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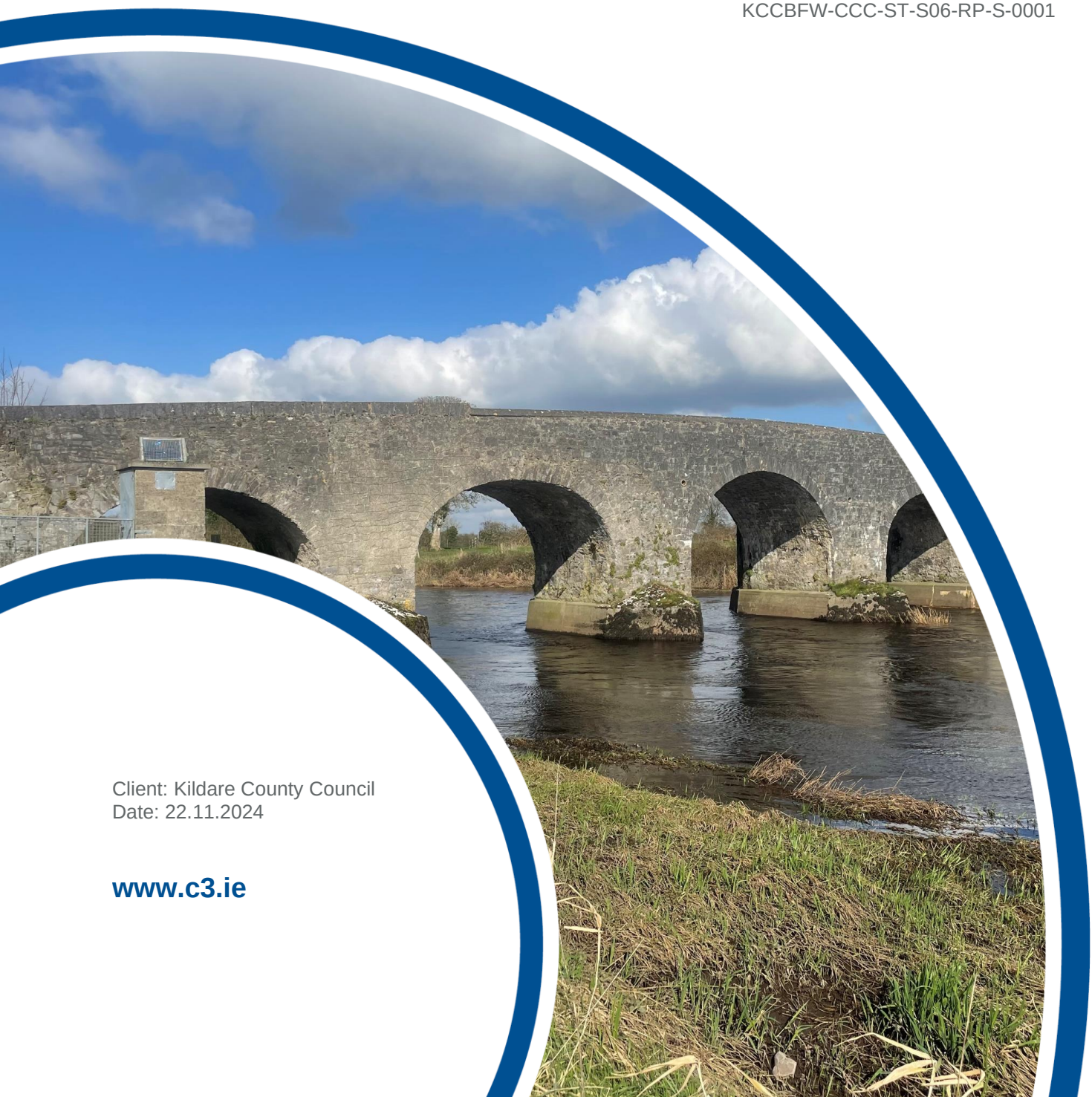
BRIDGE REHABILITATION WORKS IN CO. KILDARE

Pass Bridge Remediation Methodology

KCCBFW-CCC-ST-S06-RP-S-0001



Client: Kildare County Council
Date: 22.11.2024

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Issue and revision record

Date	Rev	Change Description	Author	Checker	Approver
22/11/24	P00	Draft	PT	-	-

Detailed Change Log

Rev	Change Description

1. Introduction

1.1 Introduction

Clandillon Civil Consulting (CCC) were engaged by the Kildare County Council (KCC) as part of the Framework Agreement for Consultancy Services for Bridge Rehabilitation Works in Co. Kildare. As part of the first call CCC will provide technical consultancy services for stages i) preliminary to v) handover for the rehabilitation works of the Pass Bridge at Passlands.

As part of the Preliminary Stage and Engineering Inspection of the Bridge was undertaken and identified several defects in the structure. In the next project stages CCC prepare the preliminary and detailed design document for the rehabilitation of the defects in the structure.

An Appropriate Assessment Stage 1: Screening was undertaken by the Flynn Furney Environmental Consultants (FFEC 2024). An AA screening was completed for the proposed works to confirm if likely significant effects on European sites will arise from the proposed works either alone or in combination with other plans or projects and also whether or not the proposed development is likely to have significant effects on European sites, either individually or in combination with other plans or projects.

The AA Screening Report prepared by FFEC concluded that an Appropriate Assessment of the proposed Project is required as it could not be concluded, on the basis of objective information, that the proposed Project, either individually or in combination with other plans or projects, will not have a significant effect on the following European site(s): River Barrow and River Nore SAC. As part of the Appropriate Assessment process, CCC engaged FFEC to prepare a Natura Impact Statement (NIS). To assist in the preparation of the NIS, CCC are required to prepare a rehabilitation methodology for inclusion in NIS, which is the subject of this report.

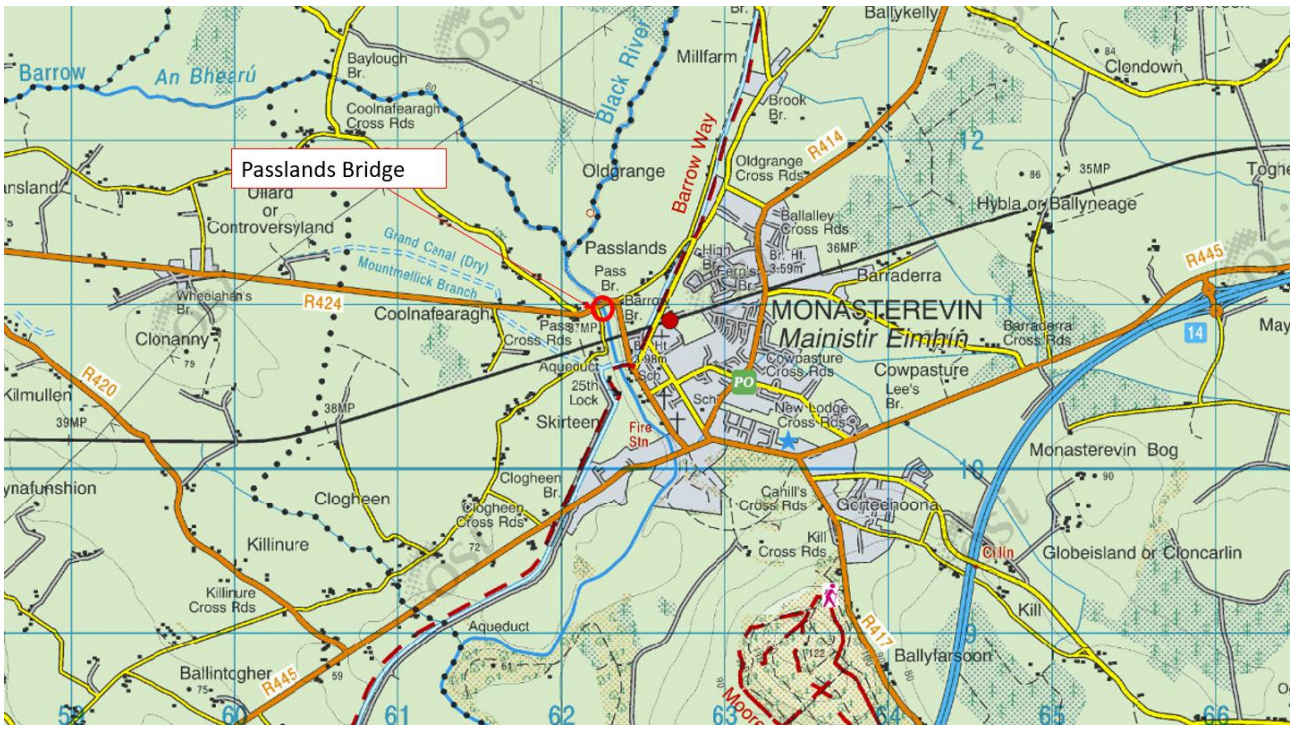
1.2 Project Background

In March 2024, CCC have carried out an Engineering Inspection of the Pass Bridge in Co. Kildare, the location of the bridge is illustrated in **Figure 1**. The condition assessment and rating of the structure were carried out following the 'Bridge Asset Management System (BAMS) for Regional and Local Roads' Guidelines for Engineering Inspections.

The overall condition rating of the Bridge is 3 – Significant Damage. The following defects were recorded:

- Damaged parapet and missing capping stones
- Cracked cutwater
- Soft verges
- Vegetation growth in masonry and missing pointing
- Arch Cracking
- Flood relief span partial abutment collapse

Figure 1: Location Map (ITM 662187, 711035)



1.3 Bridge Description

Pass Bridge carries the R424 road over the River Barrow and is located at Passlands north of Monasterevin town. The R424 is a regional road running East to West. The road is reduced to one lane over the bridge and controlled by traffic lights on approaches.

The Bridge is a five-span masonry arch bridge, **Figure 2**. The structure was constructed c. 1750 with rubble stone and is a registered heritage structure (NHBS number 11816100). Bridge round arches and parapets are also constructed with rubble limestone. Parapets finished with cut-stone coping. The spandrels and arch barrels are constructed with random rubble limestone with variable-width lime mortar joints. The arch vossoirs comprise a dressed limestone with thin lime mortar joints. The bridge piers have distinctive full-height V-shape cutwaters with pedestrian refuges at the road level. Concrete skirting is installed to all piers and abutments and terminates approx. 1.0m above water level measured during the inspection.

The river flows through all the five spans from north to south. A water level measuring station is located on the SW embankment immediately to the bridge. The River Barrow is a major river with deep water noted at the bridge during the site visit.

The first RHS cutwater is damaged and a section of the upstream parapet coping stone is missing at the same location.

Figure 2: Downstream Elevation

Table 1: Structure Information

Structure Name – Pass Bridge	
Road name	R424
Primary passage Overbridge/ Underbridge	U
Secondary passage type	Watercourse
Number of spans	5 (+ 1 flood relief span)
Span (m)	6.29
Width out-to-out (m)	4.84
Length (m)	70
Skew (degrees)	0
Cross Section	Masonry arch
Utilities	Water, Traffic lights, Public lighting, ESB
Comments: The Bridge is a protected historical structure (NHBS number 11816100) A water level measuring station is present on downstream LHS. The single-lane carriageway over the bridge is controlled by the traffic lights on approaches. A flood relief span is present on the northern approach and of the same construction type.	

2. Site Ecologist

A site ecologist will be appointed for the duration of the rehabilitation works.

3. Site Access

Access to the Pass Bridge will be from R424. **Figure 3** illustrates the proposed access to the main structure and **Figure 4** to the flood relief span.

Figure 3 Site Access, Main Bridge Works

Figure 4 Site Access, Flood Relief Span Works

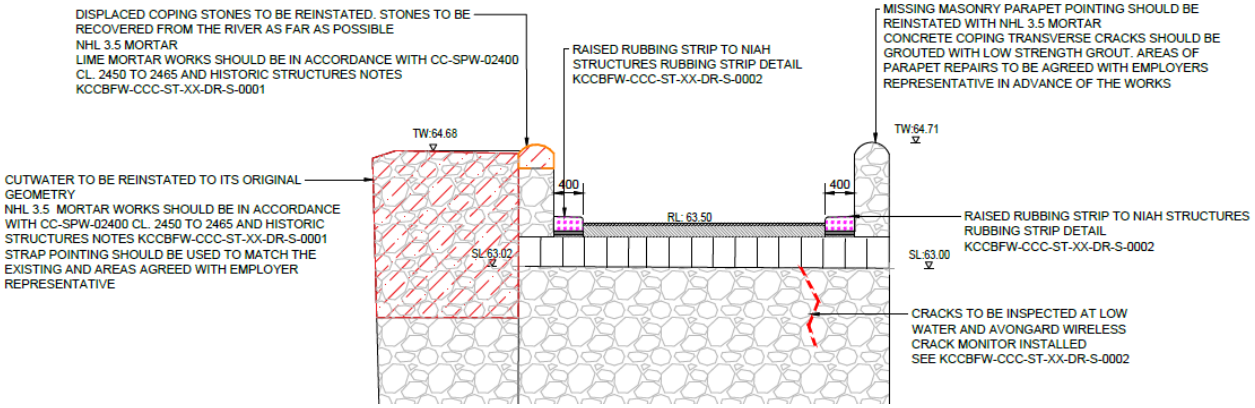
4. Description of Works

4.1 Cutwater and Parapet Reconstruction

Damage to the 1st pier cutwater and parapet was recorded during the inspection on 7/03/2024. The damage to both elements is likely to be associated with vehicle impact **Figure 5**. Part of the parapet coping approx. 6m long is missing and loose stones are visible in the stream. CCC are proposing to recover the collapsed stone from the stream as much as possible and reconstruct the parapet coping and the cracked cutwater section to its original geometry **Figure 6**. Strap pointing should be used to match the original with NHL 3.5 mortar.

