

Ecological Impact Assessment

Proposed Bridge
Replacement, Hartley
Bridge, Carrick-On-
Shannon, Co. Leitrim





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Table of Contents

1. INTRODUCTION.....	5
1.1 Background.....	5
1.2 Statement of Authority	5
1.3 Relevant Guidance	5
2. DESCRIPTION OF PROPOSED DEVELOPMENT	6
2.1 Site Location.....	6
2.2 Characteristics of Proposed Development.....	6
2.2.1 Development Description	6
2.2.2 Site Compound.....	7
2.2.3 New Bridge Construction.....	13
2.2.4 Demolition of Existing Hartley Bridge.....	18
2.2.5 Road Construction.....	19
2.2.6 In-stream Works.....	19
2.2.7 Works at Span 4-5.....	20
2.2.8 Overhead Line	21
3. METHODOLOGY	24
3.1 Desk Study.....	24
3.2 Field Surveys	24
3.2.1 Multi-disciplinary ecological walkover surveys	24
3.2.2 Otter Survey	25
3.2.3 Badger Survey.....	25
3.2.4 Aquatic Survey.....	25
3.3 Methodology for Assessment of Impacts and Effects.....	26
3.3.1 Determining Importance of Ecological Receptors	26
3.3.2 Characterisation of Impacts and Effects	26
3.3.3 Determining the Significance of Effects	27
4. DESK STUDY	30
4.1 Designated Sites	30
4.2 New Flora Atlas.....	37
4.3 NPWS Records	37
4.4 Biodiversity Ireland Database.....	38
4.4.1 Bat Records.....	40
4.5 Water Quality	40
4.5.1 EPA Water Quality Data.....	40
4.5.2 Aquatic Impact Assessment	41
4.6 Inland Fisheries Ireland (IFI)	42
5. FIELD STUDY	43
5.1.1 Habitats Present on the Site and Surrounding Area	43
5.2 Fauna	47
5.2.1 Mammals.....	47
5.2.2 Birds.....	48
5.2.2.1 Fish	48
5.2.2.2 Additional Fauna	49
5.2.1 Importance of Ecological Receptors	49
6. ECOLOGICAL IMPACT ASSESSMENT	52
6.1 Do Nothing Impact	52
6.2 Impacts during Construction.....	52

6.2.1.1	Treeline and Hedgerow	52
6.2.1.2	Riverbed and Reed Habitat.....	53
6.2.1.3	Aquatic Fauna	54
6.2.1.4	Mitigation Measures and Best Practice	55
6.3	Operational Phase	59
6.3.1	Decommissioning.....	59
6.4	Assessment of any Biodiversity or Ecological Gains	61
6.5	Impacts on Designated Sites	61
6.5.1	Impacts on European Sites.....	61
6.5.2	Impacts on Nationally Designated Sites	61
7.	CUMULATIVE IMPACT ASSESSMENT	63
7.1	Plans.....	63
7.2	Carrick-on-Shannon to Battlebridge Blueway	63
7.3	Other Projects	63
7.3.1	Conclusion of Cumulative Assessment	64
8.	DEVELOPMENT CONTEXT - ECOLOGICAL PLANS AND POLICIES.....	65
8.1	County Development Plan.....	65
9.	CONCLUSION	68
	BIBLIOGRAPHY	69

TABLE OF TABLES

Table 3.1 Designated sites within the Likely Zone of Impact	7
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TABLE OF FIGURES

<i>Figure 2-1 Site Location.....</i>	8
<i>Figure 2-2 Site Layout.....</i>	9
<i>Figure 2-3 Bridge Navigation Details.....</i>	10
<i>Figure 2-4 Sequence of Demolition Works.....</i>	11
<i>Figure 2-5 New Bridge Detail.....</i>	12
<i>Figure 2-6 Bathymetric Survey.....</i>	22
<i>Figure 2-7 Bridge Deck Details.....</i>	23
<i>Figure 4-1 Nationally Designated Sites within 15km Buffer.....</i>	31
<i>Figure 4-2 European Designated Site within 15km Buffer.....</i>	32
<i>Figure 5-1 Habitat Map.....</i>	44
<i>Figure 5-2 Habitat Map with Proposed Development Footprint.....</i>	45
<i>Figure 6-1 Proposed Drainage Layout.....</i>	60

APPENDIX

Appendix 1	Construction and Environmental Management Plan
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1. INTRODUCTION

1.1 Background

MKO has been commissioned by Leitrim County Council to conduct an Ecological Impact Assessment (EcIA) of the proposed replacement of Hartley Bridge, including construction of a new bridge, demolition of the old bridge and associated road realignment works at Hartley Bridge, Carrick on Shannon, Co. Leitrim (Grid Ref: E193904 N301894). It is noted that the proposed Hartley Bridge is located on the county boundary and hence the proposed work extents are located within both County Leitrim and County Roscommon. Leitrim Co. Co. and Roscommon Co. Co. have agreed in accordance with the provisions of Section 85 of the Local Government Act 2001 that Leitrim County Council will be the lead authority on this project.

The EcIA includes an accurate description of all aspects of the proposed development during construction and operation (decommissioning is not anticipated). It then provides a comprehensive description of the baseline ecological environment, which is based on an appropriate level of survey work that was carried out in accordance with the most appropriate guidelines and methodologies. The EcIA then completes a thorough assessment of the impacts of the proposed development on biodiversity. Where likely ecologically significant effects are identified, measures are prescribed to avoid or minimise or compensate for such effects.

1.2 Statement of Authority

Field surveys were carried out by James Owens (BSc., MSc.) in February 2019 and Pat Roberts (BSc. Env., MCIEEM) in August 2020. This report has been written by Laoise Kelly (BSc. Env, MCIEEM) and reviewed by Pat Roberts. Laoise has over six years' experience in ecological consultancy. Pat has over fifteen years' experience in consultancy and environmental management.

1.3 Relevant Guidance

The guidelines listed below were consulted in the preparation of this document to provide the scope, structure and content of the assessment:

- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018) (amended 2019).
- Draft Revised guidelines on the information to be contained in Environmental Impact Statements (EPA, 2017).
- Environmental Impact Assessment of National Road Schemes –A Practical Guide (NRA, 2009).
- Guidelines for assessment of Ecological Impacts of National Road Schemes, (NRA, 2009).
- Environmental Assessment and Construction Guidelines (NRA, 2006).

2. DESCRIPTION OF PROPOSED DEVELOPMENT

2.1 Site Location

The site of proposed works is Hartley Bridge, on the River Shannon, north of Carrick-on-Shannon, Co. Leitrim. The bridge also crosses into Co. Roscommon on the western side of the river (Grid Ref: E193904 N301894). The proposed works are located approximately 2.8km north of Carrick-on-Shannon town. The site location is provided in Figure 2-1.

2.2 Characteristics of Proposed Development

2.2.1 Development Description

In 2016, Leitrim Country Council commissioned a structural report on Hartley Bridge which found the bridge in poor condition and unfit for purpose. As a result, it is proposed to construct a new bridge, demolish the old bridge and realign the road to remove the existing bend to the east of the river. The road realignment works on approach to the bridge comprise approximately 135m on the western bank and 110m on the eastern bank. It should be noted that the western bank is located within the Roscommon county border and the eastern bank within the Leitrim county border. These will be referred to as the western and eastern bank going forward. The layout of the proposed works is shown in Figure 2-2. The bridge navigation details are shown in Figure 2-3.

The proposed development consists of the following:

1. The demolition of the existing Hartley bridge over the River Shannon
2. Construction of new 3-span replacement bridge structure 25m downstream of the existing bridge crossing
3. Construction of the realigned (vertical and horizontal) L3400 on approaches to the new bridge structure.
4. Decommissioning of defunct sections of the L3400.
5. All ancillary works associated with the above works, including:
 - a. Temporary Site Compound
 - b. Drainage and other Utility Works
 - c. Road Safety Barriers
 - d. Fencing

The proposed works are outlined in a series of drawings prepared by PUNCH Consulting Engineers and are supplied as part of this submission. The proposed demolition of the existing bridge will follow the demolition sequence as outlined in Figure 2-4.

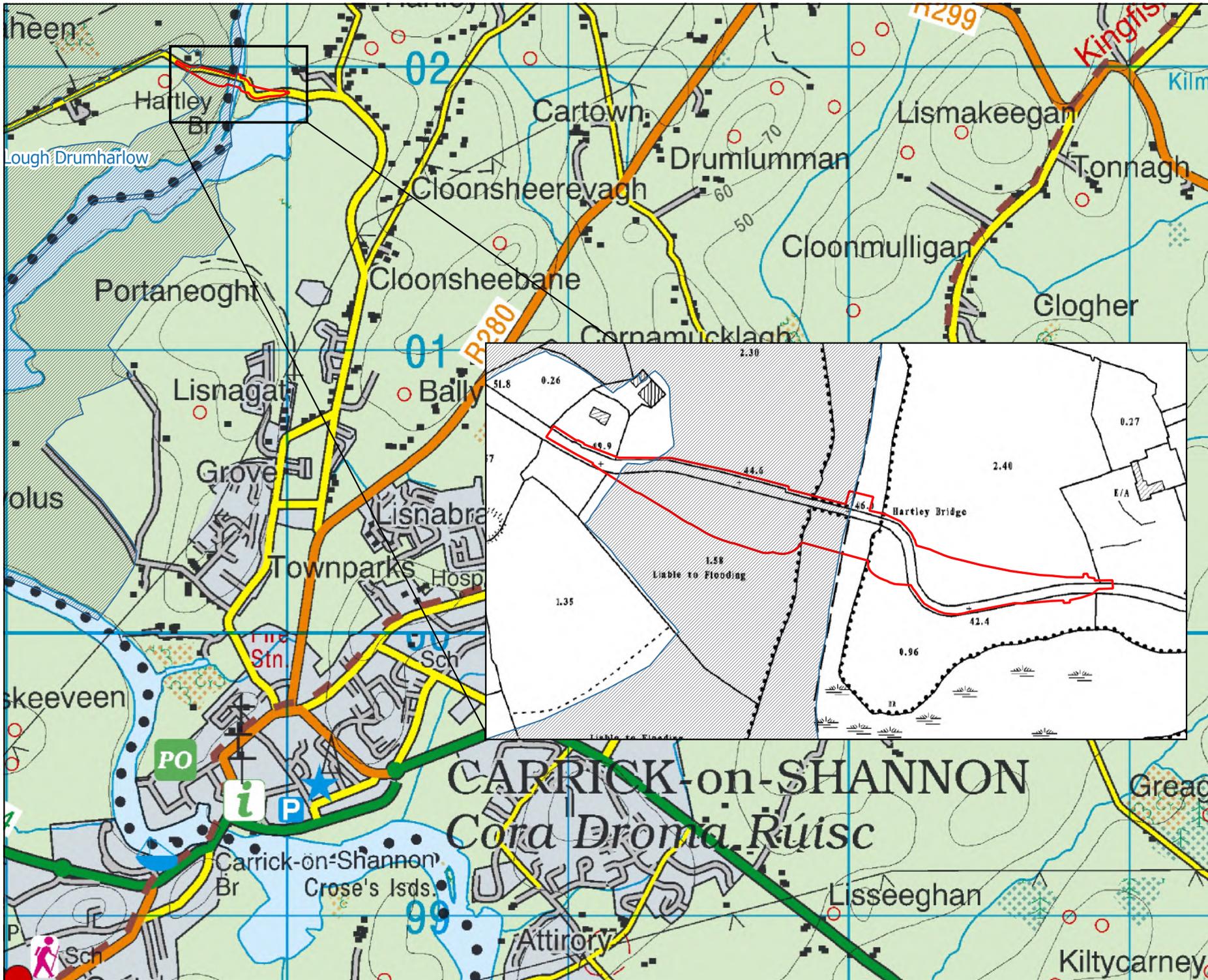
The proposed replacement bridge consists of a three-span precast concrete structure totalling a length of 75m, with in-situ deck and precast/metal parapet upstands. The foundations shall comprise of piles onto which the abutments and piers sit. The proposed location of the bridge is 25m downstream of the existing bridge. For further information relating to the replacement bridge, please refer to Figure 2-5.

The proposed realignment works associated with the local road on both approaches to the bridge consists of approximately 135m on the western bank and 110m on the eastern bank, with the removal of an existing sharp bend on the eastern side. For further information relating to the realignment of the aforementioned roads, please refer to Figure 2-2.

A detailed description of works and an indicative programme of works is provided in the Construction and Environmental Management Plan which is provided in Appendix 1 and below.

2.2.2 Site Compound

The proposed works are located within and adjacent to the River Shannon and thus subject to water level changes associated with the natural character of the river. The proposed works will be carried out between July to September inclusive in line with Inland Fisheries (2016) Guidelines, therefore the works will be carried out during periods coinciding with (typically) the driest period of weather. As a precaution the site compound will be located a minimum distance of 50m from the waters edge. outside of areas mapped as potentially having an Annual Exceedance Probability of 0.1%, 1% or 10% as mapped on the OPW CFRAM maps (<https://www.floodinfo.ie/map/floodmaps/>). The compound shall be secured and all construction materials shall be stored in this defined area. Weather conditions will be monitored and if at any stage the works site is in danger of being inundated due to rising water levels, machinery will be removed outside of the floodable area.



Map Legend

-  Site Boundary
-  Lough Drumharlow pNHA



Drawing Title

Site Location

Project Title
Proposed Bridge Replacement,
Hartley Bridge

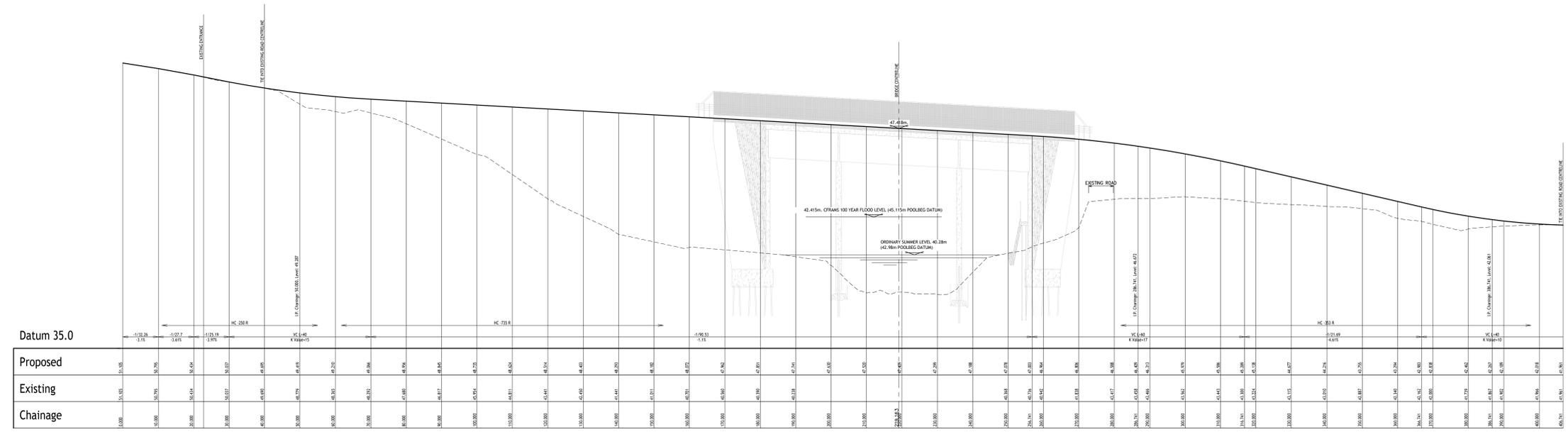
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LK	PR
Project No.	Drawing No.
181209	Figure 2-1
Scale	Date
1:1	16.09.20



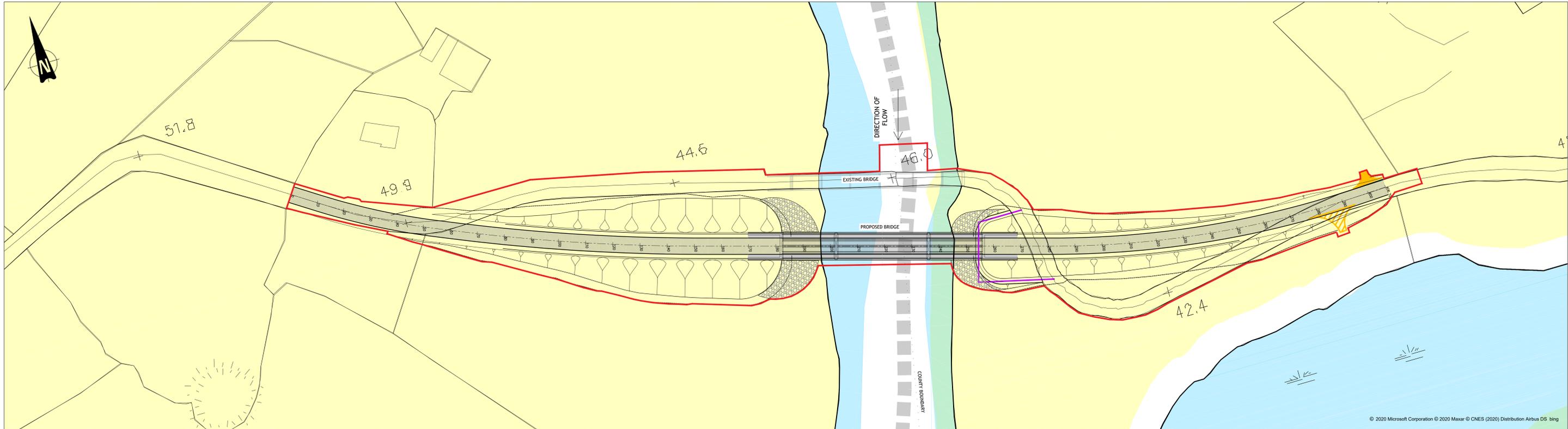
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NOTE:
 ALL LEVELS ARE RELATED TO THE ORDINANCE DATUM (O.D.)
 MALIN HEAD UNLESS NOTED OTHERWISE
 MALIN HEAD DATUM IS APPROXIMATELY 2.7m ABOVE THE
 POOLBEG Lighthouse DATUM
 TO GET POOLBEG FROM MALIN HEAD ADD 2.7m
 TO GET MALIN HEAD FROM POOLBEG SUBTRACT 2.7m
 (SOURCE: OSI)
 ALL WATER LEVELS TO BE CONFIRMED WITH WATERWAYS
 IRELAND

LEGEND:
 PROPOSED SITE BOUNDARY



REALIGNED ROAD - VERTICAL PROFILE
 Scale Horizontal 1/500, Vertical 1/100



PROPOSED REALIGNED ROAD - HORIZONTAL ALIGNMENT
 1:500



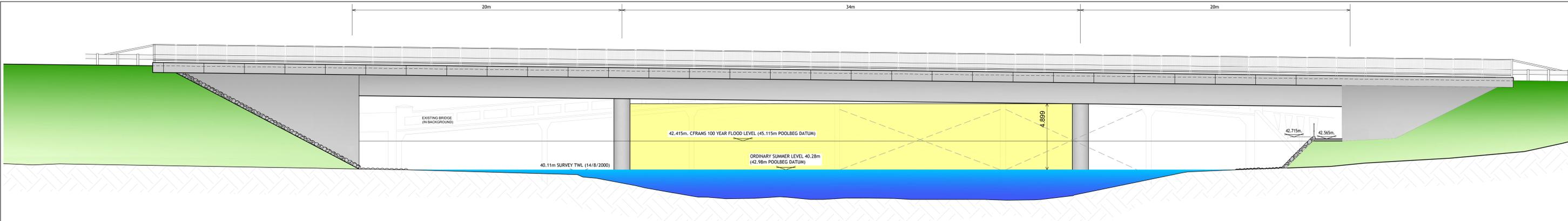
Date Drawn:	July 2020
Drawn By:	S. Buckley
Date Issued:	
Issued By:	



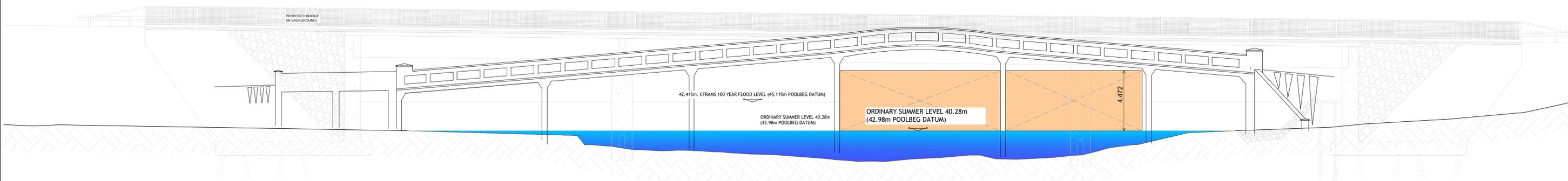
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PLD	ISSUED FOR PLANNING	HS	2021/01/25				
PL1	ISSUED FOR PLANNING	HS	2021/04/27				



