Natural Resources Wales

Stephenson Street Flood Defence Scheme

Ecological Appraisal Report

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1 Introduction

1.1 Background

Ove Arup and Partners Limited (Arup) has been commissioned by Natural Resources Wales (NRW) to undertake an Ecological Assessment 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.

The current flood defences include an existing 1,350 m long flood defence embankment located on the left (eastern) bank of the River Usk from Stephenson Street south past Coronation Park in Newport, between National Grid Reference (NGR): ST3191986152 and NGR ST 32873 85428. A site location plan is provided in Figure 1.

Stephenson Street flood defence embankment reduces tidal flood risk to much of the Lliswerry area of Newport. This includes significant industry, leisure and residential properties; assuming a breach was to occur today some 192 residential and 620 non-residential properties in Spytty have greater than a 1 in 200 risk of tidal flooding in any given year. Sea level rise due to climate change increases the predicted risk significantly to 1,117 residential and 1,016 non-residential properties. The predicted speed and depth of inundation is hazardous, extending some 2.5 km from the embankment.

In the embankment's current condition, it would be classified as a failing asset due to subsidence and structural failures; although, this asset is not recorded on the NRW register as its ownership is currently uncertain. The embankment crest level varies along its length, with known low spots originating from the original design, subsequent subsistence and landowner activity. NRW estimate the standard of protection provided is as low as a 1 in 30-year tidal event (3.33% chance of occurrence) at certain low spots. Near misses have occurred during recent high tides, including in January and March 2014, which corroborate NRW's estimate of the lowest standard of protection.

The 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 in 200 year tidal event with sea level rise).

1.2 Scheme Development

The original options appraisal was undertaken in 2016 as part of the Outline Business Case (OBC) that was approved in December 2018. A range of options to manage flood risk as required by the Severn Estuary Flood Risk Management Strategy were considered during the development of the OBC, including:

- Option A: Do Nothing - cease existing defence maintenance.

- Option B: Do Minimum – continue with existing defence maintenance to maintain current standard of protection.
- Option C: Enhance flood defence (standard NRW soil bund) – to achieve target flood defence levels.
- Option D: Enhance flood defence (concrete canvas lined bund) – to achieve target flood defence levels.
- Option E: Enhance flood defence (concrete wall options) – to achieve target flood defence levels.
- Option F: Enhance flood defence (sheet piles) – to achieve target flood defence levels.

Option C was adopted as the preferred option for the length of defences adjacent to Coronation Park and Option F was adopted as the preferred option for raising the existing bund to the south of Coronation Park. In addition, a series of options were considered for providing flood protection to the south of the proposed works at Corporation Road, including a combination of flood gates, flood walls and road raising to provide the necessary flood protection levels.

1.3 Post-Outline Business Case Design Development

Significant uncertainties have delayed the Proposed Development; however, there is now agreement between Newport City Council (NCC) and NRW as to their respective maintenance responsibilities (NCC's responsibilities extending throughout their landownership), and the M4 Corridor around Newport (M4CaN) project's cancellation has removed the complex design/delivery interface (the proposed works for the Usk Bridge clashed with the scheme proposals).

Since the M4CaN scheme was cancelled and in the absence of Welsh Government Compulsory Purchase arrangements, further engagement and design development has been undertaken with the businesses on Corporation Road, as well as the buried utility owners and NRW Operations. As a result, changes have been made to the original OBC design and the current preferred option is shown in Appendix A; details are available in the planning drawings. In addition, further updates were undertaken to the flood model which generally resulted in an increase in the design flood levels.

Further updates to the flood modelling were undertaken as well as a Flood Consequences Assessment (FCA - 274580-ARP-XX-XX-RP-XX-0001). These flood modelling works identified that in addition to the works at Stephenson Embankment and Corporation Road, additional areas of flood defence at the following locations were also required:

- Railway Wall; located at NGR: ST335850.
- North of the Transporter Bridge; located at NGR: ST319861, ST325865, ST326866.
- North of the Nash Wastewater Treatment Works; located at NGR: ST335842.

1.4 Proposed Works

An overview of the detailed design of the current scheme proposals is shown in Appendix A; details are available in the planning drawings. This includes cross reference to other relevant drawings (where available) and the proposed defence levels for the various sections of flood defences. In summary the proposed flood defences comprise:

- Orb Works Riverbank Minor Ground Raising – south of Kingfisher Walk and adjacent to Orb Electrical Steels. Localised ground raising at two locations to tie into existing Jetty Structure Wall and ground levels with 1:2 slope and 100mm of seeded topsoil. Located c. 6m and c. 30m southeast of the River Usk SAC boundary respectively and within the footprint of the existing flood defence structure. Drawing Ref.: 2001.
- Stephenson Street River Bank Minor Ground Raising – land abutting the eastbound carriageway of Stephenson Street, immediately adjacent to the Newport Transporter Bridge. Localised ground raising of existing river bank adjacent to Transporter Bridge to tie into existing verge and bank with 100mm seeded topsoil and 1:2 slope. Located within the River Usk SAC boundary but within the footprint of the existing flood defence structure. Drawing Ref.: 2002.
- Stephenson Street Flood Embankment and Upgrade to Wales Coast Path (WCP) – Western boundary of Coronation Park. Upgrading to the existing Stephenson Street flood embankment along the eastern boundary of Coronation Park. Works would include the raising and widening of the existing embankment with associated enhancement landscaping and WCP enhancements. Enhancements to the existing WCP would include the stepped and seating areas with associated landscaping along the embankment crest with variable crest widths and slope planting. Located partly within the River Usk SAC boundary but within the footprint of the existing flood defence structure. Drawing Ref.: 2003, 2004, 2005.
- Access Ramp: formalised gated emergency / maintenance access from Stephenson Street adjacent to the Transporter Bridge. Existing access will be upgraded to include a formal access for emergency services and maintenance activities (removal of debris from SAC habitat). Localised to c. 100m2 area of degraded grassland. Drawing Ref.: 2003.
- Coronation Park Landscaping and Planting – Coronation Park, south of Stephenson Street. Comprehensive enhancement and mitigation planting throughout Coronation Park inclusive of benches, bins and concrete step areas. Inclusion of heritage and ecological interpretation boards to Stephenson Street embankment with grassland and ornamental shrub planting to the southern boundary, inclusive of 3no. urban forests. Located outside the River Usk SAC boundary within Coronation Park. Drawing Ref.: 2003.
- Sheet Pile Wall and Embankment with upgraded WCP, including improved new metal stepped access spanning the Hanson Conveyor Belt – River Usk riverbank and WCP PRoW. Construction of sheet pile wall with Corten steel copings and resurfacing/edging details to the WCP. Upgrading of the existing

WCP would include a variable width crest, enhancement planting, seating and observation areas. Replacement of the stepped metal access spanning the Hanson Conveyor will improve accessibility. Located partly within the River Usk SAC boundary but within the footprint of the existing flood defence structure. Minor encroachment required to install stanchions for the upgraded metal stepped access. Drawing Ref.: 3000, 3001, 3004.

- Reinforced Concrete Flood Wall at Felnex Industrial Estate – Land comprising the lateral edges of East Bank. Road, new proposed flood relief road and Hanson Conveyor crossing the Felnex Industrial Estate. Construction of a reinforced concrete flood wall adjacent to the Hanson Conveyor, extending to the site of the proposed T-junction access of East Bank Road. A secondary (larger) wall would extend from the proposed junction along the flood relief road and East Bank Road. Located c. 5m northeast of the River Usk SAC boundary behind the footprint of the existing flood defence structure. Drawing Ref.: 4000, 4001, 4002.
- Flood Relief Road – Land comprising the Felnex Industrial Estate, Hanson Aggregates and Marshalls sites connecting East Bank Road to the north and Corporation Road to the south. Construction of a 0.7km single carriageway flood relief road connecting from East Bank Road adjacent to KDK Metals Industrial Unit to Corporation Road adjacent to Marshalls estate. Ramped access and T-Junction access to be provided for ingress and egress at East Bank Road with pedestrian footways. Located c. 5m northeast of the River Usk SAC boundary behind the footprint of the existing flood defence structure. Drawing Ref.: 274580-ARP-XX-XX-DR-CX-1120, -1121.
- Wales Coastal Path Resurfacing – Land situated to the west of Hanson Aggregates and East Bank Road, incorporating the WCP PRoW on the eastern bank of the River Usk. Resurfacing of Wales Coast Path with compacted Hoggin and Concrete edgings. Works would include a metal stepped access to improve accessibility of the WCP at the existing Hanson Conveyor site. Surface water drainage for flood relief road via swales to outfall into SAC boundary. Located partly within the River Usk SAC boundary but within the footprint of the existing flood defence structure. Minor encroachment required to install small headwall and outfall within the existing embankment. Drawing Ref.: 4003.
- Corporation Road Flood Gate and Walls – Railway overbridge at Corporation Road, south of WCP. Construction of two reinforced flood walls adjacent to the Corporation Road railway overbridge and installation of sliding highway flood gate which would run flush to the existing railway embankment. Located c. 330m northeast of the River Usk SAC boundary behind the Eastern Docks. Drawing Ref.: 4004 and 4005.
- Railway Flood Wall and Access Track – land comprising the existing WCP to the northeast of the existing railway line and land immediately adjacent to the embankment slope. Construction of a reinforced concrete flood wall adjacent to the existing railway embankment with non-return tidal flap valve at the base. Temporary resurfacing and widening of the WCP to be reinstated upon completion of the flood wall ‘Type A’ and extension of the track ‘Type B’ surfacing to remain in perpetuity. Located c. 400m east of the River Usk SAC

boundary behind the footprint of the existing flood defence structure. Drawing Ref.: 5000, 5001, 5002.

- Marshalls Railway Embankment Culvert with access and maintenance hardstanding – Railway embankment situated to the northern boundary of Marshalls. Installation of reinforced concrete culvert chamber with non-return duckbill tidal valve. Provision of 15m² concrete hardstanding to the west of the culvert of maintenance and access with reinstated fence line. Located c. 280m north of the River Usk SAC boundary behind the footprint of the existing flood defence structure. Drawing Ref.: 7000.
- Liberty Steel Railway Embankment Culvert – Railway embankment situated to the north eastern boundary of Liberty Steel Installation of reinforced concrete culvert chamber with a non-return duckbill return valve. Additional provision of a gravel (type B) access and construction tracks at railway embankment. Located c. 360m north of the River Usk SAC boundary behind the footprint of the existing flood defence structure. Drawing Ref.: 7001.
- Nash Flood Wall and Access Track – Nash Sewerage Treatment Works. Construction of a reinforced concrete flood wall to the north of the existing Nash site with raised permanent access track (subject to landowner agreement). Located c. 150m east of the River Usk SAC boundary (Julian's Gout outfall) behind the footprint of the existing flood defence structure. Drawing Ref.: 6000, 6001.

Amenity, biodiversity and landscape enhancements are detailed in the Planning Drawings within the Pre-Application Consultation pack and describe the proposed enhancements the project will deliver, focussing around Coronation Park. Upgraded access will be provided, at the entrances to Coronation Park, along the new bund section and within Coronation Park itself to provide better connection between the riverside walk and the sports pitches and creating a circular walking route. Viewing platforms will be integrated into the soil bund section to allow for resting areas and provide a connection with the riverside habitats. One viewing platform will encroach into the SAC beyond the defence footprint; construction will be undertaken from the bund (dry side), no temporary access track is required, and a no-dig construction will be employed during installation. Additional planting will be provided within the park and wildflower planting on the inland embankment to increase local biodiversity without compromising integrity of the flood defence. Further biodiversity enhancements will be delivered by the project, including: provision of higher value habitat (three urban forests, reedbed habitat and wildflower planting), restriction of access to SAC / SSSI habitats, provision of bins to reduce litter / dog waste and planting of c. 90 high value standard trees and c. 1,600 saplings.

The total length of the flood defence improvement works proposed, as described above, is approximately 1,600m. The proposed works cover an area of circa 9.6 hectares.

The timescale for the Proposed Development is currently uncertain, given investment programme pressures. However, if funding can be secured and consents obtained, the earliest construction start date is Autumn 2021.

1.5 Design Development

The Detailed Design has been developed to avoid any encroachment into the River Usk SAC and River Usk (Lower Usk) SSSI. The footprint of the earth bund extends into Coronation Park to avoid any encroachment into the SAC.

Early design development adopted a sheet pile wall solution for the constrained sections of the Stephenson Embankment to avoid extensive excavation along the length of the existing bund and likely encroachment. A hydraulic piling technique, including a clamp crane (see Diagram 1 below) that precludes the need for a construction access track at the toe of the embankment, has been specified for sheet pile installation due to Stephenson Embankment being located within the River Usk SAC and River Usk (Lower Usk) SSSI. Specification of this sensitive technique avoids the need for a temporary access track at the riverside toe of the embankment and avoids encroachment into Marshall's SINC on the dry side of the embankment. This technique is also known as 'silent piling' due to its hydraulic nature and therefore also avoids percussive or vibratory techniques that may lead to disturbance.

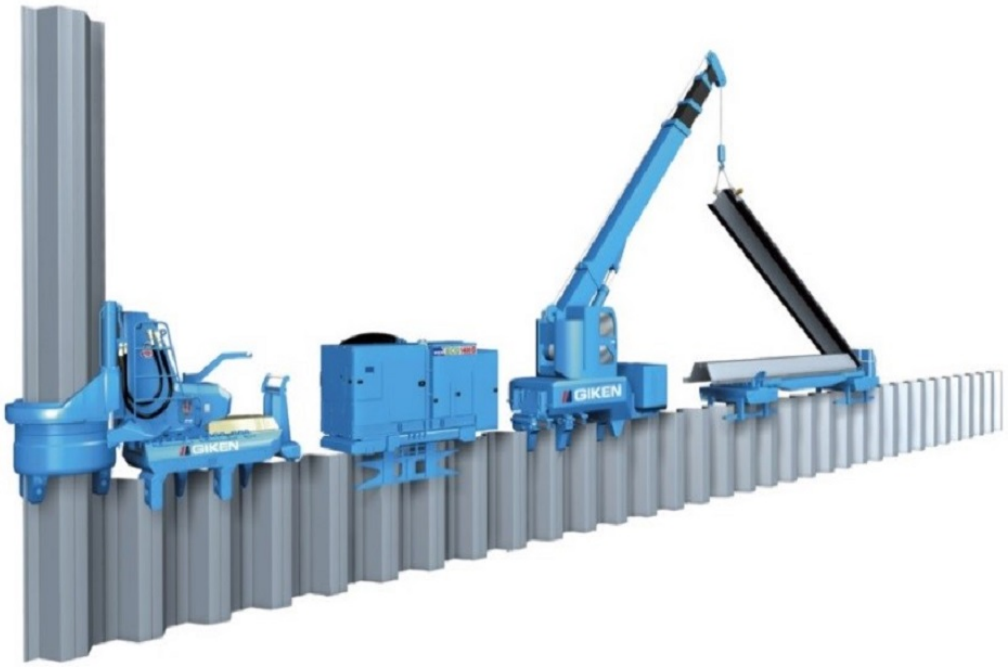

Diagram 1: Hydraulic Piling Rig and Service Crane

This technique further supports NRW Fisheries Team advice [01/03/2019] to avoid potential effects on vibration-sensitive species associated with the River Usk SAC and the Severn Estuary European Marine Site; the advice received was as follows: River Usk standard condition wording: '*Any piling within 30 metres of the river bank (mean high tide level) should be timed to avoid the shad migration period (March to June inclusive). Where piling cannot be avoided during the shad migration period (March and June inclusive) AND is within 30 metres of the mean high tide level, non-percussive piling methods should be used and must only take place on a falling tide from 1 hour after high tide to 1 hour before low tide. If you cannot meet the above criteria you will need to contact Natural Resources Wales*

to discuss your application further. Where piling is required, we support piling methods such as driven, auger or vibro piling with soft start. If piling was subsequently found to be needed within 30m of MHWS, then the position would revert to the Standard condition above.

All avoidance measures will need to be set out in the Appropriate Assessment. This includes any potential working distance separation such as that described above. Avoiding percussive piling would also potentially reduce impacts on other flora, fauna and human receptors. It would also have potentially a smaller footprint of temporary works affecting the SAC foreshore habitats (designated within the SAC boundary but not a feature, it is a feature of the SSSI) so this would be an aim if feasible. However, it is recognised that there may be situations where it is unavoidable, such as if the piles hit bedrock. Therefore, the project team advise that the restriction on piling would best be advisory rather than conditioned.' As Stephenson Street piling will be further than 30m from MHWS, this advisory text will be adhered to and incorporated into the Environmental Action Plan for the Project.

In accordance with their advice, no piling will be undertaken within 30m of the river, therefore ensuring that vibration from piling will not affect migratory fish, which are a qualifying feature of the SAC and SSSI; in particular, shad species, which are more sensitive to vibrations. This best practice has also been implemented on other recent NRW flood alleviation schemes elsewhere along the River Usk.

Amenity, biodiversity and landscape enhancements are detailed in the Planning Drawings within the Pre-Application Consultation pack, which provide a vision for the site. This sets out how the scheme will deliver its main objectives of flood defence and minimise impacts on landscape and biodiversity, in addition to providing better access and opportunities to link the scheme with the local heritage, landscape and biodiversity. The vision includes enhancements of the landscape and biodiversity, and as such aims to meet UN Sustainable Development Goals, and objectives of the Well-being of Future Generations (Wales) Act 2015 and the Environment (Wales) Act 2016. In particular, the landscape vision, sets out improvements including access to Coronation Park from the Wales Coast Path, amenity and educational provisions along the coast path such as seating and interpretation boards. Biodiversity enhancements will include the establishment of species-rich grasslands on the eastern (dry) side of the embankment and planting of native trees and shrubs to bolster connectivity.

1.6 Consultation

NRW have previously issued three EIA Screening Opinion Requests to Newport City Council on previous iterations of the proposed scheme; as follows:

- NRW requested formal pre-application advice from Newport City Council during preparation of the Outline Business Case to inform anticipated risks.
- One EIA Screening Opinion request dated 18th February 2016 comprising the Outline Business Case design and receipt of EIA Screening Opinion NCC Ref. 16/0171 dated 18th March 2016 stating non-EIA Development.

- A second EIA Screening Opinion request dated 5th June 2018 [NCC Ref. 18/0532] to reconfirm validity of the 2016 EIA Screening Opinion that reconfirmed the original non-EIA Development status of the Project.
- A third EIA screening request was submitted dated 19th March 2020: outlining the revised scope of the preferred option, environmental baseline and key receptors, and initial consideration of likely significant effects. An EIA Screening Opinion was received from Newport City Council on 22nd May 2020 [NCC Ref. 20/0305] confirming that the project was not EIA Development and that an Environmental Statement would not be required.
- A response from the Newport County Council Ecologist was received on the 16th April 2020 (provided in Appendix B), and raised the following concerns (which have been addressed in Section 5: Assessment and Mitigation of this report):
    - *Direct habitat loss is expected to be reinstated after development; it is not clear whether this will be restored or naturally regenerate;*
    - *Sensitive working methods will be required in the Construction Environmental Management Plan (CEMP) to avoid potential risks to the protected and priority species; and*
    - *Compensation for loss of nesting habitat should be considered to ensure there is no net loss for biodiversity.*

There has been ongoing consultation with the NRW: Newport, Caerphilly and Blaenau Gwent Environmental Team throughout project development. This has included consultation in relation to potential effects on protected species and protected sites. In particular, discussions were had regarding potential effects of the scheme on the River Usk Special Area of Conservation (SAC) and River Usk (Lower Usk) Site of Special Scientific Interest (SSSI), during a meeting held on the 14th March 2019 and on the 27th May 2020, to specifically discuss the detailed design.

An Environmental Constraints and Opportunities Report (ECOR): Part A (Baseline and Preliminary Assessment) was issued for wider stakeholder consultation on the 23rd July 2020. Responses from the consultation have been taken into account in finalising the project documents.

1.7 The Site

The Project Site is located in an industrial area east of the River Usk within Newport, South Wales. A coastal embankment runs through the site. There is a public footpath, along the northern extent of the embankment, north of the Newport Orb Steelworks, and along the southern extent, south of Corporation Road towards the Marshalls site (at which point the path heads inland). The embankment is lined with a mosaic of scrub and grassland. To the west of the embankment is saltmarsh and intertidal mud of the River Usk. To the east of the embankment are industrial habitats associated with the Newport Orb Steelworks, Liberty Steelworks, and the Marshalls Brickworks Site, which occur in a mosaic with scrub, woodland, and standing water habitats. Further inland, a railway line, lined by scrub and woodland, runs through the southern part of the site, from the

Liberty Steelworks and into the Usk Power Station. Nash Wastewater Treatment Works is also present to the east of the railway line, in the southern part of the site.

