be provided at all times to enable mammals to safely access the waterbodies and other habitats on and off Site so as not to cause a barrier to movement.

Habitats

Best practice guidelines should be implemented for all works in proximity to a watercourse:

- An Environmental Action Plan will be produced and should be maintained by the contractor during the construction phase. This will include Site-specific methods to ensure that all Site activities, especially those in proximity to watercourses and waterbodies are controlled and are in accordance with relevant legislation and undertaken in compliance with the relevant Guidance for Pollution Prevention (GPPs) and industry best practice (GPP5[27], CIRIA[28]).

[27] Natural Resources Wales (NRW), the Northern Ireland Environment Agency (NIEA), Scottish Environment Protection Agency (SEPA) (2018). Guidance for Pollution Prevention – Works or maintenance in or near water: GPP5 v1.2 Feb 2018. http://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf (accessed 15.02.19)
[28] CIRIA (2018) CIRIA http://www.ciria.org (accessed 15.02.19)

- Where possible any disturbed habitats should be re-instated post construction, and re-seeded/ planted with an appropriate seed/plant mix or left to revegetate naturally, as approved by NRW.

Species

4.2.1 Bats

The Site does not provide any roosting opportunities for bats but does provide suitable foraging habitat.

- All works should be carried out during daylight hours (typically up to 30 mins before sunset and 30 minutes after sunrise) within the main active period (April to October) where possible to avoid disturbance to commuting or foraging bats.
- Any task lighting required for health and safety or security reasons should be directional lighting (towards the ground) to avoid light spill onto habitats immediately within or adjacent to the Site

4.2.2 Breeding Birds

- All vegetation clearance of suitable bird nesting habitat should be undertaken outside of the core bird nesting season (the bird nesting period is 1 March to 31 August, subject to regional and seasonal variations) to avoid damage or destruction of occupied nests or harm to breeding birds. If this cannot be achieved, works within the core bird nesting season will require an inspection of vegetation to be cleared for breeding birds and their occupied nests by a suitably qualified ecologist no more than 24 hours prior to any works commencing. If any nesting birds are identified during the survey they should be left in situ for their entire nesting period and alternative approaches to the work proposed. This may include leaving an exclusion zone around the nests to avoid disturbance.
- If any Schedule 1 birds such as the Cetti's warbler are nesting on the Site at the time of construction a larger buffer between construction and nests of these species as advised by a suitably experienced ecologist.

4.2.3 Otter and Water Vole

The following mitigation should be implemented to minimise impacts on otter and water vole:

- Good practice working methods should be adhered to which to prevent any adverse impact to otter and water vole; i.e. materials should not be left overnight in an area accessible to these species and excavations should not be left uncovered overnight. If any excavations are required to be left open overnight, a ramp should be created to allow any animals to escape, including other mammals at the Site.

- Access for otter and water vole along all waterbodies should be maintained during construction and operation, thus ensuring that movement of otter and water vole is not impeded during operation of the Proposed Works.
- All works should be carried out during daylight hours (up to 30 minutes after sunrise and 30 minutes before sunset) where possible to avoid disturbance to commuting or foraging otters. Any use of task lighting should be directional to avoid illumination of the river corridor at night.
- If any water vole breeding or resting places are found during pre-construction surveys, additional mitigation measures may also be required to reduce disturbance.

4.2.4 Invasive Non-Native Plants

Japanese knotweed was recorded during the survey. Works should be avoided within 7 m of the Japanese knotweed. If this is unavoidable, an eradication plan for treating Japanese knotweed by stem injection is recommended, as advised by NRW. Areas where Japanese knotweed has been identified previously are currently being treated by NRW. An invasive species management plan should be produced within the contractor Risk Assessment and Method Statement (RAMS) document, containing Site-specific methods to ensure that all Site activities are controlled and are in accordance with best practice procedures as mitigation. A pre-construction survey should be carried out to further inspect for invasive species to confirm their distribution, as species may have been missed during the Extended Phase 1 Habitat Survey due to the suboptimal time of year for botanical surveys.

4.3 Post Construction

4.3.1 Enhancement Measures

The following measures are recommended to enhance the biodiversity within the Site and surrounding area, in line with national and local planning policy[29] [30]:

- The inclusion of logs / brash piles to encourage invertebrates and also act as a refuge for reptiles, amphibians and small mammals.

[29] Welsh Government (2018). Planning Policy Wales. Edition 10. Available online at: https://beta.gov.wales/sites/default/files/publications/2018-12/planning-policy-wales-edition-10.pdf (accessed 15/02/19).

[30] Newport City Council (2015). Newport Local Development Plan 2016-2015. Available online at: http://www.newport.gov.uk /documents/Planning-Documents/LDP-2011-2026/LDP-Adopted-Plan-January-2015.pdf (accessed 15/02/19).

5 Summary and Conclusions

The Site is situated adjacent to Solutia and Alpha Steel SINCs and within 150 m of Marshall's SINC. The Site is also within 150 m of the River Usk SAC and within 5 km of other designated sites including the Severn Estuary SAC, SPA, Ramsar site, and SSSI, Gwent Levels SSSI, and Newport Wetlands NNR.

An Appropriate Assessment will be required to assess any likely significant effects on the River Usk SAC and the River Severn SAC, SPA and Ramsar sites taking into account proposed mitigation. NRW will be the competent authority for a Flood Risk Activity Permit, whereas Newport City Council will be for Planning Permission. Consultation with the LPA should be undertaken regarding any potential impacts to the adjacent SINCs.

