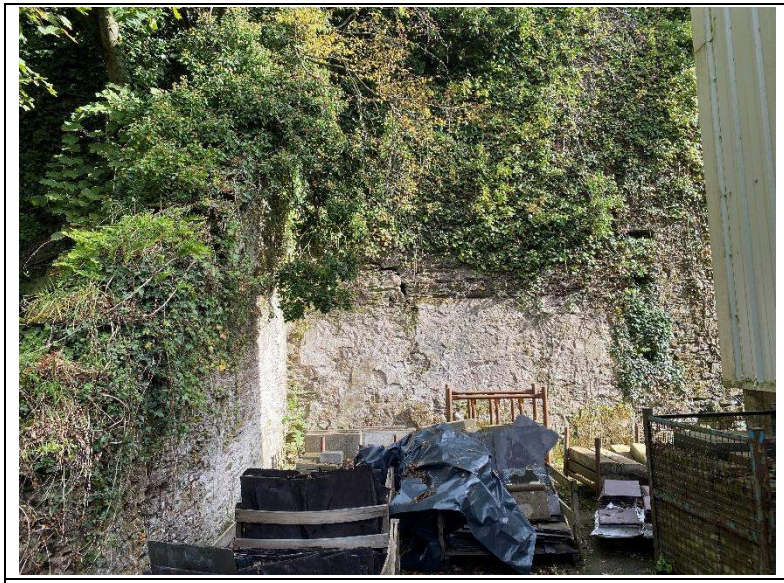
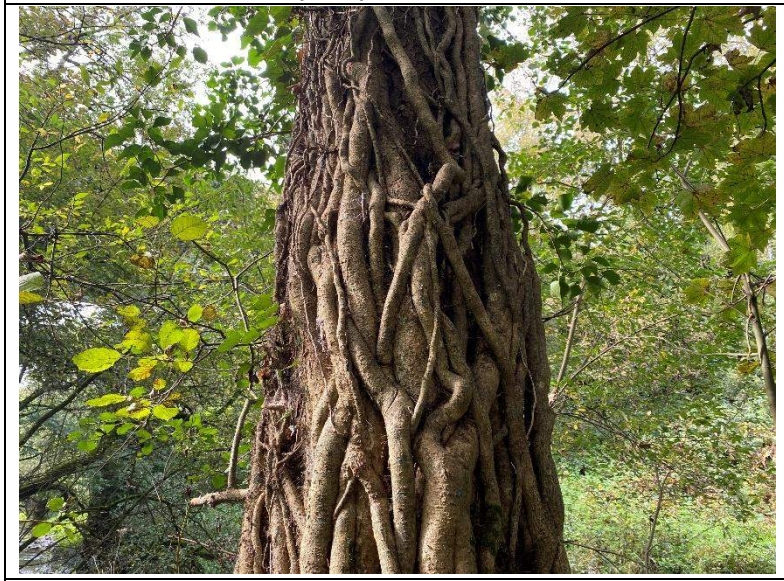
	
A13. B14 - Bridge over River Bride. Steel and masonry construction. Roosting opportunities present but occurs in a location which experiences significant light pollution at night.	**A14.** B15 - Culvert entrance on River Bride. No evidence of bat activity in culvert system. Receives occasional inundation and occurs in a location which experiences significant light pollution at night.
	
A15. B15 - Culvert exit on River Bride. Receives occasional inundation and occurs in a location which experiences significant light pollution at night.	**A16.** S01 - Stone wall adjacent proposed works area. Gaps in stonework present some roosting opportunities.

	
A17. S02 - Stone wall adjacent proposed works area. Gaps in stonework present some roosting opportunities. Proposed concrete wall to tie-in.	**A18.** S05 - Boulder wall with gaps which present some roosting opportunities. Proposed floodwall to replace.
	
A19. S06 - Non-residential building (mechanical garage) bordering the River Bride. No evidence of current or historical bat occupation internally.	**A20.** S06 - Non-residential building (mechanical garage) bordering the River Bride. No evidence of current or historical bat occupation internally.

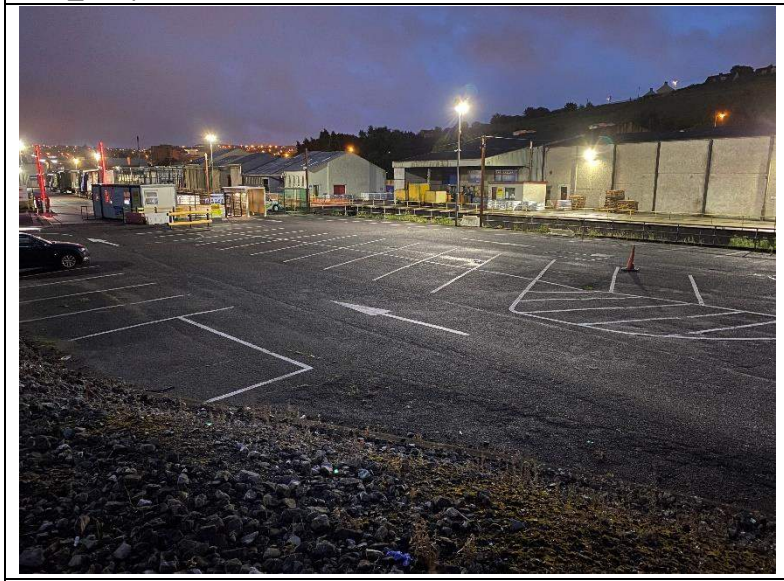
	
A21. One of two derelict dwellings adjoining S06 which were boarded up and not accessible for survey. Adjoin River Bride at rear.	**A22.** One of two derelict dwellings adjoining S06 which were boarded up and not accessible for survey. Adjoin River Bride at rear.
	
A23. Tree T25 - An example of thick interweaving ivy stems which provide potential roosting opportunities.	**A24.** Tree T22 - An example of a rot hole which may provide potential bat roosting opportunity.

	
A25. Tree T30. Rot hole associated with 'tear-out' damage extending approximately 10cm upwards provides potential bat roosting opportunity.	**A26.** River corridor at site of proposed roughing screen (Item C08_T01).
	
A27. River corridor at site of proposed roughing screen (Item C08_T01).	**A28.** River corridor at site of proposed flood defence embankment and wall (Items C08_E01, C08_L01).

	
A29. River corridor upstream of proposed flood defence wall (Item C08_L02). Bridge Ref. B01 included.	**A30.** River corridor at site of propsed proposed flood defence embankment and wall (Items C08_E02 and C08_L04). Passive bat monitor B_1 located in woodland on left.
	
A31. River corridor downstream of proposed bridge replacement (Item C08_B01). Bridge B04 in foreground.	**A32.** Trees to be felled to provide vehicle access ramp (Item C06_R01).

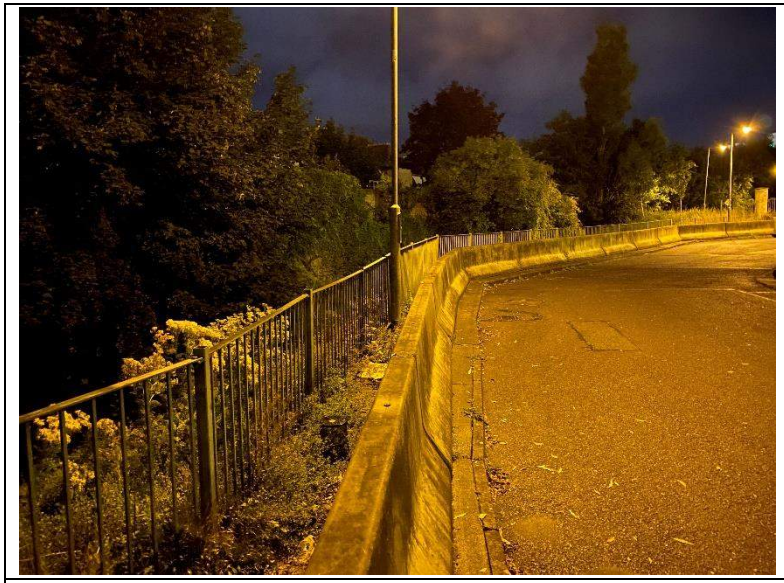
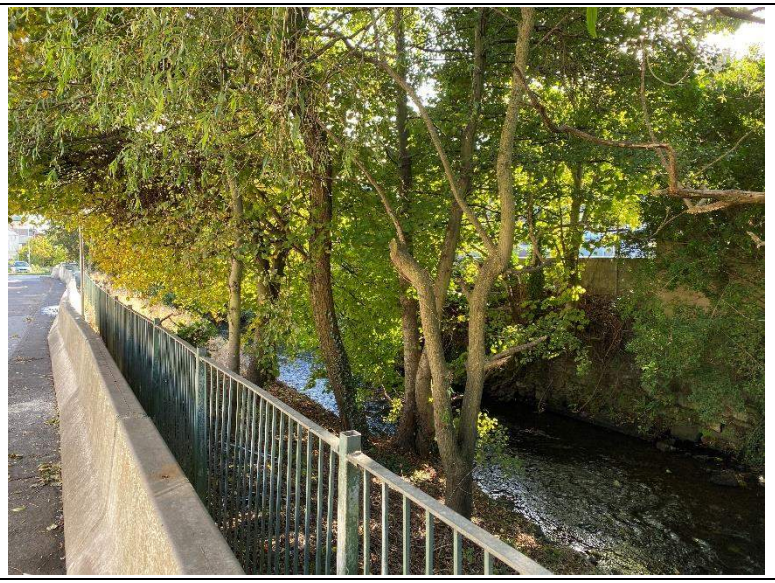
A33. Potential access route for work near Commons Inn (including Item C06_C01).

A34. River corridor at site of proposed flood wall (Item C06_L05). Largely unlit at night.

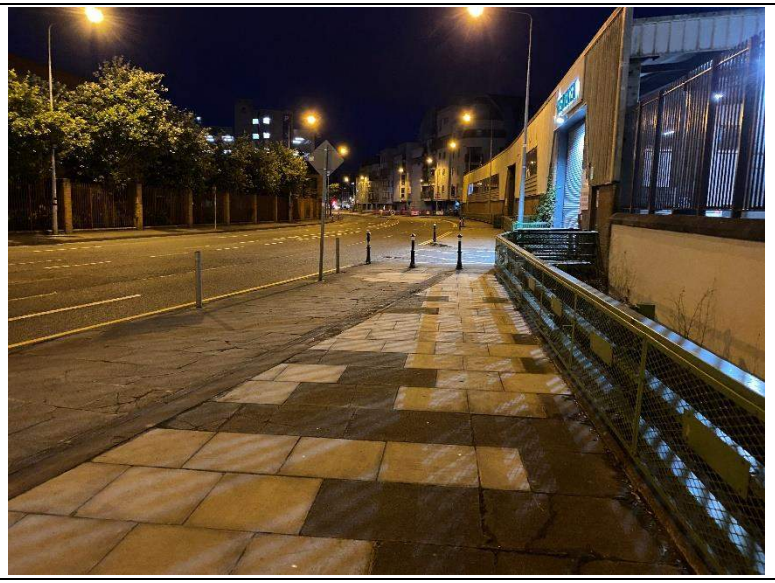


A35. River corridor at Dulux Factory where flood defence walls are proposed (Item C06_L08, C06_L11). This section of channel experiences significant light pollution at night.

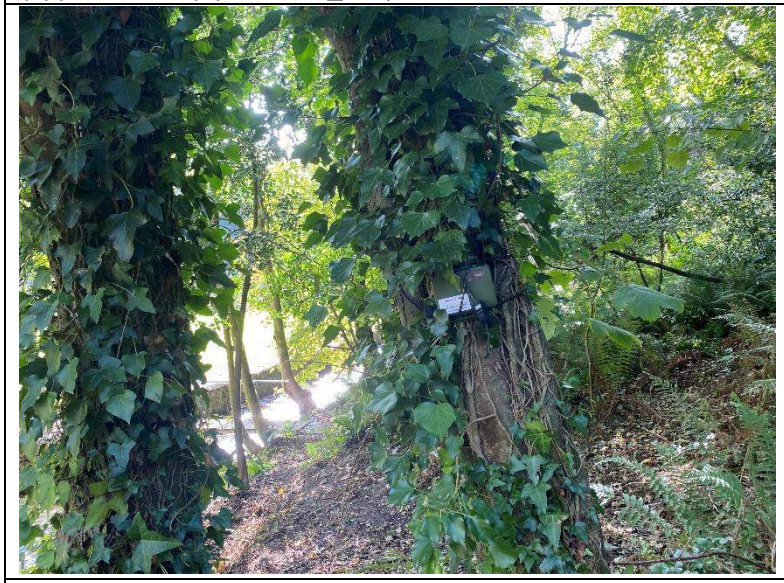
A36. River corridor in proximity to passive bat monitor B_2. Proposed for replacement of open river with culvert (Item C06_B04).

	
A37. River corridor proposed for replacement of open river with culvert (Item C06_B04), taken at night. Overhanging riparian vegetation provides cover for bats foraging at night.	**A38.** River corridor in proximity to passive bat monitor B_2. Propsed for replacement of open river with culvert (Item C06_B04).
	
A39. Partial view of rear of S06, a commercial premesis adjoining the River Bride.	**A40.** Partial view of rear of S06, a commercial premesis adjoining the River Bride, and adjoining derelict dwelling.

A41. River corridor on Glen River at site of proposed flood defence wall (opposite bank) (Item C04_L01).