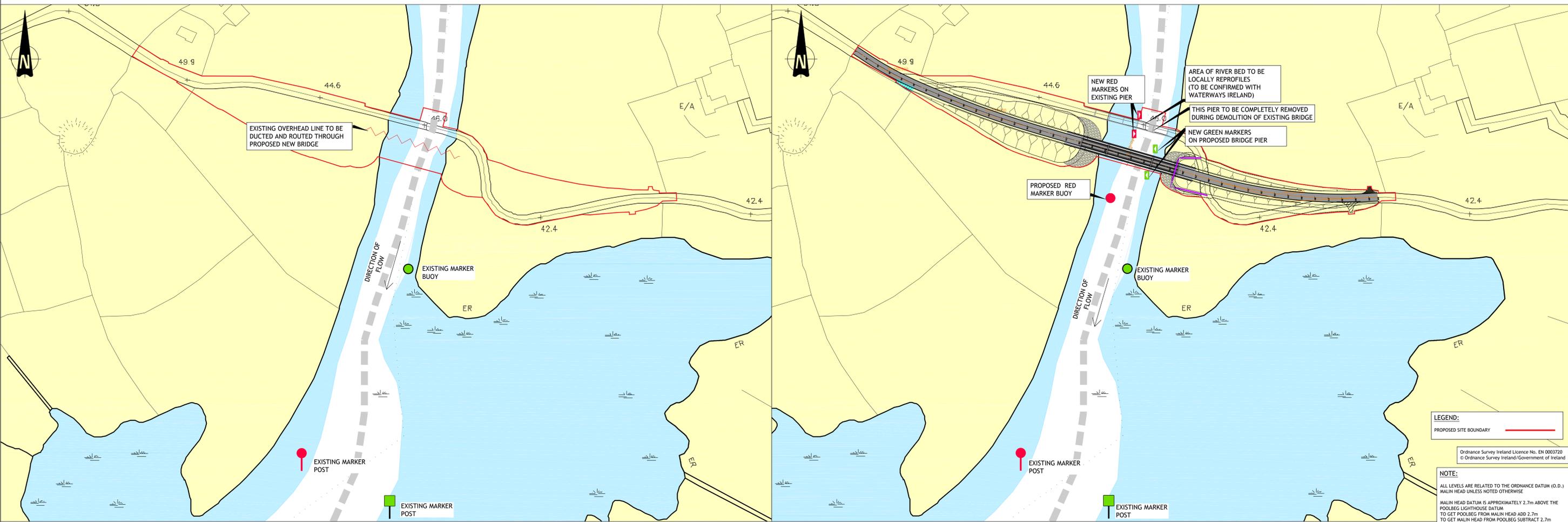
Job: HARTLEY BRIDGE REPLACEMENT
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PROPOSED HARTLEY BRIDGE SHOWING PROPOSED NAVIGATION CLEARANCE (IN YELLOW)
Scale: 1/100



EXISTING HARTLEY BRIDGE SHOWING EXISTING NAVIGATION CLEARANCE (IN ORANGE)
Scale: 1/100



EXISTING HARTLEY BRIDGE NAVIGATION MARKS
SCALE 1:1000

PROPOSED HARTLEY BRIDGE NAVIGATION MARKS
SCALE 1:1000

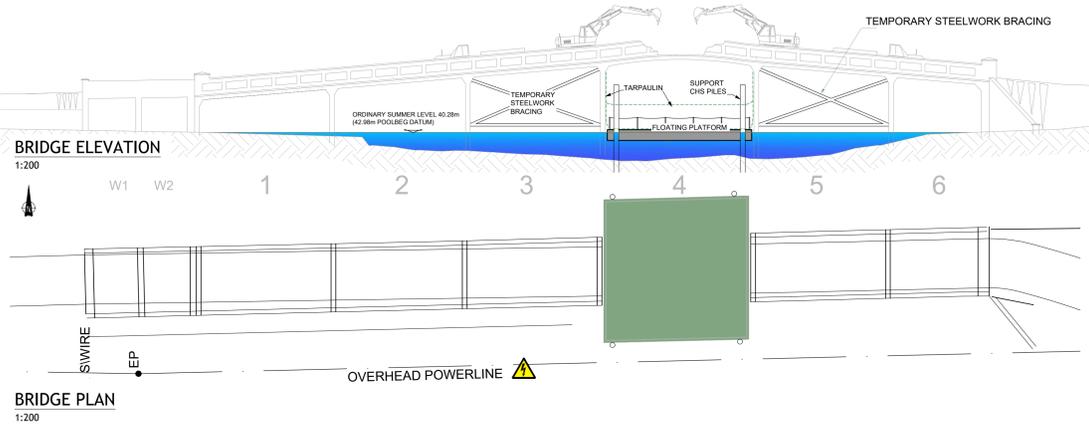
Rev	Amendment	By	Date	Rev	Amendment	By	Date
PLD	ISSUED FOR PLANNING	HS	2021/01/25				
PL1	ISSUED FOR PLANNING	HS	2021/04/27				

STAGE 1

Stage 1 - Commence with Demolition of Span 4 of Main 6-Span Bridge with Barge-Based Crash Deck
 Drive line of CHS piles from barge upstream of Span 4 of main bridge.
 Build barge platform with crash deck (to catch falling debris) and float under Span 4 of main bridge.
 Drive line of CHS piles from barge downstream of Span 4 of main bridge.
 Fix barge platform around piles allowing it to float in times of flood.
 Provide temporary steelwork bracing to adjacent Spans 3 and 5 supporting lightweight machinery.
 Fix edge protection and debris tarpaulins around edges of crash deck.
 Saw-cut parapet upstands in 1m lengths.
 Working from both sides of Span 4, use lightweight machinery to:

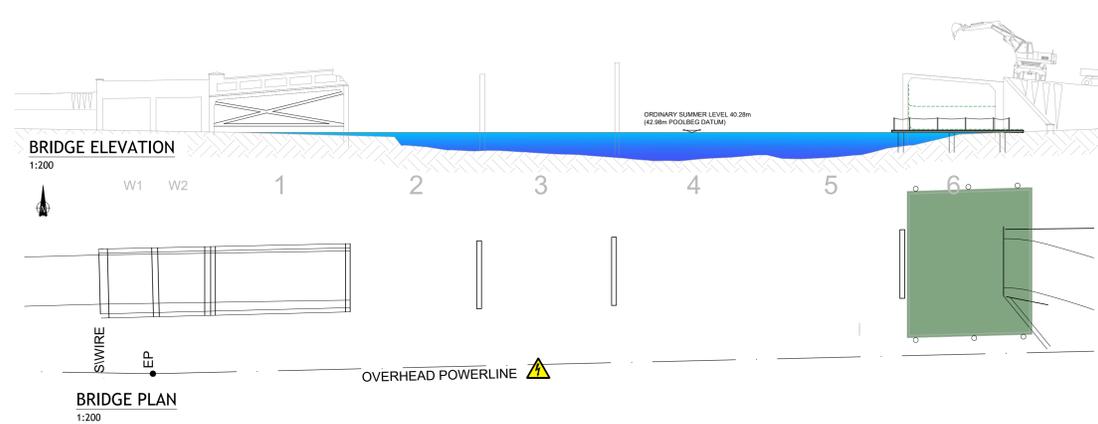
- knock parapet upstands inwards; recover debris directly as far as possible.
- break out road build-up and slab spanning between cross-beams; recover debris directly as far as possible.
- break out longitudinal beams; recover debris directly as far as possible.
- break out longitudinal beams; recover debris directly as far as possible.

Clear crash deck to awaiting barge and bring demolition waste ashore.



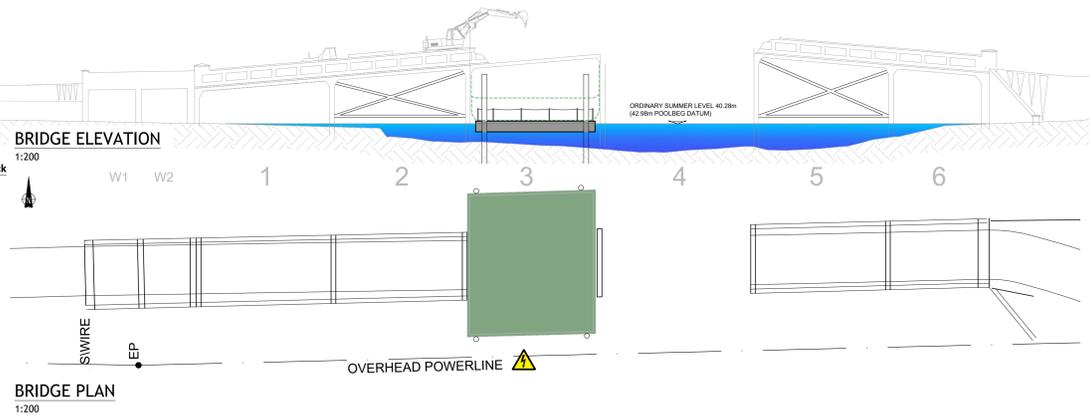
STAGE 5

Stage 5 - Demolition of Span 6 of Main 6-Span Bridge with Land-Based Crash Deck
 For Span 6, construct crash deck off 2 lines of temporary piles driven from riverbank.
 Conduct demolition works from behind East Abutment.



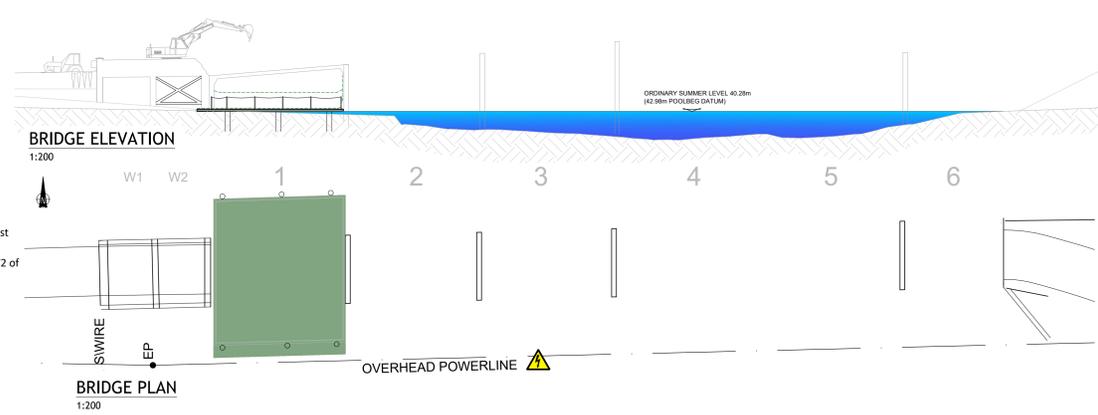
STAGE 2

Stage 2 - Demolition of Span 3 of Main 6-Span Bridge with Barge-Based Crash Deck
 Repeat for Span 3, working from Span 2.
 Provide temporary steelwork bracing to adjacent Span 2.



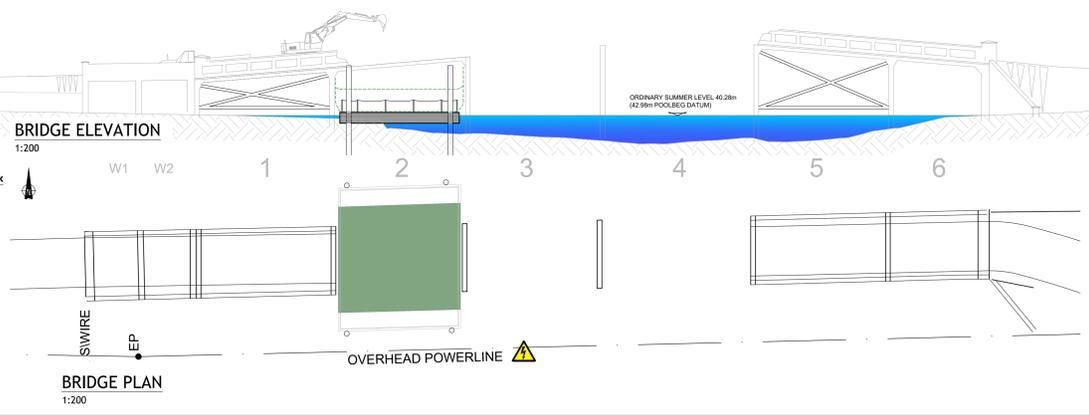
STAGE 6

Stage 6 - Demolition of Span 1 of Main 6-Span Bridge with Land-Based Crash Deck
 For Span 1, construct crash deck off 2 lines of temporary piles driven from riverbank.
 Conduct demolition works from Span W2 of West Abutment run-on bridge.
 Provide temporary steelwork bracing to Span W2 of West Abutment run-on bridge.



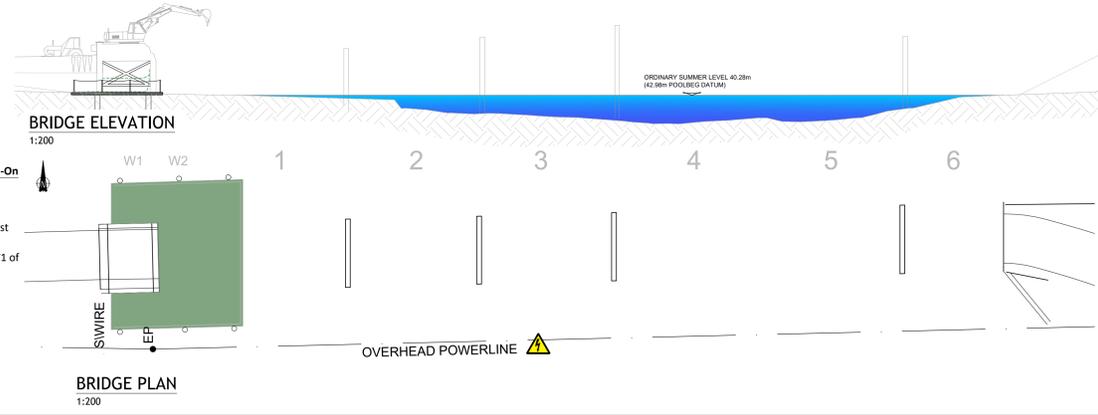
STAGE 3

Stage 3 - Demolition of Span 2 of Main 6-Span Bridge with Barge-Based Crash Deck
 Repeat for Span 2, working from Span 1.
 Provide temporary steelwork bracing to adjacent Span 1.



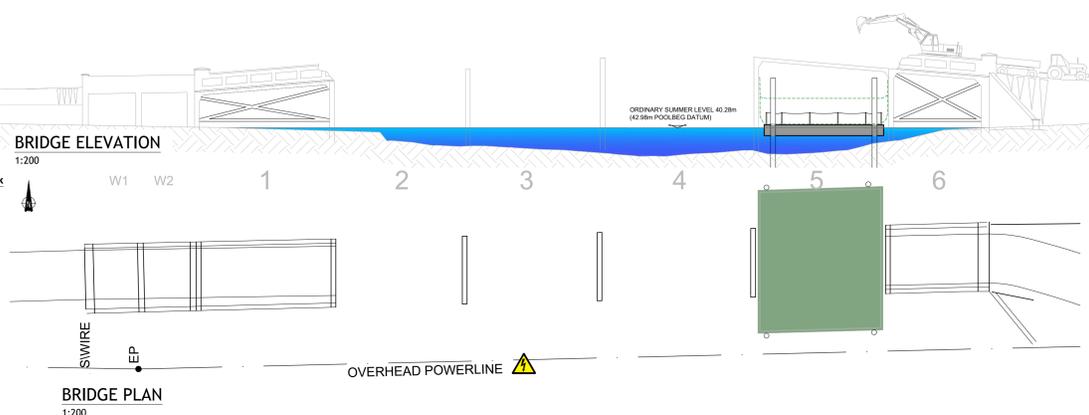
STAGE 7

Stage 7 - Demolition of Span W2 of 2-Span Run-On Bridge with Land-Based Crash Deck
 For Span W2, construct crash deck off 2 lines of temporary piles driven from riverbank.
 Conduct demolition works from Span W1 of West Abutment run-on bridge.
 Provide temporary steelwork bracing to Span W1 of West Abutment run-on bridge.



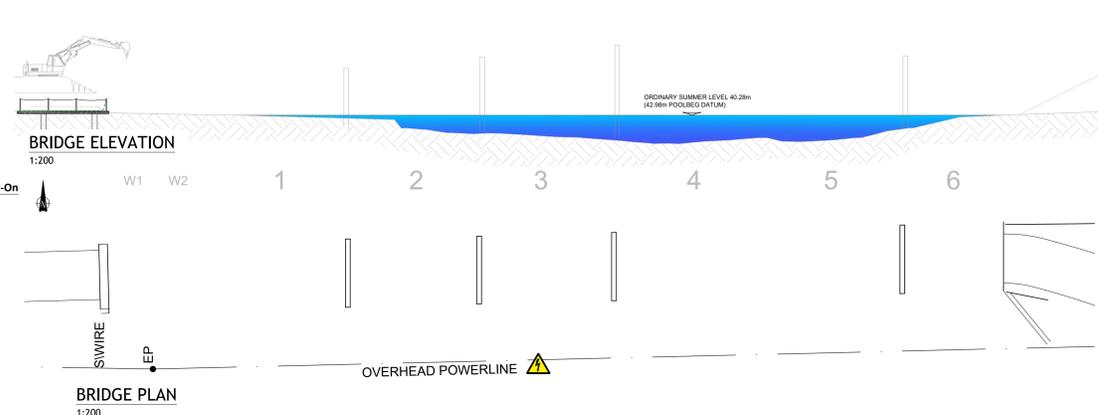
STAGE 4

Stage 4 - Demolition of Span 5 of Main 6-Span Bridge with Barge-Based Crash Deck
 Repeat for Span 5, working from Span 6.
 Provide temporary steelwork bracing to adjacent Span 6.



STAGE 8

Stage 8 - Demolition of Span W1 of 2-Span Run-On Bridge with Land-Based Crash Deck
 For Span W1, construct crash deck off 2 lines of temporary piles driven from riverbank.
 Conduct demolition works from behind West Abutment.



NOTE:
 ALL LEVELS ARE RELATED TO THE ORDINANCE DATUM (O.D.) MALIN HEAD UNLESS NOTED OTHERWISE
 MALIN HEAD DATUM IS APPROXIMATELY 2.7m ABOVE THE POOLBEG LIGHTHOUSE DATUM
 TO GET POOLBEG FROM MALIN HEAD ADD 2.7m
 TO GET MALIN HEAD FROM POOLBEG SUBTRACT 2.7m (SOURCE OSI)
 ALL WATER LEVELS TO BE CONFIRMED WITH WATERWAYS IRELAND

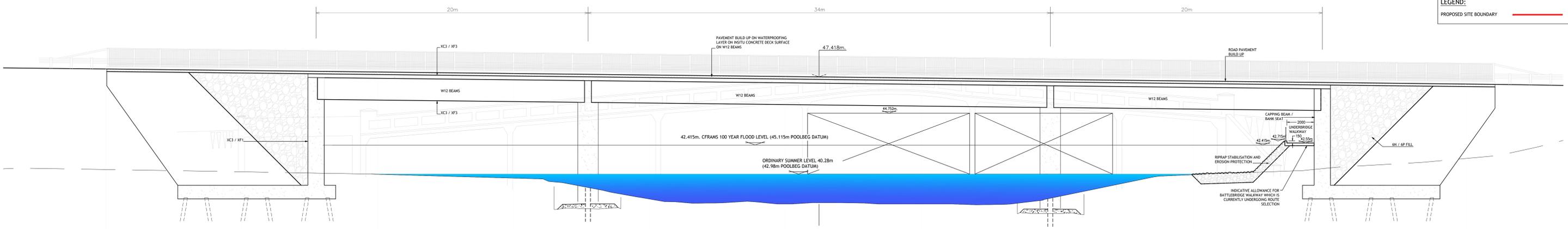
Figure 2-4

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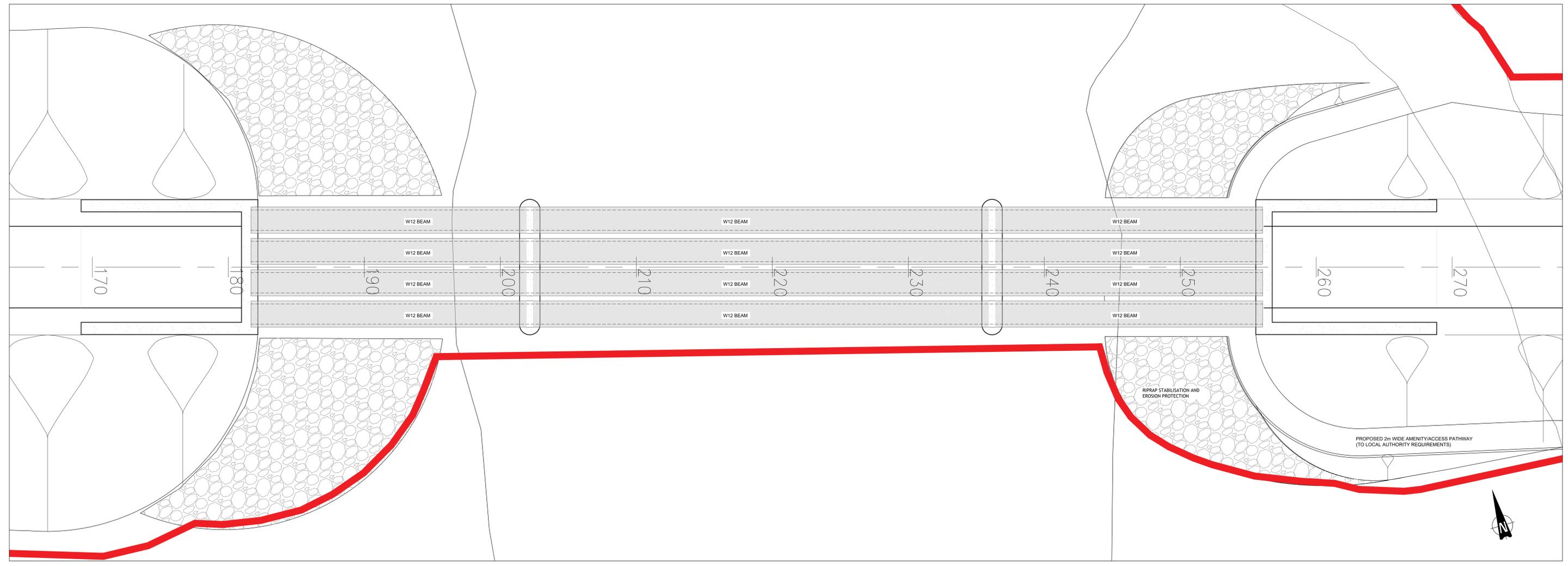
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 TO GET MALIN HEAD FROM POOLBEG SUBTRACT 2.7m (SOURCE: OS)
 ALL WATER LEVELS TO BE CONFIRMED WITH WATERWAYS IRELAND

LEGEND:
 PROPOSED SITE BOUNDARY



PROPOSED BRIDGE - SECTIONAL ELEVATION
 1:100



PROPOSED BRIDGE - SECTIONAL PLAN
 1:100



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PL1	ISSUED FOR PLANNING	HS	2021/04/27				

Rev	Amendment	By	Date	Rev	Amendment	By	Date

2.2.3 New Bridge Construction

The paragraphs below describe the stages of construction of the proposed new bridge. The scope of works includes:

1. Mobilisation and Enabling Works
2. Raised Embankments on Approaches to Abutments – Phase 1
3. Piled reinforced concrete (RC) Foundations for Piers & Abutments
4. Cast in-situ RC Abutment Walls, Wing Walls & Pier Walls
5. Installation of Precast W Beams for Centre Span & Side Spans.
6. Cast in-situ RC Bridge Deck
7. Cast in-situ RC Diaphragms
8. Installation of Precast Parapet Upstands and Metal Parapets on Bridge Deck & Wing Walls
9. Raised Embankments on Approaches to Abutments – Phase 2
10. Completion of Roadway and Safety Barriers
11. Completion Works
12. Demobilisation

Stage 1: Mobilisation and Enabling Works - Terrestrial

- Prior to the outset of works a silt fence will be erected along both sides of the river channel to prevent run-off entering the river. This will comprise wooden posts and geotextile membrane buried in an 'L' shape to a minimum depth of 250mm. The silt fence will act in filtering any potential surface water run-off from the site generated during the proposed works.
- The proposed works area will be fenced off with temporary fencing and no works will be undertaken outside of the fenced area.
- Access routes will be clearly marked / identified. Access during construction to any working areas will be restricted to land within the outlined works area.
- Silt fencing will be installed alongside the works area where required as a water quality protective measure. Further details are provided in the CEMP.
- A compound/layby area will be constructed near the road above flood level at least 50m from the river on both sides of the River Shannon.
- On approach to the bridge 25m out from abutment wall, material will be excavated to 1.5m above formation level.
- Exposed ground will be compacted.
- A 500mm stone platform will be built 5m to the front (river side), 10m to the sides and 15m to the back of the abutment wall location.
- The compound will be connected to the stone platform with compacted stone access strip for site traffic and lifting machinery.