The Site also supports a range of other habitats such as scrub, grassland, reedbeds and swamps which may not be of great ecological value in themselves, but for the species they support including European Protected Species such as foraging otter, and Schedule 1 birds such as the Cetti's warbler. There is also the potential for other species such as badger and water vole to occur within habitats on Site.

Further pre-construction surveys are also recommended for invasive non-native plant species, badger, water vole and otter, due to their mobile and / or invasive nature. Additional mitigation measures may be required if these species are found to be present.

General mitigation is recommended during construction to protect existing habitat and species such as bats, birds and mammals. In addition, mitigation is recommended for the avoidance or treatment of Japanese knotweed, to avoid its spread within / from the Site.

Measures are suggested to enhance the value of the Site for biodiversity, in line with planning policy and the Environment (Wales) Act 2016.

Once the design of the Proposed Works has been finalised, and the access route confirmed, an Ecological Impact Assessment should be undertaken, detailing results and recommendations from any further ecological surveys.

This report is the result of survey work undertaken between January 2019 and January 2020. This report refers, within the limitations stated, to the condition or Proposed Works at the Site at the time of the inspections. Changes in legislation, guidance, best practice, etc. may necessitate a re-assessment / survey. It is also advised that if there is a delay of over a year in undertaking the works, an updated walkover survey is recommended to ensure the baseline conditions have not changed. No warranty is given as to the possibility of future changes in the condition of the Site.

This report is produced solely for the benefit of NRW and no liability is accepted for any reliance placed on it by any other party. This report is prepared for the proposed uses stated in the report and should not be used in a different context.

Figures

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

Site Location

A3

ARUP

0 475 950 1,900 2,850 3,800 Metres

Rev.	Date.	Drawn.	Description.	Chkd.	Appd.	Date.
F1	2019-02-15	KJ	Preliminary	CP	PC	2019-02-21

Cyfoeth Naturiol Cymru
Natural Resources Wales

Project Name.
Stephenson Street

Drawing Title.
SITE LOCATION

Suitability.	Suitability Code.
For Issue	S1

Originator	Designer	Date.
KJ	CP	2019-02-21
Internal Project Number	**Scale**	**Rev.**
246344	1:90,000	F1

Drawing Number.
001

\\global.arup.com\europe\Cardiff\Jobs\246000\246344-00\4 Internal Project Data\4-80 GIS\4-8-4 Map Documents\

A3

LEGEND

- Trial pits
- Target note
- Standing water
- Wall
- Semi-natural broadleaved woodland
- Broad-leaved plantation
- Dense scrub
- Swamp
- Standing water
- Gravel and concrete

Great crested newt habitat suitability index

- Average (0.6-0.69)
- Below average (0.5-0.59)
- Poor (<0.5)

ARUP

0 10 20 40 60 80 Metres

Rev.	Date.	Drawn.	Description.	Chkd.	Appd.	Date.
F1	2019-02-08	EA	For Issue	CP		2019-03-05

Cyfoeth Naturiol Cymru
Natural Resources Wales

Project Name.
Stephenson Street

Drawing Title.
ECOLOGICAL CONSTRAINTS PLAN

Suitability.	Suitability Code.
For Issue	2019-02-08

Originator	Designer	Date.
EA	CP	2019-02-08

Internal Project Number	Scale	Rev.
246344	1:2,000	F1

Drawing Number.
002

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

- Trial pits
- Target note
- Fence
- Dense scrub
- Japanese knotweed
- Tarmac

A3

ARUP

0 5 10 20 30 40 Metres

Rev.	Date.	Drawn.	Description.	Chkd.	Appd.	Date.
F1	2019-02-08	EA	For Issue	CP	PC	2019-02-21