1.8 Objectives

The objective of the work included the following:

- To establish baseline ecological conditions on Site and within the immediate vicinity, including its potential to support important habitats and notable / protected species;
- To identify key ecological constraints to the proposed works;
- To set out the mitigation measures required to ensure compliance with nature conservation legislation and to address any potentially significant ecological effects;
- To identify how mitigation measures will / could be secured;
- To provide an assessment of the significance of any residual effects;
- To identify appropriate enhancement measures; and
- To set out the requirements for post-construction monitoring.

1.9 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. The Invasive Alien Species (Enforcement and Permitting) Order 2019;
v. Salmon and Freshwater Fisheries Act 1975 (as amended);
vi. Eels (England and Wales) Regulations 2009;
vii. Wild Mammals (Protection) Act 1996;
viii. Environment (Wales) Act 2016 including Section 7 biodiversity lists;
ix. The Well-being of Future Generations (Wales) Act 2015;
x. The Countryside and Rights of Way Act 2000;
xi. The Hedgerow Regulations 1997; and

xii. Protection of Badgers Act 1992.

This legislation includes 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 C.

1.10 Supporting Assessments

A number of ecological baseline reports contributed to this Ecological Appraisal Report; as follows:

- 274581-ARP-XX-XX-RP-EN-0010 Stephenson Embankment Preliminary Ecological Appraisal (PEA).
- 274582-ARP-XX-XX-RP-EN-0011 North of Transporter Bridge PEA.
- 274583-ARP-XX-XX-RP-EN-0012 Felnex_Marshalls Estates PEA.
- 274584-ARP-XX-XX-RP-EN-0013 Corporation Road_Railway Wall PEA.
- 274585-ARP-XX-XX-RP-EN-0014 Nash Wall and Access PEA.
- 274586-ARP-XX-XX-RP-EN-0015 Railway Wall Access PEA.
- 274587-ARP-XX-XX-RP-EN-0016 Stephenson Embankment National Vegetation Classification (NVC) Report.
- 274588-ARP-XX-XX-RP-EN-0017 North of Transporter Bridge NVC.

2 Methodology

2.1 Desk Study

A desk study was carried out to identify statutory internationally designated sites (European Sites) within 5km and nationally designated sites within 2km of the Site centre point. Online searches were carried out using the Multi Agency Geographic Information for the Countryside (MAGIC)[1], Natural Resources Wales website[2] and the Joint Nature Conservation Committee (JNCC) website[3].

A biodiversity records data request was provided by South East Wales Biodiversity Records Centre (SEWBReC)[4] on 22nd January 2019 to inform the Phase 2 works.

The records included protected and priority species[5] up to 2km from the Proposed Works and included details of local designations such as Sites of Importance for Nature Conservation (SINCs) within 2km.

The MAGIC website was also used to search for the presence of waterbodies within 500m of the site in order to establish whether habitat within and surrounding the site could be used by great crested newts (*Triturus cristatus)* (GCN), a European protected species. This species can use habitat within 500m, or more typically within 250m, of a breeding pond[6].

A review was also undertaken of the Environmental Statement for the proposed M4 Corridor around Newport (M4CaN) and associated ecological reports.

2.1.1 Ecological Zone of Influence

The Ecological Zone of Influence (EZoI) is assessed as the area in which it is considered possible that the proposed works could impact ecological receptors such as valuable habitat or protected species. The EZoI determines the area for which desk study data is obtained, the Survey Area for the Site and the area for which potential effects are assessed.

2.2 Extended Phase 1 Habitat Survey

Extended Phase 1 Habitat Surveys were undertaken of different areas within the Survey Area on the following dates:

[1] http://magic.defra.gov.uk/ (accessed 15/02/19).
[2] https://naturalresources.wales/conservation-biodiversity-and-wildlife/find-protected-areas-of-land-and-seas/designated-Sites-search/?lang=en (accessed 15/02/19).
[3] http://jncc.defra.gov.uk (accessed 15/02/19).
[4] http://www.sewbrec.org.uk/home.page (accessed 15/02/19).
[5] 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).
[6] Natural England (2004). An assessment of the efficiency of capture techniques and the value of different habitats for the great crested newt (ENRR576).

- Stephenson Street Embankment – Initially surveyed by JBA Consulting in 2015, then by Arup: Stephenson Street to Bird Port from the 13th March 2018 including subsequent species-specific surveys until October 2018;
- Railway Wall - an area east of Bird Port on the 24th January 2019;
- North of Transporter Bridge - an area north of the transporter bridge on the 4th April and 17th May 2019;
- Nash Wall - an area in the vicinity of Nash Wastewater Treatment Works and Usk Power Station on the 18th and 27th June, and 18th July 2019.
- Felnex Estate (known as Option 2b areas) - a number of smaller areas within the Felnex Estate were also surveyed on the 17th January 2020;
- Railway Wall Construction Access - areas proposed for construction access on the 17th September 2020.

The aims of the Extended Phase 1 Habitat survey, undertaken in accordance with best practice guidance[7], were to identify the habitats present and protected species the habitat may support, and thus any ecological constraints or features of ecological interest within the Site that may be affected based on the scope of the works.

The surveys were led by Arup ecologists Pete Wells (CEnv MCIEEM), Claire Pooley (CEcol, MCIEEM) and Kathryn Jones (ACIEEM).

All accessible areas of the site plus 50m of adjacent land were walked where accessible and relevant habitat types classified according to their vegetation types and presented in the standard Extended Phase 1 survey format. Predominant flora species within each habitat were also recorded and Target Notes (TNs) were used to highlight any features or habitats of interest.

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 C), 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 using survey methods based on those outlined in the Bat Conservation Trust's Bat Surveys: Good Practice Guidelines[8].

- Assessing the potential of terrestrial and aquatic habitats to support amphibians, both protected species and species of conservation concern. A Habitat Suitability Index (HSI)[9] was assigned to all permanent waterbodies to assess their potential to support GCN.

[7] Joint Nature Conservation Council (2010) Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit (ISBN 0 86139 636 7).
[8] Collins, J. (2016). Bat Surveys: Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn.). The Bat Conservation Trust, London.
[9] Odiham et al (2000) in ARG UK Advice Note 5: Great Crested Newt Habitat Suitability Index

- 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[10].
- Assessing the suitability of habitats for nesting birds (including any old nests);
- Assessing the suitability of habitats for common species of reptiles; adder, (*Vipera beres)*, grass snake (*Natrix natrix),* slow worm (A*nguis 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*)[11], otter *(Lutra lutra*)[12] and white-clawed crayfish *(Austropotamobius pallipes)*[13] based on published guidance for each species.
- Assessing the suitability of habitats for dormice (*Muscardinus avellalanrius*)[14].
- Assessing the suitability of habitats for notable invertebrates.
- Evidence of the presence of Invasive Non-Native Species (INNS) 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*).

Further survey details including weather conditions and target notes are detailed in the supporting Preliminary Ecological Appraisal (PEA) reports for each survey area: Stephenson Embankment[15], Railway Wall addendum[16], Transporter Bridge addendum[17], Nash addendum[18], and Phase 2b addendum[19].

2.3 Species-Specific Surveys

Following the Phase 1 habitat survey, the following species-specific surveys for protected species considered likely to be present were undertaken as detailed in sections 2.3.1 – 2.3.4 below.

[10] Harris, S., Cresswell, P. and Jefferies, D., 1989. Surveying Badgers. Mammal Society.
[11] Strachan, R. and Moorhouse, T., 2006. Water Vole Conservation Handbook, 2nd Edition.
[12] Chanin, P., 2003. Monitoring the Otter, *Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10., English Nature, Peterborough.
[13]Peay, Stephanie. (2002), Guidance on Habitat for White-clawed Crayfish and its restoration. Environment Agency.
[14] Bright. Paul, Morris. P, Mitchell Jones, T. (2006 updated) The Dormouse Conservation Handbook 2nd ed. English Nature.
[15] Arup (October 2018) Stephenson Street Embankment Ecological Appraisal.
[16] Arup (March 2020) Stephenson Street Embankment: Preliminary Ecological Appraisal Addendum (Railway Wall) V2.
[17] Arup (September 2019) Stephenson Street embankment: Preliminary Ecological Appraisal Addendum (Transporter bridge).
[18] Arup (September 2019) Stephenson Street Embankment: Preliminary Ecological Appraisal addendum (Nash).
[19] Arup (February 2020) Stephenson Street Embankment: Preliminary Ecological Appraisal addendum (2b).

2.3.1 Great Crested Newts

2.3.1.1 Biosecurity Measures

The following measures were employed during GCN surveys to avoid the spread of amphibian diseases including chytridiomycosis and ranavirus, in accordance with best practice[20] 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.

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 disposed of appropriately.

2.3.1.2 Habitat Suitability Index (HSI) Survey

A search was made for waterbodies with potential to support GCN within 250m of the Site based on Ordnance Survey mapping and during the various Extended Phase 1 Surveys between March 2018 and September 2020. These were assessed for breeding habitat suitability using the standard HSI[21] methodology by competent and qualified Arup ecologists. The HSI is a numerical index which ranges from 0 to 1. It is calculated using ten key habitat criteria and is based on the assumption that the habitat quality determines GCN presence/absence. Using this standard approach, waterbodies with high scores are more likely to support breeding GCN 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 GCN or that any waterbody with a low score will not. The waterbodies and drains subject to HSI are shown in Appendices E1, E8, E9 and E10.

Table 1 - Habitat Suitability Indices for GCN.

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

[20] Amphibian and Reptile Group UK (2017). UK Advice Note 4.
[21] Amphibian and Reptile Groups of the UK (2010) (ARG UK Advice Note 5, Great crested newt Habitat Suitability Index.

HSI	Pond Suitability	Predicted Occupancy
>0.8	Excellent	0.93

Waterbodies with scores over 0.6 are generally considered for further presence/absence surveys, whilst likely absence is considered for HSI scores ≤0.6.

Further survey details including weather conditions and survey limitations are detailed in the separate reports[15, 16, 18].

2.3.1.3 Environmental DNA (eDNA) sampling

Despite low HSI scores on a number of waterbodies, NRW Species Team requested that Environmental DNA (eDNA) surveys were carried out on suitable waterbodies, following best practice methodologies[22], and within the optimum timeframe.

Within the area of the Stephenson Embankment, four waterbodies and two associated drains were surveyed (as shown in Appendix E1). Samples taken from waterbodies 1, 2, 3 and two drains on the 18th April 2018 and from Waterbody 4 on the 10th May 2018. Samples were sent to FERA[23] for analysis.

Within the area of the Nash Wastewater Treatment works, further eDNA surveys were carried out on four waterbodies (as shown in Appendix E10) on the 27th June 2019. Samples were sent to NatureMetrics[24] for analysis.

Surveys were led by Claire Pooley (NRW Licence no. 78081:OTH:SA:2018) and Debbie Brown (NRW Licence no. 75436:OTH:SA:2017).

Further survey details including weather conditions and survey limitations are detailed in the separate reports[15, 18].

2.3.1.4 Presence / Absence Surveys

GCN presence / absence surveys were undertaken in accordance with best practice guidance[25], and included waterbodies which tested positive for GCN eDNA, and connecting waterbodies. In addition, seven waterbodies in the area of the Railway Wall were also subject to presence / absence surveys.

Four surveys were conducted between mid-March and mid-June, with at least two surveys undertaken between mid-March and mid-May. The following survey methods were employed:

[22] https://naturalresources.wales/media/3509/guidance-on-use-of-dna-sampling-of-great-crested-newts.pdf
[23] FERA webSite accessed 17/08/18: https://www.fera.co.uk/environmental-science/environmental-dna
[24] https://www.naturemetrics.co.uk/
[25] English Nature (2001) Great crested newt mitigation guidelines

- 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 GCN.
- Bottle-trapping: bottle traps made using 2-litre plastic bottles 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 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 GCN 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 GCN 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 GCN were searched.

Waterbodies 5-12 (within the Railway Wall area) were subject to presence / absence surveys, in addition to 3 and 4 (within the Stephenson Embankment area). These waterbodies are shown in Appendix E9. Table 2 below, details the number of bottle traps used for each waterbody during each survey.

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 GCN. 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 were subject to presence / absence surveys, in addition to 3 and 4. These waterbodies are shown in Appendix E8 and E9. 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	-

Waterbody/Date	28th/29th March	3rd/4th April	17th/18th April	24th/25th April	30th April/1st May	16th/17th May
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.

2.3.1.5 Population Assessment

In order to undertake a population size class assessment, a total of six presence / absence surveys needs to be undertaken. A further two presence / absence surveys were undertaken on Waterbody 4 (where previous eDNA samples had tested positive; see Stephenson Street Embankment PEA (Ref.: 274581-ARP-XX-XX-RP-EN-0010) and Nash Wall PEA (Ref.: 274585-ARP-XX-XX-RP-EN-0014) for details on eDNA surveys), and Waterbody 3 which was immediately adjacent to Waterbody 4, and benefited from good habitat connectivity. In accordance with best practice survey guidance**Error! Bookmark not defined.**, the additional surveys were undertaken between the end of May and mid-June, therefore meeting the criteria of at least three of the survey visits being during mid-April to mid-May.

All of the survey visits were led by Arup ecologist Claire Pooley (CEcol, MCIEEM); who holds a personal GCN survey licence for work in Wales (NRW: S087588/1) and has over eight years' experience of undertaking GCN surveys, completing impact assessments and designing GCN mitigation. Other Arup ecologists and ecologists from Wildwood Ecology Ltd. (all MCIEEM) also assisted with these surveys under direct supervision of the licensed surveyor.

Further survey details including weather conditions and survey limitations are detailed in a separate report[16].

2.3.2 Reptile Survey

Following the habitat assessment for reptiles as part of the Extended Phase 1 Habitat Survey, presence / absence surveys were undertaken in accordance with accepted reptile survey guidelines[26]. Sixty-two artificial refugia made from roofing felt of approximately 50cm x 50cm were placed in areas of suitable habitat along the embankment on the 17th April 2018. The extent of the reptile survey was from the approximate grid reference ST31928610 to the approximate

[26] Froglife Advice Sheet 10 (1999) Reptile survey, an Introduction to planning, conducting and interpreting surveys for snake and lizard conservation.

grid reference ST32298567. The reptile mats were checked seven times between the 10th of May and the 19th of July 2018 in suitable weather conditions (see Appendix F).

The surveys were led by Arup ecologist Claire Pooley (CEcol, MCIEEM), an experienced ecologist familiar with undertaking reptile surveys.

Further survey details including weather conditions and survey limitations are detailed in a separate report[15].

2.3.3 Riparian Mammal Survey

2.3.3.1 Habitat Suitability Assessment and Presence / Absence Surveys

A riparian mammal survey specifically for otter and water vole was undertaken in the area of Stephenson Embankment where access allowed during the Extended Phase 1 Survey on 13th March 2018. This included waterbodies (1-4, shown in Appendix E1) and bank of the river, as well as suitable terrestrial habitat.

Further riparian mammal surveys were undertaken of waterbodies (5-12) within the Railway Wall area (as shown in Appendix E6) on the 17th and 18th July 2019 and five waterbodies in the area at Nash Wastewater Treatment Works and Usk Power Station (as shown in Appendix E7), and their connecting terrestrial habitat on the 28th June 2019.

A walkover survey was also undertaken of Waterbody 11 (within the Railway Wall area) on 17th January 2020, when vegetation had died back, to more closely examine the banks, and connecting ditch, for the presence of any water vole burrows or other signs.

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

Surveys comprised an assessment of habitat suitability of waterbodies for otter and water vole in accordance with criteria in detailed in Table 3 below, and a presence / absence survey for otter and water vole (of waterbodies and connecting terrestrial habitats). Presence / absence surveys for otter included a search for field signs such as 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.

Table 3: Habitat Suitability Criteria for Otter.

Habitat Suitability	Shelter Requirements	Food Supply	Modification & Disturbance	Hydrology	Pollutants
High	Many suitable habitat features	Suspected presence of abundant prey;	Minor man-made modification of watercourse	Watercourse with fast to moderate flow velocity and	'Good' or above chemical or biological water quality.

Habitat Suitability	Shelter Requirements	Food Supply	Modification & Disturbance	Hydrology	Pollutants
	adjacent to watercourse.	particularly fish species.	habitat and disturbance from the public e.g. dog walking.	more than 1 m deep.	
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.

Table 4: Habitat Suitability Criteria for Water Vole.

Habitat Suitability	Description
High	Typical high-quality water vole habitat is a slow-flowing watercourse, less than 3m wide and 1m 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

Habitat Suitability	Description
	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.

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.

Presence / absence surveys for water vole included a search for faeces and latrines, feeding stations, burrows and footprints. Where possible a thorough search (every 1m) of the bankside vegetation was performed at each waterbody. Where presence had been determined, field signs were recorded every 5m where the bankside vegetation made the channel inaccessible to reduce damage to bankside vegetation.

The surveys were led by Arup ecologist Claire Pooley (CEcol, MCIEEM), or Dyfrig Jones (TerraAqua Ltd); experienced ecologists familiar with the ecology and field signs of otter and water vole.

Further survey details including weather conditions and survey limitations are detailed in the separate reports[15][16][18].

2.3.3.2 Raft and Camera Monitoring

Two infra-red cameras were set up in suitable habitat at the southern end of Waterbody 1 (in the area of Stephenson Embankment, the location of the waterbody is shown in Appendix E1), approximate Ordnance Survey Grid Reference ST32068585 and ST32058787 (as detailed in the separate report[16]), on 27th March 2018 and left on Site to record otter and or water vole activity. Memory cards were checked and replaced on the 18th April 2018 and 15th May 2018 and the cameras collected on the 19th July 2018.

To provide further evidence of water vole presence at the site (further to likely water vole droppings and feedings signs being found), 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 location of Waterbody 11 is shown in Appendix E6 and the three monitoring locations are shown in the separate report[16]). Each raft comprised of a 60cm x 30cm piece of cavity wall insulation. The rafts were sited at the edge of

the waterbody, within reedbed, in shallow water. Two cameras (Bushnell trail camera) were also installed, approximately 1m, facing the raft and waterbody. 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.

Further survey details including weather conditions are detailed in the separate report[17].

2.3.4 Phase 2 Botanical Survey

A National Vegetation Classification Survey (NVC) was undertaken by Dr Peter Sturgess of Sturgess Ecology of riverside habitats within the River Usk SSSI and SAC boundary along the Stephenson Street Embankment on the 15th August 2018 and at the locations of proposed ground raising north of the Transporter Bridge on 15th August 2019; at optimal times for botanical survey.

Survey methodology, weather conditions etc. are detailed within separate reports[27, 28]; refer to Ecology Baseline Reports: NVC Stephenson Street Embankment and North of Transport Bridge (Ref.: 274582-ARP-XX-XX-RP-EN-0011).

2.4 Assessment Methodology

2.4.1 Nature Conservation Value

The Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK [29] form the basis of assessment undertaken. This is the standard methodology to ascertain potential effects on ecological features. The guidelines recommend that the nature conservation value or potential value of an ecological feature is determined within the following geographic context:

- International;
- National i.e. Wales;

[27] P. Sturgess (2018) Stephenson Street Embankment, Newport: Vegetation Survey. Ove Arup and Partners.
[28] P. Sturgess (2019) Stephenson Street Embankment, Newport: Vegetation Survey. Ove Arup and Partners
[29] CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial Freshwater and Coastal, 2nd Edition. Chartered of ecology and Environmental Management, Winchester.

- Regional i.e. South Wales;
- County (Newport);
- Local (i.e. within circa 5 km);
- Less than Local (i.e. within the Site);
- Negligible (i.e. hard standing).

2.4.2 Ecological Assessment

In accordance with CIEEM guidelines[17] when describing potential effects, reference is made to the following:

- Magnitude – i.e. the size of an effect in quantitative terms where possible;
- Extent – i.e. the area over which an effect occurs;
- Duration – i.e. the time for which an effect is expected to last;
- Reversibility – i.e. a permanent effect is one that is irreversible within a reasonable timescale or for which there is no chance of action being taken to reverse it. A temporary effect is one from which spontaneous recovery is possible;
- Timing and frequency – i.e. whether effects occur during critical life stages or seasons and how often effects occur;
- Direct or indirect – i.e. direct ecological effects are changes that are directly attributable to a defined action, e.g. the physical loss of habitat occupied but a species during the construction process. Indirect ecological effects are attributable to an action, but which affect ecological resource through effects on an intermediary ecosystem, process or receptor.