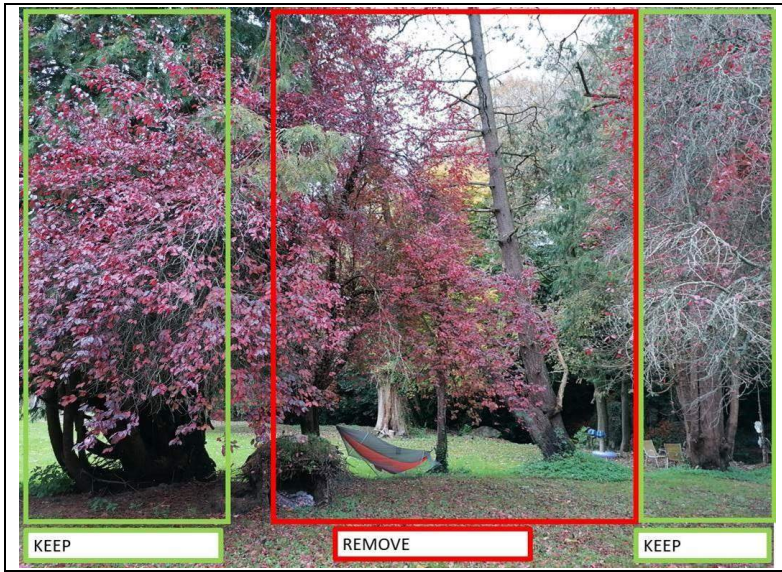


A42. Southern extent of scheme where maintenance of existing channel is proposed. Nightime illumination is a significant barrier to bats in urban areas.



A43. Bat Recorder Bat_1 overlooking Glenamought River.

A44. Location of bat Recorder Bat_2 overlooking River Bride.

	
A45. Proposed tree removal (3 no. trees) at Woodpark (Item: C08_E03) (source: ARUP).	

Appendix B - Bat Conservation Ireland Records

Record	Reference*	Source	Date	Species Record	Location
Roost	R_01	-	-	Leisler's Bat; Soprano Pipistrelle	Blackrock; Cork
Roost	R_02	-	-	Daubenton's Bat	Blarney; Co. Cork.
Roost	R_03	-	-	Leisler's Bat	Grattan Street; Cork City
Roost	R_04	-	-	Soprano Pipistrelle	Monkstown; Cork
Roost	R_05	-	-	Soprano Pipistrelle	Thomas Davis Bridge; Cork City
Roost	R_06	-	-	Daubenton's Bat	Victoria Bridge; Cork City
Transects	T_01	BCI Volunteer	-	Daubenton's Bat; Unidentified bat	Anglers Rest Bandon
Transects	T_02	BCI Volunteer	-	Daubenton's Bat; Unidentified bat	Bannon Bridge
Transects	T_03	BCI Volunteer	-	Daubenton's Bat; Leisler's Bat; Unidentified bat	Bawnafinny Bridge
Transects	T_04	BCI Volunteer	-	-	Carrigrohane (Beyond Lee Fields)
Transects	T_05	BCI Volunteer	-	-	Cork City
Transects	T_06	BCI Volunteer	-	Daubenton's Bat; Unidentified bat	Glyntown Bridge
Transects	T_07	BCI Volunteer	-	Daubenton's Bat; Unidentified bat	Kennel's at Weir Stream
Transects	T_08	BCI Volunteer	-	Daubenton's Bat; Soprano Pipistrelle; Pipistrellus spp. (45kHz/55kHz); Unidentified bat	Lee Fields
Transects	T_09	BCI Volunteer	-	Daubenton's Bat; Unidentified bat	Leemount Place
Transects	T_10	BCI Volunteer	-	Daubenton's Bat; Unidentified bat	Murphys Farm Bishopstown
Transects	T_11	BCI Volunteer	-	Daubenton's Bat; Unidentified bat	Tower Bridge
Transects	T_12	BCI Volunteer	-	Daubenton's Bat; Unidentified bat	Upper Glanmire Bridge
Transects	T_13	BCI Volunteer	-	Leisler's Bat; Common Pipistrelle; Pipistrellus spp. (45kHz/55kHz)	W56 (19) 2005-2008
AdHoc	A_01	BATLAS 2009	07/11/2015	Leisler's Bat; Soprano Pipistrelle	-

AdHoc	A_02	BATLAS 2010	11/08/2008	Myotis spp.; Leisler's Bat; Common Pipistrelle; Soprano Pipistrelle; Pipistrellus spp. (45kHz/55kHz)	-
AdHoc	A_03	BATLAS 2010	26/09/2008	Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_04	BATLAS 2010	28/08/2008	Myotis spp.; Leisler's Bat; Common Pipistrelle; Soprano Pipistrelle; Pipistrellus spp. (45kHz/55kHz)	-
AdHoc	A_05	BATLAS 2010	18/09/2008	Daubenton's Bat; Myotis spp.; Leisler's Bat; Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_06	BATLAS 2010	18/09/2008	Daubenton's Bat; Myotis spp.; Soprano Pipistrelle	-
AdHoc	A_07	BATLAS 2010	18/09/2008	Soprano Pipistrelle; Unidentified bat	-
AdHoc	A_08	BATLAS 2010	18/09/2008	Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_09	BATLAS 2010	19/09/2008	Daubenton's Bat; Myotis spp.; Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_10	BATLAS 2010	13/08/2008	Myotis spp.; Leisler's Bat; Soprano Pipistrelle; Pipistrellus spp. (45kHz/55kHz)	-
AdHoc	A_11	BATLAS 2010	25/09/2008	Myotis spp.; Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_12	BATLAS 2010	14/08/2008	Myotis spp.; Leisler's Bat; Soprano Pipistrelle; Pipistrellus spp. (45kHz/55kHz)	-
AdHoc	A_13	BATLAS 2010	26/09/2008	Soprano Pipistrelle	-
AdHoc	A_14	BATLAS 2010	18/09/2008	Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_15	BATLAS 2010	18/09/2008	Myotis spp.; Leisler's Bat; Common Pipistrelle; Brown Long-eared Bat; Unidentified bat	-
AdHoc	A_16	BATLAS 2010	18/09/2008	Daubenton's Bat; Myotis spp.; Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_17	BATLAS 2010	22/08/2008	Myotis spp.; Leisler's Bat; Common Pipistrelle; Soprano Pipistrelle; Pipistrellus spp. (45kHz/55kHz)	-
AdHoc	A_18	BATLAS 2010	25/09/2008	Daubenton's Bat; Myotis spp.; Soprano Pipistrelle	-
AdHoc	A_19	BATLAS 2020	08/09/2015	Common Pipistrelle; Soprano Pipistrelle; Brown Long-eared Bat	-
AdHoc	A_20	BATLAS 2020	23/09/2015	Daubenton's Bat; Natterer's Bat; Common Pipistrelle; Soprano Pipistrelle; Pipistrellus spp. (45kHz/55kHz)	-
AdHoc	A_21	BATLAS 2020	08/10/2015	Daubenton's Bat; Common Pipistrelle; Soprano Pipistrelle; Brown Long-eared Bat	-

AdHoc	A_22	BATLAS 2020	01/10/2015	Daubenton's Bat; Common Pipistrelle; Soprano Pipistrelle; Unidentified bat	-
AdHoc	A_23	BATLAS 2020	16/10/2015	Soprano Pipistrelle; Pipistrellus spp. (45kHz/55kHz)	-
AdHoc	A_24	BATLAS 2020	17/09/2015	Daubenton's Bat; Myotis spp.; Common Pipistrelle; Soprano Pipistrelle; Pipistrellus spp. (45kHz/55kHz); Brown Long-eared Bat	-
AdHoc	A_25	BATLAS 2020	22/09/2015	Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_26	BATLAS 2020	22/09/2015	Soprano Pipistrelle	-
AdHoc	A_27	BATLAS 2020	10/10/2015	Common Pipistrelle	-
AdHoc	A_28	BATLAS 2020	01/10/2015	Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_29	BATLAS 2020	03/09/2015	Daubenton's Bat; Leisler's Bat; Common Pipistrelle; Soprano Pipistrelle; Pipistrellus spp. (45kHz/55kHz)	-
AdHoc	A_30	BATLAS 2020	22/09/2015	Common Pipistrelle; Pipistrellus spp. (45kHz/55kHz); Unidentified bat	-
AdHoc	A_31	BATLAS 2020	08/09/2015	Daubenton's Bat; Leisler's Bat; Common Pipistrelle; Soprano Pipistrelle; Pipistrellus spp. (45kHz/55kHz)	-
AdHoc	A_32	BATLAS 2020	07/10/2015		-
AdHoc	A_33	BATLAS 2020	22/09/2015	Pipistrellus spp. (45kHz/55kHz)	-
AdHoc	A_34	BATLAS 2020	27/09/2015	Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_35	BATLAS 2020	22/09/2015	Daubenton's Bat; Leisler's Bat; Soprano Pipistrelle	-
AdHoc	A_36	BATLAS 2020	08/09/2015	Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_37	BATLAS 2020	08/10/2015	Daubenton's Bat; Leisler's Bat; Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_38	BATLAS 2020	12/07/2016	Leisler's Bat; Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_39	BATLAS 2020	17/09/2015	Daubenton's Bat; Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_40	BATLAS 2020	22/09/2015	Daubenton's Bat; Common Pipistrelle; Pipistrellus spp. (45kHz/55kHz)	-
AdHoc	A_41	BATLAS 2020	04/09/2015	Daubenton's Bat; Leisler's Bat; Common Pipistrelle; Soprano Pipistrelle; Pipistrellus spp. (45kHz/55kHz); Brown Long-eared Bat	-

AdHoc	A_42	BATLAS 2020	21/09/2015	Daubenton's Bat; Soprano Pipistrelle	-
AdHoc	A_43	BATLAS 2020	16/10/2015	Daubenton's Bat; Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_44	BATLAS 2020	16/09/2015	Daubenton's Bat; Common Pipistrelle	-
AdHoc	A_45	BATLAS 2020	27/09/2015	Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_46	BATLAS 2020	21/09/2015	Leisler's Bat; Common Pipistrelle; Soprano Pipistrelle; Unidentified bat	-
AdHoc	A_47	BATLAS 2020	12/07/2016	Soprano Pipistrelle	-
AdHoc	A_48	BATLAS 2020	07/10/2015		-
AdHoc	A_49	BATLAS 2020	22/09/2015	Soprano Pipistrelle; Pipistrellus spp. (45kHz/55kHz)	-
AdHoc	A_50	BATLAS 2020	23/09/2015	Daubenton's Bat; Leisler's Bat; Common Pipistrelle; Soprano Pipistrelle; Brown Long-eared Bat	-
AdHoc	A_51	BATLAS 2020	16/09/2015		-
AdHoc	A_52	BATLAS 2020	01/10/2015	Daubenton's Bat; Soprano Pipistrelle	-
AdHoc	A_53	BATLAS 2020	07/10/2015	Soprano Pipistrelle	-
AdHoc	A_54	BATLAS 2020	12/07/2016	Common Pipistrelle	-
AdHoc	A_55	BATLAS 2020	17/09/2015	Daubenton's Bat; Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_56	Consultant	05/09/2007	Leisler's Bat; Common Pipistrelle	-
AdHoc	A_57	Consultant	15/06/2004	Whiskered/Brandt's Bat; Leisler's Bat; Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_58	Consultant	23/07/2007	Daubenton's Bat; Leisler's Bat; Common Pipistrelle; Soprano Pipistrelle; Brown Long-eared Bat	-
AdHoc	A_59	Consultant	15/06/2004	Whiskered/Brandt's Bat; Leisler's Bat; Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_60	Consultant	09/06/2005	Natterer's Bat; Leisler's Bat; Common Pipistrelle; Soprano Pipistrelle; Brown Long-eared Bat	-
AdHoc	A_61	Consultant	16/09/2007	Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_62	Consultant	21/07/2003	Leisler's Bat; Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_63	Consultant	05/09/2007		-

AdHoc	A_64	Consultant	15/06/2004	Whiskered/Brandt's Bat; Leisler's Bat; Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_66	Consultant	15/06/2004	Whiskered/Brandt's Bat; Leisler's Bat; Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_67	Consultant	29/07/2004	Daubenton's Bat; Leisler's Bat; Common Pipistrelle; Soprano Pipistrelle; Brown Long-eared Bat	-
AdHoc	A_68	Consultant	16/09/2007	Common Pipistrelle; Soprano Pipistrelle	-
AdHoc	A_69	Consultant	02/08/2005	Common Pipistrelle	-
AdHoc	A_70	Consultant	01/08/2006	Daubenton's Bat; Natterer's Bat; Leisler's Bat; Common Pipistrelle; Soprano Pipistrelle; Brown Long-eared Bat	-

** See Figure 3.2*

O'DONNELL ENVIRONMENTAL

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Appendix 10.1 – List of Heritage Sites

APPENDIX 10.1 HERITAGE ASSETS

The following table identifies the Heritage Assets located within the environs of the proposed scheme, including their locations. Please refer to the figures in the ADCO reports presented as Appendices 10.2 and 10.3 for extent of riverine features, such as millraces and river walls.

