The background is a vibrant red color. It features several abstract geometric shapes: a large white circle with a blue border in the upper right; a smaller white circle with a blue border in the lower left; a large teal shape with a white border in the bottom right; and various other shapes in blue, green, and white scattered throughout the corners and edges.

Appendix F
Existing Structures Impact
Assessment Report

National Transport Authority (NTA)

**Blanchardstown to City Centre
Core Bus Corridor Scheme**

**Existing Structures Impact
Assessment Report**

Issue | 26 April 2022

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 268401

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ARUP

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Appendices

Appendix A

Drawing

Appendix B

Structure ref 5.16

Appendix C

Risk Assessment for Vehicle Restraint System

1 Introduction

1.1 Overview

Arup has been appointed by the National Transport Authority (NTA) to provide multi-disciplinary technical consultancy services for the delivery of a number of core bus corridors associated with the BusConnects Dublin Programme. Arup's appointment includes the preliminary design and assessment of structures on the Blanchardstown to City Centre Core Bus Corridor (CBC) scheme (herein after referred to as the 'Proposed Scheme').

1.2 Purpose of this Report

The Proposed Scheme includes the provision of dedicated bus lanes and cycle tracks, with associated widening/alteration of the existing road alignment. Existing structures have been qualitatively checked for any increase in adverse load effects. The purpose of this report is to identify the impact the Proposed Scheme has on existing structures.

1.3 Project Background and Description

The BusConnects Dublin Programme is a plan to transform Dublin's bus system, with the CBC project providing 230 km of dedicated bus lanes and 200 km 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.