In accordance with the CIEEM guidelines, a significant effect, in ecological terms, is defined as 'an impact (negative or positive) on the integrity[30] of a defined Site or ecosystem and/or the conservation status'[31].

[30] Integrity is the coherence of ecological structure and function, across a Sites whole area that enables it to sustain a habitat, complex of habitats and/ or the levels of populations of species.
[31] Conservation status for habitats is determined by the sum of the influences acting on the habitat and its typical species that may affect is long-term natural distribution, structure, functions as well as the long-term survival of its typical species within the territory.

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 5km and 2km 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 2. Further details of each designation citation are provided in Appendix D1.

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

Site Name	Approximate Distance from the Site
Internationally Designated Sites	
River Usk SAC	Within the Site boundary
Severn Estuary Ramsar Site	1km south (hydrologically connected via the River Usk)
Severn Estuary SAC	1km south (hydrologically connected via the River Usk)
Severn Estuary Special Protection Area (SPA)	1km south (hydrologically connected via the River Usk)
Nationally Designated Sites	
River Usk (Lower Usk) SSSI	Within the Site boundary
Gwent Levels - Nash and Goldcliff SSSI	500m east
Newport Wetlands National Nature Reserve (NNR)	550m south
Gwent Levels - St Brides SSSI	1.8km west
Gwent Levels – Whitsun SSSI	Approximately 4km west.

3.1.2 Non-Statutory Designated Sites

There are seven non-statutory designated sites within 2km 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 2. Further details of each designation are provided in Appendix D2.

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

Site Name	Approximate Distance from the Site
Marshall's SINC	Forms the Stephenson Embankment and certain adjacent waterbodies.
Alpha Steel	The Railway Wall part of the site, and Usk Power Station / Nash Wastewater Treatment Works site are within the Alpha Steel SINC.
Julian's Gout Land	Immediately adjacent to the site (to the west)
Solutia	Immediately adjacent to the Site (to the north east).
Monkey Island	250m north of the Site
Gwent Wetland Reserve	Approximately 550m south of the Site
Afon Ebbw River	1.50km west of the Site.

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 River Usk.

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 (*Cettia cetti*), plants including orchids: marsh helleborine (*Epicactis palustris)*, bee orchid (*Ophrys apifera),* pyramidal orchid (*Anacamptis pyramidalis),* and spotted orchid sp. (*Dactylorhiza* spp*).*

Julian's Gout Land is a maritime influenced semi-improved neutral grassland, with willow car and large populations of marsh helleborine (*Epipactis palustris*), marsh orchids (*Dactylorhiza* spp.) and narrow leaved bird's-foot trefoil (*Lotus glaber*).

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 and invertebrates including hairy dragonfly (*Brachyton prantense).*

Monkey Island SINC comprises a mosaic of post-industrial grassland, scrub and ruderal habitats. There are records of blue pimpernel (*Anagallis monelli*) from the Site (the only record in Gwent)

The remaining SINCs within 2km are over 500m away from the Proposed Works and no pathway for effect has been identified.

3.1.3 Protected and Notable Species

SEWBReC provided data on protected and notable species within 2km 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 2km of the Site boundary from the last ten years. Distances are approximate.

Species/Group	Status [32]	Summary of Records	Year of nearest record[33]
Amphibians and Reptiles			
Great crested newt *(Triturus cristatus)*	EPS, WCA, Section 7	Thirteen records with the closest 463m east in the Solutia site, Newport Docks.	Most recent record in 2015.
Common frog (*Rana temporaria*)	WCA, Section 7	One record at 843m east in the Solutia site	2017
Common toad *(Bufo bufo*)	WCA, Section 7	Two records. The closest at 843m east in the Solutia site	Most recent in 2017.
Slow worm *(Anguis fragilis)*	WCA, Section 7	One record 1.8km north west in Maes Glas Landfill Site.	2015
Common lizard (*Zootoca vivipara)*	WCA, Section 7	Two records with the closest 1.1km west in Newport Docks.	Most recent record 2011.
Grass snake (*Natrix helvetica*)	WCA, Section 7	Three records with the closest at 1.1km east at Pye Corner	Most recent record in 2017.
Bats			
Noctule bat (*Nyctalus noctula)*	EPS, WCA, Section 7	One record 1.1km north west in Newport Docks.	2012

[32] 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
[33] Only records from the last ten years are used.

Species/Group	Status [32]	Summary of Records	Year of nearest record[33]
Brown long-eared bat *(Plecotus auritus)*	EPS, WCA, Section 7	One record of a roost 1. km south west in Hains Court	2011
Common pipistrelle *(Pipistrellus pipistrellus)*	EPS, WCA, Section 7	Four records with the closest 1. km west in Newport Docks.	Most recent in 2017
Whiskered bat (*Myotis mystacinus*)	EPS, WCA, Section 7	Closest record is 1.2km north of the site.	2017
Natterer's bat *(Myotis nattereri)*	EPS, WCA, Section 7	One record 1.4km north east	2011
Mammals			
Grey Seal (*Halichoerus grypus*)	EPA, WCA, Section 7	One record 1.4km north west of the site.	2018
Otter (*Lutra lutra)*	EPS, WCA, Section 7	The record is at 1.4km 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 1km to the east of the site.	2018
Badger (*Meles meles)*	BA	One record with the closest 1.3km 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 1013m 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 2km search area from the last 10 years. Of these (listed in Appendix D3 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 D3.

SEWBReC data records the nearest waterbird species features of the Severn Estuary European Marine Site (EMS) 1.5km south of the proposed works; these records include: gadwall (*Anas strepera*), redshank (*Tringa tetanus*) and shelduck (*Tadorna tadorna*). Only one incidental record of redshank was identified just north of the Transporter Bridge.

3.1.3.2 Section 7 Species

SEWBReC returned data on Section 7 species within the 2km 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 M4 Corridor around Newport (M4CaN), numerous ecological surveys were undertaken. A summary of the key findings of these surveys is provided below, taken from reports within appendices of the M4CaN Environmental Statement[34].

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 150m east) having more than 15,000 bat passes, and one (central

[34] 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)

location, approximately 75m east of the railway) having between 500 and 1,500 passes.

The majority of the waterbodies within the Site, were not accessible to the M4CaN team (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 GCN were found to be absent. The closest GCN was found to the south of Tatton Farm (approximately 1.9km east of the Site).

The closest dormouse surveys were undertaken at Pye Corner to the east of the Site (approximately 900m) 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 Extended Phase 1 Habitat Survey

A mosaic of habitats was identified within the Survey Area, during the various Extended Phase 1 Habitat surveys undertaken. The results of the surveys, including mapped habitats and target notes (TNs) are shown in Appendices E (1-5) and summarised below.

3.2.1.1 Stephenson Street Embankment (Appendix E1)

The Wales Coast Path runs from north west to south east through the Survey Area and is aligned with the proposed flood embankment works, parallel to the River Usk. Saltmarsh interface and intertidal mud lay between the path and the river. Adjacent to either side of the path was poor semi improved grassland with scattered scrub including the following species: hawthorn (*Crataegus monogyna*), immature oaks (*Quercus sp.*), willow (*Salix sp.),* bramble (*Rubus fruticosus*) and buddleia (*Buddleja davidii*). Ivy (*Hedera helix*) covered some of the trees.

At the northern end of the Site, there is a small area of swamp, dominated by common reeds, (*Phragmites australis*) and mud above mean high water on the western side of the path. On the eastern side of the path lies Coronation Park, which is managed as amenity grassland. There was little botanical diversity besides common grass species which included: perennial rye grass (*Lolium perenne*), bent grass (*Agrostis sp.*), annual meadow grass (*Poa annua*), Yorkshire fog (*Holcus lanatus*) and Timothy grass (*Phleum pratense*). Herbs included: white clover (*Trifolium sp.*), dandelion (*Taraxacum officinalis*) and plantain species (*Plantago spp*). There are two stands of Japanese knotweed (TN3) south of this park that have since been treated as part of the project and are no longer present. Dense scrub surrounded a waterbody, which was tidally-fed and again had associated intertidal mud above mean high water and was dominated by common reed. Fencing continues along the length of the path and scrub transitions from scattered to dense along the footpath. This dense scrub encompasses a second

waterbody (Waterbody 2) and associated ditch or reen that are included within Marshall's SINC.

There is an area of bare ground adjacent to a conveyor (TN1) which leads into the intertidal mud habitat. This conveyor bridges the path and leads into a sand spoil area directly opposite (TN2). There is another area of dense scrub on the northern side of the path which surrounds a small swamp area and area of open water (Waterbody 3) and associated ditch. South of this, there is an area of hard standing, before another area of dense scrub surrounds further standing water (Waterbody 4) with areas of swamp habitat. A small area of amenity grassland adjoins this habitat at the eastern extent of the Site.

3.2.1.2 Railway Wall (Appendix E2)

The Wales Coast 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 coast 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. A number of small waterbodies are scattered within the woodland including ponds, ditches and a rain-filled concrete chamber (Waterbodies 5-8). 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. 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, hawthorn, bramble 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).

3.2.1.3 Transporter Bridge (Appendix E3)

The Site comprises the habitats adjacent to the eastern (left) bank of the River Usk, from the transporter bridge, north to the A48 bridge. Along the riverbank, the habitat was predominantly intertidal mud, with saltmarsh at the top of the banks. A wading bird (presumed redshank) was seen in the river (TN2) and fox prints (TN3) were identified in the mud along the riverbank.

Further from the riverbank, the habitat graded into dense / continuous scrub comprising bramble and buddleia.

A line of broadleaved trees and scattered scrub was present to the south of the Site, with species present including buddleia, silver birch, ash (*Fraxinus excelsior*), elder (*Sambucus nigra*) and willow species. A silver birch tree with

low bat roosting suitability (TN1) was identified here. The potential roosting feature on the tree was a single knot hole.

Amenity grassland surrounded car parks and buildings to the south of the Site. Species present included perennial rye-grass, annual meadow grass, daisy (*Bellis perennis*), dandelion and ribwort plantain (*Plantago lanceolata*). Ornamental vegetation was also present in these areas.

The southernmost part of the Site was wet woodland, comprised of willow trees. A pond (TN4) was present within the woodland. It was very silted with shallow water and no aquatic vegetation.

3.2.1.4 Nash (Appendix E4)

The Site encompasses the habitats east of the River Usk, between the river and the Nash Wastewater Treatment Works. Much of the Site comprised dense or scattered scrub, consisting of bramble (*Rubus fruticosus* agg.) and buddleia.

Two watercourses were present on Site. Julian's reen (TN5) runs along the northern edge of the treatment works and discharges into the River Usk (TN2). It is a slow-flowing, steep-sided channel with a large amount of silt build-up in addition to dense riparian vegetation (largely common reed) along both sides – therefore leaving only a small channel of open water. The water flowed through a culvert into the River Usk to the west. West of the culvert, it flowed into the river, where it had a wide, open channel with muddy banks. Common reeds were present on the higher banks, and behind these was dense scrub.

There was also a number of areas of open standing water bodies. There were two ditches, running parallel to the railway line (TN4), on both sides. The majority of these waterbodies were choked with silt/debris and or common reed. In some places there were small areas of open water and including deep water. At these locations, species such as hemlock water dropwort (*Oenanthe crocata*) and fool's watercress (*Apium nodiflorum*) occurred. Gypsywort (*Lycopus europaeus*) and water figwort (*Scrophularia umbrosa*) occurred in areas with shallower water.

Adjacent to these ditches were scattered trees and scrub. Bramble, common nettle (*Urtica diocia*), wild strawberry (*Fragaria vesca*), hart's tongue fern (*Asplenium scolopendrium*) and hemp agrimony (*Eupatorium cannabinum*) were present in the ground flora. Willow scrub was scattered through these areas and one tree was identified as having moderate bat roosting suitability (TN14); refer to Nash Wall and Access PEA (Ref.: 274585-ARP-XX-XX-RP-EN-0014). Giant hogweed (*Heracleum mantegazzianum*) was also identified at one location, along the bank of the ditch, east of the railway line (TN11).

A treeline was present, east of the ditch and forming the boundary between the Nash treatment works and Uskmouth Power Station. This consisted of mature planted poplar trees (*Populus* sp.). The trees appeared largely unsuitable for roosting bats with no suitable roosting features. A few of the trees did, however, support dense ivy in places and would therefore be assessed as having at least some (low) suitability for roosting bats.

There was rough grassland/ruderal habitat present adjacent to the reen (TN5) in the Nash treatment works. Species present here included Yorkshire fog, cock's foot (*Dyctalis glomerata*), common nettle, hemp agrimony, common hogweed (*Heracleum sphondylium*), willowherb species (*Epibolium* sp.) and cleavers (*Galium aparine*). In addition, occasional species such as common knapweed (*Centuarea nigra*) also occurred within the sward. In places, grassland/ruderal habitats were encroached by dense bramble scrub.

3.2.1.5 Felnex Estate (Option 2b) (Appendix E1a)

The Survey Area comprised three discrete sectors, the largest of which had been subject to Extended Phase 1 Habitat Survey previously[15] (and is described under 'Stephenson Embankment' above). This area (in the west of the Survey Area comprised a large pond (with common reed) and associated ditch surrounded by an extensive swathe of dense scrub, which included a small patch of Japanese Knotweed (TN2, mapped as introduced shrub) on its western side. NRW have treated this knotweed stand.

The small sector in the northeast of the Survey Area was comprised of dense scrub with an adjacent line of broad-leaved trees including sycamore (*Acer pseudoplatanus)*, oak., ash, field maple (*Acer campestre)* and poplar on its southern side.

The south-eastern area comprised dense scrub and scattered scrub, a small patch of broad-leaved woodland and brash pile (TN1) and tall ruderal vegetation (with multiple rubble piles at the southeast end. The dense scrub areas included buddleia, bramble, hawthorn, Himalayan honeysuckle (*Leycesteria formosa)*, blackthorn (*Prunus spinosa)*, rosebay willowherb (*Chamaenerion angustifolium)*, willow and rose (*Rosa* sp.). Scattered scrub included buddleia, mugwort (*Artemisia vulgaris)* and common reed. The area of tall ruderal vegetation included teasel (*Dipsacus fullonum)*, evening primrose (*Oenothera biennis)*, bristly oxtongue (*Helminthotheca echioides)*, dandelion and burdock (*Arctium lappa)*.

3.2.1.6 Railway Wall Construction Access (Appendix E2a)

Much of the Site comprised dense or scattered scrub, consisting of bramble (*Rubus fruticosus* agg.), buddleia (*Buddleja davidii*), hawthorn (*Crataegus monogyna*) and rose (*Rosa* sp.). Towards the north of the Site, scrub lies either side of a hard-standing track. There was also a treeline of mature silver birch (*Betula pendula*) parallel to the path.

Towards the south of the Site there were areas of semi-natural broadleaved woodland, with species including silver birch, English oak (*Quercus robur*), blackthorn (*Prunus spinosa*), hawthorn, willow (*Salix* spp.) with ivy (*Hedera helix*) understory in many places.

There was broad-leaved woodland plantation towards the south with fences running from north west to south east. Species in this area included mature willow, oak and hawthorn.

One watercourse was present on Site, a small culvert (TN6) that runs through dense scrub. The water was still with duckweeds (*Lemnoideae* spp.) present on the surface and the banks were made of brick. The culvert was shaded by trees and there was a dry ditch which ran through a disused camp. This was vegetated with bramble and is likely to be dry throughout the year. No invasive plants were identified during the Extended Phase 1 Habitat survey.

3.2.2 Phase 2 Botanical Survey

3.2.2.1 Stephenson Street Embankment NVC (Appendix G1)

The National Vegetation Classification Survey (NVC) undertaken by Dr Peter Sturgess of Sturgess Ecology on the 15th August 2018 detailed habitats located within the SAC / SSSI between the Stephenson Street Embankment and the river; the report is provided in Appendix G1.

In summary, the plant communities recorded include:

- SM24 Sea couch *Elytrigia atherica* Saltmarsh (which covers the majority of the area surveyed). Notable species include Dittander (*Lepidium latifolium*) and marsh-mallow (*Althaea officinalis*).
- SM13/SM6 *Puccinellia maritima/spartina angelica* mosaic.
- S21 Seaclub rush *Bolboschoenus maritimus* swamp, S4 Common reed *Pragmites australis* reedbed. Notable species include long bracted sedge (*Carex extensa*).
- Fragmentary MG1 Mesotrophic neutral grassland, sparse vegetation on sandy ground, sparse vegetation on disturbed ground, dense scrub, scattered scrub.
- S4 *Phragmites australis* reedbed.
- Open vegetation communities on disturbed ground (TN2). Notable species include narrow everlasting pea (*Lathyrus sylvestris*)
- Fragmentary MG1 *Arrhenatherum elatius* grassland. Notable species include: common restharrow (*Ononis repens var horrida)*, stone parsley (*Sison apifera*) and bee orchid (*Ophrys apifera*).
- Grassland and scrub on flood bank (TN1). Notable species include black horehound (*Ballota nigra*) and stone parsley. Japanese knotweed is also present [*Note - this stand of Japanese knotweed (Fallopia japonica) has since been treated*].
- Grassland and scrub on flood bank (TN4). Notable species include Viper's bugloss (*Echium vulgare*) and yellow-wort (*Blackstonia perfoliata*).

None of the plant species recorded during the survey is included in the Environment (Wales) Act 2016 Section 7 lists of species of 'principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales'. However, several were found that are listed as being locally notable in the Wildlife Sites Guidelines (Wales Biodiversity Partnership, 2008): Primary Species - Dittander (*Lepidium latifolium*); Contributory Species – Marsh Mallow (*Althaea officinalis*), Black Horehound (*Ballota nigra*), Long-bracted Sedge (*Carex*

extensa), Viper's Bugloss (*Echium vulgare*), Narrow-leaved Everlasting Pea (*Lathyrus sylvestris*), Bee Orchid (*Ophrys apifera*), Stone Parsley (*Sison amomum*). Under these guidelines a site is considered significant in a county context if it supports one or more Primary Species or five or more Contributory Species.

In addition to the plants noted for their rarity, Japanese Knotweed is notable because of its listing on Schedule 9 of the Wildlife and Countryside Act as a non-native invasive species. Treatment of known Japanese knotweed has been completed and is now absent from this area of the site.

3.2.2.2 North of the Transporter Bridge NVC (Appendix G2)

The NVC survey undertaken in August 2019 surveyed the riverside habitat north of the Transporter Bridge associated with ground raising; the report is included in Appendix G2.

In summary, the plant communities recorded include:

- SM24 Sea couch *Elytrigia atherica* Saltmarsh (which covers the majority of the area surveyed). This has a very low diversity sward typically limited to a few sparse plants of spear-leaved orache.
- SM13/SM6 *Puccinellia maritima/spartina angelica* mosaic.
- *S21 Bolboschoenus maritimus swamp*
- *W24 Rubus fruticosus – Holcus lanatus underscrub on flood bank (*TN1, TN5 & TN6*;* and
- Fragmentary MG1 *Arrhenatherum elatius* grassland.

In comparison with the saltmarsh surveyed at the Stephenson Street Embankment, the sections examined north of the Transporter Bridge formed a narrower strip and appeared to be less diverse than the downstream section, and they supported fewer species of nature conservation significance.

None of the plant species recorded during the survey are included in the Environment (Wales) Act 2016 Section 7 lists of species of 'principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales'. Similarly, none were found that are listed as being locally notable in the Wildlife Sites Guidelines (Wales Biodiversity Partnership, 2008). No non-native invasive plant species that are listed on Schedule 9 of the Wildlife and Countryside Act were found during this survey.

3.2.3 Species-Specific Surveys

3.2.3.1 Riparian Mammals: Otters and Water Vole

Both species have been recorded in connecting habitat, with the nearest water vole records being recorded at Pye Corner approximately 1km east, and otter recorded approximately 500m north west of the site. Otter are a qualifying feature of the River Usk SAC.

Habitat Suitability and Presence / Absence surveys

Waterbodies 1-4

The Site has moderate potential to support water vole in areas where common reeds line the ditches and the waterbodies which will provide suitable food resource and refuge.

The Site has potential to support otters due to presence of waterbodies which include connecting habitats to scrub and the river. The Wales Coast Path along the embankment is however used by dog walkers and this is likely to negatively impact the potential for otters to breed on Site.

During the Extended Phase 1 Habitat survey of the Stephenson Embankment area flattened reeds forming paths in and around the second swamp (Waterbody 2, Appendix E1) from the north were noted, and which were considered as potentially being formed by otters[15].

