The background is a vibrant red color. It is decorated with several abstract geometric shapes: a large teal semi-circle in the top-left corner, a blue semi-circle in the top-right, a dark blue semi-circle in the bottom-right, and a teal semi-circle in the bottom-right. There are also several white circles of varying sizes, some with blue or dark blue outlines, scattered throughout the design.

Appendix F Existing Structures Impact Assessment Report

BUSCONNECTS INFRASTRUCTURE DELIVERY – PROJECT D

BALLYMUN/FINGLAS TO CITY CENTRE CORE BUS CORRIDOR STRUCTURAL SURVEY REPORT

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1 INTRODUCTION

1.1 Objective

The aim of this report is to identify, classify and know the bridges and other structures involved in the works associated to the BusConnects project, a National Transport Authority's (NTA) programme. The purpose of this programme, which is part of the Project Ireland 2040, is to solve existing mobility issues in Dublin providing additional bus lanes and reinforcing the cycle route network.

At this time, the report and analysis of the existing structures is mainly based on the information collected during a field visit, in which the layout of the corridors has been traversed and that has allowed an inventory of the bridges affected in greater or smaller way for the project.

In this report, the corridors Ballymun/Finglas to City Centre Core Bus Corridor will be studied.

1.2 Project location

Ballymun/Finglas to City Centre Core Bus Corridors of the CBC Infrastructure Works (herein after called the 'Proposed Scheme') measures approximately 6.7 km from end to end. The Proposed Scheme runs from the Ballymun Church Street southwards.

The Ballymun to City Centre Bus Corridor Study Area runs from the M50 at the northern end southward to the River Liffey at the western edge of the city centre. It is centred on the axis of Ballymun Road and Phibsborough Road and extends for a width of about 3 km in the east-west direction while the Finglas to Phibsborough Bus Corridor Study Area consisted of two sections extending from Tyrrelstown at the north-western end southwards over a distance of 6.7km to the edge of the M50 motorway, and from there to Phibsborough over a distance of approximately 5km.

Finglas to City Centre Core Bus Corridors of the CBC Infrastructure Works (herein after called the 'Proposed Scheme') measures approximately 4.2km from end to end. The Proposed Scheme runs from St Margarets Road Junction to Prospect Way southwards.

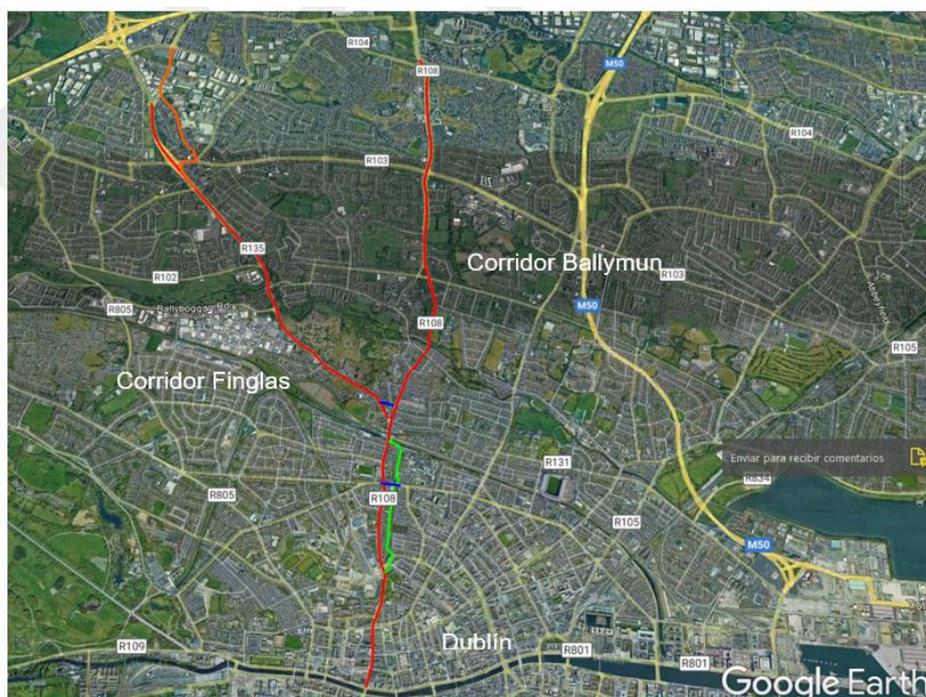


Figure 1: View of the Ballymun & Finglas corridors

2.1.2 Web of the National Inventory of Architectural Heritage

There is a national organization that collects information of buildings and unique and old structures that deserve to be protected. According to the description of his work that is collected on the web (<http://webgis.buildingsofireland.ie/HistoricEnvironment/>):

“The National Inventory of Architectural Heritage (NIAH) is a state initiative under the administration of the Department of Culture, Heritage and the Gaeltacht and established on a statutory basis under the provisions of the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999.

The purpose of the NIAH is to identify, record, and evaluate the post-1700 architectural heritage of Ireland, uniformly and consistently as an aid in the protection and conservation of the built heritage. NIAH surveys provide the basis for the recommendations of the Minister for Culture, Heritage and the Gaeltacht to the planning authorities for the inclusion of particular structures in their Record of Protected Structures (RPS).

The published surveys are a source of information on the selected structures for relevant planning authorities. They are also a research and educational resource. It is hoped that the work of the NIAH will increase public awareness and appreciation of Ireland’s architectural heritage.”

Q

Cross Guns Bridge, Cabragh (ba. W By.), Dublin City



View on map

Survey Data

Reg No	50060185
Date	1860 - 1865
Townland	CABRAGH (BA. W BY.)
County	Dublin City
Coordinates	315097, 236272
Previous Name	Westmoreland Bridge

Description

Single-span canal bridge, likely rebuild of c.1864 at same time as construction of railway bridge to north, carrying Phibsborough Road over Royal Canal. Older canal bridge apparently removed. Ashlar limestone abutments and terminating piers, latter with dressed limestone caps supporting cast-iron lamp standards with acanthus-leaf ornament to bases. Drainage spouts to outer faces of piers. Rubble limestone wing walls. Cast-iron parapets with rounded tops, round-ended vertical perforations and curving buttress-like elements to outer sides. West side of bridge has pipe attached. Canal lock to same side.

Figure 3: Example of the register of the structures in the web

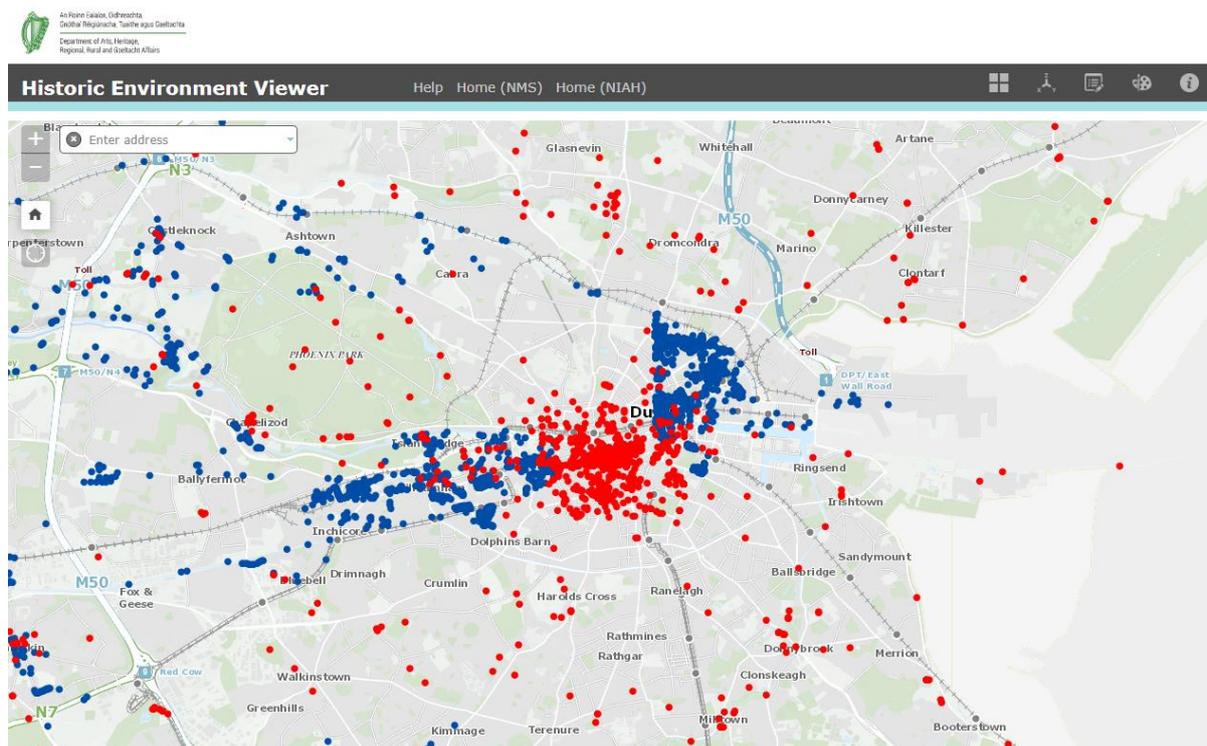


Figure 4: Database with buildings, bridges and other architectural elements in Dublin

2.1.3 Field visit

A field visit to the bridges was carried out by the structures specialist to know better the condition and typologies of the bridges within these corridors. The information collected during the visit can be seen in more detail in the Bridge Data Sheets, included in Appendix A.

During the visit, a visual inspection of the structures was carried out, analysing the typology of the superstructure and of the substructure, the surrounding infrastructure, specific site details, etc. It was also observed if there was any type of pathology or any functional problem in the bridges, and condition of supports and expansion joints, if applicable depending on the structural type. The presence of barriers was identified and recorded its type.

Representative measurements of the bridges were taken in order to study potential widening or the need of new structures instead in the area.

The existing structures surrounding and its environs were also inspected to record its condition and to determine the physical space available just in case there was needed to build new bridges to replace existing ones or to increase the road platform by new structures adjacent to the existing.

Broadly speaking, the modern bridges have sufficient space and clearances to incorporate the proposed road layout with extra lanes in the scheme. Some of the older bridges cannot accommodate the proposed road layout, therefore it is proposed widening them or building new structures adjacent to them. In those bridges where there is no work expected, the site visit and data collection has been done in a more cursory way, because in the absence of any structural work it would not be necessary to take more detailed information.