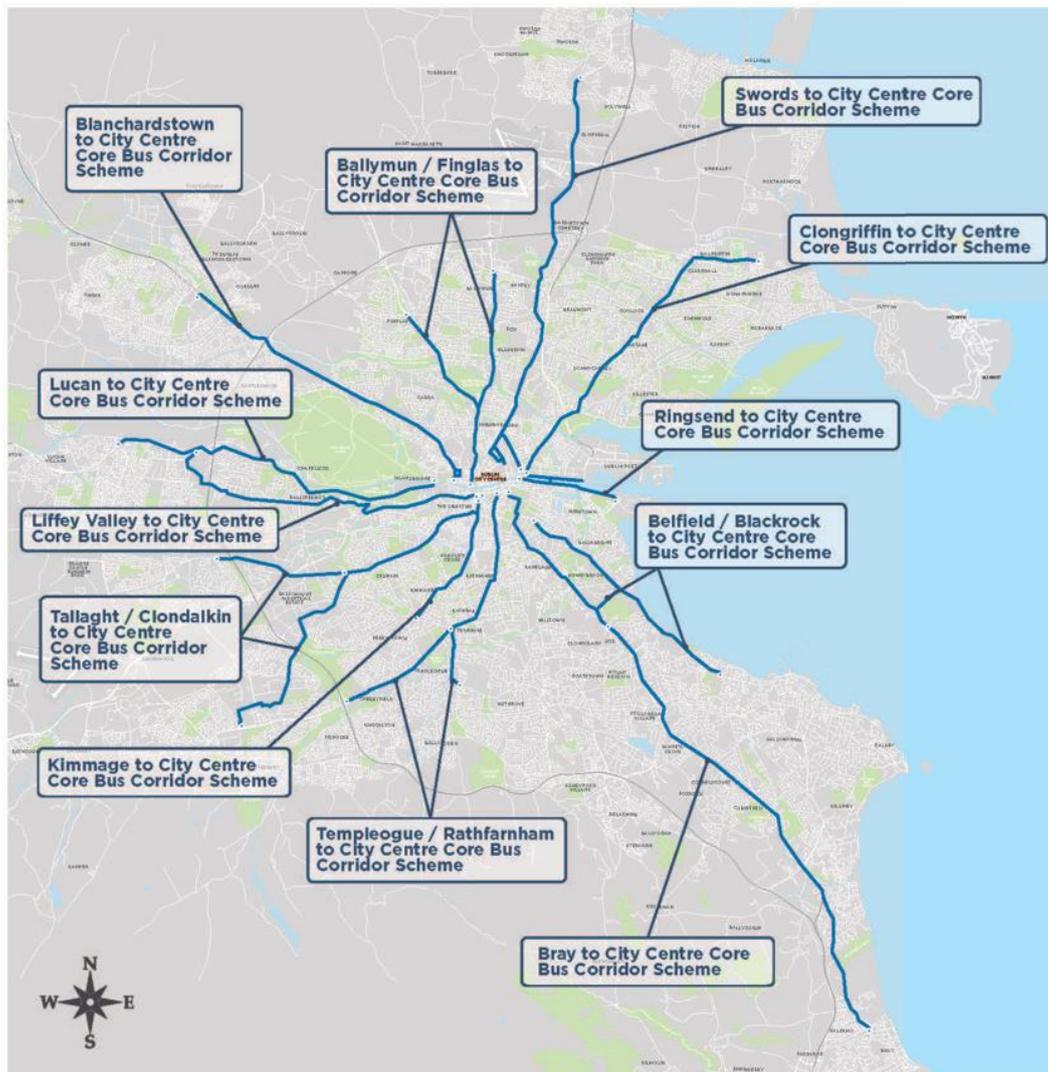


Figure 1: BusConnects Dublin Radial CBC Network

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.

2 Assessment methodology

2.1 Assessment Procedure

An initial desk-top study was undertaken to identify the existing structures on the Proposed Scheme, which comprised a review of aerial photography and street-view imagery. This was then followed up by a site walk-over to better understand the composition of the structures within the Proposed Scheme. A list of existing structures and their location was then compiled using this information. Existing records for these structures, where available, (e.g. drawings and Eirspan inspection reports) was also acquired from the maintaining authorities.

The Proposed Scheme design was reviewed to assess the potential impact on these structures and adjustments made to limit significant impacts on existing structures where feasible.

A qualitative assessment on each of the structures was undertaken to assess the potential impacts. The following assumptions informed the assessment:

- There is no net change in loading when considering current versus future traffic conditions (i.e. the governing vehicle loads, configuration and frequency are assumed to remain unchanged).
- Regions within the existing kerb lines are assumed to be designed for full traffic loading, regardless of their current usage (i.e. whether these regions are currently used as a trafficable lane or a hard shoulder). Hence any change in lane markings between existing kerb lines does not constitute a change in loading on the structure.
- All structures are assumed to be in a reasonable condition suitable for their current and ongoing usage. Comprehensive condition assessments have only been carried out on structures that are to be modified.
- Only structures classified as such in TII Publication DN-STR-03001 are included in this review, with the exception of some retaining walls less than 1.5m in retained height.
- Existing dimensions for headroom and intrusion envelopes are assumed to be sufficient for ongoing and future usage. However, headroom clearance checks at existing structures have been undertaken where there is a proposed adjustment to the kerb line.

2.2 Standards

The following standards were referenced:

1. TII - DN-GEO-03036 (April 2017) Cross Sections and Headroom.
2. TII - DN-REQ-03034 (May 2019) The Design of Road Restraint Systems (Vehicle and Pedestrian) for Roads and Bridges.

3. TII - DN-STR-03001 (April 2019) Technical Acceptance of Road Structures on Motorways and Other National Roads. Noting that the following structures are excluded from this publication: Retaining structures with <1.5m retained height, Bridges/Culverts with clear span/diameter < 2.0m.

3 Structural Impact Assessment

The results of the assessment process have been outlined in Table 1. Refer to Appendix A for the location of each structure.

