Appendix J1
Preliminary Design Report
- Tolka River Bridge

National Transport Authority

Blanchardstown to City Centre Core Bus Corridor Scheme

Preliminary Design Report - Tolka River Bridge

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1 Introduction

1.1 Design Brief

Arup has been appointed by the National Transport Authority (NTA) to undertake a preliminary design of the proposed Blanchardstown to City Centre Core Bus Corridor (CBC) Scheme (hereinafter referred to as the 'Proposed Scheme') of the BusConnects CBC network. Arup's appointment includes the preliminary design of structures including modifications, on this Proposed Scheme.

This report includes the considerations and assumptions made during the preparation of the preliminary design of the Tolka River Bridge, TII Structure Ref. FG-N03-008.00.

1.2 Project Background

The BusConnects Dublin Programme is a plan to transform Dublin's bus system, with the Core Bus Corridor (CBC) project providing 230km of dedicated bus lanes and 200km of cycle tracks across sixteen of the busiest bus corridors in and out of the city centre. The project is fundamental to addressing the congestion issues in the Dublin region with the population due to grow by 25% by 2040. In June 2018 the National Transport Authority (NTA) published the Core Bus Corridors Project Report, which set out the vision for the provision of bus lanes and cycle tracks on sixteen key bus corridors.

The Blanchardstown to City Centre CBC is identified in this document as forming part of the radial Core Bus Network. The BusConnects Dublin Core Bus Network is shown in Figure 1.

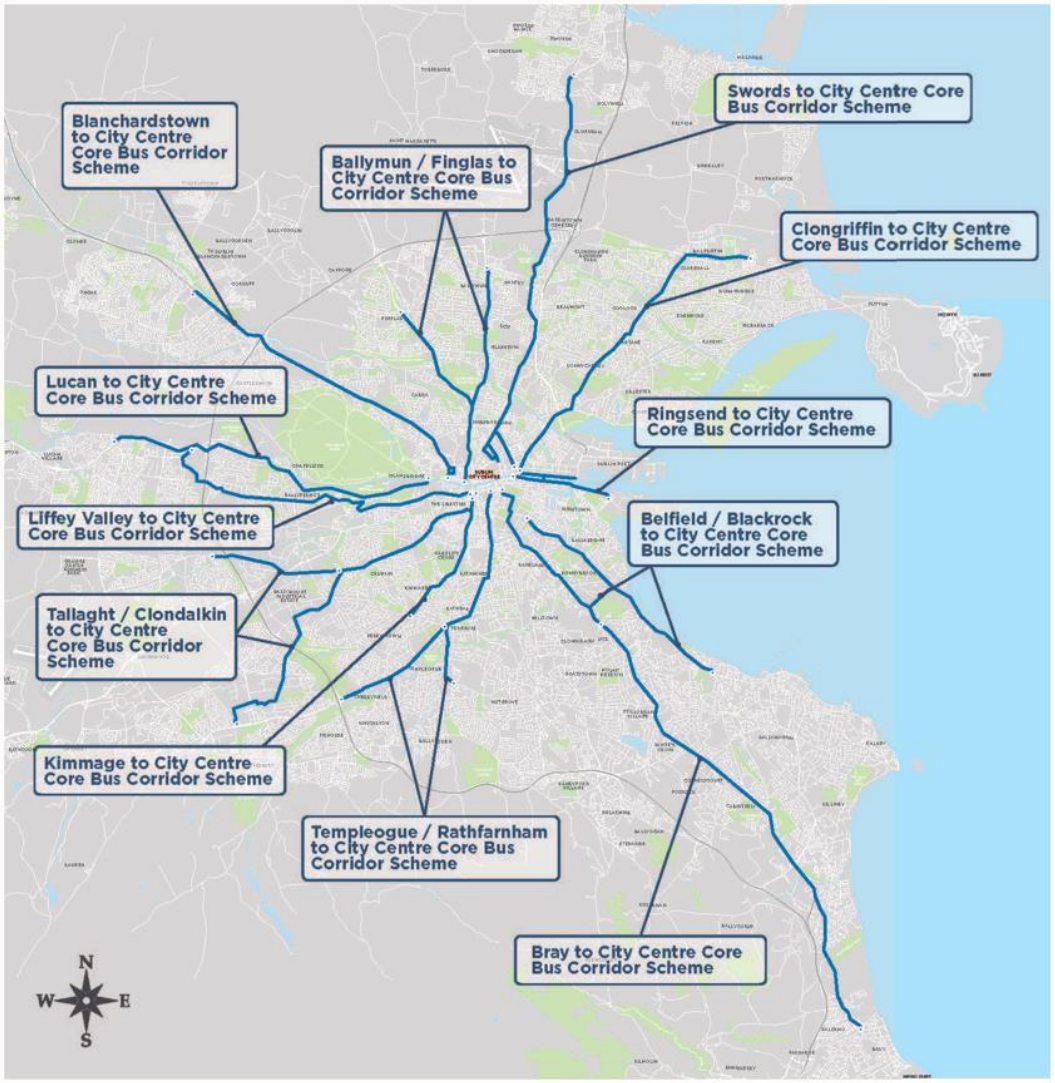


Figure 1: BusConnects Dublin Radial CBC Network

The Proposed Scheme commences at Junction 3 (Blanchardstown / Mulhuddart) southbound off-slip from the N3. The Proposed Scheme proceeds along the R121 Blanchardstown Road South into the Blanchardstown Shopping Centre.

From a new terminus to the north-west of Blanchardstown Shopping Centre the Proposed Scheme is routed onto the N3 Navan Road via the Snugborough Road junction and follows the N3 and Navan Road as far as the junction with the Old Cabra Road. From here, the Proposed Scheme is routed along Old Cabra Road, Prussia Street, Manor Street and Stoneybatter to the junction with King Street North. The core bus corridor is then routed via Blackhall Place as far as the junction with Ellis Quay, where it joins the prevailing traffic management regime on the North Quays. At the Stoneybatter / Brunswick Street North junction, cyclists proceed along Brunswick Street North, George's Lane and Queen Street as far as Ellis Quay/Arran Quay.

1.3 Previous Studies

The first non-statutory public consultation on the BusConnects CBCs took place on a phased basis between November 2018 to May 2019. The second round of public consultations occurred between March 2020 to April 2020. A third round of public consultations then followed between November 2020 and December 2020.

Consultation with the principal project stakeholders (i.e. Dublin City Council, Fingal County Council, Transport Infrastructure Ireland, An Garda, Utility companies and the National Transport Authority) has also taken place.

A desktop study was undertaken to identify the existing structures within the project extents, with site inspections undertaken where information was limited.

1.4 Extent of Bridge Works

The existing Tolka River bridge is proposed to be extended by approximately 2 m at its southern end to accommodate the widened carriageway and bus lanes as part of the BusConnects scheme.

1.5 Consultation with TII Structures Section

The proposed bridge widening works was presented to TII Structures Section for review and comment. Following this review and a follow up meeting with TII (held on the 6/07/2021), it was agreed that the widened bridge deck shall be structurally connected to the existing structure. This connection will limit the differential movement between the two structures and avoid the risk of longitudinal cracking occurring in the road pavement above. It was also agreed that the bridge should be founded on a piled foundation to limit potential settlements. The drawings and this report have been updated to reflect these details.

The following actions were also agreed:

- Undertake a visual assessment of the existing structure to record defects and arrange for any necessary repairs.
- Enquire with the pre-cast beam manufacturers to see if they have any historical records of the existing beams used on the previous extension.
- Undertake a structural assessment to assess impact of proposed widening works on the existing structure.
- Review the current Standards to assess whether there are any non-conformances associated with the existing structure, which may impact on the proposed works.

TII Structures Section has agreed in principle to the proposals in this report subject to the above actions being undertaken.

2 Site and Function

2.1 Site Location

The Tolka River Bridge is located on the N3 Navan Road, which is on the route of the Proposed Scheme. The location of the bridge is shown below in Figure 2.