Figure 5 Cutwater/ Parapet Damage, Span 1, upstream view

Figure 6 Cutwater & Parapet Reconstruction, KCCBFW-CCC-ST-S06-DR-S-0006



The following is the methodology for the reconstruction of the cutwater and parapet:

i) Refer to section 6 of this report for plant & equipment before the commencement of works;

ii) Access to the stream for stone recovery and falsework installation will be by the shortest route - from the north-west bank;

iii) Temporary dambing will be used such as sandbags in conjunction with plastic sheeting, and marine plywood to divert the river flow from the works area. If pumping is required to dewater the works area silt bags will also be used. The site ecologist will monitor suspended solids downstream of the works;

iv) An appropriate-size excavator will be used to recover the loose stone from the stream;

v) Remove sandbags and silt trenches and reinstate the stream flow in the affected area;

vi) Install an approved scaffolding system and netting to access the damaged section and protect the stream pollution from falling debris and rebound materials;

vii) Marked the cutwater stones and reduced the cracked cutwater to the sound masonry. Stone will be removed from the falsework and cleaned away from the stream and stored safely on site;

viii) All removed and surplus materials will be disposed of safely off-site;

ix) Reconstruct the cutwater with the original fabric and NHL 3.5 mortar. Strap pointing should be used to match the existing. Any new stones required to complete the reconstruction will be approved by the Employer's representative in advance of the works;

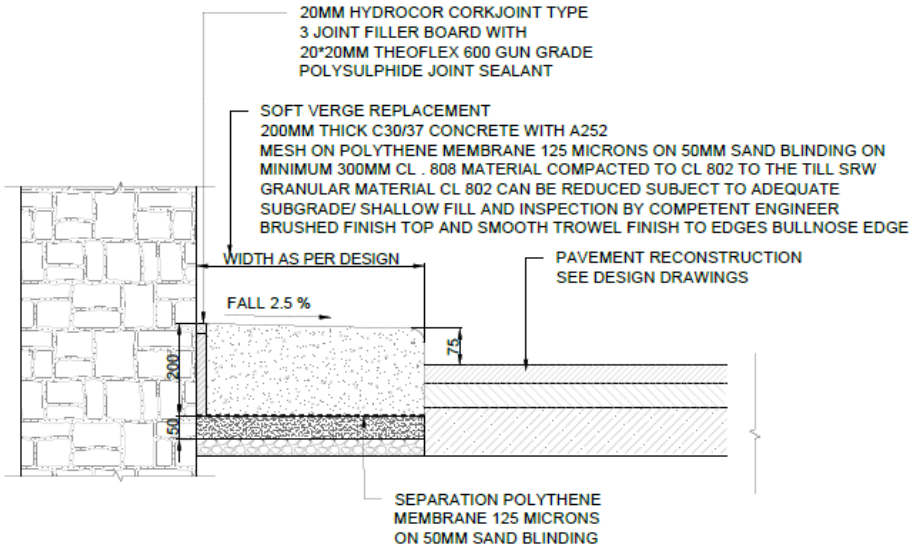
x) Remove scaffolding and stream protection measures;

xi) Reinstate embankment and fencing as required and agreed with the land owner in advance of the works;

4.2 Soft Vege Replacement

Soft verges were recorded on both sides of the structure. As a result of water ingress through the permeable verges defects are evident on the soffit of all arches such as water staining and calcite accumulations and, could lead to further masonry deterioration. CCC are proposing to replace the soft verges with an impermeable raised rubbing strip **Figure 7**.

Figure 7 Raised Rubbing Strip Detail, KCCBFW-CCC-ST-XX-DR-S-0002



RASIED RUBBING STRIP DETAIL NIAH STRUCTURES

SCALE 1:10

The following is the methodology for the reconstruction of the cutwater and parapet:

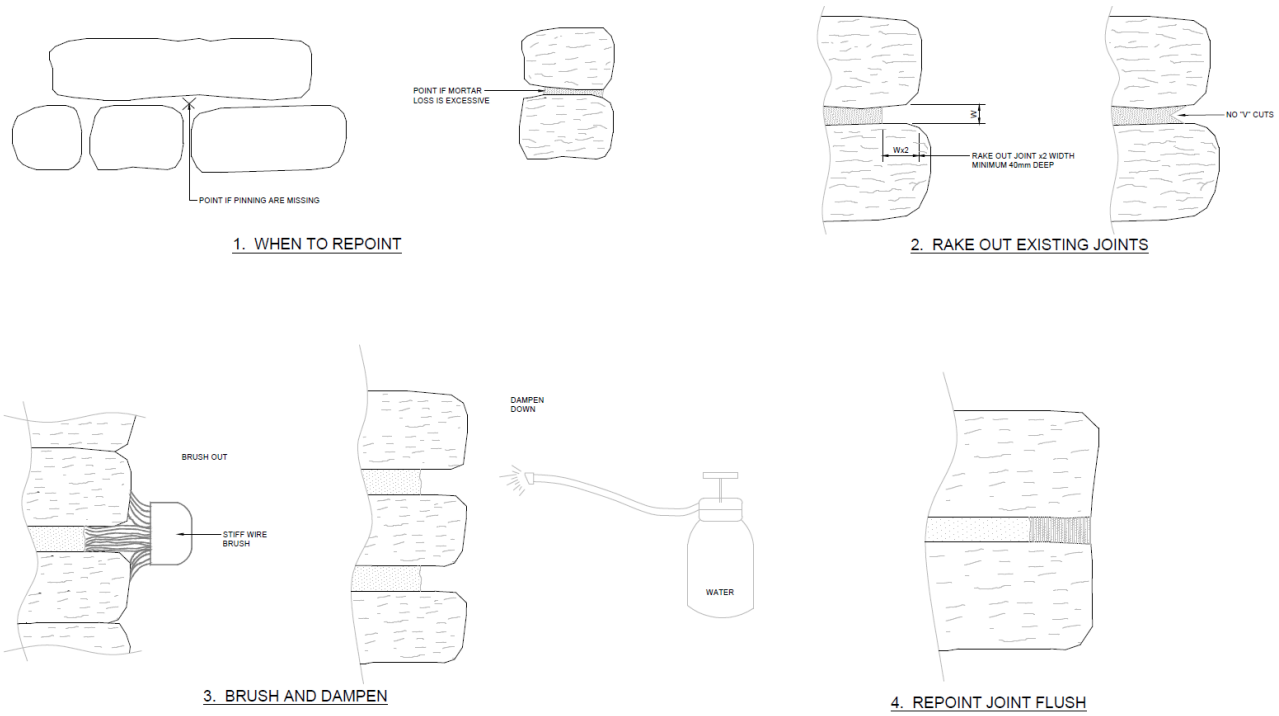
i) Implement temporary traffic control measures during the works;
ii) Remove soft verges to the design depth using suitable machinery;
iii) Construct soft verges as per the design detail KCCBFW-CCC-ST-XX-DR-S-0002;
iv) Reinstate road surfacing to the new rubbing strip;
v) Remove temporary traffic control measures;

4.3 De-vegetation and Repointing of Masonry

During the Bridge inspection, it was recorded that areas of masonry have loose, friable or missing masonry pointing as well as being covered in vegetation which causes further masonry degradation if not removed **Figure 8**. CCC are proposing to remove the vegetation in the affected areas, remove loose pointing and reinstate any missing pointing with NHL 3.5 or NHL 5 mortar in the areas subject to water saturation as outlined in the design drawings. Strap pointing should be used in the areas where this pointing is currently present such as spandrel walls and cutwaters. Normal joint pointing should be used on the inner faces of the parapets **Figure 9**. Repointing type should be agreed upon with the Employer's Representative in advance of the works.

Figure 8 Minor Vegetation Growth and Missing Pointing, Parapets, looking north

Figure 9 Standard Detail, Stone Masonry Repointing



The following is the methodology for the vegetation removal and repointing of the masonry:

i) For repointing/ vegetation removal in the spandrel walls and cutwaters over water, a bridge unit is proposed with adequate debris protection measures;

ii) For other areas with difficult access, temporary scaffolding could be used. Appropriate debris protection measures should be employed such as debris netting, and temporary lining to avoid material entering the stream/ ground.

iii) Repointing should be carried out as outlined in Standard Details drawings and Notes illustrated in **Figure 9** and **Appendix B.**

4.4 Flood Relief Span Abutment Reconstruction

During the Engineering Inspection on 23/04/24, additional defects were recorded in the flood relief span on the northern approach to the bridge. Vegetation, missing pointing and soft verges were noted as well as the localised collapse of the south abutment **Figure 10**.

The following is the methodology for the abutment reconstruction:

i) No water or flow was present during the inspection. The flood relief span repairs should be carried out on dry;

ii) Collapsed stones should be recovered, cleaned and stored safely;

iii) Appropriate machinery should be used to expose the abutment foundation stone and remove any soft sediments in the span;

iv) Appropriate debris protection measures should be installed to avoid the contamination of the stream bed;

v) The abutment should be reconstructed with the original stone and NHL 5 mortar;

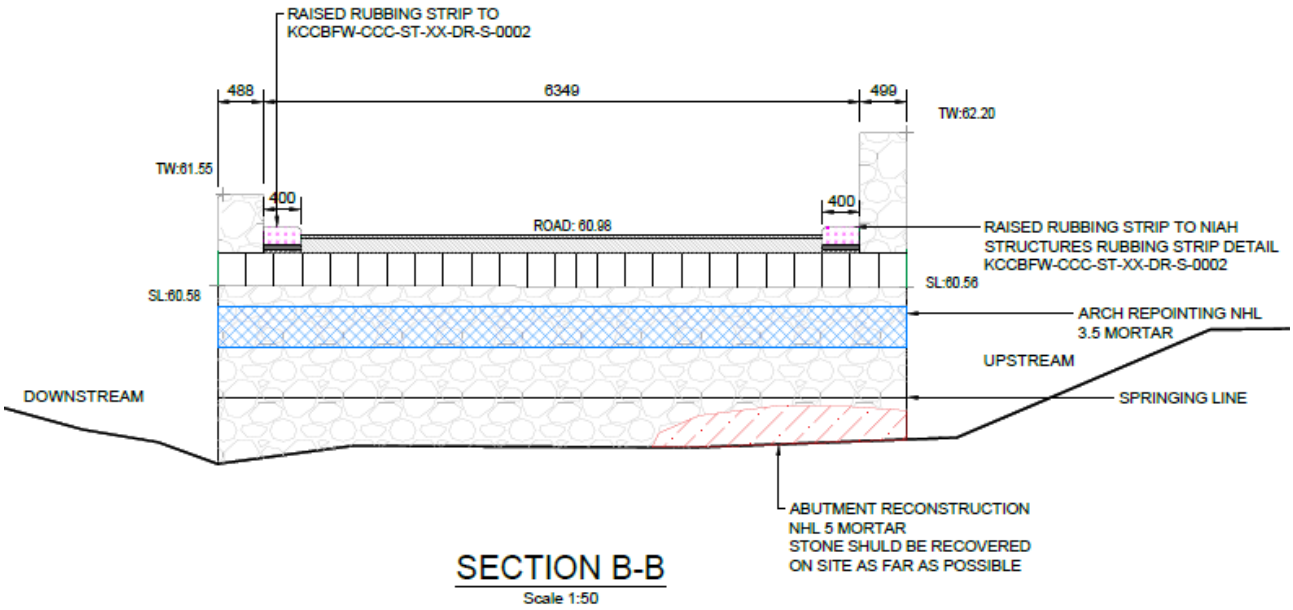
vi) Repointing of the arch barrel will be carried out during the abutment repair stage to avoid

vii) Remove stream protection measures and reinstate the stream bed level;

viii) Any obstruction restricting the flow in the relief span should be removed such as pallets, gates etc.

Figure 10 South Abutment Masonry Collapse, Flood Relief Span, looking upstream

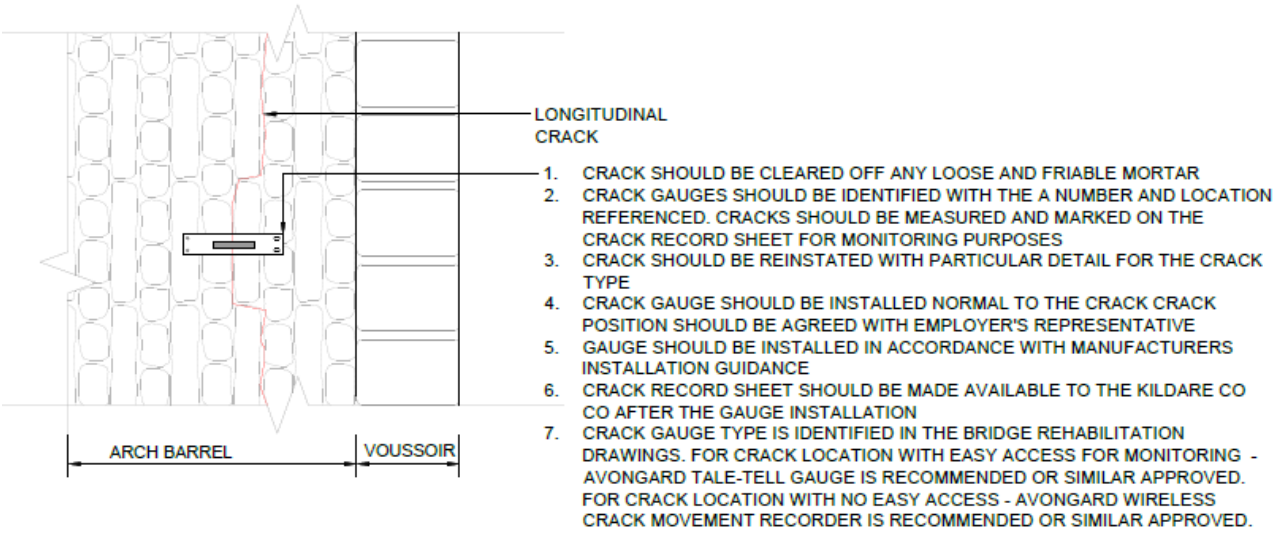
Figure 11 Flood Relief Span, Rehabilitation Works, KCCBFW-CCC-ST-S06-DR-S-0006



4.5 Arch Cracking

Arch longitudinal cracking was recorded during the inspection of the Bridge arches. Similar cracking was recorded during the previous inspection undertaken in 2015. No immediate intervention is proposed to remediate the cracks and monitoring should be undertaken **Figure 12**.