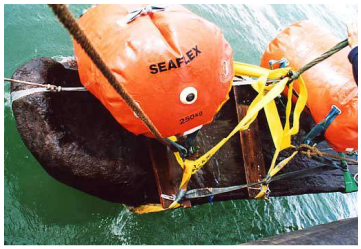
HAN	Status	ADCO ref.	Heritage Asset Type/Name	NGR East	NGR North
1	CO063-067----	-	Kilbarry Mill	167278	75299
2	-	-	Glen Mill/Distillery	166974	75137
3	RPS PS616 NIAH 20858003	-	Kilnap Glen House	166434	74971
4	CO074-112----	-	Kilnap Mill	167369	74120
5	CO074-115----	-	Former mill (Sunbeam)	166479	74960
6	PS1139	-	Church of Annunciation	167434	73263
7	PS491	-	Madden's Buildings		
8	NIAH 20858004	F01	Masonry Road Bridge (Kilnap Bridge)	166578	75046
9	-	F02	Weir/Dam Structure	166528	75033
10	PS617 NIAH 20858005	F03	Railway Bridge (Kilnap Viaduct)	166514	75015
11	-	F04/F04B	RiverWalling/Revetment; five sections	166487	75016
12	-	F05	Weir Structure	166396	74980
13	-	F06	Millrace	166418	74956
14	-	F07	Masonry Bridge (Kilnap House Access Bridge)	166307	74830
15	-	F08	River Walling / Revetment	166302	74822
16	-	F09	Masonry Bridge (Fitz's Boreen)	166924	74239
17	-	F10	River Walling	167403	73490
18	-	F11	Bridge Section	167404	73318
19	-	F12	Masonry Culvert	167435	73317
20	-	F13	Masonry Culvert	167452	73242
21	-	F14	Masonry Culvert	167427	72738
22	-	F15	River Walling /Revetment; two opposing sections	167429	72738
23	-	F16	Masonry Culvert	167436	72650
24	-	F17	Millpond	166706	75126
25	-	F18	River Walling/ Revetment	166703	75126
26	-	F19	Weir	166736	75135
27	-	F20	Tailrace (mill)	166854	75094
28	-	F21A	River Walling (north side of channel)	166832	75127
29	-	F21B	River Walling (south side of channel)	166820	75121
30	-	F22	Mill Boundary Wall (masonry)	166850	75108
31	-	F23	River Walling/ Revetment	166859	75110
32	-	F24	Masonry Wall (part of former mill building)	166997	75157
33	-	F25	Masonry Bridge (Glen Mill)	167002	75163
34	-	F26	River Walling	166989	75189
35	-	F27	Weir (site of)	167060	75211
36	-	F28	River Walling/ Revetment	167072	75205
37	20906320	F29	Glennamought Masonry Bridge (road)	167200	75287

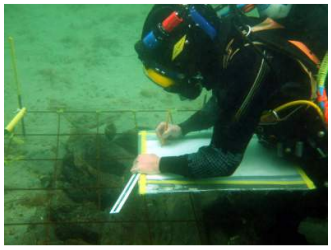
Appendix 10.2 – 2016 ADCO Report

Leading Maritime Archaeology

Underwater Archaeological Impact Assessment (UAIA)
River Bride Certified Drainage Scheme
Blackpool, Cork

16D0044, 16R0044



Underwater Archaeological Impact Assessment (UAIA)
River Bride Certified Drainage Scheme
Blackpool, Cork

16D0044, 16R0044

22 June 2016

Project Director **Rex Bangerter MA**

ADCO, Beverley Studios, Church Terrace, Bray, Co. Wicklow www.adco-ie.com

CONTENTS

EXECUTIVE SUMMARY

The Archaeological Diving Company Ltd (ADCO) was appointed by Ryan Hanley, Consulting Engineers for the Office of Public Works, to carry out an Underwater Archaeological Impact Assessment (UAIA) of the River Bride and its tributary the Glenamought River. The work was carried out as part of pre-planning conditions associated with the River Bride (Blackpool) Certified Drainage Scheme, to include in-water assessment that will complement existing desktop and walkover survey conducted in 2015 for the project Environmental Impact Statement.

The in-water archaeological assessment comprised a 2.5km stretch of the River Bride and a 500m section of the Glenamought River, extending from Kilnap Bridge in the north (upstream extent of study area) to the southern end of the Blackpool Architectural Conservation Area in the south (downstream extent). The assessment recorded riverbed topography and provides a detailed account of the existing riverside environment. On-site work comprised systematic non-disturbance waded inspection of the two river channels, their attendant bank structures, and any associated riverine features, including bridge structures (piers and foundations), weirs, culverts, river-walling, and any natural features encountered. Particular attention was paid to the assessment of two masonry bridge structures, located at Kilnap Glen and Fitz's Boreen, which are to be removed as part of the proposed drainage scheme; Interference Reference numbers C08_B01 and C06_B01. On-site work was carried out between the 3rd and 8th of April 2016, under licence from the DAHG; licence numbers 16D0044 and 16R0044.

The River Bride, including its tributary the Glenamought River, has witnessed successive alteration/adaption of the waterway with the development of milling and other industrial activity in the nineteenth-century. In addition, the area has undergone extensive modern alterations as a result of the twentieth-century development of the surrounding landscape. Cartographic evidence supports the findings from the in-water survey that two substantial sections of the present day River Bride, running adjacent to the Commons Road, are created watercourses of twentieth-century date; running northwest to southeast at a distance of between *c.* 10m to *c.* 70m from the original line of river. The historic watercourse has been maintained along the southernmost section of the river, as it flows through Blackpool Village itself. The Glenamought River remains largely unaltered by twentieth-century intervention.

The UAIA identified a series of sixteen known or previously unrecorded features of historic significance within the original courses of the two river channels (Features F01-F16). The features include: four bridge structures (F01, F03, F07, and F09); multiple sections of river walling (F04A/F04B, F08, F10, and F15A/F15B); three masonry culverts (F13, F14/F14B, F16); a rubble stone weir (F05); section of a bridge arch (F11); a masonry culvert arch (F12); a millrace (F07) and the remains of a dam/ weir structure (F02). Features F01-16 are catalogued in Appendix 1, with corresponding impact assessment and proposed mitigation measures presented in Sections 6.0 and 7.0 respectively.

In addition, numerous cut-stone pieces (CS01-15) were encountered in the riverbed, along the upstream section of the Glenamought River survey area. The masonry pieces are associated with the construction of the Railway Viaduct in 1849 (Feature F03) and other stone-cutting activity that took place within the grounds of Kilnap Glen House in the nineteenth-century. Currently there is no in-water work planned for this section of the Glenamought River. However, in the event that potential impacts do arise as part of any additional in-river works, it is recommended that these architectural pieces be recovered and recorded more fully at that point. Two further cut-stone pieces were identified at separate locations along the River Bride (CS16 and CS17) and are also included within the mitigation proposals.

This report recommends that further archaeological assessment in advance of construction is not required. However, it is recommended that archaeological monitoring of ground disturbances during construction be undertaken, with the proviso to resolve fully any archaeological material observed at that point. In particular, archaeological monitoring is required at the location of five features impacted by the proposed Drainage Scheme, including: Feature F07 (Kilnap House Access Bridge), Feature F09 (Bridge, Fitz's Boreen), Feature F10 (River Walling, Orchard Court), Feature F11 (Bridge section, off Commons Road) and Feature F12 (Masonry Culvert Arch).

The recommendations of this report are subject to the approval of the National Monuments Service, formerly at the Department of Arts, Heritage and the Gaeltacht.

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LIST OF ABBREVIATIONS

ADCO	The Archaeological Diving Company Ltd
ACA	Architectural Conservation Area
DAHG	Department of Arts, Heritage and the Gaeltacht
DAU	Development Applications Unit
E	Easting
N	Northing
NGR	National Grid Reference
NIAH	National Inventory of Architectural Heritage
OPW	Office of Public Works
RMP	Record of Monuments and Places
RPS	Record of Protected Structures
UAU	The Underwater Archaeology Unit
UAIA	Underwater Archaeological Impact Assessment

1.0 INTRODUCTION

The Archaeological Diving Company Ltd. was appointed by Ryan Hanley, consulting engineers on behalf of the Office of Public Works (OPW), to undertake an Underwater Archaeological Impact Assessment (UAIA) along a 3km section of the River Bride and its tributary the Glenamought River (Figures 1-2). This work was commissioned to update the existing project Environmental Impact Statement (EIS) for the proposed River Bride (Blackpool) Certified Drainage Scheme.

Onsite assessment comprised the systematic visual inspection of the in-water extent of the proposed drainage scheme. The archaeological assessment sought to record riverbed and bankside topography, assess the potential of riverbed deposits to retain archaeological material, and identify any features/structures of archaeological or historic significance that are present. In addition, targeted metal-detection was employed to help assess the riverbed and highlight any metallic concentrations present within those deposits.

The assessment included the archaeological survey of two historic bridge structures which are to be removed as part of the proposed development, Feature F07 (Kilnap House Access Bridge) and Feature 09 (Masonry Bridge at Fitz's Boreen); Project Interference Reference numbers C08_B01 and C06_B01 respectively.

For a comprehensive outline of the archaeological and historical background of the areas impacted by the proposed drainage scheme, the reader is directed to the desktop study completed by John Cronin and Associates as part of the 2015 EIS.[1] The EIS identified a number of areas/sites of historic interest and provided mitigation for same, including Blackpool Village (EIS section 10.4.2), the Sunbeam Industrial Complex (section 10.4.3), Fitz's Boreen Road Bridge (section 10.4.4), and Kilnap Glen House Property (section 10.4.5).

In preparation for the in-water assessment, the EIS was read in detail and the site area was inspected in the company of Tony Cummins (John Cronin and Associates), author of the EIS chapter. The UAIA was carried out in accordance with the terms of Section 5 of the National Monuments Act (2004 Amendment) by a team of two underwater archaeologists and a certified surveyor between 3rd and 8th of April 2016, under licence from the DAHG; licence numbers 16D0044 and 16R004.

[1] Chapter 10, Archaeological and Cultural Heritage Assessment, River Bride (Blackpool) Certified Drainage Scheme, Environmental Impact Statement, prepared by Tony Cummins for John Cronin and Associates, November 2015. pp.10-1 to 10-22.

The following report presents the findings from the UAIA, and includes a catalogue that is a factual record of any known and newly-encountered features of archaeological or historic interest. The report assesses the potential level of impact arising from the development at the location of each of the in-water features, and provides a set of specific mitigation measures relating to each feature.

2.0 PROPOSED DRAINAGE SCHEME

The proposed drainage scheme will comprise the use of a combination flood mitigation measures, including the insertion of flood walls, the culverting of a section of open river channel, bridge replacement, and the construction of flood embankments as required (Figures 2-7). It is understood that the proposed flood relief scheme will involve the following works:

- Construction of new culverts
- Replacement of existing bridges and culverts
- Construction of new flood defence walls and earthen embankments
- Construction of new bridge parapets
- Local channel widening of the River Bride
- Construction of a sedimentation trap on the west bank of River Bride
- Removal of approximately 100m of existing culvert and restoration of open channel at this location
- Construction of a new trash screen and roughing screen, and the removal of existing trash screens
- Modifications to the existing foul and surface water collection networks in the vicinity of the proposed works, including construction of pumping stations
- Removal of an existing sluice structure in the channel of the river Bride to the rear of the Dulux factory
- Localised regrading of ground levels, erection of fencing and access gates to facilitate pedestrian/ vehicular access to and around the flood defences, or to redirect overland surface water flow paths
- The in-filling of an existing open watercourse
- Introduction of a flow control structure on the entrance to the Brewery culvert on the River Bride and the Spring Lane culverted branch of the River Glen
- Regular maintenance of the river channel and pumping stations.

3.0 CARTOGRAPHIC INFORMATION

Examination of the Ordnance Survey (OS) 6-inch First Edition (1841) and later 25-inch edition mapping provides an insight to the extent of extractive industry along the River Bride and its tributary in the nineteenth-century (Figure 8). Milling activity is represented by a corn mill (RMP: CO074-112) located within the property of Kilnap Glen House and a mill complex at

Millfield (RMP: CO074-115), which was subsequently subsumed by further nineteenth- and twentieth-century industrialisation works (Sunbeam Industrial Estate and Dulux Factory). Associated millraces, millponds, and weirs are also shown extending between the two mill sites.

Comparison with the modern-day OS mapping highlights the extent of land redevelopment and river adaption that has taken place. This is highlighted further when comparing the modern route of the River Bride and its tributary with that of the route shown on the historic mapping; more than 90% of the watercourse having experienced some form of twentieth-century alteration (Figure 9). The in-water assessment supports this cartographic observation.

4.0 SURVEY METHODOLOGY

Visual inspection, along the extent of the River Bride Drainage Scheme, was conducted across the riverbed and attendant back structures of the River Bride and the Glenamought River (Figures 10-19).

The survey commenced at the scheme's most upstream point, NGR: 166591E, 75068N, and progressed downstream. The survey included a 120m section of Rathpeacon Stream, which flows into the River Bride downstream of the access bridge to Kilnap House. Uninterrupted inspection of the watercourse route was carried out along most of the survey area, until reaching a point where the River Bride flows through a modern culvert, located beneath Watercourse Road, at NGR: 167446E, 73240N. The river remains culverted from this point for a distance of approximately 520m. Inspection of the full length of the culverted section was not deemed practicable, and inspection was limited to the first 40m and last 20m of the culvert.

The river is once again exposed along an 87m section, between NGR: 167427E, 72737N, and NGR: 167436E, 72650N, adjacent (west) to the North Link Road. This section was inspected, before the river flows beneath a road-bridge and enters another culvert, where it remains culverted until its discharge point into the River Lee at NGR: 167525E, 72139N. Inspection of the culverted section was limited to the first 30m of the culvert.

Detailed descriptions of riverbed topography and bottom composition where taken at regular intervals as the survey progressed. A comprehensive photographic record of the existing river environment was made. Where possible, metal-detector anomalies were inspected and mapped using a total station and/or DGPS Unit (Plate 1). In addition, a series of river profiles were taken to highlight any changes in topography along the exposed extent of the watercourse (Figures 20-29, Plate 2).

Particular attention was paid to recording any features of archaeological of historic interest encountered as part the survey. This included the gathering of data to produce metrically accurate perspective drawings and elevations of a number of these features, including Features F07 (Kilnap Glen House Access Bridge), F09 (Masonry Bridge at Fitz's Boreen), F11 (section of Bridge Arch), and F12 (Culvert Arch); see Figures 30-32.

A Leica Total Station EDM and Topcon DGPS unit facilitated the gathering of profile data and the position-fixing any features encountered. A Fisher *Aquanaut* 1280U and Tesoro *Compardre* metal detectors were used for the Magnetometer survey. However, reliable metal-detection survey was not achievable across much of the survey area, due to the presence of a significant level of in-water metallic debris. Metal-detection was more practical along sections of the Glenamought River, where less metallic debris is present at surface level.

4.1 Terminology

When referring to the degree of compaction observed for the riverbed deposits under inspection, the terms loose, medium, and hard are relative and do not relate to the measured properties of these deposits. When referring to sediment grain size, the Wentworth scale was adopted, as detailed in Table 1.

Size (mm)	Grade
>256	Boulder
>64	Cobble
>4	Pebble
>2	Granule (gravel)
>1	Very coarse sand
>1/2	Coarse sand
>1/4	Medium sand
>1/8	Fine sand
>1/16	Very fine sand
>1/32	Coarse silt
>1/64	Medium silt
>1/128	Fine silt
>1/256	Very fine silt
<1/256	Clay

Table 1: Sediment grain size categories as applied to the Riverbed deposits discussed

The survey team comprised of two underwater archaeologists and a certified surveyor. The survey was carried out to HSE/HSA standards using all relevant safety equipment.

5.0 ARCHAEOLOGICAL ASSESSMENT

5.1 River Topography

The River Bride and its tributary the Glenamought River have been subdivided into five areas to allow the systematic discussion of the river topography present along their extent. These river areas are geographically delineated in Table 2 below.