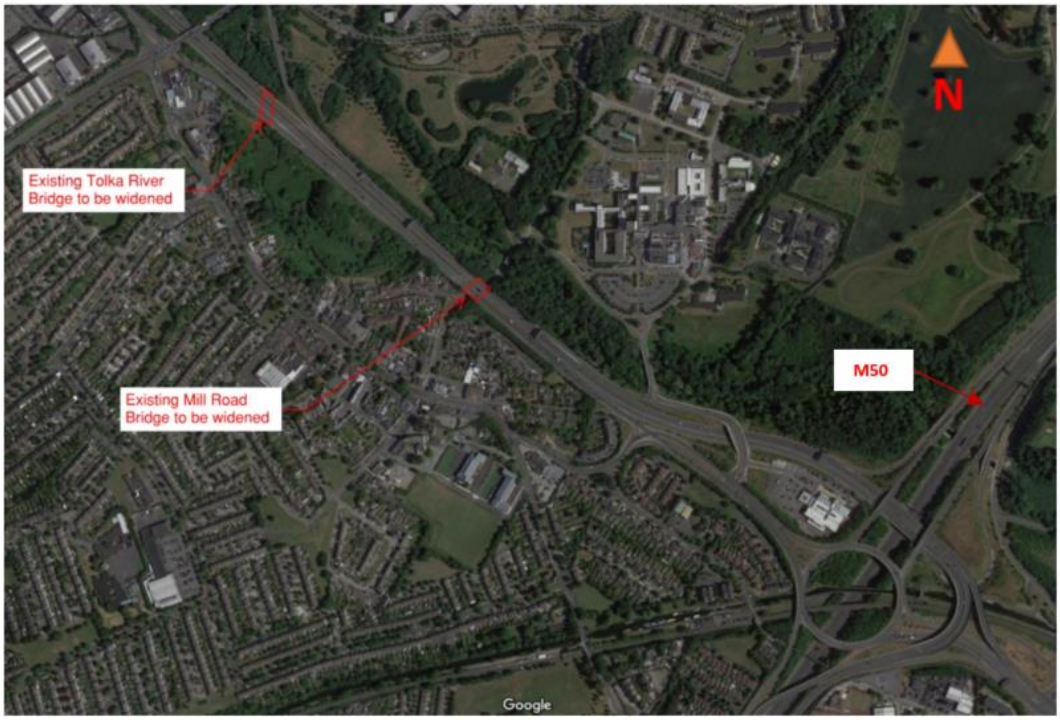


Figure 2: Tolka River Bridge Location

2.2 Function of the Structure and Obstacles Crossed

The Tolka River Bridge carries the N3 mainline and off slip to the R843 Snugborough Road junction over the culverted Tolka River.

2.3 Choice of Location

The Blanchardstown to City Centre CBC has been identified as one of the radial core bus corridors forming the BusConnects scheme. The extent of the carriageway widening for the scheme proposals covers the location of the existing Tolka River Bridge on the N3 Navan Road.

2.4 Site Description and Topography

The Tolka River Bridge is located on the N3 Navan Road which is a dual carriageway on a straight alignment. At the location of the structure the east-bound carriageway consists of three lanes with the west-bound carriageway

consisting of two lanes with a two lane off-slip to the R843 Snugborough Road junction.

Figure 3: Existing Bridge (Southern Elevation)

2.5 Vertical and Horizontal Alignments

The preliminary design along the N3 Navan Road and off-slip to the R843 Snugborough Road have been developed to match the existing alignment.

At the location of the Tolka River Bridge, the off-slip to the R843 Snugborough Road is on a straight horizontal alignment and a vertical sag curve, K=33.

The vertical and horizontal alignments of the off-slip to the R843 Snugborough Road at the location of the Tolka River Bridge are shown in Table 1 below.

Table 1: Vertical & Horizontal Alignments

Carriageway	Horizontal Alignment	Vertical Alignment
R843 Off-slip	Straight	K = 33

2.6 Cross-Sectional Dimensions

Details of the proposed cross-section of the carriageways above the Tolka River Bridge are shown in Table 2 below.

Table 2: Carriageway cross-sectional dimensions

Southern Verge	R843 Off-slip
2.0m Raised Verge	2 x 3.5m Traffic Lane + 0.3m separation Strip + 3.5m Bus Lane = 10.8m

2.7 Existing Underground and Overground Services

The only confirmed existing service in the vicinity of the bridge extension works is an underground stormwater drain and street lighting.

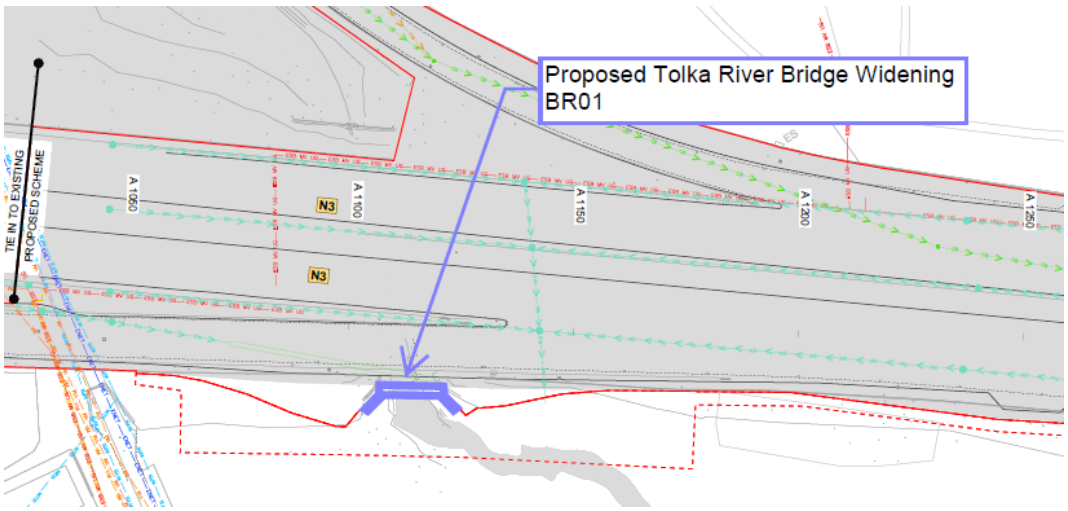


Figure 4: Existing services at the bridge location

No above ground services were identified at the bridge location.

Existing services records were obtained by the NTA and provided to Arup. These do not show any other existing services in the area. The NTA is currently considering where slit trenches will be needed along the corridor. The exact scope and locations of slit trenches are not yet confirmed, but it is likely that this area will be included because of the road pavement widening into the grass verge.

We propose to provide 4 No. spare 110mm dia ducts in the raised verge concrete over the bridge at this location.

2.8 Geotechnical Summary

The initial desktop study of the surrounding area shows that ground conditions consist of Made Ground, Alluvial, Glacial Gravel and Till derived from Limestone over Limestone. The desk study also presents a geological feature (meltwater channel) crossing the area.

Supplementary GI was undertaken at the bridge site comprising a borehole which was drilled down to approximately 35m BGL. This borehole did not encounter bedrock, suggesting that the meltwater channel was encountered at this location.

Given the potential for high variability of ground conditions due to the presence of the meltwater channel, additional GI will be required as part of the detailed design to confirm ground conditions at each of the bridge abutments.

Further details are provided in Section 6.

2.9 Hydrogeology Summary

Flood levels at the downstream face of the existing bridge were taken from the 2004 Tolka CFRAM study, which recommended a set of proposed flood relief measures, the majority of which have been implemented since the study was done. However, it is not known whether the full extent of works have been carried out in the Fingal area. The 100-year flood level quoted in the study is 47.27m at this location. 2-Year flood levels were not determined as part of this study.

2.10 Archaeological Summary

An Environmental Impact Assessment Report (EIAR) is currently being produced as a separate commission. This EIAR will assess whether the proposed design has any impact on archaeological sites in the area.

2.11 Environmental Summary

An Environmental Impact Assessment (EIA) is currently being prepared for this project. Any outcomes from this EIA will be reviewed and incorporated once determined.