Stage 2: Raised Embankments on Approaches to Abutments – Phase 1 – Terrestrial

- Topsoil and weak material will be removed as far as solid ground. All waste material will be removed to a licenced waste facility.
- Exposed ground will be compacted.
- CL6N1 fill will be placed and compacted in 250mm layers until within 500mm of the proposed finished road level. When 25m from abutment wall, the top of the embankment will be ramped down to the top of the stone platform required to support heavy machinery and lifting equipment near the riverbank.

Stage 3: Piled RC Foundations – Piers & Abutments – Aquatic

- A barge with piling rig will be used for the internal piers.
- H-piles for the pier will be driven.
- Sheetpiles for the cofferdam for the pier will be installed; top of cofferdam @ +41.000 mOD.
- The cofferdam will be dewatered and excavated to formation level, installing waling beams as required.
- The cofferdam will be kept dry using a pump; the cofferdam will be allowed to be inundated during a flood.
- Clean water will be pumped from inside the cofferdam each morning in advance of the works proceeding. This will be pumped directly to the River Shannon.
- Any dirty water that requires pumping will be pumped to dry ground over 30m from the river via a silt bag which will filter any sediment that remains. The entire discharge area will be enclosed by a perimeter of silt fencing.
- The point of discharge will be monitored and the silt bag and silt fencing moved as necessary to avoid erosion of the ground and potential sediment run-off occurring.
- Material inside the cofferdam will be excavated and pile heads will be prepared.
- Substrate at base of cofferdam will be compacted and 175-200mm blinding concrete placed to formation level @ +37.900 mOD.
- Concrete will be poured using a machine working from the bank and piped over directly to the cofferdam/pier similar to the image provided in Plate 2-1 below. The pipe may be provided with additional support by placing on a pontoon halfway between the bank and the pier.
- Spacers, reinforcement cage and shutter will be installed and a 1250mm deep pile cap with wall starters will be poured.
- When the pilecap has cured, the shutter will be removed and the pilecap backfilled with stone to 150 below top of pile cap @ +39.000 mOD to create working platform.
- Concrete will be poured in stages along the 10m section of the pier and allowed to set before proceeding to the next layer of concrete. This will continue until the pier reaches the finished height of 8m (beneath bridge deck).
- Gabions will be installed at the base of the pier along its entire length for additional support as described in Stage 11.



Plate 2-1 Example of concrete pouring taking place across a river

West Abutment & East Abutment

- A mobile piling rig will be used for the abutments.
- H piles for the abutment will be driven.
- Sheetpiles for the cofferdam for abutment will be installed; top of cofferdam @ +41.000 mOD.
- The cofferdam will be dewatered and excavated to 100mm below formation level, installing waling beams as required.
- The cofferdam will be kept dry using pump; the cofferdam will be allowed to be inundated during a flood.
- The cofferdam will be excavated and pile heads prepared.
- Substrate at the base of the cofferdam will be compacted and 75-100mm concrete blinding will be placed to formation level @ +38.540 mOD.
- Spacers, reinforcement cage and shutter will be installed and 1000mm deep pile cap with 150mm kicker and wall starters for abutment and wing walls will be poured.
- When pilecap has cured, the shutter will be removed and buried faces will be painted with waterproof epoxy paint.
- Stone will be backfilled to top of foundation @ 39.540 mOD (150 below top of wall kicker).

Stage 4 – Cast in-situ RC Abutment Walls, Wing Walls & Pier Walls up to Beam Bearing Level –

- Slip-form reinforced concrete and abutment walls and wing walls will be installed from kicker up to beam bearing level.
- When concrete walls have cured, shutters will be removed and buried surfaces painted with waterproof epoxy paint.
- Above foundation and behind the abutment and wing walls will be backfilled to 150mm below top of concrete with CL6N1 fill.

- Reinforcement cages for reinforced concrete end diaphragms on the land side of the short-span W-Beams will be constructed.

Pier Walls

- Slip-form reinforced concrete pier walls will be installed from the top of the pile cap up to beam bearing level.
- Reinforcement concrete cages will be constructed for the inner sections of the reinforced concrete pier diaphragms between adjacent spans.

Stage 5 – Installation of Precast W-Beams for Centre Span & Side Spans

- A lorry and barge will be used to transport the 4 no. 33.5m long, 75.3T centre span W-Beams to site.
- A pair of 200T high reach mobile cranes, one on each side of the river on the stone platforms, will be used to lift these beams into position using a tandem lift.
- A lorry will be used to transport the 8 no. 19.65m long, 44.2T side span W-Beams to site, 4 no. to each side.
- The 200T mobile cranes will then be used independently to lift these beams into position.
- Cantilever falsework with edge protection will be fixed to the outside of the edge W-Beams prior to lifting.

W-Beams for 34m Centre Span

- 4 no. 75.3T precast W-beams will be brought to the barge berth on a lorry and lifted onto the barge.
- Prior to installation, the pier walls must have reached sufficient strength to bear the beam weight.
- Before placing the beams, mortar bedding and shims will be installed on the bearing shelves.
- The precast W-beams will be brought to site on the barge and lifted straight from the barge into position on the pier walls on Gridlines 2 & 3 by the 200T cranes using a tandem lift.
- The beams will be lined and levelled and secured to the prior-installed pier diaphragm reinforcement cages.

W-Beams for 20m Side Spans

- 8 no. 44.2T precast W-beams for the side spans will be brought to site on a lorry, 4 no. to each compound, and lifted straight from the lorry into position on the pier wall and adjacent abutment wall.
- Prior to installation, abutment and pier walls must have reached sufficient strength to bear the beam weight.
- Before placing the beams, mortar bedding and shims will be installed on the bearing shelves.
- The 200T mobile crane, located on the western bank, will be used to lift 4 no. beams into position onto the western abutment wall on Gridline 1 and pier wall on Gridline 2.
- The other 200T mobile crane, located on the eastern bank, will be used to lift 4 no. beams into position onto the pier wall on Gridline 3 and eastern abutment wall on Gridline 4.
- The beams will be lined and levelled and secured to the pre-installed abutment diaphragm and pier diaphragm reinforcement cages.

Stage 6 – Cast in-situ Reinforced Concrete Bridge Deck

- Place permanent glass reinforced concrete formwork between webs of W-Beams.
- Fix shuttering on the cantilever falsework for deck cantilever slab.
- Place deck rebar and pour a 275mm thick slab from centre of span up to diaphragm construction joints.
- Commence with the central span.
- Concrete joints will be formed with grout checks.
- Form work will be constructed with an adequate capacity and additional freeboard to prevent any spillage.
- Concrete (including waste and wash down) will be contained and managed appropriately to prevent pollution of watercourses. Pouring will occur in the dry, with appropriate curing times (48 hours).
- Weather forecasts will be monitored to ensure the above curing times is achievable prior to any pouring of concrete.

Stage 7 – Cast in-situ Reinforced Concrete Diaphragms

Abutment Diaphragms and Upper Section of Wing Walls

- Tie rebar for outer diaphragm rebar (between & inside webs of W-Beams) to end diaphragm rebar.
- Cast the abutment diaphragm and upper section of the two wing walls in one consistent pour from beam bearing level up to top of slab level.

Pier Diaphragms

- Tie rebar for outer diaphragm rebar (between & inside webs of W-Beams) to inner diaphragm rebar.
- Cast the pier diaphragm from beam bearing level up to top of slab level.

Stage 8 – Installation of Precast Parapet Upstands and Metal Parapets on Bridge Deck & Wing Walls

- Once the deck slab, diaphragms and wing walls have cured, install 3m lengths of precast parapet upstands.
- Tie projecting rebar from upstands to stitch rebar in deck slab & wing walls, seal joints and cast reinforced concrete stitches.
- When reinforced concrete stitches have cured, bolt metal parapets to cast-in cradles in precast reinforced concrete upstands.

Stage 9 – Raised Embankments on Approaches to Abutments – Phase 2

- Complete approach embankments from road tie-ins to abutment walls with CL6N1 fill, compacting in 250mm layers up to road sub-base level.
- Complete road sub-base, services, and footpaths up to movement joints on approaches.

Stage 10 – Completion of Roadway

- Apply bridge deck waterproofing, place service ducts, kerb drains, concrete footpaths up to movement joints.
- Lay road surfacing on bridge deck up to movement joints at abutment walls.
- Lay road surfacing on approach embankments from road tie-ins up to movement joints at abutment walls.
- Construct Road Safety Barriers, End Terminals and Parapet Transitions.
- Complete movement joints.

Stage 11 – Completion Works

- Remove all sheetpiles.
- Place pier gabions, rock armour and backfill.
- Complete landscaping and paving.

Stage 12 – Demobilisation

- Demobilise both compounds and layby areas and make good.

2.2.4

Demolition of Existing Hartley Bridge

The following stages describe the works to be carried out in the demolition of the existing Hartley Bridge. These stages are shown above in Figure 2-3.

Stage 1 – Commence with Demolition of Span 4 of Main 6-Span Bridge with Barge-Based Crash Deck

- A line of circular hollow section (CHS) piles will be driven from a barge upstream of Span 4 of the main bridge.
- A barge platform with crash deck will be built (to catch falling debris) and float under Span 4 of the main bridge.
- A line of CHS piles will be driven from a barge downstream of Span 4 of the main bridge.
- A barge platform will be fixed around piles allowing it to float in times of flood.
- A temporary steelwork bracing will be provided adjacent to Spans 3 and 5 supporting lightweight machinery.
- Edge protection and debris tarpaulins will be fixed around edges of crash deck.
- The platform will be jacked up from the piles above water level in the river.
- Parapet upstands will be saw-cut in 1m lengths.
- Working from both sides of Span 4, lightweight machinery will be used to:
 - knock parapet upstands inwards; recover debris directly as far as possible.
 - break out road build-up and slab spanning between cross-beams; recover debris directly as far as possible.
 - break out cross-beams; recover debris directly as far as possible.
 - break out longitudinal beams; recover debris directly as far as possible.
- The crash deck will be cleared to the awaiting barge and demolition waste brought ashore.
- It is proposed to leave the existing piers in-situ as identifiable navigation hazards above high-water level with the exception of one pier which will be completely removed between Span 4-5 for navigation purposes as shown in Figure 2-3.

Stage 2 – Demolition of Span 3 of Main 6-Span Bridge with Barge-Based Crash Deck

- Repeat for Span 3, working from Span 2.
- Temporary steelwork bracing will be provided adjacent to Span 2.

Stage 3 – Demolition of Span 2 of Main 6-Span Bridge with Barge-Based Crash Deck

- Repeat for Span 2, working from Span 1.
- Temporary steelwork bracing will be provided adjacent to Span 1.

Stage 4 – Demolition of Span 5 of Main 6-Span Bridge with Barge-Based Crash Deck

- Repeat for Span 5, working from Span 6.
- Temporary steelwork bracing will be provided adjacent to Span 6.

Stage 5 – Demolition of Span 6 of Main 6-Span Bridge with Land-Based Crash Deck

- For Span 6, a crash deck will be constructed off 2 lines of temporary piles driven from the riverbank. Demolition works will be conducted from behind the East Abutment.

Stage 6 – Demolition of Span 1 of Main 6-Span Bridge with Land-Based Crash Deck

- For Span 1, a crash deck will be constructed off 2 lines of temporary piles driven from riverbank.
- Demolition works will be conducted from Span W2 of West Abutment run-on bridge.
- Temporary steelwork bracing will be provided at Span W2 of West Abutment run-on bridge.

Stage 7 – Demolition of Span W2 of 2-Span Run-On Bridge with Land-Based Crash Deck

- For Span W2, a crash deck will be constructed off 2 lines of temporary piles driven from the riverbank.
- Demolition works will be conducted from Span W1 of West Abutment run-on bridge.
- Temporary steelwork bracing will be provided at Span W1 of West Abutment run-on bridge.

Stage 8 – Demolition of Span W1 of 2-Span Run-On Bridge with Land-Based Crash Deck

- For Span W1, a crash deck will be constructed off 2 lines of temporary piles driven from the riverbank.
- Demolition works will be conducted from behind the West Abutment.

2.2.5 Road Construction

Road construction will be as per the following sequence:

- Temporary swales will be constructed outside the extents of the proposed embankments to direct surface water run-off during the construction period to temporary soak-pits.
- Topsoil will be stripped to satisfactory formation level and a suitable geotextile membrane will be placed on the base.
- Selected fill material will be imported with placement to new embankments and compaction in layers not in excess of 300mm. The sequence will be repeated until required design levels are achieved.
- The construction of a new surface water drainage system will be carried out.
- A new Tarmac road surfacing will be placed.
- After works have been completed, the temporary drainage will be removed followed by landscaping of embankments and area within the site boundary.

2.2.6 In-stream Works

As outlined in the methodologies above, in-stream works will be required to complete the new bridge construction and existing bridge demolition phases of the project.

The in-stream works methodology are summarised as follows:

- Clean stone will be imported to provide a solid working area on the bank
- All topsoil will be stripped from the worksite and either stockpiled for re-use or removed from the site entirely by a licensed waste contractor.
- Water quality shall be visually monitored on a regular basis by the Site Manager for the duration of the works.

The in-stream works at Hartley Bridge will be undertaken in line with Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters (Inland Fisheries Ireland (IFI) 2016). This document sets out issues of concern in terms of construction impacts and their prevention. It also provides guidance on timing of works. IFI will be notified prior to these works commencing.

All works (including in-stream activities) will also be undertaken in line with Transport Infrastructure Ireland (TII) (formerly the National Roads Authority (NRA)) guidance, specifically; Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes (NRA, 2008).

Works will involve the driving of piles into the riverbed which will be undertaken from both the riverbank and from a barge. Subsequent placement of the cantilevered section will be via bankside and pontoon mounted machinery. Demolition of the existing bridge will be carried out by working from a barge.

Works are proposed to take place in the riverbed with disturbance of sediments expected. Limited sediment excavation may be required around the pier foundations. There has been no history of industrial activity within the vicinity and sediments are not expected to be contaminated. Prior to removal of any sediments from the river they will however be subject to environmental sampling and analysis to confirm the absence of contaminants and the most suitable recovery/disposal route.

Excavated sediments will be removed from the site by a qualified contractor for dewatering and recovery/disposal. No earthworks/disturbance to the banks of the river shall occur other than the minimum works necessary to be undertaken to facilitate construction of the cantilever structure.

- Prior to in-stream piling works a cofferdam will be placed to contain sediment and other material generated during piling. Cofferdams will be installed using sheet piles where piers are to be constructed to create a dry working area. The sheet piles will be installed by a drill rig working from a barge.
- Where silt or sediment is evident within the waters being pumped from the cofferdam, the water will be pumped through a silt bag with the filtered water discharged back to the watercourse
- The silt bag will allow the water to flow through the geotextile fabric, trapping fine silt and sediment, preventing it from entering the watercourse. Formwork will be constructed with an adequate capacity and additional freeboard to prevent any spillage.
- During demolition the bridge deck will be removed by working from a barge. The waste material from the demolished bridge will be collected on the barge and removed to the site compound prior to disposal to a licenced waste facility.
- Potential impacts caused by fuel spillages etc. during the construction phase will be reduced by keeping spill kits and other appropriate equipment (e.g. floating absorbent oil boom, floating absorbent mats and silt curtains) on the workboat.
- Fuels, oils, greases and hydraulic fluids will be stored in bunded compounds at least 50m from watercourses.

2.2.7

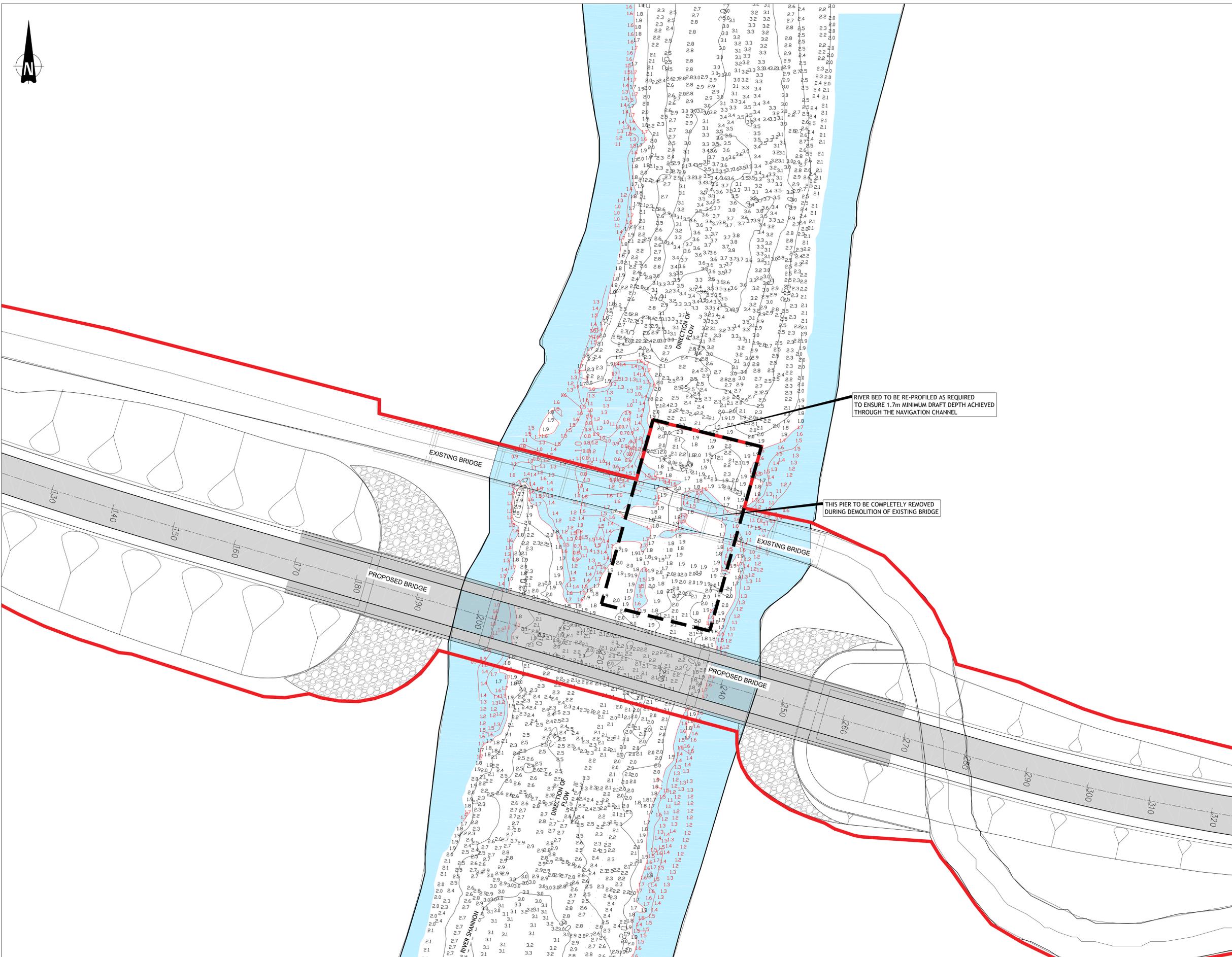
Works at Span 4-5

A bathymetric survey was carried out by Hydrographic Surveys Ltd. in September and October 2020. This survey identified a raised area of riverbed between Span 4 and 5 of the existing bridge to be demolished. Minimal levelling works are required at this location to allow for safe navigation at this point on the river in an area covering 99.5m². in line with Waterways Ireland requirements These works will be carried out by a mini-excavator working from a barge. The riverbed will be levelled by minor digging works with no requirement for dredging. Material removed will be disposed of to the barge and subsequently to a designated waste facility or re-used on-site as appropriate. The volume of material to be removed as part of the reprofiling works will be minimal and comprises approximately 15.75m³. One pier will require complete removal in this section to facilitate navigation of the channel. The

remaining piers will be left in-situ as identifiable navigation hazards above high-water level. The bathymetric survey showing the area to be reprofiled is provided in Figure 2-6.