Cyfoeth Naturiol Cymru
Natural Resources Wales

Project Name.
Stephenson Street

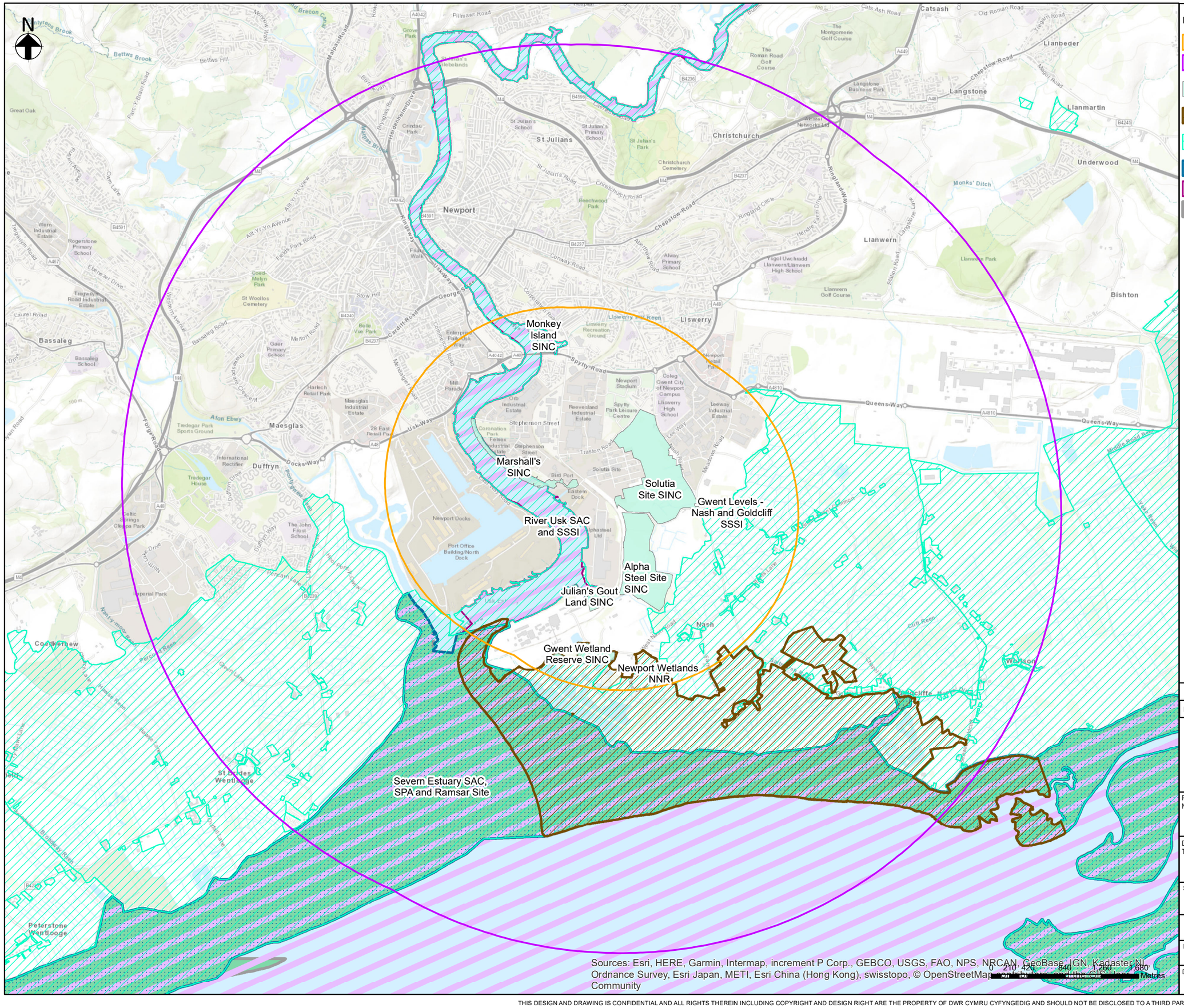
Drawing Title.
EXTENDED PHASE 1 HABITAT SURVEY
MAP 2 OF 2

Suitability.	Suitability Code.
For Issue	S1

Originator	Designer	Date.
EA	CP	2019-02-21

Internal Project Number	Scale	Rev.
246344	1:1,000	F1

Drawing Number.
003



LEGEND

- 2km buffer
- 5km buffer
- Sites of Importance for Nature Conservation (SINCs)
- National Nature Reserve (NNR)
- Sites of Special Scientific Interest (SSSI)
- Special Protection Areas (SPA)
- Special Areas of Conservation (SAC)
- Ramsar

A3

ARUP

Rev.	Date.	Drawn	Description.	Chkd.	Appd.	Date.
P0	2019-02-27	EA	Preliminary			2019-02-27

Cyfoeth Naturiol Cymru
Natural Resources Wales

Project Name.
Stephenson Street Embankment

Drawing Title.
STATUTORY AND NON-STATUTORY DESIGNATED SITES

Suitability.	Suitability Code.
Preliminary	2019-02-27

Originator	Designer	Date.
EA		2019-02-27
Internal Project Number	**Scale**	**Rev.**
246344	1:40,000	P0

Drawing Number.
001

A3

15/08/2019 15:26:00

LEGEND

Waterbodies surveyed

No great crested newt were recorded in any of the waterbodies during the presence / absence surveys.