Waterbodies 5-12

The results of the Otter Habitat Suitability Assessment and presence / absence surveys for waterbodies 5-12 are detailed below in Table 8 below.

Table 8: Results of Otter Habitat Suitability and presence/absence survey of waterbodies 5-12. Results are also shown in Appendix E6.

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 500m southeast of the works.
12	Low	No signs.

During the otter survey (on the 17th May 2019) a spraint along a ditch running south from Waterbody 11 (as shown in Appendix E6).

No otter resting or breeding places were recorded around waterbodies 5 – 12, the open woodland habitat with little understorey or undisturbed areas are likely to be suboptimal for such refuges. Any presence is considered to be limited to foraging and or commuting otter, travelling through the site.

The results of the water vole Habitat Suitability Assessment and presence / absence surveys are detailed below in Table 9 below.

Table 9: Results of water vole Habitat Suitability Assessment and presence/absence survey. Results are also shown in Appendix E6.

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 (revised to low after second survey)	Likely water vole droppings/latrines and feeding remains recorded within dense reedbeds along the eastern and northern edges of the waterbody, approximately 280m and 400m southeast of the works. Potential water vole burrows were found in a ditch south of waterbody 11, 420m southeast of the works, (but could also possibly be rat burrows).
12	Negligible	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 is 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.

During the second presence / absence survey (18th July 2019), 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 280m southeast of the proposed works. The waterbodies that are closer than 280m to the proposed works are unsuitable for water vole, and therefore it is unlikely that water vole will be present any closer to the works. No burrows or nests were recorded. The droppings were slightly smaller than typical adult water voles (with some being approximately 8mm and others slightly smaller); however, they had the general

appearance of water vole droppings. 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.

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

Waterbodies 1-4 (Nash Area)

During the Extended Phase 1 survey of the area of Nash Wastewater Treatment Works, five waterbodies were identified with the potential to support otter and water vole.

Further riparian mammal surveys recorded a number of locations, which were considered likely to provide lay-up areas for resting otters (including TN1, TN3 and TN5 in Appendix E4); however these are >50 m from the proposed works. No permanent resting / breeding places were recorded.

Railway Wall Access Route

No signs of otter or water vole were observed during the Extended Phase 1 Habitat Survey. No suitable habitat was identified on Site for water vole as the culvert had brick walls, unsuitable for burrows, and there was no vegetation close to the banks which would provide a food source for this species. No otter lay-ups were recorded during the survey. None of the areas within this area were assessed as being suitable for breeding, or places of permanent rest.

Incidental Recordings

Signs of otter were recorded during the GCN surveys in the form of otter prints along the margins of Waterbody 10 (4th April 2019).

Raft and Camera Monitoring

Two otter cameras set up at Waterbody 2 (Appendix E1) to confirm any otter activity, between 18th April 2018 and 19th July 2018, only recorded rats and foxes and did not record any evidence of otter or other protected species.

In addition, two cameras were set up at Waterbody 11 (with the objective to confirm the presence of water vole). As discussed in limitations[15], 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 (from camera 1), two on the 20th September 2019 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.

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

3.2.3.2 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 and therefore are not considered to be a constraint to the proposed works.

Dormice are not considered any further in this report.

3.2.3.3 GCN and Amphibians

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

HSI were created for each waterbody on Site. The details of the HSI scores are reported in the table below.

Table 10: HSI for Waterbodies on Site (1-4) (shown in Appendix E1 & E8).

Waterbody Number	HSI Score	Classification of HSI Score	Location
1	0	Unsuitable. Waterbody connected to the estuary through a culvert. The sea water is not considered suitable habitat for GCN due to the increased salinity.	ST32049 85904
2	Larger Pond HSI Score 0.53 Reen/Ditch HSI Score 0.67	Below average/ Average	ST32385 85620
3	Larger Pond HSI Score 0.50 Reen HSI Score 0.49	Below average/Poor	ST32564 85509
4	Larger Pond HSI Score 0.49 Reen HSI Score 0.61	Poor/Average	ST32753 85431

Table 11: HSI for Waterbodies on Site (5-12) (Stephenson Embankment and Railway Wall area) (Appendix E2 & E9).

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

Table 12: HSI for Waterbodies on Site (Nash site) (Appendix E10).

Waterbody Number	Description	HSI Score	Classification of HSI Score	Other comments
1	Pond (in treatment works)	0.52	Below average	Very silted and overgrown with common reed and bramble. Small area (5m x 5m) of open water accessible.
2	Ditch (west of the railway)	0.39	Poor	Very overgrown with common reed and bramble. Few locations with open water.
3	Ditch (east of railway - south)	0.39	Poor	Very overgrown with common reed and bramble. Few locations with open water.
4	Ditch (east of railway - south)	0.39	Poor	Very overgrown with common reed and bramble. Few locations with open water. Deep water. Appears very polluted.
5	Ditch	0.39	Poor	Dry at time of survey. Very overgrown similar to other ditches.

An additional survey including HSI was undertaken for the Railway Wall Access with results as follows. The HSI score of the culvert in TN6 was 0.49 (Poor). This score is considered as having poor suitability to support great crested newts. Since the culvert has slow running water it is considered unsuitable for supporting great

crested newts; the lack of positive records from previous surveys further supports this. Photographs of the waterbody are given in Appendix A of the Railway Wall Access PEA (Ref. 274586-ARP-XX-XX-RP-EN-0015).

eDNA

Although the HSI scores for the waterbodies were low, the presence of GCN could not be ruled out, particularly due to existing records of GCN less than 500m from the Site. Therefore, NRW requested that eDNA surveys were undertaken on waterbodies along Stephenson Embankment.

eDNA surveys undertaken between April and May 2018, recorded a positive result for Waterbody 4, indicating the potential presence of GCN and requirement for further survey effort. Due to connectivity, further surveys were also recommended for Waterbody 3. The eDNA score was 1 / 12 (1 out of 12 tests scoring positive), indicating low confidence in the result. False positives are known to occur during handling and laboratory analysis, as well as by cross contamination in the field[35]. The latter is considered unlikely to have occurred due to the surveyors following the survey methods, and not having surveyed any other great crested newt sites at that time, but it is possible that there was contamination during laboratory analysis. This is further supported by the lack of evidence of great crested newts during the presence / absence surveys and population size class assessment, in addition to evidence of large numbers of sticklebacks within Waterbody 4, which are known to adversely affect the suitability of habitats for great crested newts[36].

eDNA samples for the remaining waterbodies were negative.

Presence / Absence

No GCN were recorded in any of the waterbodies during the presence/absence surveys (as shown in Table 13 below, and Appendix E8 and E9). Smooth newts were recorded from Waterbodies 3, 4, 5, 9, 11 and 12. No population surveys are therefore required for GCN, and GCN 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.

Population Assessment

Despite great crested newt presence not being recorded during the first four presence / absence surveys, a further two surveys were undertaken on Waterbodies 3 and 4, as recommended following a potential (low confidence)

[35] Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F 2014. Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA. Freshwater Habitats Trust, Oxford

[36] Oldham, R.S., Keeble, J., Swan, M.J.S. & Jeffcote, M. (2000). Evaluating the suitability of habitat for the great crested newt (*Triturus cristatus*). Herpetological Journal 10, 143‑155.

positive eDNA result for Waterbody 4. Site visits confirmed a large population of sticklebacks from Waterbody 4 that makes newt presence unlikely. Waterbody 3, which was dry at the time of the last survey visit, was recommended for further survey effort due to connectivity with Waterbody 4.

Surveys confirmed the presence of smooth newts under refugia in terrestrial habitat adjacent to Waterbody 4 during the final two surveys.

Table 13: Results of GCN presence / absence surveys and population assessment (also summarised in Appendix E8 and E9).

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	Sticklebac k 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 newts 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)/	0	-	Diving beetle /

Waterbody/Dates	28th/29th March	3rd/4th April	17th/18th April	24th/25th April	30th April/ 1st May	16th/17th May	Comments/additional information
				1 female newt (bottle)			water scorpion present

3.2.3.4 Bats

One potential roost feature was identified on a tree within the Transporter Bridge area (TN1, Appendix E3)[17] and one potential roost feature was identified on a tree within the area of the Nash Wastewater Treatment works[18] (TN14, Appendix E4).

A number of trees in a line of poplar trees (along the boundary between Nash treatment works and Uskmouth power station) (Appendix E4) were also identified as having low potential for roosting bats due to supporting dense ivy[18].

Potential bat roost features were identified on a number of trees along the railway line between the Wales Coast Path and the Railway Wall site, near the Railway Wall construction access route (refer to Appendix E2a). An oak tree with dense ivy (TN2) was identified as having low suitability, a willow with lifted bark (TN4) was identified as having low suitability, a willow with a hazard beam and a tear out (TN8) was assessed as having moderate suitability, an oak tree with some splits (TN9) was assessed as having low suitability and a willow with a woodpecker hole and cavity (TN10) was assessed as having moderate suitability.

The Railway Wall Access site provides potential roosting habitat in five trees, TN8, TN10 (moderate suitability) and TN2, TN4 and TN9 (low suitability).

In general, the Site has the 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.

3.2.3.5 Badgers

Records of badger setts are located approximately 200m east of the old railway line / north western corner of Waterbody 10 (Appendix E2) and badger setts are known to be present within the Nash Wastewater Treatment Works and Uskmouth Power Station, approximately 300m southeast of the Nash Wall Construction Access. The habitats present, particularly areas of woodland and scrub, are suitable for sett creation.

However, no active setts or signs of badger presence were observed during the Extended Phase 1 Habitat Surveys for any of the works areas. Incidental records of badger footprints were recorded along the western margin of Waterbody 10 on two of the GCN surveys[16], suggesting badger are likely to be using the site for foraging / commuting purposes. One disused sett was identified during the Railway Wall Construction Access Extended Phase 1 Habitat Surveys, (TN1; Appendix E2a). This had four entrances, which were all blocked with debris and indicating that these were not active at the time of the survey.

One disused badger sett was identified during the Extended Phase 1 Habitat survey of the Railway Access Route, (TN1). This had four entrances, which were all blocked with debris and indicating that these were not active at the time of the survey.

It was not possible to fully inspect all areas of dense scrub within the Study Area and therefore the presence of badger setts within such areas cannot be ruled out.

3.2.3.6 Reptiles

Along the Stephenson Street embankment, the mosaic of wetland habitats, such as swamp with scrub and open areas of semi-improved grassland provide suitable habitat for reptiles specifically common lizard, slow worm and grass snake. Despite suitability of habitat, no reptiles were recorded during the monthly reptile surveys carried out between 10th May 2018 and 19th July 2018[15] and likely absence is assumed.

For the Railway Wall and Nash Wall sites, the mosaic of habitats, including scrub and brash piles, provide suitable habitat for reptiles including common lizard, slow worm and grass snake.

3.2.3.7 Birds

One Schedule 1 species, Cetti's warbler was incidentally observed singing during the Extended Phase 1 Survey in the area of Stephenson Embankment, and during further reptile / otter surveys[16, 17]. Observation during these surveys, suggests that Cetti's warbler are breeding at the Site within the reedbeds.

There is a variety of habitat including scrub, trees and swamp on Site to support a range of other breeding birds.

3.2.3.8 Fish

No species survey was undertaken for fish species present within the River Usk or Severn Estuary as part of this assessment. Presence is assumed at the relevant times of year for each species due to the River Usk and Severn Estuary designations for: sea lamprey (*Petromyzon marinus*), river lamprey (*Lampetra fluviatilis*), allis shad (*Alosa alosa*), twaite shad (*Alosa fallax*), European eel (*Anguilla anguilla*) and Atlantic salmon (S*almo salar*). The River Usk SAC Core Management Plan confirms two species are not present within the locality of the Site (SSSI Management Unit 1); absent species include: bullhead (*Cottus gobio*) and brook lamprey (*Lampetra planeri*). None of these fish species are considered likely to be present in any watercourses affected by the proposals.

3.2.3.9 Invertebrates

The Site lies within the River Usk SAC and SSSI, which is designated in part for its important invertebrate communities, including aquatic species. It is considered likely that there would be a moderate range of invertebrate species present due to the range of habitats on Site. Species rich habitats, in particular those within the

SAC / SSSI designation may also support more significant populations and or notable species including species which are associated with the designations.

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 GCN surveys, Waterbody 9 was observed to provide good breeding habitat for dragonfly species.

3.2.3.10 Other Mammals

Rabbit (*Oryctolagus cuniculus*) paths and droppings were found close to the path in the south15. Due to the habitat types identified on Site, West European hedgehog (*Erinaceus europaeus*) may also be present

4 Evaluation of Ecological Receptors

This section initially evaluates the nature conservation importance of the habitats and species present within the Survey Area in terms of their importance in an international, national, county, local and less than local or Site context as per the geographic scale identified in Section 2.4.1. Table 14 below evaluates all the ecological resources present or potentially present within the Site.

Table 14: Nature Conservation Evaluation of Ecological Receptors at the Site.

Ecological Feature	Evaluation	Conservation in the context of the Development
Designated Sites		
River Usk SAC	International	The Site falls within the designated area. Designated for internationally important riverine habitat and assemblages of fish, and otter.
River Usk (Lower Usk) SSSI	National	The Site falls within the designated area. Designated for internationally important riverine habitat and assemblages of fish and otter.
Severn Estuary SAC, SPA and Ramsar	International	The designated area lies approximately 1km to the south of the Site. It is important for its rare estuarine communities, migratory fish species and bird assemblages.
Severn Estuary SSSI	National	This SSSI is a component part of the Severn Estuary SPA and SAC. It is designated for its intertidal and saltmarsh habitats and assemblages of important waterfowl, invertebrate and migratory fish populations.
Gwent Levels: St Brides, Nash and Goldcliff, and Whitsun SSSIs	National	The Gwent Levels are approximately 500m east of the Site, and 1.8km west of the Site respectively. They are drained by an ordered network of drainage ditches which support rich plant and invertebrate communities.

Ecological Feature	Evaluation	Conservation in the context of the Development
Newport Wetlands National Nature Reserve	National	The designated area lies approximately 550m to the south of the Site, adjacent to the Severn Estuary and close to the mouth of the River Usk. The Site supports nationally important numbers of overwintering birds and breeding birds in the summer. The Site supports diverse invertebrate populations and a diverse range of botanical species within the drainage ditches.
Marshalls SINC	County	The Marshalls SINC (ST321857) lies within the Site boundary, including semi-natural habitats between the River Usk and industrial estate to the east. It 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.
Alpha Steel SINC	County	The Site falls within this SINC. Alpha Steel is an area of former levels, scrub, and other habitat that supports a range of species including scarce moth species, birds such as Cetti's warbler, plants including orchids: marsh helleborine, bee orchid, pyramidal orchid, and spotted orchid sp.
Julians Gout SINC	County	Julian's Gout Land is adjacent to the Site. It is maritime influenced semi-improved neutral grassland, with willow car and large populations of marsh helleborine, marsh orchids and narrow leaved bird's-foot trefoil.
Solutia SINC	County	Solutia SINC is adjacent to the site. It 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 and invertebrates including hairy dragonfly.

Ecological Feature	Evaluation	Conservation in the context of the Development
Monkey Island SINC	County	Monkey Island SINC is 250m to the north of the site. It is a mosaic of post-industrial grassland, scrub and ruderal habitats. Local record of blue pimpernel found on Site (the only record in Gwent).
Habitats		
Saltmarsh, intertidal mud and swamps	International	Saltmarsh, intertidal mud and swamps are habitats identified within the Site which form part of the River Usk SAC and SSSI. Consequently, these habitats are of International importance. There is potential for loss and disturbance of these habitats due to pollution events during construction. Other habitats present within the Site, which lie outside of the SSSI/SAC boundary such as amenity grassland, semi improved grassland or scrub are of value at Site level only.
Amenity grassland, semi improved grassland, ruderal vegetation, standing water, woodland and scrub	Local	These habitats lie outside of the SSSI/SAC boundary and therefore provide ecological value at a Local level for the species they support.
Hardstanding and tarmac surfaces	Negligible	
Species		
Invertebrates	County / Local	The Site lies within the River Usk SAC and SSSI, which is designated in part for its important invertebrate communities, including aquatic species. It is possible that notable species are present within parts of the site, that occur in the SSSI/SAC designation including qualifying features, although this hasn't been confirmed.

Ecological Feature	Evaluation	Conservation in the context of the Development
		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.
Fish: sea lamprey, river lamprey, brook lamprey, allis shad, twaite shad, Atlantic Salmon, European eel and bullhead	International / National	These fish are all qualifying features of the River Usk and Severn Estuary SAC, and River Usk (Lower Usk) SSSI. The works are not planned to occur within 30m of the River however.
Amphibians	Site	One waterbody was found to be positive for GCN DNA, although presence / absence surveys found no evidence of this species. Therefore, they are considered likely to be absent from the site. The Site supports a population of smooth newts.
Nesting birds (common species)	Local	Habitat at the site such as reeds, scrub, trees and swamp vegetation provide suitable habitat for a range of nesting birds including Schedule 1 species. Cetti's warbler (a Schedule 1 species) has been recorded within the Site, and is considered likely to be breeding.
Bats (Commuting / foraging and roosting)	Local	Under BCT guidelines the Site is of low quality habitat for roosting bats and low to moderate quality for commuting and foraging. A number of trees within the site provide suitable habitat for roosting bats and would require further survey effort if they are affected by any of the works.
Badger	Site	Badger footprints were recorded along the western margin of Waterbody 10 on two of the four GCN surveys, and therefore it is considered that they are likely to be using the Site for foraging / commuting purposes. The habitats present, particularly areas of woodland and scrub, are also suitable for sett

Ecological Feature	Evaluation	Conservation in the context of the Development
		creation. Furthermore, there are records of setts approx. 200m from the Site.
Otter	County	The Site provides suitable habitat for foraging and commuting otter, and evidence of otter has been recorded in the vicinity of lagoons within the Liberty Steel site. There are a number of potential lay-ups within the site, although the suitability of habitats within the site as permanent resting / breeding sites is considered to be low due to levels of disturbance within the Site, particularly along the Stephenson Embankment. Otter are a qualifying feature of the River Usk SSSI and SAC.
Water vole	Local	Evidence of water vole has been recorded within the Site, although this is limited to feeding signs at the far eastern extent of the site, and no evidence of burrows were found. Furthermore, habitats with potential suitability are approximately 200m east of the Proposed works.
Other mammals	Local	Section 7 mammals such as West European hedgehog are likely to occur within the Site.
INNS	Negligible	Japanese knotweed and giant hogweed have been recorded within the Site. This species has no ecological value, but as a Schedule 9 species under the Wildlife and Countryside Act 1981, requires measures to avoid disturbance and spread within / from the Site. Giant hogweed necessitates health and safety consideration as cut stems exude toxic sap that causes serious skin burns.

5 Assessment of Potential Effects, Agreed Mitigation and Residual Effects

This section identifies the potential effects (both positive and negative) on ecological receptors within the Ecological Zone of Influence of the Scheme during construction and operation phases. Measures to avoid, mitigate or offset for these effects are also detailed as well as any biodiversity enhancement opportunities for the Scheme. The magnitude of any residual effects is then assessed.

Effects will be assessed for ecological features valued in Section 5 at local level and above. With the exception of European Protected Species which will be assessed regardless of their nature conservation value, and in this case fish, due to the nature of the works required. Ecological features of nature conservation value at site level or those considered to have negligible ecological value have been scoped out of further ecological impact assessment. However, general mitigation and best practice measures as detailed below, will be applied during construction to ensure individual species are not harmed and no offence is committed under the relevant legislations; e.g. Wildlife and Countryside Act 1981 (as amended).

5.1 Embedded Mitigation

Construction activities have the potential to result in adverse effects of varying magnitude and duration through, for example, killing, injury or disturbance of protected species, loss of habitat, and pollution effects on aquatic biota from hydrocarbon spills and sediment ingress to watercourses.

The following general mitigation measures to avoid or alleviate negative effects upon ecological receptors will be implemented during the construction phase to comply with existing legislation and good practice as detailed below. This is secured within the Environmental Action Plan (EAP).

- **Toolbox Talks** will be provided by a suitably experienced ecologist to all site personnel to inform them of ecological features at the Site including INNS, protected and notable species prior to the commencement of construction works. An associated registry of attendance will be signed and kept as a record and a copy of the toolbox talk left at the Site office;
- **EAP**: All works will be undertaken in accordance with the EAP that will be maintained by the contractor. The EAP includes site-specific methods to ensure that all Site activities 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 (e.g. GPP5[37],) and industry best practice (CIRIA[38], CIRIA C741[39]). Additional measures

[37] 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
[38] CIRIA (2018) CIRIA http://www.ciria.org
[39] CIRIA C74139 'Environmental Good Practice on Site'; Fourth Edition (2015).

such as silt fencing, silt busters or bales may be necessary to prevent silt or contaminants from being released into connecting watercourses.