Figure 12 Arch Crack Monitoring Detail



5. Timeframe and Restrictions

It is intended that all works will be carried out during the July-September period in accordance with Inland Fisheries Ireland's 'Guidelines on the Protection of Fisheries During Construction Works in and Adjacent to Waters'.

Works will take place outside the salmonid close season. Works will not be undertaken during hours of darkness to avoid disturbance of Otter foraging and commuting. Works will be undertaken outside the lamprey spawning season.

6. Plant and Equipment

Plant and equipment will be confirmed by the appointed contractor. The Contractor will confirm the plant required to undertake the protection measures set out in this report and in agreement with Inland Fisheries Ireland and Kildare Co Co prior to any works being undertaken.

It's proposed to use the long-reach excavator with a banksman to remove the collapsed stones to avoid approaching the stream and affecting the bank vegetation **Figure 13**.

Figure 13 Long-reach excavator, Indicative

No concrete/ cement mixing or refuelling of plant and equipment will take place near any watercourse.

Fuels, lubricants and hydraulic fluids for equipment used on the construction site will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism and provided with spill containment according to current best practices. Fuelling and lubrication of equipment will be carried out offsite or in bunded areas at the site compound that must not be located within 10m of the river.

All equipment will be sterilised at a disinfection /cleaning station set up next to the site compound and not within 10m of the river. Appropriate spill control equipment, including oil booms and oil soakage pads, will be kept within the construction site to deal with any accidental spillage. Any spillage of fuels, lubricants or hydraulic oils will be immediately contained and the contaminated soil removed from the construction site and disposed of in accordance with all relevant waste management legislation.

Before commencement of works, all construction equipment will be checked to ensure that it is mechanically sound, to avoid leaks of oil, fuel, hydraulic fluids and grease.

Access to the stream for plant and equipment will be as illustrated in **Section 3** of this report.

7. Material Requirements

i) In-situ concrete for rubbing strip construction;

ii) Earthworks granular materials for rubbing strip construction;

iii) Linings and sealants for rubbing strip construction;

iv) Natural Hydraulic Mortars (NHL) 3.5 and 5 as per the design drawings;

v) Limestone rubble stone as may be required for reconstruction and approved by the Employer's Representative in advance of works;

vi) Crack gauge system.

8. Reduction or Elimination of Pollution from Substances

i) Raw or uncured waste concrete will be removed from the construction site and disposed of in accordance with the relevant waste management legislation;

ii) Wash down water from concrete trucks, cast in situ concrete etc. will be collected in a suitable containment structure and then taken off-site for appropriate disposal;

iii) Fuels, lubricants and hydraulic fluids for equipment used on the construction site will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism and provided with spill containment according to current best practices;

iv) Fuelling and lubrication of equipment will be carried out offsite or in bunded areas;

v) Appropriate spill control equipment, including oil booms and oil soakage pads, will be kept within the construction site to deal with any accidental spillage;

vi) Any spillage of fuels, lubricants or hydraulic oils will be immediately contained and the contaminated soil removed from the construction site and disposed of in accordance with all relevant waste management legislation;

vii) Prior to any work commencing all construction equipment will be checked to ensure that it is mechanically sound, to avoid leaks of oil, fuel, hydraulic fluids and grease;

viii) Measures will be implemented to minimise waste and ensure correct handling, storage and disposal of waste;

ix) Emergency response procedures will be put in place.

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APPENDIX A - ENGINEERING INSPECTION REPORT

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KE-R424-B-010

BRIDGE

Generated: 12/03/2024

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Bridge Summary

Number (calc.): KE-R424-B-010

Name (alias): N/A

Bridge Type: Arch

Maintenance Inspection Date: 13/08/2022

Maintenance Inspection Rating: Good

Engineering Inspection Date: 07/03/2024

Engineering Inspection Rating: Significant Damage

Bridge Detail

Bridge

Bridge Type: Arch

Principle Function: Public Road

Number (calc.): KE-R424-B-010

Number (plate): Passlands Bridge (KE-R424-003.00)

Name (alias): N/A

Road Number: R424

Is in Skew? No

Skew Angle: N/A

Is Flood Relief? No

Number of Openings: N/A

Height Restriction: N/A

Is Signage Present? No

Height Restriction (on signage): N/A

Weight Restriction? Yes

Weight Restriction (on signage): 3

Bridge Over: Watercourse

Bridge Under: N/A

Services Evident? Yes

Dimensions

Length: 70

Width: 4.84

Height: 5

Number of Spans: 5

Total Span: 39.9

Max. Span: 6.29

Min. Span: 5.24

Materials

Materials: Masonry

Access Hazards

Access Hazards: Deep Water, Traffic, Vegetation

Location

Location Description: one lane carriageway with traffic lights on both approaches. soft verges on both sides. cutwaters on all piers. upstream pedestrian rest places.

Townland: PASSLANDS

Municipal District: Municipal District of Kildare-Newbridge

River Basin District: South Eastern

Additional Info

Ownership: N/A

Protected Status: N/A

Ecological Status: N/A

Year of Construction (approx.): N/A

Bridge Attachments

Bridge Attachments:
File Name : 2022_08_13_09_23_09_9926.jpg **Name :** N/A **Description :** N/A 
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Description : N/A

File Name : 2022_08_13_09_28_35_8074.jpg
Name : N/A
Description : N/A

Maintenance Inspections

Inspection made on: 13/08/2022

Surveyor: PetruRusu
Overall Rating: Good
Parapets: Good
External Walls: Good
Access and Egress: Warning
Abutments and Piers: Good
Vegetation: Warning
Deck or Arch: Good
Comments: bridge in good condition

Inspection Attachments:

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Description : N/A

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Description : N/A

Engineering Inspections

Inspection made on: 07/03/2024 (Completed)

Surveyor: PaulTrofimov
Overall Rating: Significant Damage
Surface: 1
Surface Comment:
no defects evident
Footpath: 2
Footpath Comment: Soft verges are present on both sides, and water staining is evident on the soffit of arches.
Parapets: 3
Parapets Comment: Upstream parapet at RHS bank is damaged with coping missing (length 6m). The refuge parapet feature over 1st cutwater is cracked. Minor concrete coping cracks are visible throughout. Localised areas of missing mortar.
Embankment and Revertments: N/A
Embankment and Revertments Comment: N/A
Wingwalls: N/A
Wingwalls Comment: N/A
Abutments: 1
Abutments Comment: No distress evident
Piers: 3
Piers Comment: 4th Cutwater damaged at the upper level, likely associated with the vehicle impact to the parapet. A diagonal crack and displaced masonry is evident. The cutwater masonry repairs are recommended immediately to avoid further deterioration.
Spandrels: 1
Spandrels Comment: no distress evident, areas of vegetation growth present close to the banks and require clearing for a detailed inspection. Smaller areas of vegetation are noted throughout- vegetation clearing is recommended under maintenance.
Arch Barrels: 2
Arch Barrels Comment: The access to inspect the arch soffit is limited. The previous PI report (Jan-2015) indicates multiple arch cracks present. The soffit was inspected using a high-resolution camera and no obvious crack deterioration was recorded. It's recommended to carry out a closer inspection of the arches at low water during the summer months.
Beams Girders: N/A
Beams Girders Comment: N/A
Slab Deck: N/A
Slab Deck Comment: N/A
Riverbed: 1
Riverbed Comment: deep water, no distress evident. Concrete aprons throughout with no defects noted
Bearings and Expansion Joint: N/A
Bearings and Expansion Joint Comment: N/A
Other Elements: N/A
Comments: Primary defects associated with the cutwater cracking.

Inspection Attachments:

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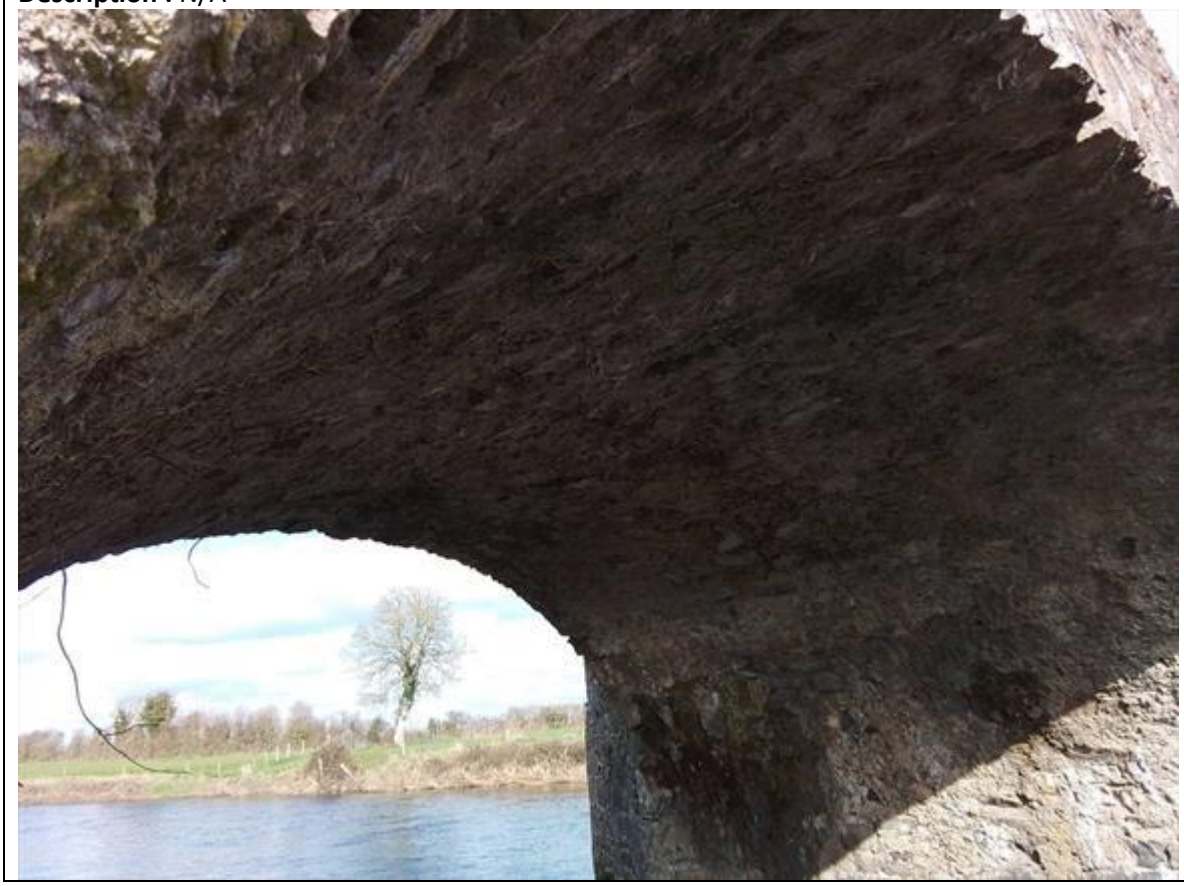