3 Structure and Aesthetics

3.1 General Description

The existing Tolka River Bridge is to be extended at its southern end.

The existing Tolka River Bridge comprises of a corrugated steel arch culvert which was previously extended at its southern end with precast reinforced concrete beams.

The original culvert was constructed in 1988 with a 8.75m span. Details of the reinforced concrete extension are not available; however, the detailed topographical survey records a clear span between abutment faces of 12.8m.

The proposed bridge extension will comprise of precast prestressed concrete TYE bridge beams, with concrete deck slab, spandrel wall and parapet edge beam. The overall width of the bridge extension is 2.345m.

The span of the bridge beams and slab will match that of the existing. The bridge beams and deck slab will be integral with abutment walls which will follow the alignment of the existing and be supported on a piled foundation.

A spandrel wall will be monolithic with the deck slab and will support the parapet edge beam, also forming a monolithic connection. The spandrel wall will be backfilled with engineered fill material and the external face will be clad with masonry.

Reinforced concrete retaining walls and splayed wingwalls will extend from the ends of the abutment walls. These will be masonry clad and founded on spread pad footings.

To limit the potential for differential settlement between the new and existing works, it is proposed to support the bridge on a piled foundation. It is also proposed to structurally connect the new structure to the existing to prevent the risk of longitudinal cracks developing within the road surface above.

3.1.1 Historical structural information

Historical records received from TII for the existing bridge is limited to the reinforcement drawings of the original spandrel walls, dated 1988. No records were found for the corrugated steel arch and its foundation. Nor were there any records showing information of the subsequently widened portion of the bridge.

The following material properties are nominated on the spandrel wall drawings:

- Concrete strength: Grade X40/20
- Reinforcement: Type 2 deformed bars 425 N/mm^2, 50mm cover.

3.1.2 Existing Condition

The latest Eirspan Inspection Report (PI FG-N03-008.00 – 2017) shows the bridge to be in a good condition overall. An extract from the Eirspan inspection report is presented in the figure below.

A site visit was undertaken by Arup on the 30 September 2020. This comprised a general inspection of the site and structure. The structure was visually assessed as being in a good condition overall, verifying the condition documented in the 2017 Eirspan inspection report.

FG-N03-008.00 Tolka River Bridge

Remarks:

The structure is a composite (corrugate steel and RC concrete) structure. The RC has a larger clearance than the corrugate steel. The bridge crosses the Tolka River and a concrete footway. Both elevations consist of rubble cut masonry with hard masonry and joints around 30mm in width.

Chronological Overview Date / Activity / Remarks	1 Br	2 Ex	3 Fo	4 Pa	5 Em	6 Wi	7 Ab	8 Pi	9 Be	10 De	11 Be	12 Ri	13 Ot	14 St
14 Sep 2012 Principal inspection	0	-	0	0	2	0	1	-	-	1	0	0	2	1
11 Jan 2018 Principal inspection	2		0	0	2	1	0			0	1		1	1

Figure 5: Extract from Eirspan Inspection Report

3.1.3 Options Considered

Three options for widening the bridge at Mill Road were considered as follows:

- Demolish and reconstruct the bridge:

  This option was ruled out due to the limited extent of widening required and the condition of the existing structure, which is in a fairly good condition.

- Widen the bridge deck using precast girders and cast in-situ deck slab.

  This option is similar in form to the previously widened solution and was favoured as it allows the widening works to be constructed with little impact to the existing bridge. Temporary works may be required to contain the road embankment while the existing wingwalls are removed and the new foundation constructed.

- Widen the bridge deck by cantilevering off existing.

  This option considered connecting a cantilevered extension to the existing headwall by either bolting on extension steelwork or integrally connecting a concrete extension to the outer beam/headwall. This option was discounted

due to the additional load that would be added to the existing structure and the lack of available information on the existing structural elements.

3.1.4 Structural Assessment

A comparative structural assessment was carried out to assess the impact the proposed widening works would have on the existing structure. The assessment showed that the proposed works would result in an increase in load effects on the primary structural members of the previously widened deck. Due to the lack of as-built details for the structure, it was not possible to accurately calculate the capacity of the existing sections. To avoid unnecessary intrusive investigations and potential strengthening works, it was recommended that the fill above the structure be partially replaced with a lighter weight material.

A number of materials were considered, including lightweight expanded clay aggregate, expanded polystyrene (EPS) blocks and foamed concrete. Following discussions with TII, it was agreed that foamed concrete be considered as a lightweight replacement material above the deck. The other materials were regarded as unfavourable due to the possibilities of damage due to water ingress (expanded clay) and the risk of environmental damage and fire risk (EPS blocks).

A 1.0 m layer of foamed concrete with a density of approximately 600 kg/m^3 and a minimum compressive cube strength of 2.0 N/mm^2 is required.

Refer to the Structural Assessment Report (BCIDC-ARP-STR_ZZ-0005_BR_01-RP-CB-0020) for further information.

3.2 Aesthetic Considerations

The proposed spandrel wall, retaining walls and wing walls will be clad with masonry, similar to that of the existing bridge spandrel wall.

3.3 Proposals for the Recommended Structure

3.3.1 Proposed Category

Category 2

3.3.2 Span Arrangements

The span of the bridge extension will match that of the existing, surveyed as being 12.8m clear between abutment faces.

3.3.3 Minimum Headroom Provided

The soffit of the proposed bridge deck extension will be 0.5m higher than the existing bridge soffit.

3.3.4 Approaches Including Run-On Arrangements

No run-on slab arrangements are proposed.

3.3.5 Foundation Type

It is proposed to support the abutment walls on a piled foundation to control differential settlement between the new and existing bridge deck. The retaining walls and wingwalls will be supported on spread pad footings.

The extent of the existing bridge foundation will need to be confirmed prior to construction.

3.3.6 Substructure

The substructure will comprise of reinforced concrete abutment walls supported on piled foundations.

The existing western wingwall appears to comprise of a masonry clad concrete wall, which will need to be demolished and removed. The foundation of this wall is unknown.

The existing eastern wingwall appears to comprise of a gabion type of construction. This wall will also need to be removed to allow for construction of the new bridge abutment and wingwalls.

3.3.7 Superstructure

The superstructure will comprise of precast, prestressed concrete TYE bridge beams and deck slab. A spandrel wall will be integral with the deck slab and will be backfilled with engineered fill material.

3.3.8 Articulation Arrangements, Joints and Bearings

The bridge beams and deck slab will be cast in so that they form an integral connection with the abutment walls.

The deck slab and abutment walls will be structurally connected to the existing bridge using a drill-and-fix connection.

3.3.9 Vehicle Restraint System and Parapets

There is no requirement to cater for cyclists on this section of the road, hence the bridge parapets will be steel, 1250mm high, H2 parapets.

The VRS on the approach and departure from the bridge parapet will be provided in accordance with TII Publication DN-REQ-03034.

3.3.10 Drainage

Back of wall drainage will be provided behind the spandrel wall to enable subsurface drainage of the bridge. This will feed into back of wall drainage provided behind the abutment walls. The back of wall drainage will be discharged into the waterway.

Carriageway and verge surfacing across the structure will have a 2.5% crossfall, matching the adjacent highway surfacing. This will enable surface water drainage which will feed into the wider highway drainage network.

3.3.11 Durability

The concrete elements of the structure are expected to require minimal maintenance during its 120-year design life.

3.3.12 Sustainability

Recycled GGBS will be used in the design and construction of some of the concrete elements of the structure leading to a more sustainable structure overall.

The bridge comprises elements (concrete and steel) which can be recycled at the end of its design life.

3.3.13 Inspection and Maintenance

Minimal maintenance is expected for all concrete elements.

The extended structure is expected to fall under the Eirspan Bridge Management System.

4 Safety

4.1 Traffic Management During Construction Including Land for Temporary Diversions

Detailed traffic management proposals will be developed at detail design stage by the appointed Contractor in consultation with their Designers and the consent for the diversions and/or road closures will be sought from the appropriate local authority.