Topographic Area	Nation Grid Reference	Location
River Area 1 Profiles P1-P12 Figures 11-12	166591E, 75068N to 166295E, 74689N	Glenamought River as it flows through the grounds of Kilnap Glen House to its confluence with the River Bride Note: a section of Rathpeacon Stream is included in this area.
River Area 2 Profiles P13-P24 Figures 12-13	166001E, 74679N to 166920,74242N	River Bride as it flows from Rose Cottage to a Masonry Bridge located at Fitz's Boreen.
River Area 3 Profiles P25-P29 Figures 14-17	166920,74242N to 167453E, 73652N	River Bride from downstream side of a Masonry Bridge at Fitz's Boreen to point adjacent to Springview Terrace, Blackpool Village.
River Area 4 Figures 17-18	167453E, 73652N to 167447E, 73240N	River Bride as it flows past Orchard Court to a point adjacent to the Church of the Annunciation in Balckpool Village.
River Area 5 Figure 19	167423E, 72757N to !67435E, 72620N	Section of the River Bridge located adjacent to Watercourse Court and the North Link Road.

Table 2: River areas delineated for the purpose of topographic description.

River Area 1 (Profiles P1-P12, Figures 11-12): the riverbed upstream of Kilnap Bridge is composed of angular to sub-angular pebbles, interspersed with fragments of shale (>20cm) (Plates 3-4). Pockets of coarse-sand and gravel are also present. Water-rolled nodules of silty-clay were noted within the sand/gravel pockets. This section of river is fast-flowing and a water depth of 0.20m was measured. The base of the riverbed is exposed in places and is composed of a compact silty-clay (sterile), light-brown in colour. The south bank is ill-defined and measures 0.30m-0.40m in height. In contrast, an almost vertical bank (subject to recent erosion) forms the north bank at this location. This structure is composed of compact-clay with frequent shale (boulder) inclusions (Plate 5). A degree of deposition is active along south side of the river, *c.* 7m upstream of Kilnap Bridge. Shale bedrock is exposed across the riverbed beneath Kilnap Bridge (Feature F01), providing a platform upon which the bridge's foundations have been constructed.

The section of river between Kilnap Bridge (Feature F01) and the Kilnap Viaduct (Feature F03) comprises deposits of gravel and sub-angular pebbles, interspersed with fragments of shale (>20cm), that overlie a base layer of compact silty-clay. In addition, large pieces of limestone masonry are present within the riverbed, measuring up to 0.60m in length x 0.40m in width. Exposed bank sections are composed of compact clay with shale inclusions forming a layer of glacial-till (Plates 6-7). Water depth increases to 0.30m, with occasional deeper pockets being present. Rock armour has been placed on the outer side of the meander and

includes the use of cut-stone masonry recovered from the riverbed (Plates 8-9). From a point c. 26m upstream of Kilnap Viaduct, both riverbanks have been subject to modern protection measures, including the placement of stone-filled gabions; extending 50m along the north side of the river and 127m on the south (Plates 10-11). Beneath the viaduct, river-flow is increased as the natural topography falls to the south (Plate 12). The riverbed is composed of large shale boulders, interspersed with sub-angular shale cobbles. In addition, frequent limestone masonry associated with the construction of the railway bridge is present along this section of riverbed (CS1-CS15, Figure 11, Plates 13-16). As previously noted, the riverbed is exposed in places to reveal a base deposit of compact silty-clay.

The stone-filled gabions, placed along the south side of the watercourse, terminate adjacent to Kilnap House. The northern side of the river is delineated by a 78m section of river-walling (Feature F04A). A small flood embankment has been placed on the south side of the river, between Kilnap House and river channel (Plate 17). The riverbed comprises a sterile clay-base with overlying boulders and sub-angular cobbles (Plate 18). Water depth is increased (0.40m-0.50m) along this stretch of the river and is due to the presence of a small weir structure (Feature F05) which located a short distance downstream (Plates 19-20). A degree of deposition was noted for the riverbed immediately upstream of the weir. The north side of the river becomes wooded (small trees, laurels and rhododendron) at this location and a number of mature trees line the southern bank. A modern water feature has been constructed on the north side of the river, downstream of the weir (Plate 21). This comprises a series of wide steps, built into the side of the river channel, designed to accommodate water-flow from a small pond located 10m to the north. A large bedrock outcrop is also located on the north side of the river, a short distance downstream from the aforementioned water feature (Plate 22). Riverbed composition remains similar to that observed upstream and frequent pieces of limestone masonry, red-brick, and modern breeze blocks were encountered within the riverbed (Plate 23-24). The river channel is delineated, starting from a point downstream of the weir, by a concrete wall to the south and eroded sections of river-walling to the north (Feature F04A/B) (Plate 25). Further downstream, the watercourse is defined by steep-sided bank structures measuring 1.2m in height to the south, and 1.8m in height to the north (Plates 26-27).

The Glenamought River flows beneath a ‘clapper’ style bridge (Feature F07) which crosses the watercourse at the entrance to Kilnap Glen House (Figure 11, Plate 28). The riverbed on the upstream side of bridge structure is composed of small cobbles and pebbles (<50mm, shale composition) with frequent gravel deposits. A concrete retaining wall, measuring 20m in length, runs along the northwest side of the river on the upstream side of the bridge (Plate 29).

The riverbed, on the downstream side of the bridge, is composed of sub-rounded pebbles, boulders, and fine gravel deposits that overlie compact clay (Plate 30). A millrace (Feature F06) conjoins with the river channel on its eastern side (Plates 31-32). Deposition of waterborne sediment is evident across a 14m section of the river channel, a short distance downstream of the access bridge. This area comprises a *c.* 0.30m deposit of gravel and coarse sand with frequent inclusions, including pieces of water eroded red-brick and fragments of earthenware pottery (Plates 33-34). A 5.8m section of river-walling (Feature F08) is located on the northwest side of the channel, adjacent to this area of deposition.

As the river flows downstream, past light industrial units to the east and a roadway to the west, its attendant banks increase in size and become artificial in nature (Plate 35). Substantial rock armour has been placed along the base of the western bank to protect the structure from flood-water erosion. The riverbed is composed of large boulders and cobbles (shale composition) with occasional pieces of dislodged rock armour.

A modern culvert is located 75m downstream of the entrance to Kilnap Glen House, allowing road access into Northpoint Business Park (Plates 36-37). Three large concrete pipes (1.45m diameter) accommodate river-flow, with poured-mass-concrete cut-waters and retaining walls to the sides (both upstream and downstream of the structure). The façade is composed of concrete block-work. In addition, a concrete sill extends from both sides of the culvert.

The general topography encountered for the remaining section of the Glenamought River, as it continues southward to its confluence with the River Bride, is also defined by the aforementioned modern developments; a roadway to the west and business park to the east (Figure 12). The west side of the channel comprises a steep (2.5m+) earthen bank which is built upon a rock armour base. The east bank measures 1.5m in height and is composed of compact clay, exposed by recent flood-water activity.

In addition, a section of Rathpeacon stream (120m), located to the west of Glenamought River was inspected (Plates 38-39). The watercourse at this location does not retain any of its original character, the development of the surrounding road network resulting in extensive re-modelling of the watercourse. The watercourse is defined by artificial bank structures that rise at a 50º angle from the riverbed. The riverbed is flat bottomed and composed of angular shale boulders and cobbles with an overlying deposit of silty-sand (<0.30m depth). A concrete culvert and associated deflector-wall is located on the western side of the watercourse, approximately halfway along the surveyed extent (Plate 40). Water depth ranges from 0.50 – 0.90m. Frequent modern debris was encountered.

The Glenamought River has been subject to considerable nineteenth- and twentieth-century intervention. The river channel has been straightened and bankside consolidation measures are evident along much of its extent. The basal deposit that forms the natural riverbed is frequently exposed to reveal a compact silty-clay which is sterile in nature. Overlying deposits are large with pebbles, cobbles, and boulders forming much of the visible riverbed. Pockets of gravels were noted, although in general there is and little deposition taking place. Given the compact nature of the riverbed, coupled with the fast flowing character of the watercourse, a very poor holding content can be ascribed to the stretch of the Glenamought River under assessment.

River Area 2 (Profiles 13-24, Figures 12-13): survey of the River Bride commenced at a location 246m upstream from its confluence with the Glenamought River (Figure 12). At this point the river flows through a semi-rural setting, adjacent to the Lower Kileens Road (Plates 41-42). Rough pasture land is located to the north, with a dwelling house (Rose Cottage) and scrubland to the south. The watercourse is narrow (3.8m in width), steep-sided (85º angle), and appears to have been subject to past dredging activity; sterile clay-banks extending to a clay river-bed. A number of reed beds with well-established rhizome matts are present along the north side of the channel. A water depth of 0.80m was recorded.

The river is truncated, immediately downstream of Rose Cottage, and a concrete culvert channels river-flow beneath the N20 roadway (New Mallow Road) and associated slip roads (Plate 43). The watercourse re-emerges 240m downstream to continue its path along the eastern side of the N20 (Plate 44). As noted for the Glenamought River, the construction of the roadway has affected river topography, the watercourse being delineated by artificial bank structures built upon a rock armour base (Plate 45). At a point *c.* 40m downstream, the N20 veers to the west and the river enters an area of scrubland to the west of the North Point and West Link Business Parks. This area of scrub extends for a distance of approximately 160m and three well developed river-meanders characterise the waterway within this area.

Both bank structures are almost vertical in profile and measure between 1m and 1.2m in height (Plates 46-47). The banks are composed of sterile clay and the riverbed is composed of a shallow deposit (<0.20m depth) of shale pebbles and gravel, beneath which a clay-bed is located. Rock armour has been placed along the west side of the river, downstream of the first river-meander. A concrete encased pipe crosses the river, 7m upstream of this meander.

The outer-face of each meander has undergone sever erosion, where flow rates are increased; undercutting of the riverbank as much a 0.60m at these locations. In contrast, deposition is taking place on the inner-face of each meander, where flow is decreased (Plate 48). These deposition areas are composed of small, rounded, cobbles and pebbles

interspersed with coarse gravel. Frequent modern debris was noted within the matrix of this deposit and included water-worn ceramic fragments, animal bone, miscellaneous iron pieces, and red-brick fragments.

Downstream from the third river-meander the channel splits into two arms to flow around a small island located within the centre of the channel (Plate 49). The island is composed of an oval shaped clay-bank. Below this the channel straightens to run in a northwest to southeast direction past the Commons Inn Hotel and North Link Business Park for a distance of 250m (Plates 50-51). Once again the watercourse is delineated by steep-sided, artificial, bank structures, measuring 2m+ in height (Plates 52-53). The riverbed is composed of river cobbles (>70mm) overlying a solid clay base, which was frequently exposed due to erosion of the riverbed. Water velocity is greatly increased along this section and water depth measures up to 0.50m.

A short distance downstream of the Commons Inn carpark, the river turns abruptly to the south (almost at right angles) (Figure 13). Bank height at this location is 3m+ and rock armour is visible protruding from its base (Plate 54). A large piece of cut-stone masonry is located on top of the west bank at NGR: 16680E, 74454N (SC16, Plate 55). The river channel changes elevation once again and flow rates increase, creating rapids over an area composed of large cobbles and boulders (Plate 56). A small stream, Fairhill Stream, discharges into the main channel immediately below these rapids, on the western side of the river (Plate 57). The stream measures 4.2m in width and has a water depth of 0.30m. There is little flow within the stream and the streambed is composed of deep deposits of silty-sand (0.40m+). Downstream of the stream, the channel once again turns abruptly, this time flowing towards the east. Residential properties back onto the southern side of the river at this location. Modern river-walling and rock armour has been inserted along south side of the channel in an attempt to protect these dwellings (Plates 58-60). Scrubland delineates the northern side of the river. The north bank is formed of a vertical clay bank, which is subject to erosion and is undercut in places (Place 61). The riverbed is composed of angular pebbles (<50mm) and cobbles (<100mm) overlying a sterile clay bed which is frequently exposed. This section of channel is broader and measures up to 6m in width. Water depth is 0.90m along the southern side of the channel, where flow is increased, and 0.50m along the north.

A tight river-meander is located 83m downstream, creating a narrow channel that loops to the north and then back southward within a distance of 25m. The channel narrows considerably (3m) and deposition is active on the inner-face of the meander (Plate 62). On leaving the meander, the river flows in a south-southeast direction through scrubland which is bordered by industrial units. A concrete revetment delineates the north side of the river as it flows past am adjacent car-lot (Noel Deasy car sales) (Plates 63-64). The south side of the river is

delineated by large slabs of rock armour protection, behind which a petrol station is located (Plate 65). A large concrete encased pipe crosses the river immediately upstream of the aforementioned revetment wall (Plate 66). On the downstream side of the revetment, the river flows beneath a modern culvert measuring *c.* 15m in width (Plate 67). The channel then re-emerges for a short distance (14m) before flowing under a second culvert for a distance of 15m (Plate 68). Both culverts structures are of identical construction and are most likely associated with the development of the adjacent McDonald's restaurant. A masonry Bridge (Features F09) which carries a local access road (Fitz's Boreen) is located 23m downstream (Figure 14, Plate 69). This structure marks the southern extent of River Area 2.

The exposed sections of channel, located between the two culverts and the masonry bridge, are composed of steep-sided grass-covered banks that rise at a 45º to 50º angle (Plate 70). The riverbed is composed of rounded to sub-rounded shale pebbles and cobbles with occasional boulders (Plate 71).

The River Bride as it flows through River Area 3 has been significantly impacted by the construction of the local road network to the west and the development of a number of business parks to the east. Little of the river's natural character remains and the watercourse is largely defined by its modern bank structures and the placement of culverts along its course. The riverbed is compact/hard in nature and has an extremely poor holding content; deposition being minimal and restricted to specific areas. Moreover, the erosional effect of increased flow during flood-water events is clearly visible with the frequent stripping of overlying deposits and exposure of the underlying sterile clay bed.