2.2.8 **Overhead Line**

There is an overhead line which will be moved as part of the proposed works. This line will be moved underground and incorporated as part of the new bridge deck design as detailed in Figure 2-7.



SURVEY NOTES:

1. SURVEYED IN IRISH TRANSVERSE MERCATOR.
2. HORIZONTAL CONTROL BY RTK GPS.
3. SOUNDINGS IN METRES AND DECIMETRES REDUCED TO LOCAL ORDINARY SUMMER LEVEL (OSL). OSL TAKEN AS 42.98 OD POOLBEG / 40.28 OD MALIN (OSGM15).
4. DEPTHS GIVEN AS POSITIVE BELOW DATUM.
5. GRID SPACING 50m.

BATHYMETRIC SURVEY CARRIED OUT BY HYDROGRAPHIC SURVEYS LTD. (From Dwg: PH2022_D01 - Rev.01 - Survey date: 23/09/2020)

LEGEND:

1.2 DENOTES RIVER BED LEVELS LESS THAN 1.7m DEPTH RELATIVE TO ORDINARY SUMMER LEVEL (OSL). OSL TAKEN AS 42.98 OD POOLBEG / 40.28 OD MALIN (OSGM15).

RIVER BED RE-PROFILING MATERIAL QUANTITIES:

AFFECTED AREA OF RIVER BED: 99.50 m²
 VOLUME OF RIVER BED MATERIAL REMOVED: 15.75 m³

LEGEND:

PROPOSED SITE BOUNDARY

BATHYMETRIC SURVEY OVERLAY
1:200

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Figure 2-6



Date Drawn: October 2020
Drawn By: S. Buckley
Date Issued:
Issued By:



Rev	Amendment	By	Date	Rev	Amendment	By	Date
1	ISSUED FOR PLANNING	HS	2021/01/25				
2	ISSUED FOR PLANNING	HS	2021/04/27				

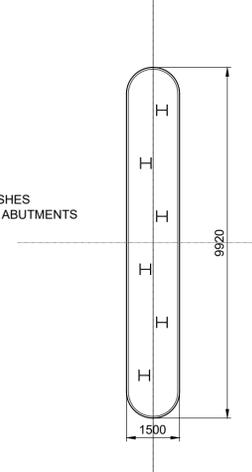
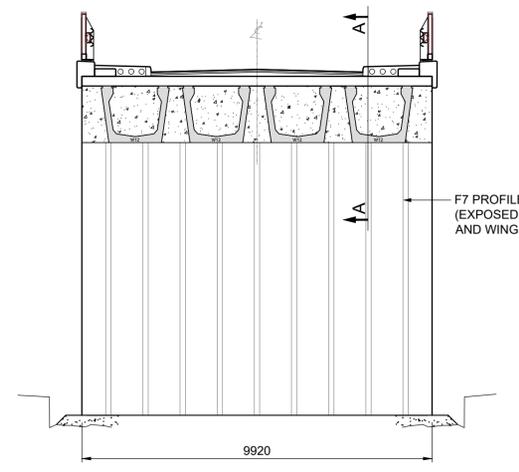
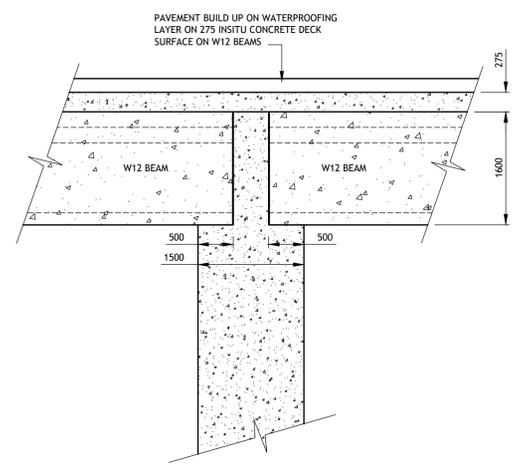
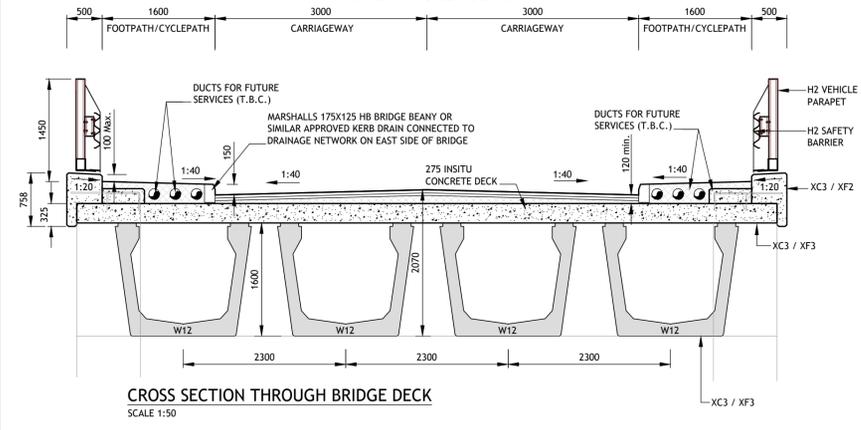


Client: **HARTLEY BRIDGE REPLACEMENT**
BATHYMETRIC SURVEY OVERLAY

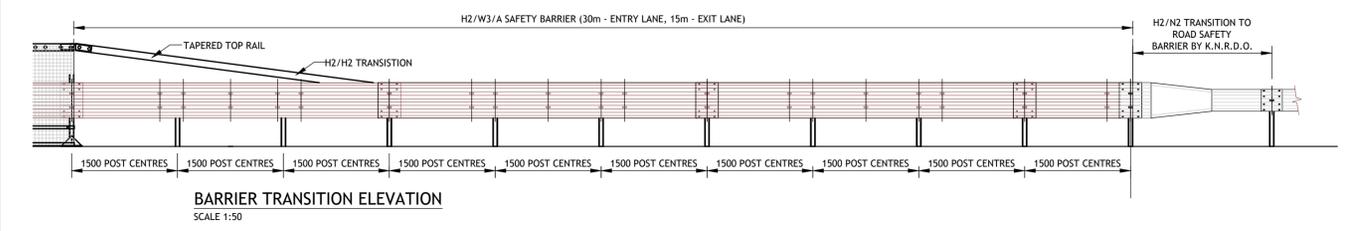
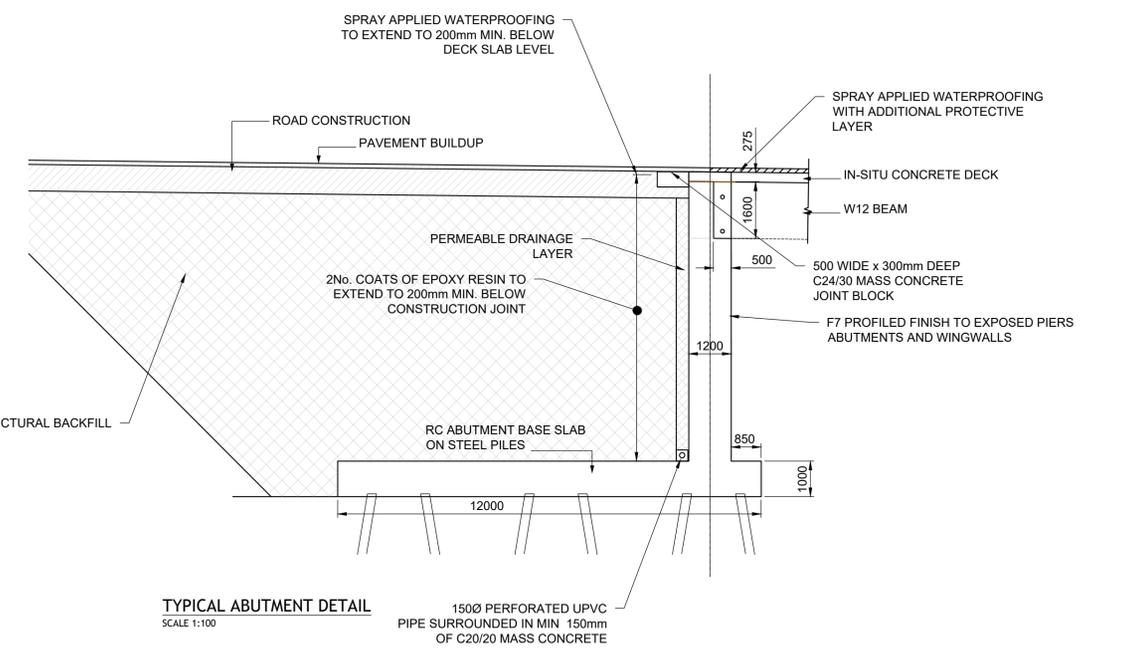
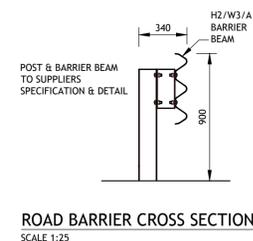
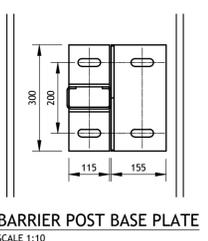
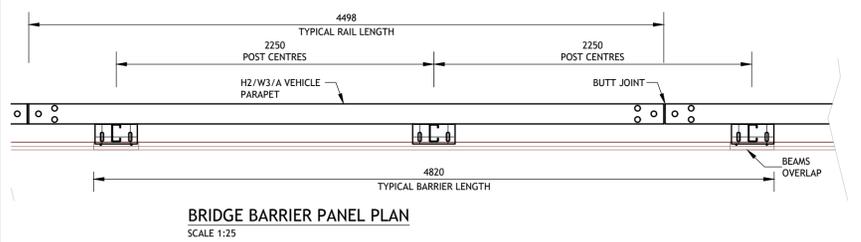
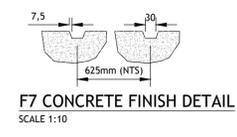
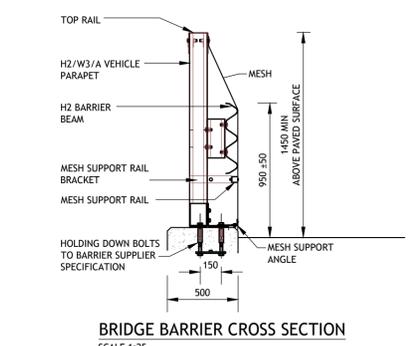
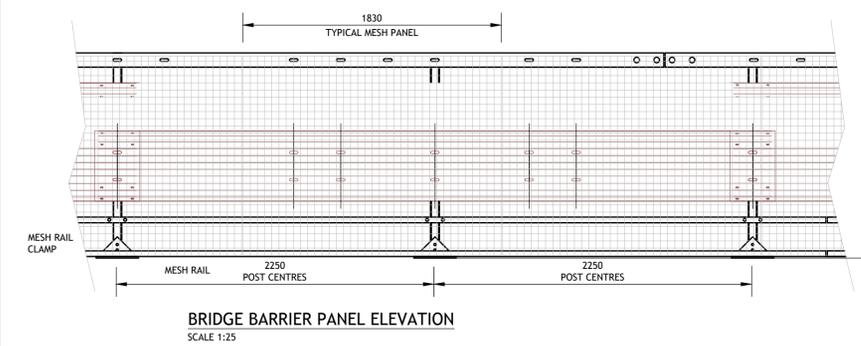
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Stage: PLANNING
 Scale: A3: 1/200
 Technician Check: S. Buckley
 Engineer Check: J. Roche
 Approved:
 Drawing No: 182-164-109
 Date: 1/10/20

PAVEMENT BUILDUP:
 120mm SURFACING-
 45mm HRA WEARING COURSE
 55MM DBM BASE COURSE
 ON REGULATING COURSE
 ON 20mm PROTECTIVE LAYER



- NOTES:**
- ALL DIMENSIONS ARE SHOWN IN MILLIMETRES UNLESS NOTED OTHERWISE.
 - ALL LEVELS ARE SHOWN IN METRES ABOVE ORDNANCE DATUM.
 - ALL EXPOSED ARRISSES TO HAVE A 25x25 CHAMFER
 - DETAILS**
- FINISHES:**
- BURIED UNFORMED SURFACES - U1
 - EXPOSED UNFORMED SURFACES (EXCLUDING AREAS TO RECEIVE WATERPROOFING) - U3
 - BURIED SURFACES - F1
 - END SUPPORTS (ABUTMENTS) - F4
 - CHEEK WALLS/WINGWALLS/FLYWALLS - F3/U3
 - PARAPET EDGE BEAMS - F4
 - PRECAST BEAMS - U4
 - AREA OF DECK TO BE WATERPROOFED - F4
 - DECK CANTILEVER - F4
- MATERIALS:**
- INSITU DECK CONCRETE - GRADE C40/50
 - CONCRETE FOR BLINDING - GRADE S1
 - PRECAST PRESTRESSED CONCRETE - GRADE C52/65
 - PARAPET UPSTAND - GRADE C40/50
 - SUBSTRUCTURE CONCRETE ABOVE BASE LEVEL - GRADE C40/50
 - INCLUDING ABUTMENT - GRADE C32/40
 - SUBSTRUCTURE CONCRETE BELOW GROUND - GRADE C25/30
 - FOOTWAY/VERGE INFILL CONCRETE - GRADE C40/50 (INCLUDING 50% GGBFS)
 - CONCRETE WITHIN SPLASH ZONE - GRADE C40/50 (INCLUDING 50% GGBFS)
- 6N1/6P1 STRUCTURAL BACKFILL TO BE SELECTED TO HAVE Ø PEAK <45°. SITE TESTING MUST BE CARRIED OUT ON THE BACKFILL MATERIAL TO VERIFY THAT THE SELECTED MATERIAL SATISFIES THIS REQUIREMENT.



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Date Drawn: July 2020
 Drawn By: S Buckley
 Date Issued:
 Issued By:



Rev	Amendment	By	Date
PL0	ISSUED FOR PLANNING	IBS	2021/01/25
PL1	ISSUED FOR PLANNING	IBS	2021/04/23



Client: Comhairle Chontae Leitrim
 Job: HARTLEY BRIDGE REPLACEMENT
 Title: BRIDGE DETAILS
 Dublin|Limerick|Cork|Galway|Glasgow
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Stage: PLANNING
 Scale @ A1: As Shown
 Technician Check: S Buckley
 Engineer Check: J Roche
 Approved:
 Drawing No: 182-164-105
 Rev: PL1

Figure 2-7

3. **METHODOLOGY**

The following sections describe the methodologies followed to establish the baseline ecological condition of the proposed development site and surrounding area. Assessing the impacts of any project and associated activities requires an understanding of the ecological baseline conditions prior to and at the time of the project proceeding. Ecological Baseline conditions are those existing in the absence of proposed activities (CIEEM, 2018).

3.1 **Desk Study**

A comprehensive desk study was undertaken to inform this ecological impact assessment. This study includes a thorough review of available information that is relevant to the ecology of the site of the proposed development. This information provides valuable existing data and also helps in the assessing the requirement for additional ecological surveys.

The following list describes the sources of data consulted:

- Review of online web-mappers: National Parks and Wildlife Service (NPWS), Environmental Protection Agency (EPA)
- NPWS records (data request)
- Review of the Bat Conservation Ireland (BCI) Private Database
- Review of the publicly available National Biodiversity Data Centre web-mapper
- Records from the NPWS web-mapper and review of specially requested records from the NPWS Rare and Protected Species Database for the hectads which overlap with the study area
- Review of Inland Fisheries Ireland GIS web mapper
- Review of report “Screening for Appropriate Assessment” prepared by Ecofact (dated: 27th August 2019)
- Review of report “Aquatic Ecological Assessment” prepared by Ecofact (dated: 27th August 2019)

3.2 **Field Surveys**

3.2.1 **Multi-disciplinary ecological walkover surveys**

Multi-disciplinary ecological walkover surveys were undertaken in accordance with NRA Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes (NRA, 2009). This survey provided baseline data on the ecology of the study area and assessed whether further more detailed habitat or species specific ecological surveys were required. The multi-disciplinary ecological walkover survey comprehensively covered the entire study area.

Habitats were classified in accordance with the Heritage Council’s ‘Guide to Habitats in Ireland’ (Fossitt, 2000). Habitat mapping was undertaken with regard to guidance set out in ‘Best Practice Guidance for Habitat Survey and Mapping’ (Smith et al., 2011).

Plant nomenclature for vascular plants follows ‘New Flora of the British Isles’ (Stace, 2010), while mosses and liverworts nomenclature follows ‘Mosses and Liverworts of Britain and Ireland - a field guide’ (British Bryological Society, 2010).

The walkover surveys were designed to detect the presence, or suitable habitat for a range of protected faunal species that are may occur in the vicinity of the proposed development.

During the multidisciplinary surveys, a search for Invasive Alien Species (IAS), with a focus on those listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2011), was also conducted.

The walkover surveys were undertaken on 12th February 2019 and 21st August 2020. The survey timing falls within the recognised optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith et al., 2011).

3.2.2 Otter Survey

An Otter survey was conducted as per NRA (2009) guidelines (Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes). This involved a search for all otter signs e.g. spraints, scat, prints, slides, trails, couches and holts. A 10m riparian buffer (both banks) was considered to comprise part of the otter habitat (NPWS 2009).

The dedicated otter survey also followed the guidance as set out in NRA (2008) *'Guidelines for the Treatment of Otters Prior to the Construction of National Roads Schemes'* and following CIEEM best practice competencies for species surveys (CIEEM, 2018).

3.2.3 Badger Survey

The badger survey covered the proposed development footprint and adjacent suitable habitats. The badger survey was not constrained by vegetation given the nature of the habitats within the site and the timing of the surveys (NRA 2006a).

The badger survey was conducted in order to determine the presence or absence of badger signs within and outside the development footprint. This involved a search for all potential badger signs as per NRA (2009) (latrines, badger paths and setts). If encountered, setts would be classified as per the convention set out in NRA (2009) (i.e. main, annexe, subsidiary, outlier).

The badger survey was conducted adhering to best practice guidance (NRA, 2009) and followed the *'Guidelines for the Treatment of Badger Prior to the Construction of National Roads Schemes'* (NRA, 2006a) and CIEEM best practice competencies for species surveys (CIEEM, 2013¹).

3.2.4 Aquatic Survey

An Aquatic Impact Assessment was carried out by Ecofact and a report prepared. The assessment was carried out using the methodology given in the Environment Agency's *'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003'* (EA, 2003). The ecological assessment within the study area was carried out in accordance with the *'Guidelines for the Assessment of Ecological Impacts of National Road Schemes – Revision 2'* (NRA 2009a).

A review of published literature was undertaken in order to collate data on the receiving environment; a range of additional sources of information including scientific reports produced by, and information on the websites of the Environmental Protection Agency (EPA), Inland Fisheries Ireland (IFI) and the National Parks and Wildlife Service (NPWS) were also reviewed. Information sources reviewed as part of the current assessment included NPWS site synopses, as well as protected species data held on the NPWS/NBDC online databases. A full bibliography of information sources reviewed is given in the reference section. Online aerial imagery was accessed to characterise the nature of proposed works locations near the Natura 2000 network. Information on flow rates and catchment areas utilised in the current report were obtained from the websites of the Environmental Protection Agency and catchments.ie.

¹ CIEEM, 2013, *Technical Guidance Series – Competencies for Species Survey*, Online, Available at: <https://cieem.net/resource/competencies-for-species-survey-css/> Accessed: 20.06.2019

The following information was taken from the survey carried out by Ecofact in 2019:

Aquatic macro-invertebrates (and juvenile fish) were sampled qualitatively using sweep net sampling –using a wetsuit and handheld net. It was originally envisaged that the full river channel would be snorkelled and surveyed visually but this was not possible due to the highly turbid nature of the river and low visibility. However, the survey was considered adequate to evaluate the site. During the survey, specific attention was given to searching for protected aquatic species and aquatic non-native invasive species within the river corridor.