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Description : N/A

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APPENDIX B - DRAWINGS

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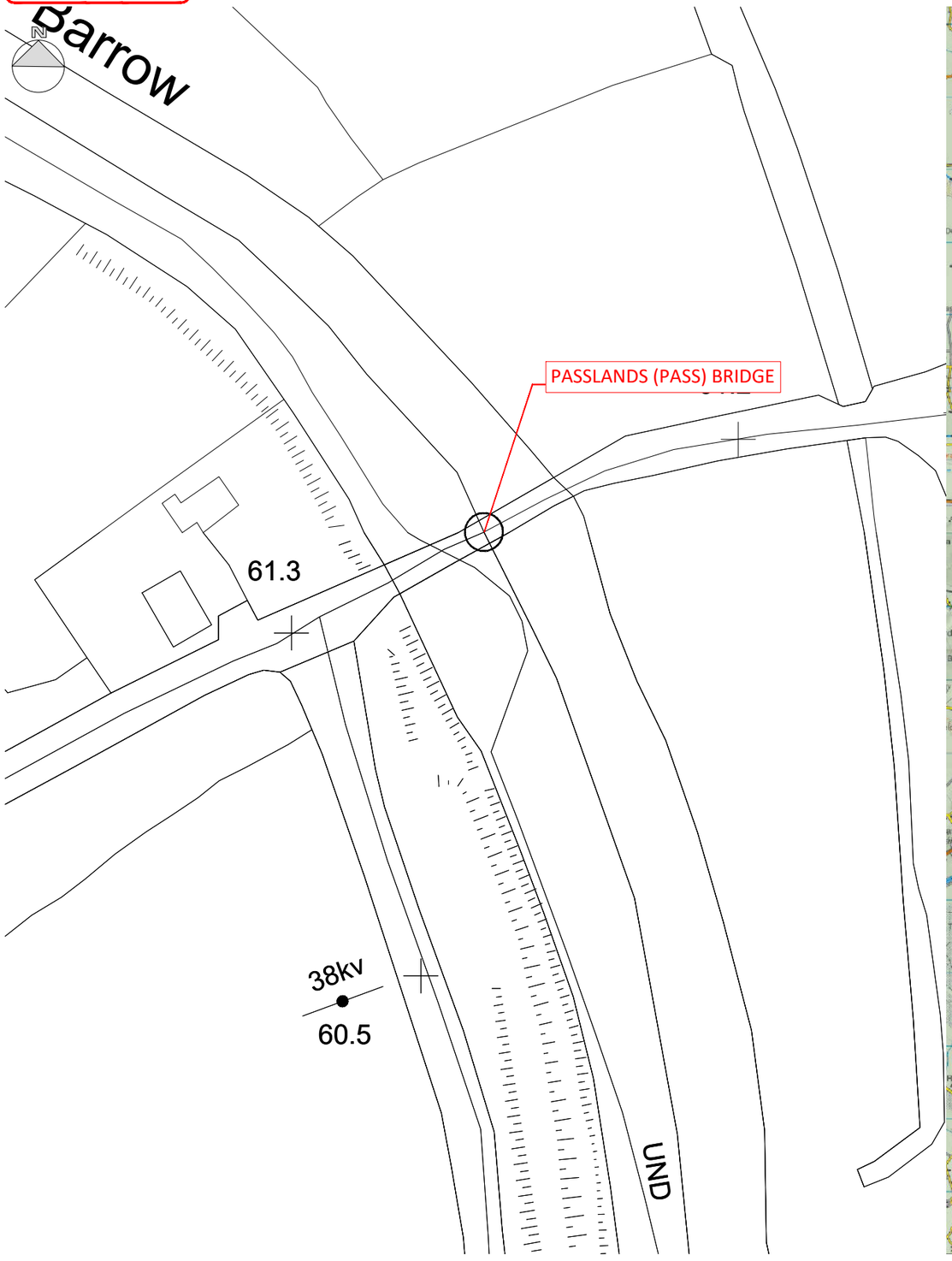
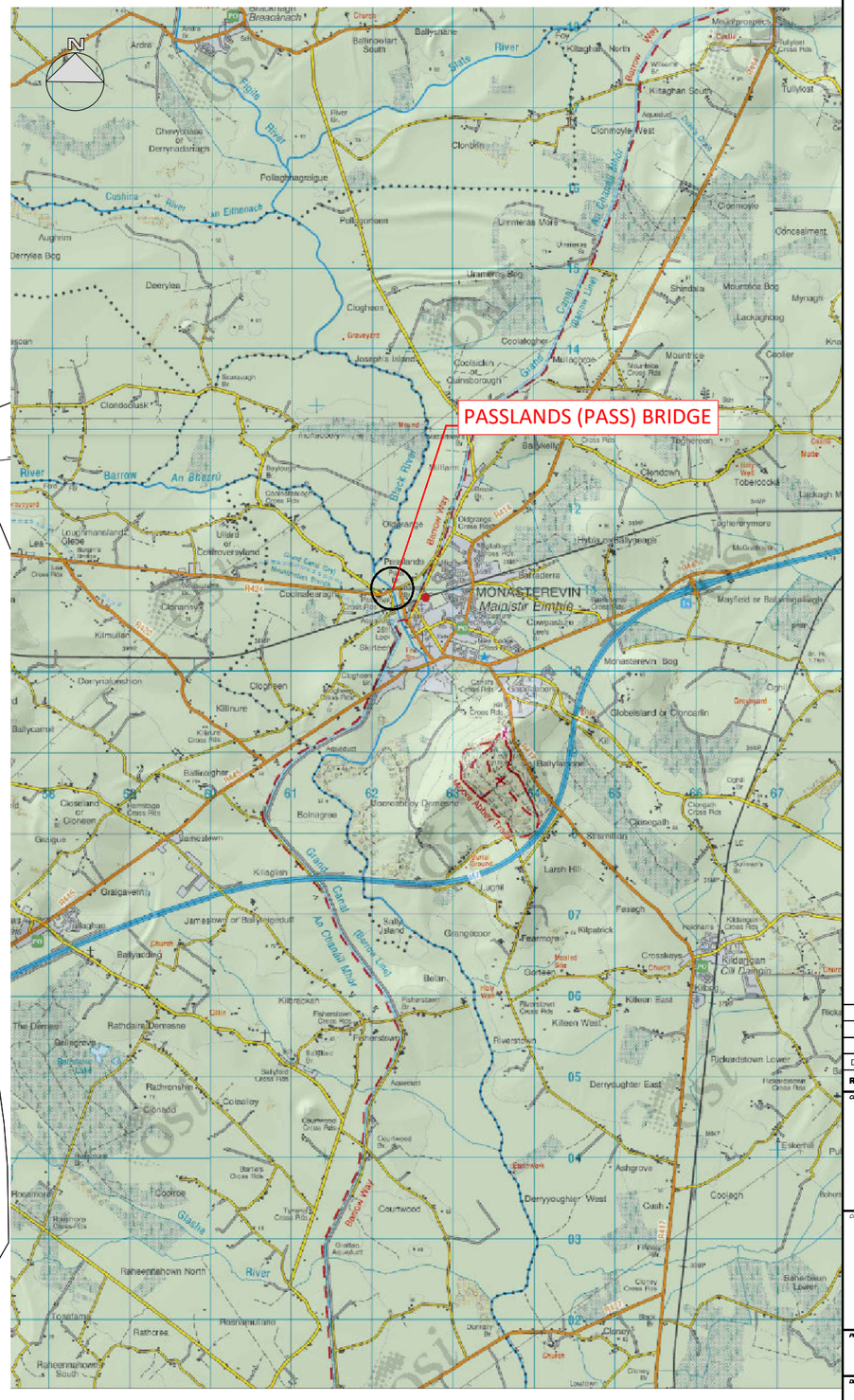
DETAILED DESIGN



Site Location Map
SCALE 1:500 @ A1



Site Location Map
SCALE 1:50000 @ A1

PASSLANDS BRIDGE ITM COORDINATES
E:662187
N:711035

NOTES

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2. Ordnance Survey of Ireland Licence no. **CYAL50250173** © Ordnance Survey Ireland/Government of Ireland/Kildare County Council
3. Passlands Bridge ITM Coordinates: **E:662187, N:711035**

REV	DATE	DESCRIPTION	BY	CHK	APD
D00	20/11/2024	DETAILED DESIGN	GA	PT	SC

CLIENT / CONSULTANT
Comhairle Contae Chill Dara
Kildare County Council

CONSULTANT
CLANDILLON
CIVIL CONSULTING

PROJECT
BRIDGE REHABILITATION WORKS
IN CO. KILDARE

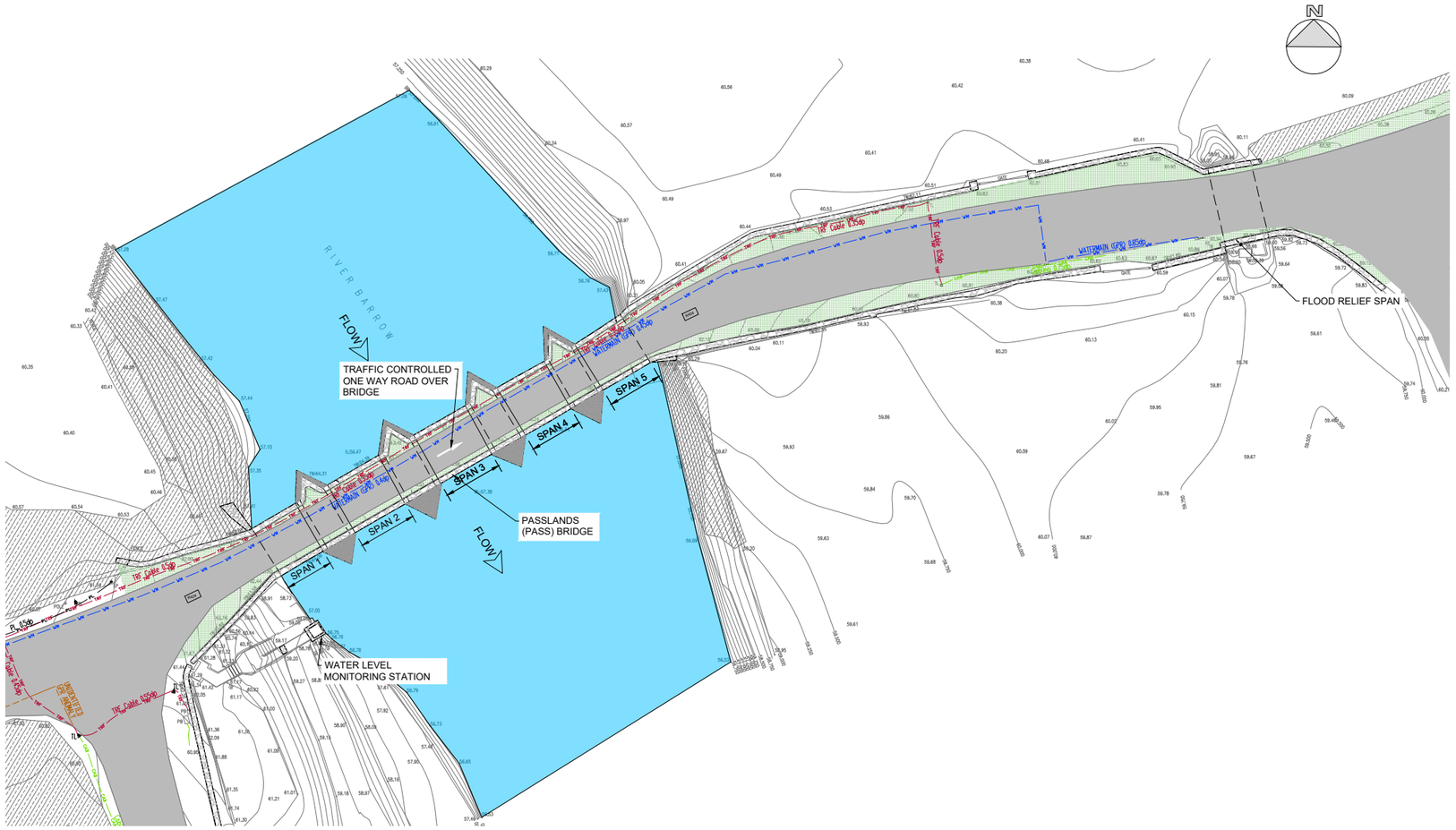
DRAWING TITLE
PASSLANDS (PASS) BRIDGE
SITE LOCATION MAP

PURPOSE OF ISSUE	STATUS/SUITABILITY	
DETAILED DESIGN	S3 - SUITABLE FOR REVIEW AND COMMENT	
DATE	SCALE	SHEET SIZE
20/11/2024	AS SHOWN	A1

DRAWING NUMBER
KCCBFW-CCC-ST-S06-DR-S-0007

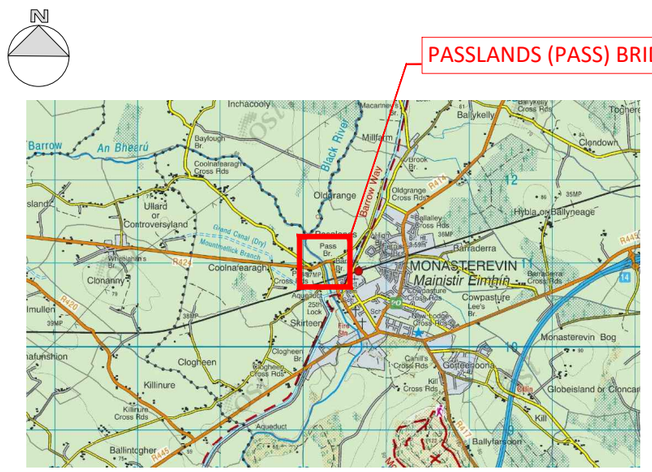
REVISION
D00

DETAILED DESIGN



SITE LAYOUT PLAN

SCALE 1:250



LOCATION MAP

DOWNSTREAM ELEVATION

UPSTREAM ELEVATION

NOTES

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GENERAL NOTES

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   KCCBFW-CCC-ST-S06-DR-S-0001 Site Layout
   KCCBFW-CCC-ST-S06-DR-S-0002 Existing Defects, Plan and Elevations
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   KCCBFW-CCC-ST-S06-DR-S-0005 Rehabilitation Works, Sheet 1 of 2
   KCCBFW-CCC-ST-S06-DR-S-0006 Rehabilitation Works, Sheet 2 of 2
   KCCBFW-CCC-ST-S06-DR-S-0007 Site Location Map

LEGEND

- MASONRY
- CONCRETE
- STREAM
- CARRIAGEWAY
- SOFT VERGE

LEGEND - EXISTING SERVICES

- UNIDENTIFIED GPR
- TRF — TRAFFIC CONTROL
- WM — WATERMAIN (GPR)
- PL — PUBLIC LIGHTING
- CAB — CABLING
- TRAFFIC LIGHT (TL)

REV	DATE	DESCRIPTION	BY	CHK	APD
D01	22/11/2024	SECTION 177 ISSUE	PT	PT	SC
D00	13/06/2024	DETAILED DESIGN	JM	PT	SC

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Comhairle Contae Chill Dara
Kildare County Council