Figure 5: Measuring the depth of the slab

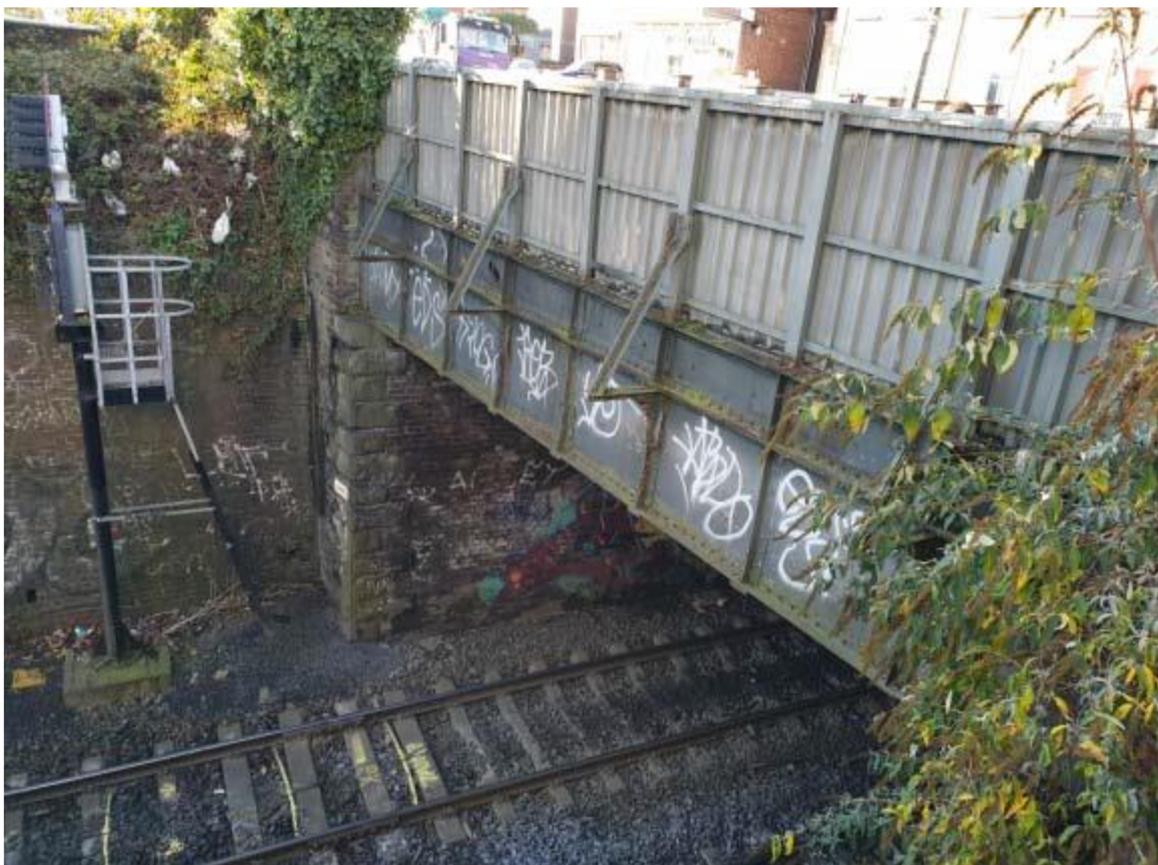


Figure 6: CBC03-02 (OBO11) Existing Parapet to be removed for bridge widening



Figure 7: Cross Guns Bridge over Royal Canal - Bridge support

2.2 Required information

This document details the current information available to aid the design in the subsequent stages of the project and to find the best possible solution at constrained points such as existing bridges and structures.

The relevant information required in subsequent design stages are, not exhaustive list, as follows:

- As-built of existing bridges (Drawings and reports)
- Year of construction and maintenance or refurbishment works carried out in the bridges (widening, reinforcements, replacements)
- Rehabilitation projects (if any) of the bridges
- Bridge structural inspection reports (Principal & General Inspections)

Irish Rail shared as-builts of CBC03-02 (OBO11) and CBC03-03 (OBD222). For more details, refer to Appendix B.

Geotechnical information is also critical to undertake the design of new structures and bridge widening, to design the foundations adequately.

3 STRUCTURAL SURVEY

In the Ballymun & Finglas corridors, the bridges have been classified into two different types: bridges and footbridges which are relatively new and for which no action is expected; and older bridges, which need to be widened or required the construction of a new bridge adjacent to them.

Some of the older bridges may be considered 'listed' or protected bridge due to their special and historic character. Thus, in those that have this kind of protection, the structural works expected might be limited.

Based on the field visits, the overall condition of all bridges inspected are good, with good conservation condition and without obvious structural pathologies that may represent a H&S risk, from the visual inspection. No intrusive tests were undertaken.

A relevant consideration of older bridges is that they are founded on masonry abutments when the newest bridges are founded on reinforced concrete substructures. This must be considered when developing the design of widening and new structures adjacent to them.

3.1 List of structures

The list of existing structures to be studied is shown below. For more details, refer to Annex A for the complete site information of the bridges.

	ID	Name	Inventory Code *	Typology	Obstacle	Station	Expected structural Works?
CBC03 – Ballymun	CBC03-01	Dean Swift Bridge	-	Concrete solid slab	Tolka river	3+760	NO
	CBC03-02	-	OBO 11	Concrete solid slab	Railway	4+700	YES
	CBC03-03	-	OBD 222	Arch + concrete solid slab	Railway	4+750	YES
	CBC03-04	Cross Guns Bridge	PB- XX- 008.00	Steel girder / Solid slab bridge	Royal Canal	4+770	YES
CBC04 - Finglas	CBC04-01	Pedestrian bridge	-	Concrete slab	Finglas Road	0+060	NO
	CBC04-02	-	-	Concrete solid slab	Finglas Road	0+780	NO
	CBC04-03	Pedestrian bridge	-	Steel truss	Finglas Road	1+025	NO
	CBC04-04	-	-	Retaining wall and concrete solid slab	Tolka River	2+660	NO

* Inventory Code taken from the plates disposed in the bridges (where available)

Table 1: List of structures Ballymun and Finglas

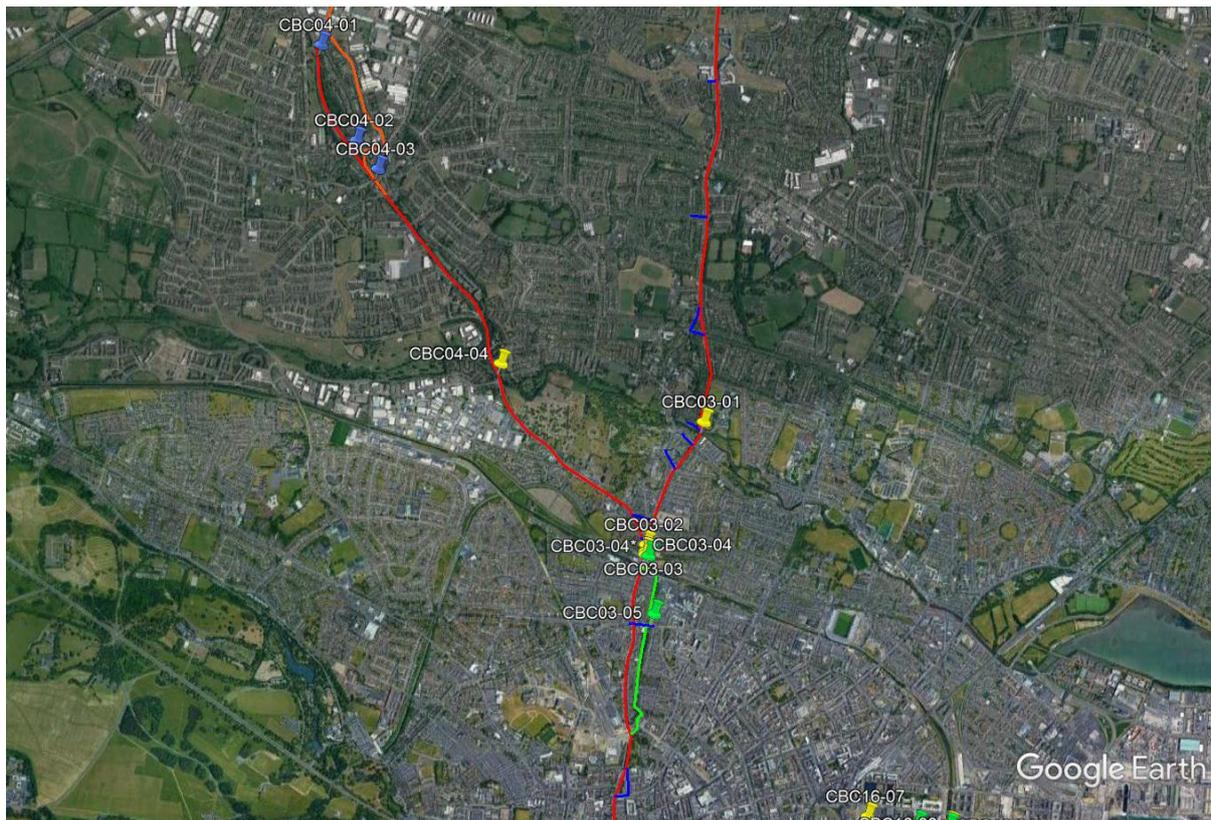


Figure 8: Location of the structures in Ballymun & Finglas corridors

3.2 Expected Structural Works

At the moment this report is written, it is envisaged structural works in the following structures:

- CBC03-02 – widening of the bridge.
- CBC03-03 – Adjacent bridge completely independent from existing one.
- CBC03-04 – Adjacent bridge completely independent from existing one

At Finglas corridor, the existing bridges are adequate to accommodate the proposed road layout with extra lanes and also comply with horizontal and vertical clearance requirements.

In the Figure 8, it is shown two proposed structures (CBC03-04* and CBC03-05) that are not related to any existing structure. Therefore, they are outside the scope of this report.

APPENDIX A – BRIDGE DATA SHEETS

STRUCTURAL SURVEY - BUSCONNECTS CORE BUS CORRIDOR - DUBLIN

Scheme = **CBC11-Kimmage to City Centre**
Structure ID = **CBC11-01**
Name = **Harold Cross Bridge / Robert Emmet Bridge**



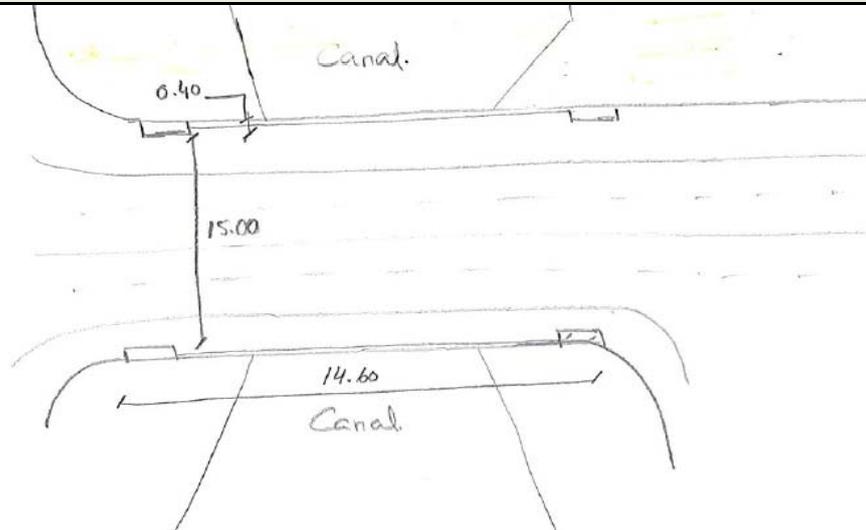
Station = 2.63
Coordinates (DD) = 53.3297021733609,-6.27517847021382
Typology = Concrete Arch
Total Length [m] = 14.60
Clear length [m] = 9.70
Width [m] = 15.00
Depth [m] = 0.50 to 3.45

Structure Description

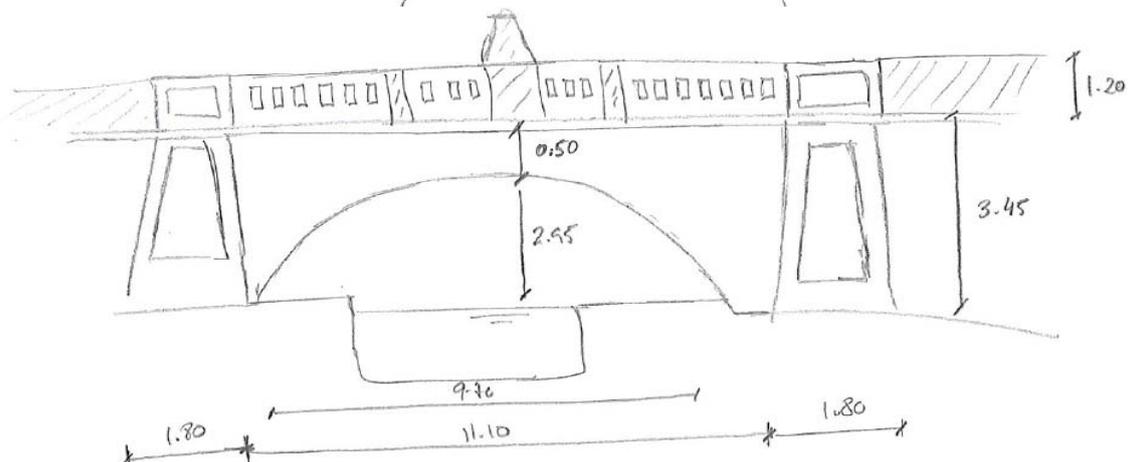
Single-arch bridge, built 1935-6, carrying road over the Grand Canal. Elliptical arch with rendered spandrels and string course. Balustrade comprising balusters and rendered handrail, terminating in rendered piers with inset panels surmounted by lamp standards. Rendered wing walls with rendered string courses, cut limestone and rendered copings. Carved limestone plaque with bust of Robert Emmet to eastern balustrade.