3.3 Methodology for Assessment of Impacts and Effects

3.3.1 Determining Importance of Ecological Receptors

The importance of the ecological features identified within the study area was determined with reference to a defined geographical context. This was undertaken following a methodology that is set out in Chapter 3 of the ‘Guidelines for Assessment of Ecological Impacts of National Roads Schemes’ (NRA, 2009). These guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned in relation to the importance of any particular receptor. The guidelines provide a basis for determination of whether any particular receptor is of importance on the following scales:

- > International
- > National
- > County
- > Local Importance (Higher Value)
- > Local Importance (Lower Value)

The Guidelines clearly set out the criteria by which each geographic level of importance can be assigned. Locally Important (lower value) receptors contain habitats and species that are widespread and of low ecological significance and of any importance only in the local area. Internationally Important sites are either designated for conservation as part of the Natura 2000 Network (SAC or SPA) or provide the best examples of habitats or internationally important populations of protected flora and fauna. Specific criteria for assigning each of the other levels of importance are set out in the guidelines and have been followed in this assessment. Where appropriate, the geographic frame of reference set out above was adapted to suit local circumstances. In addition, and where appropriate, the conservation status of habitats and species is considered when determining the significance of ecological receptors.

Any ecological receptors that are determined to be of Local Importance (Higher Value), County, National or International importance following the criteria set out in NRA (2009) are considered to be Key Ecological Receptors (KERs) for the purposes of ecological impact assessment if there is a pathway for effects thereon. Any receptors that are determined to be of Local Importance (Lower Value) are not considered to be Key Ecological Receptors.

3.3.2 Characterisation of Impacts and Effects

The proposed development will result in a number of impacts. The ecological effects of these impacts are characterised as per the CIEEM ‘Guidelines for Ecological Impact Assessment in the UK and Ireland (2018)’. The headings under which the impacts are characterised follow those listed in the guidance document and are applied where relevant. A summary of the impact characteristics considered in the assessment is provided below:

- **Positive or Negative.** Assessment of whether the proposed development result in a positive or negative effect on the ecological receptor.
- **Extent.** Description of the spatial area over which the effect has the potential to occur.
- **Magnitude** to size, amount, intensity and volume. It should be quantified if possible and expressed in absolute or relative terms e.g. the amount of habitat lost, percentage change to habitat area, percentage decline in a species population.
- **Duration** is defined in relation to ecological characteristics (such as the lifecycle of a species) as well as human timeframes. For example, five years, which might seem short-term in the human context or that of other long-lived species, would span at least five generations of some invertebrate species.
- **Frequency and Timing.** This relates to the number of times that an impact occurs and its frequency. A small-scale impact can have a significant effect if it is repeated on numerous occasions over a long period.
- **Reversibility.** This is a consideration of whether an effect is reversible within a ‘reasonable’ timescale. What is considered to be a reasonable timescale can vary between receptors and is justified where appropriate in the impact assessment section of this report.

3.3.3 Determining the Significance of Effects

The ecological significance of the effects of the proposed development are determined following the precautionary principle and in accordance with the methodology set out in Section 5 of CIEEM (2018).

For the purpose of EcIA, ‘significant effect’ is an effect that either supports or undermines biodiversity conservation objectives for ‘important ecological features’ or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local (CIEEM, 2018).

When determining significance, consideration is given to whether:

- Any processes or key characteristics of key ecological receptors will be removed or changed
- There will be an effect on the nature, extent, structure and function of important ecological features
- There is an effect on the average population size and viability of ecologically important species.
- There is an effect on the conservation status of important ecological habitats and species.

The EPA draft guidelines on information to be included in Environmental Impact Statements (EPA, 2017) and the *Guidelines for assessment of Ecological Impacts of National Road Schemes*, (NRA, 2009) were also considered when determining significance and the assessment is in accordance with those guidelines.

The terminology used in the determination of significance follows the suggested language set out in the Draft EPA Guidelines (2017) as shown in Table 3.1 below.

Table 3.1 Criteria for determining significance of effect, based on (EPA, 2017) guidelines

Effect Magnitude	Definition
No change	No discernible change in the ecology of the affected feature.
Imperceptible effect	An effect capable of measurement but without noticeable consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.

Effect Magnitude	Definition
Slight effect	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate effect	An effect that alters the character of the environment that is consistent with existing and emerging trends.
Significant effect	An effect which, by its character, its magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound effect	An effect which obliterates sensitive characteristics.

As per TII (NRA, 2009) and CIEEM (2019) best practice guidelines the following key elements should also be examined when determining the significance of effects:

1. The likely effects on ‘integrity’ should be used as a measure to determine whether an impact on a site is likely to be significant (NRA, 2009)
2. A ‘significant effect’ is an effect that either supports or undermines biodiversity conservation objectives (CIEEM, 2019)

Integrity

In the context of EcIA, ‘integrity’ refers to the coherence of the ecological structure and function, across the entirety of a site, that enables it to sustain all of the ecological resources for which it has been valued. Impacts resulting in adverse changes to the nature, extent, structure and function of component habitats and effects on the average population size and viability of component species, would affect the integrity of a site, if it changes the condition of the ecosystem to unfavourable.

Conservation status

An impact on the conservation status of a habitat or species is considered to be significant if it will result in a change in conservation status. According to CIEEM (2019) guidelines the definition for conservation status in relation to habitats and species are as follows:

- Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area
- Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

As defined in the EU Habitats Directive 92/43/EEC, the conservation of a habitat is favourable when:

- Its natural range, and areas it covers within that range, are stable or increasing
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future
- The conservation status of its typical species is favourable.

The conservation of a species is favourable when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats

- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future
- There is and will probably continue to be, a sufficiently large habitat to maintain its population on a long-term basis.

According to the NRA/CIEEM methodology, if it is determined that the integrity and/or conservation status of an ecological feature will be impacted on, then the level of significance of that impact is related to the geographical scale at which the impact will occur (i.e. local, county, national, international).

4. DESK STUDY

4.1 Designated Sites

The potential for the proposed development to impact on sites that are designated for nature conservation was considered in this Ecological Impact Assessment.

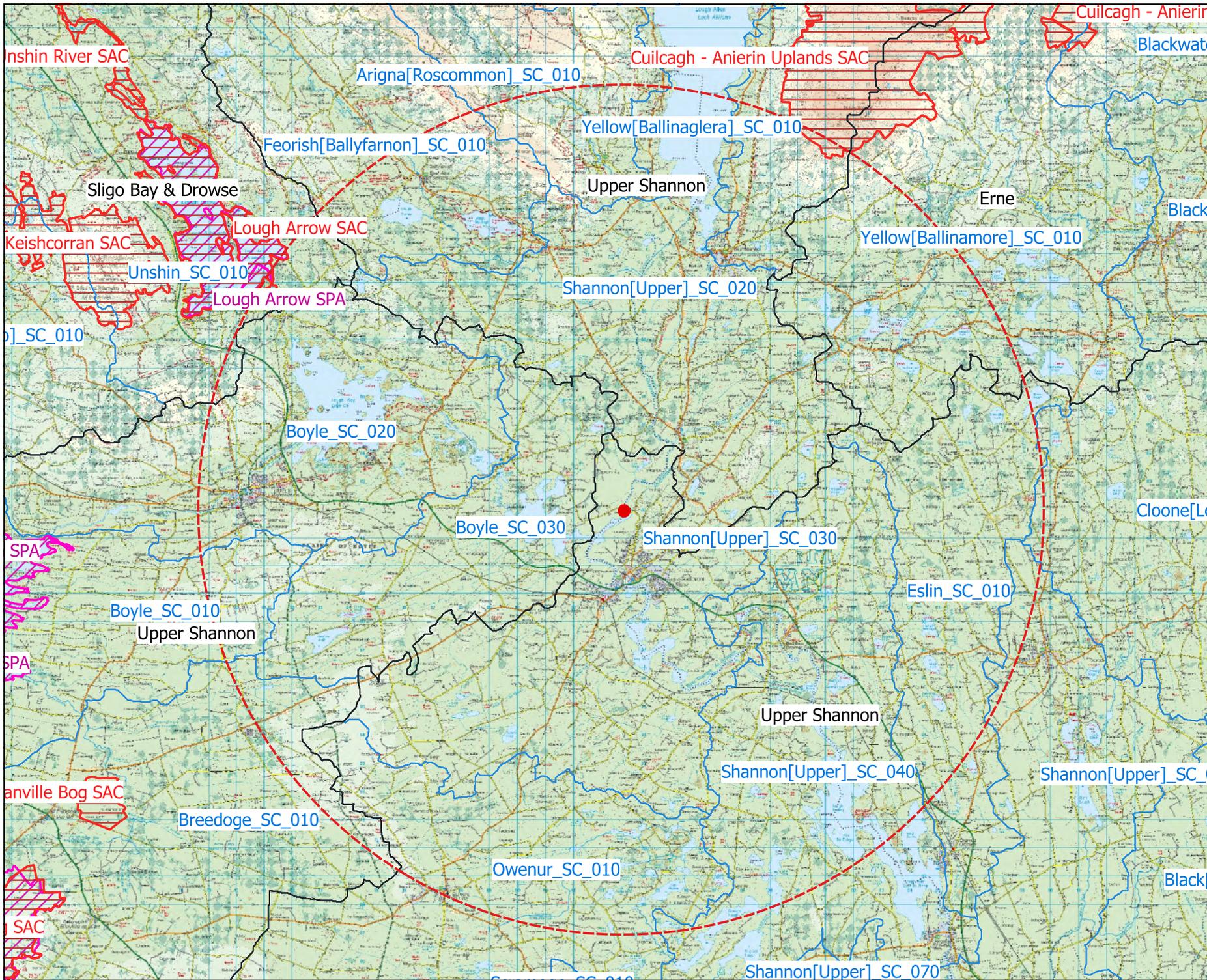
Special Areas of Conservation (SACs) and Special Protection Areas for Birds (SPAs) are designated under EU Habitats Directive and are collectively known as ‘European Sites’. The potential for effects on European Sites is fully considered in the AA Screening Report/ Natura Impact Statement that accompanies this application and discussed also in this EcIA. The European Sites that are within the Likely Zone of Impact are listed in the AASR/NIS and are not repeated in this document.

Natural Heritage Areas (NHAs) are designated under the Wildlife (Amendment) Act 2000 and their management and protection is provided for by this legislation and planning policy. The potential for effects on these designated sites is fully considered in this EcIA.

Proposed Natural Heritage Areas (pNHAs) were designated on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. However, the potential for effects on these designated sites is fully considered in this EcIA.

The following methodology was used to establish which nationally designated sites have the potential to be impacted by the proposed development:

- Initially the most up to date GIS spatial datasets for all nationally designated sites and water catchments were downloaded from the NPWS website (www.npws.ie) and the EPA website (www.epa.ie) on the 01/06/2021. The datasets were utilized to identify Designated Sites which could feasibly be affected by the proposed development.
- All nationally designated Sites within a distance of 15km surrounding the development site were identified. In addition, the potential for connectivity with nationally designated Sites at distances of greater than 15km from the proposed development was also considered in this initial assessment. In this case, Lough Boderg and Lough Bofin pNHA occurs approximately 25km (hydrological distance) downstream and Lough Forbes Complex pNHA occurs approximately 38.2km (hydrological distance) downstream of the proposed works. Given the nature, scale and location of the proposed works and the distance and attenuation properties of the intervening watercourses, impacts on designated sites that were located further downstream, were discounted.
- A map of all the nationally designated Sites within 15km is provided in Figure 4-1.
- Catchment mapping was used to establish or discount potential hydrological connectivity between the site of the proposed development and any nationally designated Sites. The hydrological catchments are also shown in Figures 4-1.
- Table 4.1, provides details of all relevant nationally designated Sites as identified in the preceding steps and assesses which are within the likely Zone of Impact.
- The site synopses for these sites, as per the NPWS website (www.npws.ie), were consulted and reviewed at the time of preparing this report. Figure 4-2 shows the location of the proposed development in relation to all European sites within 15km of the proposed development.
- Where potential pathways for Significant Effect are identified, the site is included within the Likely Zone of Impact and further assessment is required.



Map Legend

-  Special Area of Conservation
-  Special Protected Area
-  Water Catchment
-  Water SubCatchment
-  Site Location
-  15km Buffer

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Drawing Title	
European Sites within 15km Buffer	
Project Title	
Proposed Bridge Replacement Hartley Bridge	
Drawn By	Checked By
LK	PR
Project No.	Drawing No.
181209	Figure 4-2
Scale	Date
1:175000	29.09.20



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Table 4.4-1 Identification of Designated sites within the Likely Zone of Impact

Designated Sites and distance from proposed development	Likely Zone of Impact Determination
Natural Heritage Areas (NHAs)	
Kilonan Mountain Bog NHA Distance: 11km	<p>There will be no direct effect as the proposed project footprint is located outside of the National sites.</p> <p>Given the distance of the NHAs from the development and the lack of hydrological connectivity, no pathway for indirect effects has been identified.</p> <p>There is no potential for effects and the NHA is not located within the Likely Zone of Impact.</p>
Proposed Natural Heritage Areas (pNHAs)	
Lough Drumharlow Distance: the proposed works occur within the boundary of the pNHA	<p>The proposed development site is located within the boundary of Lough Drumharlow pNHA.</p> <p>Consequently, this pNHA is within the Likely Zone of Impact.</p>
Drumhierny Wood Distance: 3.6km	<p>There will be no direct effect as the proposed project footprint is located outside of the designated site.</p> <p>The designated site is located 3.6km north east of the proposed works and is terrestrial in nature. No pathway for indirect effects has been identified.</p> <p>There is no potential for effects and this pNHA is not located within the Likely Zone of Impact.</p>
Sheemore Wood Distance: 5.4km	<p>There will be no direct effect as the proposed project footprint is located outside of the designated site.</p> <p>The designated site is located 5.4km north east of the proposed works and is terrestrial in nature. No pathway for indirect effects has been identified.</p> <p>There is no potential for effects and this pNHA is not located within the Likely Zone of Impact.</p>
Annagheary Lough Distance: 6.4km	<p>There will be no direct effect as the proposed project footprint is located outside of the designated site.</p> <p>The designated site is located 6.4km north east of the proposed works and in a separate hydrological catchment. No pathway for indirect effects has been identified.</p> <p>There is no potential for effects and this pNHA is not located within the Likely Zone of Impact.</p>
Fin Lough (Roscommon) Distance: 7km	<p>There will be no direct effect as the proposed project footprint is located outside of the designated site.</p>

Designated Sites and distance from proposed development	Likely Zone of Impact Determination
Natural Heritage Areas (NHAs)	
	<p>The designated site is located 7km north west of the proposed works and in a separate hydrological catchment. No pathway for indirect effects has been identified.</p> <p>There is no potential for effects and this pNHA is not located within the Likely Zone of Impact.</p>
<p>Carrickaport Lough</p> <p>Distance: 9.4km</p>	<p>There will be no direct effect as the proposed project footprint is located outside of the designated site.</p> <p>The designated site is located 9km north east of the proposed works and in a separate hydrological catchment. No pathway for indirect effects has been identified.</p> <p>There is no potential for effects and this pNHA is not located within the Likely Zone of Impact.</p>
<p>Drumman's Island (Lough Key)</p> <p>Distance: 9.6km</p>	<p>There will be no direct effect as the proposed project footprint is located outside of the designated site.</p> <p>The designated site is located 9.6km north west of the proposed works and in a separate hydrological catchment. No pathway for indirect effects has been identified.</p> <p>There is no potential for effects and this pNHA is not located within the Likely Zone of Impact.</p>
<p>Lough Allen, South End and Parts</p> <p>Distance: 10.3km</p>	<p>There will be no direct effect as the proposed project footprint is located outside of the designated site.</p> <p>The designated site is located 10.3km north of the proposed works and in a separate hydrological catchment. No pathway for indirect effects has been identified.</p> <p>There is no potential for effects and this pNHA is not located within the Likely Zone of Impact.</p>
<p>Hog's Island (Lough Key)</p> <p>Distance: 11km</p>	<p>There will be no direct effect as the proposed project footprint is located outside of the designated site.</p> <p>The designated site is located 11km north west of the proposed works and in a separate hydrological catchment. No pathway for indirect effects has been identified.</p> <p>There is no potential for effects and this pNHA is not located within the Likely Zone of Impact.</p>
<p>Lough Boderg And Lough Bofin</p>	<p>There will be no direct effect as the proposed project footprint is located outside of the designated site.</p>

Designated Sites and distance from proposed development	Likely Zone of Impact Determination
Natural Heritage Areas (NHAs)	
<p>Distance: 11.1km</p>	<p>The designated site is located 11.1km (25km hydrological distance) south west of the proposed works. Taking a precautionary approach there is potential for the proposed works to result in deterioration in surface water quality.</p> <p>Due to hydrological connectivity downstream, this site is considered to be within the Likely Zone of Impact.</p>
<p>Drum Bridge (Lough Key)</p> <p>Distance: 11.2km</p>	<p>There will be no direct effect as the proposed project footprint is located outside of the designated site.</p> <p>The designated site is located 11.2km north west of the proposed works and in a separate hydrological catchment. No pathway for indirect effects has been identified.</p> <p>There is no potential for effects and this pNHA is not located within the Likely Zone of Impact.</p>
<p>Tawnytaskin Wood (Lough Key)</p> <p>Distance: 11.4km</p>	<p>There will be no direct effect as the proposed project footprint is located outside of the designated site.</p> <p>The designated site is located 11.4km north west of the proposed works and in a separate hydrological catchment. No pathway for indirect effects has been identified.</p> <p>There is no potential for effects and this pNHA is not located within the Likely Zone of Impact.</p>
<p>Corrigeenroe Marsh</p> <p>Distance: 11.9km</p>	<p>There will be no direct effect as the proposed project footprint is located outside of the designated site.</p> <p>The designated site is located 11.9km north west of the proposed works and in a separate hydrological catchment. No pathway for indirect effects has been identified.</p> <p>There is no potential for effects and this pNHA is not located within the Likely Zone of Impact.</p>
<p>Kilglass And Grange Loughs</p> <p>Distance: 12.6km</p>	<p>There will be no direct effect as the proposed project footprint is located outside of the designated site.</p> <p>The designated site is located 12.6km south of the proposed works. There is no hydrological connectivity with this site. No pathway for indirect effects has been identified.</p> <p>There is no potential for effects and this pNHA is not located within the Likely Zone of Impact.</p>

Designated Sites and distance from proposed development	Likely Zone of Impact Determination
Natural Heritage Areas (NHAs)	
Lough Arrow Distance: 14.3km	<p>There will be no direct effect as the proposed project footprint is located outside of the designated site.</p> <p>The designated site is located 14.3km north west of the proposed works and in a separate hydrological catchment. No pathway for indirect effects has been identified.</p> <p>There is no potential for effects and this pNHA is not located within the Likely Zone of Impact.</p>
Cuilcagh – Anieran Uplands Distance: 14.3km	<p>There will be no direct effect as the proposed project footprint is located outside of the designated site.</p> <p>The designated site is located 14.3km north east of the proposed works and is terrestrial in nature. No pathway for indirect effects has been identified.</p> <p>There is no potential for effects and this pNHA is not located within the Likely Zone of Impact.</p>
Lough Boderg and Lough Bofin pNHA Distance: 25km (hydrological distance)	<p>There will be no direct effect as the proposed project footprint is located outside of the designated site.</p> <p>Taking a highly precautionary approach there is potential for surface water pollution that may result from the proposed works to impact this designated site that occurs approximately 25km downstream.</p> <p>Taking a precautionary approach there is potential for effects on this pNHA and it is considered to be within the Likely Zone of Impact.</p>
Lough Forbes Complex SAC Distance: 38.2km (hydrological distance)	<p>There will be no direct effect as the proposed project footprint is located outside of the designated site.</p> <p>Taking a highly precautionary approach there is potential for surface water pollution that may result from the proposed works to impact this designated site that occurs approximately 38.2km downstream,</p> <p>Taking a precautionary approach there is potential for effects on this pNHA and it is considered to be within the Likely Zone of Impact.</p>

The proposed development site is located within Lough Drumharlow pNHA. There will be minimal loss of habitat within the pNHA as a result of the proposed development. In order to satisfy Waterways Ireland navigation requirements a minimal amount of reprofiling of the riverbed will be carried out in the area shown on Figure 2-5. This is to achieve a minimal depth of 1.7m for navigation purposes. This will comprise the removal of a minimal amount of built-up material comprising 15.75m³. The impacts of this loss are assessed in Section 6 below. Potential for indirect impacts on this pNHA in the form of disturbance and surface water pollution exists.

Lough Boderg and Lough Bofin pNHA occurs approximately 25km (hydrological distance) downstream and Lough Forbes Complex pNHA occurs approximately 38.2km (hydrological distance) downstream. Taking an extremely precautionary approach a potential pathway for indirect effects in the form of surface water pollution of these downstream sites exists. Given the nature, scale and location of the proposed works and the distance and attenuation properties of the intervening watercourses, impacts on designated sites that were located further downstream, were discounted.

The AA Screening that accompanies this application identifies the following European Sites as being within the Likely Zone of Impact:

- Lough Forbes Complex SAC (001818) is located approximately 23.5km from the Proposed Development site (38.2km hydrological distance) but included on a precautionary basis.

According to data received from NPWS there are records for breeding Curlew within 1km of the works as recorded in 2016 and 2019. However, the proposed works will be restricted to within and immediately adjacent to the existing road and bridge and the site does not provide suitable habitat for breeding curlew due to the presence of the existing road and hedgerows.