CONSULTANT

CLANDILLON
CIVIL CONSULTING

PROJECT

BRIDGE REHABILITATION WORKS IN CO. KILDARE

DRAWING TITLE

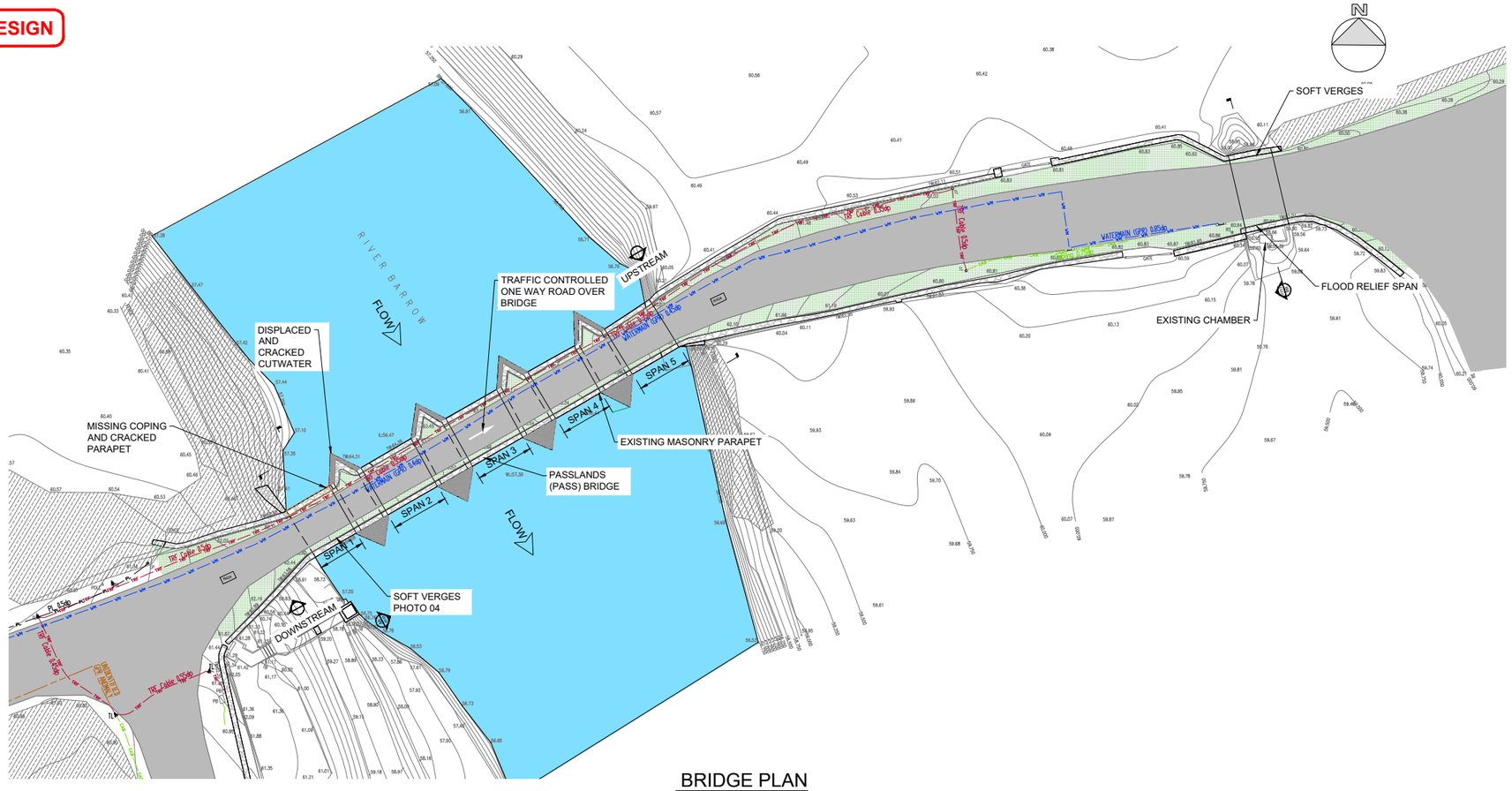
PASSLANDS (PASS) BRIDGE
SITE LOCATION & LAYOUT

PURPOSE OF ISSUE	STATUS/SUITABILITY	
DETAILED DESIGN	S3 - SUITABLE FOR REVIEW AND COMMENT	
DATE	SCALE	SHEET SIZE
22/11/2024	AS SHOWN	A1

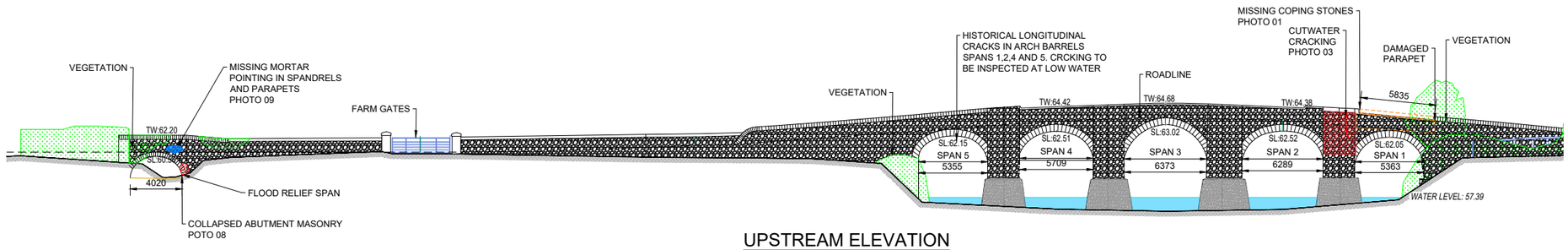
DRAWING NUMBER: KCCBFW-CCC-ST-S06-DR-S-0001

REVISION: D01

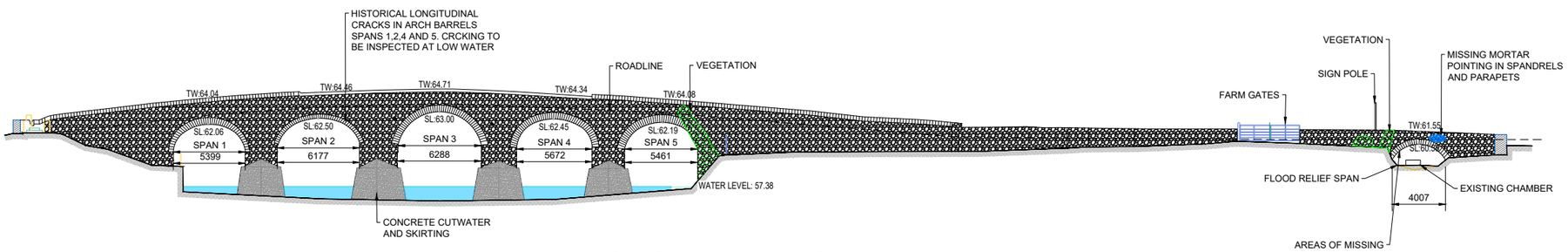
DETAILED DESIGN



BRIDGE PLAN
SCALE 1:250



UPSTREAM ELEVATION
Scale 1:200



DOWNSTREAM ELEVATION
Scale 1:200

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   KCCBFW-CCC-ST-S06-DR-S-0007 Site Location Map

LEGEND

- MASONRY
- CONCRETE
- EARTH
- PAVEMENT
- STREAM
- CARRIAGEWAY

LEGEND - EXISTING DEFECTS

- MASONRY LEANING/BULGING
- VEGETATION
- SOFT VERGE
- MISSING COPING
- CRACKING
- MISSING MORTAR

LEGEND - EXISTING SERVICES

- UNIDENTIFIED GPR
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BRIDGE REHABILITATION WORKS IN CO. KILDARE

DRAWING TITLE

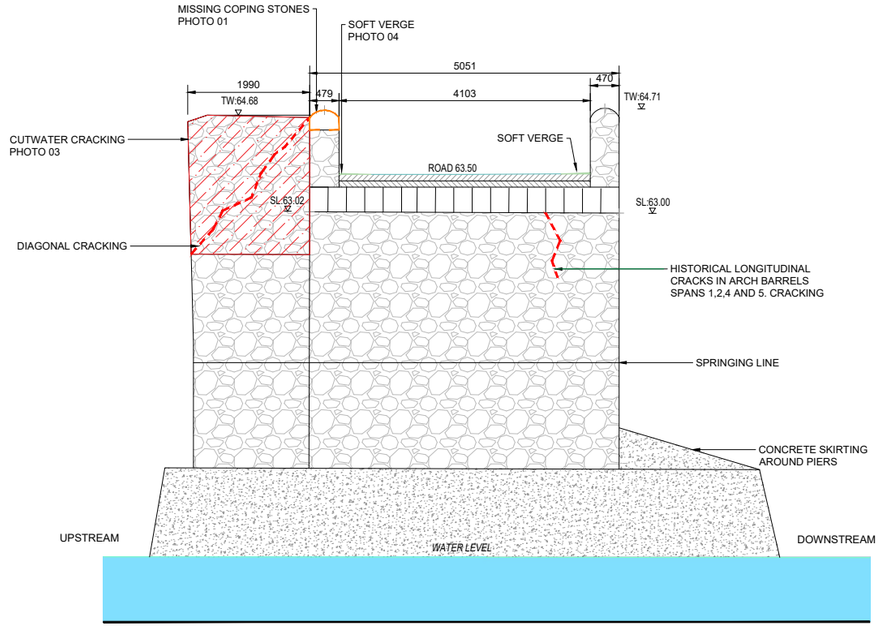
PASSLANDS (PASS) BRIDGE
EXISTING DEFECTS
PLAN AND ELEVATIONS

PURPOSE OF ISSUE	STATUS/SUITABILITY	
DETAILED DESIGN	S3 - SUITABLE FOR REVIEW AND COMMENT	
DATE	SCALE	SHEET SIZE
22/11/2024	AS SHOWN	A1

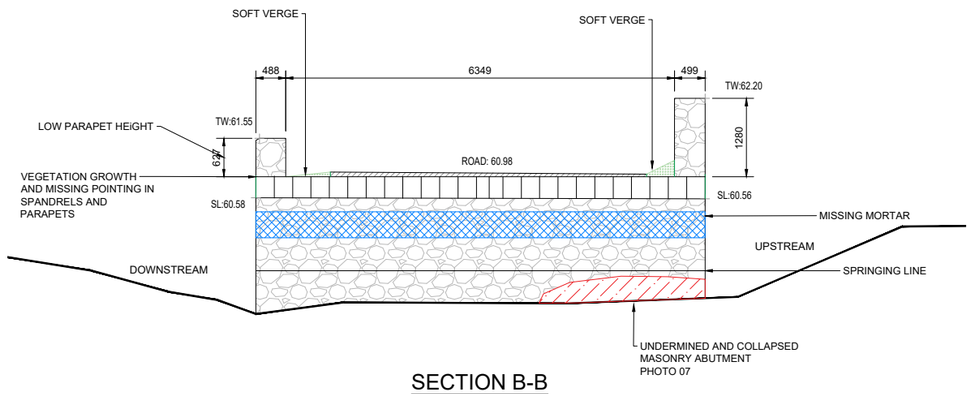
DRAWING NUMBER: KCCBFW-CCC-ST-S06-DR-S-0002

REVISION: D01

DETAILED DESIGN



SECTION A-A
Scale 1:50



SECTION B-B
Scale 1:50

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   KCCBFW-CCC-ST-S06-DR-S-0006 Rehabilitation Works, Sheet 2 of 2
   KCCBFW-CCC-ST-S06-DR-S-0007 Site Location Map

LEGEND

- MASONRY
- CONCRETE
- EARTH
- PAVEMENT
- STREAM
- CARRIAGEWAY

LEGEND - EXISTING DEFECTS

- MASONRY LEANING/BULGING
- VEGETATION
- SOFT VERGE
- MISSING COPING
- CRACKING
- MISSING MORTAR

LEGEND - EXISTING SERVICES

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PROJECT

BRIDGE REHABILITATION WORKS
IN CO. KILDARE

DRAWING TITLE

PASSLANDS (PASS) BRIDGE
EXISTING DEFECTS
SECTIONS

PURPOSE OF ISSUE	STATUS/SUITABILITY	
DETAILED DESIGN	S3 - SUITABLE FOR REVIEW AND COMMENT	
DATE	SCALE	SHEET SIZE
22/11/2024	AS SHOWN	A1

DRAWING NUMBER: KCCBFW-CCC-ST-S06-DR-S-0003

REVISION: D01

DETAILED DESIGN

PHOTO 01
UPSTREAM SPAN 1 MISSING COPING

PHOTO 02
UPSTREAM SPAN 1 DAMAGED PARAPET

PHOTO 03
UPSTREAM SPAN 1 DAMAGED CUTWATER/CRACKING

PHOTO 04
SOFT VERGES

PHOTO 05
ARCH WATER STAINS

PHOTO 06
PARAPET

PHOTO 04
RELIEF ARCH UNDERMINING /
COLLAPSED ABUTMENT

PHOTO 08
RELIEF ARCH UPSTREAM

PHOTO 09
RELIEF ARCH DOWNSTREAM

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   KCCBFW-CCC-ST-S06-DR-S-0007 Site Location Map