Table 1: Existing Structures Impact Assessment

Structure Ref.	Structure Type	Name/ Description	Structure ID	Jurisdiction	Structure Comments	Impact
5.01	Retaining wall	N3 Junction 3 Southbound off-slip - retaining wall at ESB pylon.		FCC	Localised existing vertical concrete retaining wall. Height of wall approximately 1.5m with timber fence atop. Retained height matches full height of wall. Roadside is the lower side. No change in road edge adjacent wall at this location.	No impact
5.02	Bridge	N3 - R121 Overbridge	FG -N03-002.90 (northern bridge) FG-N03-003.00 (southern bridge)	FCC	2no existing 4 span reinforced concrete bridges: - (northern bridge) 550 deep type TY4 girder and - (southern bridge) 1no. insitu slab. Each superstructure carrying 3 lanes of traffic and 1 cycleway. Each superstructure supported on separate RC foundations. The proposed design maintains the existing kerblines.	No impact
5.03	Retaining wall	Retaining wall between northern edge of R121 and Whitestown estate		FCC	Height of vertical concrete wall est 1.2m with steel fence atop. Retained height matches full height of wall. Grassed area is the elevated side. Retaining wall to be re-constructed between Ch300-Ch 540 approximately on Blanchardstown Road South due to a reduction in footpath levels. Maximum retained height of approx. 0.3m. Slight variation of back of footpath levels expected at the northern quadrant of the Blakestown Way/Blanchardstown Road South Junction. No impact at this location.	Structure impacted

Structure Ref.	Structure Type	Name/ Description	Structure ID	Jurisdiction	Structure Comments	Impact
5.04	Embankment	Embankment to the N3 from the L3020 Blanchardstown		FCC	Existing embankment with approx. 2.5m difference in overall height Significant road widening on the eastern side of the L3020, varies between 12m to 6m (west to east). Retaining wall required on east side to contain widening works, being constructed under Snugborough Junction Upgrade Scheme.	Structure impacted
5.05	Embankment & Retaining wall	Embankment and retaining wall adjacent to the L3020 at the Ebay building		FCC	Relocation of the bus stop results in local widening into embankment. Embankment height approx. 1.5m. Roadside is the low side. Retaining wall required with a proposed retained height of approximately 1.2m. Proposed retaining wall will tie into existing retaining wall at this location.	Structure impacted
5.06	Pedestrian Underpass	Pedestrian underpass under N3 and westbound N3 offramp		FCC	Existing RC box culvert approximately 3.5m wide by 2.5m high. Off-ramp road carriageway widened to provide a dedicated bus lane which develops into a general traffic lane on approach to Snugborough junction. Existing southern headwall suitably located to allow for carriageway widening without any modifications to the underpass structure. Widening will be at the same elevations as the existing carriageway therefore by inspection there will be no increase in superimposed loading.	No impact

Structure Ref.	Structure Type	Name/ Description	Structure ID	Jurisdiction	Structure Comments	Impact
5.07	Culvert	Tolka River Culvert under N3	FG-N03-008.00	FCC	<p>Culvert conveys the Tolka river under the 7 lanes of traffic.</p> <p>Culvert appears to have originally been an arch structure that was then widened by means of RC abutment walls and 4 No. PSC beams. West Wingwall is Masonry approx. 500mm thick. No access to eastern wingwall but signs of a gabion wall (in poor condition).</p> <p>Proposed road configuration will increase number of lanes from 7 to 10 lanes of traffic.</p> <p>Widening on west side of structure requiring additional culvert segments and a new headwall. Structural assessment of existing structure required.</p> <p>Refer to structure specific PDR for proposed works to structure.</p>	Structure impacted
5.08	Cantilever Gantry	Navan Road N3		FCC	<p>Existing cantilevered steel structure founded on RC foundations.</p> <p>Carriageway widened towards gantry. Gantry to be replaced at a suitable offset from carriageway.</p>	Structure impacted
5.09	Portal Gantry	Navan Road N3 Gantry SG-057		FCC	<p>Existing portal frame steel structure founded on RC foundations.</p> <p>Gantry signage to be realigned with revised lane arrangement which may involve modification or replacement of portal structure.</p>	Structure impacted