4.2 Safety During Construction

The Designer will take account of the General Principles of Prevention, as specified in the Schedule 3 of the Safety, Health and Welfare at Work Act 2005, liaise with the Project Supervisor appointed by the Client for the Design Process and the Project Supervisor appointed for the Construction Stage and carry out all other duties as required by Clause 15 of the Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013).

4.3 Safety in use

Bridge parapets will be provided across the length of the widened structure.

A 1.5m wide inspection access path will be provided in front of the proposed abutment wall and will include a steel guardrail for protection.

4.4 Lighting

Some of the existing lighting columns along the N3 off slip to the R843 Snugborough Road junction may have to be relocated as part of the works, however no lighting columns are proposed at the location of the bridge.

5 Design Assessment Criteria

5.1 Actions

5.1.1 Permanent Actions

Permanent Actions shall be in accordance with IS EN 1991-1-1:2002 and the associated National Annex.

5.1.2 Snow, wind and Thermal Actions

Snow actions shall not be considered due to geographical locations as outlined in IS EN 1990 and the National Annex.

Wind actions shall be in accordance with IS EN 1991-1-4.

Thermal actions shall be in accordance with IS EN 1991-1-5.

5.1.3 Actions relating to normal traffic

Normal traffic actions shall be in accordance with Load Models LM1, LM2 and LM4 from IS EN 1991-2:2003 and the associated National Annex.

5.1.4 Actions relating to abnormal traffic

Abnormal traffic actions shall be in accordance with Load Model LM3 from IS EN 1991-2:2003 and the associated National Annex.

Special vehicle model SV196 will be used as recommended by TII Publication GE-POL-01008.

5.1.5 Footway Live Loading

Footway Live loading shall be in accordance with IS EN 1991-2:2003 and the associated National Annex.

5.1.6 Provision for exceptional abnormal traffic

No exceptional abnormal loads are to be provided for.

5.1.7 Accidental Loads

Accidental wheel loading and vehicular impact loading in accordance with IS EN 1991-2:2003 shall be considered for the design of the structure.

5.1.8 Actions during construction

Traffic Actions shall be in accordance with IS EN 1991-2:2002 and the associated National Annex.

5.1.9 Any Special Loading Not Covered Above

Not applicable.

5.2 Authorities Consulted and any Special Conditions Required

Inland Fisheries Ireland (IFI) has been consulted to understand the impacts associated with works adjacent to the waterway. The construction methodology presented in the Environmental Impact Assessment Report (EIAR) has been developed taking into account IFI requirements.

The section 50 application has been submitted to the Office of Public Works (OPW).

5.3 Proposed Departures from Standards

A departure from standard will be submitted for the use of a lightweight fill above the structure. Details of this departure will be included in the Departure from Standards register for the project.

5.4 Proposed methods of dealing with aspects not covered by Standards

Not applicable.

6 Ground Conditions

The Geotechnical Category for the Tolka River Bridge is assessed as Category 2.

An initial desktop study was undertaken at this site using the available existing GI information from the surrounding area. This desk study shows that ground conditions in the area consist of Made Ground, Alluvial, Glacial Gravel and Till derived from Limestone over Limestone. The desk study also presents a geological feature (meltwater channel) crossing that area. However, it is noted that the closest historical GI information is located more than 200 m from the proposed bridge site and hence was not used in developing the ground profile used for the preliminary design.

Supplementary geotechnical information was undertaken adjacent the proposed western abutment, comprising a rotary cable percussive cored borehole (R05-CP05). This borehole was drilled to a completion depth of approximately 35m BGL and did not encounter bedrock. Based on the above, it is very likely that this borehole encountered the meltwater channel identified in the desk-top study.

The ground profile recorded from borehole R05-CP05 is presented in the table below.

Table 3: Ground profile at bridge site based on R05-CP05

Ground Strata Description	N-Value	Depth of Stratum (m)	Elevation at top of Stratum (m)	Thickness (m)
Very soft to Soft, greyish brown to brown, slightly sandy gravelly **CLAY**.	3	0.0 – 2.8	44.9	2.8
Firm to stiff, greyish brown, slightly sandy gravelly **CLAY**.	12	2.8 – 3.5	42.1	0.7
Very stiff greyish brown slightly sandy gravelly **CLAY** with occasional sub-rounded cobbles.	41	3.5 – 4.7	41.4	1.2
Dark brown slightly sandy gravelly **CLAY** with occasional boulders.	50	4.7 – 8.2	40.2	3.5
Grey, sandy clayey **GRAVEL**.	26	8.2 – 15.7	36.7	7.5
Dark brown sandy **CLAY.**	30	15.7 – 18.7	29.2	3.0
Dark brown fine to coarse **SAND.**	30	18.7 – 25.0	26.2	6.3
Brown clayey gravelly Cobbles with occasional boulders.	33	25.0 – 27.4	19.9	2.4
Very stiff brown slightly sandy gravelly **CLAY** with occasional cobbles and boulders.	50	27.4 – 35.0	17.5	7.6

Due to the very likely presence of the meltwater channel at the proposed bridge site, the rockhead could be highly variable. As a result, there is a risk of high differential settlements between the bridge supports. Additional GI will be

required as part of the detailed design to confirm ground conditions at each of the bridge abutments.

Preliminary design calculations show approximately 10 mm of differential settlement is possible between the existing and proposed structures assuming a pad foundation. While the structure may be able to accommodate these differential settlements, the road pavement above will likely experience signs of distress dependant on how these settlements are managed. Hence, it is recommended that the proposed bridge extension be supported on a piled foundation.

7 Drawings and Documents

7.1 List of all Documents Accompanying the Submission

Relevant documents are included as appendices to this report.

Appendix A - Drawings

The following drawings are included as part of this submission.

Table 4: Drawing List

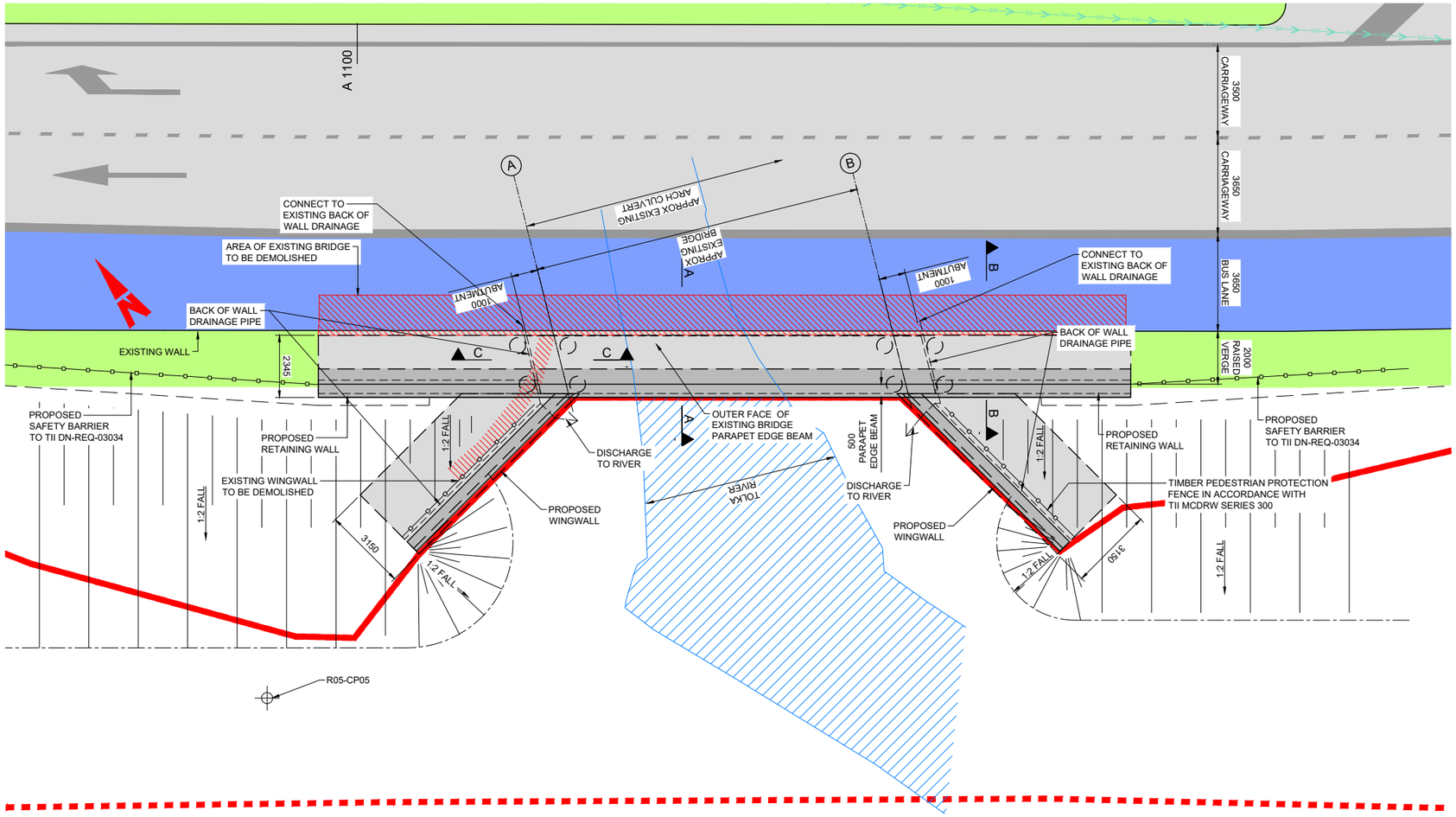
Drawing Number	Drawing Title
BCIDC-ARP-STR_GA-0005_BR_01-DR-CB-0002	General Arrangement Sheet 1
BCIDC-ARP-STR_GA-0005_BR_01-DR-CB-0003	General Arrangement Sheet 2