Sketch

Plan view



Elevation



Photos

Location



View from south abutment



Railing



Inside the arch



North access. Zone to be widened



View from the west



View from the east



STRUCTURAL SURVEY - BUSCONNECTS CORE BUS CORRIDOR - DUBLIN

Scheme = CBC03-Ballymun to City Centre
Structure ID = CBC03-01
Name = Dean Swift Bridge



Station = 3+760
Coordinates (DD) = 53.3724586181851,-6.26620474525664
Typology = Concrete solid slab
Total Length [m] = 13,75
Clear length [m] = 12,00
Width [m] = 17,70
Depth [m] = 1,45

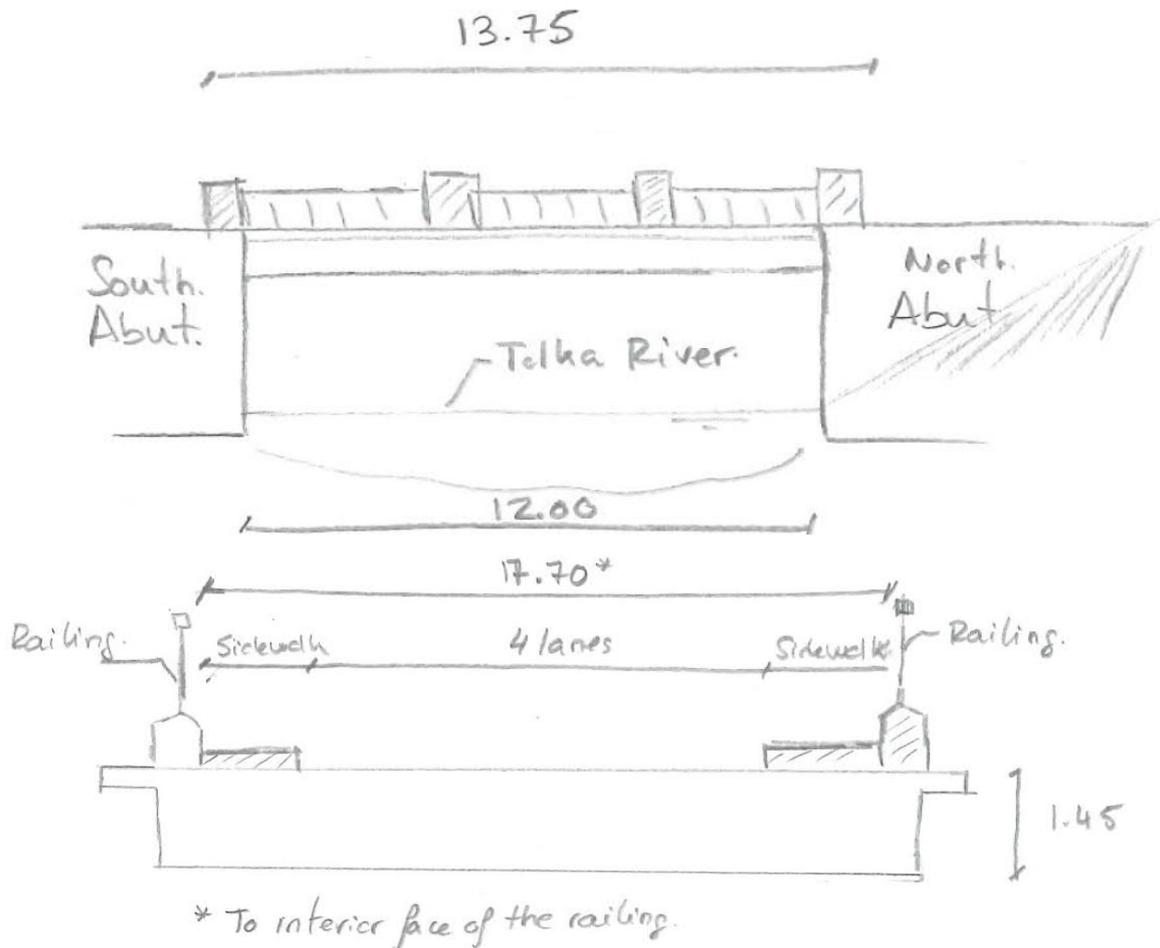
Structure Description

Single span concrete bridge over the Tolka river. 12 meters length. There are not structural works planned for this bridge.

Superstructure: - The deck contains 2+2 lanes and 2 mixes sidewalks/bike lines in 17.70 meters width. There is a metal railing with concrete pedestals on each side.

Substructure: - The two abutments are concrete wall, with concrete wingwalls containing the earth. The concrete seems to be in good condition. The deck is supported directly in the abutments, without bearings pads. There are not expansion joints.

Sketch



Photos

Location



Deck



Name Plate



Sidewalk, bike lane. West side



Deck and south abutment, view from the east



Deck/Railing. West side



Deck/Railing. East side



STRUCTURAL SURVEY - BUSCONNECTS CORE BUS CORRIDOR - DUBLIN

Scheme = **CBC03-Ballymun to City Centre**
Structure ID = **CBC03-02**
Name = -



Station = 4+700
Coordinates (DD) = 53.3648391300763,-6.27190756534662
Typology = Concrete solid slab
Total Length [m] = 12,70
Clear length [m] = 9,40
Width [m] = 17,10
Depth [m] = 1.00 interior girder / 1.43 exterior girder

Structure Description

Single-span bridge over the railway. Steel girders forming the deck and ashlar abutments. It is planned to widen the bridge by the east side where there is an existing building so close to the north abutment and deck.

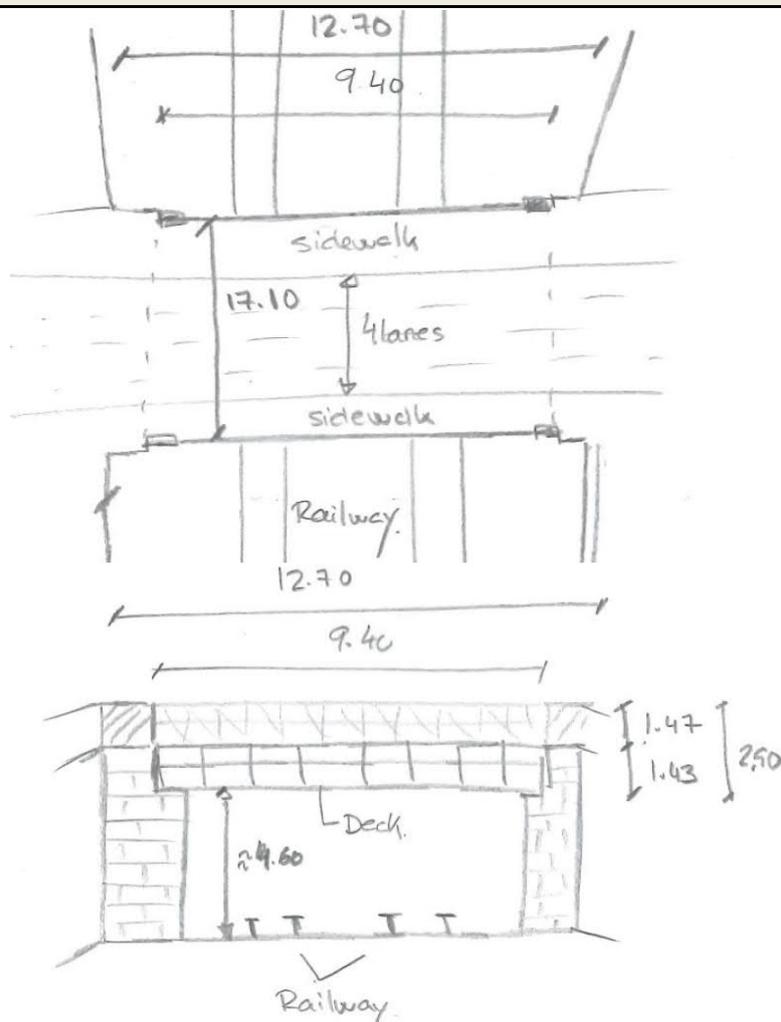
Superstructure: - The deck contains 2+2 lanes and 2 sidewalks in 17.10 meters width.
There is a metal railing with concrete pillars on each side.

Substructure: The abutments are of masonry and the lateral walls are a little displaced towards the exterior, what would allow to build the future abutment without modify the wingwalls.

Estimated vertical clearance 4.60m

Estimated vertical clearance 4.60m

Sketch

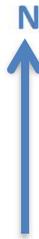


Photos

Location



Inventory Code



Deck. East view



North abutment and wall. Existing building



Zone of the north abutment to be widened



Railing



North abutment. West side



Deck/Railing. West side



STRUCTURAL SURVEY - BUSCONNECTS CORE BUS CORRIDOR - DUBLIN

Scheme = CBC03-Ballymun to City Centre
Structure ID = CBC03-03
Name = -



Station = 4+750
Coordinates (DD) = 53.3645503977657,-6.27186153786907
Typology = Arch + concrete solid slab
Total Length [m] = 12,00
Clear length [m] = 10,50
Width [m] = 18,30
Depth [m] = 0,95

Structure Description

Railway tunnel, opened 1864, on branch line from former Broadstone Station to Connolly Station, via North Wall. Tunnel is 292 yards (263 metres) east-west, with elliptical arch to east end, having rusticated limestone voussoirs and walling. Late twentieth-century extension to east, to front of tunnel, of concrete, with trapezoidal-profile metal parapets flanked by short pieces of recent brick walling with concrete copings. West end of tunnel not accessible to view.

It is planned to built a pedestrian bridge just beside, without interfering with the existing deck but supported on the existing wall / abutment.