Structure Ref.	Structure Type	Name/ Description	Structure ID	Jurisdiction	Structure Comments	Impact
5.10	Culvert	Tolka River Culvert under N3 (James Connolly Bridge)	FG-N03-009.00	FCC	<p>Corrugated Steel culvert with a span of 8.6m and RC headwalls.</p> <p>Existing Culvert buried beneath 6 general traffic lanes.</p> <p>Proposed vehicle lanes to be increased to include 6 general traffic lanes and 2 bus lanes.</p> <p>Widening on east side however the headwall is set back sufficiently that widening does not impact on structure. By inspection no structural assessment necessary as additional widening will maintain elevations of adjoining existing lanes</p>	No impact
5.11	Bridge	Mill Road Bridge	FG-N03-010.00	FCC	<p>2 no. existing single span RC insitu deck bridges with shared integral foundation. Each superstructure carrying 3 no. lanes of traffic with a 4.8m width (clear) between superstructures.</p> <p>Decks are integrally cast with both abutments. No PT noted on drawings.</p> <p>Abutments measure 32m, perpendicular to the overbridge alignment, with a 23 deg skew, no foundation expansion joints noted. Abutments integral with pad footing foundations.</p> <p>4 No. wingwalls return 12m parallel with overbridge alignment (note pad foundations only return 3.2m)</p> <p>Widening of the overbridge structure required on both sides and centrally to accommodate 2 additional bus lanes on the overbridge.</p> <p>Refer to structure specific PDR for proposed alterations to bridge structure.</p> <p>Structural assessment of existing structure required.</p>	Structure impacted

Structure Ref.	Structure Type	Name/ Description	Structure ID	Jurisdiction	Structure Comments	Impact
5.12	Portal Gantry	Navan Road N3 Gantry SG-059		FCC	Existing Portal frame steel structure founded on RC foundations. Existing gantry to be demolished and constructed 50m east of existing location. The proposed gantry will facilitate construction of a maintenance layby on the N3 mainline and will see signs mounted indicating lane designation on approach to the diverge junction.	Structure impacted
5.13	Retaining wall	Retaining Wall at N3 eastbound off slip (adjacent to Connolly Hospital access)		FCC	Retaining wall offset approx. 4.3m min from the N3 off ramp with steel fence atop. Roadside is the retained side. Retained height approx. 1.8m - 2.4m. Note also the presence of a large diameter pipe and manhole structure (possible storm water) which is also supported by the retaining wall (located at the eastern extremity adjacent to the Connolly Hospital entrance bridge). Additional bus lane results in minor kerb realignment works to kerb line adjacent to retaining wall.	No impact
5.14	Bridge	Bridge over Tolka River at Connolly Hospital access		FCC	Existing single span steel box girder bridge with concrete abutments. No local widening or reduction in traffic offset proposed.	No impact

Structure Ref.	Structure Type	Name/ Description	Structure ID	Jurisdiction	Structure Comments	Impact
5.15	Retaining wall	Retaining Wall at N3 eastbound off-slip		FCC	<p>2 No. retaining walls to the north (RC Cantilever) and south (RSW Wall) of the approach to the overbridge.</p> <p>Retained height on north side of approach appears to vary from 4.0-7.0m while on the south side is approx. 2.4m.</p> <p>Both retaining structures have pedestrian parapets.</p> <p>No local widening or reduction in traffic offset proposed within the vicinity of the northern retaining wall.</p> <p>Lane widening will move kerb line closer to top of southern wall, with limited space to fit VRS at back of wall. This impact is localised to approximately first 15m of the wall as the road approaches the wall at this location. It is proposed to remove the coping at the top of the RSW wall and extend the earthworks locally over the wall to accommodate the VRS and provide suitable working width. The wall over this section will not be acting as a retaining wall as it will be buried. Hence, the moving of the kerb line closer to the existing wall at this location will not have any structural impact on the wall.</p> <p>No structural modifications to the RSW wall is proposed.</p>	Structure impacted