Issue	Date	By	Chkd	Appd
P0	2019-08-15	EA	CP	

Metres
0 25 50 100

ARUP

4 Pierhead Street
Cardiff CF10 4QP
Tel +44 29 2047 3727 Fax +44 29 2047 2277
www.arup.com

Client
Natural Resources Wales

Job Title
Stephenson Street

Great crested newt presence / likely absence survey results

Waterbodies 3 and 4

Scale at A3
1:2,000

Job No	Drawing Status
246344-00	**Preliminary**

Drawing No	Issue
001	**P0**

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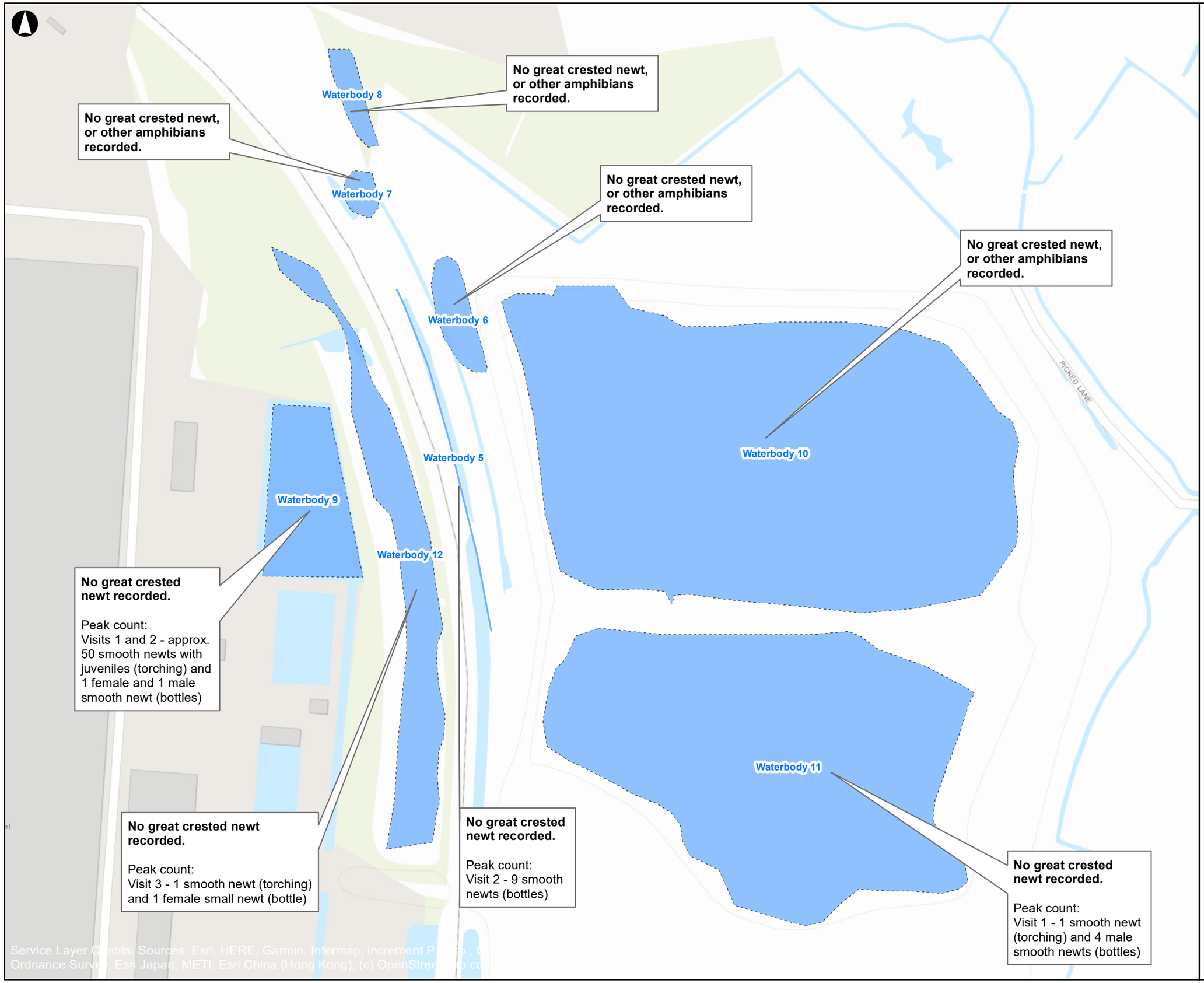
A3



\\globaleurope\Cardiff\Jobs\246000\246344-00\4 Internal Project Data\4-80 GIS\4-84 Map Documents\ENV_Environment\Extended phase 1 plan_updated with Nash area.mxd

15/08/2019 15:10:24

LEGEND

Waterbodies surveyed

Waterbodies surveyed

No great crested newt were recorded in any of the waterbodies during the presence / absence surveys.

Issue	Date	By	Chkd	Appd
P0	2019-08-15	EA	CP	

Metres
0 25 50 100

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Client
Natural Resources Wales

Job Title
Stephenson Street

Great crested newt presence / likely absence survey results

Waterbodies 5 - 12

Scale at A3
1:2,000

Job No	Drawing Status
246344-00	**Preliminary**

Drawing No	Issue
002	**P0**

A3

LEGEND

- Waterbodies surveyed
- Waterbodies surveyed

Otter suitability

- Low suitability for otter

Water vole suitability

- Low suitability for water vole
- Negligible suitability for water vole

Riparian Mammal Results

- Possible American mink footprints
- Otter spraint
- Water vole droppings
- Potential water vole burrows (could be rat, ditch considered to have low potential for water vole)

Issue	Date	By	Chkd	Appd
P0	2019-08-14	EA	CP	

Metres
0 25 50 100

ARUP

4 Pierhead Street
Cardiff CF10 4QP
Tel +44 29 2047 3727 Fax +44 29 2047 2277
www.arup.com

Client
Natural Resources Wales

Job Title
Stephenson Street

Riparian Mammal Survey Results

Scale at A3
1:2,250

Job No	Drawing Status
246344-00	**Preliminary**

Drawing No	Issue
001	**P0**

14/08/2019 16:40:48

A3

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

- Water vole monitoring equipment
- Results

02/03/2020 13:08:41

Issue	Date	By	Chkd	Appd
P1	2020-03-02	EA	CP	

Metres
0 5 10 20

ARUP

4 Pierhead Street
Cardiff CF10 4QP
Tel +44 29 2047 3727 Fax +44 29 2047 2277
www.arup.com

Client
Natural Resources Wales

Job Title
Stephenson Street

Figure 8
Water Vole Monitoring

Scale at A3
1:750

Job No	Drawing Status
246344-00	**Preliminary**

Drawing No	Issue
001	**P1**

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Appendix A

A1: Legislative Context

A1 Legislative Context

A framework of international, European, national and local legislation and planning policy guidance exists to protect and conserve wildlife and habitats. This is described in the following sections. The reader will refer to the original legislation for the definitive interpretation.