- **Lighting:** If any task lighting is required outside daylight hours (typically 30 minutes after sunrise and up to 30 mins before sunset), directional lighting (towards the ground) with minimal upward spill will be implemented, to avoid light spill into adjacent habitats to avoid disturbance to commuting and foraging nocturnal protected species.
- **Noise & Vibration** – General construction noise and vibration will be controlled through the EAP. Piling noise and vibration has been reduced to negligible through specification of a 'silent' piling hydraulic Giken rig.
- **Excavations:** Good practice working methods will be adhered to which prevent any adverse effects on otters, badgers or other mammals at the Site. Materials or plant will not be left overnight in an area that may prohibit access for accessible to commuting otters and or badgers and excavations will not be left uncovered overnight. If any excavations are required to be left open overnight, a ramp will be provided created to allow any animals to escape.
- **Trees**: Measures to protect trees to be retained within and immediately adjacent to the Site and access route in line with the British Standard BS5837:2012 and recommendations made within the Arboricultural Impact Assessment (274580-ARP-XX-XX-RP-EN-0005).
- **Vegetation Clearance:**
    - **Breeding Birds:** vegetation clearance within the breeding bird season (March-August inclusive) should be avoided to prevent 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 for breeding birds and their occupied nests by a suitably experienced ecologist no more than 24 hours prior to any works commencing. If nesting birds are found during the pre-construction checks, a buffer around the nest will be implemented of at least 5 metres as agreed with the ecologist and further work within the immediate and surrounding area will be delayed until young have fledged and left the nest, and the nest is no longer in use.
    - **Section 7 Species, Reptiles and Amphibians:** clearance of vegetation will be undertaken in a sensitive manner: two-staged directional strimming towards retained habitat and will be avoided or kept to a minimum during the hibernation season (November to February). If required during this time, clearance will be subject to a Toolbox Talk and Precautionary Methods of Working written and overseen by a suitably experienced ecologist.
- **Invasive Non-Native Species**: All equipment and footwear will be cleaned thoroughly before entering the site with a suitable disinfectant. In addition, all equipment and footwear will be thoroughly cleaned and disinfected when leaving site. Giant hogweed necessitates health and safety consideration as cut stems exude toxic sap that causes serious skin burns. Soil management and appropriate management and disposal will be required in the vicinity (within

7m) of Japanese knotweed. INNS will be managed via the Environmental Action Plan (EAP - 274580-ARP-XX-XX-RP-EN-0006).

- **Expert Advice:** If any protected species or signs of protected species such as a badger sett, or INNS (other than rhododendron) are encountered during the works, all work in the vicinity is to stop immediately and a suitably qualified ecologist contacted as soon as possible for advice.
- **Access** to the working areas will be via designated tracks only, and storage of materials will be at pre-agreed locations.

5.2 Potential Effects

Potential ecological effects of the works during the construction and operational phases, including site preparation, may be direct or indirect and may be categorised as follows:

- Habitat loss through vegetation clearance to provide access tracks and storage;
- Habitat disturbance and or degradation including pollution and sedimentation;
- Disturbance to species during construction (noise, vibration and lighting);
- Habitat fragmentation and or physical restrictions to species movements;
- Species mortalities and injuries – e.g. through collisions with construction vehicles and direct contact through excavation works, falling and trapping in open excavations during construction.

5.2.1 Designated Sites

5.2.1.1 European and National Sites

There are four European designated sites potentially affected: including River Usk SAC within the Site, and the Severn Estuary SAC, Ramsar and SPA within 5km. Any effects on the River Usk SAC or Severn Estuary EMS would be of international significance.

There are five nationally designated sites: including River Usk (Lower Usk) SSSI within the Site, Severn Estuary SSSI, Gwent Levels (Goldcliff and St Brides) SSSIs and Newport Wetlands NNR within 5km. Any effects on the River Usk (Lower Usk) SSSI or Newport Wetland NNR would be of national significance. Newport Wetlands NNR will not be affected by the proposed improvement works.

The design has been developed to avoid encroachment into the River Usk SAC and River Usk (Lower Usk) SSSI, through the selection of a specific piling methodology that does not require a temporary access track for the delivery of sheet piles. The proposed Giken hydraulic press method ‘walks’ along the installed sheet piles and will be supported by a sheet pile mounted crane to deliver sheet piles to the piling rig. This method avoids encroachment and maintains the construction width within the existing embankment to avoid direct impacts on adjacent habitats. As such, no mitigation measures are required.

Indirect impacts through pollution events and or mobilisation of sediment, into the river, and therefore River Usk SAC and River Usk (Lower Usk) SSSI, could occur during construction, but this will be mitigated for by the implementation of standard best practice pollution control measures during construction secured within the EAP.

The proposed ground raising north of the Transporter Bridge would involve increasing the height of the flood bank in certain sections. The only habitats that would be affected would be the bramble scrub with tall herbs and the adjacent mown grassland. Both of these low value habitats would be expected to regenerate within a few years of the disturbance and no specific mitigation would be required.

There is also the potential for direct and indirect effects on fish and otter, which are qualifying species of the River Usk SAC and SSSI. Effects on these species are discussed in the relevant species sections below.

A Record of a Habitat Regulation Assessment (HRA - 274580-ARP-XX-XX-RP-EN-0002)[40] has been prepared in consultation with NRW based on the proposed works, which identifies potential pathways for effect on the River Usk SAC qualifying features: sea lamprey, river lamprey, twaite shad, allis shad, Atlantic salmon, and otter.

Any effects on the freshwater qualifying features: watercourses of plain to montane levels with *Ranunculion fluitantis* and C*allitricho batrachion* vegetation, brook lamprey and bullhead are screened out due to not occurring within the tidal management unit of the SAC within which the Site occurs.

The HRA screens out potential effects on the Severn Estuary SAC, Ramsar site and SPA due to spatial separation and absence of records or observations of associated waterbirds within 1.5km of the Site. Relevant anadromous fish species which are qualifying features of the Severn Estuary are considered as part of the project assessment as they are also features of the River Usk SAC.

Minor encroachment into the SAC boundary will be required to install a maintenance access ramp (c. 100m^2 area of degraded grassland; refer to Stephenson Street NVC – Ref.: 274587-ARP-XX-XX-RP-EN-0016) onto the foreshore from Stephenson Street, to accommodate the viewing platform (c. 5m^2; no excavation), to replace the footbridge over the flood defence at the conveyor adjacent to the Felnex Estate (c. 5m^2) and to install a surface water outfall, pursuant to SUDS compliance, on the riverside embankment south of the Marshall's Estate (c. 100m^2). No significant habitat loss is anticipated, nor any sensitive species affected. Approximately 100m^2 of saltmarsh habitat will be temporarily lost, relative to an area of saltmarsh in the local vicinity exceeding 75,000m^2; saltmarsh is anticipated to re-establish within the concrete mattress during operation.

[40] NRW (2020) Stephenson Street Flood Alleviation Scheme; Record of a Habitat Regulation Assessment of a Project (NRW; OGN200).

5.2.1.2 SINCs

There are four locally designated sites potentially affected: including Marshall's SINC and Alpha Steel SINC, which occur within the Site, and two other adjacent SINCs: Solutia and Julian's Gout, which could potentially be affected by the works. SINCs are classified as County significance.

No clearance or development is anticipated within the Marshall's SINC, and therefore no habitat loss of adjacent habitats. The Railway Wall and Nash Wall works are proposed outside but adjacent to the Alpha Steel SINC, although potential effects are considered unlikely. Habitats includes dense scrub, woodland, waterbodies, ruderal vegetation and short perennial vegetation. The Railway Wall construction access route would be constructed outside the boundary of the Solutia SINC. The Landscape Masterplan provides for suitable offsetting measures for any SINC habitat losses.

Native planting of trees, shrubs and wildflower grasslands is proposed as part of the landscape masterplan within the Site, which will offset any affected SINC habitats.

The following mitigation will be implemented to offset impacts to SINC habitats:

- Replacement planting will be undertaken with appropriate native tree, shrub and wildflower species of local provenance avoiding species at risk of prevalent disease; e.g. ash die-back, *Phytophthera*, etc., and designed to maintain and enhance connectivity, focussing on SINC requirements. Refer to Landscape Masterplan, Planting Schedule and Planning Drawings for details.

5.2.2 Fish

There are several fish species designated under the River Usk SAC. The freshwater species: brook lamprey and bullhead, are not present in this tidal stretch of the river. Shad species (twaite and allis) are the most sensitive to disturbance from vibrations due to auditory connection with their air-filled swim bladders. Significant vibrations can cause fish mortality or lead to them avoiding an area and failing to migrate up or downstream. Atlantic salmon are also relevant but are less sensitive than shad, so any mitigation designed for shad will protect these species. Sea lamprey are non-hearing specialists and not vibration-sensitive species.

The main migratory period for adult shad along the Newport reaches of the River Usk are between April and June. However, the exact period of migration depends on water temperature, and it is feasible that the duration of the up-river migration could be longer, potentially spanning from 1st March to 30th June[41].

NRW Fisheries Team recommended the following mitigation to minimise impact to fish (twaite shad, allis shad and Atlantic salmon) that are using the River Usk for migration:

[41] Ecology of the Allis and Twaite Shad - Conserving Natura 2000 Rivers - Ecology Series No. 3 - Peter S Maitland and Tristan W Hatton-Ellis

- A 30 m buffer from the works area (piling) to Mean High Water Springs (MHWS) during construction.
- Where piling cannot be avoided during the shad migration period (March and June inclusive) and is within 30 metres of MHWS, non-percussive piling methods should be used and must only take place on a falling tide from one hour after high tide to one hour before low tide.

The location of the sheet pile wall, >30m from MHWS, ensures compliance with NRW Fisheries Team recommendations to avoid potential effects. Specification of the Giken hydraulic press piling rig provides further certainty that there will be no disturbance issues during sheet pile installation.

Potential for pollution incidents that could affect fish and eel populations will be managed by best practice construction measures (GPPs, CIRIA) secured within the EAP. No operational effects on fish are anticipated.

5.2.3 Otter

Otter are a feature of the River Usk SAC and Lower Usk SSSI and a European Protected Species. Presence is considered to be limited to foraging and or commuting otter, travelling through the site. No permanent resting / breeding places were recorded. Given the very low signs of otters presence recorded during regular searches and camera trapping, it is considered that the area is not a vastly important part of otter habitat within the wider Usk, although any otter within the Site are likely to be part of the River Usk SAC population.

Stephenson Street Embankment - Extensive surveys for otter along the Stephenson Street Embankment including monthly searches for holts, resting places, signs of presence and camera traps were all negative leading to a conclusion of likely absence of otter in this area. NRW Species Team confirmed that in light of the negative results, specific mitigation to retain access over the sheet pile wall was not warranted, but that it would be desirable to encourage potential otter access to the scrub habitats to the rear of the embankment in strategic locations.

Railway Wall and Nash Wall - Footprints were recorded along the western edge of Waterbody 10 (northern sludge lagoon) and a spraint recorded on a culvert crossing a stream to the south of Waterbody 11 (southern sludge lagoon); approximately 500m southeast of the works. Otter cameras on a raft at the eastern bank of the sludge ponds returned three otter recordings; however, these were c. 300m east of the nearest works at the Railway Wall. Habitat suitability of all waterbodies was low such that otter presence is not considered likely adjacent to the works.

Commuting / foraging otter, albeit at low frequency, may travel between the River Usk and inland waterbodies, using terrestrial vegetation and pond / ditch networks as habitat corridors. Any excavations created during construction could result in animals becoming trapped or injured, when moving through the Site at night.

The following best practice will be implemented to minimise potential effects on otters that are using the Site for foraging and commuting:

- Pre-clearance / construction checks will be undertaken, in accordance with best practice survey guidance**Error! Bookmark not defined.** for otter resting / breeding places, within 50m of the works.
- If any otter breeding / resting areas are found during pre-construction checks, further survey work and specific mitigation measures may also be required, in addition to a European Protected Species (EPS) licence which would be obtained from NRW.
- Access for otters along the River Usk will be maintained during construction as secured within the EAP.
- Lighting - If any task lighting is required outside daylight hours (typically 30 minutes after sunrise and up to 30 minutes before sunset), directional lighting (away from linear habitat features and watercourses) with minimal upward spill will be implemented, to avoid light spill into adjacent habitats to avoid disturbance to any commuting otter.
- Noise & Vibration – General construction noise and vibration will be controlled through the timing restrictions within the EAP. Specification of hydraulic 'silent' piling has concomitantly reduced piling noise and vibration to negligible. General construction noise is controlled through good construction practice and hours of working within the EAP.

Standard best practice construction techniques will be implemented (providing an escape from excavations, potential commuting routes kept open, directional task lighting, etc.) through the EAP. Implementation of the standard practices described herein, will ensure that there are no effects on otter.

5.2.4 Habitats

A range of habitats, such as sea couch dominated saltmarsh, saltmarsh mosaic with cord grass and saltmarsh grass, reedbeds, mesotrophic grassland and hawthorn scrub have been recorded within the site, which may be affected during construction. Higher value habitats are associated with the SAC / SSSI that will not be affected following specification of the hydraulic piling rig that negates the need for an access track at the riverside toe of the embankment, thus avoiding potential effects.

With the exception of habitats within designated sites as discussed in Section 5.2.1 above, habitats such as scrub, woodland, ruderal vegetation, waterbodies, amenity grassland or sparse vegetation on bare or sandy soil (conveyor belt) are not species rich and do not have more than local value. As such, any effects to habitats would be of no more than **local significance.**

Indirect effects through pollution events and or mobilisation of sediment, into the river and any wetland habitats, during construction, will be managed by the implementation of standard best practice pollution control measures. Adjacent habitats and protection of tree root protection zones will be protected through the use of Heras fencing. In accordance with the landscape masterplan, new habitats will be created alongside the flood protection infrastructure, which will utilise

local, native species of local provenance avoiding species at risk of prevalent disease; e.g. ash die-back, *Phytophthera*, etc.

With the implementation of these standard practice measures, there will be no effects on any important habitats within the site.

5.2.5 Bats

Habitats within the Site are likely to provide a foraging resource and commuting corridors to a range of bat species, that occur in the local area. Site clearance could result in the loss of potential roosting sites, and if any bats are roosting at the time, there is the potential for them to be injured or killed. Construction activities and associated noise and lighting could also disturb foraging bats, and or roosting bats, if present. No lighting is proposed during operation, and it is considered that there will be no other impacts to bats post-construction.

If trees associated with the Railway Wall Access TN8 and TN10 (Appendix E2a) and Nash Wall (TN14) are to be removed or if there is potential for significant sources of noise and vibration that could disturb roosts (if present) within these trees, further surveys will be undertaken to confirm presence or likely absence of bats.

The following mitigation is advised to avoid or reduce potential effects on roosting and foraging or commuting bats at the Site:

- In line with good practice guidelines[8], a dusk emergence survey and a dawn re-entry survey will be undertaken in 2021 on trees with moderate suitability marked for removal. Surveys will commence during the appropriate survey season (May to September inclusive) and results submitted to inform the planning application. Refer to ECOR for updates.
- Should subsequent emergence / inspection surveys identify the presence of a roost, a European Protected Species (EPS) licence will be obtained from NRW prior to the undertaking of any clearance works. All conditions of the licence will be adhered to and integrated into the project Environmental Action Plan (EAP). Refer to ECOR for updates.
- Lighting - If any task lighting is required outside daylight hours (typically 30 minutes after sunrise and up to 30 minutes before sunset), directional lighting (away from linear habitat features and watercourses) with minimal upward spill will be implemented, to avoid light spill into adjacent habitats to avoid disturbance to any commuting bats.
- Noise & Vibration – General construction noise and vibration will be controlled through the timing restrictions within the EAP. Specification of hydraulic ‘silent’ piling has concomitantly reduced piling noise and vibration to negligible. General construction noise is controlled through good construction practice and hours of working within the EAP.

With the implementation of the above mitigation it is not considered that there would be residual effects on bats, roosting habitats or local bat populations.

5.2.6 Badger

Evidence of badger activity recorded during surveys, suggests that badgers use the site for foraging / commuting. No setts have been recorded although there are records of setts in connecting habitat, and habitats within the site offer suitable habitat for sett construction. As such the presence of badger setts at the time of construction, cannot be ruled out.

Site clearance could result in the loss of setts if any were present at the time of construction, and loss of foraging habitat. Construction activities and associated noise and lighting could also disturb badgers, should their range increase prior to construction. No lighting is proposed during operation, and it is considered that there will be no other impacts to badger post-construction.

The following mitigation is advised to avoid or reduce potential impacts to foraging or commuting badgers at the site should their range expand:

- A pre-construction (including enabling works) inspection of suitable habitat for badger, within 50m of the works, will be carried out to ascertain whether the badger's home range has expanded, and any setts are present. Further monitoring will be undertaken in accordance with best practice survey guidelines, as required pending the initial pre-construction assessment.
- A badger licence will be obtained if any setts will be disturbed or lost by the works.

With the implementation of the above mitigation it is not considered that there would be any significant residual effect on badger, their setts or local badger populations.

5.2.7 Water Vole

Construction Impacts, Mitigation and Residual Effects

Evidence of water vole foraging has been recorded in Waterbody 11, approximately 280m east of the Railway Wall works (eastern and northern banks of the sludge lagoon); however, final surveys in January 2020 did not identify any signs of presence. Furthermore, no water vole breeding / resting places have been recorded. Waterbodies closer to the proposed works are not suitable for water vole.

The following mitigation is advised to avoid or reduce potential impacts to foraging and commuting water vole at the Site should their range expand:

- Pre-clearance / pre-construction checks, in accordance with best practice survey guidance**Error! Bookmark not defined.** will be undertaken for water vole resting / breeding places, within 50m of the works.
- If any water vole breeding / resting areas are found during pre-construction checks, further survey work and mitigation measures may also be required, in addition to a European Protected Species licence which would be obtained from NRW.

With the implementation of the above mitigation it is not considered that there would be any residual effects on water voles or local populations of this species.

5.2.8 Reptiles, Amphibians, Nesting Birds and Section 7 Mammals

Construction Impacts, Mitigation and Residual Effects

Areas of vegetation including trees and scrub within the site, are likely to offer nesting opportunities for a range of bird species including Schedule 1 species; i.e. Cetti's warbler. Small numbers of amphibians and or Section 7 mammal species such as West European hedgehog may also be present; negative survey results suggest likely absence of reptiles.

Construction activities particularly vegetation clearance may result in harm or mortality. Breeding birds will be particularly susceptible during vegetation clearance due to being less mobile, and either sitting on eggs or with young.

In addition to the implementation of embedded mitigation / best practice as detailed above in Section 5.1, namely sensitive vegetation clearance, habitats will be re-instated in accordance with the landscape masterplan using local, native species. These habitats will be suitable for nesting birds, amphibians and Section 7 mammals currently present in the Site.

With the incorporation of mitigation measures there will be no residual effects on nesting birds, amphibians and Section 7 mammals.

5.2.9 Section 7 Invertebrates

A moderate range of common and widespread invertebrates are likely to occur in terrestrial habitats present within the Site such as woodland and wetland habitats, as well as a smaller proportion of notable invertebrates including Section 7 species.

Similar habitats to those lost will be created, using local, native flora and which will provide habitat for local terrestrial invertebrate populations.

With the incorporation of new planting there will be no residual effects on local terrestrial invertebrate populations.

5.2.10 Invasive Non-Native Species (INNS)

Stands of Japanese knotweed (*Fallopia japonica*) located in the south-west corner of Coronation Park, along the main embankment and were treated (sprayed and stem injected) in 2018, 2019 and 2020. However, an additional stand was recorded within the Felnex Estate west of the proposed horseshoe section of the raised highway. Currently this is not anticipated to be affected (refer to ECOR Doc. Ref.: 274580-ARP-XX-XX-RP-EN-0001, ECOP; Appendix B3) by the proposed works; however, should any works be located within 7m of the stand INNS management will be required as specified in the EAP. As an enhancement measure, it is recommended that the identified stand is treated prior to / during

construction to prevent further spread. Subsequent survey identified giant hogweed (*Heracleum mantegazzianum*) in the watercourse near the Nash Wall site; refer to TN11, Appendix E4. This stand of giant hogweed is not likely to be impacted under current proposals; however, should this change an effective management plan will be required noting the species' health and safety (toxic sap that causes serious skin burns) and disposal requirements.