Location



Photos

Deck



Deck and railing



Inventory Code



Support detail



STRUCTURAL SURVEY - BUSCONNECTS CORE BUS CORRIDOR - DUBLIN

Scheme = **CBC03-Ballymun to City Centre**
Structure ID = **CBC03-04**
Name = **Cross Guns Bridge over Royal Canal**



Station = 4+770
Coordinates (DD) = 53.3643517641307,-6.27150303713494
Typology = **Steel girder / Solid slab bridge**
Total Length [m] = 14.60-16.40
Clear length [m] = 4.80 to 11.75
Width [m] = 18,30
Depth [m] = 0.60-0.90

Structure Description

Single-span canal bridge, likely rebuild of c.1864 at same time as construction of railway bridge to north, carrying Phibsborough Road over Royal Canal. Older canal bridge apparently removed. Ashlar limestone abutments and terminating piers, latter with dressed limestone caps supporting cast-iron lamp standards with acanthus-leaf ornament to bases. Drainage spouts to outer faces of piers. Rubble limestone wing walls. Cast-iron parapets with rounded tops, round-ended vertical perforations and curving buttress-like elements to outer sides. West side of bridge has pipe attached. Canal lock to same side.

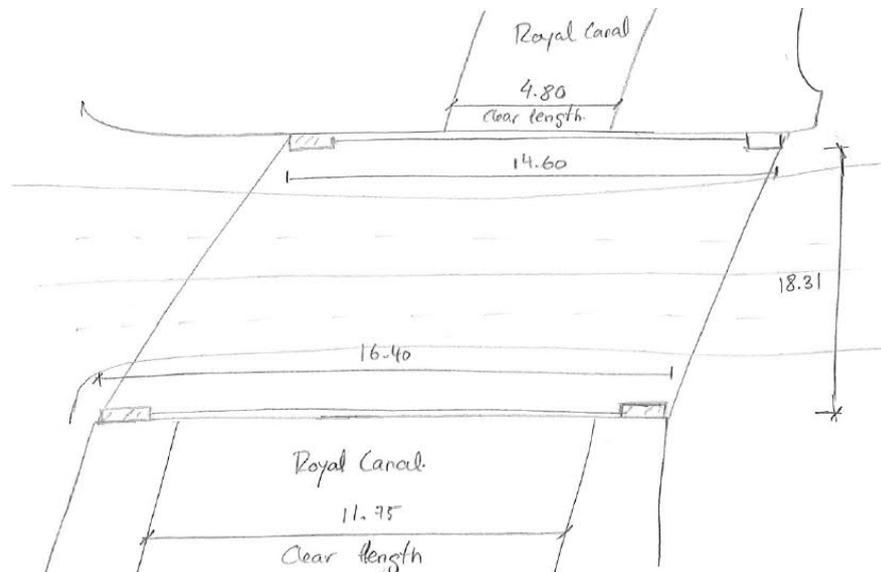
Superstructure: The clear length varies from west side to east side (4.80-11.75). The deck is of concrete with cast iron railings and embedded beams at the edges. The deck has a trapezoidal form due to that variable length of the span.

Substructure: The abutments are of ashlar limestone. They are skewed and they neither are parallel. They have little wing walls and from them leave some walls that delimit the channel

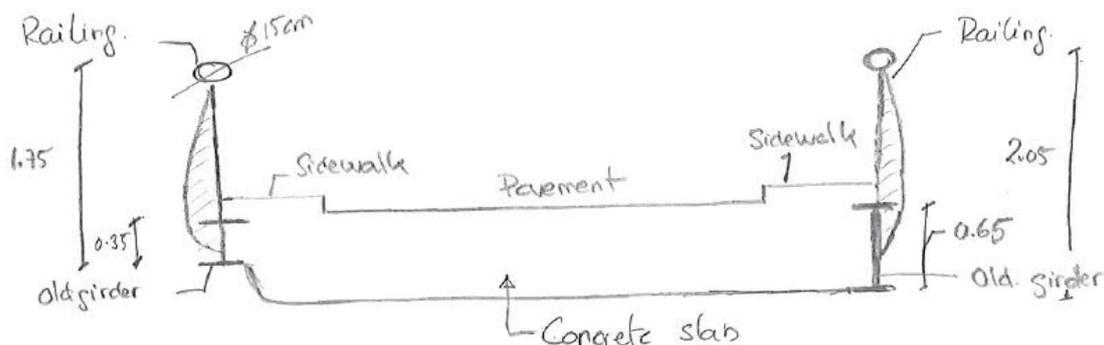
The abutment seems to be in a good condition. The joints between ashlars seem to have been slightly dissolved in some places. There are not bearing devices. The deck is directly supported on the abutment.

Sketch

Plan view

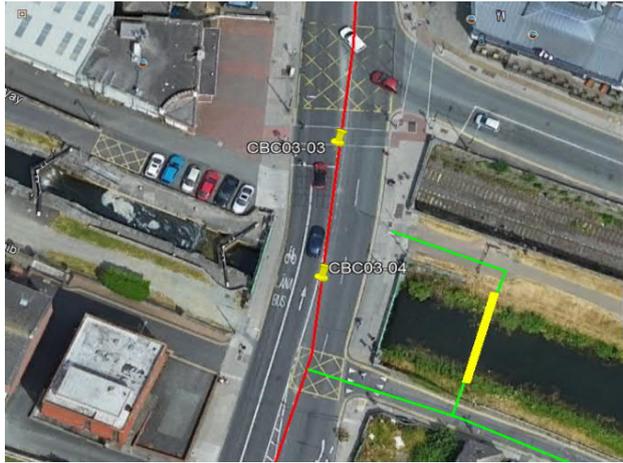


Typical section



Photos

Location



Deck and railing



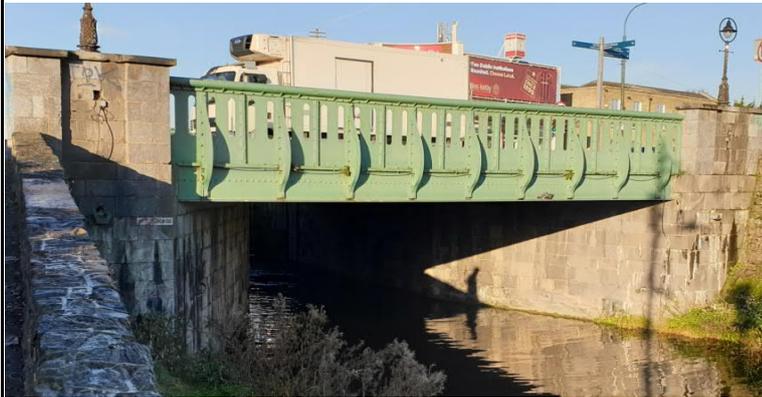
Deck



Deck support on south abutment



Deck. East view



Deck support on north abutment



South abutment. Inventory code



North entrance to the bridge



STRUCTURAL SURVEY - BUSCONNECTS CORE BUS CORRIDOR - DUBLIN

Scheme = **CBC04-Finglas to Phibsborough**
Structure ID = **CBC04-01**
Name = **Footbridge over Finglass Rd**



Station = 0+060
Coordinates (DD) = 53.3959150391496,-6.30541174199865
Typology = Concrete slab
Total Length [m] = 187,10
Span lengths [m] = 27.2*+17.6+20.5+28.7+18.5+9.6+9.6+18.5+14.8*
Width [m] = 2,70
Depth [m] = 0,70
*Length of the access ramp on the abutments

Structure Description

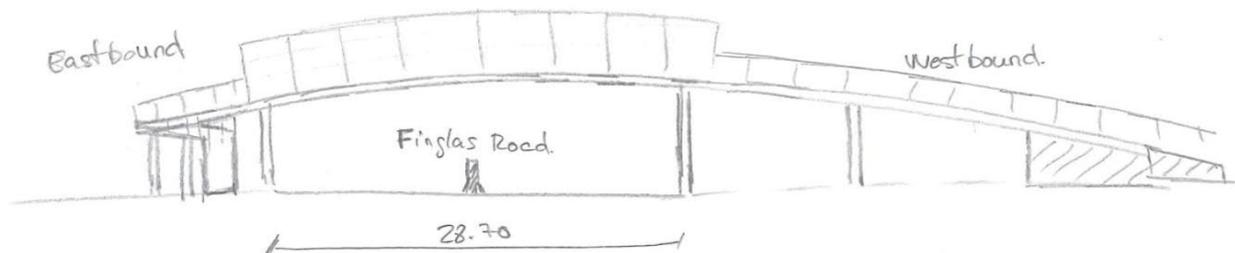
Pedestrian bridge over Finglas Road with a concrete solid slab typical section of 0.70m depth. 4 spans in the main section and 4 other spans in the east access (circular access). The largest span, over the road is 28.72m length.

The piers for the main span are rectangular with rounded angles, 1.55x1.60m. For the other spans are 1.1x0.45m, rectangular with rounded angles as well.

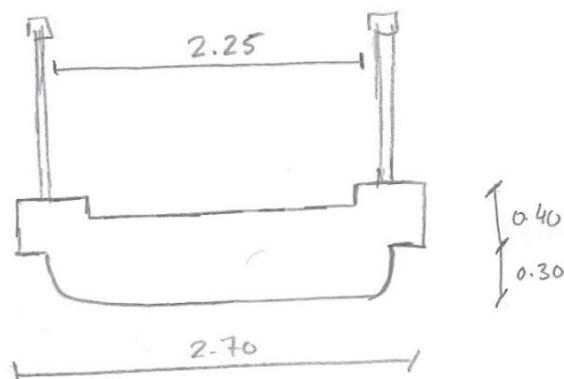
The Busconnects project will go under the pedestrian bridge, so no action in the structure is expected.

Sketch

Elevation

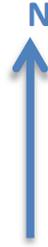


Typical section



Photos

Location



West access



West access and main span



Main span



Entrance to main span



East access



Expansion joint detail



STRUCTURAL SURVEY - BUSCONNECTS CORE BUS CORRIDOR - DUBLIN

Scheme = **CBC04-Finglas to Phibsborough**
Structure ID = **CBC04-02**
Name = **Overpass over Finglass Rd**



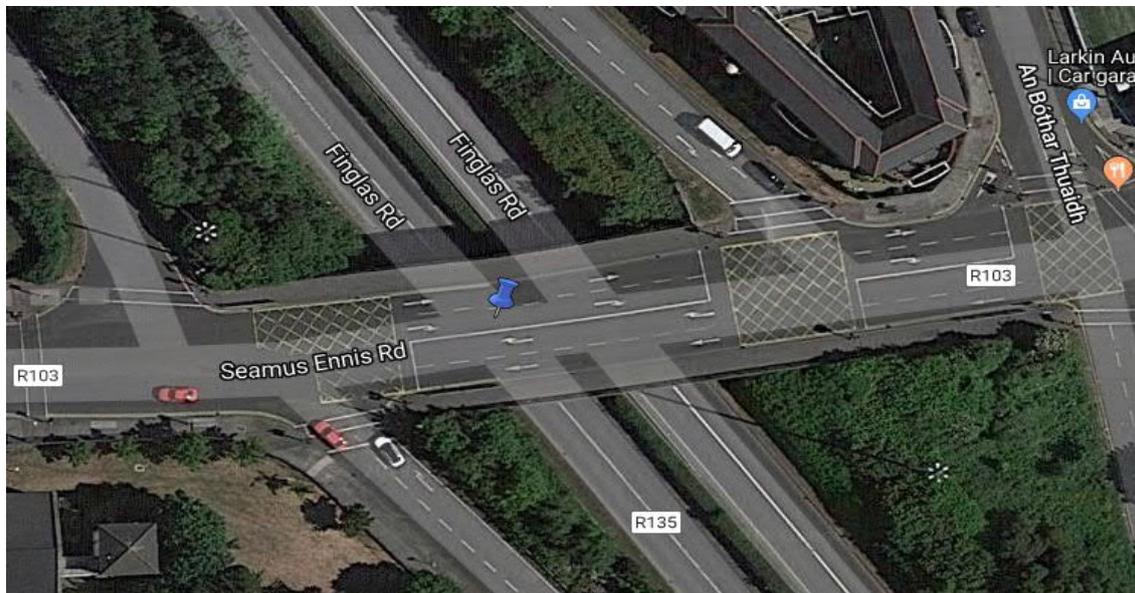
Station = 0+780
Coordinates (DD) = 53.3898574862552,-6.30167328030814
Typology = Concrete solid slab
Total Length [m] = 28,80
Span lengths [m] = 14.40+14.40
Width [m] = 20,50
Depth [m] = -

Structure Description

2 span overpass, over Finglas Road. The deck is a concrete solid slab. The abutments are of concrete as well, with wing walls. The central support consists of 3 rectangular with rounded angles columns of reinforced concrete that are placed at the median strip. The deck have 4 road lanes and two sidewalks.