River Area 3 (Profiles 25-29, Figures 14-17): this area runs from the masonry bridge (Feature F09) at Fitz's Boreen, to a point approximately 1.3km downstream. This stretch of the River Bride is almost entirely formed of modern-cut river channel and is the result of the successive development of neighbouring lands. It includes the construction of the Dulux Factory, the Sunbeam Industrial Estate, the Blackpool Retail Park, and the Blackpool Shopping Centre.

Concrete walls, measuring up to 3.2m in height, delineate the channel as it flow through the Dulux Factory site (Plates 72-73). Two modern culverts provide vehicular access between factory units within the complex (Plate 74-75). The riverbed is composed of rounded pebbles and small cobbles interspersed with river gravels (Plate 76). Frequent boulders are also present. Exposed bedrock is present in places, the largest section being located beneath the first of the two modern culverts (Figure 14, Plate 77). Water depth ranges between 0.40m and 0.60m. Grass-covered areas (composed of a fine silty-clay) have formed on alternating sides of the channel, as indicated on Figures 14-15, and measure up to 0.70m in height (Plates 78-81).

A modern weir, with overhanging footbridge (disused), is located at NGR: 167250E, 74126N, at a point 50m from the most southerly limit of the factory complex (Plates 82-84). A sluice-gate empties into the channel on the south side of the river and a possible winding mechanism is located on the north, both situated downstream of the weir. Concrete walls continue to delineate the river channel until reaching a 70m-long culvert (modern), which accommodates the river as it flows past the Sunbeam Industrial Estate, located to the south (Plates 85-87). Concrete walls also extend from the downstream side of the culvert, along a further a 55m section, before the river flows beneath another modern culvert (9m long) located off the southeast corner of the industrial estate (Plates 88-89).

The river channel narrows substantially on the downstream side of the culvert, as the river starts to flow through a parkland area constructed as part of the development of the adjacent Blackpool Retail Park. As it traverses the parkland area, the river is delineated by rock armour and/or stone-filled gabions (Plates 90-92). The riverbed is composed of large shale cobbles (>10mm) and boulders (>300mm). Water depth varies between 0.30m and 0.70m. Two modern bridges cross the river channel and provide pedestrian access through the parkland (Plates 93-94). The channel base is visible in places, and is cut into a deposit of sterile clay (Plate 95). A small weir, 4.2m-wide, is located at NGR: 167476E, 73859N. The weir is composed of boulders that appear to overlie an exposed section of bedrock (Figure 16, Plate 96).

A 24m-long concrete culvert accommodates a road bridge on the downstream side of the parkland area (Plates 97-98). On emerging from the culvert, the river channel is delineated by four tiers of stone-filled gabions (Plate 99). These extend for a distance of *c.* 34m before reaching another culvert structure (Plate 100-101). This culvert accommodates river-flow beneath the main road (N20), as the river channel swings to the southwest. The river emerges at a point 42m downstream, opposite the back gardens of Vaudeville Terrace.

The final 53m stretch of this river area is characterised by steep-sided banks composed of rubble stone, concrete, and modern debris, interspersed with bank sections that have been lined using stone-filled gabions (Plates 102-103). The riverbed is composed largely of sub-angular to angular cobbles and boulders which overlie compact sterile clay. A natural weir feature, formed from the accumulation of riverbed boulders, is located at a point 34m downstream of the culvert (Plate 104). An iron pipe crosses the river 20m downstream at NGR: 167423E, 73608N (Plate 105).

In conclusion, River Area 3 is largely composed of modern-cut watercourse and its riverine archaeological potential is extremely limited. Feature F09 (masonry bridge at Fitz's Boreen) is the only visible feature surviving from the original, historic route of the watercourse.

River Area 4 (Figures 17-18): in contrast to River Areas 2 and 3, this section of the River Bride appears to maintain its original course and, while subject to modern intervention, it still retains some features of historic interest. River Area 4 encompasses the river as it flows southward, adjacent to the Commons Road and Brockelsby Road, to a point located opposite the Church of the Annunciation (approximately 300m downstream). The river is for the most part bounded by terraced houses to the west and new housing developments (Goldenvilla Terrace/ Orchard Court) to the east.

The first 40m of the channel is restricted to between 2.4- 2.6m in width, as it flows past Goldenvilla Terrace. A poured mass-concrete retaining wall (3m+ in height) delineates a 20m section of the channel on its western side, while rock armour has been placed along the east bank (Plate 106). As the river enters Orchard Court, it broadens to 9m in width, although the channel sides continue to be defined by modern flood protection measures; stone-filled gabions (32m section) to the east and an old concrete wall (40m section) to the west (Plates 107-108). Approximately half-way along the survey area, the concrete wall gives ways to an historic section of river-walling (Feature F10, Figure 17). A rubble bank, rising at a 45º angle, delineates the west side of the river channel for much of its course through Orchard Court (Plates 109-110). Rock armour can be seen protruding from the base of the rubble bank and the structure is likely to be contemporary with the development of the adjacent housing estate. However, it is likely that the modern bank could retain the original bank structure within its core.

The riverbed has a more natural appearance along this section and is composed of rounded pebbles, cobbles, and small boulders. Pockets of coarse sand and gravel were also evident. The underlying clay-bed is exposed in places along the base of the east bank. The riverbed is littered with modern debris, dumped by the neighbouring houses, and includes general refuse, building materiel, and items such as bicycles, car parts, and broken pieces of furniture.

A short distance downstream from the terminus of Feature 10, a home-constructed water-wheel (now disused) protrudes from a section of modern river-walling at NGR: 167404E, 173455N (Plate 111). A modern culvert crosses the river channel at a point 32m downstream of the water-wheel (Plate 112). This structure provides pedestrian access form the housing estate to the Commons Road and is built upon the location of an historic crossing; the residue of this bridge feature (Feature F011) being found beneath the existing structure. A second

culvert crosses the river at a point 66m downstream and also facilitates pedestrian access to/from the housing estate (Plate 113). The section river running between these structures is defined by modern walling to the west and rock armour and stone-filled gabions to the west.

At a point 25m downstream of the second pedestrian crossing, the river enters a large modern culvert that extends 68m under Blackpool Bridge, to emerge adjacent to the Church of the Annunciation (Plates 114-115). Two short sections of masonry walling are located either side of the culvert opening, as indicated on Figure 18, and a small historic culvert drains into the channel on its west side (Feature F12). Poured mass-concrete slabs extend across the width of the channel to cover this feature. At a distance of *c.* 8m within the culvert, masonry walls are replaced with mass-concrete box sections that encompass the culvert walls, ceilings, and floor (Plate 116). Another small culvert (modern) drains into the river on its east side, within the larger culvert at a location approximately 30m downstream (Plate 117).

The river emerges only briefly, for a distance of 19m, before entering another longer culvert structure that runs beneath Watercourse Road for approximately 520m. A concrete sill extends across the riverbed at this location and encompasses a series of concrete flow deflectors, designed to slow down water-flow across the sill area. The channel side comprises concrete block walls, topped with metal railing to prevent ingress to the watercourse.

A small culvert drains into the channel on its eastern side, immediately upstream of the downstream culvert opening (Plate 118). An older (masonry) culvert exists a short distance within this structure, and is recorded as Feature F13 (as indicated on Figure 18).

Inspection progressed for a distance of *c.* 40m into the culvert that runs beneath Watercourse Road (Plate 119). The structure is of identical construction to that observed for the upstream culvert, comprising box-sections of poured mass concrete.

In part, River Area 4 retains some antiquity, as much of the channel follows its course as recorded in the nineteenth-century. The majority of features associated with the historic waterway (bridges, culverts, river-walling), however, have been replaced. The riverbed itself, where exposed, remains compact and comprises of shallow pebble/cobble deposits that overlie a sterile clay base. As such, a poor holding content can be ascribed to the riverbed along this section of the River Bride. In contrast, it is likely that the attendant bank structures may retain elements of interest and the sections modern river-walling may obscure earlier structures behind.

River Area 5 (Figure 19): this section of the River Bride is located adjacent to the North Link Road, at a point *c.*520m downstream, where the river re-emerges from the Watercourse Road

culvert system. Inspection of a 20m-section of this culvert was undertaken, travelling upstream into the structure. The surveyed section of culvert identified two historic culvert sections, Features F14A/F14, as indicated on Figure 19.

The riverbed is composed of rounded shale pebbles and small cobbles with occasional larger rocks and collapsed elements from the adjacent river-walls (Plate 120). The first *c.* 18m of this area comprises 3m+ high river-walling of drystone construction. These are likely to represent consolidation measures carried out across this section of watercourse in the nineteenth-century (Feature F15A/F15B). Downstream of these structures, the river-walling is replaced modern concrete walls and brick-work from houses that back onto the watercourse (on west side of the channel). In addition, the eastern side of the channel has undergone modern intervention with the placement of a 63m section of river-walling (Plates 121). A modern culvert, constructed from red-brick, drains into the channel (west side), at a point approximately 32m from the main river culvert located upstream (Plate 122). The river channel re-enters an historic culvert (Feature F16) at a point 87m downstream.

As noted for River Area 4, Area 5 retains its historic route and a number of features relating to the nineteenth-century adaptation of the river. A low to medium holding content can be ascribed to the riverbed, due to the increased level of deposition observed for this stretch of the River Bride.

5.2 Visual Survey and Assessment

A total of sixteen features of historic significance were encountered as part the assessment. Four are known structures, while twelve are previously un-recorded structures (Figures 11-19). These features (F01-F016) have been fully described and catalogued in Appendix 1 of this report, and Table 3 presents the location coordinates for each feature. What follows is an overall discussion of the features identified.

Features F01-F016 all comprise river-related features such as bridge structures, river-walling, weirs and culverts. They largely date to the 1800s, although a number may be of earlier eighteenth-century date. Only two of the features are recorded in the National Inventory of Architectural Heritage (NIAH): Kilnap Bridge (Feature 01) and Kilnap Viaduct (Feature F03), NIAH reference 20858004 and 20858005 respectively. There are two other structures that are known but are not included in the NIAH inventory: Kilnap Glen House Access Bridge (Feature F07) and the Masonry at Fitz's Boreen (Feature F09). These structures are subject to removal as part of the proposed river drainage scheme (Project Interference Numbers: C08_B01 and C06_B01 respectively). The remaining twelve features considered in this report have not been recorded previously.

The majority of the features are concentrated along Glenamought River, as it flows through the grounds of Kilnap Glen House (Features F01-F07). This area was widely exploited as a resource for milling activity in the eighteenth- and nineteenth-centuries. While the course of the Glenamought River has been adapted, such events occurred prior to the modern period, and modern intervention along the channel has been minimal.

In contrast, much of the River Bride has been altered extensively in modern times, and those works frequently reshaped and realigned its original course (see Section 3.0, Figures 8-9). It is particularly evident as the river flows from the downstream side of Feature F07 (Access Bridge) to a point upstream of Orchard Court in Blackpool Village. Only two features of historic interest are located in this section of the river channel, Features F08 (River Walling) and F09 (Masonry Bridge at Fitz's Boreen).

Further downstream, as the River Bride flows past Orchard Court (adjacent to the Commons road) to a point adjacent to the Church of the Annunciation, the channel appears to retain its historic course, as depicted on the historic OS mapping. Four features of historic significance (F10-F13) were located along this section of river channel and comprise: river-walling (F10), a section of bridge (F11), and two culverts (F12-F13). Feature F12 is particularly interesting as it retains an elliptical arch and its general construction detail suggests a potential eighteenth-century date for its structure.

At the centre of Blackpool Village the river flows beneath a *c.* 520m long culvert. The inspected upstream part of this culvert is of modern construction, while the inspected section of the downstream part is formed from two conjoining historic stone-built culverts (Features F14A/F14B). Inspection was undertaken to a point 20m upstream of the culvert opening and it is likely this structure (F14B) continues upstream for a considerable distance. Two sections of opposing river walling (drystone construction) extend *c.* 18 from either side of Culvert Feature F14A and have been catalogued as Feature F15A and F15B. One further feature (Feature F16) is located 87m downstream where the river channel becomes once again culverted. This culvert is also historic in nature and inspection of the culvert proceeded 30m downstream of its archway. It is unclear how far this feature extends before being replaced with a modern culvert structure.

The features identified as part of the assessment (tabulated below, Table 3) are of particular importance as they represent the only tangible remains of the once extensive eighteenth- and nineteenth-century management of the watercourse, as depicted on the historic mapping for the area surrounding Blackpool village.

Feature No.	National Grid Reference	Townland	Site Type
F01	166575E, 75052N	Kilnap, Carhoo	Masonry Road Bridge (Kilnap Bridge)
F02	166528E, 75033N	Carhoo	Weir/Dam Structure
F03	166509E, 75023N	Kilnap, Carhoo	Railway Bride (Kilnap Viaduct)
F04A/F04B	166487E, 75016N – 166367E, 74945N	Kilnap, Rathpeacon	River Walling/Revetment; five sections
F05	166396E, 74980N	Kilnap, Rathpeacon	Weir Structure
F06	166418E, 74956N – 166311E, 74825N	Kilnap, Rathpeacon	Millrace
F07	166307E, 74830N	Kilnap, Rathpeacon	Masorny Bridge (Kilnap House Access Bridge)
F08	166302E, 74822N - 166296E, 74819N	Kilnap, Rathpeacon	River Walling/ Revetment
F09	166924E, 74239N	Kilnap, Commons	Masonry Bridge (Fitz's Boreen)
F10	167403E, 73490N – 167405E, 73463N	Blackpool	River Walling
F11	167404E, 73318N	Blackpool	Bridge Section
F12	167435E, 73317N	Blackpool	Masonry Culvert
F13	167452E, 73242N	Blackpool	Masonry Culvert
F14A/F14B	167427E, 72738N and 167426E, 72743N	Blackpool	Masonry Culvert
F15A/F15B	167429E, 72738N – 167432E, 72719N	Blackpool	River Walling/Revetment; to opposing sections
F16	167436E, 72650N	Blackpool	Masonry Culvert

Table 3: Location of features encountered as part of the River Bride and Glenamought River assessment.