A1.1 Statutory Designated Sites

A network of nationally designated Sites has been established through the designation of Sites of Species Scientific Interest (SSSI) under the Wildlife and Countryside Act 1981 (as amended). The protection afforded by the Act means it is an offence to carry out or permit to be carried out any operation listed within the notification without the consent of the Statutory Nature Conservation Organisation[31] (Natural Resources Wales).

The protection afforded to SSSIs is used to underpin the designation of areas at a European Level. European Sites comprise:

- Special Areas of Conservation (SAC) designated under the Conservation of Habitats and Species Regulations 2010 (as amended) (known as the Habitats Regulations);
- Special Protection Areas (SPA) designated under the Wildlife and Countryside Act.

Wetlands of International Importance (Ramsar Sites) declared under the Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 are normally also notified as SSSIs but are only considered European Sites as a matter of UK and Local Government Policy.

The Habitats Regulations transpose the requirements of Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) in to law within England and Wales, while the Wildlife and Countryside Act transposes Directive 79/409/EEC on the Conservation of Wild Birds (the Birds Directive) in the law within England and Wales. Equivalent legislation exists to transpose these directives in the law within Scotland and Northern Ireland.

The Habitats Regulations require that consideration is given to the implications of plans and projects (developments) on European Sites are considered. Specifically, Regulation 61(1) states:

"*A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which –*

(a) is likely to have a significant effect on a European Site or European marine Site (either alone or in combination with other plans or projects), and

[31] Section 28 of the Wildlife and Countryside Act 1981 (as substituted by Schedule 9 of the Countryside and Rights of Way Act 2000).

(b) is not directly connected with or necessary to the management of that Site, must make an appropriate assessment of the implications for that Site in view of that Site's conservation objectives."

The formal consideration of effects on European Sites is therefore undertaken by the determining authority such as the Local Planning Authority.

Local Nature Reserves can be given protection against damaging operations through powers within the National Parks and Access to the Countryside Act 1949 (as amended). However, this protection is usually conveyed through inclusion of protection within local planning policy relating to these Sites and other non-statutory Sites such as Sites of Importance for Nature Conservation.

A1.2 European Protected Species

The Habitats Regulations convey special protection to a number of species which are listed in schedule 2 of the Regulations and are referred to a European Protected Species (EPS):

- All UK resident bat species;
- All whale and dolphin species;
- Large blue butterfly (*Maculinea arion*);
- Common dormouse (*Muscardinus avellanarius*);
- Pool frog (*Rana lessonae*);
- Sand lizard (*Lacerta agilis*);
- Fisher's estuarine moth (*Gortyna borelii lunata*);
- great crested newt (*Triturus cristatus*)
- common otter (*Lutra lutra*)
- wild cat (*Felis silvestris*);
- Lesser Whirlpool Ram's-horn Snail (*Anisus vorticulus*)
- Smooth snake (*Coronella austriaca*);
- Sturgeon (*Acipenser sturio*);
- Natterjack toad (*Bufo calamita*); and
- All marine turtles.

Regulation 41 makes it an offence to:

a) Deliberately capture, injure or kill any wild animal of a EPS;

b) Deliberately disturb wild animals of such a species;

c) Deliberately takes or destroys the eggs of such a species;

d) Damages or destroys a breeding Site or resting place of such an animal.

Disturbance in the context of the offences above is disturbance which is likely to impair the ability of the animals to survive, to breed or reproduce, to nurture their young, to hibernate, to migrate; or to affect significantly the local distribution of the species.

Licences can be granted by the relevant SNCO for developments (sometime referred to as EPS Licences or Derogation Licences) providing the purposes of the licence is for "*preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment*".

A1.3 UK Protected Species

The Wildlife and Countryside Act 1981 provide protection to both EPSs and other species including wild birds, water voles and reptiles.

All wild birds, their nests and eggs are protected with some rare species afforded extra protection from disturbance during the breeding season (these species are listed in Schedule 1 of the Act). It is illegal to take any wild bird or damage or destroy the nests and eggs of breeding birds. There are certain exceptions to this in respect of wildfowl, game birds and certain species that may cause damage.

Water vole receive protection under the Wildlife and Countryside Act 1981 which prohibits the killing, injuring or taking by any method.

All native reptile species in the UK are subject to partial protection from intentional or reckless killing or injury only.

Badger and their setts are protected under the Protection of Badgers Act 1992 which makes it an offence to kill, injure or take a badger, or interfere with a sett.

A1.4 Other Legislation Relating to Species

Section 6 of the Environment (Wales) Act 2016 includes a duty on all public authorities to "seek to maintain and enhance biodiversity" so far as it is consistent with the proper exercise of those functions. In so doing, public authorities must also seek to "promote the resilience of ecosystems". This duty applies to government bodies, local authorities and statutory undertakers.

To assist in complying with this duty, public authorities must have regard to relevant evidence provided in the State of Natural Resources Report and any relevant area statement for an area in which the authority exercises functions, as well as having regard to the list of living organisms and habitats published under Section 7 of the Act. Species and habitats listed on Section 7 are considered to be of Principal Importance for the conservation of biological diversity.

The Environment (Wales) Act 2016 replaces the NERC Act 2006; Section 6 replaces Section 40 of the NERC Act and Section 7 replaces the Section 42 lists.