The Busconnects project will go under the pedestrian bridge, so no action in the structure is expected.

Location



Photos

Elevation view from the south



Railing



View from Finglas Rd



Sidewalk



Deck/Railing. North side



Sidewalk and railing



STRUCTURAL SURVEY - BUSCONNECTS CORE BUS CORRIDOR - DUBLIN

Scheme = **CBC04-Finglas to Phibsborough**
Structure ID = **CBC04-03**
Name = **Footbridge over Finglass Rd**



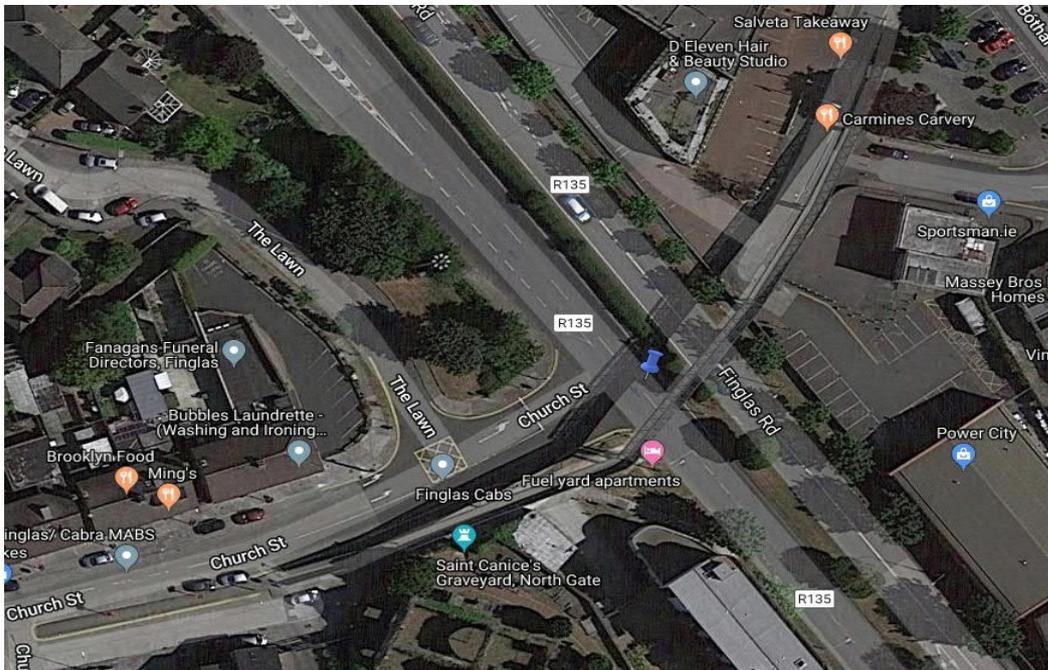
Station = 1+025
Coordinates (DD) = 53.3880330587652,-6.29935244840067
Typology = Steel truss
Total Length [m] = 133,00
Span lengths [m] = Main span 32.00
Width [m] = 2,50
Depth [m] = 1.55 - 2.30

Structure Description

Steel pedestrian bridge over Finglass Road. The deck is a steel truss of square profiles with a depth of 1.55m in the access ramps and 2.30m of depth in the main span, of 32.00m length.

The Busconnects project will go under the pedestrian bridge, so no action in the structure is expected.

Location



Photos

Deck



Access to main span



Western entrance



Eastern entrance



Pier



East access



STRUCTURAL SURVEY - BUSCONNECTS CORE BUS CORRIDOR - DUBLIN

Scheme = **CBC04-Finglas to Phibsborough**
Structure ID = **CBC04-04**
Name = **Bridge over Tolka River**



Station = 2+660
Coordinates (DD) = 53.3766127965296,-6.28626237883509
Typology = Retaining wall and concrete solid slab
Total Length [m] = 25,20
Span lengths [m] = 7.30+10.60+7.30
Width [m] = 26,44
Depth [m] = 1,50

Structure Description

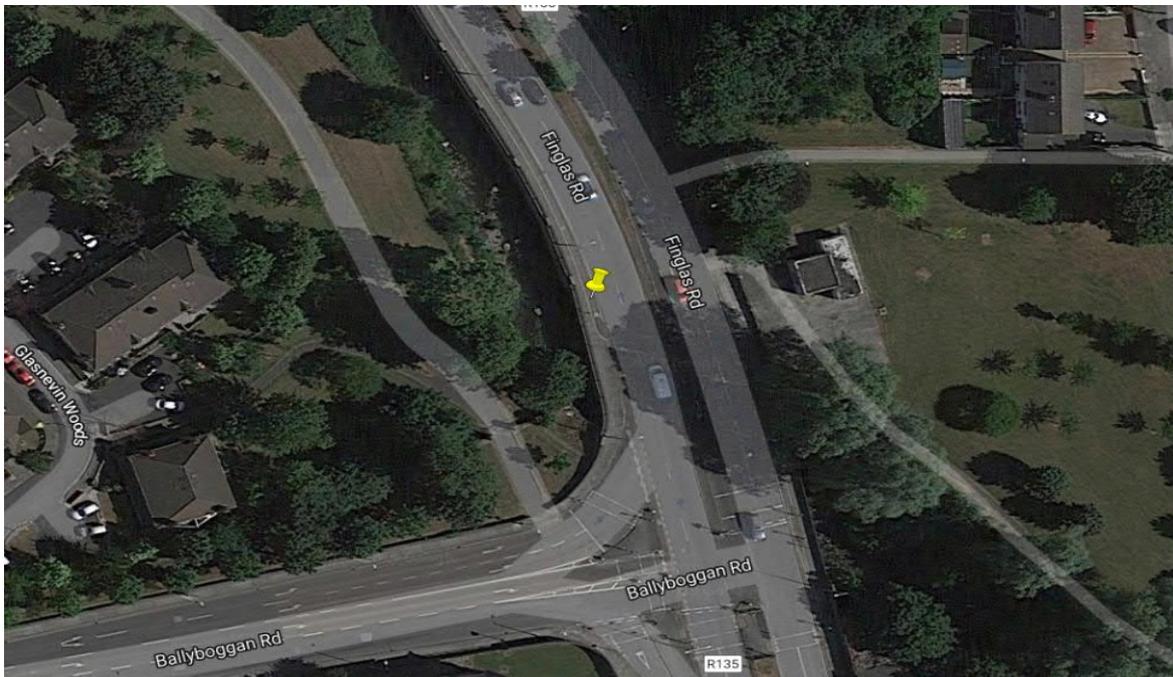
Solid slab concrete bridge over the Tolka River. The bridge has 3 spans with length of 7.30+10.60+7.30. The total length is 25.20m.

Superstructure: - The deck slab has around 1.50m depth. It has a metal railing on the west side and a stone wall/railing on the east side.

Substructure: The substructure is so skewed to be adapted to the river flow. The abutments are of concrete with a long wall in the west side of the north abutment. The two piers are very similar to a "hammerhead pier" and they are founded in the river bed.

There are not structural works planned for this bridge.

Location



Photos

Deck. Elevation view



Deck, railing and wall



South abutment



Support detail



Expansion joint and railing



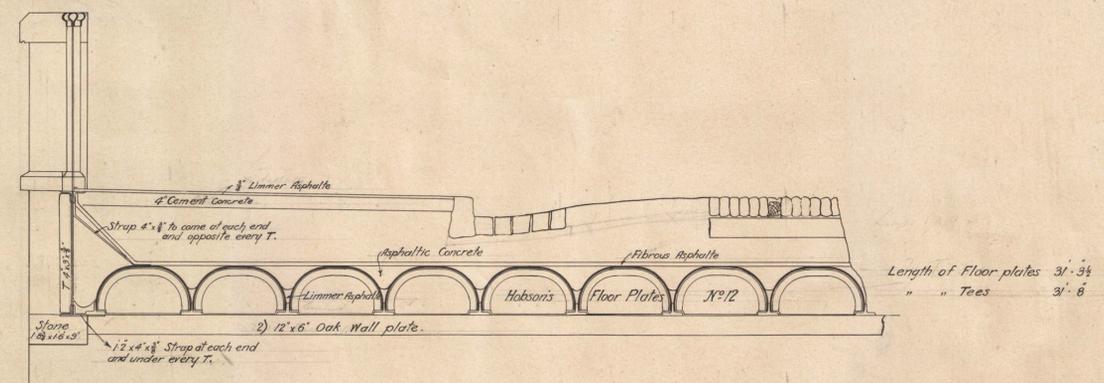
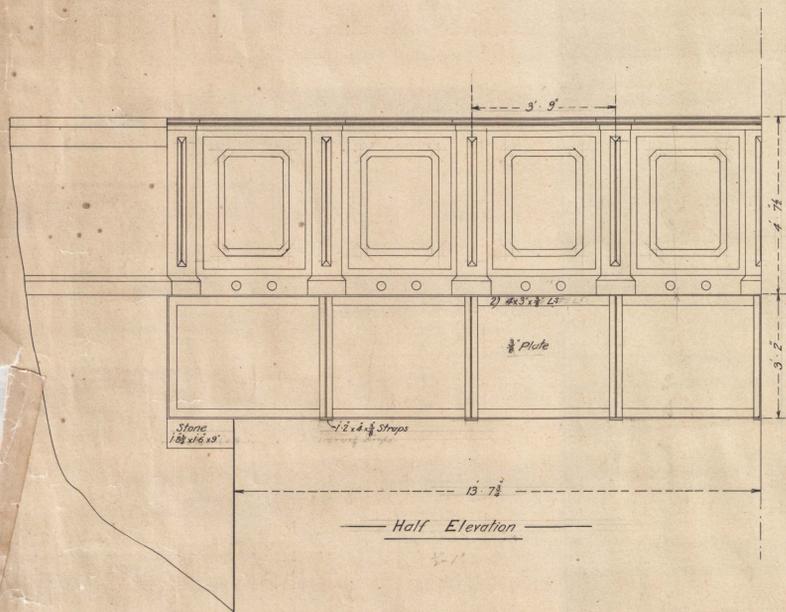
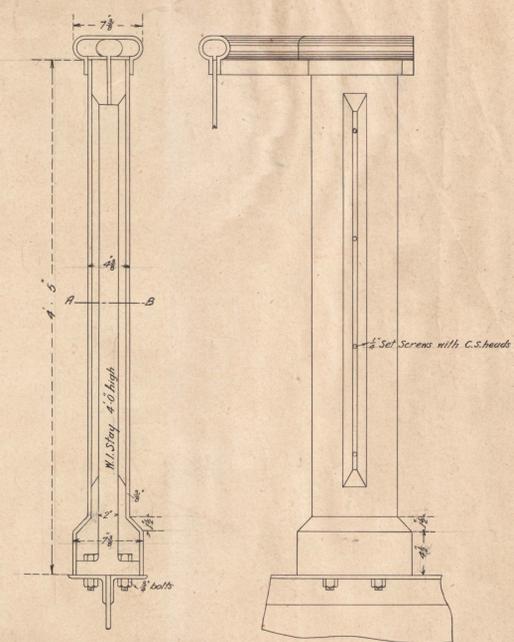
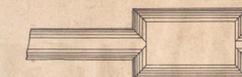
Pier and stone railing