5.3 Metal-detection Survey

Metal-detection was restricted to the section of watercourse running through the grounds of Kilnap house, where the river appears to retain much of its historic route. A concentrated target ratio of 2-3 hits per m² was encountered. Detection hits were predominately from ferrous metal and inspected targets included a number of horse shoes, pieces of reinforcing bar, metal barrel fragments, drinks cans, fishing weights, a pair of scissors, and miscellaneous concerted modern objects (Plate 123). Reliable metal-detection survey was not achievable across the wider survey area, due to the significant level of in-water metallic debris present.

6.0 PROPOSED IMPACTS[2]

The impact categories used have regard to those set out in the 'Guidelines on the information to be contained in Environmental Impact Statements', 2002, EPA, 'Advice notes on Current Practice (in preparation of Environmental Impact Statements), 2003, EPA, and Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes, National Roads Authority.

[2] This section does not purport to relate to precise engineering details but is rather an attempt to understand the nature of the impact on the potential archaeological environment, based on the supplied data.

6.1 Pre-mitigation Impacts

Impacts associated with the proposed flood alleviation scheme are localised to specific areas within the surveyed extent of the River Bride and its tributary the Glenamought River. Of the sixteen features of historic interest identified in the present assessment, it is understood that direct impacts will only take place at the location of five (5) of these features and will constitute a Permanent Moderate Negative Impact: Features F07, F09, and F09-F12. Planned maintenance work undertaken to culvert Features F14A/F14B and F16 will constitute a Slight Positive Impact. A list of the identified features (Features F01-F016) with proposed impacts and associated level of impact, pre-mitigation, at each site has been provided below (Table 4).

Feature No.	Feature Type	Potential Impact	Level of Impact
F01	Masonry Road Bridge	None	Not applicable
F02	Weir/ Dam structure	None	Not applicable
F03	Railway Bridge	None	Not applicable
F04A/F04B	River Walling/ Revetment	None	Not applicable
F05	Weir structure	None	Not applicable
F06	Millrace	None	Not applicable
F07	Masonry Road Bridge	Removal of structure; Interference number C08_B01	Permanent Moderate Negative Impact
F08	River Walling / Revetment	None	Not applicable
F09	Masonry Road Bridge	Removal of structure; Interference number C06_B01	Permanent Moderate Negative Impact
F10 (CS17)	River Walling/ Revetment	Replace existing channel with concrete culvert; Interference number C06_B03	Permanent Moderate Negative Impact
F11	Bridge section	Replace existing channel with concrete culvert; Interference number C06_B03	Permanent Moderate Negative Impact
F12	Masonry Culvert	Replace existing culvert with reinforced concrete culvert; Interference number C06_B05	Permanent Moderate Negative Impact
F13	Masonry Culvert	Replace existing open channel with concrete culvert; Interference number C06_B08	No impact to the culvert structure from proposed works.
F14A/F14B	Masonry Culvert	Local Masonry Repairs to culvert be carried out; Interference number C02_C04	Slight Positive Impact
F15A/F15B	River Walling / Revetment	None	Not applicable
F16	Masonry Culvert	Local Masonry Repairs to culvert be carried out; Interference number C02_C05	Slight Positive Impact

Table 4: Potential impacts to identified features along the River Bride and Glenamought River survey area. Sites where impacts are proposed are highlighted in blue.

6.2 Residual Impacts

It is envisaged that all potential impacts are to be addressed during the preconstruction and construction phases of the proposed drainage scheme. In the event that any previously unrecorded features are identified, appropriate further mitigation is to be carried out at that time. The level of impact following the construction phase and the implementation of the proposed mitigation measures is provided below (Table 5).

Feature No.	Feature Type	Level of Impact (Pre-construction)	Residual Impact (Post-construction)
F01	Masonry Road Bridge	Not applicable	Not applicable
F02	Weir/ Dam structure	Not applicable	Not applicable
F03	Railway Bridge	Not applicable	Not applicable
F04A/F04B	River Walling/ Revetment	Not applicable	Not applicable
F05	Weir structure	Not applicable	Not applicable
F06	Millrace	Not applicable	Not applicable
F07	Masonry Road Bridge	Permanent Moderate Negative Impact	Permanent Slight Negative Impact
F08	River Walling / Revetment	Not applicable	Not applicable
F09	Masonry Road Bridge	Permanent Moderate Negative Impact	Permanent Slight Negative Impact
F10 (CS17)	River Walling/ Revetment	Permanent Moderate Negative Impact	Permanent Slight Negative Impact
F11	Bridge section	Permanent Moderate Negative Impact	Permanent Slight Negative Impact
F12	Masonry Culvert	Permanent Moderate Negative Impact	Permanent Slight Negative Impact
F13	Masonry Culvert	No impact to the culvert structure from proposed works.	Not applicable
F14A/F14B	Masonry Culvert	Slight Positive Impact	Permanent Slight Positive Impact
F15A/F15B	River Walling / Revetment	Not applicable	Not applicable
F16	Masonry Culvert	Slight Positive Impact	Permanent Slight Positive Impact

Table 5: Potential impacts to identified features along the River Bride and Glenamought River survey area. Sites where impacts are proposed are highlighted in blue.

7.0 MITIGATION

Archaeological mitigation measures proposed for the identified features from the River Bride and Glenamought River assessment are tabulated in Table 6 below. No additional archaeological mitigation is required for Features F01-F06, Feature F08, or Features F13-F16, where there is little or no impact arising from the proposed drainage works. However, archaeological monitoring is required where a Permanent Impact is to take place. This includes the removal of Feature F07 (Kilnap House access Bridge), Feature F09 (Masonry Bridge, Fitz's Boreen), Feature F10 (River Walling), Feature F11 (Bridge Section), and

Feature F12 (Masonry Culvert). The removal of the above (5) features should be undertaken in a systematic manner, under archaeological supervision, allowing the archaeologist to obtain additional information and undertake supplementary recoding, as may be required during the excavation process. In addition, key masonry elements from these structures, including any other pieces identified as being of interest by the monitoring archaeologist, should be retained as part of that process.

Feature No.	Feature Type	Proposed Impact	Archaeological Mitigation
F01	Masonry Road Bridge	None	No additional mitigation required
F02	Weir/ Dam structure	None	No additional mitigation required
F03	Railway Bridge	None	No additional mitigation required
F04A/F04B	River Walling/ Revetment	None	No additional mitigation required
F05	Weir structure	None	No additional mitigation required
F06	Millrace	None	No additional mitigation required
F07	Masonry Road Bridge	Removal of structure; Interference number C08_B01	Archaeological Monitoring; structure to be removed under archaeological supervision.
F08	River Walling / Revetment	None	No additional mitigation required
F09	Masonry Road Bridge	Removal of structure; Interference number C06_B01	Archaeological Monitoring; structure to be removed under archaeological supervision.
F10 (CS17)	River Walling/ Revetment	Replace existing channel with concrete culvert; Interference number C06_B03	Archaeological Monitoring; structure to be removed under archaeological supervision. This is to include the recovery cut stone CS17.
F11	Bridge section	Replace existing channel with concrete culvert; Interference number C06_B03	Archaeological Monitoring; structure to be removed under archaeological supervision.
F12	Masonry Culvert	Replace existing culvert with reinforced concrete culvert; Interference number C06_B05	Archaeological Monitoring; structure to be removed under archaeological supervision.
F13	Masonry Culvert	Replace existing open channel with concrete culvert; Interference number C06_B08	No additional mitigation required
F14	Masonry Culvert	Local Masonry Repairs to culvert be carried out; Interference number C02_C04	No additional mitigation required
F15A/F15B	River Walling / Revetment	None	No additional mitigation required
F16	Masonry Culvert	Local Masonry Repairs to culvert be carried out; Interference number C02_C05	No additional mitigation required
CS01-CS15	Cut stone masonry	None	No additional mitigation required

Feature No.	Feature Type	Proposed Impact	Archaeological Mitigation
	from Kilnap Viaduct		
CS16	Large rectangular slab of limestone masonry.	Construction of a Winter Channel, downstream of the Commons Inn; Interference number C06_C01	Recover cut-stone CS16 prior to construction of the winter channel.

Table 6: Archaeological mitigation measures proposed for the identified features from the River Bride and Glenamought River assessment. Sites where impacts are proposed are highlighted in blue.

8.0 RECOMMENDATIONS

8.1 Pre-construction Measures

No further ameliorative measures are recommended in advance of construction commencing as part of the River Bride (Blackpool) Drainage Scheme.

8.2 Construction Phase Measures

ARCHAEOLOGICAL MONITORING. Archaeological monitoring in accordance with the terms of Section 5 of the National Monuments Act (2004 Amendment) is recommended during riverbed and bankside disturbances associated with the proposed flood relief scheme. These measures will ensure that any sub-surface remains of archaeological or historic value are dealt with in an appropriate archaeological manner.

It is understood that five (5) features of historic interest, as identified in the present report, will be removed as part of the proposed works. It is recommended that the removal of these features should be carried out archaeological supervision, allowing the archaeologist to obtain additional information and undertake supplementary recoding, as may be required during that process. It is also recommended that any masonry, identified to be particular interest, is retained and removed to suitable storage as part of the removal process.

A number of cut-stone pieces (CS01-15) were encountered within the riverbed along the upstream section of the Glenamought River survey area. These masonry pieces are associated with the construction of the Railway Viaduct in 1849 (Feature F03) and other stone-cutting activity that took place within the grounds of Kilnap Glen House in the nineteen-century. Currently there is no in-water work planned for this section of the Glenamought River. However, in the event that potential impacts do arise as part of any additional in-river works, it recommended that these architectural pieces be recovered and further recorded at that point. In addition, two further cut-stone pieces were identified at separate locations along the River Bride (CS16 and CS17) and are included also included within the mitigation

proposals. A list of the identified features (Features F01-F016) with proposed impacts and proposed archaeological mitigation measures is provided above (Section 7.0, Table 6). Cut-stone pieces CS01-CS17 are included in this table.

RETAINING AN ARCHAEOLOGIST/S. An archaeologist should be retained for the duration of the relevant works. The archaeologist should be familiar with and experienced in river/estuarine environments.

THE TIME SCALE for the construction phase should be made available to the archaeologist, with information on where and when ground disturbances and dredging will take place.

SUFFICIENT NOTICE. It is essential for the developer to give sufficient notice to the archaeologist/s in advance of the construction works commencing. This will allow for prompt arrival on site to monitor the ground disturbances. As often happens, intervals may occur during the construction phase. In this case, it is also necessary to inform the archaeologist/s as to when ground disturbance works will recommence.

DISCOVERY OF ARCHAEOLOGICAL MATERIAL. In the event of archaeological features or material being uncovered during the construction phase, it is crucial that any machine work cease in the immediate area to allow the archaeologist/s to inspect any such material.

ARCHAEOLOGICAL MATERIAL. Once the presence of archaeologically significant material is established, full archaeological recording of such material is recommended. If it is not possible for the construction works to avoid the material, full excavation would be recommended. The extent and duration of excavation would be a matter for discussion between the client and the statutory authorities.

ARCHAEOLOGICAL TEAM. It is recommended that the core of a suitable archaeological team be on standby to deal with any such rescue excavation. This would be complimented in the event of a full excavation.

SECURE SITE OFFICES and facilities should be provided on or near those sites where excavation is required.

FENCING of any such areas would be necessary once discovered and during excavation.

ADEQUATE FUNDS to cover excavation, post-excavation analysis, and any testing or conservation work required should be made available.

MACHINERY TRAFFIC during construction must be restricted as to avoid any of the selected sites and their environs.

SPOIL should not be dumped on any of the selected sites or their environs.

PLEASE NOTE: All of the above recommendations are based on the information supplied for the River Bride (Blackpool) Certified Drainage Scheme. Should any alteration occur, further assessment maybe required.

PLEASE NOTE: Recommendations are subject to the approval of The Department of the Arts, Heritage and the Gaeltacht, and of the National Museum of Ireland.

9.0 ACKNOWLEDGEMENTS

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APPENDIX 1:

Catalogue of Features encountered as part of the in-water survey [Features F01-F16].

Feature F01

Name	Kilnap Bridge
Site Type	Masonry Road Bridge
Townland	Kilnap, Carhoo
NGR	166575E, 75052N (centre-point)
Dimensions	13.5m in width (maximum)
Figure(s)	11
Plate(s)	124-127
Impact	None
Level of Impact	Not applicable
Mitigation	No mitigation required
Residual Impacts	None

Description

Kilnap Bridge is located 40m upstream of the remains of a weir/dam structure (Feature F02) and 60m upstream of Kilnap Viaduct (Feature F03). The bridge is depicted on the OS First Edition (1841) map and is the only structure shown to cross the river within the grounds of Kilnap Glen House at that time. The bridge is located 17m from the start point of the river survey area, the Glennnamought River flowing through the structures fourth archway. Kilnap Bridge is listed in the NIAH (Reg. No. 20858004) where it is rated as being of *regional importance* and as a structure that retains *architectural, social, and technical interest*.

The structure comprises a six-ached road bridge, constructed *c.* 1820, which spans the Glenamought River valley to accommodate the Mallow Road (Plates 124-125). The bridge façade and arch-walls are composed of coursed rubble-stone with squared *voussoirs* and semi-circular arches (Plates 126). An interesting feature of the bridge is the presence of a series of putlog (putlock) holes, placed uniformly across the façade of each arch wall (Plate 127). These recesses were used to hold wooden scaffolding beams erected during construction of arch walls, the beams being successively raised (as build-height increased) to allow construction of the arch-ceiling (*intrados*). None of the bridge's piers/foundation elements were visible. The structure is located well away from any in-water impacts associated with the proposed drainage scheme.

Feature F02

Name	unnamed
Site Type	Weir/ Dam structure
Townland	Carhoo
NGR	166528E, 75033N (centre-point)
Dimensions	8m in length x 7m in width x 3m in height
Figure(s)	11, 29 (Section 01)
Plate(s)	128-132
Impact	None
Level of Impact	Not applicable
Mitigation	No mitigation required
Residual Impacts	None

Description

Feature F02 forms the remaining section of a weir/dam structure which once spanned the Glenamought River at a point 13.4m upstream of Kilnap Viaduct (Feature F03). The structure is located on the north side of the river, 1.4m from the northern bank (Plates 128-129). It measures 3m in height, 7m in width, and survives to a maximum length of 8m. The north side of the structure is encased in poured-mass concrete, while the centre part of the structure retains its original build. The southern terminus has been removed, providing a cross-section though the structure and allowing its internal fabric to be inspected (Plates 130-131). The upstream side of the structure comprises a limestone masonry retaining wall (85º batter), against which rubble-stone has been placed to form the structures core. The weir's face is composed of rough-cut shale blocks which rise to from a 45º ramp with rounded-top. Masonry of similar type and cut-style to that used for the construction of the Railway Viaduct was noted within the fabric of the retaining wall. It is likely that this represents the re-use of masonry that was left over from that endeavour.