Appendix B – Geotechnical Information

Appendix C – Existing Drawings

Appendix A

Drawings



PLAN ON PROPOSED BRIDGE

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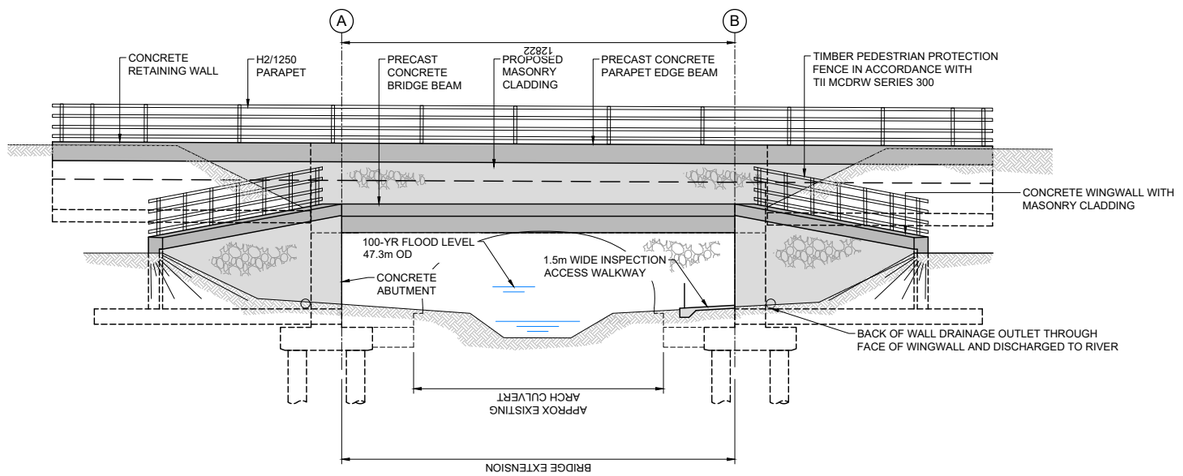

ELEVATION ON PROPOSED BRIDGE

SCALE: 1:100

NOTES:

1. ALL DIMENSIONS ARE SHOWN IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE SHOWN IN METRES ABOVE ORDNANCE DATUM.
3. STRUCTURAL CONCRETE TO BE:
- PRECAST BEAMS C50/60
- DECK SLAB & SPANDREL WALL C40/50
- SUBSTRUCTURE C40/50
- PARAPET EDGE BEAM C40/50
4. WATERPROOFING:
I) BRIDGE DECK WATERPROOFING SHALL BE SPRAY APPLIED AND SATISFY THE REQUIREMENTS OF DN-STR-03009 & DN-STR-03012.
II) ALL OTHER BURIED CONCRETE SURFACES SHALL BE TREATED WITH TWO COATS OF EPOXY RESIN WATERPROOFING PAINT IN ACCORDANCE WITH TII CC-SPW-02000.
5. ALL EXPOSED CONCRETE SHALL BE IMPREGNATED WITH HYDROPHOBIC PORE LINER IN ACCORDANCE WITH TII CC-SPW-01700.
6. BREAKING BACK OF THE EXISTING STRUCTURAL CONCRETE SHALL BE UNDERTAKEN USING METHODS THAT WILL NOT IMPACT ON THE STRUCTURAL PERFORMANCE OF THE EXISTING REINFORCEMENT UNDAMAGED WHERE NECESSARY.
7. EXPOSED FACES OF WINGWALLS TO HAVE F4 PATTERNED PROFILE FINISH.
8. LOCALISED SOFT SPOTS, IF PRESENT, TO BE EXCAVATED AND REPLACED WITH CLASS 6N2.
9. FOUNDATION DETAILS SUBJECT TO CONFIRMATION OF RECEIPT OF SUPPLEMENTARY GEOTECHNICAL INVESTIGATION WORKS.

LEGEND:

- AREA OF EXISTING BRIDGE TO BE DEMOLISHED
- RED LINE BOUNDARY
- TEMPORARY BOUNDARY FOR CONSTRUCTION

Project Ireland 2040 Building Ireland's Future

Rev	Date	Drn	Chk'd	App'd	Description
M01	04/04/2022	BM	CG	BD	ISSUE FOR PHASE 4: PLANNING

Client: NTA Údarás Náisiúnta Iompair National Transport Authority

Engineering Designer: ARUP

Date	Scale	Drawn	Checked	Approved
04/04/2022	As Shown @ A1 As Shown @ A3	BM	CG	BD

Project Code	Originator Code	QMS Code
BCIDC	ARP	268401-00

Programme Title: **BUSCONNECTS DUBLIN**
CORE BUS CORRIDORS INFRASTRUCTURE WORKS

Drawing Title: BLANCHARDSTOWN TO CITY CENTRE CORE BUS CORRIDOR SCHEME
BR_01 TOLKA RIVER BRIDGE
GENERAL ARRANGEMENT SHEET 1

Drawing File Name	Sheet Number	Status	Rev
BCIDC-ARP-STR_GA-0005_BR_01-DR-CB-0002	01 of 01	A	M01

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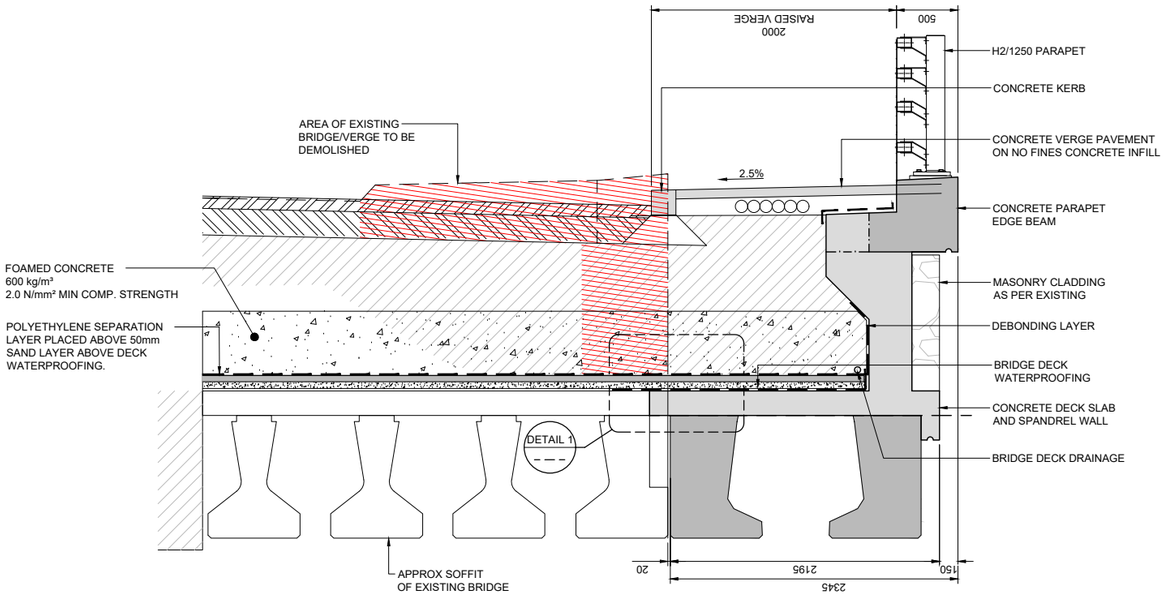
NOTES:

1. REFER TO DWG. BCIDC-ARP-STR_GA-0005_BR_01-DR-CB-0002 FOR NOTES.



SECTION A-A

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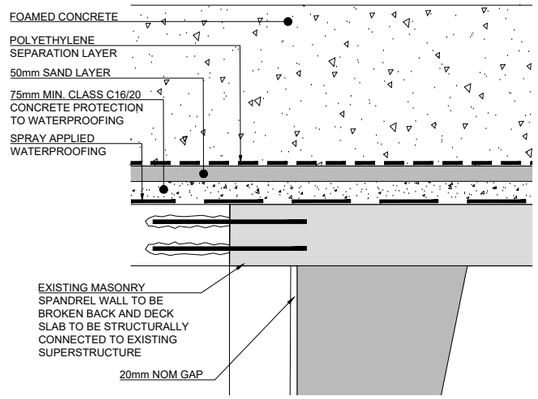

DETAIL 1

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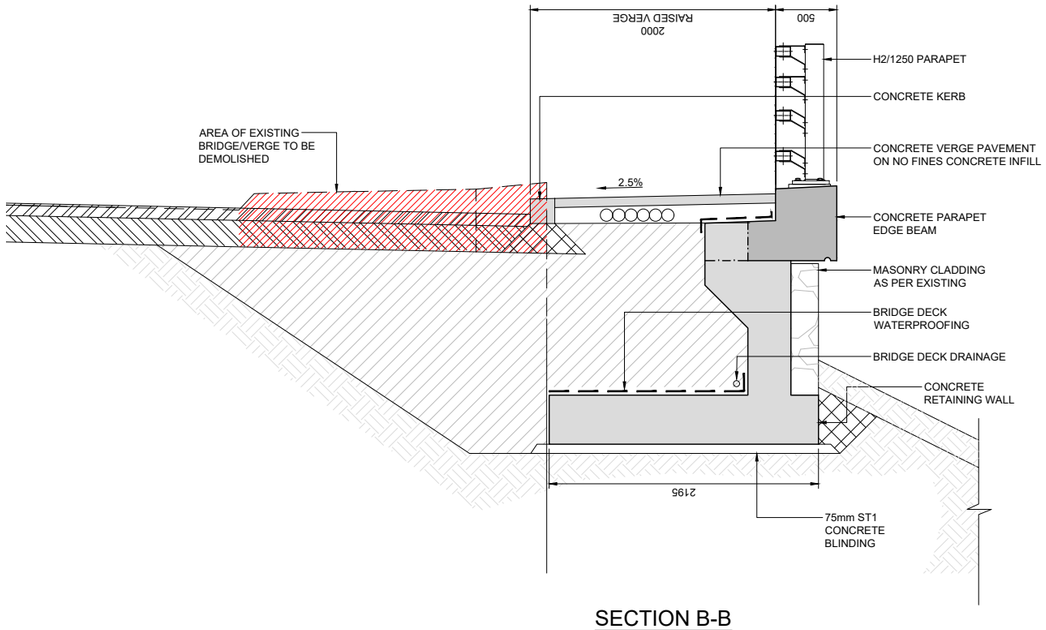
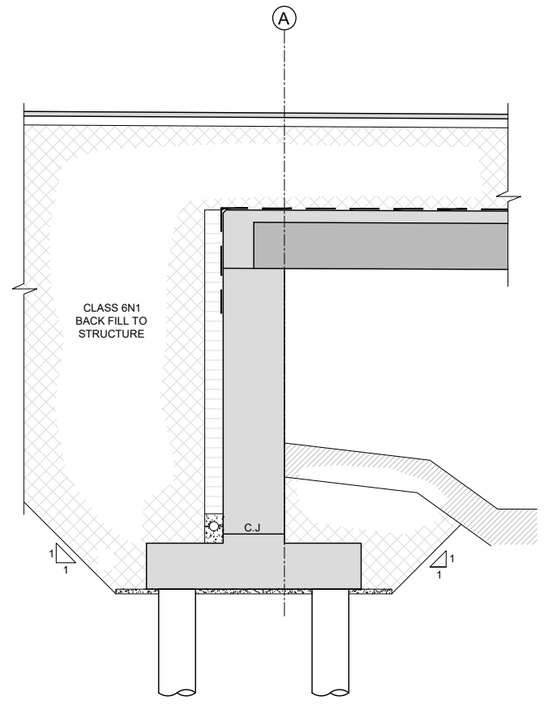


SECTION B-B

SCALE: 1:25



SECTION C-C

SCALE: 1:25

Project Ireland 2040 Building Ireland's Future

Rev	Date	Drn	Chk'd	App'd	Description
M01	04/04/2022	BM	CG	BD	ISSUE FOR PHASE 4: PLANNING

Client: NTA Údarás Náisiúnta Iompair National Transport Authority

Engineering Designer: ARUP

Date	Scale	Drawn	Checked	Approved
04/04/2022	As Shown @ A1 As Shown @ A3	BM	CG	BD

Project Code	Originator Code	QMS Code
BCIDC	ARP	268401-00

Programme Title: **BUSCONNECTS DUBLIN**
CORE BUS CORRIDORS INFRASTRUCTURE WORKS

Drawing Title: BLANCHARDSTOWN TO CITY CENTRE CORE BUS CORRIDOR SCHEME
BR_01 TOLKA RIVER BRIDGE
GENERAL ARRANGEMENT SHEET 2

Drawing File Name	Sheet Number	Status	Rev
BCIDC-ARP-STR_GA-0005_BR_01-DR-CB-0003	01 of 01	A	M01

DO NOT SCALE USE FIGURED DIMENSIONS ONLY

\\globaleurope\Dublin\jobs\268000\268401-0014 Internal\4-02 Drawings\4-02 BCID\BCIDC\0005\13 STR\Drawings\DR\BCIDC-ARP-STR_GA-0005_BR_01-DR-CB-0003.dwg

Appendix B

Geotechnical Information

Ground Investigations Ireland Ltd
www.gii.ie

Site Bus Connect Detailed Stage 1 Lot 1			**Borehole Number** R05-CP05
Machine : Dando 2000 + Bereta T44 **Method :** Cable Percussion with Rotary follow on	**Casing Diameter** 200mm cased to 4.80m 96mm cased to 35.20m	**Ground Level (mOD)** 46.78	**Client** National Transport Authority	**Job Number** 9754-07-20
	Location 707796.1 E 739014.4 N	**Dates** 07/12/2020	**Project Contractor** Ground Investigations Ireland	**Sheet** 1/4