A1.5 Newport Local Biodiversity Action Plan (LBAP)

In 2007, the UK Biodiversity Partnership published a Biodiversity Action Plan (BAP) which listed priority species and habitats covering terrestrial, freshwater and marine biodiversity to focus conservation action for rarer species and habitats in the UK.

The UKBAP has now been superseded by the UK Post-2010 Biodiversity Framework,[32] which forms the basis for biodiversity action in the UK.

The Newport Biodiversity Partnership is a partnership of more than 15 organisations and individuals who are involved with, either professionally or personally, conserving and enhancing Newport's biodiversity and wrote the Newport LBAP[33].

Otter, water vole and bats are all listed as priority species on the Newport LBAP.

[32] JNCC (2012). UK Post-2010 Biodiversity Framework. Available online at: http://jncc.defra.gov.uk/pdf/UK_Post2010_Bio-Fwork.pdf (accessed 15/02/19).
[33] The Newport Local Biodiversity Action Plan. Available online at: http://www.newport.gov.uk/documents/Leisure-and-Tourism/Countryside/Newport-Local-Biodiversity-Action-Plan.pdf (accessed 15/02/16).

Appendix B

B1: Statutory Designated Sites Citations
B2: Non-Statutory Designated Sites Citations
B3: SEWBReC Desk Study Birds Records

B1: Statutory designated Sites within 5 km and 2 km of the Site boundary, for European and national Sites, respectively. Designated features are taken from NRW's website and the corresponding citations/data forms.

Site Name	Features	Distance from Proposed Development
European Protected Sites		
River Usk Special rea of Conservation (SAC)	Annex I habitats present as a qualifying feature, but not a primary reason for selection of this Site: Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. Annex II species that are a primary reason for selection of this Site: Sea lamprey (*Petromyzon marinus*), brook lamprey (*Lampetra planeri*), river lamprey (*Lampetra fluviatilis*), twaite shad (*Alosa fallax*), Atlantic salmon (*Salmo salar*), bullhead (*Cottus gobio*) and otter (*Lutra lutra*). Annex II species present as a qualifying feature, but not a primary reason for Site selection: Allis shad (*Alosa alosa*)	150 m west of the Site
Severn Estuary Ramsar Site	Habitats Directive Annex I features: sandbanks, which area slightly covered by sea water all the time, estuaries, mudflats and sandflats not covered by seawater at low tide and Atlantic salt meadows *Glauco-Puccinellietalia maritimae* (Ramsar criterion 1). Unusual estuarine communities, reduced diversity and high productivity (Ramsar criterion 3). This Site is important for the run of migratory fish between sea and river via estuary. Species include salmon, sea trout (*Salmo trutta*), sea lamprey, river lamprey, allis shad, twaite shad and eel (*Anguilla anguilla*). The Site is important as a feeding and nursery ground for many fish species particularly allis shad and twaite shad which feed on mysid shrimps in the salt wedge (Ramsar criterion 8). It is also of particular importance for migratory birds during spring and autumn (Ramsar criterion 4) Assemblages of international importance: - Species with peak counts in winter (waterfowl) (Ramsar criterion 5).	1.6 km south of the Site (hydrologically connected via the River Usk)

Site Name	Features	Distance from Proposed Development
	- Species/populations occurring at levels of international importance (Ramsar criterion 6). Bewick's swan (*Cygnus bewickii*), greater white-fronted goose (*Anser albifrons albifrons*), common shelduck (*Tadorna tadorna*), gadwall (*Anas strepera*), dunlin (*Calidris alpine*), common redshank (*Tringa tetanus*). - Future species for consideration: During the breeding species: lesser black-backed gull (*Larus fuscus graelsii*) With peak counts in spring/autumn: ringed plover (*Charadrius hiaticula*) With peak counts in winter: teal (*Anas crecca*), northern pintail (*Anas acuta*).	
Severn Estuary SAC	Annex I habitats that are a primary reason for selection of this Site: Estuaries Mudflats and sandflats not covered by seawater at low tide Atlantic salt meadows (Glauco-Puccinellietalia maritimae) Annex I habitats present as a qualifying feature, but not a primary reason for selection of this Site: Sandbanks which are slightly covered by sea water all the time Reefs Annex II species that are a primary reason for selection of this Site: Sea lamprey, river lamprey and twaite shad	1.6km south of the Site (hydrologically connected via the River Usk)
Severn Estuary Special Protection Area (SPA)	This Site qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: Over winter: Bewick's swan. This Site qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: On passage: ringed plover Over winter: curlew (*Numenius arquata*), dunlin, pintail, redshank, shelduck.	1.6 km south of the Site (hydrologically connected via the River Usk)