4.2 New Flora Atlas

A search was made in the New Atlas of the British & Irish Flora (Preston et al., 2002) to investigate whether any rare or unusual plant species listed as Annex II of the Habitats Directive which are listed as rare on the Red Data List (Curtis and McGough 1988) or protected under the Flora (Protection) Order, 1999 had been recorded in the relevant 10km squares in which the study site is situated (G90), during the 1987-1999 atlas survey. It follows that there will be a number of habitats, and thus many plant species, that were recorded in G90 during the atlas survey that are not likely to be found at the development site. No species listed on the Flora Protection Order or on Annex II of the EU Habitats Directive have been recorded from the Grid Square G90.

4.3 NPWS Records

A data request was sent to the NPWS and data received in relation to the grid square on the 28th of October 2020. Table 4.2 lists the rare and protected species records obtained from the NPWS during this study.

Table 4-2 Records for rare and protected species, NPWS.

Common Name	Scientific Name	Status
Otter	<i>Lutra lutra</i>	Annex II, Annex IV, WA 1976-2017
White-clawed Freshwater Crayfish	<i>Austropotamobius pallipes</i>	Annex II, Annex V, WA 1976-2017
Irish Hare	<i>Lepus timidus subsp. hibernicus</i>	Annex V, WA 1976-2017
Common Frog	<i>Rana temporaria</i>	Annex V, WA 1976-2017
Pine Marten	<i>Martes martes</i>	Annex V, WA 1976-2017
Badger	<i>Meles Meles</i>	WA 1976-2017

Common Name	Scientific Name	Status
Hedgehog	<i>Erinaceus europaeus</i>	WA 1976-2017
Fallow Deer	<i>Dama dama</i>	WA 1976-2017
Whooper Swan	<i>Cygnis cygnus</i>	Annex I, WA 1976-2017
Lapwing	<i>Vanellus vanellus</i>	Annex I, WA 1976-2017
Curlew	<i>Numenius arquata</i>	Red List BoCCI

Annex II, Annex IV, Annex V – Of EU Habitats Directive, WA – Irish Wildlife Acts (1976-2017), Red Data List (Curtis and McGough 1988), BoCCI Red List – Birds of Conservation Concern in Ireland (Population for which the species is red listed in brackets), AEWA -Agreement on the Conservation of African-Eurasian Migratory Waterbirds [1999].

4.4 Biodiversity Ireland Database

The National Biodiversity Data centre database was accessed on 30th September 2020 and the following information was obtained. Table 4-3 lists the protected faunal species (excluding birds) recorded within the hectad which pertains to the current study area. The database was also searched for records of Third Schedule non-native invasive species within the hectad. Table 4-4 lists the non-native invasive species recorded within the hectad. Table 4-5 lists all the protected bird species recorded within the hectad which pertains to the current study area.

Table 4-3 NBDC records for protected fauna records (excl. birds).

Common Name	Scientific Name	Status
Otter	<i>Lutra lutra</i>	HD, WA
White-clawed Freshwater Crayfish	<i>Austropotamobius pallipes</i>	HD, WA
Desmoulin's Whorl Snail	<i>Vertigo moulinsiana</i>	HD, WA
Marsh Fritillary	<i>Euphydryas aurinia</i>	HD
Daubenton's Bat	<i>Myotis daubentonii</i>	HD, WA
Natterer's Bat	<i>Myotis nattereri</i>	HD, WA
Common Frog	<i>Rana rana</i>	HD, WA
Irish Hare	<i>Lepus timidus hibernicus</i>	HD, WA
Pine marten	<i>Martes martes</i>	HD, WA
European Eel	<i>Anguilla anguilla</i>	OSPAR Convention
Smooth Newt	<i>Lissotriton vulgaris</i>	WA
Fallow Deer	<i>Dama dama</i>	WA

Common Name	Scientific Name	Status
Hedgehog	<i>Erinaceus europaeus</i>	WA

Annex II, Annex IV, Annex V – Of EU Habitats Directive, WA – Irish Wildlife Acts (1976-2017).

Table 4-4 NBDC records for Invasive species.

Common Name	Scientific Name
Rhododendron	<i>Rhododendron ponticum</i>
Canadian Waterweed	<i>Elodea canadensis</i>
Japanese Knotweed	<i>Fallopia japonica</i>
Asian River Clam	<i>Corbicula fluminea</i>
Roach	<i>Rutilus rutilus</i>
American Mink	<i>Mustela vison</i>
Brown Rat	<i>Rattus norvegicus</i>
Greylag Goose	<i>Anser anser</i>
Grey Squirrel	<i>Sciurus carolinensis</i>

Table 4-5 NBDC Records for Birds

Common Name	Scientific Name	Status
Common kingfisher	<i>Alcedo atthis</i>	Protected EU Birds Directive Annex I species
Common tern*	<i>Sterna hirundo</i>	
Greenland white-fronted goose**	<i>Anser albifrons flaviostris</i>	
Hen harrier	<i>Circus cyaneus</i>	
Merlin**	<i>Falco columbarius</i>	
Whooper swan	<i>Cygnus cygnus</i>	
Corn crake***	<i>Crex crex</i>	Protected EU Birds Directive Annex I Bird Species & Birds of Conservation Concern in Britain and Ireland - Red List
Yellowhammer	<i>Emberiza citronella</i>	Birds of Conservation Concern in Britain and Ireland - Red List
Barn owl	<i>Tyto alba</i>	
Black-headed gull	<i>Larus ridibundus</i>	
Common redshank	<i>Tringa totanus</i>	

Common Name	Scientific Name	Status
Northern pintail	<i>Anas acuta</i>	
Northern shoveler	<i>Anas clypeata</i>	
Eurasian Wigeon	<i>Anas penelope</i>	
Eurasian Woodcock	<i>Scolopax rusticola</i>	
Meadow pipit	<i>Anthus pratensis</i>	
Tufted duck	<i>Aythya fuligula</i>	

Annex I – Of EU Birds Directive, Red List – Birds of Conservation Concern in Ireland (Population for which the species is red listed in brackets).

4.4.1 Bat Records

A review of the National Bat Database of Ireland maintained by Bat Conservation Ireland, was made on the 19th of June 2019, within 1km and 10km of the proposed site (Grid Ref: E193904 N301894) respectively. This database provides details of recorded roosts, records from transect surveys and any other Ad-Hoc records that are available.

A search of a 1km buffer from the proposed development site returned no records. A search of a 10km buffer from the proposed development site resulted in the following records; 22 roost records, 14 transect records and 10 ad hoc observations for bat species. Roosts were found to contain Natterers’ bat (*Myotis nattereri*), lesser horseshoe bat (*Rhinolophus hipposideros*), soprano pipistrelle (*Pipistrellus pygmaeus*), brown long-eared bat (*Plecotus auritus*) and unidentified bats.

Fourteen transect records were returned with records for Daubenton’s bat (*Myotis daubentonii*), Leislers’ Bat (*Nyctalus leisleri*), Common pipistrelle (*Pipistrellus pipistrellus*), Pipistrelle (*Pipistrellus* spp.), soprano pipistrelle (*Pipistrellus pygmaeus*), *Myotis* spp., brown long-eared bat (*Plecotus auritus*) and unidentified bats.

Ten ad-hoc observations were returned with records for Common pipistrelle (*Pipistrellus pipistrellus*) and Soprano pipistrelle (*Pipistrellus pygmaeus*), Daubenton’s bat (*Myotis daubentonii*) and Leisler’s bat (*Nyctalus leisleri*). The information provides for a good baseline understanding of bat species in the area and indicates that the region has been previously surveyed for bats.

4.5 Water Quality

4.5.1 EPA Water Quality Data

The EPA web-mapper (<https://gis.epa.ie/EPAMaps/>) was consulted on the 30th September 2020 regarding the water quality and status of waterbodies that are located downstream of the site of the proposed development.

River Basin Management Plans (RBMPs) have been published for all River Basin Districts in Ireland in accordance with the requirements of the Water Framework Directive. The online EPA Envision map viewer provides access to water quality information at individual waterbody status for all the River Basin Districts in Ireland. The WFD River Waterbody Status 2013 – 2018 for the watercourses which flow close to the site have been assessed in Table 4-6.

Table 4-6 Watercourses with relevant water quality statuses

Name	Location	Status	Risk
River Shannon (Upper)	Flows in a southerly direction, at the proposed demolition and construction site.	Poor	At risk

Status– WFD River Waterbody Status 2013-2018 Risk – WFD River Waterbodies Risk

Table 4-7 illustrates the respective Q-value status results from two monitoring stations located along the River Shannon both upstream and downstream of the proposed demolition and construction site.

Table 4-7 Water quality monitoring stations and associated Q values

Watercourse Name	Sampling Station Name	Location (Approximate)	Sampling Year	Q-Value & Water Quality Status
Shannon Upper [EPA Code: [26S02]	Battle Br	4.9km upstream of the proposed site	2017	4 (Good)
Shannon Upper [EPA Code: [26S02]	Jamestown: d/s Weir (LHS)	14km downstream of the proposed site	2017	3 (Poor)

The proposed bridge replacement works are located on the River Shannon approximately 2.8km north of Carrick-on-Shannon in the townland of Hartley, County Leitrim.

4.5.2 Aquatic Impact Assessment

An Aquatic Impact Assessment Report was prepared by Ecofact on 27th August 2019. The conclusions of the aquatic impact assessment report are provided below:

‘The bridge is across the main River Shannon. There are no protected aquatic species at this site; although otters can be expected to occur (see Terrestrial Ecology report). The site does contain non-native cyprinids, Pike and Perch and provides spawning, nursery and rearing habitat for these species. There is no evidence that lampreys are present – and this stretch of river does not provide habitat for salmonids; although they will use this stretch of the river as migration pathway.

Water quality is rated as being “At Risk” and based on the surveys completed for the current assessment it is rated as being “Moderate”. The Class A indicator Ephemera danica (a mayfly larvae) was recorded in small numbers at this site. No native red-listed Swan or Duck Mussels were recorded during the current survey – however the non-native and highly invasive Asian Clam and Zebra Mussels are present. No White-clawed crayfish were recorded, but they may be present in small numbers.

4.6 Inland Fisheries Ireland (IFI)

A search of the Inland Fisheries Ireland (IFI) (<https://ifigis.maps.arcgis.com/>) online database was carried out to determine the species richness of the River Shannon in Carrick-on-Shannon.

A total of four fish species were recorded in the most recent River Shannon Upper Survey (2010) at Battlebridge located approximately 2.3km upstream of the proposed works; Gudgeon (*Gobio gobio*), Perch (*Perca fluviatilis*), Pike (*Esox lucius*) and Roach (*Rutilus rutilus*) The nearest downstream sample point, Kilnacarrow, located over 50km downstream recorded a total of eight species during the 2010 survey; Bream (*Abramis brama*), European eel (*Anguilla anguilla*), Gudgeon (*Gobio gobio*), Lamprey sp., Perch (*Perca fluviatilis*), Pike (*Esox lucius*), Roach (*Rutilus rutilus*) and Rudd (*Scardinius erythrophthalmus*). (Inland Fisheries Ireland, 2010). European Eel are categorised as ‘critically endangered’ on the All-Ireland IUCN Red Data List. Lamprey are protected under Annex II of the EU Habitats Directive. All three lamprey species found in Ireland are also listed on Appendix III of the Bern Convention (1979).

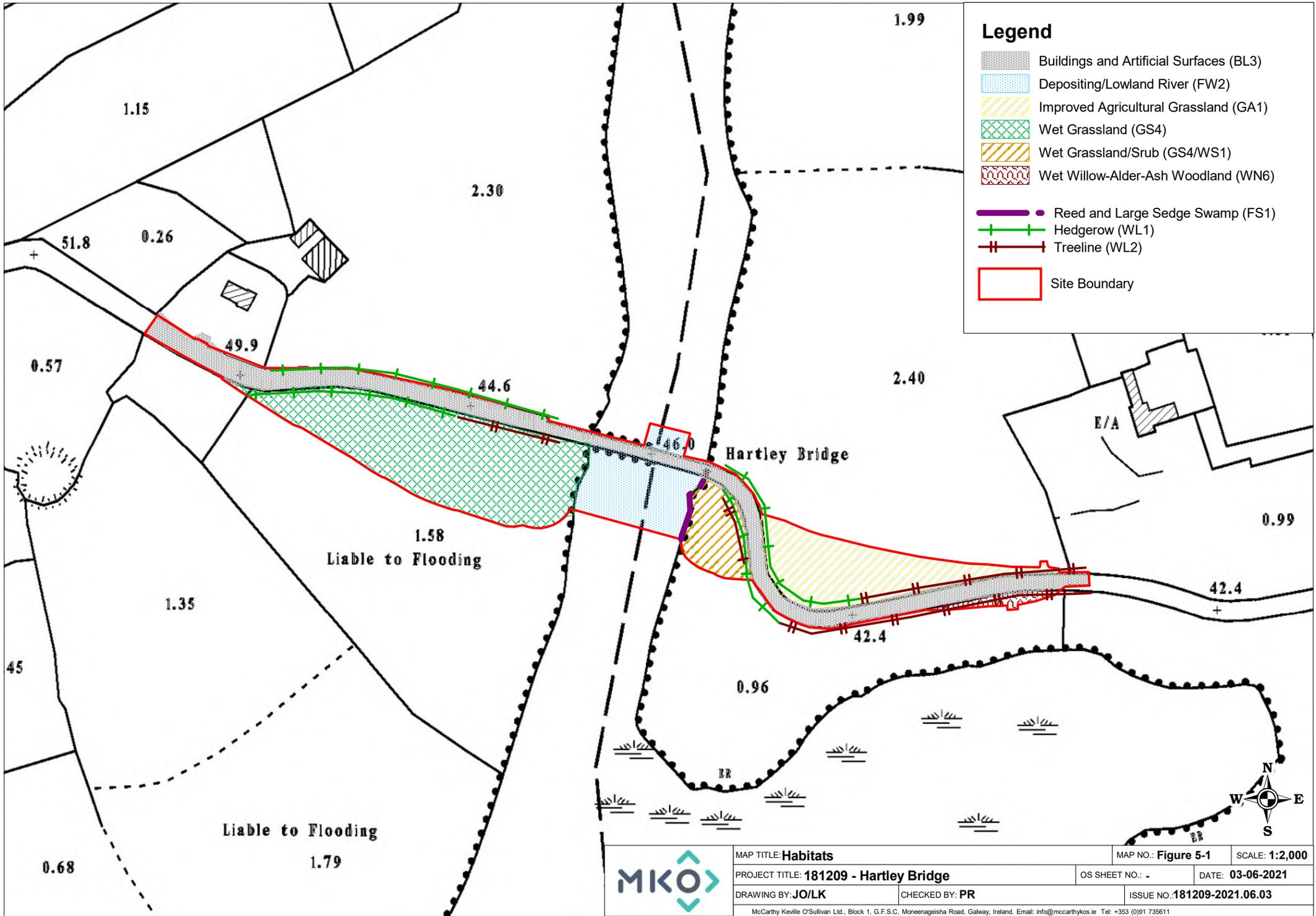
5. FIELD STUDY

5.1.1 Habitats Present on the Site and Surrounding Area

Assessing the impacts of any project and associated activities requires an understanding of the ecological baseline conditions prior to and at the time of the project proceeding. Ecological Baseline conditions are those existing in the absence of proposed activities (CIEEM, 2018).

A dedicated habitat survey of the area within and in the vicinity of the proposed development were undertaken on the 12th of February 2019 and again on the 21st of August 2020 by Pat Roberts. An aquatic survey was carried out by Ecofact in July 2019 and has also been considered as part of this assessment. The habitat classifications and codes correspond to those described in ‘A Guide to Habitats in Ireland’ (Fossitt, 2000). The ecological survey was undertaken within the optimal time of year to undertake a habitat and flora survey (Smith et al., 2011). The habitats recorded during the site visits are listed below in Table 5.1 and shown in Figure 5-1. A habitat map with the development footprint overlain is shown in Figure 5-2.

Habitat	Code
Depositing/lowland rivers	FW2
Wet grassland	GS4
Improved agricultural grassland	GA1
Reed and large sedge swamp	FS1
Scrub	WS1
Hedgerows	WL1
Treelines	WL2
Wet willow-alder-ash woodland	WN6



The River Shannon at the proposed development site has a low gradient and slow flow and is categorised as **Lowland/depositing river (FW2)**. The river consisted of glide habitat and at the time of the walkover survey in 2019 it had expanded beyond its channel and flooded some of the surrounding grassland.

The western side of the river consisted of **Wet grassland (GS4)** which was primarily dominated by soft rush (*Juncus effusus*), Yorkshire fog (*Holcus lanatus*), creeping bent (*Agrostis stolonifera*) and marsh thistle (*Cirsium palustre*). Closer to the river the vegetation also included common sedge (*Carex nigra*) and water mint (*Mentha aquatica*).

Reed and large sedge swamp (FS1) was recorded immediately adjacent to the eastern side of the river and was dominated by common reed (*Phragmites australis*), scattered immature regenerating willow (*Salix* sp.) and alder (*Alnus glutinosa*) were also recorded (Plate 5-1). This habitat graded into bramble (*Rubus fruticosus* agg.) **Scrub (WS1)** and **Improved agricultural grassland (GAI)**. Improved grassland was dominated by Yorkshire fog and perennial ryegrass (*Lolium perenne*).

The existing road and bridge are categorised as **Buildings and artificial surfaces (BL3)**. The road west of bridge was bordered by a whitethorn (*Crataegus monogyna*) **Hedgerow (WL1)** and short willow **Treeline (WL2)**. The road on the eastern side of the river was bordered by a whitethorn Hedgerow (WL1), roadside Treeline (WL2) consisting of alder, sycamore (*Acer pseudoplatanus*) and ash (*Fraxinus excelsior*) (Plate 5-2). A small area of newly generated (post-2005) **Wet willow-alder-ash woodland (WN6)** was recorded south of the road but outside the proposed footprint with the main species consisting of ash, alder and willow (Plate 5-3).

Wet willow-alder ash (WN6) corresponds to Annex I Alluvial woodland. None of the additional habitats correspond to any habitat listed under Annex I of the EU Habitats Directive.

No species listed under Annex II of the EU Habitats Directive or Annex I of the EU Birds Directive were recorded during the site visits carried out.

No botanical species listed under the Flora (protection) Order (1999, as amended 2015), listed in the EU Habitats Directive (92/43/EEC), or listed in the Irish Red Data Books were recorded on the site. All species recorded are common in the Irish landscape. No invasive species listed on the Third Schedule of Regulations 49 and 50 of the European Communities (Birds and Natural Habitat) Regulations S.I. 477/2011 were recorded during the survey.



Plate 5-1 Downstream side of the existing Hartley Bridge showing Depositing/lowland river (FW2), Wet grassland (GS4) looking to the western side of the river and Reed and large sedge swamp (FS1) on the eastern side of the River Shannon.



Plate 5-2 Looking towards the eastern bank of the River Shannon showing Wet grassland (GS4), Hedgerow (WL1), Treeline (WL2) and Scrub (WS1).



Plate 5.3 Public road categorised as Buildings and artificial surfaces (BL3) with adjacent roadside Treeline (WL2) and immature Wet willow-alder-ash (WN6).

5.2 Fauna

5.2.1 Mammals

Otter

A dedicated search for signs of otter (*Lutra lutra*) was undertaken along the river bank, however no evidence of this species was encountered. No spraints, holts or couches were recorded. Although otter were not recorded, the river does provide suitable potential foraging and commuting habitat for the species.

Badger

A dedicated badger (*Meles meles*) survey was undertaken of the area. Badger snuffle holes were recorded in agricultural grassland on the western and eastern sides of the river. However, no setts or latrines were recorded within the study area.

Bats

The existing Hartley Bridge to be demolished and trees within the proposed development footprint were assessed for potential bat roost suitability as per *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn) (Bat Conservation Trust, 2016)*. The existing bridge structure comprises precast concrete slabs and does not contain any stonework or crevices which offer suitable bat roost sites and therefore was categorised as offering *Negligible-Low* bat roosting potential.

There were no signs of any additional protected fauna recorded.

Trees within the proposed development footprint were categorised as having *Negligible-Low* bat roosting potential.

Linear landscape features such as hedgerows and treelines in the study area were categorised as offering *Moderate-High* commuting/foraging potential.

5.2.2 Birds

Birds recorded during the ecological walkover surveys included mallard (*Anas platyrhynchos*), heron (*Ardea cinerea*), rook (*Corvus frugilegus*), blackbird (*Turdus merula*), magpie (*Pica pica*), wren (*Troglodytes troglodytes*), great crested grebe (*Podiceps cristatus*), and curlew (*Numenius arquata*).

Great crested grebe is on the Amber List of Birds of Conservation Concern in Ireland (BoCCI) and curlew is on the Red-list of Birds of Conservation Concern in Ireland (BoCCI).

Curlew were recorded foraging on wet grassland, alongside the River Shannon, adjacent to study area during the site visit in February 2019. The species was not recorded during the survey in August 2020. The site of the proposed development does not offer suitable breeding habitat due to its close proximity to the public road and the occurrence of trees adjacent to the site which would encourage predation.

The remaining birds are common in agricultural landscapes.

The proposed development site is located within the Lough Drumharlow Proposed Natural Heritage Area (pNHA) which has been designated for Greenland white-fronted goose. The wet grasslands adjacent to Lough Drumharlow were used for foraging by the geese (NPWS, 2002). No geese were recorded during the walkover survey. Geese numbers had declined to 0 in 2002 (NPWS, 2002) and by 2012 there was still no records of the geese and the site is considered to have been abandoned (GWFG Study and NPWS, 2012). Lough Drumharlow (Eidin) is located approximately 2.5km from the proposed works. The lake is separated from the River Shannon by the Boyle River. The lake is approximately 860m upstream of the point where it meets the River Shannon, therefore there is no downstream connectivity with the proposed works site.