Depth (m)	Sample / Tests	TCR	SCR	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B							(1.50)	Soft greyish brown slightly sandy gravelly CLAY. Gravel is fine to coarse, sub-angular.		
1.00-1.45 1.00	SPT(C) N=6 B					1,1/2,1,1,2	45.28	1.50	Very soft brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse, sub-angular.		
2.00-2.45 2.00	SPT(C) N=3 B					1,0/1,0,1,1		(1.30)			▼1
3.00	B					Water strike(1) at 3.00m, rose to 2.70m in 20 mins.	43.98	2.80	Firm to stiff greyish brown slightly sandy gravelly CLAY. Gravel is fine to coarse, sub-angular.		▽1
3.00-3.45	SPT(C) N=12					2,2/2,3,3,4		(0.65)			
4.00 4.00-4.45	B					4,5/6,8,13,14 SPT(C) N=41	43.33	3.45	Very stiff greyish brown slightly sandy gravelly CLAY with occasional sub-rounded cobbles. Gravel is fine to coarse, sub-angular.		
		TCR	**SCR**	**RQD**	**FI**			(1.25)			
4.20		50					42.08	4.70	Poor recovery, recovery consists of: Dark brown slightly sandy gravelly CLAY with occasional boulders. (Drillers notes: Gravelly CLAY with boulders).		
5.20		33						(3.50)			
6.70-7.08 6.70		13				7,7/6,8,36 SPT(C) 50/225					
8.20-8.65 8.20		30				8,7/8,6,9,12 SPT(C) N=35	38.58	8.20	Poor recovery, recovery consists of: Grey slightly clayey medium to coarse sub-angular to sub-rounded GRAVEL with occasional cobbles.		
9.70-10.15 9.70						7,6/7,8,9,11 SPT(C) N=35		(0.80)			
							37.78	9.00	Poor recovery, recovery consists of: Grey sandy fine to coarse, sub-rounded GRAVEL., (Driller notes Gravell)		

Remarks
Borehole completed at 35.20m BGL.on engineers instruction
From 20.2 to 21.7 and 24.7 to 26.2 Driller notes blowing sand
Borehole backfilled on completion.
Groundwater encountered at 3.00m BGL
Chiselling from 4.70m to 4.80m for 1 hour.

Scale (approx)	Logged By
1:50	JS

Figure No. 9754-07-20.R05-CP05

Ground Investigations Ireland Ltd
www.gii.ie

Site Bus Connect Detailed Stage 1 Lot 1			**Borehole Number** R05-CP05
Machine : Dando 2000 + Bereta T44 **Flush :** **Core Dia :** 64 mm **Method :** Cable Percussion with Rotary follow on	**Casing Diameter** 200mm cased to 4.80m 96mm cased to 35.20m	**Ground Level (mOD)** 46.78	**Client** National Transport Authority	**Job Number** 9754-07-20
	Location 707796.1 E 739014.4 N	**Dates** 07/12/2020	**Project Contractor** Ground Investigations Ireland	**Sheet** 2/4

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(2.20)			
	26				9,8/8,7,9,7 SPT(C) N=31	35.58	11.20	Poor recovery, recovery consists of: Grey sandy fine to coarse, sub-rounded GRAVEL., (Driller notes Gravell with clay)		
11.20-11.65 11.20										
	20						(1.50)			
					4,5/4,4,5,6 SPT(C) N=19	34.08	12.70	Poor recovery, recovery consists of: Grey medium to coarse, sub-rounded to sub-angular GRAVEL. (Driller notes Gravell with clay)		
12.70-13.15 12.70										
	13									
					5,5/4,5,4,6 SPT(C) N=19		(3.00)			
14.20-14.65 14.20										
	10									
					6,8/4,5,4,6 SPT(C) N=19	31.08	15.70	Poor recovery, recovery consists of: Dark brown sandy CLAY. (Driller notes sandy Clay)		
15.70-16.15 15.70										
	26									
					7,9/6,8,9,7 SPT(C) N=30		(3.00)			
17.20-17.65 17.20										
	23									
					9,8/6,7,8,8 SPT(C) N=29	28.08	18.70	Poor recovery, recovery consists of: Dark brown fine to coarse SAND.(Driller notes Sand)		
18.70-19.15 18.70										
	6									

Remarks

Scale (approx)	Logged By
1:50	JS

Figure No. 9754-07-20.R05-CP05

Ground Investigations Ireland Ltd
www.gii.ie

Site Bus Connect Detailed Stage 1 Lot 1			**Borehole Number** R05-CP05
Machine : Dando 2000 + Bereta T44 **Flush :** **Core Dia :** 64 mm **Method :** Cable Percussion with Rotary follow on	**Casing Diameter** 200mm cased to 4.80m 96mm cased to 35.20m	**Ground Level (mOD)** 46.78	**Client** National Transport Authority	**Job Number** 9754-07-20
	Location 707796.1 E 739014.4 N	**Dates** 07/12/2020	**Project Contractor** Ground Investigations Ireland	**Sheet** 3/4

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					7,7/8,9,10,12					
20.20-20.65 20.20	10				SPT(C) N=39			20.2 to 21.7 Driller notes blowing sand		
21.70-22.15 21.70	26				9,7/6,7,9,8 SPT(C) N=30		(6.30)			
23.20-23.65 23.20	23				8,8/6,9,7,11 SPT(C) N=33					
24.70-25.15 24.70	30				9,7/10,11,14,12 SPT(C) N=47			24.7 to 26.2 Driller notes blowing sand		
						21.78	25.00	Poor recovery, recovery consists of: Brown clayey gravelly Cobbles with occasional boulders. (Driller notes Clay with boulders)		
26.20	50						(2.40)			
27.70-28.08 27.70	50				9,11/8,12,30 SPT(C) 50/225	19.38	27.40	Very stiff brown slightly sandy gravelly CLAY with occasional cobbles and boulders. Gravel is fine to coarse, sub-angular to sub-rounded.		
29.20-29.50 29.20	13				7,9/14,36 SPT(C) 50/150		(4.80)			

Remarks

Scale (approx)	Logged By
1:50	JS

Figure No. 9754-07-20.R05-CP05

Ground Investigations Ireland Ltd
www.gii.ie

Site Bus Connect Detailed Stage 1 Lot 1			**Borehole Number** R05-CP05
Machine : Dando 2000 + Bereta T44 **Flush :** **Core Dia :** 64 mm **Method :** Cable Percussion with Rotary follow on	**Casing Diameter** 200mm cased to 4.80m 96mm cased to 35.20m	**Ground Level (mOD)** 46.78	**Client** National Transport Authority	**Job Number** 9754-07-20
	Location 707796.1 E 739014.4 N	**Dates** 07/12/2020	**Project Contractor** Ground Investigations Ireland	**Sheet** 4/4

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
30.70-31.08 30.70	50				8,11/10,13,27 SPT(C) 50/225					
32.20-32.43 32.20	50				12,15/50 SPT(C) 50/75	14.58	32.20	Very stiff dark grey slightly sandy gravelly CLAY with occasional cobbles and boulders. Gravel is fine to coarse, sub-angular to sub-rounded.		
33.70-33.70 33.70	30				25/50 SPT(C) 25*/0 50/0		(2.80)			
35.20						11.78 11.58	35.00 (0.20) 35.20	Grey slightly clayey medium to coarse sub-angular GRAVEL. Complete at 35.20m		