Structure Ref.	Structure Type	Name/ Description	Structure ID	Jurisdiction	Structure Comments	Impact
5.16	Bridge	N3 Overbridge at eastbound off-slip	FG-N03-010.60	FCC	<p>Existing 2 span precast, prestressed girder bridge carrying 3 lanes of traffic. Bridge spans over 1 No. 2 lane and 1 No. 3lane motorway.</p> <p>Approximately 14m of kerb realignment in the south east corner of the bridge deck is required. This widening stays inside the eastern edge bridge girder beam as demonstrated within Appendix B. At this location the kerb widens the carriageway 1.4m into footpath resulting in an overall carriageway width of 17.30m. Consequently, the overall carriageway width at this location remains less than the current maximum carriageway width over the bridge. Hence no additional traffic loading is applied to this structure.</p> <p>To maintain the current upstand at the bridge parapet and to avoid making the eastern footpath steeper than existing, a trief kerb is proposed to be installed over the impacted length of the eastern kerb line as a minimum.</p> <p>Due to the realignment of the kerbs on the bridge any ducting in this section of the footpath will need to be relocated. On reducing the footpath width at this location it still remains the widest part of the footpath so there will be suitable space in the footpath to accommodate the relocation of services.</p>	Structure impacted
5.17	Retaining wall	Retaining wall between northbound and southbound carriageway		FCC	<p>Localised existing vertical concrete retaining wall, dual purpose with front face acting as a traffic barrier and rear face as retaining wall. Height of wall approx. 0.6 to 0.9m. Retained height of approximately 900 mm matches full height of wall.</p> <p>Local widening to southern side of wall results in direct clash with existing wall.</p> <p>New wall to be provided in the new median</p>	Structure impacted

Structure Ref.	Structure Type	Name/ Description	Structure ID	Jurisdiction	Structure Comments	Impact
5.18	Bridge	N3 outbound - M50 interchange - Royal Canal Bridge		FCC	Existing 4 span RC integral slab with RC substructure and RSS abutments. Bridge spanning over canal, canal lock, pedestrian/cycle path and 2no rail lines (no OHLE). Bridge has curved longitudinal cables and transverse cables. No local widening proposed across the span, however there will be removal of lane hatching to make way for a bus lane. This is within the existing kerb lines and assumes no impact on structure.	No impact
5.19	Bridge	N3 outbound - M50 interchange - M50 Bridge		FCC	Existing RC integral arch bridge with 9no. sub-spans and RC substructure. Bridge spanning over 6 lane dual carriageway motorway (M50). No local widening or reduction in traffic offset across the structure.	No impact
5.20	Bridge	N3 inbound - M50 interchange - M50 Bridge	M50PPP-S01-N3	FCC	Existing RC integral arch bridge with 9 No. sub-spans and RC substructure. Bridge spanning over 6 lane dual carriageway motorway (M50). No local widening or reduction in traffic offset across the structure.	No impact
5.21	Bridge	N3 inbound - M50 interchange - Royal Canal Bridge		FCC	Existing 4 span RC integral slab with RC substructure and RSS abutments. Bridge spanning over canal, pedestrian/cycle path and 2no rail lines (no OHLE). No local widening proposed across the span, however there will be removal of lane hatching to make way for a general traffic lane. This is within the existing kerb lines and assumes no impact on structure.	No impact

Structure Ref.	Structure Type	Name/ Description	Structure ID	Jurisdiction	Structure Comments	Impact
5.22	Bridge	M50 interchange, Bridge over N3		FCC	<p>Existing 5 span RC box girder bridge carrying 2x 2 lanes of traffic, separated by 2no. central traffic barriers. Bridge spanning over (span 1) 1 lane road, (2) 2no. pedestrian footpaths and a canal, (3) 2no rail lines (no OHLE), (4) diverging 3 lane road, and (5) a 3 lane road.</p> <p>No changes to current arrangement on the bridge superstructure. Diverging 3 lane road beneath span 4 to be increased to 4 lanes. Local widening results in reduction in traffic offset to intermediate pier from 7.3m to 5.7m.</p> <p>Headroom clearance has been checked for the proposed alignment and complies with DN-GEO-03036 for maintained headroom.</p>	No impact
5.23	Bridge	M50 interchange Bridge		FCC	<p>Existing 4 span RC box girder bridge carrying 2 lanes of traffic. No changes to current arrangement on the bridge superstructure. Existing bridge spans over single lane off-ramp.</p> <p>Single lane off-ramp beneath bridge, widened to include additional bus lane. Posted speed limit below structure is 50 kph and using a design speed of 60 kph in the existing condition the pier does not sit in the clear zone of 4.5m from edge of travel lane.</p> <p>The bridge was constructed circa 2009. Since the pier is within 4.5m of the existing carriageway, the bridge pier would have been designed for collision loading, assuming BD60/94 was used (Design of Highway Bridges for Collision Loads). Current assessment loading is identical to the loading used to design the structure therefore no impact to structure.</p> <p>The additional lane moves the general traffic lane to 1.6m from the pier. The pier therefore sits within the</p>	Structure Impacted