A weir structure and corresponding millpond are depicted on the OS 25-inch (1897) series map at this location. It is more than likely that Feature F02 represents the residue of this cartographic weir feature, as depicted on the OS 25-inch map. Moreover, the absence of a weir feature from any earlier mapping, combined with the probable use of masonry from the railway viaduct in its build, places its construction in the latter part of nineteen-century.

The fact that the feature is not located within the existing river channel is due to a change in river-course at this location; the current waterway is an estimated *c.*3m to the south of its original route, as depicted on the historic mapping. In addition, there is evidence that the weir was later incorporated into a dam-like structure which spanned the river valley at this location (Plate 132). This dam was constructed of concrete and is believed to have been built in the early part of the twentieth-century, the structure subsequently being breached in 1954 and never reinstated.

Feature F03

Name	Kilnap Viaduct
Site Type	Railway Bridge
Townland	Kilnap, Carhoo
NGR	166509E, 75023N (centre-point)
Dimensions	9.2m in width (maximum)
Figure(s)	11
Plate(s)	133-134
Impact	None
Level of Impact	Not applicable
Mitigation	No mitigation required
Residual Impacts	None

Description

Kilnap Viaduct comprises an eight-ached railway bridge built to accommodate the Great Southern and Western Railway Line (Plate 133). The bridge was constructed in 1845 and forms an imposing structure as it spans the river valley. The railway viaduct is depicted on the OS 25-inch (1897) map and is listed in the NIAH (Reg. No. 20858005), where it is rated as being of *regional importance* and as a structure that retains *architectural, social, and technical interest*.

The bridge structure is located 13.4m downstream of Feature F02 and 80m upstream of Kilnap Glen House. The viaduct is built of well-cut limestone masonry, the façade, spandrels, and arch-walls being composed of squared coursed limestone blocks. A feature of the bridge aesthetic is the use of distinctive rock-faced ashlar to form the bridge piers and *voussoirs* used in the arch-rings (Plate 134). Rock-faced masonry is also dotted throughout the arch-walls and haunch areas. The Glennamoutgh River flows through the viaduct's fourth archway, the tops of which are of semi-circular design. Limestone masonry and rock-faced ashlar, left over from the construction of the viaduct, was frequently encountered within the river channel as part of the in-water survey (CS01-15, see Figure 11 thumbnail). In addition, as previously mentioned, masonry from the viaduct appears to have been re-used in the construction Feature F02 (weir/dam structure).

Features F04A/ F04B

Name	unnamed
Site Type	River Walling/ Revetment
Townland	Kilnap/ Rathpeacon
NGR	166487E, 75016N – 166367E, 74945N
Dimensions	78m in length (longest section)
Figure(s)	11
Plate(s)	135-142
Impact	None
Level of Impact	Not applicable
Mitigation	No mitigation required
Residual Impacts	None

Description

Feature F04A comprises four sections of river-walling situated on both sides of the Glenamought River, located between NFR: 166487E, 75016N and 166367E, 74945N (Plates 135-137). The longest section of walling is located on the north side of the river (17m downstream of Kilnap Viaduct), where it extends along a 78m section of the watercourse. The river walling survives to a maximum height of 1.5m in places, although much of it has been eroded to between 0.40m and 0.60m in height. The river-walling is of drystone construction and is composed of roughly coursed shale of irregular size and shape. These courses are formed of a mixture of both horizontal and vertically set stones. In addition, a number of wrought-iron fastenings protrude from the walling, 11m downstream of a weir structure, Feature F05 (Plates 138-139).

Feature F04A is thought to have originally extended along both sides of the river as it flows through the grounds of Kilnap Glen House. It is likely that this river-walling is contemporary with the insertion of a weir structure (Feature F02), upstream of the railway bridge. Moreover, comparison between the OS First Edition (1841) map and subsequent OS mapping shows a straightening of the river channel, a cartographic change that would be consistent with the insertion of river-walling along the channel's extent.

Feature F04B also constitutes a section of river-walling, although of more robust design, comprising rough-cut bonded limestone. It is located on the north side of the river, at a point 33m downstream of Feature F05 (Weir). The structure survives to a height of 1.4m and measures 7.6m in length. The north terminus is eroded and the southern end is abutted by river walling of drystone construction (a section of Feature F04A) (Plates 140-141). This feature is thought to represent the residue of a pathway that once crossed the watercourse at this location (NGR: 166371E, 74954N, centre-point); as depicted on the OS 25-inch map. It is likely that the insertion of a crossing point at this location required the placement of bonded masonry walls to accommodate a platform structure, rather than the more simply constructed river-walling evident elsewhere along the river. Another crossing point, comprising a narrow

footbridge, is also depicted on the OS 25-inch map. A section of river-wall, corresponding with this footbridge location (NGR: 166430E, 74992N), can be found largely intact on the northern side of the river (Plate 142). No evidence of this crossing is located on southern side of the river, this area having undergone bankside consolidation with the placement of stone-filled gabions.

Feature F05

Name	unnamed
Site Type	Weir
Townland	Kilnap/ Rathpeacon
NGR	166396E, 74980N (centre-point)
Dimensions	6.8m in length x 2.1 in width
Figure(s)	11
Plate(s)	19-21 and 143
Impact	None
Level of Impact	Not applicable
Mitigation	No mitigation required
Residual Impacts	None

Description

Feature F05 comprises a stone-built weir which spans the width of the river channel at a point 114m downstream of Kilnap Viaduct (Feature F03), a short distance northwest of Kilnap Glen House (see Plates 19-20). Modern river-walling extends on both sides of the river, downstream from the weir structure. A small pond feature is depicted on the OS 25-inch (1897) map, located a short distance to the north. A stepped water-feature, of twentieth-century origin, has been created to accommodate run-off from the pond as it enters the river channel at a point 5m downstream (see Plate 21). Feature F05 is not depicted on the historical mapping and appears to be a later construction than the aforementioned river-walling (Features F04A and F04B).

The weir's retaining wall remains largely buried, only 0.05m of its topmost course being exposed. The main body of the weir is formed of large rocks and boulders. A 20cm diameter cast-iron pipe crosses the river immediately upstream of the weir (Plate 143). Closer inspection of the weir structure was not afforded due to the velocity of water flowing over the structure.

Feature F06

Name	unnamed
Site Type	Millrace
Townland	Kilnap/ Rathpeacon
NGR	166418E, 74956N – 166311E, 74825N
Dimensions	156m in length x 3.9m width (maximum)
Figure(s)	11
Plate(s)	31-32
Impact	None
Level of Impact	Not applicable
Mitigation	No mitigation required
Residual Impacts	None

Description

Feature F06 is a 156m long millrace that is located to the south of Kilnap Glen House, running between the adjacent Corn Mill (RMP: C074-112) and it confluence with the Glenamought River (see Plates 32-33). The millrace joins the river channel on the downstream side of Feature F07 (Bridge), NGR: 166311E, 74825N. The millrace measures 3.9m in maximum width. The structures sides have become heavily overgrown and little or no water flow is visible along its extent, the channel having undergone considerable siltation (0.50m+ deposit). No river-walling or revetment of the millrace was evident.

Feature F07

Name	Kilnap House Access Bridge
Site Type	Masonry Road Bridge
Townland	Kilnap/ Rathpeacon
NGR	166307E, 74830N (centre-point)
Dimensions	6.6m in length x 5.6m in width x 1.8m in height
Figure(s)	11, 30
Plate(s)	144-148
Impact	Removal of structure; Interference number C08_B01
Level of Impact	Permanent Moderate Negative Impact
Mitigation	Archaeological Monitoring; structure to be removed under archaeological supervision.
Residual Impacts	Permanent Slight Negative Impact

Description

Feature F07 comprises a narrow ‘clapper’ style bridge that crosses the river channel at the entrance to the property of Kilnap Glen House (NGR: 166307E, 74830N, Figure 11). The structure measures 6.6m in length, 5.6m in width, and 1.8m in height (Figure 30A, Plates 144-146). Three bonded masonry piers support four flow-channels (Figure 30B). The upstream side of each pier comprises an angled cutwater; angled at 45º with its apex facing to the east (Plate 147). Six courses of masonry form the visible sections of the pier walls, consisting of rough-cut limestone with a size range of between 0.10m length x 0.04m width (smallest) and 0.45m length x 0.20m width (largest) (Plate 148).

The upstream bridge parapet (0.64m in height) is formed of poured mass concerted, while an earthen bank is present on the downstream side (Figure 30C). Large slabs of limestone, up to 1.6m in length, have been placed between the bridge piers to form a crossing platform (clapper style). Poured concrete and earth have been placed above these limestone blocks in order to raise road-height above the structure. In addition, the structures base has been underpinned and a concrete sill extends across the full width of the bridge; the sill protruding 0.5m from the downstream side of the structure. A considerable elevational difference was noted between the riverbed on the upstream and the downstream sides of the bridge; the riverbed being up to 0.60m lower on the downstream side of the structure. A 19m long concrete wall extends from the bridge, on its upstream side, to form the northwest side of the river channel and modern railings have been fitted to delineate the sides of the access road as its crosses the river channel.

The access bridge is not depicted on the OS First Edition (1841) map, the river channel being subsequently altered to cross the entranceway to Kilnap Glen House. However, the OS 25-inch (1897) map does show a crossing point at the current bridge location. Feature F07 is consistent in style with a structure built in the latter part of 1800s and is most likely the same structure as that depicted on the OS 25-inch map.

Feature F08

Name	unnamed
Site Type	River Walling / Revetment
Townland	Kilnap/ Rathpeacon
NGR	166302E, 74822N - 166296E, 74819N
Dimensions	5.8m in length
Figure(s)	11
Plate(s)	149
Impact	None
Level of Impact	Not applicable
Mitigation	No mitigation required
Residual Impacts	None

Description

Feature F08 constitutes a short section (5.8m in length) of river-walling located downstream of Feature F07, situated on the river's north bank between NGR: 166302E, 74822N and 166296E, 74819N (Plate 149). The walling comprises a drystone revetment formed of vertically placed shale. The stone used in its construction is fairly uniform in size and shape (rectangular), typically measuring between 0.025m length x 0.05m width and 0.40m length x 0.12m width. However, irregular shaped pieces and square-cut stone have also been incorporated into the build.

The First Edition (1841) map shows the watercourse extending from the downstream side of Feature F07, running underneath the main roadway to flow into a large millpond. The OS 25-

inch (1897) map also depicts this watercourse, although straightened and no longer flowing into a millpond; the millpond having been reclaimed. It is likely that Feature F08 is the residue of river-walling placed to consolidate the watercourse. This endeavour appears to be contemporary with the other improvement works undertaken upstream, within the grounds of Kilnap Glen House (Features F04A and F04B).

Feature F09

Name	Bridge, Fitz's Boreen
Site Type	Masonry Road Bridge
Townland	Kilnap/ Commons
NGR	166924E, 74239N
Dimensions	9.2m in length x 6.8m in width
Figure(s)	14, 31
Plate(s)	150-154
Impact	Removal of structure; Interference number C06_B01
Level of Impact	Permanent Moderate Negative Impact
Mitigation	Archaeological Monitoring; structure to be removed under archaeological supervision.
Residual Impacts	Permanent Slight Negative Impact

Description

Feature F09 comprises a two-arched masonry bridge that accommodates a local access road known as Fitz's Boreen (Figures 14 and 31). The bridge measures 9.2m in length x 6.8m in width. The structure has undergone considerable modern intervention (Plates 150-151). Bridge parapets have been replaced with poured mass concrete and the structure has also been impacted by upstream bank consolidation measures and downstream culverting of the channel. The remaining sections of bridge façade have undergone repointing using cement. The façade is composed of rough-cut rectangular masonry ranging in size between 0.18 in length x 0.07m in width x 0.32m in length x 0.25m in width. The haunch (area between the two arches) measures 1.04m in maximum width. A single triangular-shaped cutwater extends from the upstream side of the bridge pier and measures 1.23m in height x 1.18m in width (Plate 152).

Bridge arches are segmental in form and are construed of rough-cut limestone *voussoires* (Figure 31). Arch Number 1 measures 2.35m in width and comprises twenty arch-stones, ranging from 0.42m to 0.62m in length and 0.08m to 0.24m in width. Arch Number 2 measures 231m in width and comprises seventeen arch-stones, ranging from 0.41m to 0.78m in length and 0.07m to 0.18m in width. The arch-walls and *intrados* (arch-ceiling) are formed of narrow rectangular masonry, measuring up to 0.40m in length x 0.20m in width (Plate 153). A coarse hydraulic-lime mortar is visible between the ceiling stones, and calcification across the *intrados* is also evident (Plate 154).

Concrete plinths have been used to underpin the base of each arch-wall, these are square in profile and measure 0.25m in width x 0.25m in depth. In addition, a concrete sill has been placed across the riverbed, running beneath the two archways and extending to a point 16m downstream of the bridge structure (Figure 14).

Both the OS First Edition and the OS 25-ich series mapping depict a roadway that crosses the river channel at this location. However, no cartographic information relating specially to the bridge structure is provided.