REV	DATE	DESCRIPTION	BY	CHK	APD
D01	22/11/2024	SECTION 177 ISSUE	PT	PT	SC
D00	13/06/2024	DETAILED DESIGN	JM	PT	SC

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BRIDGE REHABILITATION WORKS
IN CO. KILDARE

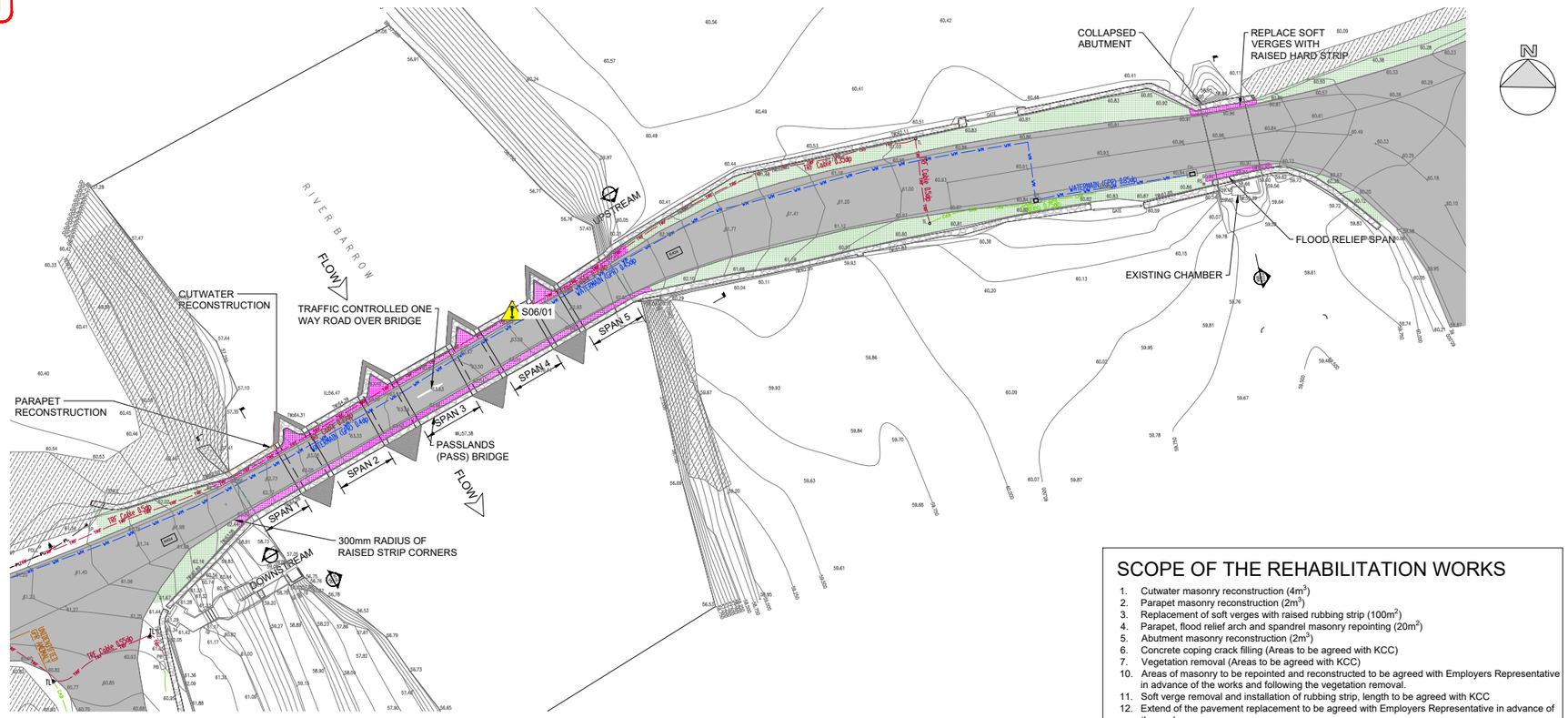
DRAWING TITLE
PASSLANDS (PASS) BRIDGE
DEFECTS PHOTOS

PURPOSE OF ISSUE	STATUS/SUITABILITY	
DETAILED DESIGN	S3 - SUITABLE FOR REVIEW AND COMMENT	
DATE	SCALE	SHEET SIZE
22/11/2024	AS SHOWN	A1

DRAWING NUMBER
KCCBFW-CCC-ST-S06-DR-S-0004

REVISION
D01

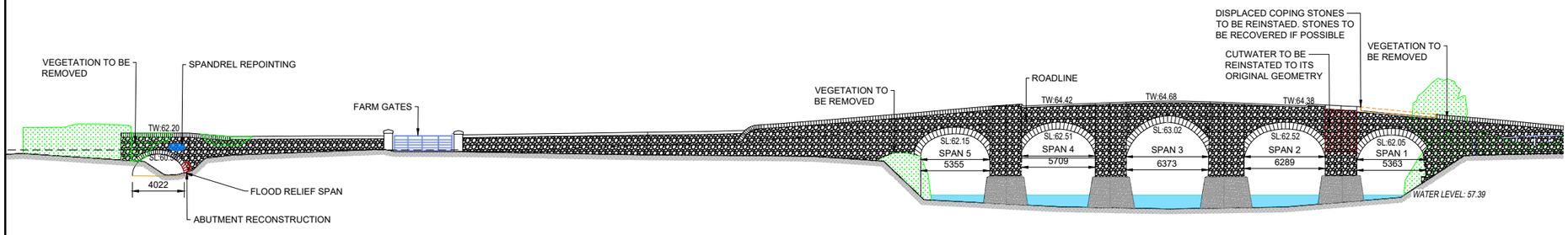
DETAILED DESIGN



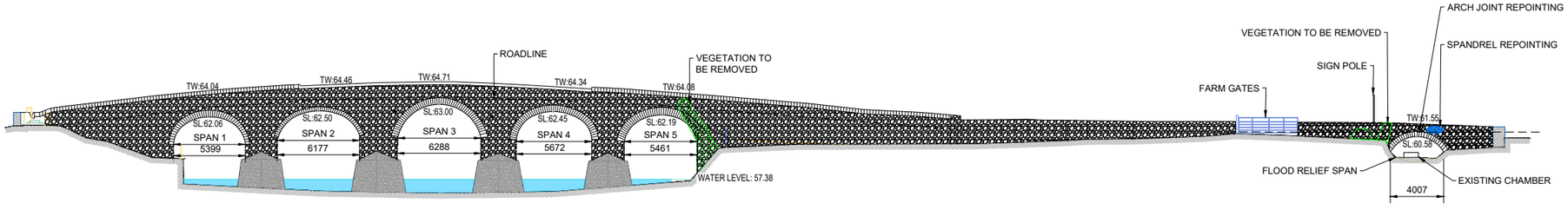
BRIDGE PLAN
SCALE 1:250

SCOPE OF THE REHABILITATION WORKS

1. Cutwater masonry reconstruction (4m^3)
2. Parapet masonry reconstruction (2m^3)
3. Replacement of soft verges with raised rubbing strip (100m^2)
4. Parapet, flood relief arch and spandrel masonry repointing (20m^2)
5. Abutment masonry reconstruction (2m^3)
6. Concrete coping crack filling (Areas to be agreed with KCC)
7. Vegetation removal (Areas to be agreed with KCC)
10. Areas of masonry to be repointed and reconstructed to be agreed with Employers Representative in advance of the works and following the vegetation removal.
11. Soft verge removal and installation of rubbing strip, length to be agreed with KCC
12. Extend of the pavement replacement to be agreed with Employers Representative in advance of the works.



UPSTREAM ELEVATION
Scale 1:200



DOWNSTREAM ELEVATION
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   KCCBFW-CCC-ST-S06-DR-S-0007 Site Location Map

LEGEND - EXISTING

MASONRY
PAVEMENT
CONCRETE
STREAM
EXISTING FILL
CARRIAGEWAY
EARTH
SOFT VERGE

LEGEND - REHABILITATIONS

PARAPET RECONSTRUCTION
MASONRY RECONSTRUCTION
CRACK MONITORING
VEGETATION TO BE REMOVED
CONCRETE RUBBING STRIP
JOINT REPOINTING

LEGEND - EXISTING SERVICES

UNIDENTIFIED GPR
TRF — TRAFFIC CONTROL
WM — WATERMAIN (GPR)
PL — PUBLIC LIGHTING
CAB — CABLING
TRAFFIC LIGHT (TL)

Health & Safety Legend

XX/00 — Indicates a residual hazard considered to be additional to the risks normally associated with works of this type. Refer to DRA reference KCCBFW-CCC-ST-S06-RA-S-0001
No guarantees are given to the accuracy of the services information shown. Contractor to locate all utilities on site prior to commencement of work.

REV	DATE	DESCRIPTION	BY	CHK	APD
D01	22/11/2024	SECTION 177 ISSUE	PT	PT	SC
D00	13/06/2024	DETAILED DESIGN	JM	PT	SC

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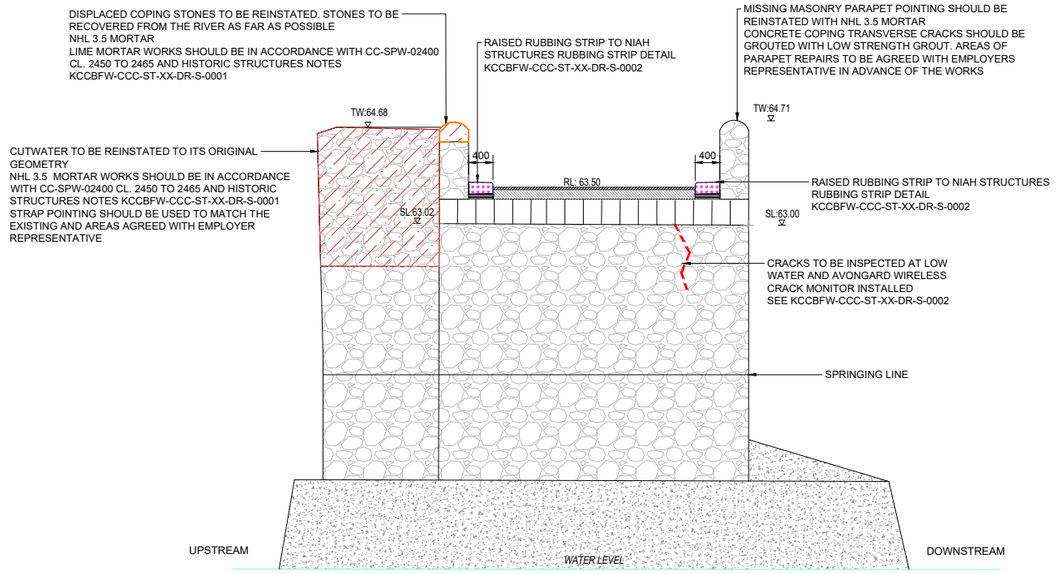
PROJECT
BRIDGE REHABILITATION WORKS IN CO. KILDARE

DRAWING TITLE
PASSLANDS (PASS) BRIDGE REHABILITATION WORKS SHEET 1 OF 2

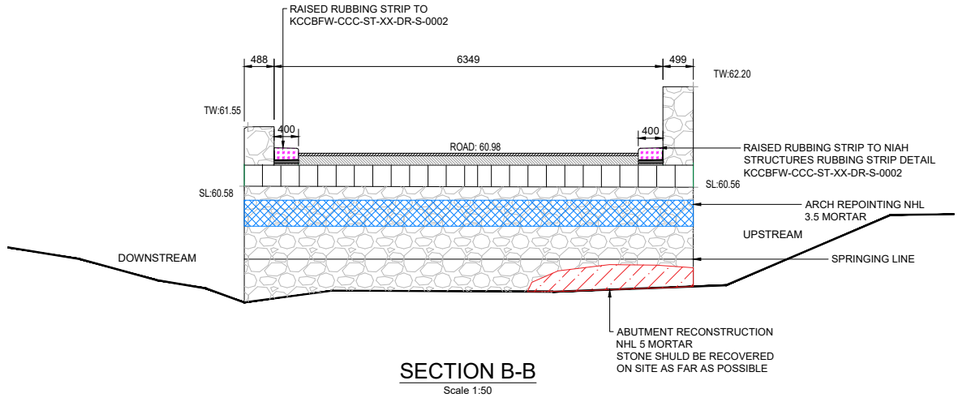
PURPOSE OF ISSUE	STATUS/SUITABILITY	
DETAILED DESIGN	S3 - SUITABLE FOR REVIEW AND COMMENT	
DATE	SCALE	SHEET SIZE
22/11/2024	AS SHOWN	A1
DRAWING NUMBER		REVISION
KCCBFW-CCC-ST-S06-DR-S-0005		D01

DETAILED DESIGN



SECTION A-A

Scale 1:50



SECTION B-B

Scale 1:50

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   KCCBFW-CCC-ST-S06-DR-S-0007 Site Location Map

LEGEND - EXISTING

MASONRY
PAVEMENT
CONCRETE
STREAM
EXISTING FILL
CARRIAGEWAY
EARTH
SOFT VERGE

LEGEND - REHABILITATIONS

PARAPET RECONSTRUCTION
MASONRY RECONSTRUCTION
CRACK MONITORING
CONCRETE RUBBING STRIP
JOINT REPOINTING

REV	DATE	DESCRIPTION	BY	CHK	APD
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D00	13/06/2024	DETAILED DESIGN	JM	PT	SC

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PROJECT

BRIDGE REHABILITATION WORKS IN CO. KILDARE

DRAWING TITLE

PASSLANDS (PASS) BRIDGE REHABILITATION WORKS SHEET 2 OF 2

PURPOSE OF ISSUE	STATUS/SUITABILITY	
DETAILED DESIGN	S3 - SUITABLE FOR REVIEW AND COMMENT	
DATE: 22/11/2024	SCALE: AS SHOWN	SHEET SIZE: A1
DRAWING NUMBER: KCCBFW-CCC-ST-S06-DR-S-0006		REVISION: D01

DETAILED DESIGN

1 Vegetation Removal

1.1 All areas to be re-pointed shall be cleared of all vegetation and algae. Invasive roots shall be removed in so far as is possible. Those not able to be fully removed shall be cut back as far as possible and treated with a suitable systemic herbicide, as approved by the Employers representative.

1.2 The vegetation removed should be collected and disposed of offsite. Care should be taken to prevent debris from entering the water course.

1.3 A controlled localized application herbicide shall be used, spraying shall not be permitted.

1.4 Threes should be cut down as close to the ground as possible. The three stump should not be removed and the remaining stump treated with a Glyphosate-based herbicide. This should be applied directly to the vascular bundle in dry conditions. The stump should not be rooted out as this may cause instability to both bank and bridge.

1.4 Threes marked for full removal should be fully removed with the root system.

2 Masonry Joint Pointing - Lime Mortar

2.1 Contractor should prepare the Traffic Management Plan for the proposed works for approval with KCC.

2.3 Scaffolding should be lined with an impermeable membrane, polythene or similar, to prevent falling mortar from entering the watercourse below.

2.4 Re-pointing should be carried out as per CC-SPW-02400 Specification for Road Works Series 2400- Brickwork, Blockworks and Stonework.

2.5 The areas to be pointed with lime-based mortars are identified in the design drawings.

2.6 Lime mortar to comply with SRW series 2400 CL. 2450 TO 2465.

2.7 The following Mortar Guide should be used for Lime Mortar pointing in accordance with Table 24.4 CC-SPW-02400 Specification for Road Works:

- For the spandrel wall and external side of parapet an NHL 3.5 mortar should be used.
- For parapet coping and parapet on the traffic side an NHL 5 mortar should be used.
- For abutments and soffit of arch barrel NHL 5 mortar should be used. Where the arch barrel is above flood level an NHL 3.5 mortar could be used.