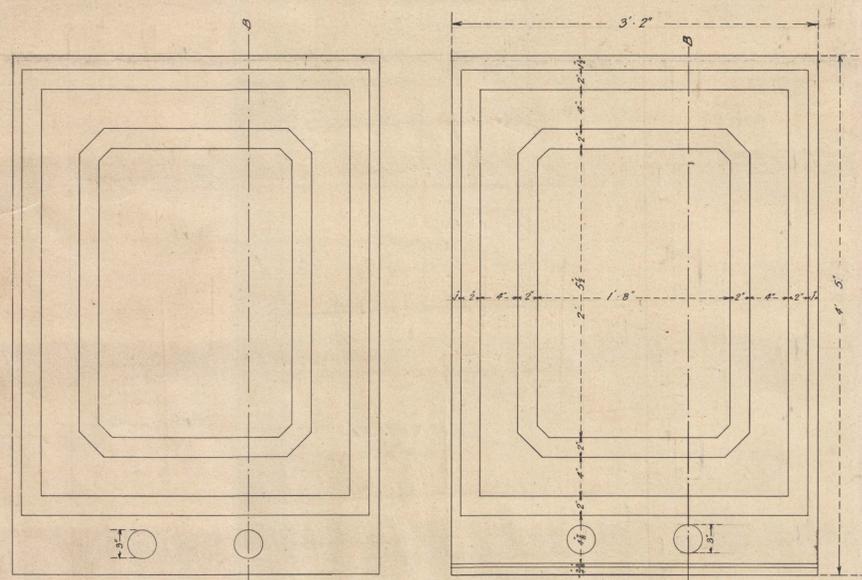
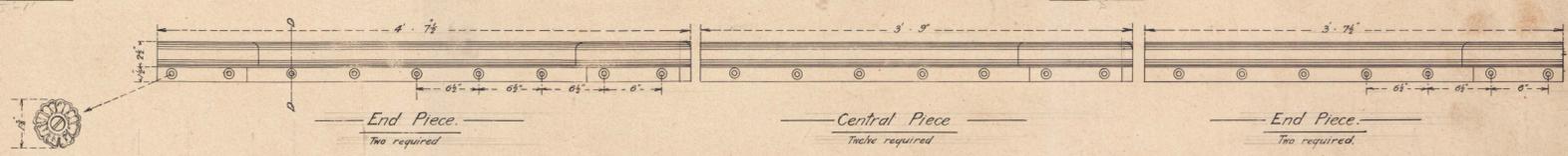
APPENDIX B – AS-BUILTS CBC03-02 & CBC03-03



C. S & W. R.
 DRUMCONDRA LINK LINE
 GLASNEVIN ROAD
 OVERBRIDGE

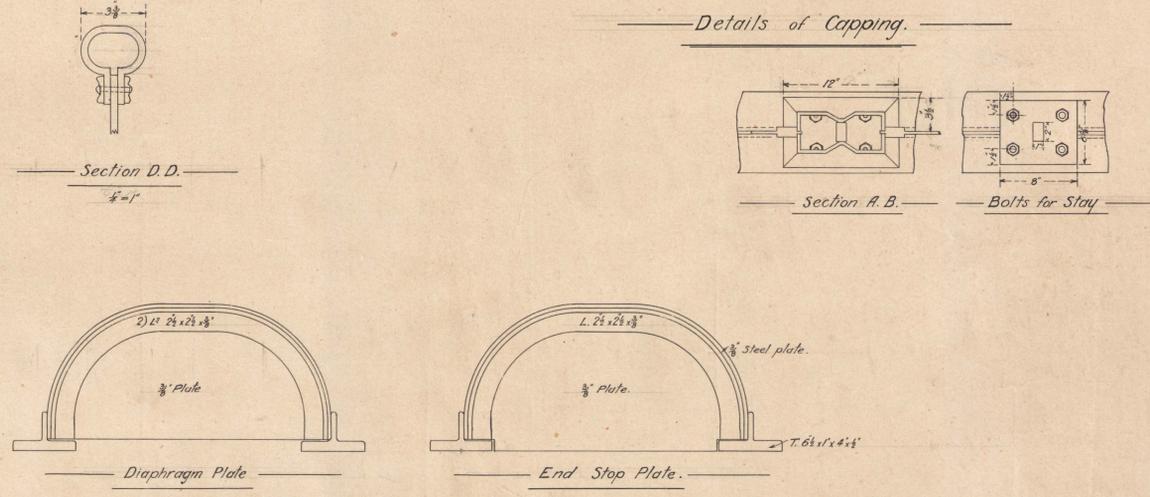


Cross Section



Outside Elevation Inside Elevation

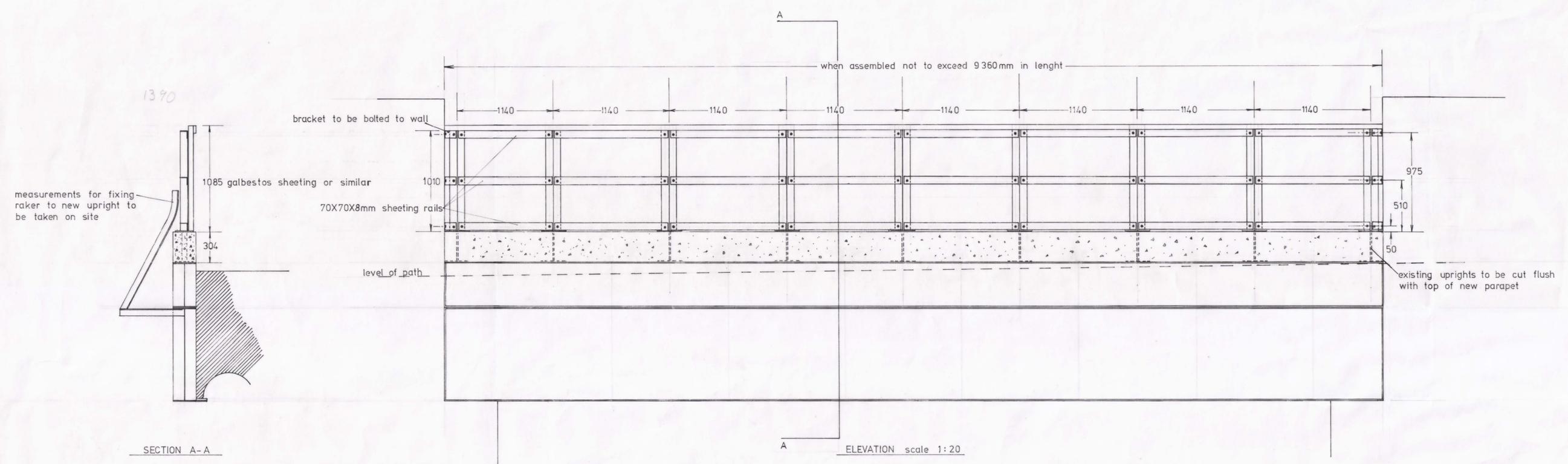
Panel Plates



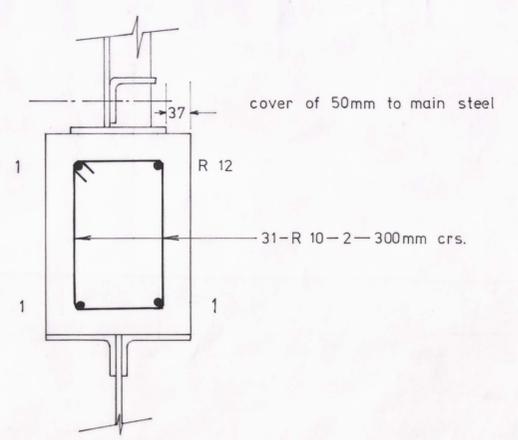
SCALES -
For Elevation and Cross Section 1/2" = 1'
" Details 3/8" = 1'