Due to the persistent nature of INNS, it is possible that re-growth of INNS following clearance could impact the establishment of new landscape planting or areas left to naturally regenerate.

Therefore, it is recommended that post-construction survey of retained and newly created habitats within / adjacent to the Site is implemented to reconfirm absence, and where necessary further treatment to control the growth of any INNS is undertaken.

5.3 Monitoring and Maintenance

Further monitoring will be required, post-construction to ensure that habitat establishment is successful, and sensitive ecological receptors within the site have not been damaged during the works. Specifically, this will include:

- Monitoring for signs of scrub colonisation and encroachment into wetland and grassland areas. Where there is encroachment, scrub should be cleared.
- Monitoring the establishment of new tree planting and replace any that fail or are damaged within the first five years. This will be detailed in any landscaping specifications that are provided. Regular monitoring should be in place, at least during the first growing season post-planting.
- Ensuring no invasive plants colonise the area including Japanese knotweed. If these species or any other which are listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) are recorded they will be removed immediately in line with guidance from the Department for Environment, Food and Rural Affairs (Defra, 2003)[42].

5.4 Biodiversity Enhancements

In accordance with Welsh Planning Policy (Planning Policy Wales Edition 10 and supporting Technical Advice Notes (TAN) 5: Nature Conservation and Planning[43]), and the Environment (Wales) Act 2016 opportunities for biodiversity enhancement and the promotion of ecosystem resilience, should be incorporated into the development proposals. Consideration of the following enhancement options in this case include the following; defined Enhancements for delivery are identified within the Environmental Constraints and Opportunities Report (ECOR - 274580-ARP-XX-XX-RP-EN-0001).

[42] https://www.gov.uk/guidance/prevent-the-spread-of-harmful-invasive-and-non-native-plants (accessed on 21.01.2019)
[43] http://wales.gov.uk/docs/desh/policy/100730tan5en.pdf

5.4.1 Coronation Park

Amenity, biodiversity and landscape enhancements are detailed in the Planning Drawings within the Pre-Application Consultation pack. Upgraded access will be provided, at the entrances to Coronation Park, along the new bund section and within Coronation Park itself to provide better connection between the riverside walk and the sports pitches and creating a circular walking route. Viewing platforms will be integrated into the soil bund section to allow for resting areas and provide a connection with the riverside habitats. One viewing platform will encroach into the SAC beyond the defence footprint; construction will be undertaken from the bund (dry side), no temporary access track is required, and a no-dig construction will be employed during installation. Additional planting will be provided within the park and wildflower planting on the inland embankment to increase local biodiversity without compromising integrity of the flood defence. Further biodiversity enhancements will be delivered by the project, including: provision of higher value habitat (three urban forests, reedbed habitat and wildflower planting), restriction of access to SAC / SSSI habitats, provision of bins to reduce litter / dog waste and planting of c. 90 high value standard trees and c. 1,600 saplings.

5.4.2 SSSI Habitats

Previous maintenance access along the River Usk foreshore in the SSSI / SAC boundary, and disturbance of the ground at the same location, has resulted in rutting which has diversified the floral assemblage. As such, there are potential opportunities to enhance the River Usk foreshore within the SSSI / SAC boundary, through further intentional disturbance, which creates shallow scrapes, and therefore encourages the growth / establishment of rare/notable flora and which contributes to the SSSI designation by diversifying the current extensive monoculture of low biodiversity SM24: Sea Couch - *Elytrigia atherica* saltmarsh.

It is also recommended that the saltmarsh should be subject to periodic litter collections. There are many accumulations of tidal litter, including a substantial proportion of plastic waste, and removing these would be beneficial for plants and other wildlife.

At present the flood bank appears to have little or no vegetation management except occasionally clearing the line of the footpath, and this results in a gradual loss of plant diversity as the grassland habitats eventually become covered by low-diversity scrub. In the long term, it would be advantageous to make provision for periodic management to maintain a variety of grassland vegetation types on the new embankment and limit scrub encroachment.

5.4.3 Otter

An artificial otter holt could be provided in suitable habitat, connecting to the River Usk, as identified by the ECoW in consultation with NRW, to provide a suitable breeding site for otters due to the presence of foraging / commuting otter in this area.

5.4.4 Bats

A range of bat boxes (at least five models) will be provided on mature trees within the Site, focussed on the Railway Wall Access route, and or adjacent habitats (subject to landowner agreement and agreement with NRW and the NCC Ecologist). The number and location will be selected by the ECoW and would be informed by the number of appropriate trees within / adjacent to the Site. These should be of woodcrete construction, such as Schwegler models, which are more durable and do not require maintenance.

5.4.5 Birds

A range of bird boxes (at least five models) will be provided on mature trees, and where possible buildings and bridge structures, within the Site, and or adjacent habitats (subject to landowner agreement). The number and location will be selected by the ECoW and will be informed by the number of appropriate receptors within / adjacent to the Site. Similar to bat boxes, these should be of woodcrete construction, such as Schwegler models, which are more durable and do not require maintenance.

5.4.6 Reptiles, Amphibians, Section 7 Mammals

At least three artificial reptile refugia, which provide shelter to hibernating and active reptiles, will be created using materials available post site clearance / construction such as timber logs, brash, grubbed up tree roots, inert hardcore, bricks or building rubble. The number and location will be selected by the ECoW and will be informed by available suitable habitat.

5.5 Potential Operational Effects

Potential ecological impacts of the operational site may be direct or indirect and may be categorised as follows:

- Physical restrictions to species movements.

Physical restrictions to species movements will be managed as described above and secured via the EAP; i.e. Section 5.1 and Section 5.2.3.

6 Conclusion

Arup were commissioned by NRW to evaluate the ecological receptors likely to be present at the Site and to assess the potential impacts associated with the construction and operation phase of the proposed flood defence works along the River Usk. The Ecological Appraisal considered effects on protected sites, habitats and species.

The Site is situated within the River Usk SAC and River Usk (Lower Usk) SSSI supporting important habitats such as saltmarsh and intertidal habitat, otter, and species assemblages of fish and invertebrates of international and national importance. The Site is also within the locally designated Marshalls SINC and Alpha Steel SINC, and in proximity to a number of other SINCS: Julian's Gout, Solutia and Monkey Island. The Site also occurs within 5km of other designated sites including the Severn Estuary SAC, SPA, Ramsar site and SSSI, Gwent Levels SSSI, and Newport Wetlands NNR.

Recommendations have been made regarding the protection of the designated sites and their qualifying features, in addition to the protection of SINCs.

The Site also supports a range of other habitats such as scrub, grassland, woodland, waterbodies and short perennial vegetation, which are not considered to be of great ecological value in themselves, but for the species they support including legally protected species such as nesting birds (including Schedule 1 birds), bats, otter, water vole and potentially reptiles. Although not a valued ecological receptor in terms of conservation, the presence of badger and INNS also warrants consideration due to their legal status.

Potential effects identified on the ecological receptors include disturbance and degradation of habitats, both terrestrial and aquatic, habitat loss, disturbance to protected species, barriers to species movement such as otters, potential for species mortality and injuries to breeding birds, bats, otters, water vole, badger and fish and the spread of INNS.

General mitigation and best practice methods are recommended during site preparation and construction to protect existing habitat and protected species valued for nature conservation, which are of local value or greater. Project-specific mitigation is required for locally protected sites and certain legally protected species: bats and nesting birds and badger and water vole should their ranges extend prior to construction.

With standard construction measures incorporated into the EAP, and post-construction enhancements and monitoring plan in place, effects during the construction phase are reduced to a negligible level or removed completely. No operational impacts are anticipated.

Enhancements are also recommended, to meet the requirements of the Environment (Wales) Act 2016, through the provision of species-specific habitat features and potential enhancement of the SSSI foreshore, alongside existing

proposals to enhance habitats which have already been embedded into the design and landscaping.

This report is the result of survey work undertaken between March 2018 and January 2020, although the site has been surveyed for the project since 2015. This report refers, within the limitations stated, to the condition or proposed development of the site at the time of the inspections. Changes in legislation, guidance, best practice, etc. may necessitate a re-assessment / survey. Pre-construction surveys, planned for 2021, will review and update the baseline status 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

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LEGEND

A3

- Phase 1 Works- Flood Defence Improvements
- Phase 2 Works
- 2km works buffer
- 5km works buffer
- Sites of Importance for Nature Conservation (SINC)
- Sites of Special Scientific Interest (SSSI)
- Special Protection Areas (SPA)
- Special Areas of Conservation (SAC)
- Ramsar

ARUP

Rev.	Date.	Drawn.	Description.	Chkd.	Appd.	Date.
P0	2018-07-24	EA	Preliminary	GM	PC	2018-07-24

Cyfoeth Naturiol Cymru Natural Resources Wales

Project Name.
Stephenson Street Embankment

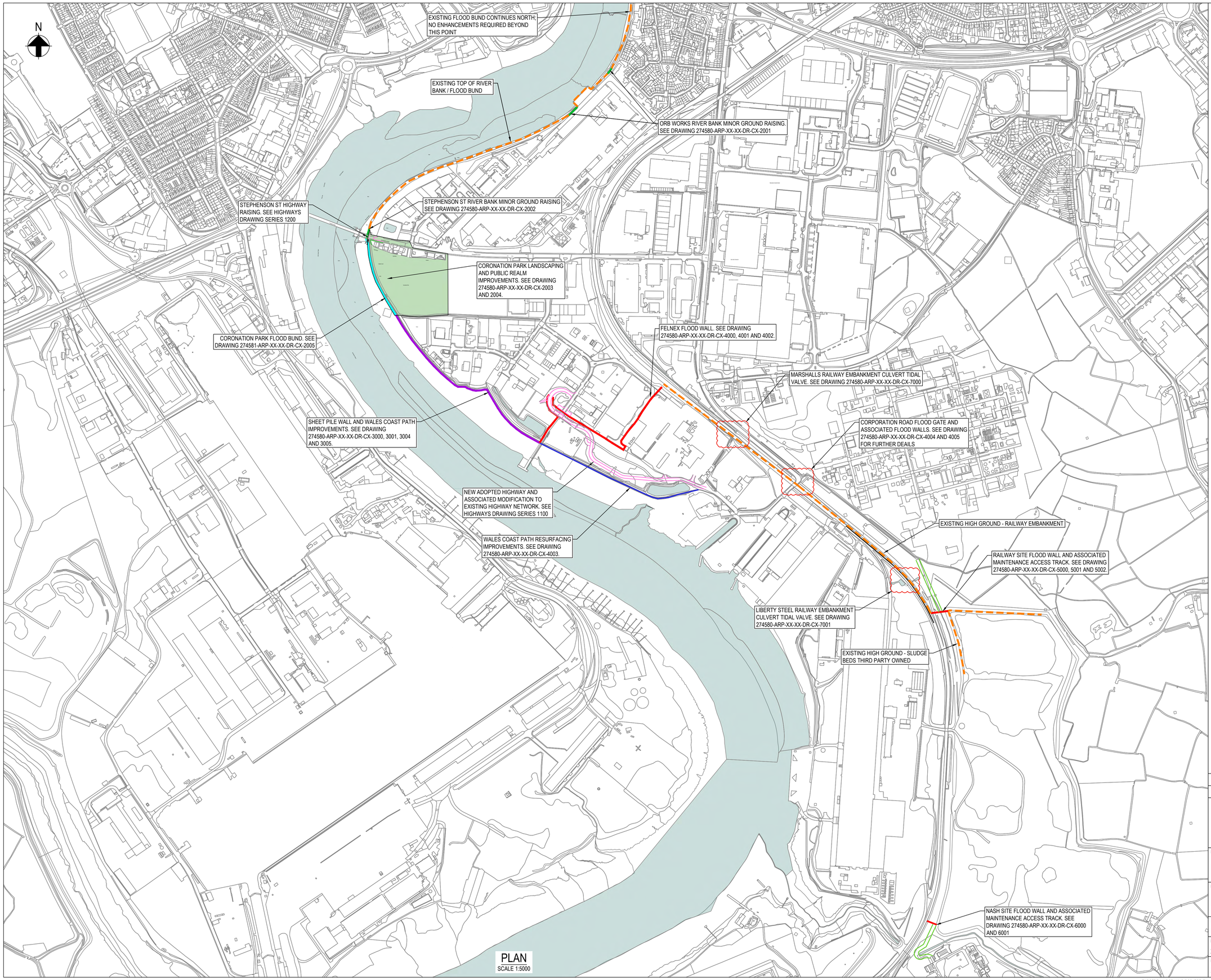
Drawing Title.
FIGURE 2
STATUTORY AND NON-STATUTORY DESIGNATED SITES

Suitability.	Suitability Code.
Preliminary	2018-07-24

Originator	Designer	Date.
EA	GM	2018-07-24
Internal Project Number	**Scale**	**Rev.**
245404	1:41,990	P0

Drawing Number.
002

Appendix A: Scheme Design Drawing



PLAN
SCALE 1:5000

A1

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS, SPECIFICATIONS AND CONTRACT DOCUMENTS. NOTIFY THE PROJECT MANAGER OF ANY DISCREPANCIES.
2. ALL DIMENSIONS IN MILLMETERS AND ALL LEVELS IN METERS ABOVE ORDNANCE DATUM UNLESS NOTED OTHERWISE.
3. DO NOT SCALE FROM DRIWING.

LEGEND:

- EXISTING HIGH GROUND
- GROUND RAISING
- BUND
- SHEET PILE WALL
- REINFORCED CONCRETE WALL
- WALES COASTAL PATH RESURFACING
- MAINTENANCE ACCESS TRACKS
- ADOPTED HIGHWAY
- LANSCAPING AND PUBLIC REALM ENHANCEMENTS

0 50 100 200 Metres
Scale 1:5000

Rev.	Description	Drawn	Chkd.	Appd.	Issue Date
P01	DRAFT FOR COMMENT	SG	JL	RC	19.02.21

Cyfoeth Naturiol Cymru Natural Resources Wales

ARUP

Project Name.
STEPHENSON ST FLOOD DEFENCE SCHEME

Drawing Title.
SCHEME KEY PLAN

Suitability.	Suitability Code.
DRAFT FOR COMMENT	S2

Internal Project Number.	Scale.	Rev.
274580	AS SHOWN	P01

Drawing Number.
274580-ARP-XX-XX-DR-CX-2000

J:\274000\274580-00\4 Internal Project Data\4-30 Drawings\4-31 Issue drawings\274580-ARP-XX-XX-DR-CX-2000.dwg

Appendix B: Consultations

Ecology Comments

Application Reference:	20/0305
Site Address:	Embankment Along East Of River And South of, Stephenson Street, Newport
Description:	EIA SCREENING OPINION FOR IMPROVEMENT WORKS TO FLOOD DEFENCE EMBANKMENT
Planning Officer:	Geraint Roberts
Ecology Officer:	Sali Palmer, Biodiversity and Ecology Officer (MCC)
Date of Comments:	16th April 2020

I have addressed some of the key questions in the EIA screening checklist relating to ecology, and offer the following information for your consideration.

Questions to be Considered when screening the application.	Yes / No / ? . Briefly describe	Is this likely to result in a significant effect? Yes/No/? – Why?
8. Will there be any risk of accidents during construction or operation of the development project which could affect human health or the environment?	**Yes** Due to the proximity of the river, there is risk of accidents during the construction phase which could affect the environment.	**Potentially** Accidental pollution events may affect water chemistry and siltation/turbidity, and may result in toxic contamination. A CEMP is proposed to avoid potential risks.
11. Are there any areas on or around the location which are protected under international or national or local legislation for their ecological, landscape, cultural or other value, which could be affected by the development project?	**Yes** River Usk SSSI & SAC (within site) Marshall's SINC (within site) The Severn Estuary SSSI, SAC, SPA & Ramsar site (1.5 km) The Afon Ebbw SINC (1.5 km)	**Potentially** There is potential for direct (habitat loss and disturbance) and indirect (disturbance and pollution) impacts to the habitats within these designated sites and the species that are the interest features. Mitigation measures are proposed to reduce the potential for impacts.
12. Are there any other areas on or around the location which are important or sensitive for reasons of their ecology e.g. wetlands, watercourses or other waterbodies, the coastal zone, mountains, forests or woodlands, which could be affected by the development project?	**Yes** The site supports a mosaic of plant communities including saltmarsh, swamp, mesotrophic neutral grassland, reed bed and scrub. The site is immediately	**Potentially** There is potential for direct (habitat loss and disturbance) and indirect (disturbance and pollution) impacts to the habitats within the site and adjacent to the site.

	surrounded by internationally important river habitats.	Mitigation measures are proposed to reduce the potential for impacts. Direct habitat loss is expected to be reinstated after development; it is not clear whether this will be restored or naturally regenerate.
13. Are there any areas on or around the location which are used by protected, important or sensitive species of fauna or flora e.g. for breeding, nesting, foraging, resting, overwintering, migration, which could be affected by the development project?	**Yes** The site is suitable for otter, which is an EPS and interest feature of the river. No evidence was found during the surveys to inform the EcIA, but evidence of otter has recently been identified by the Transporter Bridge to inform the proposed restoration worlds. Schedule 1 bird Cetti's warbler was considered to be likely breeding on site. The site is likely to support a range of invertebrate species, potentially nationally scarce species.	**Potentially** There is potential for injury or mortality to species potentially present or confirmed as being present within the site, including Schedule 1 nesting birds. Sensitive working methods will be required in the CEMP to avoid potential risks to the protected and priority species. Habitat loss is likely to be temporary. Compensation for loss of nesting habitat should be considered to ensure no net loss for biodiversity.

Appendix C: Legislation, Policy Context & Guidance

Legislation

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.

Conservation of Habitats and Species Regulations 2017 (as amended)

The Conservation of Habitats and Species Regulations 2017 (as amended) (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) into law within England and Wales. These regulations provide for the designation and protection of sites of European importance know as European or Natura 2000 Sites.

European Sites comprise:

1. Special Areas of Conservation (SACs), including candidate sites, designated under the Conservation of Habitats and Species Regulations 2017 (as amended)[44].
2. Special Protection Areas (SPAs) including candidate sites, designated under the Wildlife and Countryside Act 1981 (as amended)[45].
3. Ramsar Sites designated under the Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 are also considered as European Sites as a matter of UK Government policy along with proposed SACs and SPAs.

The Habitats Regulations require that consideration is given to the implications of plans and projects (developments) on European Sites. Specifically Regulation 63(1) states:

1. "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;

(b) is not directly connected with or necessary to the management of that site.

[44] The Habitats Regulations transposes the requirements on Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora in to UK law.
[45] The Wildlife and Countryside Act 1981 transposes the requirements of Directive 79/409/EEC on the Conservation of Wilde Birds (Birds Directive) in to UK law. The Birds Directive has been updated through Directive 2009/147/EC on the Conservation of Wild Birds.

2. 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 under the Town and Country Planning Act 1990. The determining authority is known as the Competent Authority with the Regulations.

The Habitats Regulations also convey special protection to a number of species, which are listed in Schedule 2 of the Regulations and are referred to as European Protected Species (EPS). Those relevant to the Scheme include:

1. All UK resident bat species;
2. Common dormouse (*Muscardinus avellanarius*);
3. Great crested newt (*Triturus cristatus*);
4. Otter (*Lutra lutra*);
5. Marsh fritillary butterfly (*Euphydryas aurinia*).

Regulation 43 makes it an offence to:

1. Deliberately capture, injure or kill any wild animal of a EPS;
2. Deliberately disturb wild animals of such a species;
3. Deliberately take or destroy the eggs of such a species;
4. Damage or destroy 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 Statutory Nature Conservation Organisation (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".

Ramsar Convention 1971

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

Wildlife and Countryside Act 1981 (as amended)

A network of nationally designated sites has been established through the designation of Sites of Special Scientific Interest (SSSIs) under the Wildlife and Countryside Act 1981. 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 (Natural Resources Wales). The protection afforded to SSSIs is used to underpin the designation of areas at a European Level.

The Wildlife and Countryside Act also places obligations on Welsh Ministers and other public bodies with regard to the conserving and enhancing of the features of SSSIs in the exercise of their functions.

The Wildlife and Countryside Act 1981 provides 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.

In England and Wales water voles are listed on Schedule 5 of the Wildlife and Countryside Act 1981, receiving full protection since 2008. The Wildlife and Countryside Act 1981 together with amending legislation, lists the following offences:

1. Intentionally killing, injuring or taking a water vole by any method.
2. Intentionally or recklessly damaging or destroying a water vole place of shelter or protection.
3. Intentionally or recklessly damaging disturbing a water vole whilst it is occupying such a structure or place it uses for shelter or protection.
4. Intentionally or recklessly obstructing access to a water vole’s place of shelter or protection.
5. Selling, offering for sale, or possessing or transporting for the purposes of sale, any live or dead water vole, or any part or derivative, or advertising any of these for buying or selling.