2.8 Refer to lime mortar re-pointing guidelines specified in Section 6 below.

3 Re-pointing Guidelines

3.1 All loose mortar, soil, deleterious material etc should be removed from the joint and the joint cleaned prior to re-pointing. Debris from this operation should be captured by the protecting barrier on the scaffolding and appropriately disposed of offsite in accordance with the applicable legislation.

3.2 Angle grinders or other disc machinery should not be used to remove existing mortar from the joints. Mortar joint should be raked out using hand tools to a minimum depth of 50mm to allow adequate bond to form.

3.3 The area raked out should be no larger than 1m x 2m before re-pointing is carried out.

3.4 Remaining mortar should be brushed clean and washed with water before re-pointing. Absorbent masonry should be dampened at time of application of the fresh mortar. Non-absorbent masonry should be dry at the time of application.

3.5 Often the use of rotating drum cement mixers does not sufficiently distribute the lime binder among the aggregate without the addition of excessive quantities of water. Care should be taken to thoroughly mix the mortar in small batches in accordance with CC-SPW-02400 using only the amount of water specified.

3.6 Mortar shall be applied using flat steel jointing tools of varying width to suit individual joint.

3.7 Joint shall be fully filled flush with the surrounding masonry, or the weathered edges. Once the surface of the mortar is firm the surface should be tamped with a stiff brush or lightly scraped to expose the aggregate and improve the appearance of the mortar.

3.8 Any overspill/ splashback on the face of the stone shall be cleared to remove all traces of excess mortar. Overspill should be minimized using suitably experienced masons.

3.9 Suitably sized pinning stones should be used to limit the joint width to a maximum of 20mm for the full depth of joint.

3.10 Pinning stones shall be supported with props or other method as agreed with the Employers representative. The use of steel tying wire shall not be allowed.

3.11 Immediately after re-pointing for a period of at least 3-4 days or longer if conditions dictate, the mortar shall be protected against the harmful effects of weather (wind, rain, sun and frost).

3.12 New mortar shall be kept in a dampened condition for 72 hours after placing.

3.13 Re-pointing shall not take places where there is a risk the temperature will drop below 5deg C in the 2-3 weeks following the re-pointing. If necessary, the works should be protected from the cold weather with appropriate insulation and a heat source to ensure temperature stays above 5deg C.

4 Masonry Reconstruction

4.1 Areas of masonry to be reconstructed are identified in the detailed design drawings - Rehabilitation Works.

4.2 Any missing and collapsed stone should be recovered on site as much as possible.

4.3 Existing masonry recovered should be inspected by Employer's Representative before use. Recovered stone proven to be unsuitable should not be used in the reconstruction.

4.4 New stone to be used for reconstruction should match the existing masonry in type, appearance and quality.

5 Masonry Crack Repairs

5.1 The type and areas of crack repairs are identified in the detailed design drawings - Rehabilitation Works.

Grouting, Deep Pointing and Filling of Non-Progressive Cracks

5.2 For deep pointing, eroded joints and non-progressive cracks where normal pointing technique is not suitable a "dry mix process" should be used.

5.3 Joints and cracks should be prepared in accordance with Re-pointing Guidelines outlined in Section 3.

5.4 Mortar should be injected into the joint under pressure using mortar sprayed equipment. The mortar should be built up in layers from the back of the join to the front.

5.5 Injecting mortar used should have proven characteristic compressive strength of max. 2N/mm^2 at 28 days and 5N/mm^2 at 91 days. Grouting materials should be approved by Employer's Representative before use.

6 Crack Stitching Guidance

6.1 Depending in the position of longitudinal cracks, certain structures may require the option of a number of stitching bars to be drilled completely through the structure/drilled from each face and overlapped in a crack-free zone.

6.2 Stitching bar positions to be marked out and drilled with rotary/rock drilling equipment. Stitching bars or anchors shall be installed horizontally trough the voussoirs and arch barrel, parallel to the springing. The level of the bar shall be equidistant from the intrados and extrados of the arch barrel. Hole diameter to be drilled with a tolerance of 0% to +5%.

6.3 Stitching bars should be stainless steel threaded bar 304 (1.4301). Stitching bar should be installed in accordance with manufacturer's recommendations.

6.4 Stitching bars installation should be carried out using core drilling method. Percussion drilling should not be used

6.5 Holes shall, wherever reasonably practicable be formed through bricks or masonry units as applicable and not through joints or where damage to new brickwork or bonding may occur. Holes to be flushed clear of all dirt and debris, and any sharp protrusions removed.

6.6 Grout to be injected into the anchor hole at a pressure recommended by the supplier/manufacturer. The grout chosen shall be a low heat of hydration and low plastic shrinkage, with a high resistance to sulphate and or other chemical attack.

6.7 Insert the anchors bars into the holes ensuring that when fully inserted, a clearance of 40mm from the face of the arch is maintained.

6.8 Remove any surplus grout from drilled hole and face of structure. Point up any remaining holes with mortar to match the existing structure. Crack to be pointed up & grouted on completion.

6.9 The contractor is at liberty to propose alternative methods and/materials for carrying out the works, in a separate project specific from the design submission.

6.10 The contractor shall provide a method statement with details of the cracks to be injected, the procedure for cleaning out cracks, the injection process and proposed materials to be used ensuring no damage occurs to be to the existing structure. Crack injection using proprietary systems shall be in accordance with the manufacturers recommendations.
Mortar or sealing compounds used to seal the face of the crack shall have achieved sufficient strength strength before injection commences. The choice of mortar, sealing compound and injection material shall take into account the crack width, depth, presence of water and compatibility with the "parent" material.

NOTES

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GENERAL NOTES

1. Design Notes to be read in conjunction with the specification.
2. Design Notes to be read in conjunction with the Detailed Design Notes KCCBFW-CCC-ST-XX-DR-S-0001
3. Design Notes to be read in conjunction with the Standard Details KCCBFW-CCC-ST-XX-DR-S-0002 Standard Details, Sheet 1 of 2 KCCBFW-CCC-ST-XX-DR-S-0003 Standard Details, Sheet 2 of 2
4. Design Notes to be read in conjunction with the Drawings:
   - KCCBFW-CCC-ST-S01-DR-S-0001 to 000x Balfeaghan Bridge
   - KCCBFW-CCC-ST-S02-DR-S-0001 to 000x Clogharinka 1 Bridge
   - KCCBFW-CCC-ST-S03-DR-S-0001 to 000x Staplestown Bridge
   - KCCBFW-CCC-ST-S04-DR-S-0001 to 000x Clogharinka 2 Bridge
   - KCCBFW-CCC-ST-S05-DR-S-0001 to 000x Baltreacey Bridge
   - KCCBFW-CCC-ST-S06-DR-S-0001 to 000x Passlands Bridge
   - KCCBFW-CCC-ST-S07-DR-S-0001 to 000x Bridge at Newtown
   - KCCBFW-CCC-ST-S08-DR-S-0001 to 000x Boherbaun Bridge

REV	DATE	DESCRIPTION	BY	CHK	APD
D02	22/11/2024	SECTION 177 ISSUE	PT	PT	SC
T00	25/07/2024	TENDER DESIGN	SS	PT	SC
D01	02/07/2024	DETAILED DESIGN	PT	PT	SC
D00	08/05/2024	DETAILED DESIGN	PT	PT	SC

CLIENT / CONSULTANT

Comhairle Contae Chill Dara
Kildare County Council

CONSULTANT

CLANDILLON
CIVIL CONSULTING

PROJECT

BRIDGE REHABILITATION WORKS
IN CO. KILDARE

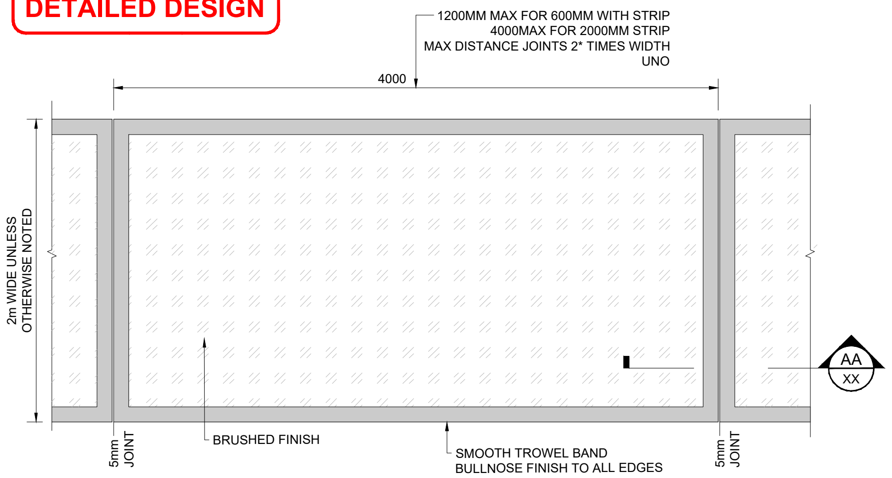
DRAWING TITLE

REHABILITATION WORKS
DESIGN NOTES

PURPOSE OF ISSUE	STATUS/SUITABILITY	
DETAILED DESIGN	S3 - SUITABLE FOR REVIEW AND COMMENT	
DATE	SCALE	SHEET SIZE
22/11/2024	AS SHOWN	A1

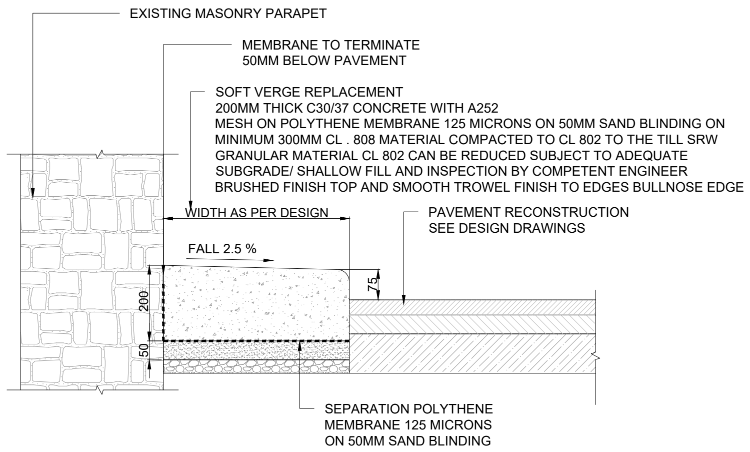
DRAWING NUMBER	REVISION
KCCBFW-CCC-ST-XX-DR-S-0001	D02

DETAILED DESIGN



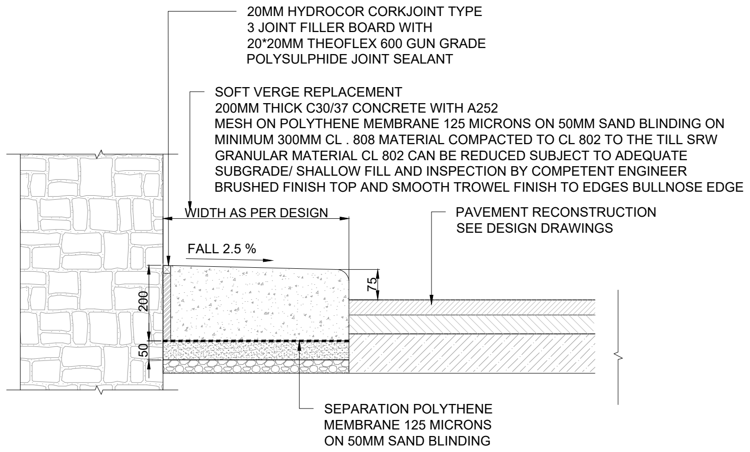
RUBBING STRIP PLAN

SCALE 1:25



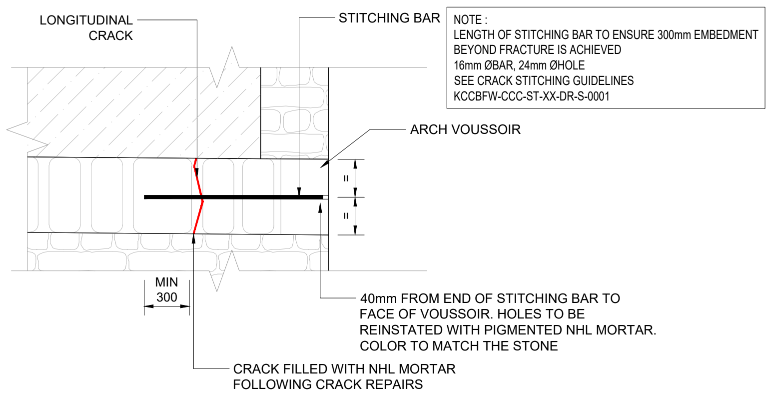
RAISED RUBBING STRIP DETAIL

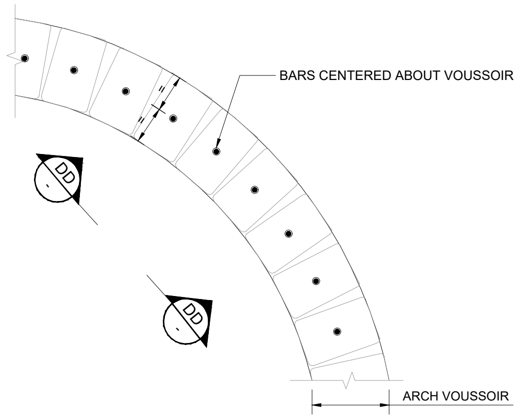
SCALE 1:10

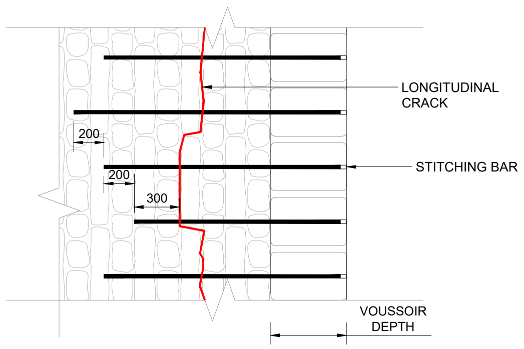


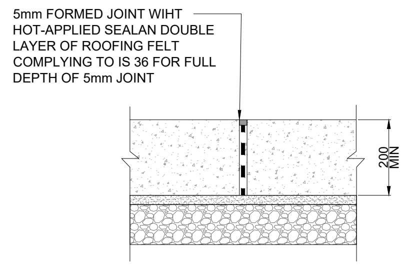
RASIED RUBBING STRIP DETAIL NIAH STRUCTURES