5.2.2.1 Fish

An Aquatic Impact Assessment was carried out by Ecofact in July 2019 and recorded the following:

There is no habitat for salmonid fish at this site. The River Shannon at this site is however a migration pathway for Brown Trout (and perhaps the occasional Atlantic salmon). There is potential nursery habitat for Brook Lampreys planeri at this site. However, none were recorded during the sweep net sampling (which included sampling silt). Lamprey ammocoetes are likely to present in low densities – but none were found during the current survey despite extensive searching. There is no spawning habitat for lampreys this site and anadromous lampreys are

not able to access this part of the River Shannon catchment due to downstream fish passage issues. The margins of the river do provide ideal spawning and nursery areas for cyprinids, perch and pike. Juvenile Roach *Rutilus rutilus* and were recorded during the sweep net sampling at this site. According to IFI this is an angling stretch and contains Bream *Abramis brama*, Tench *Tinca tinca*, Rudd *Scardinius erythrophthalmus*, Perch *Perca fluviatilis* and Pike *Esox Lucius*. IFI have stated that “Hartley Bridge [] can be a very productive venue in May as the shoals of Roach migrate up river to spawn. There are also Bream to 3lbs, Hybrids and Rudd in the section”.

Small numbers of the critically endangered European eel *Anguilla* are also likely to be present.

5.2.2.2 Additional Fauna

No evidence of additional faunal populations of ecological significance were recorded.

5.2.1 Importance of Ecological Receptors

Table 5.1. lists all identified receptors and assigns them an ecological importance in accordance with the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009). This table also provides the rationale for this determination and identifies the habitats that are Key Ecological Receptors.

Table 5.1. Importance of Ecological Receptors

Habitat and Geographic Importance	KER Y/N	Rationale
Depositing/lowland rivers	Y	The River Shannon acts as a conduit for commuting and foraging species and acts as a potential conduit of pollution to lakes and rivers downstream. The river also provides spawning habitat for coarse fish around the bridge as identified in the Aquatic Impact Assessment Report. Therefore, due to its capacity to support regularly occurring populations of Annex II species such as Otter and Salmon, the River Shannon at this location was assigned County Importance and has been designated a Key Ecological Receptor.
Wet grassland	N	Wet grassland was considered to be of Local Importance (lower value) due to its low species richness and common occurrence in the wider area.
Reed and large sedge swamp	Y	The reed and large sedge swamp habitat is an important link between the river and the terrestrial and an important habitat for birds and fish. This habitat was assigned Local Importance (higher value) . Due to its capacity to support high biodiversity in a local context, this habitat has been designated a Key Ecological Receptor.

Wet willow-alder-ash woodland	N	<p>The Wet willow-alder -ash woodland has links with Annex I Alluvial woodland. However, this area of woodland is located outside the proposed development footprint and will not be impacted by the proposed works.</p> <p>Due to potential links with Annex I habitat <i>Alluvial Woodland</i>, this habitat was assigned County Importance. The proposed works occur completely outside this habitat, therefore it has not been designated a Key Ecological Receptor.</p>
Improved agricultural grassland	N	Improved agricultural grassland is common in the wider landscape and was assigned <i>Local Importance (lower value)</i> .
Scrub	N	Scrub is common in the wider landscape and was assigned <i>Local Importance (lower value)</i> .
Hedgerows	Y	Hedgerows within the study area provide high biodiversity in a local context and were assigned Local Importance (higher value) and have been designated a Key Ecological Receptor.
Treelines	Y	Trees within the study area provide high biodiversity in a local context and were assigned Local Importance (higher value) and have been designated a Key Ecological Receptor.
Fauna and Geographic Importance	KER Y/N	Rationale
Fish	Y	The proposed works site supports habitat for coarse fish. Salmonids are also likely to utilise the river as a commuting corridor though no spawning habitat for these species were recorded at the site (Ecofact 2019). These species have been assigned Local Importance (higher value) There is potential for disturbance to these species therefore they have been designated a Key Ecological Receptor.
European Eel	Y	Small numbers of critically endangered European Eel are likely to be present at the site. This species has been assigned Local Importance (higher value) . There is potential for disturbance to these species therefore they have been designated a Key Ecological Receptor.
Otter	Y	The proposed works site provides suitable habitat for commuting and foraging Otter protected under Annex II of the Habitats Directive. As a result this species has been assigned Local Importance (higher value) and has been designated a Key Ecological Receptor.
Waterbirds	Y	The location of the proposed works supports marginal reed habitat along the riverbank. This habitat has potential to support nesting waterbirds such as moorhens and ducks. These species have been assigned Local Importance (higher value) .

		There is potential for disturbance to these species therefore they have been designated a Key Ecological Receptor .
Greenland White-fronted Geese	N	<p>The Site Synopsis for Drumharlow pNHA states that a flock of Greenland white-fronted goose, which is an Annex I species, is known to feed on callows and wet rough pasture in the vicinity of the study area. Although the flock was of national importance in the past, it does not now reach the qualifying level (NPWS, 2009). Geese numbers had declined to 0 in 2002 (NPWS, 2002) and by 2012 there were still no records of the geese and the site is considered to have been abandoned (GWFG Study and NPWS, 2012).</p> <p>Due to its protection under Annex I of the EU Birds Directive, this species has been assigned Local Importance (higher value). However, due to the lack of suitable breeding habitat within and adjacent to the site and lack of historic records for this species within the pNHA it has not been designated a Key Ecological Receptor.</p>
Curlew	N	<p>There are records held by NPWS for breeding Curlew within 1km of the proposed bridge works. The site of the proposed development does not offer suitable breeding habitat due to its close proximity to the public road and the occurrence of trees adjacent to the site which would encourage predation.</p> <p>Due to its Red List status on the Birds of Conservation Concern in Ireland this species has been assigned Local Importance (higher value). However, due to the lack of suitable breeding habitat within and adjacent to the site it has not been designated a Key Ecological Receptor.</p>

6. ECOLOGICAL IMPACT ASSESSMENT

6.1 Do Nothing Impact

The site of the proposed development consists predominantly of; depositing/lowland river and associated habitats, existing road/bridge, wet grassland, improved agricultural grassland and scrub habitat with some hedgerow and treeline. If the proposed development were not to go ahead, it is likely that the development site would remain under its current management regime i.e. navigable waterway, road/bridge and agriculture.

6.2 Impacts during Construction

The impacts on KER habitats and species are considered in Tables 6.1 – 6.3 below. Impacts on non-KER habitats were also considered but the loss of small areas of wet grassland, improved agricultural grassland and scrub associated with the proposed works does not constitute a significant ecological effect at any geographic scale.

6.2.1.1 Treeline and Hedgerow

Table 6-1 Impacts on Tree Line and Hedgerow Habitat

Description of Effect	The proposed development site supports treeline and hedgerow which have been designated as Local Importance (higher value) as they provide high biodiversity in a local context. The works will result in the removal of approximately 260m of Treeline (WL2) and 230m of Hedgerow (WL1).
Characterisation of unmitigated effect	The loss of 260m of treeline and 230m of hedgerow would constitute a <i>permanent slight negative effect</i> . This would not be reversible as it is within the construction footprint.
Assessment of Significance prior to mitigation	The permanent loss of 260m of treeline and 230m of hedgerow is a permanent negative effect. However, this is not significant at a county, national or international scale as it will not affect the conservation status of this habitat, which is widespread and common in the wider area outside the site
Mitigation	In order to mitigate the loss of treeline and hedgerow, approximately 490m of roadside planting of native tree and shrub species will be undertaken along the new sections of road. This will result in no net loss of hedgerow/treeline habitat as a result of the proposed works. Species planted will comprise native species such as hawthorn, blackthorn, hazel and birch.
Residual Effect following Mitigation	There will be no significant residual effect on tree line or hedgerow habitat at any geographic scale as a result of this development. There will be no net loss of treeline/hedgerow as this habitat will be replaced like for like.
Potential for Cumulative Effect	The proposed development will not result in any significant loss of treeline or hedgerow habitat. It therefore cannot contribute to any cumulative effect in this regard

6.2.1.2 Riverbed and Reed Habitat

Table 6-2 Impacts on Riverine Habitat

<p>Description of Effect</p>	<p>The proposed development includes the installation of two new piers within the river channel. The footprint of the piers will be approximately 10m by 1.5m for each pier within the riverbed. The eastern riverbank will include the installation of rock armour to facilitate access. The rock armour will extend approximately 2m into the riverbed at this location. There will be some minor loss of reed and sedge swamp that exists along the river bank as a result of the proposed works.</p> <p>In addition, in order to satisfy Waterways Ireland navigation requirements a minimal amount of reprofiling of the riverbed will be carried out in the area shown on Figure 2-5. This is to achieve a minimal depth of 1.7m for navigation purposes. This will comprise the removal of a minimal amount of built-up material comprising 15.75m³.</p>
<p>Characterisation of unmitigated effect</p>	<p>The unmitigated works could result in minor habitat loss within the proposed works area as described above, which could result in a <i>permanent slight negative effect</i>. The proposed works could also result in surface water pollution at the location of and downstream of the proposed works which could result in a <i>short-term slight negative effect</i>.</p>
<p>Assessment of Significance prior to mitigation</p>	<p>The area of reed and riverbed habitat to be lost is considered to be minimal in scale in relation to the reed and riverbed habitat located in the immediate surrounding area.</p> <p>This loss is not significant in the wider context of the River Shannon. In the absence of mitigation and following the precautionary principle, there is potential for the proposed development to result in significant indirect effects on the identified aquatic habitats at a local geographic scale in the form of pollution during the construction phase of the proposed development.</p>
<p>Mitigation</p>	<p>Mitigation regarding instream works including pier installation is as detailed in Section 6.2.1.4 of the report. A barge will be used for drill rig machinery to work from and sheet piles will be installed to create a clearly defined dry working area and to minimise the instream works area for installation of the piers and rock armour. The works will be monitored by an ECoW and a designated site Environmental Officer. A barge will also be used to remove material from the reprofiled area shown in Figure 2-5. This will be disposed of to a designated waste facility or re-used as appropriate on site.</p> <p>Robust measures are in place to prevent surface water pollution arising as a result of the proposed works as summarised below:</p> <p>Terrestrial</p> <ul style="list-style-type: none"> ➤ Prior to the outset of works a silt fence will be erected along both sides of the river channel to prevent run-off entering the river. This will comprise wooden posts and geotextile membrane buried in an 'L' shape to a minimum depth of 250mm. The silt fence will act in filtering any potential surface water run-off from the site generated during the proposed works. ➤ The proposed works area will be fenced off with temporary fencing and no works will be undertaken outside of the fenced area. ➤ Access routes will be clearly marked / identified. Access during construction to any working areas will be restricted to land within the outlined works area. ➤ Silt fencing will be installed alongside the works area where required as a water quality protective measure. Further details on silt fencing are provided in the CEMP. <p>In-Stream</p> <ul style="list-style-type: none"> ➤ A dry working area will be created to prevent potential sedimentation of the watercourse ➤ Machinery will work either from the bank and or a barge to protect the riverbed ➤ Where reprofiling works are carried out for navigation purposes (see Figure 2-5) these will be minimal and short-term and will utilise a barge.

	<p>➤ Best practice measures with regard to pollution prevention will be adhered to as described in Section 6.2.1.4.</p> <p>With these measures in place potential for impact on riverine habitat is not significant.</p>
Residual Effect following Mitigation	There will be no significant residual effect on riverbed or reed habitat or pollution of the watercourse at any geographic scale as a result of this development.
Potential for Cumulative Effect	The proposed development will not result in any significant loss of riverbed habitat or pollution of the watercourse. It therefore cannot contribute to any cumulative effect in this regard.

6.2.1.3 Aquatic Fauna

Table 6-3 Impacts on Aquatic Fauna and Waterbirds

Description of Effect	<p><u>Habitat Loss and Deterioration</u></p> <p>The proposed development includes the installation of two new piers within the river channel 10m by 1.5m for each pier, installation of rock armour which will extend approximately 2m into the riverbed as well as some minor loss of reed and sedge swamp along the eastern bank. The river margins provide spawning, nursery and rearing habitat for coarse fish and there is also potential nursery habitat for Brook Lamprey at the site as identified in the report carried out by Ecofact in July 2019. The river corridor also provides suitable habitat for otter. In addition, the reed habitat has potential to support nesting birds. There is potential for the proposed works to result in indirect habitat loss in the form of surface water deterioration as a result of the construction phase of the proposed works.</p>
	<p><u>Disturbance</u></p> <p>There is potential for disturbance to aquatic fauna such as fish, eel, otter and waterbirds as a result of the proposed development both due to direct disturbance as a result of loss of habitat and indirect disturbance as a result of potential surface water pollution that could arise as a result of the proposed works. Potential for disturbance will be limited by carrying out the works outside of the spawning period (i.e. October – June inclusive).</p>
Characterisation of unmitigated effect	<p><u>Habitat Loss and Deterioration</u></p> <p>The unmitigated works could result in direct and indirect habitat loss which could result in a <i>permanent slight negative effect</i> on aquatic faunal habitat.</p>
	<p><u>Disturbance</u></p> <p>The unmitigated works could result in disturbance to aquatic fauna at the location of and downstream of the proposed works with regard to machinery related activities and potential for surface water pollution to occur at and downstream of the proposed works and was assigned as a <i>short term slight negative effect</i>.</p>
Assessment of Significance prior to mitigation	<p><u>Habitat Loss and Deterioration</u></p> <p>The area of reed and riverbed habitat to be lost is considered to be minimal in scale in relation to the reed and riverbed habitat located in the immediate surrounding area. There is also potential for indirect habitat loss as a result of potential deterioration of surface waters. This loss is anticipated to have a <i>negligible effect</i> in the wider context of the River Shannon.</p>
	<p><u>Disturbance</u></p>

	<p>Given the context of the wider habitat of the River Shannon and its associated navigational activities, disturbance to fauna and pollution of surface waters will have a <i>slight temporary effect</i> should works be unmitigated.</p>
<p>Mitigation</p>	<p>Mitigation regarding pier installation is as detailed in Section 6.2.1.4 of the report. A barge will be used for drill rig machinery to work from and sheet piles will be installed to create a clearly defined dry working area and to minimise the instream works area for installation of the piers and rock armour.</p> <p>Robust measures are in place to prevent surface water pollution and disturbance arising as a result of the proposed works as summarised below:</p> <ul style="list-style-type: none"> ➤ Works will be carried out during the period July - September (inclusive) in line with Inland Fisheries Ireland (2016) ‘<i>Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters</i>’. ➤ Prior to the outset of works a silt fence will be erected along both sides of the river channel to prevent run-off entering the river. This will comprise wooden posts and geotextile membrane buried in an ‘L’ shape to a minimum depth of 250mm. The silt fence will act in filtering any potential surface water run-off from the site generated during the proposed works. ➤ The proposed works area will be fenced off with temporary fencing and no works will be undertaken outside of the fenced area. ➤ Access routes will be clearly marked / identified. Access during construction to any working areas will be restricted to land within the outlined works area. ➤ Silt fencing will be installed alongside the works area where required as a water quality protective measure. Further details on silt fencing are provided in the CEMP. ➤ A pre-commencement otter survey will be carried out to ensure no otter holts occur within 150m of the proposed development. Should this be the case, a derogation licence will be obtained from NPWS prior to works proceeding. ➤ A dry working area will be created to prevent potential sedimentation of the watercourse ➤ Machinery will work either from the bank and or a barge to protect the riverbed ➤ Best practice measures with regard to pollution prevention will be adhered to as described in Section 6.2.1.4. ➤ The works will be monitored by an ECoW and a designated site Environmental Officer.
<p>Residual Effect following Mitigation</p>	<p>There will be no significant residual effect on fish, eel, otter or waterbirds at any geographic scale as a result of this development.</p>
<p>Potential for Cumulative Effect</p>	<p>The proposed development will not result in any significant loss of riverbed habitat or disturbance to fauna. It therefore cannot contribute to any cumulative effect in this regard.</p>

6.2.1.4 Mitigation Measures and Best Practice

Potential for surface water pollution to occur has been taken into consideration as part of the design of the proposed works and measures in relation to this have been described in the Construction and Environmental Management Plan (CEMP) provided in **Appendix 1**. The CEMP outlines the approach to construction management during the course of the works and includes best practice and mitigation measures to ensure that there is no negative impact on the receiving environment. Some of the key features of the environmental management strategy as described in the CEMP are outlined below:

Site Set-up (Terrestrial Works)

- A pre-commencement otter survey will be carried out to ensure no otter holts occur within 150m of the proposed development. Should this be the case, a derogation licence will be obtained from NPWS prior to works proceeding.
- A site compound shall be established within the agricultural fields and a minimum distance of 50m away from the water's edge outside of areas mapped as potentially having an Annual Exceedance Probability of 0.1%, 1% or 10% as mapped on the OPW CFRAM maps (<https://www.floodinfo.ie/map/floodmaps/>). The compound shall be secured and all construction materials shall be stored in this defined area.
- Prior to the outset of works a silt fence will be erected along both sides of the river channel to prevent run-off entering the river. This will comprise wooden posts and geotextile membrane buried in an 'L' shape to a minimum depth of 250mm. The silt fence will act in filtering any potential surface water run-off from the site generated during the proposed works.
- The proposed works area will be fenced off with temporary fencing and no works will be undertaken outside of the fenced area.
- Access routes will be clearly marked/identified. Access during construction to any working areas will be restricted to land within the outlined works area.
- A SOWOR will be implemented in relation to the proposed works. A Schedule of Works Operation Record (SOWOR) is a document used to programme individual work tasks, and audit compliance of works with planning conditions and law relating to environmental protection. An example SOWOR template is included in Appendix B of the CEMP provided in Appendix 1.

Site Set-up (Instream Works)

- Works are proposed to take place in the riverbed with disturbance of sediments expected. Limited sediment excavation may be required around the pier foundations. There has been no history of industrial activity within the vicinity and sediments are not expected to be contaminated. Prior to removal of any sediments from the river they will be subject to environmental sampling and analysis to confirm the most suitable recovery/disposal route. Excavated sediments will be removed from the site by a qualified contractor for dewatering and recovery/disposal.
- A barge will be installed for the piling rig to work to facilitate the installation of the 2 piers associated with the new bridge.
- A cofferdam will be installed as described in Section 2.2.3 of the report. The cofferdam will result in the creation of a sealed dry working area which will prevent sedimentation of the river during the proposed works
- Piles in the form of steel tubes that will be driven or bored into the riverbed. This operation will be undertaken from a barge and will involve minimal sediment disturbance and no excavation outside the physical area of the pile or cofferdam.
- IFI will be notified before works commence and any recommendations made by them will be adhered to throughout. Once the cofferdams are in place these will be electrofished by IFI to ensure no fish remain within the works area prior to works progressing.
- Works will be carried out during the period July - September (inclusive) in line with Inland Fisheries Ireland (2016) '*Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters*'.
- Clean water will be pumped from inside the cofferdam each morning in advance of the works proceeding. This will be pumped directly to the River Shannon.
- Any dirty water that requires pumping will be pumped to ground via a silt bag which will filter any sediment that remains. The entire discharge area will be enclosed by a perimeter of silt fencing.
- The point of discharge will be monitored and the silt bag and silt fencing moved as necessary to avoid erosion of the ground and potential sediment run-off occurring.

- No tools or potentially toxic materials will be stored or left within the Cofferdam overnight or when there is any danger of the dam becoming inundated with water.
- All machinery and equipment to be used instream will be cleaned with 1% Virkon aquatic disinfectant (or equivalent) or steam cleaned at a high temperature > 40 degrees celsius in line within IFI (2010) *IFI Biosecurity Protocol for Field Survey Work* prior to arrival on site. This is to prevent the transfer of aquatic invasive species to the site from elsewhere.
- All pollution prevention equipment such as drip trays and spill kits will be readily available on site prior to works commencing.

Pollution Prevention – Terrestrial

- Spoil arising from bore holes during site investigation works will be stored on board a barge for later disposal on land and at least 30m away from any water course.
- Discharge of pumped water to ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of silt fencing.
- Whilst no significant excavations are proposed, should any ingress of water (ground or rain) require pumping out this will be done so as described above or alternatively it will be pumped to a sealed clean tanker and removed from the site and spread to improved agricultural grassland at a distance of over 50m from any watercourse.
- Stockpiling of excavated material will be temporary and located in a clearly defined and demarcated area a minimum distance of 50m from any watercourse. Stockpiles will be removed on a regular basis to avoid potential sediment-laden run-off escaping the site.
- Earthworks will take place during periods of low rainfall to reduce run-off and potential siltation of watercourses;
- As construction advances there may be a small requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into silt bags prior to overland discharge allowing water to percolate naturally to ground or disperse by diffuse flow into local drainage ditches;
- The weather forecast will be checked prior to the pouring of concrete and no such works will be undertaken when bad weather is forecast. Any works at any time when water levels that may cause inundation of the works area will be avoided. Concrete will not be poured at times when rain is predicted as this may lead to run off and over spillage of the form work.
- Concrete trucks will not be washed out at the site of the proposed works. If chutes require wash out, this will be undertaken at a designated wash out tank located in the site compound. This will recycle waters within the tank.
- Good construction practices such as dust suppression on site roads, and regular plant maintenance will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites (CIRIA, 2001). This will ensure that surface water arising during the course of demolition and construction activities will contain minimum sediment.
- Daily monitoring and inspections of site drainage during construction will be completed.