Feature F10

Name	unnamed
Site Type	River Walling / Revetment
Townland	Blackpool
NGR	167403E, 73490N – 167405E, 73463N
Dimensions	26.9m in length
Figure(s)	17
Plate(s)	155-158
Impact	Replace existing channel with concrete culvert; Interference number C06_B03
Level of Impact	Permanent Moderate Negative Impact
Mitigation	Archaeological Monitoring; structure to be removed under archaeological supervision. This is to include the recovery cut stone CS17.
Residual Impacts	Permanent Slight Negative Impact

Description

A 26.9m section of historic river-walling is located on the western side of the river, adjacent to the Commons Road, at a point 45m upstream of Feature F11 (bridge remains). The wall comprises rough-cut limestone masonry with good quality coping forming its topmost section (Plate 155). Large boulders comprise the wall's foundations, above which irregular shaped masonry has been used. The river-wall survives to its original height of 2.5m and has a number of square profile drain features along its base (Plate 156). The walling has been damaged in number of places, both by tree growth and modern construction activity from adjacent houses. A piece of well-dressed masonry (CS17), re-used from a much finer structure, is located at the upstream terminus of the wall structure at NGR: 167403E, 73488N (Plate 157). In addition, a round-headed wrought iron pin has been fastened to the wall, close to the aforementioned cut-stone masonry block (Plate 158).

Feature F10 is thought to form the remains of a river revetment structure that once extended along both sides of the River Bride, as it flows between Orchard Court and the Commons Road. This historic river intervention is alluded to on both the OS Frist Edition (1841) and 25-inch (1897) maps; these maps depicting a river channel that changes from a natural looking river course, on the upstream of this area, to an artificially straightened section of watercourse downstream.

Feature F11

Name	unnamed
Site Type	Bridge section
Townland	Blackpool
NGR	167404E, 73318N (centre point)
Dimensions	4.2m in width (maximum)
Figure(s)	18, 32A
Plate(s)	112, 159-160
Impact	Replace existing channel with concrete culvert; Interference number C06_B03.
Level of Impact	Permanent Moderate Negative Impact
Mitigation	Archaeological Monitoring; structure to be removed under archaeological supervision.
Residual Impacts	Permanent Slight Negative Impact

Description

Feature F11 comprises a 3m wide section of bridge archway and arch-wall, broken at its springing point. The structure is located on the west side of the River Bride; beneath a modern bridge/culvert that has replaced the original structure (see Plate 112).This concrete structure provides pedestrian access from Orchard Court to the Commons Road.

Bridge section F11 is composed of limestone masonry that has been heavily bonded with hydraulic-lime mortar (Plates 159-160). A 1.2m section of masonry wall, also forming part of the original structure, extends from the northern (upstream) side of the arch. Most of the bridge section is obscured by a concrete retaining wall and it is unclear if the Feature F11 represents the remains a single or double arched bridge structure. No bridge remains are present on the eastern side of channel at this location.

Both the OS First Edition (1841) and 25-inch (1897) maps depict a crossing point at this location. It is highly probable that Feature F011 forms the remains of the original bridge structure that once accommodated this crossing, as depicted on the historic mapping. As Such a pre-1841 construction date can be ascribed the Feature F11.

Feature F12

Name	unnamed
Site Type	Masonry Culvert
Townland	Blackpool
NGR	167435E, 73317N (centre point)
Dimensions	3.94m in width (maximum)
Figure(s)	18, 32B
Plate(s)	161-164
Impact	Replace existing culvert with reinforced concrete culvert; Interference number C06_B05.
Level of Impact	Permanent Moderate Negative Impact
Mitigation	Archaeological Monitoring; structure to be removed under archaeological supervision.
Residual Impacts	Permanent Slight Negative Impact

Description

A masonry culvert arch (Feature F12) is situated on the west side of the river channel, located beneath a modern culvert on its upstream side. The modern culvert measures 68m in length and houses the river as it flows adjacent to Brockelsby Street, to a point immediately upstream of the Church of the Annunciation.

Feature F12 is no longer in use and has been blocked-off using breeze blocks, although four holes have been left to allow some drainage into the river channel. In addition, a concrete plinth (measuring 0.20m x0.20m) has also been inserted along the base of the culvert.

The culvert arch measures 3.94m in length (inner measurement) x 1.62m in height. The arch is elliptical in form and is composed of thirty-three arch-stones (*voussoirs*) (Figure 32B, Plate 161). These comprise both dressed, and partially-dressed, limestone masonry and roughly shaped shale blocks. The keystone is of limestone composition and measures 0.49m in length x 0.39m in width at top and 0.30m at bottom. A single well-dressed piece of limestone forms the lowest arch-stone on the southern side of the arch. This stone (S1, Figure 32B) is punch-dressed and measures 0.69m in length 0.35m in width. Three limestone blocks (S2-S4, Figure 32B) are located on the northern side of the arch-ring and also display stone-working marks; evident in the form of punch-lines running down the centre of each *voussoir* (Plate 162).

Narrow form red brick has been used at the base of the southern side of the arch-ring (0.32m length x 0.65m width). A masonry wall extends *c.*4m downstream from the southern side of the arch, to a point where it is replaced with the poured mass concrete wall that forms part of modern culvert (Plate 163). The wall is constructed of roughly shaped limestone and shale blocks measuring between 0.20 in length x 0.10m in width and 0.38m in length and 0.14m in width. A similar style of wall is located on the eastern side of the channel and extends for a distance of 3m from the start of the modern culvert (Plate 164)

Inspection of the historic mapping does not provide additional information relating this riverine feature. However, given its elliptical form and the overall construction technique used, the structure is thought to date to from mid to late eighteenth-century.

Feature F13

Name	unnamed
Site Type	Masonry Culvert
Townland	Blackpool
NGR	167452E, 73242N (centre point)
Dimensions	0.80m in height x 1.4m in width
Figure(s)	18
Plate(s)	118, 165
Impact	Replace existing open channel with concrete culvert; Interference number C06_B08.
Level of Impact	Not applicable
Mitigation	No mitigation required.
Residual Impacts	None

Description

A culvert opening is located on the east side of the river channel, opposite the Church of the Annunciation (Blackpool village). The opening is of modern construction being composed of a rendered poured mass concrete (see Plate 118). However, an historic culvert structure lies behind this modern opening (Plate 165). The culvert arch measures 0.80m in height and 1.4m in width. It is constructed of heavily-bonded (coarse grained hydraulic-lime mortar) rubble stone and shale pieces. Timber shoring (modern) has been placed a short distance into the structure.

Feature F14A/ F14B

Name	Watercourse Road Culvert
Site Type	Masonry Culvert
Townland	Blackpool
NGR	167427E, 72738N and 167426E, 72743N
Dimensions	3m-3.25m in width x 1.7m-1.9m height
Figure(s)	19
Plate(s)	166-170
Impact	Local Masonry Repairs to culvert be carried out; Interference number C02_C04.
Level of Impact	Slight Positive Impact
Mitigation	No mitigation required.
Residual Impacts	Slight Positive Impact

Description

Feature F14A/ F14B is an assemblage of two historic culverts that accommodates river flow beneath watercourse road to its discharge point at NGR: 167427E, 72738N. Inspection of the culvert was limited to a 20m section, as indicated in Figure 19.

The arch-ring of culvert F14A comprises thirty-five arch-stones, nine of which protrude from the arch-face in a decorative fashion (Plate 166). The arch-stones largely comprise rough-cut shale measuring between 0.40m in length x 0.15m in width and 0.60m in length x 0.25m. A single piece of neatly cut and dressed limestone is located towards the base of the arch-ring (west side). This arch-stone most likely constitutes re-use of masonry from another structure.

The culvert *intrados* (ceiling) is composed of heavily-bonded rubble stone a shale pieces (Plate 167).

Culvert F14A extends for a distance of *c.* 5.6m before con-joining with a second culvert structure, Feature F14B (NGR: 167426E, 72743N). This structure pre-dates the latter, the tail end of Feature F14A abutting the arch-ring of F14B (Plate 168). The arch-ring comprises thirty visible arch-stones of similar size and dimensions to that observed for F14A. In addition, rough-cut shale that protrudes from the arch-ring has been used to form a similar decorative finish to that observed for the other arch-ring (Plate 169). The culvert measures 3m in width and 1.70m in height. The culvert *intrados* is of similar composition to that of the abutting culvert, comprising heavily-bonded rubble stone a shale pieces (Plate 170).

Feature F15A/F15B

Name	unnamed
Site Type	River Walling / Revetment
Townland	Blackpool
NGR	167429E, 72738N – 167432E, 72719N
Dimensions	4.6m in width x 1.9m height
Figure(s)	19
Plate(s)	171-172
Impact	None
Level of Impact	Not applicable
Mitigation	No mitigation required
Residual Impacts	None

Description

Features F15A and F15B comprises two sections of opposing river walling of drystone construction that extend *c.* 18m from either side of Culvert Feature F14A. These wall sections measure 3m+ in height and are thought to relate to historical consolidation measures undertaken across this section of watercourse (Plate 171). These features are composed of roughly shaped limestone and shale blocks (rectangular to square in shape) ranging in size from 0.20m in length x 0.15m in width (smallest) to 0.40m in length x 0.30m in width (largest) (Plate 172). Modern pipework and drains have been cut into the river-walling, located on the west side of the channel, and cement has been used to repair the wall sections around these interventions.

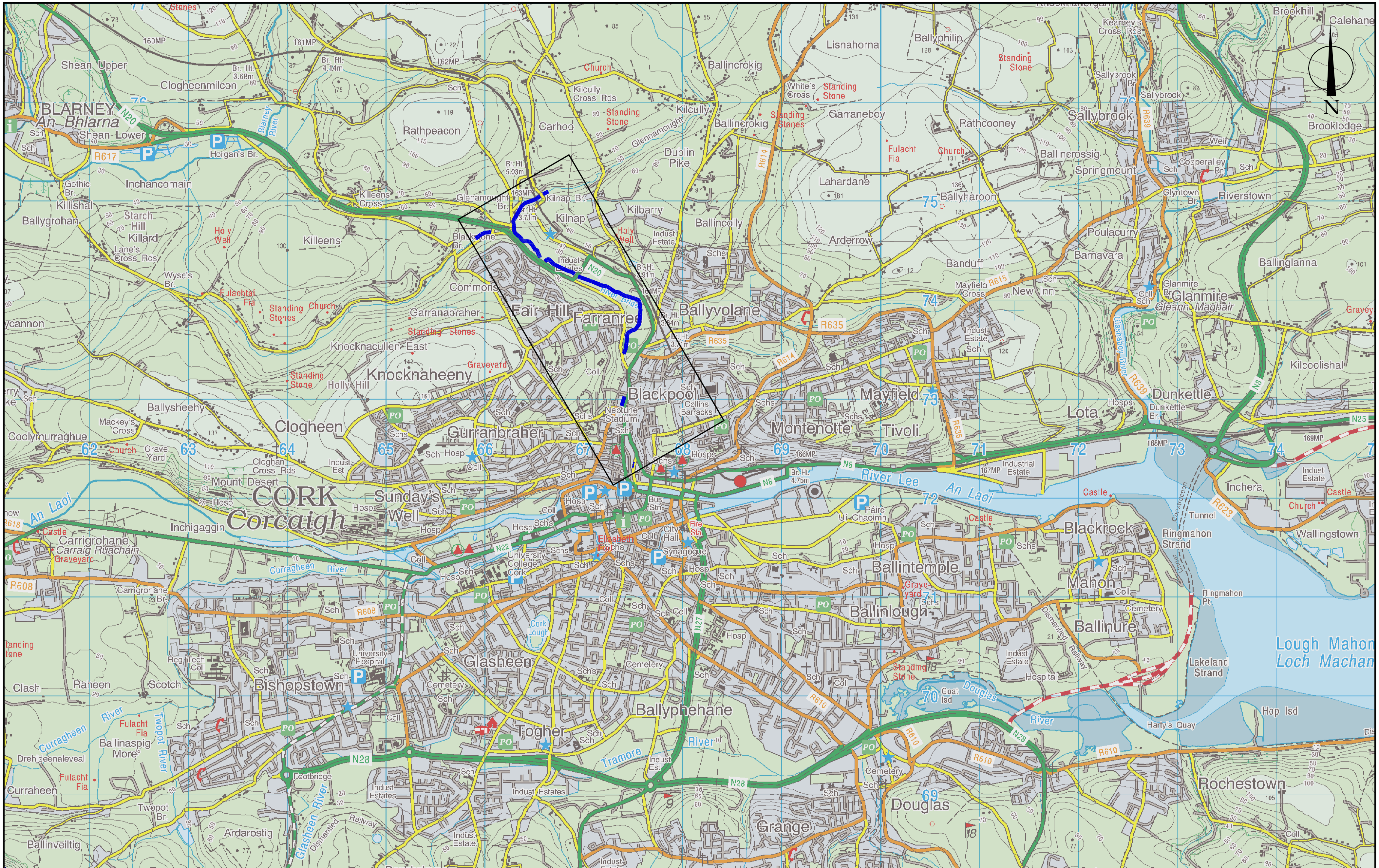
Feature F16

Name	unnamed
Site Type	Masonry Culvert
Townland	Blackpool
NGR	167436E, 72650N
Dimensions	4.6m in width x 1.9m height
Figure(s)	19
Plate(s)	172-174
Impact	Local Masonry Repairs to culvert be carried out; Interference number C02_C05.
Level of Impact	Slight Positive Impact
Mitigation	No mitigation required.
Residual Impacts	Slight Positive Impact

Description

At a point 87m downstream of Feature F14A, the river channel once again enters a culvert structure, Feature F15. This feature is also historic in nature and its entrance comprises a broad arch-ring composed of forty-five neat-cut limestone blocks (thirty-one visible) (Plate 172). The west side of the archway is truncated by a stone wall and overlying poured mass-concrete (Plate 173). The culvert is low and broad, measuring 1.9m in height x 4.6m in width.

The culvert ceiling (*intrados*) is composed of heavily-bonded rubble stone/ shale pieces and is also covered in natural calcite (Plate 174). A rigid steel I-beam has been inserted into the structure, at a point 6m from the culvert's entrance. A 30m section of this culvert was subject to inspection.



Notes	A4	Job/Exc No.	Compiled by	CAD reference	Client	Title
source: OSi Discovery Series Mapping Extent of River Bride Survey Area		16D0044	R.Bangerter	RiverBrideFRS	Ryan Hanley Consulting Engineers	Figure 1- Extract from OS Map showing location and extent of ADCO Survey Area along the River Bride and Glenamought River, Blackpool, Cork.
		Date	Scale	Drawing No.	Project	
		25.04.16	1:50,000	Figure xx	UAIA, River Bride (Blackpool) Drainage Scheme	

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