Site Name	Features	Distance from Proposed Development
	The area qualifies under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl, including gadwall, shelduck, pintail, dunlin, curlew, redshank, Bewick's swan, wigeon (*Anas Penelope*), lapwing (*Vanellus vanellus*), teal, mallard (*Anas platyrhynchos*), shoveler (*Anas clyptea*), pochard (*Aythya farina*), tufted duck, (*Aythya fuligula*), grey plover (*Pluvialis squatarola*), white-fronted goose and whimbrel (*Numenius phaeopus*).	
National Protected Sites		
River Usk SSSI	The River Usk (Lower Usk) (Abergavenny – Newport) is a rare example of a large mesotrophic lowland river which has not been subject to significant modification by man. Of particular significance to the river's morphology and biology are the extensive deposits of fluvio-glacial and alluvial material in the Usk valley between Abergavenny and Newport. The invertebrate fauna is characteristic of a large lowland river. Of special interest are the craneflies associated with silty river margins in the vicinity of Newbridge on Usk. The fish fauna is of international significance including several rare and scarce species and there is an expanding population of otters. Several scarce higher plant species occurring along the river's tidal reaches are also of special interest. Whilst not a special feature of the Site, there is a good range of breeding birds associated with riverine habitats. The SSSI incorporates adjacent areas of riparian habitat which directly support the special interest of the river. These include woodlands dominated by alder (*Alnus glutinosa*) and willows (*Salix spp*.), marshy grassland, stands of tall herb, swamp and fen vegetation, salt-marsh and coastal grassland.	150 m west of the Site
Gwent Levels-Nash and Goldcliff SSSI	The Gwent Levels constitute the lowlands between Cardiff and Chepstow and are drained by an ordered network of drainage ditches. The Gwent Levels reens are rich in plant species and communities, many of which are rare or absent in other Levels systems. The regular maintenance of some reens provides conditions for submerged species such as hairlike pondweed (*Potamogeton trichoides*) and openwater emergents such as arrowhead (*Sagittaria sagittifolia*) an opportunity to flourish. Nationally rare or notable aquatic invertebrate species are present such as *Haliplus mucronatus* and *Hydrophilus piceus*. The area is important in the Welsh context for its snails and dragonflies and includes the species *Physa heterostropha* and *Brachytron pratense* respectively. The large number of hedgerows add to the diversity of the area	690 m east of the Site (hydrologically connected via the River Usk/Severn Estuary)

Site Name	Features	Distance from Proposed Development
	and together with the main reen banks provide a habitat for nationally important assemblages of terrestrial invertebrates such as *Pipunculus fonsecai* and *Tomosvaryella minima*. The Nash and Goldcliff area forms an important part of the Gwent Levels system and is of particular botanical interest as it is the only area in Wales for the least duckweed (*Wolffia arrhizal*). There is also an interesting community where two species of hornwort *Ceratophyllum submersum* and *C. demersum* grow together. The invertebrate interest is also high, as rare and notable species such as *Odontomyia ornata*, *Oplodontha viridula* and *Hydaticus transversalis* are present.	
Newport Wetlands (National Nature Reserve (NNR)	The Site lies within the Gwent Levels and to the south of the city of Newport, adjacent to the Severn Estuary and close to the mouth of the River Usk In winter, Newport Wetlands support nationally (UK) important numbers of shoveler and black-tailed godwit (*Limosa limosa*). Other over -wintering species include gadwall, wigeon, shelduck, dunlin, redshank, whimbrel and curlew. During the summer Newport Wetlands supports an exceptional variety of breeding birds, including nationally (UK) important breeding populations of avocet (*Recurvirostra avosetta*), redshank, lapwing, water rail (*Rallus aquaticus*), Cetti's warbler (*Cettia cetti*) and bearded tit (*Panurus biarmicus*). In addition, breeding populations of ringed plover and little ringed plover (*Charadrius* dubius) also present. The aquatic invertebrate assemblage is diverse with nationally rare and scarce species are present, including the great silver water beetle (*Hydrophilus piceus*), the water beetle (*Hydaticus transversalis*) and the ornate brigadier soldierfly (*Odontomyia ornate*). The nationally scarce spider *Tetragnatha striata* has a strong population in the reedbeds and the nationally scarce shrill carder bee (*Bombus sylvarum*) is found throughout the Site. The watercourses are rich in plant species and communities, many of which are rare or absent in other levels systems. In the ditches themselves, submerged species such as curly pondweed (*Potamogeton crispus*), rigid hornwort (*Ceratophyllum demersum*) and, occasionally, stoneworts (*Chara* spp.) grow. Amongst the more notable species is hairlike pondweed which, in Wales, is almost entirely confined to the Gwent Levels area. There is a high diversity of floating plants, with all five British native duckweed species and frog-bit (*Hydrocharis morsus-ranae*) frequently abundant. Newport Wetlands is one of the few places on the Levels where nationally scarce least duckweed, is found at the north-western extent of its British range. Along the banks, fool's watercress (*Apium nodiflorum*), lesser water-parsnip (*Berula erecta*), tubular water dropwort (*Oenanthe fistulosa*) and water plantain (*Alisma plantago-aquatica*)	1.2 km south of the Site (hydrologically connected via the River Usk)

Site Name	Features	Distance from Proposed Development
	occur. The reedbeds at Newport Wetlands are the largest within the south-east Wales area. In wetter areas with standing water, the vegetation is almost entirely composed of common reed (*Phragmites australis*). However, in drier areas, it is joined by marsh bedstraw (*Galium palustre*), hemp agrimony (*Eupatorium cannabinum*) and great willowherb (*Epilobium hirsutum*). In addition, the Site has a number of other habitats that add to its overall wildlife value. These include hedgerows, scrub, woodland and grassland.	

B2: Non-statutory designated Sites within 2km of the Site boundary.