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

The Act also includes provisions for the control of invasive non-native species (INNS). Under these provisions it is an offence to:

1. Release or allow to escape into the wild any animal which is not ordinarily resident or a regular visitor to Great Britain, or is included in Schedule 9 of the Act.
2. Plant or otherwise cause to grow in the wild any plant which is included in Schedule 9 of the Act.

People undertaking works in proximity to invasive non-native plant species should take all reasonable steps and exercise all due diligence to avoid committing an offence.

The Invasive Alien Species (Enforcement and Permitting) Order 2019

The order came into effect on the 1st December 2019 to allow for enforcement of EU Regulations (Regulation (EU) No. 1143/2014 on the prevention and management of the introduction and spread of invasive alien species in England and Wales) also known as the IAS Regulations.

It lists 66 species which are of European Union concern. There are currently 19 species listed in the Order (16 of these species are found in Wales). Species include:

- Chinese mitten crab (*Eriocheir sinensis*)
- Red Swamp crayfish (*Procambarus clarkii*)
- Crayfish signal (*Pacifastacus leniusculus*)
- Spiny cheek crayfish (*Orconectes limosus*)
- Muntjac deer (*Muntiacus reevesi)*
- Ruddy duck (*Oxyura jamaicensis)*
- Egyptian goose (*Alopochen aegyptiacus*)
- Grey squirrel (*Sciurus carolinensis*)
- Himalayan balsam (*Impatiens glandulifera)*
- Fanwort (otherwise known as Carolina water shield) (*Cabomba caroliniana*)
- Giant hogweed (*Heracleum mantegazzianum*)
- Water hyacinth (*Eichhornia crassipes*)
- Parrots Feather (*Myriophyllum aquaticum*)
- Floating pennywort (*Hydrocotyle ranunculoides*)
- Floating water primrose (*Ludwigia peploides*)
- Water Primrose (*Ludwigia grandiflora*)
- Giant rhubarb (*Gunnera tinctoria*)
- Curly waterweed (*Lagarosiphon major*)
- Nuttall’s waterweed (*Elodea nuttallii*)

This Order allows for the enforcement of, including the relevant licences, permits and rules for keeping invasive alien species.

The amendments remove these Invasive Alien Species (IAS) of Union concern from the ambit of the provisions relating to invasive non-native species in sections 14 and 14ZA of the Wildlife and Countryside Act 1981. This is to make the

legislation more transparent and easier to use by bringing all the offences relating to species of Union concern into one place.

Criminal offences are introduced for breaches of the main restrictions of The IAS Regulation, as well as offences relating to:

- False statements;
- Altering, or not meeting, the conditions of permits and licences;
- Attempts to commit offences;
- Obstruction; and
- Offences for companies and partnerships.

It is also an offence to:

- Allow the escape or release into the wild an animal that is not normally a resident or regular visitor to Great Britain, or an animal listed in Part 1 of Schedule 2, including species of crabs, ducks and squirrel.
- Plant, or allow to grow in the wild, plants listed in Part 2 of Schedule 2.
- Sell, or be involved in the sale of, any plant listed in Part 3 of Schedule 2, including Water Primrose and Floating Pennywort.

If found guilty of an offence a person may be liable to imprisonment of up to two years, or a fine. Permits and licences may be made void where an offence is committed and a person may be banned from being granted a permit or licences again for up to 5 years.

The legislation in relation to the remaining species listed in Schedule 9 of the Wildlife and Countryside Act 1981 remains unchanged.

National Park and Access to the Countryside Act 1949 (as amended)

Local Nature Reserves (LNRs) can be given protection against damaging operations through powers within the National Parks and Access to the Countryside Act 1949. 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.

The Protection of Badgers Act 1992

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.

Interference with a sett includes damaging or destroying it, obstructing access to it, causing a dog to enter it, or disturbing the badgers which are occupying it.

Hedgerow Regulations 1997

The Hedgerow Regulations 1997 set out a framework for the protection of hedgerows against removal where they are deemed to be important either due to their age, ecological or archaeological features. Approval is required from the local authority prior to the removal of hedgerows. Local authorities can enforce the retention of Important Hedgerows through the issuing of Retention Notices.

Salmon and Freshwater Fisheries Act 1975 (as amended)

The Salmon and Freshwater Fisheries Act (SAFFA) is legislation that aims to protect freshwater fish, with a particularly strong focus on salmon and trout. The legislation covers a broad range of topics, but of particular relevance to development are those sections covering water pollution, habitat disturbance and fish migration routes.

Under Section 2 (4) it is an offence to wilfully disturb spawn, spawning fish or spawning areas and under Section 4 (1) it is an offence to knowingly permit the flow of poisonous matter and polluting effluents into river courses that are poisonous or injurious to fish or the spawning grounds, spawn or food of fish.

Sections 9 to 15 are concerned with fish passage and migration routes. It is the duty of the waterway owner that when constructing dams, screens or sluices to provide and maintain a facilitating fish pass for migrating salmon or trout. Section 9 allows the regulator to serve notice on the owner or occupier of a dam or obstruction, to install a fish pass where necessary. This section applies to dams which are either new or have been altered to create an increased obstacle to the passage of migratory salmonids. It is also applicable where dams in a state of disrepair have been rebuilt over at least one half of their length.

Eels (England and Wales) Regulations 2009

This implements Council Regulation (EC) No 1100/2007 of 18 September 2007 establishing measures for the recovery of the stock of European eel. The regulations are focussed on the management of commercial eel fisheries (licences, catch returns and restocking) and the passage/migration of eels. The regulations afford powers to the regulators (Environment Agency and Natural Resources Wales) to implement eel recovery measures in all freshwater and estuarine waters in England and Wales.

Part 4 of the regulations is concerned with the passage of eels and makes it a legal requirement to notify the regulator of the construction, alteration or maintenance of any structure likely to affect the passage of eels. This include water intakes and outfalls, dams and weirs, sluices or any other in-river obstruction. Where any such structure exists, the owner, occupier or person in charge of the land on which the dam, structure or obstruction lies may be required to construct and operate an eel pass to allow the free passage of eels.

Wild Mammals (Protection) Act 1996

This Act operates in parallel with the legislation listed above conferring specific protection on rare or threatened mammal species by protecting all wild mammals from any action intended to cause unnecessary suffering.

Natural Environment and Rural Communities (NERC) Act 2006

The Act is primarily intended to implement key aspects of the Government's Rural Strategy published in July 2004; it also addresses a wider range of issues relating broadly to the natural environment. The Act also makes provision in respect of biodiversity, pesticides harmful to wildlife and the protection of birds, and in respect of invasive non-native species. It alters enforcement powers in connection with wildlife protection and extends time limits for prosecuting certain wildlife offences. It addresses a small number of gaps and uncertainties which have been identified in relation to the law on sites of special scientific interest. It also amends the functions and constitution of National Park authorities, the functions of the Broads Authority and the law on rights of way (DEFRA website September 2016).

The Environment (Wales) Act 2016

The Environment (Wales) Act 2016 replaces the duties on public bodies in Wales to conserve and enhance biodiversity in the exercise of their functions. This duty includes consideration of the resilience of ecosystems in terms of their diversity, connectivity, adaptability, scale and condition. The Act also reinforces the duties in relation to the lists of species and habitats of importance and duties to conserve and enhance those species and habitats. Within this Chapter these are referred to as Section 7 Habitats and Species, although revised lists have not been published to date.

The Well-being of Future Generations (Wales) Act 2015

The Well-being of Future Generations Act requires public bodies in Wales to consider the long-term impacts of decisions on the social, cultural, environmental and economic well-being of both current and future generations.

In particular the Act includes a number of goals including to maintain and enhance a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change.

Policy Context

The Newport County Council Adopted Local Development Plan (LDP) 2011-2026 includes a number of policies relating to nature conservation, in particular:

GP5 General Development Principles – Natural Environment

Development will be permitted where, as applicable i) the proposals are designed and managed to protect and encourage biodiversity and ecological connectivity including through the incorporation of new features on or off site to further the

UK/Welsh and or Newport Biodiversity Action Plans; ii) the proposals demonstrate how they avoid, or mitigate and compensate negative impacts to biodiversity, ensuring that there are no significant effects on areas of nature conservation interest including international, European, National Welsh section and local protected habitats and species, and protecting features of importance for ecology iii) the proposal will not result in an unacceptable impact on water quality iv) the proposal should not result in the loss or reduction in quality of high quality agricultural land (Grades 1, 2 and 3A); v) there would be no unacceptable impact on landscape quality vi) the proposal includes an appropriate landscape scheme, which enhances the site and the wider context including green infrastructure and biodiversity networks; vii) the proposal includes an appropriate tree planting or retention where appropriate and does not result in the unacceptable loss of or harm of trees, woodland or hedgerows that have wildlife or amenity value.

CE8 Locally Designated Nature Conservation and Geological Sites.

Proposals affecting locally designated sites will only be permitted where i) there would be no overall loss of the nature conservation resource for which the site has been designated ii) there would be no significant adverse effect on the geological interest of the site; iii) appropriate mitigation or compensatory measures can be achieved.

Planning Policy Wales (PPW)

Planning Policy Wales[46] (WG, 2018) sets the national policies in relation to development control through the Town and Country Planning Act 1990. This is supported by a series of Technical Advice Notes (TAN), of particular relevance is Technical Advice Note 5 (WG, 2009) which sets out the consideration of nature conservation in the determination of planning applications.

PPW 10 sets out that “planning authorities must seek to maintain and enhance biodiversity in the exercise of their functions. This means that development should not cause any significant loss of habitats or populations of species, locally or nationally and must provide a net benefit for biodiversity” (para 6.4.5). This policy and subsequent policies in Chapter 6 of PPW 10 respond to the Section 6 Duty of the Environment (Wales) Act 2016.

A recent letter from WG to LPAs clarified that in light of the PW 10, and the Environment (Wales) Act 2016, where biodiversity enhancement is not proposed as part of an application, significant weight will be given to its absence, and unless other significant material considerations indicate otherwise it will be necessary to refuse permission

United Kingdom Biodiversity Action Plan (UK BAP)

In 1992 the UK signed the Convention on Biological Diversity at the Rio Convention pledging the UK to develop national strategies for the conservation and sustainable use of biological diversity. The UK Government subsequently produced Biodiversity: The UK Action Plan in 1994, which described the

[46] Welsh Government (2018) Planning Policy Wales, Edition 10.

biological resources of the UK as a whole and in turn led to the production of Biodiversity Action Plans for individual habitats and species.

Biodiversity policy within the UK has been revised through the publication of the UK Post-2010 Biodiversity Framework (JNCC, 2012) which covers the period from 2011 to 2020. A total of 65 Priority Habitats and 1150 Priority Species have been identified as the most in need of protection. Such species and habitats present in Wales have been listed as species and habitats of principal importance for conservation in response to the requirements of the Environment (Wales) Act 2016. They are hereafter referred to as Section 7 (S7) species.

Wales Action Plan for Pollinators (2013)

The Action Plan for Pollinators in Wales recognises that: 'Pollinators are an essential component of our environment. Honey bees and wild pollinators including bumblebees, solitary bees, parasitic wasps, hoverflies, butterflies and moths and some beetles are important pollinators in Wales, for crops such as fruit and oil seed rape, clovers and other nitrogen fixing plants that are important to improving the productivity of pasture systems for livestock grazing, and wild flowers.'

The Welsh Government has worked with industry and stakeholders to look in more detail at the evidence and issues around pollinators and their conservation in Wales. Following consultation, an 'Action Plan for Pollinators in Wales' was launched setting the strategic vision, outcomes and areas for action to halt and reverse pollinator decline in Wales. This plan aims to reduce and reverse the decline in wild and managed pollinator populations, which includes bees, some wasps, butterflies, moths and hoverflies, some beetles and flies. A pollinator task force comprising of key stakeholders is now active and a draft implementation plan is in place.

Newport Local Biodiversity Action Plan

The Newport Local Biodiversity Action Plan[47] includes Habitat Action Plans for Woodland habitats, Freshwater, Wetland, Farmland, lowland Grassland and Heathland, Brownfield and Urban Habitats. In addition, a dormouse, bat, shrill carder bee, water vole, otter, fungi and small ranunculus Species Action Plan.

[47] http://www.newport.gov.uk/documents/Leisure-and-Tourism/Countryside/Newport-Local-Biodiversity-Action-Plan.pdf

Appendix D: Desk Study

D1: Statutory designated Sites within 5 km and 2 km of the Site boundary, for European and national Sites, respectively[48].

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*)	Within Site boundary

[48] Designated features are taken from NRW's website and the corresponding citations/data forms.

Site Name	Features	Distance from Proposed Development
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). - 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*)	1 km south

Site Name	Features	Distance from Proposed Development
	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 km south

Site Name	Features	Distance from Proposed Development
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. 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*).	1 km south
National Protected Sites		

Site Name	Features	Distance from Proposed Development
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.	Within Site boundary

Site Name	Features	Distance from Proposed Development
Severn Estuary Site of Special Scientific Interest (SSSI)	The Severn Estuary lies on the south west coast of Britain at the mouth of four major rivers (the Severn, Wye, Usk and Avon) and many lesser rivers. The immense tidal range (the second highest in the world) and classic funnel shape make the Severn Estuary unique in Britain and very rare worldwide. The intertidal zone of mudflats, sand banks, rocky platforms and saltmarsh is one of the largest and most important in Britain. The estuarine fauna includes: internationally important populations of waterfowl; invertebrate populations of considerable interest; and large populations of migratory fish, including the nationally rare and endangered Allis shad. The SSSI forms the major part of a larger area of estuarine habitat, which includes the Upper Severn Estuary, the Taf/Ely Estuary and Bridgwater Bay.	1 km south west
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.	550 m south

Site Name	Features	Distance from Proposed Development
	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*) 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.	
Gwent Levels – St. Brides SSSI	The information above (for the Gwent Levels – Rumney and Peterstone SSSI) is applicable here with regards to the general ecology of the Gwent Levels SSSI. In addition, the following information is specific to the St Brides area: The reens in the St Brides area support a number of interesting plant species most notably thread-leaved water-crowfoot (*Ranunculus trichophyllus*) and small pondweed (*Potamogeton berchtoldii*). Reen bank and green lane habitats in this area are also important for relict meadow plant species such as the regionally notable grass vetchling (*Lathyrus nissolia*) and common meadow-rue (*Thalictrum flavum*). The St Brides area also supports rich invertebrate communities with a number of nationally notable and notable marshland species, e.g. the true fly (*Chrysogaster macquarti*) and the beetle (*Hydaticus transversalis*). It is the only area on the Gwent Levels where the rare fly *Stenomicra cogani* has been recorded.	1.8 km west

Site Name	Features	Distance from Proposed Development
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 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.	500 m east

Site Name	Features	Distance from Proposed Development
Gwent Levels SSSI – Whitsun	The Gwent Levels constitute the lowlands between Cardiff and Chepstow and are drained by an ordered network of drainage ditches. They are an example of one of the most extensive areas of reclaimed wet pasture in Great Britain which includes the Somerset Levels, Romney Marsh and the Pavensey Levels, and is the largest area of its kind in Wales. Together these Levels systems constitute a national series of sites each with its own special features. The Gwent Levels reens are rich in plant species and communities, many of which are rare or absent in other Levels systems. This is due to the variety of reen types and their management regimes and the timing of the management which results in a staggered programme across the Levels. 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. Others are less intensively managed and some have become completely overgrown by weeds and hedges. The aquatic invertebrate fauna is very diverse and the Gwent Levels compares well with similar areas in Britain. Many nationally rare or notable 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 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 Whitson area is of particular importance for its large number of nationally rare and notable invertebrate species. A total of 65 of these rare invertebrates have been recorded in this area including *Anthomyza bifasciata*, *Coptophlebia volucris* and *Hydrophilus piceus*. This area is also important for its botanical interest as it contains the nationally rare hairlike pondweed *Potamogeton trichoides* and is the only location in Gwent for the tussock sedge *Carex elata.* Arrowhead *Sagittaria sagittifolia* also grows in abundance in several main reens in this area.	Approximately 4 km east of the Site.

D2: Non-statutory designated Sites within 2 km of the Site boundary

Site Name	Reason for designation[49]	Approximate Distance from the Site
Marshall's SINC	Mosaic neutral grassland, post-industrial wetland along the banks of the River Usk.	Forms the embankment that is the Site
Alpha Steel	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.*	The Railway Wall part of the site, and Usk Power station/Nash treatment works site occurs within the Alpha Steel SINC..
Julian's Gout Land	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*.	Immediately adjacent to the site (to the west)
Solutia	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 adjacent to the Site (to the north east).
Gwent Wetland Reserve	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*.	Approximately 550 m south of the Site
Monkey Island	Mosaic post-industrial grassland, scrub and ruderal. Local record of blue pimpernel found on Site (the only record in Gwent)	250 m north of the Site
Afon Ebbw River	Major river system with associated semi-improved neutral and marsh grassland, swamp, scrub and semi-natural woodland with associated species including bulbous foxtail *Alopecurus* near the confluence with the River Usk, kingfisher *Alcedo atthis*, sandmartin *Riparia riparia* and grass snake *Natrix natrix*.	1.50 km west of the Site.

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

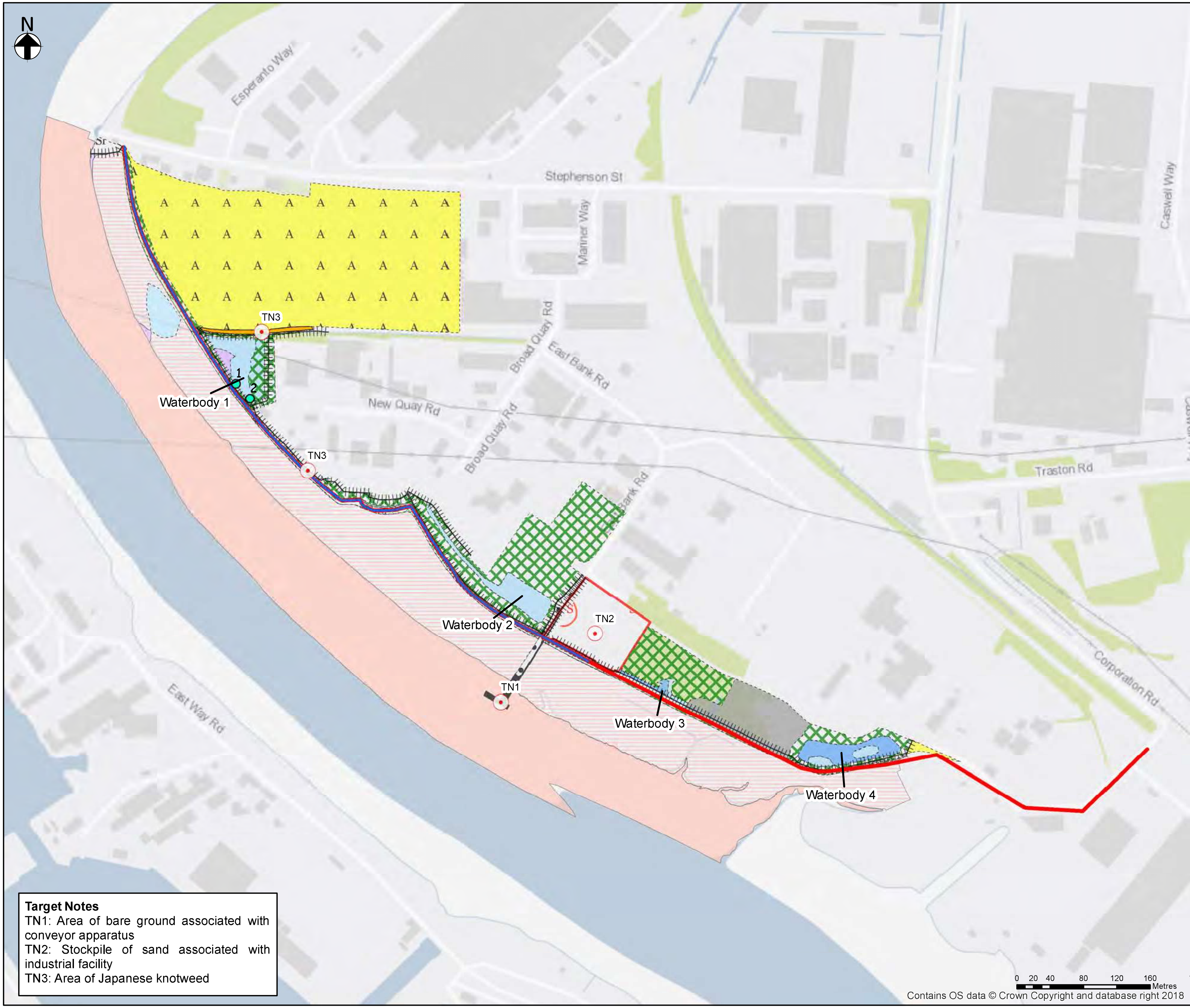
D3: SEWBReC Desk Study Bird Records

Bird Species	Scientific Name	Status[50]
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
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