Remarks

Scale (approx)	Logged By
1:50	JS

Figure No. 9754-07-20.R05-CP05

Bus Connect Route 5 – Rotary Core Photographs

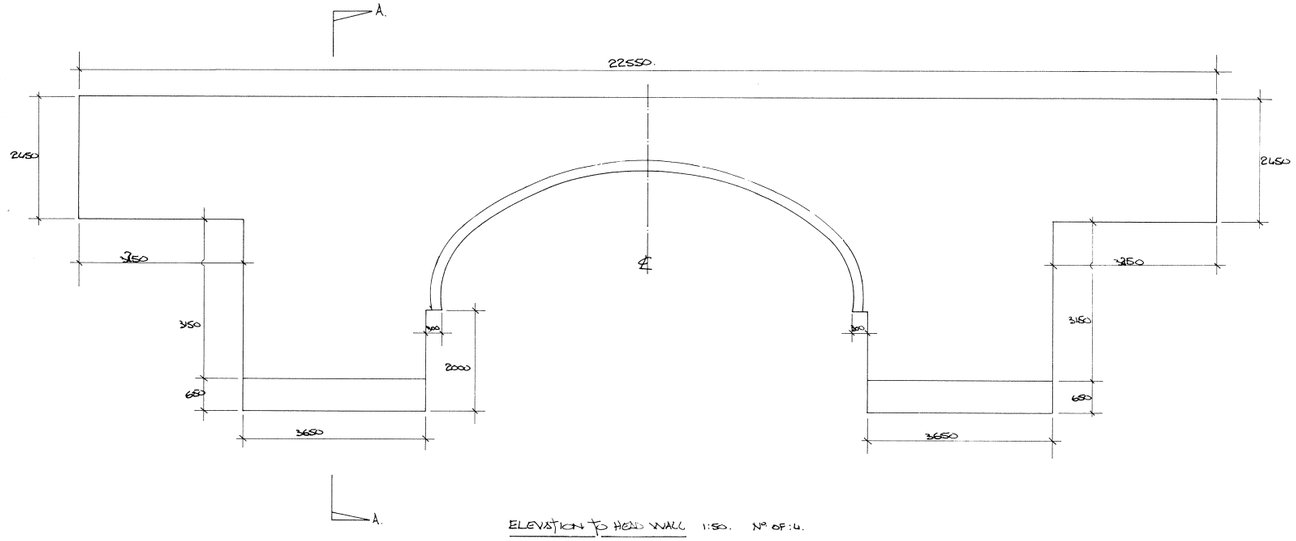
R05-CP05

Bus Connect Route 5 – Rotary Core Photographs

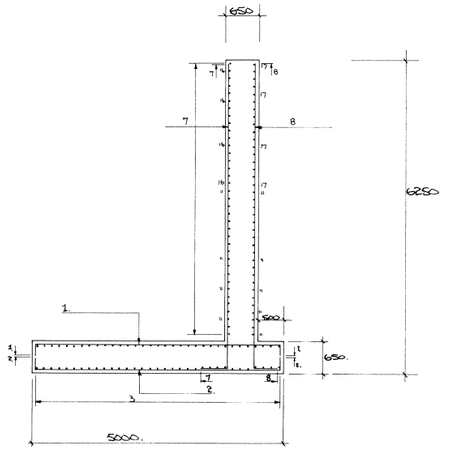
R05-CP05

Appendix C

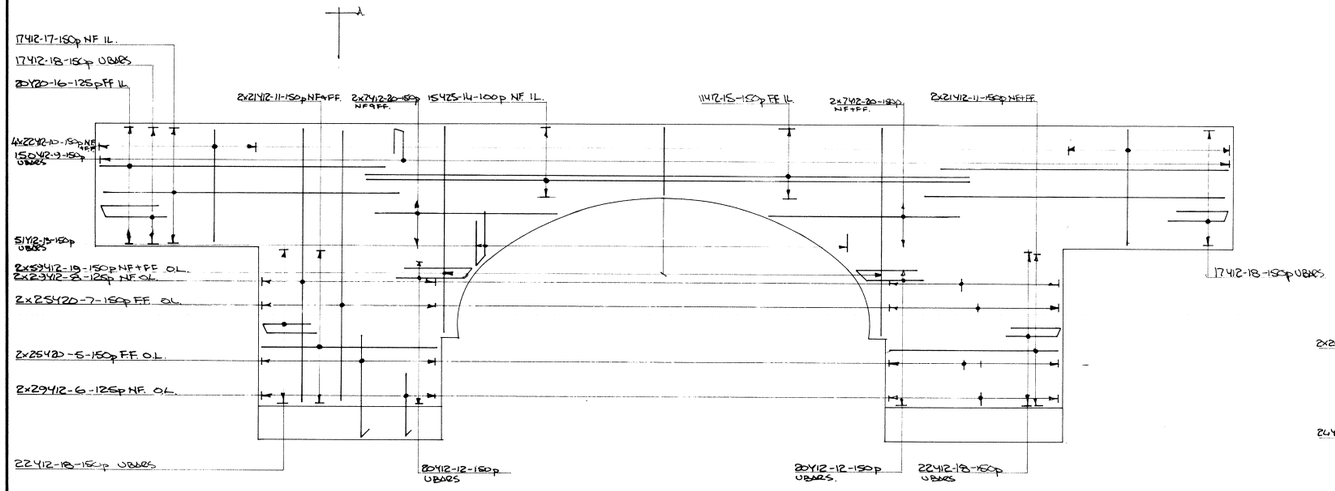
Existing Drawings



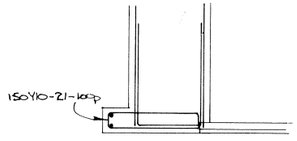
ELEVATION TO HEADWALL 1:50. Nº OF: 4.



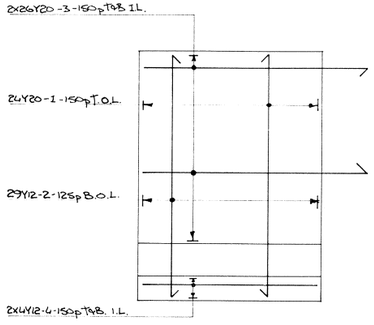
SECTION A-A.



REINFORCING DETAIL TO HEADWALL Nº OF: 4



REINFORCING DETAIL TO BOOT LINTEL. Nº OF: 4.



REINF. TO BASE Nº OF: 8.

NOTES:

(1) ALL DIMENSIONS IN MILLIMETRES UNLESS STATED OTHERWISE.
(2) FIGURED DIMENSIONS ONLY - DO NOT SCALE.
(3) THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERING DRAWINGS.
(4) ALL LEVELS REFER TO DATUM UNLESS STATED OTHERWISE.
(5) ALL DIMENSIONS AND LEVELS TO BE CHECKED ON SITE PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES TO BE REPORTED TO THIS OFFICE IN WRITING.

CONCRETE:

(6) THE STRUCTURE TO BE CONSTRUCTED IN ACCORDANCE WITH B.S. 5400.
(7) BLINDING CONCRETE TO BE GRADE X10/20.
(8) KICKERS TO BE 75mm.
(9) "F3" DENOTES CLASS OF FINISH.
(10) CONCRETE STRUCTURE TO BE GRADE X40/20 UNLESS NOTED OTHERWISE.
MAXIMUM AGGREGATE SIZE 20mm.
MINIMUM CEMENT CONTENT 290kg/m.
CHARACTERISTIC STRENGTH 40N/mm.

REINFORCEMENT:

(11) NOMINAL COVER TO BE 50mm UNLESS NOTED OTHERWISE.
(12) "Y" DENOTES HIGH TENSILE TYPE 2 DEFORMED BARS CHARACTERISTIC STRENGTH 425N/mm.
"R" DENOTES MILD STEEL REINFORCEMENT CHARACTERISTIC STRENGTH 250N/mm.

ABBREVIATIONS:

(13) T: TOP NF: NEAR FACE
C: CENTRE FF: FAR FACE
B: BOTTOM EF: EACH FACE
P: PITCH AP: ALTERNATELY PLACED

REV.	DESCRIPTION	DATE

DUBLIN COUNTY COUNCIL,
BRIDGE & STRUCTURES SECTION,
PARNELL HOUSE,
PARNELL SQ. EAST,
DUBLIN 1. PH 727777(Ext 2041)

JOB TITLE
NAVAN ROAD
TOLKA CULVERTS

ORG TITLE
HEADWALL DETAILS

DRAWN BY	CHECKED	SCHEDULE No
T.W.		
DESIGNED	SCALE	DATE
T.W.	1:50	JULY '88.

P.J. KELLEGHAN B.E.,C.Eng.,F.I.C.E.,F.I.E.I.
Chief Engineer,
Roads Department.

T Walshe Dip. Eng., B.Sc., M.I.E.I.,
Senior Executive Engineer.
C De Blacam B.E., C.Eng., M.I.E.I.,
Senior Engineer.
J F Vaughan B.E.,C.Eng.,M.I.C.E.,DipTE.
Deputy County Engineer.

DRG Nº.
BSS 260/3