C. S & W. R
DRUMCONDRA LINK LINE.
GLASNEVIN ROAD.
OVERBRIDGE.

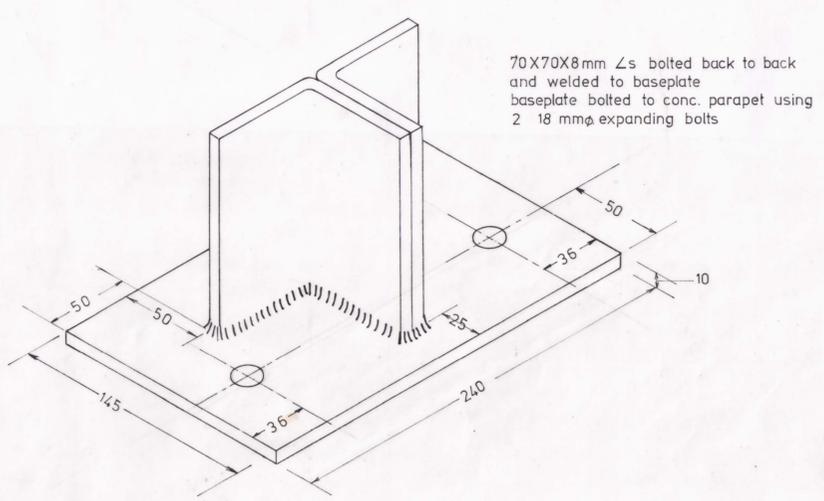
Proposed Parapets at Crossguns Bridge



NOTES
 ALL DIMENSIONS IN MM
 BOTH PARAPETS TO BE RENEWED



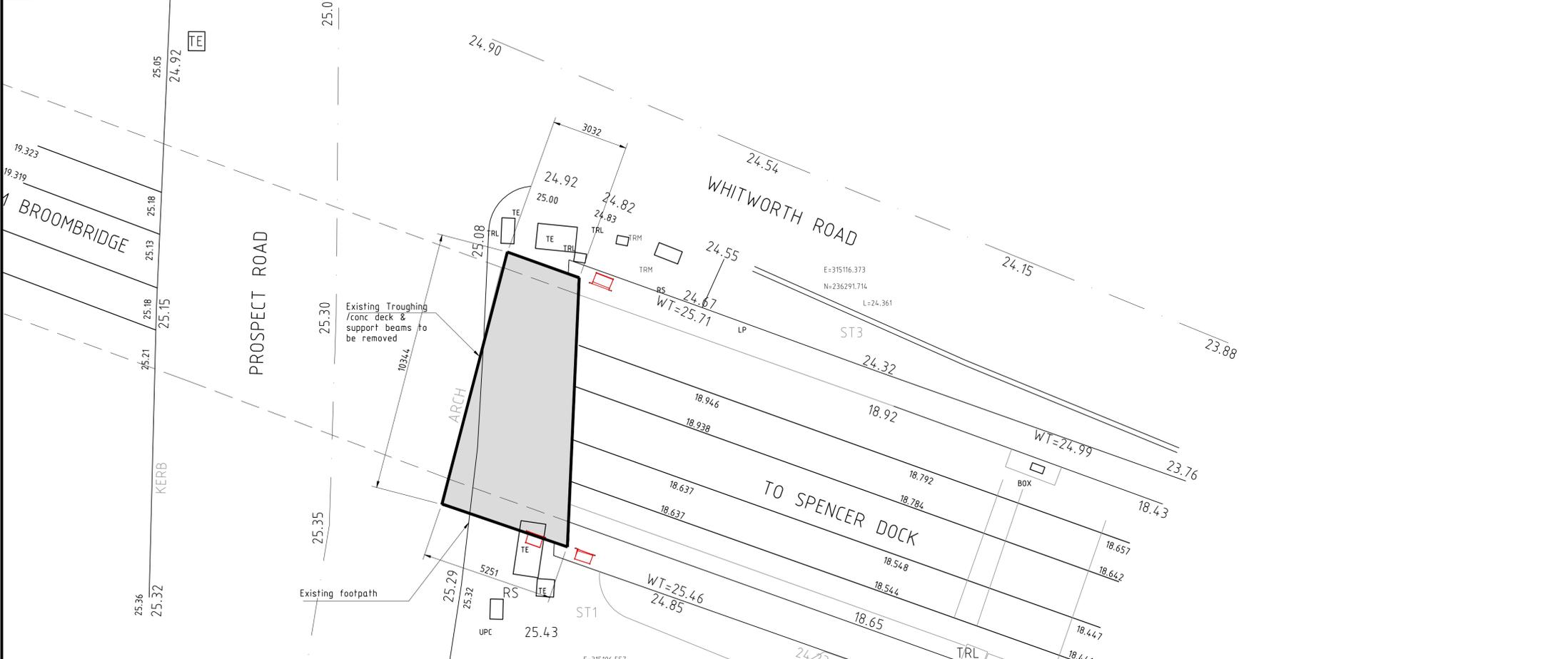
DETAIL OF CONCRETE PARAPET
 scale 1:5



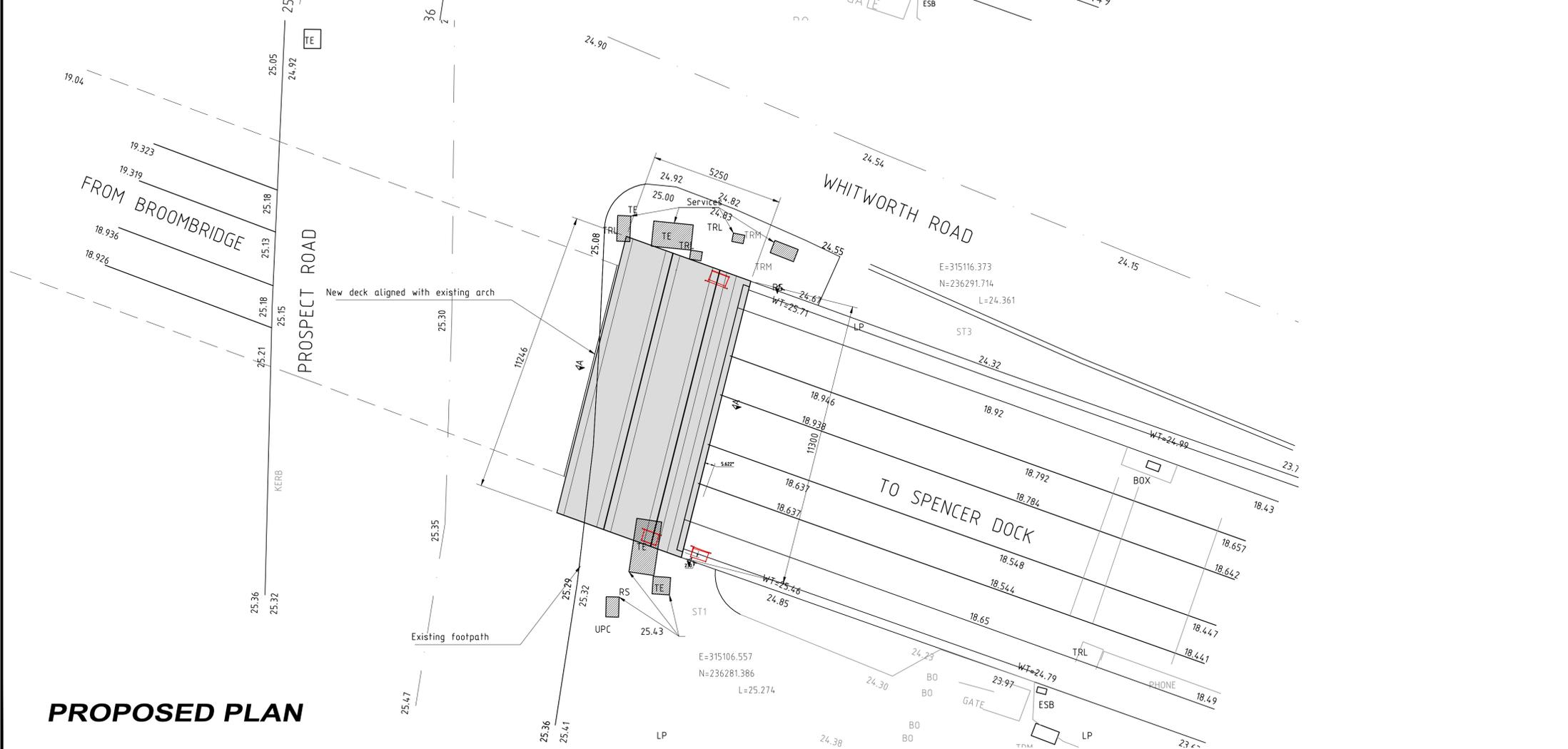
DETAIL OF BASEPLATE scale 1:2

OFFICE	DIVISIONAL ENGINEER — DUBLIN		
REVISIONS			
A/			
B/			
C/			
D/			
E/			
DRAWN	CHECKED	SURVEYED	DATE 26-9-78

C6ras Iompair Éireann Civil Engineering Department	
RENEWAL OF PARAPET CROSSGUNS BRIDGE	
SCALES AS SHOWN	DRAWING NO.



EXISTING PLAN



PROPOSED PLAN

- NOTES:**
1. All concrete to be Grade 50/20
 2. All chamfers 25x25 unless otherwise stated
 3. Edge Beam to be prefabricated and delivered to site. Bridge Deck to be poured insitu.
 4. All concrete surfaces to be Class F4 finish.

- FINISHES**
- Bush hammered finish: recess on outside faces
 - F3: All other formed surfaces
 - U3: Top of walls
 - U4: Surfaces to receive waterproofing membrane
 - U1: All other unformed surfaces
 - F4: Are as for Class F3 except that internal ties and embedded metal formwork supports will be permitted.

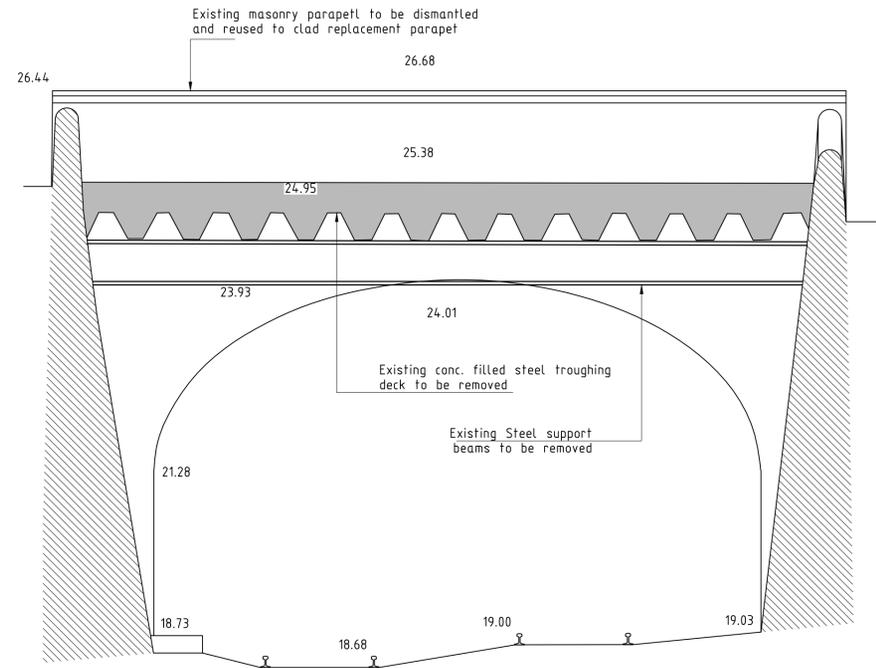
THIS DRAWING IS BASED ON SURVEY DRAWING NO.:
THIS DRAWING TO BE IN READ IN CONJUNCTION WITH DRAWING(S) NO.:

REV	DESCRIPTION	BY	CHK'D	APPR'D	DATE
E/					
D/					
C/					
B/					
A/					

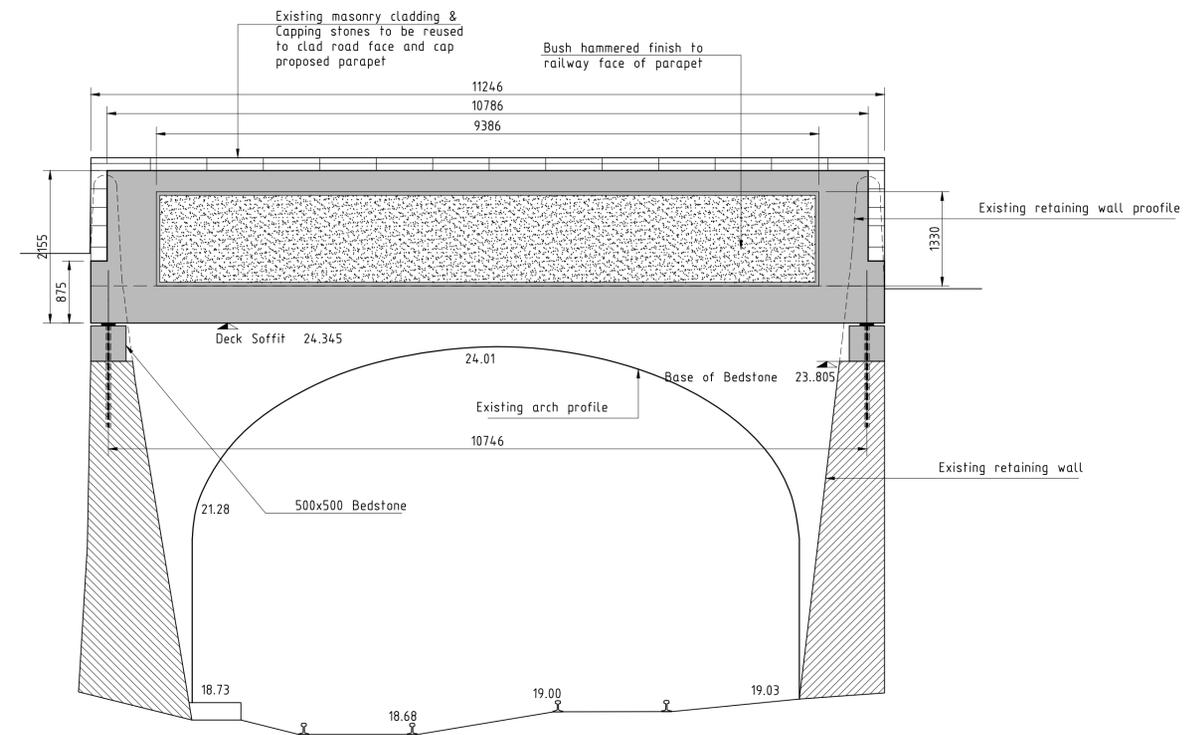
DRAWING STATUS		TENDER ISSUE			
DRAWN	DESIGNED	CHECKED	APPR'D	DATE	
AWB	SB	EN	LM	Sept 11	