Pollution Prevention – Instream

- Cofferdams will be installed using sheetpiles where piers are to be constructed to create a dry working area. The sheetpiles will be installed by a drill rig working from a barge.
- No materials will be stored within the cofferdam.
- Where rock armour extends into the river bed a dry working area will be created to prevent sedimentation of the watercourse both at the site and downstream. This will be done using either sheet piles or sand bags as appropriate. Rock armour will be installed approximately 300mm below the riverbed to prevent potential erosion occurring at this

location. As with the cofferdam, the dry working area created for rock armour installation will first be electrofished to ensure no aquatic fauna remain prior to works progressing.

- Where works are require instream, machinery will work from the bank or a barge.
- The waste material from the demolished bridge will be collected on a barge and removed to the site compound prior to disposal to a licenced waste facility.
- Form work will be constructed with an adequate capacity and additional freeboard to prevent any spillage.
- Concrete (including waste and wash down) will be contained and managed appropriately to prevent pollution of watercourses. Pouring will occur in the dry, with appropriate curing times (48 hours) before re-flooding.
- Excavated material will be reused on-site where possible and otherwise will be removed from the site and disposed of in a licenced waste facility.
- All plant will be inspected prior to use. Defective plant shall not be used until the defect is satisfactorily fixed. All major repair and maintenance operations will take place off site.
- Vehicles will never be left unattended during refuelling. Only dedicated trained and competent personnel will carry out refuelling operations and plant refuelling procedures shall be detailed in the contractor's method statements.
- Fuels, lubricants and hydraulic fluids for equipment used will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment.
- Potential impacts caused by spillages etc. during the construction phase will be reduced by keeping spill kits and other appropriate equipment on the workboat.
- All fuels and oils will be contained within bunded containers in the site compound.
- Refuelling will be completed in a controlled manner using drip trays at all times and at least 50m away from the watercourse.

Waste Management

- All waste will be collected in skips and the site will be kept tidy and free of debris at all times.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or recycling.
- All construction waste materials will be stored within the confines of the site, prior to removal from the site to a permitted waste facility.

Disturbance Limitation Measures

- Noisier plant will be positioned to optimise screening by other plant.
- Plant machinery will be turned off when not in use.
- Operating machinery will be restricted to the proposed development site boundary.

Biosecurity

The introduction and/or spread of invasive species such as Terrestrial species Japanese Knotweed or aquatic species Zebra Mussel for example, could result in the establishment of invasive alien species and this may have negative impacts on the surrounding environs.

- Good construction site hygiene will be employed to prevent the introduction and spread of problematic invasive alien plant species (e.g. Japanese Knotweed, Himalayan Balsam etc.) by thoroughly washing vehicles prior to entering the site. Any soil and topsoil required on the site will be sourced from a stock that has been screened for the presence of any invasive species and where it is confirmed that none are present. All machinery and equipment to be used instream will be cleaned with 1% Virkon aquatic disinfectant (or equivalent) or steam cleaned at a high temperature > 40 degrees Celsius in line with IFI (2010) *IFI Biosecurity Protocol for Field Survey Work* prior to arrival on site. This is to prevent the transfer of aquatic invasive species to the site from elsewhere. This method of clean down will also be carried out on completion of the works prior to machinery and equipment moving off site to prevent

potential spread of Asian Clam and Zebra Mussel which have been recorded in the River Shannon as part of the Aquatic Impact Assessment undertaken by Ecofact in 2019.

Environmental Monitoring

- Regular monitoring of weather patterns and river levels will be carried out prior to works commencing as well as during the course of the day during the works period.
- The proposed works will be monitored by an ECoW to ensure all mitigation is carried out in line with this and all environmental documents and as detailed in the contractors Method Statements.
- The contractor will assign a member of the site staff as the environmental officer with the responsibility for ensuring the environmental measures prescribed in this document are adhered to. Any environmental incidents or non-compliance issues will immediately be reported to the project team.

6.3 Operational Phase

There will be no significant change to the usage of the new bridge compared to the existing bridge. The proposed works relates to the construction of a new bridge and the demolition of the existing bridge. The new road realignment will include drainage designed in accordance with TII guidelines. This includes the installation of road gullies drainage pipes and soak pits as shown in Figure 6-1. No impacts are anticipated.

6.3.1 Decommissioning

The proposed construction and demolition is considered to be permanent. However, any future demolition works are likely to be similar to those associated with the demolition works that will be carried out as part of the current project. Standard best practice measures prescribed in Section 6.2.1.4. and within the CEMP will be implemented for the avoidance of significant impact on water quality, biodiversity, flora and fauna.



LEGEND:	
PROPOSED SURFACE WATER DRAINAGE	— SW — SW — SW —
PROPOSED EIRCOM DUCTING	— ECOM — ECOM — ECOM —
PROPOSED ESB DUCTING	— ESB — ESB — ESB —
PROPOSED WATERMAIN	— WM — WM — WM —
PROPOSED SITE BOUNDARY	— (Red Line) —

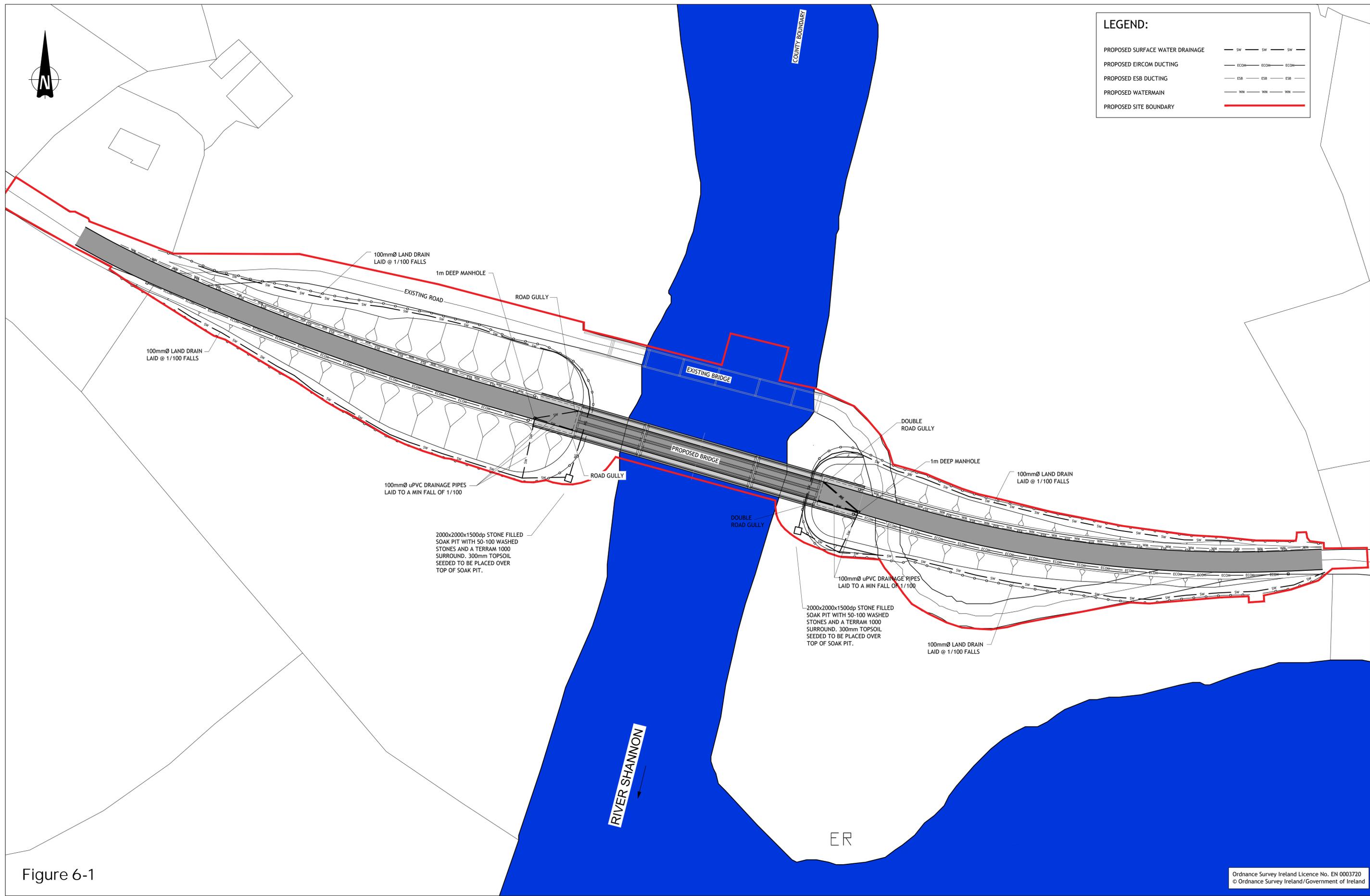


Figure 6-1

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Date Drawn: September 2020
Drawn By: S Buckley
Date Issued:
Issued By:



Rev	Amendment	By	Date
PL0	ISSUED FOR PLANNING	IBS	2021/04/27

Client:

Job: HARTLEY BRIDGE REPLACEMENT
 Title: PROPOSED BRIDGE SERVICES PLAN
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Stage: PLANNING
Scale @ A1: 1:500
Technician Check: S Buckley
Engineer Check: J Roche
Approved:
Drawing No: 182-164-208
Rev: PLO

6.4 Assessment of any Biodiversity or Ecological Gains

It is proposed to carry out 490m of roadside planting of native tree and shrub along the new sections of road. This will mitigate for the loss of 260m of treeline and 230m of hedgerow. This will result in no net loss of this habitat as a result of the proposed development.

A pollinator friendly grass seed mix will be used as part of the final landscaping of the site in order to encourage pollinators to the area and support the existing invertebrates that may occur in association with the river corridor.

6.5 Impacts on Designated Sites

6.5.1 Impacts on European Sites

The EPA draft Guidance 2017 states:

“a biodiversity section of an EIAR, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement” but should “incorporate their key findings as available and appropriate”.

This section provides a summary of the key assessment findings with regard to Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

Following an extremely precautionary principal, a potential pathway for effect in the form of deterioration of surface water quality was identified in relation to aquatic QI habitats associated with Lough Forbes Complex SAC (001818) namely;

- Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation [3150]
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) [91E0].

The potential for impact on European sites has been fully assessed in the Natura Impact Statement (NIS) has been prepared in support of the current application.

The NIS concludes as follows:

“Therefore, it can be objectively concluded that the proposed replacement of Hartley Bridge and associated road realignment works individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site.”

6.5.2 Impacts on Nationally Designated Sites

Impacts on nationally designated sites including NHAs and pNHAs are considered in this section of the report. Where such sites are also designated as SACs or SPAs (European Sites) they have been assessed and considered under that designation. Lough Forbes complex pNHA occurs approximately 38.2km (hydrological distance) downstream of the proposed works and its boundary is concurrent with Lough Forbes Complex SAC. Mitigation measures employed for the protection of the SAC (e.g. prevention of water pollution) also apply to the protection of the pNHA. Where there are pathways for effect on Nationally designated sites that are not also designated as European Sites, a full ecological impact assessment is provided below.

The proposed development site is located within Lough Drumharlow pNHA and a direct impact in the form of habitat loss and indirect impacts in the form of disturbance/displacement and surface water pollution exist.

There will be some minor loss of Local Importance (lower value) wet grassland habitat within the pNHA, however the location of the proposed development has been restricted to an area immediately adjacent to existing built habitats. Any hedgerow/treeline removed will be replaced like for like. Due to the size and scale, direct effects are considered negligible and will not have a significant effect on the pNHA. The Greenland white-fronted goose population for which the pNHA is designated has no longer a population of national importance (NPWS,2009) and the site is considered to be abandoned (GWFG Study and NPWS, 2012).

Potential for indirect impacts upon this pNHA in the form of disturbance and surface water pollution exist as a result of the proposed works. However, disturbance and pollution of surface waters will be robustly blocked by the use of a coffer dam and other preventative measures taken as part of the construction and demolition methodology. Significant effects upon this pNHA are therefore not anticipated.

Potential for indirect effects in the form of surface water pollution on pNHA's downstream of the proposed development, such as Lough Boderg and Lough Bofin pNHA have been robustly blocked by the pollution prevention measures and construction methodology described in this report.

No direct or indirect pathway for affecting any additional sites was recorded.

7. CUMULATIVE IMPACT ASSESSMENT

A search and review in relation to plans and projects that may have the potential to result in cumulative and/or in-combination impacts on the ecology of the site was conducted. This assessment focuses on the potential for cumulative in-combination effects on the existing habitats where potential for significant effects was identified. This included a review of online Planning Registers, development plans and other available information and served to identify past and future plans and projects, their activities and their predicted environmental effects.

7.1 Plans

The following plans have been reviewed and are taken into consideration as part of this assessment:

- Leitrim County Development Plan 2015-2021
- Roscommon County Development Plan 2014-2020

The review focused on policies and objectives that relate to Natura 2000 sites and natural heritage as listed in Table 8.1 in Section 8.

7.2 Carrick-on-Shannon to Battlebridge Blueway

A feasibility Study was prepared by RPS in 2019 in relation to the proposal of a blueway from Carrick-on-Shannon to Battlebridge which is located approximately 5km hydrological distance upstream of Hartley Bridge. The study identified the existing Hartley Bridge as a hinderance to such a blueway as there is currently no access under the bridge. The proposed demolition and replacement of Hartley Bridge would benefit the construction of a blueway by opening up access beneath the bridge at this location. Any further developments with regard to a blueway will be subject to further design development as well as environmental and planning assessment.

7.3 Other Projects

The online planning system for Leitrim and Roscommon County Council as well as the An Bord Pleanála Website (planning searches), was consulted on the 01/06/2021 for the wider area surrounding the site.

A number of small-scale projects were identified in the last 5 years in the townland of Hartley and Cleaheen located on the east and west side of Hartley Bridge as provided below:

- Retention of an existing harbour comprising of (a) boating channel; (b) floating jetty and ramp; (c) slip-way and (d) associated site works and services (Pl. Ref 2089)
- Permission for (a) alterations to existing roof to incorporate dormer windows to front and rear, 2 new bedrooms with en-suites in existing roof space; (b) alterations to existing ground floor hallway to accommodate new stairs (Pl. Ref 2045)
- Permission to construct construct a new entrance comprising stone masonry piers and wing walls, gates gravel surface and piped culvert on to lands from local road L3400 (Pl Ref 2112)
- Permission to upgrade and relocate the Waste Water Treatment System and polishing filter to current EPA Code of practise and all associated ancillary works. To retain the current location of the existing dwelling as it deviates from that granted under planning ref 00/132. To retain the single story extension to the rear of the dwelling. To retain the access entrance which adjoins the existing agricultural lane adjacent to the dwelling. (Pl Ref 20132).

- Permission for the construction of a garage/shed with associated site works (Planning Ref.: 16119),
- Permission for the change of site boundaries and the retention of the position of the dwelling from that granted planning permission under Leitrim County Council planning reference 97/10344 and to carry out all other necessary ancillary works (Planning Ref.: 1946),
- Permission for works at an existing harbour comprising of (a) boating channel; (b) floating jetty and ramp; (c) slip-way and (d) all associated site works and services (Planning Ref.: 2089).
- Permission for (a) alterations to existing roof to incorporate dormer windows to front and rear, 2 new bedrooms with en-suites in existing roof space; (b) alterations to existing ground floor hallway to accommodate new stairs (Planning Ref: 2045)
- Permission to construct an extension to a dwelling house along with all associated alterations to layout and elevations (to a design which varies from that approved under P.11/298) (Planning Ref: 15220)
- Permission for a development which will consist of the construction of a new extension to the existing dormer dwelling and associated remodelling of facades; completion of existing incomplete detached Garage; the relocation of the existing site entrance; along with associated site works and services (Planning Ref: 1778)

7.3.1 Conclusion of Cumulative Assessment

In the review of the projects that was undertaken, no connection, that could potentially result in additional or cumulative impacts was identified. Neither was any potential for different (new) impacts resulting from the combination of the various projects and plans in association with the proposed development.

Taking into consideration the reported residual impacts from other plans and projects in the area and the predicted impacts with the current proposal, no residual cumulative impacts have been identified.

8. DEVELOPMENT CONTEXT - ECOLOGICAL PLANS AND POLICIES

8.1 County Development Plan

Table 8-1 Identification of Development Plans

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
<p>Leitrim County Development Plan 2015- 2021</p>	<p><u>NHA/pNHA</u></p> <p><u>Policy 79</u></p> <p>It is the policy of the Council to protect NHA sites. The Council acknowledges that not all sites of ecological importance have been identified and will protect any such site of significance, proposed as an NHA.</p> <p><u>Objective 66</u></p> <p>It is an objective of the Council to protect all Natural Heritage Areas and those proposed for designation either before or during the lifetime of this plan so as to recognise that the process of designation of such sites is ongoing, with new sites being added and boundaries of existing sites being adjusted, as better information becomes available.</p> <p><u>Objective 67</u></p> <p>It is an objective of the Council to protect the following proposed Natural Heritage Areas and all others as they become proposed during the lifetime of this plan</p> <p><u>Policy 86</u></p> <p>It is the policy of the Council to control development in accordance with the aims of the Water Framework Directive generally and more particularly with the goals and policies of the three River Basin Districts which cover all water bodies in Leitrim.</p> <p><u>Policy 88</u></p> <p>It is the policy of the Council to fully implement the programme of measures (and where appropriate the additional recommendations) of the Shannon, North Western International and Western River Basin District Plans, as appropriate, in co-operation with the other relevant local authorities and statutory bodies,</p>	<p>The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity, protected species and designated sites.</p> <p>The proposed development is located within Lough Drumharlow pNHA. Robust measures have been put in place as described in Section 6.2.1.4 above to prevent potential pollution of surface waters during the proposed bridge replacement works. The Site Synopsis for Drumharlow pNHA states that a flock of Greenland white-fronted goose, which is an Annex I species, is known to feed on callows and wet rough pasture in the vicinity of the study area. Although the flock was of national importance in the past, it does not now reach the qualifying level (NPWS, 2009). Geese numbers had declined to 0 in 2002 (NPWS, 2002) and by 2012 there were still no records of the geese and the site is considered to have been abandoned (GWFG Study and NPWS, 2012). The proposed development has been restricted to an area immediately adjacent to existing built habitats and any hedgerow/treeline removed will be replaced like for like. As a result the proposed works will not negatively impact on the pNHA or its points of interest, namely lakes and raised bog habitat. Due to the NPWS data provided above, the minimal loss of wet grassland habitat is not significant in the context of Greenland White-fronted Goose.</p> <p>No potential for negative cumulative impacts when considered in conjunction with the current proposal were identified.</p> <p>No developments or projects identified within the Development Plan were found to occur in the wider area surrounding the proposed development.</p>

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	<p>subject to funding being available.</p> <p><u>Policy 89</u> It is the policy of the Council to promote the improvement of water quality in the rivers, lakes and ground water bodies in line with the objectives of the three River Basin Management Plans.</p>	
<p>Roscommon County Development Plan (2014- 2020)</p>	<p><u>Policy 7.1</u> Protect proposed and designated Natural Heritage Areas, Special Protection Areas and Special Areas of Conservation.</p> <p><u>Policy 7.2</u> Protect geological Natural Heritage Areas as they become proposed, designated and notified to Roscommon County Council during the lifetime of this plan.</p> <p><u>Policy 7.3</u> Protect any additional areas that may be proposed or designated during the lifetime of the plan in accordance with Policy above</p> <p><u>Policy 7.4</u> Promote development in these areas, for recreational and educational purposes, where it would not conflict with the preservation and protection of these sites.</p> <p><u>Policy 7.5</u> It is Council policy to implement the mitigation measures as set out in Section 11.3 of the Environmental Report accompanying the Development Plan, which are envisaged to prevent, reduce and, as fully as possible, offset any significant adverse impacts on the environment of implementing the County Development Plan. These mitigation measures refer to biodiversity, human health, geology and soils, water quality, flooding, air, climatic factors, transport infrastructure, wastewater treatment, waste management, cultural assets and landscape as referred to in Table 48 of the Environmental report.</p> <p><u>Objective 7.1</u> Maintain or restore the favourable conservation condition of a designated or</p>	

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	<p>proposed designated site under the control of the Planning Authority.</p> <p><u>Objective 7.2</u></p> <p>Ensure Appropriate Assessment Screening, and, where required, Appropriate Assessment, is carried out for any plan or project which, individually, or in combination with other plans and projects is likely to have a significant direct or indirect impact on any Natura 2000 site or sites; in accordance with best practice guidance as issued by the National Parks & Wildlife Service of the Department of Arts, Heritage & the Gaeltacht and/or the Department of Environment, Community & Local Government.</p> <p><u>Objective 7.16</u></p> <p>The retention, re-location, or re-establishment of hedgerows in planning consents shall be an aim of the Planning Authority for those seeking Planning Permission where feasible.</p> <p><u>Objective 7.30</u></p> <p>Maintain and preserve the aesthetic value of inland waterways and the waterway corridors in the county from the impacts of dispersed and highly visible development.</p>	

9. CONCLUSION

Following consideration of the residual effects (post incorporation of best practice measures) it is concluded that the proposed development will not result in any significant effects on the flora, fauna and biodiversity of the existing environment.

Provided that the proposed development is constructed and operated in accordance with the design and best practice that is described within this application, significant effects on biodiversity are not anticipated at any geographical scale.

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APPENDIX 1

CONSTRUCTION AND ENVIRONMENTAL MANAGEMENT PLAN