SCALE 1:10









CRACK STITCHING DETAIL

SCALE 1:25

STITCHING BAR LAYOUT

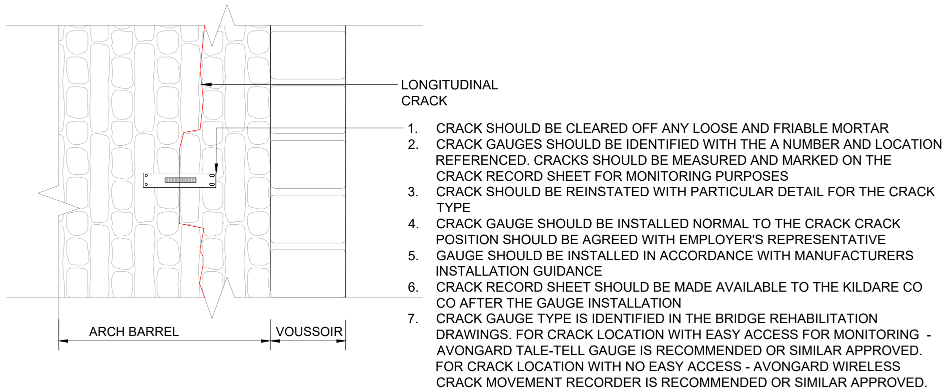
SCALE 1:25

STITCHING BAR PHASING D-D

SCALE 1:25

SECTION A-A (JOINT DETAIL)

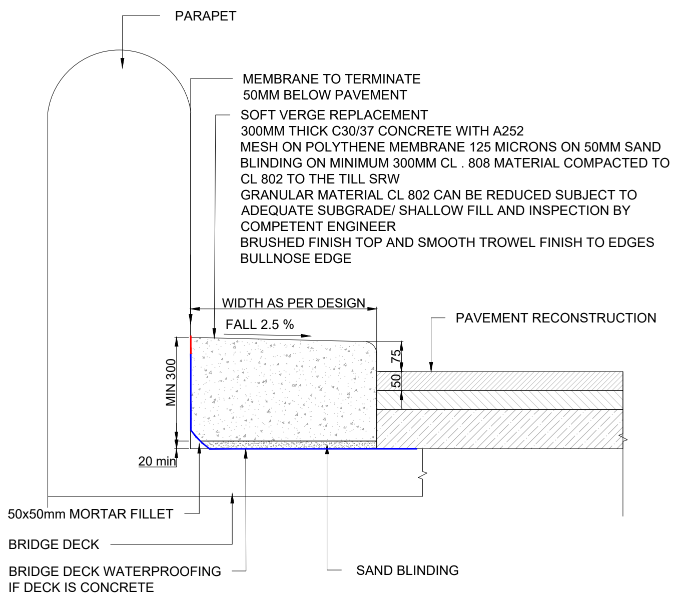
SCALE 1:10



1. CRACK SHOULD BE CLEARED OFF ANY LOOSE AND FRIABLE MORTAR
2. CRACK GAUGES SHOULD BE IDENTIFIED WITH THE A NUMBER AND LOCATION REFERENCED. CRACKS SHOULD BE MEASURED AND MARKED ON THE CRACK RECORD SHEET FOR MONITORING PURPOSES
3. CRACK SHOULD BE REINSTATED WITH PARTICULAR DETAIL FOR THE CRACK TYPE
4. CRACK GAUGE SHOULD BE INSTALLED NORMAL TO THE CRACK CRACK POSITION SHOULD BE AGREED WITH EMPLOYER'S REPRESENTATIVE
5. GAUGE SHOULD BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS INSTALLATION GUIDANCE
6. CRACK RECORD SHEET SHOULD BE MADE AVAILABLE TO THE KILDARE CO CO AFTER THE GAUGE INSTALLATION
7. CRACK GAUGE TYPE IS IDENTIFIED IN THE BRIDGE REHABILITATION DRAWINGS. FOR CRACK LOCATION WITH EASY ACCESS FOR MONITORING - AVONGARD TALE-TELL GAUGE IS RECOMMENDED OR SIMILAR APPROVED. FOR CRACK LOCATION WITH NO EASY ACCESS - AVONGARD WIRELESS CRACK MOVEMENT RECORDER IS RECOMMENDED OR SIMILAR APPROVED.

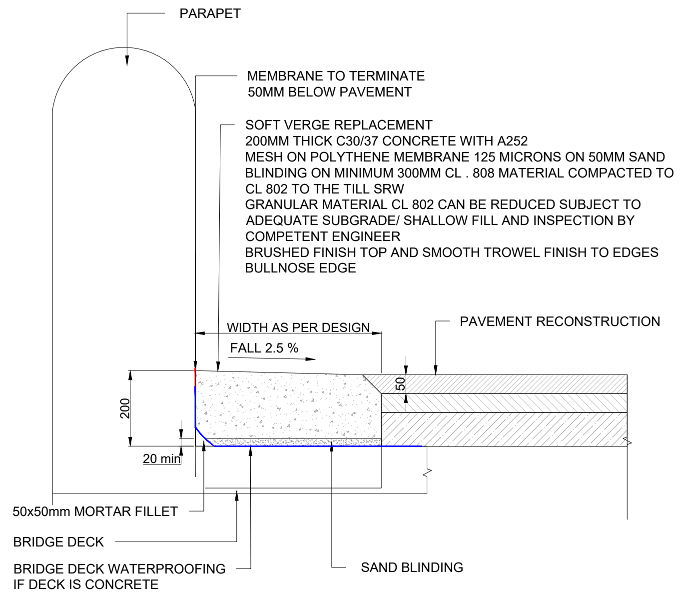
CRACK MONITOR INSTALLATION DETAIL - ARCH LONGITUDINAL CRACKING

SCALE 1:25



RAISED RUBBING STRIP DETAIL (CONCRETE SLAB)

SCALE 1:10



RUBBING STRIP DETAIL (CONCRETE SLAB)

SCALE 1:10

NOTES

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   - KCCBFW-CCC-ST-S04-DR-S-0001 to 000x Clogharinka 2 Bridge
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   - KCCBFW-CCC-ST-S06-DR-S-0001 to 000x Passlands Bridge
   - KCCBFW-CCC-ST-S07-DR-S-0001 to 000x Bridge at Newtown
   - KCCBFW-CCC-ST-S08-DR-S-0001 to 000x Boherbaun Bridge

MASONRY
CONCRETE
EXISTING FILL
EARTH
PAVEMENT
CONCRETE RUBBING STRIP

REV	DATE	DESCRIPTION	BY	CHK	APD
D03	22/11/2024	DETAILED DESIGN	PT	PT	SC
D02	08/10/2024	DETAILED DESIGN	GA	PT	SC
T00	25/07/2024	TENDER DESIGN	SS	PT	SC
D01	02/07/2024	DETAILED DESIGN	PT	PT	SC

CLIENT / CONSULTANT

Comhairle Contae Chill Dara
Kildare County Council

CONSULTANT

CLANDILLON
CIVIL CONSULTING

PROJECT

BRIDGE REHABILITATION WORKS IN CO. KILDARE

DRAWING TITLE

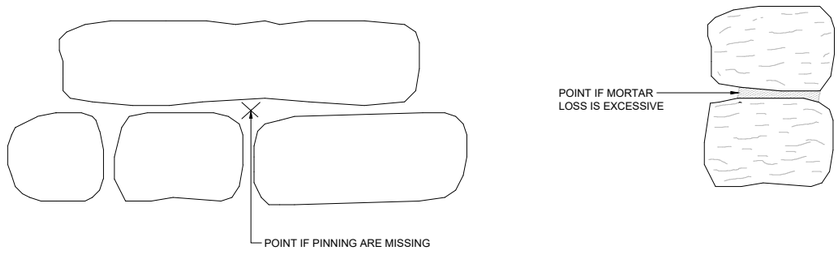
REHABILIATION WORKS STANDARD DETAILS SHEET 1 OF 2

PURPOSE OF ISSUE	STATUS/SUITABILITY	
DETAILED DESIGN	S3 - SUITABLE FOR REVIEW AND COMMENT	
DATE	SCALE	SHEET SIZE
22/11/2024	AS SHOWN	A1

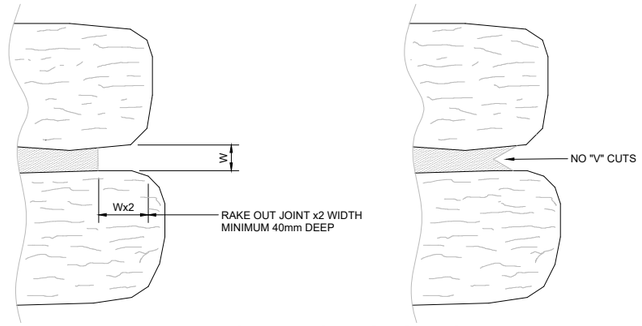
DRAWING NUMBER: KCCBFW-CCC-ST-XX-DR-S-0002

REVISION: D03

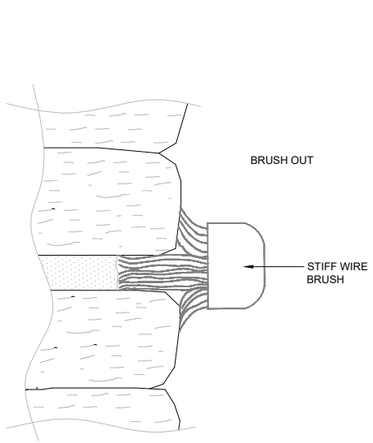
DETAILED DESIGN

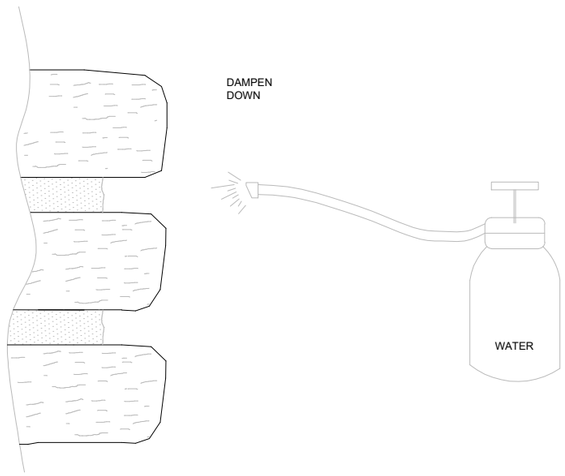


1. WHEN TO REPOINT

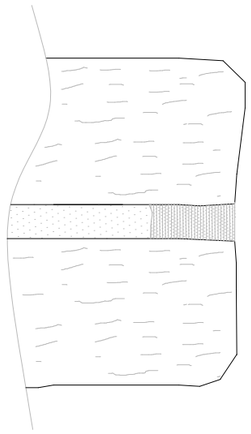


2. RAKE OUT EXISTING JOINTS





3. BRUSH AND DAMPEN



4. REPOINT JOINT FLUSH

NOTES

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   - KCCBFW-CCC-ST-S02-DR-S-0001 to 000x Clogharinka 1 Bridge
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   - KCCBFW-CCC-ST-S04-DR-S-0001 to 000x Clogharinka 2 Bridge
   - KCCBFW-CCC-ST-S05-DR-S-0001 to 000x Baltreacey Bridge
   - KCCBFW-CCC-ST-S06-DR-S-0001 to 000x Passlands Bridge
   - KCCBFW-CCC-ST-S07-DR-S-0001 to 000x Bridge at Newtown
   - KCCBFW-CCC-ST-S08-DR-S-0001 to 000x Boherbaun Bridge

MASONRY REPOINTING NOTES:

1. Masonry repointing should be carried out when the conditions presented in **Step 1)** are encountered and agreed with Employer's Representative. Refer to the scope of the Rehabilitation Works in the drawings for the expected areas to be repointed.
2. Rake out existing joint to remove loose and friable mortar. Joints shall be raked out to a depth of twice the joint width as shown in Step 2) using a plugging chisel and hammer. Grinders and breakers should not be used. Joints shall be raked out square with no "V" cuts.
3. Joints shall be brushed out using a stiff wire brush. The surrounding masonry shall be suitable dampened, the contractor shall ensure no water flow, weeping, or pooled water is present prior to repointing.
4. Joints shall be repointed flush with the existing masonry unless specifically noted in the design drawings that pointing should match the existing e.g. strap pointing, weathered pointing etc.
5. Repointing shall be carried out using an appropriate lime or cementitious mortar to match existing. Refer to each bridge element in the design drawings for the type of mortar specified.
6. Refer to the Design Notes for the mortar selection and application.

REV	DATE	DESCRIPTION	BY	CHK	APD
D00	21/11/2024	DETAILED DESIGN	DM	PT	SC

CLIENT / CONSULTANT

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Kildare County Council

CONSULTANT

CLANDILLON
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PROJECT

BRIDGE REHABILITATION WORKS
IN CO. KILDARE

DRAWING TITLE

REHABILIATION WORKS
STANDARD DETAILS
SHEET 2 of 2

PURPOSE OF ISSUE	STATUS/SUITABILITY	
DETAILED DESIGN	S3 - SUITABLE FOR REVIEW AND COMMENT	
DATE	SCALE	SHEET SIZE
22/11/2024	N.T.S.	A1

DRAWING NUMBER: KCCBFW-CCC-ST-XX-DR-S-0003

REVISION: D00

Xref KCC-CCC-AL-XX-M2-S-0001 LOGOS XREF.dwg