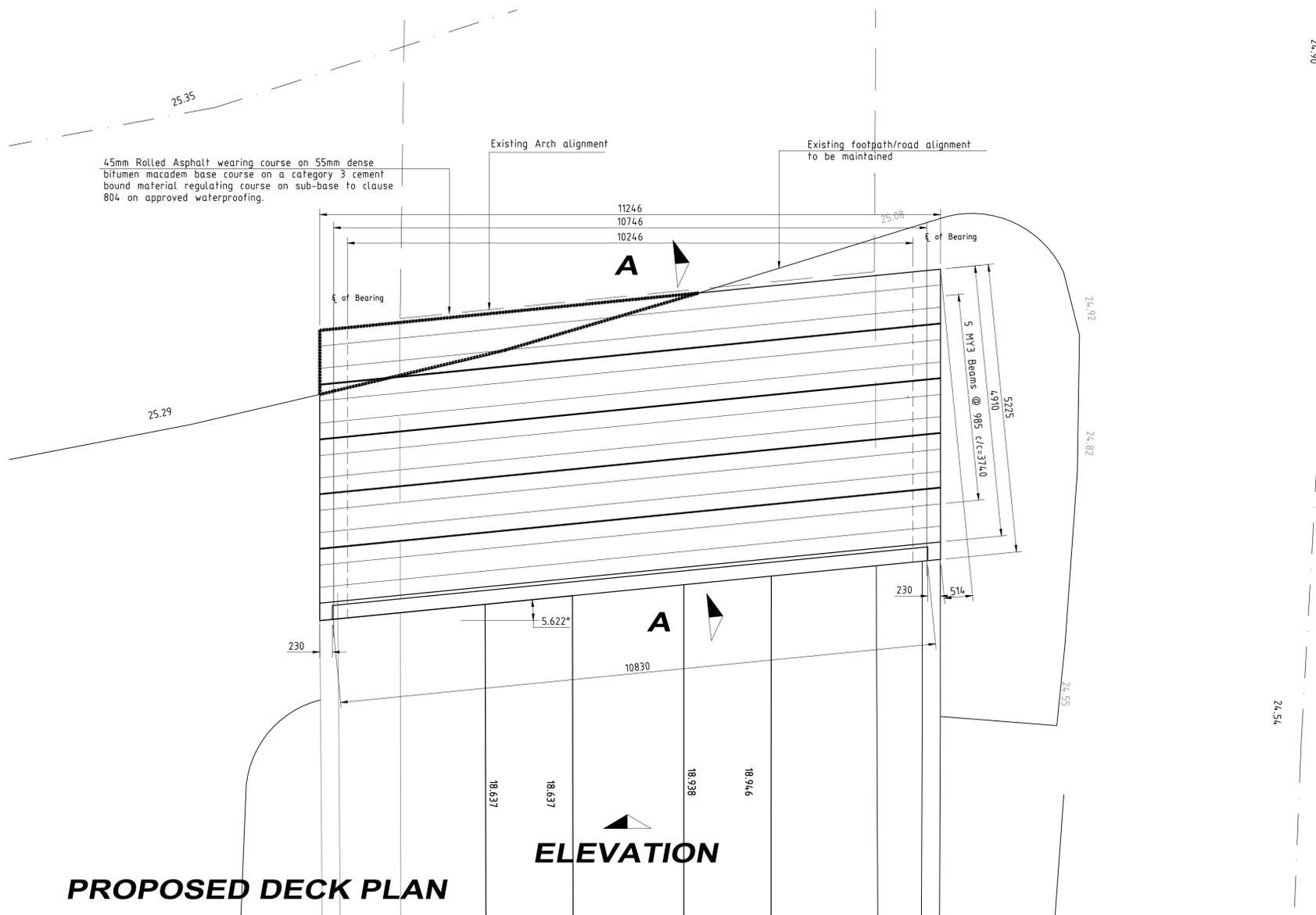
**OB 222 CROSS GUNS BRIDGE
MGWR NORTH WALL (LIFFEY BRANCH)
REPLACEMENT BRIDGE EXTENSION
GENERAL ARRANGEMENT 1 OF 3**



EXISTING ELEVATION



PROPOSED ELEVATION



PROPOSED DECK PLAN

- NOTES:**
1. All concrete to be Grade 50/20
 2. All chamfers 25x25 unless otherwise stated
 3. Edge Beam to be prefabricated and delivered to site. Bridge Deck to be poured insitu.
 4. All concrete surfaces to be Class F4 finish.

- FINISHES**
- Bush hammered finish: recess on outside faces
 - F3: All other formed surfaces
 - U3: Top of walls
 - U4: Surfaces to receive waterproofing membrane
 - U1: All other unformed surfaces
 - F4: Are as for Class F3 except that internal ties and embedded metal formwork supports will be permitted.

THIS DRAWING IS BASED ON SURVEY DRAWING NO.:
THIS DRAWING TO BE IN READ IN CONJUNCTION WITH DRAWING(S) NO.:

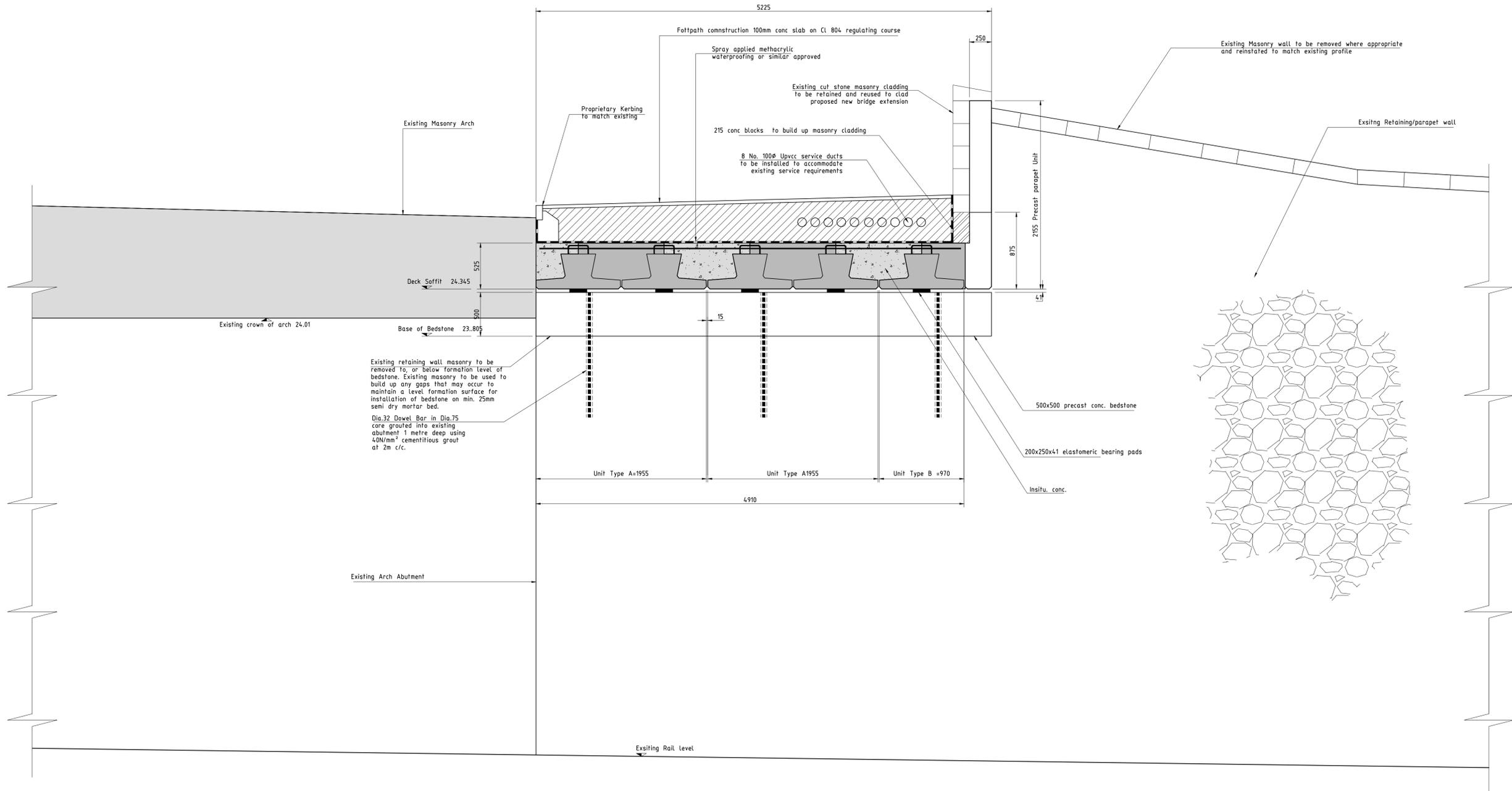
REV	DESCRIPTION	BY	CHK'D	APPR'D	DATE
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D/					
C/					
B/					
A/					

DRAWING STATUS		TENDER ISSUE			
DRAWN	DESIGNED	CHECKED	APPR'D	DATE	
AWB	SB	EN	LM	Sept 11	

Iarnród Éireann
Structural Design Section, New Works,
Iarnród Éireann, Track & Signal HQ,
Inchicore Works, Dublin 8.

**OB 222 CROSS GUNS BRIDGE
MGWR NORTH WALL (LIFFEY BRANCH)
REPLACEMENT BRIDGE EXTENSION
GENERAL ARRANGEMENT 2 OF 3**

SCALES 1:50 DRAWING No. 151-3815



TYPICAL CROSS SECTION A-A

NOTES:

1. All concrete to be Grade 50/20
2. All chamfers 25x25 unless otherwise stated
3. Edge Beam to be prefabricated and delivered to site. Bridge Deck to be poured insitu.
4. All concrete surfaces to be Class F4 finish.

FINISHES

- Bush hammered finish: recess on outside faces
- F3: All other formed surfaces
- U3: Top of walls
- U4: Surfaces to receive waterproofing membrane
- U1: All other unformed surfaces
- F4: Are as for Class F3 except that internal ties and embedded metal formwork supports will be permitted.

THIS DRAWING IS BASED ON SURVEY DRAWING NO.:
THIS DRAWING TO BE IN READ IN CONJUNCTION WITH DRAWING(S) NO.:

REV	DESCRIPTION	BY	CHK'D	APPR'D	DATE
E/					
D/					
C/					
B/					
A/					

DRAWING STATUS		TENDER ISSUE			
DRAWN	DESIGNED	CHECKED	APPR'D	DATE	
AWB	SB	EN	LM	Sept 11	

Iarnród Éireann *Structural Design Section, New Works, Iarnród Éireann, Track & Signal HQ, Inchicore Works, Dublin 8.*

**OB 222 CROSS GUNS BRIDGE
MGWR NORTH WALL (LIFFEY BRANCH)
DECK EXTENSION REPLACEMENT
GENERAL ARRANGEMENT 3 OF 3**