Site Name	Reason for designation[34]	Approximate Distance from the Site
Solutia SINC	A series of improved and semi-improved grasslands with traditional ditches and ponds, supporting a range of species including nesting birds such as Cetti's warbler and invertebrates including hairy dragonfly *Brachyton prantense.*	Immediately east of the Site
Alpha Steel SINC	Area of former levels, scrub, and other habitat such as support a range of species including scarce moth species, birds such as Cetti's warbler, plants including orchids *Epicactis* palustris, *Ophrys apifera, Anacamptis pyramidalis, Dactylorhiza spp.*	Immediately east of the Site
Marshall's SINC	Mosaic neutral grassland, post-industrial wetland along the banks of the River Usk.	150 m west of the Site
Julian's Gout Land SINC	Neutral grasslands – maritime influence semi-improved neutral grassland with willow car and large populations of marsh helleborine *Epicactis palustris*, marsh orchids and narrow leaved bird's foot trefoil *Louts glaber.*	635 m south east of the Site
Gwent Wetland Reserve SINC	Mosaic of wet grassland, reed beds, open water, hedgerows and saline lagoon, which supports internationally important numbers of wildfowl as well as UKBAP priority species such as water vole, great crested newt and brown hare *Lepus europaeus*.	1.2 km south of the Site
Monkey Island SINC	Mosaic post-industrial grassland, scrub and ruderal. Local record of blue pimpernel found on Site (the only record in Gwent)	1.6 km north east of the Site

B3: SEWBReC Desk Study Bird Records

Bird Species	Scientific Name	Status[35]
Black-tailed Godwit	*Limosa limosa*	Sch1
Cetti's Warbler	*Cettia cetti*	Sch1, S7
Fieldfare	*Turdus pilaris*	Sch1
Goldeneye	*Bucephala clangular*	Sch1
Green Sandpiper	*Tringa ochropus*	Sch1
Greenshank	*Tringa nebularia*	Sch1, S7

[34] Newport City Council (2013) Sites of Importance for Nature Conservation (SINC) Background paper, Revised Deposit Plan – Newport Local Development Plan 2011 – 2026.

[35] Sch1 = Designated under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended).
BDir1 = Birds listed on Annex I of the EC Birds Directive.
S7 = Birds listed on Section 7 of the Environment (Wales) Act 2016.

Bird Species	Scientific Name	Status[35]
Little Ringed Plover	*Charadrius dubius*	Sch1
Peregrine	*Falco peregrinus*	Sch1, BDir1, S7
Redwing	*Turdus iliacus*	Sch1, S7
Ruff	*Philomachus pugnax*	Sch1, BDir1, S7
Aquatic Warbler	*Acrocephalus paludicola*	S7, BDir1
Bar-tailed Godwit	*Limosa lapponica*	BDir1
Bittern	*Botaurus stellaris*	Sch1, BDir1, S7
Black-headed Gull	*Chroicocephalus ridibundus*	S7
Bullfinch	*Pyrrhula pyrrhula*	S7
Common Scooter	*Numenius arquata*	S7
Corn Bunting	*Emberiza calandra*	S7
Corncrake	*Crex crex*	Sch1, BDir1, S7
Cuckoo	*Cuculus canorus*	S7
Curlew	*Numenius arquata*	S7
Dunnock	*Prunella modularis*	S7
Golden Plover	*Pluvialis apricaria*	BDir1, S7
Grasshopper Warbler	*Locustella naevia*	S7
Hen Harrier	*Circus cyaneus*	Sch1, BDir1, S7
Herring Gull	*Larus argentatus*	S7
House Sparrow	*Passer domesticus*	S7
Kestrel	*Faclo tinnunculus*	Sch1, S7
Lapwing	*Vanellus vanellus*	S7
Lesser Redpoll	*Carduelis cabaret*	S7
Linnet	*Carduelis cannabina*	S7
Pied Flycatcher	*Ficedula hypoleuca*	S7
Reed Bunting	*Emberiza schoeniclus*	S7

Bird Species	Scientific Name	Status[35]
Ring Ouzel	*Turdus torquatus*	S7
Ringed Plover	*Chairadrius hiaticula*	S7
Skylark	*Alauda arvensis*	S7
Song Thrush	*Turdus philomelos*	S7
Spotted Flycatcher	*Muscicapa striata*	S7
Starling	*Sturnus vulgaris*	S7
Tree Pipit	*Anthus trivialis*	S7
Tree Sparrow	*Passer montanus*	S7
Willow Tit	*Poecile montanus*	S7
Wood Warbler	*Phylloscopus sibilatrix*	S7
Woodlark	*Lullula arborea*	Sch1, BDir1, S7
Yellow Wagtail	*Motacilla flava*	S7
Yellowhammer	*Emberiza citrinella*	S7

Appendix C

C1: Photographs

C1: Photographs of waterbodies

Photograph 1 Waterbody 5

Photograph 2 Waterbody 5

Photograph 3 Waterbody 6

Photograph 4 Waterbody 6

Photograph 5 Waterbody 7

Photograph 6 Waterbody 8

	
Photograph 7 Waterbody 10.	Photograph 8 Waterbody 12.
	
Photograph 9 Possible water vole feeding remains at Waterbody 11.	Photograph 10 Possible water vole feeding remains at Waterbody 11.
	
Photograph 11 possible water vole droppings at Waterbody 11.	Photograph 12 possible water vole droppings at Waterbody 11.

Photograph 13: Raft in-situ

Photograph 14: water logged vole type droppings

Photograph 15 water logged vole type droppings

Photograph 17: water logged vole type droppings