[50] 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[50]
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
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*	
Wood Warbler	*Phylloscopus sibilatrix*	S7
Woodlark	*Lullula arborea*	Sch1, BDir1, S7
Yellow Wagtail	*Motacilla flava*	S7
Yellowhammer	*Emberiza citrinella*	S7

Appendix E: Survey Areas and Results



Target Notes
TN1: Area of bare ground associated with conveyor apparatus
TN2: Stockpile of sand associated with industrial facility
TN3: Area of Japanese knotweed

Legend

- Target note
- Otter Camera Locations
- Phase 2 Works
- Phase 1 Works- Flood Defence Improvements
- Fence
- Wall
- Japanese knotweed
- Dense scrub
- Scattered scrub
- Poor semi-improved grassland
- Swamp
- Standing water
- Running water
- Intertidal mud/sand
- Saltmarsh dune interface
- Mud/sand above mean high water
- Spoil
- Amenity grassland
- Buildings
- Bare ground
- Gravel and concrete

A3

ARUP

Rev.	Date.	Drawn	Description.	Chkd.	Appd.	Date.
P0	2018-05-21	EA	Preliminary	GM		2018-07-24

Cyfoeth Naturiol Cymru
Natural Resources Wales

Project Name. Stephenson Street Embankment

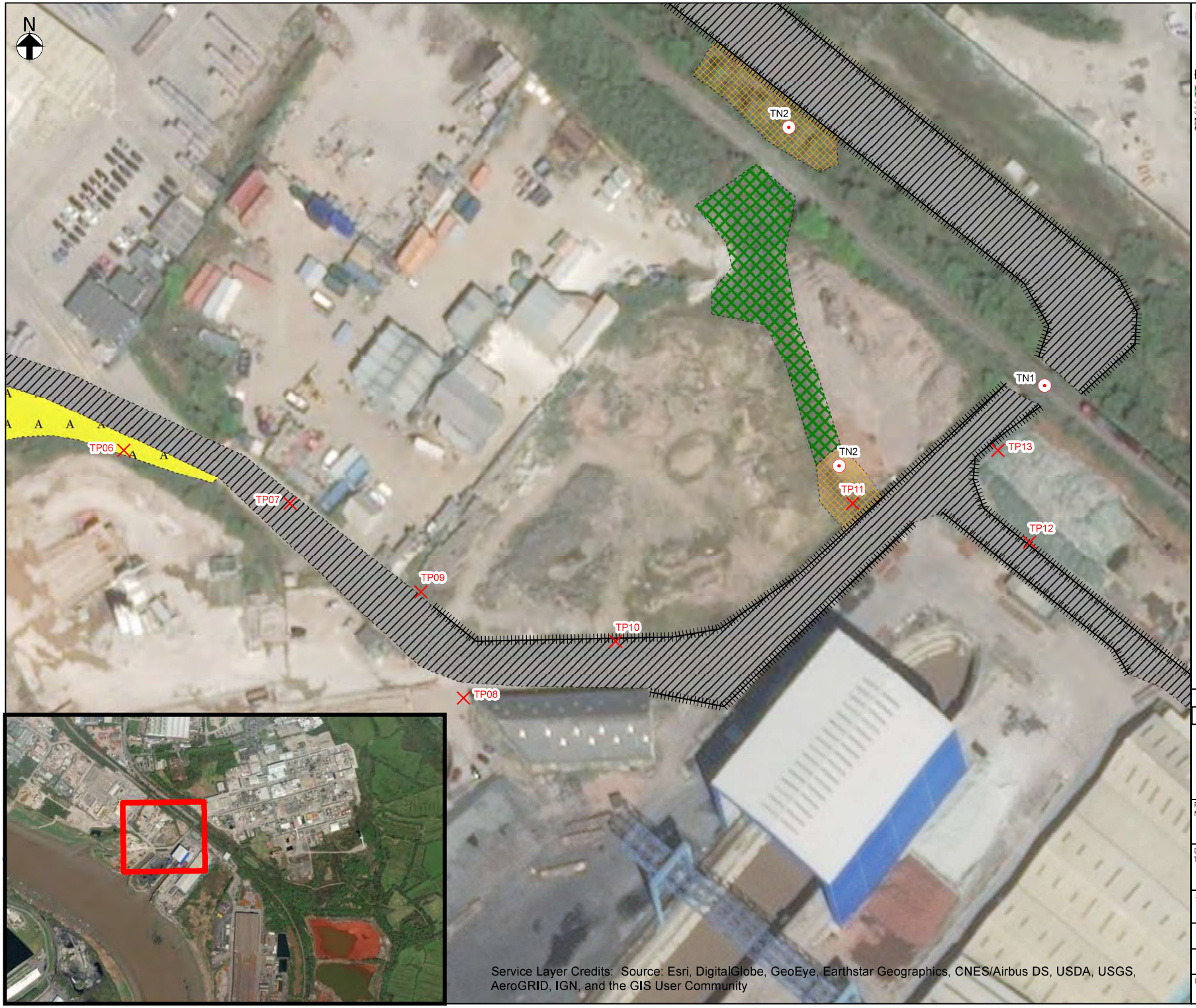
Drawing Title. FIGURE 2
EXTENDED PHASE 1 PLAN

Suitability. Preliminary
Suitability Code. 2018-05-21

Originator EA
Designer GM
Date. 2018-05-21

Internal Project Number 245404
Scale 1:4,250
Rev. P0

Drawing Number. 002



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

A3

LEGEND

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

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. For Issue

Suitability Code. S1

Originator	Designer	Date.
EA	CP	2019-02-21

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

Drawing Number. 003

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. For Issue

Suitability Code. 2019-02-08

Originator EA

Designer CP

Date. 2019-02-08

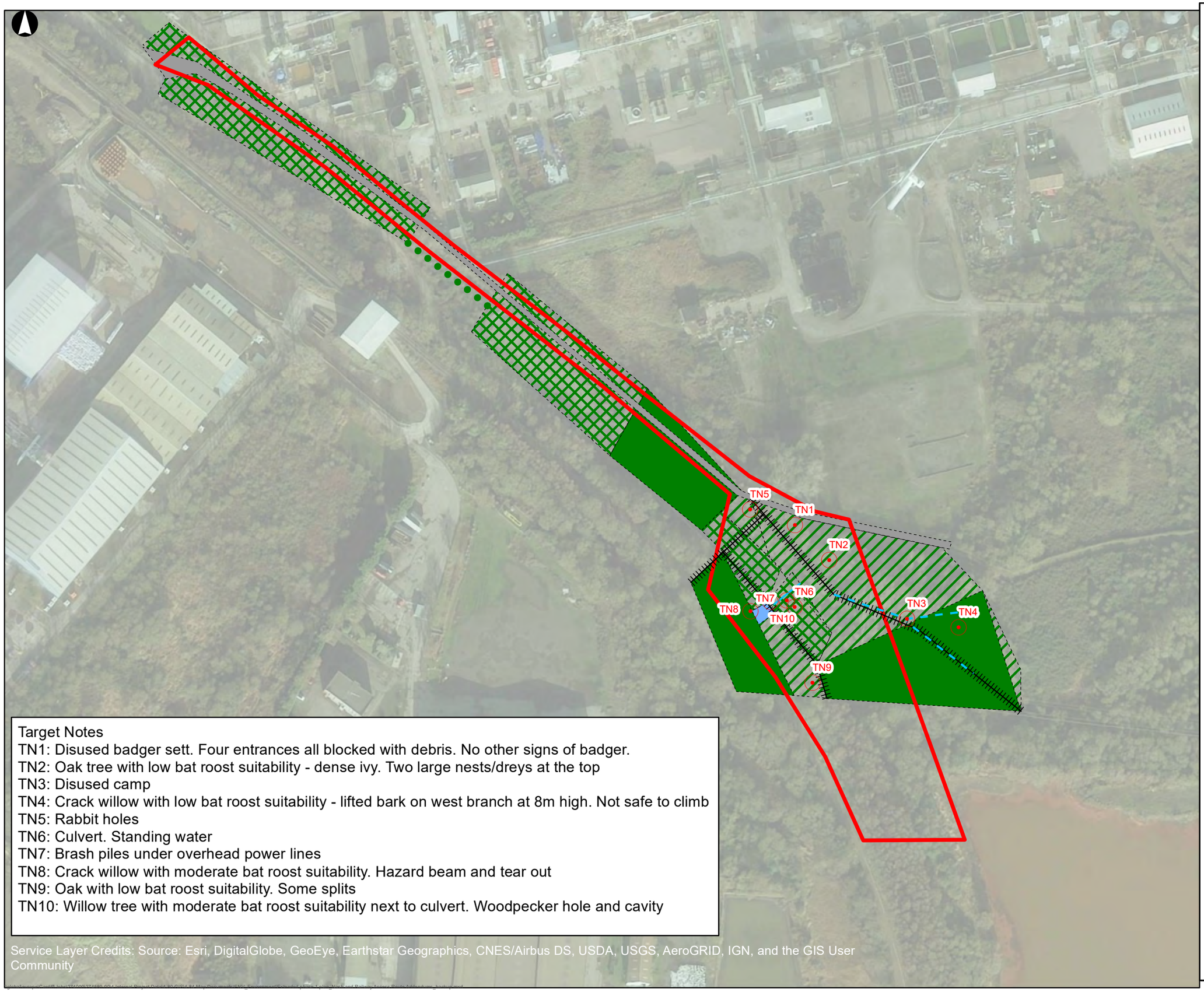
Internal Project Number 246344

Scale 1:2,000

Rev. F1

Drawing Number. 002

A3



Target Notes
TN1: Disused badger sett. Four entrances all blocked with debris. No other signs of badger.
TN2: Oak tree with low bat roost suitability - dense ivy. Two large nests/dreys at the top
TN3: Disused camp
TN4: Crack willow with low bat roost suitability - lifted bark on west branch at 8m high. Not safe to climb
TN5: Rabbit holes
TN6: Culvert. Standing water
TN7: Brash piles under overhead power lines
TN8: Crack willow with moderate bat roost suitability. Hazard beam and tear out
TN9: Oak with low bat roost suitability. Some splits
TN10: Willow tree with moderate bat roost suitability next to culvert. Woodpecker hole and cavity

04/10/2020 17:29:30

Legend

- Proposed Access Route
- A3.1 - Broadleaved parkland/scattered trees
- J2.6 - Dry ditch
- J2.4 - Fence
- G1 - Standing water
- A1.1.1 - Broadleaved woodland - semi-natural
- A1.1.2 - Broadleaved woodland - plantation
- A2.1 - Scrub - dense/continuous
- G1 - Standing water
- J5 - Gravel/hard standing
- TN - Target note

Issue	Date	By	Chkd	Appd
F1	2020-09-24	AK	CP	PC

Metres
0 25 50 100

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Client
Natural Resources Wales

Job Title
Stephenson Street Embankment Railway Wall Access Route

Extended Phase 1 Habitat Survey

Scale at A3
1:2,000

Job No	Drawing Status
	For Issue

Drawing No	Issue
001	**F1**

A3

Target Notes
TN1: Tree with low bat roost suitability.
TN2: Wading bird. Species unidentified.
TN3: Fox footprints along entire length of saltmarsh up to bridge, adjacent to housing.
TN4: Silted pond.

TN1
TN2
TN3
TN4

A

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

Legend

- Target Note
- A2.2 - Scrub - scattered
- A3.1 - Broadleaved parkland/scattered trees
- No Access
- A1.1.1 - Broadleaved woodland - semi-natural
- A2.1 - Scrub - dense/continuous
- G1 - Standing water
- H1.1 - Intertidal - mud/sand
- H2.6 - Saltmarsh - dense/continuous
- J1.2 - Cultivated/disturbed land - amenity grassland
- J1.5 - Other vegetation
- J3.6 - Buildings

Issue	Date	By	Chkd	Appd
F1	2019-06-13	KJ	CP	PC

Metres
0 37.5 75 150

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Job Title
Stephenson Street

Extended Phase 1 Habitat Survey

Scale at A3
1:3,000

Job No	Drawing Status
246344	For Issue

Drawing No	Issue
001	F1

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A3

Legend

- Target Notes
- A3.1 - Broadleaved parkland/scattered trees
- J2.4 - Fence
- J2.4.2 - Fence with scattered scrub
- G2 - Running water
- A2.1 - Scrub - dense/continuous
- H1.1 - Intertidal - mud/sand
- J5 - Gravel/hard standing
- A3.1 - Broadleaved parkland/scattered trees
- G2 - Running water
- G1 - Standing water
- A2.1 - Scrub - dense/continuous
- A2.2 - Scrub - scattered
- C3.1 - Other tall herb and fern - ruderal
- F1 - Swamp
- J1.2 - Cultivated/disturbed land - amenity grassland

Issue	Date	By	Chkd	Appd
F1	2019-07-31	KSJ	CP	NH

Metres
0 15 30 60

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Job Title
Stephenson Street

Extended Phase 1 Habitat Survey

Scale at A3
1:1,250

Job No	Drawing Status
246344-00	For Issue

Drawing No	Issue
001	F1

31/07/2019 15:34:17

A3

Target Notes
TN1: Multiple rubble piles.
TN2: Brash pile.
TN3: Burned fly tipping.
TN4: Willow tree with ivy cover, could not access but may have low bat suitability.
TN5: Mammal paths leading into scrub.
TN6: Japanese knotweed

TN1
TN2
TN3
TN4
TN5
TN6

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

Legend

- A3.1 - Broad-leaved parkland/scattered trees
- TN - Target note
- A3.1 - Broadleaved parkland/scattered trees
- J2.4 - Fence
- G1 - Standing water
- A1.1.1 - Broadleaved woodland - semi-natural
- A2.1 - Scrub - dense/continuous
- A2.2 - Scrub - scattered
- C3.1 - Other tall herb and fern - ruderal
- G1 - Standing water
- J1.4 - Introduced shrub

Issue	Date	By	Chkd	Appd
F1	2020-01-28	KJ	CP	PC

Metres
0 25 50 100

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Job Title
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Extended Phase 1 Habitat Survey Marshall's

Scale at A3
1:2,000

Job No	Drawing Status
246344	For Issue

Drawing No	Issue
001	F1

28/01/2020 10:37:21

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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

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Job Title
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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

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A3

31/07/2019 15:34:17

Legend

Waterbodies surveyed for riparian mammals

Issue	Date	By	Chkd	Appd
F1	2019-07-31	KSJ	CP	NH

Metres
0 30 60 120

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Job Title
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Riparian Mammal Surveys

Scale at A3
1:2,692

Job No	Drawing Status
246344-00	**For Issue**

Drawing No	Issue
001	**F1**

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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

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Job Title

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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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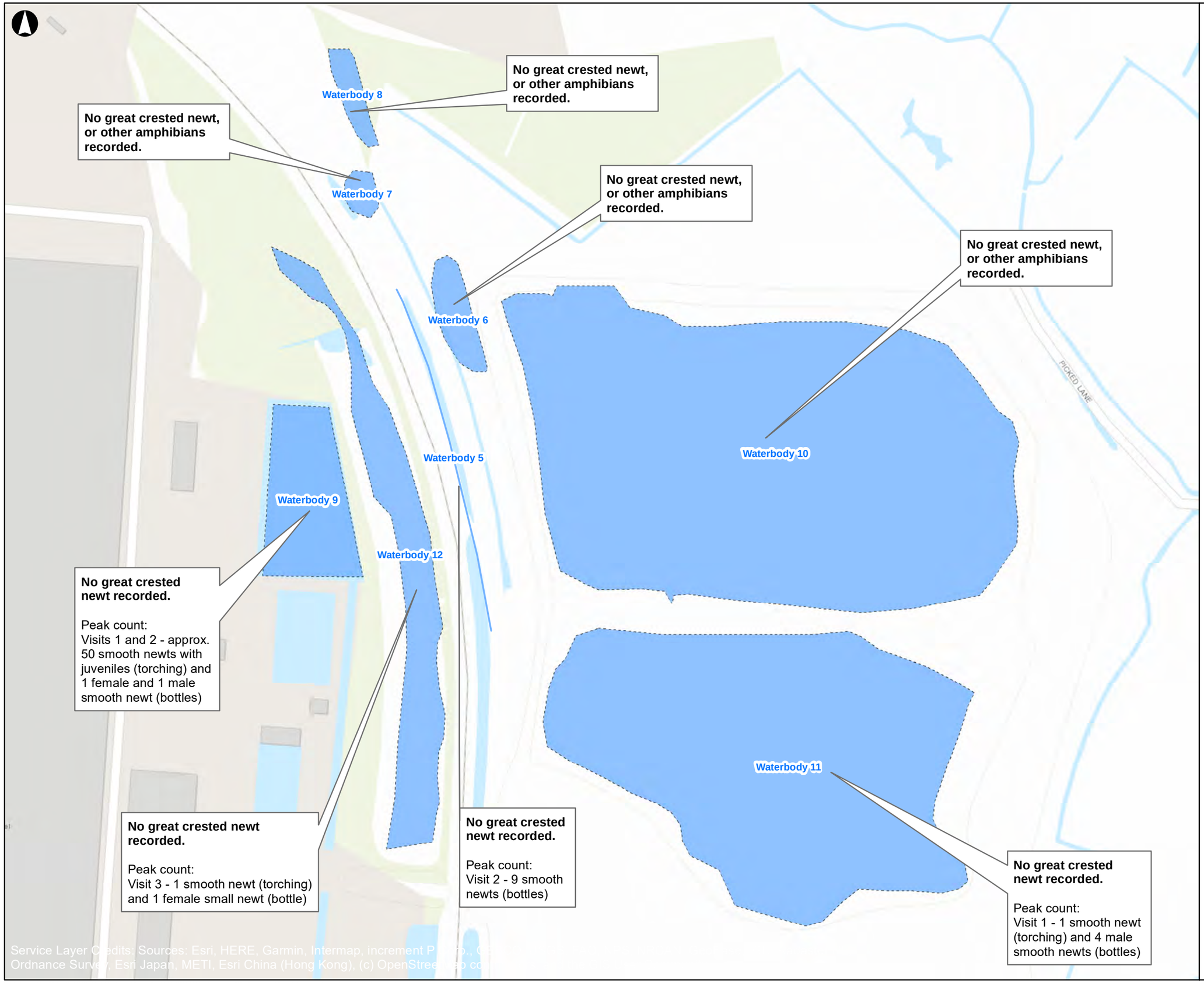
A3



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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Job Title
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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

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A3

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

Legend

- eDNA locations - negative result

GCN_HSIs

- <all other values>

Great crested newt habitat suitability index

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

World Imagery

Low Resolution 15m Imagery

High Resolution 60cm Imagery

High Resolution 30cm Imagery

Citations

Issue	Date	By	Chkd	Appd
F1	2019-07-31	KSJ	CP	NH

Metres

0 40 80 160

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Job Title

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eDNA and HSI Surveys

Scale at A3

1:3,325

Job No	Drawing Status
246344-00	For Issue

Drawing No	Issue
001	F1

31/07/2019 15:34:17

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Appendix F: Reptile Survey Results

Survey Date	Weather	Survey Results
17.04.18 – Set up	13 °C, wind speed 2, northerly direction, 100% cloud cover, dry.	No reptiles
08.05.18	13°C, wind speed 2, southerly direction, cloud cover 70%, dry	No reptiles
10.05.18	14°C, light wind speed 2, SW direction, 70 % cloud, sunny.	No reptiles
15.05.18	17°C, wind speed 1, southerly direction, 5% cloud cover, sunny.	No reptiles
17.05.18	17 °C, wind speed 2, southerly direction, 40% cloud cover, sunny.	No reptiles
22.05.18	10 °C, wind speed 3, easterly 50 % cloud cover, sunny	No reptiles
24.05.18	13°C, windspeed 1, southerly, 100 % cloud cover, light drizzle.	No reptiles
19.07.18 survey and collect	19°C, windspeed 1, southerly, 10 % cloud cover, sunny.	No reptiles