Structure Ref.	Structure Type	Name/ Description	Structure ID	Jurisdiction	Structure Comments	Impact
					<p>clear zone. Due to the constrained nature around the pier a suitable set back cannot be achieved to provide the required H2 barrier as per DN-REQ-03034. Therefore, a risk assessment conducted to DN-REQ-03079 is required. Refer to Appendix C for risk assessment. The risk assessment has found that the risk rating is high and therefore a barrier with a reduced set back of 0.5m should be adopted at this location.</p> <p>Headroom clearance has been checked for the proposed alignment and complies with DN-GEO-03036 for maintained headroom.</p>	
5.24	Portal Gantry	Navan Road N3 Gantry SG-060		FCC	<p>Existing Portal frame steel structure founded on RC foundations.</p> <p>Signs to be updated to reflect lane designation changes, no structural modifications required</p>	No impact
5.25	Portal Gantry	Navan Road R147 Gantry SG-061		FCC	<p>Existing Portal frame steel structure founded on RC foundations.</p> <p>Gantry to be altered or replaced due to change of lane positions below the gantries.</p>	Structure impacted
5.26	Portal Gantry	Navan Road R147 Gantry SG-062		FCC	<p>Existing Portal frame steel structure founded on RC foundations.</p> <p>Gantry to be altered or replaced due to change of lane positions below the gantries.</p>	Structure impacted
5.27	Bridge	Bridge- Ashtown Train Station		FCC	<p>Existing 2 span RC bridge spanning three lanes of traffic.</p> <p>3 lanes of traffic and 2 cycleways at footpath level are maintained.</p> <p>No proposed widening across the span.</p>	No impact
5.28	Portal Gantry	Navan Road R147 Gantry SG-063		FCC	Existing Portal frame steel structure founded on RC foundations.	Structure impacted

Structure Ref.	Structure Type	Name/ Description	Structure ID	Jurisdiction	Structure Comments	Impact
					Gantry to be altered or replaced due to change of lane positions below the gantries.	
5.29	Bridge	R805 Old Cabra Road - Railway Bridge		Irish Rail	<p>Existing single span bridge with two lanes, two on road cycle lanes and two footpaths spanning over existing in-use railway line. No OHLE.</p> <p>The proposed footpath kerb lines generally follow existing kerb lines (apart from at proposed bus stop location) and the western (outbound) on-road cycle lane is separated from traffic lane by Armadillo segregation, with the eastern cycle lane having a segregated kerb and the eastern footpath being amended as follows.</p> <p>The eastern footpath will be raised by approximately 60-70mm to provide 160mm high containment (kassel) kerbs at the location of the bus stop. The loads on the existing masonry arch bridge were assessed, with calculations showing only a marginal increase in overall dead load at this location, calculated to be less than 3% increase in total dead load. Hence it was assessed that there is no structural impact on the bridge due to this marginal increase in load.</p> <p>The parapet height adjacent to the footpath was also assessed for the purposes of determining the minimum requirement for a parapet railing over the bridge. The existing parapet comprises of a solid masonry wall with a steel extension above, placing the height at over 2m for the extent of the bridge crossing, which is greater than the 1.8m minimum requirement. Further to this, the height of the solid masonry wall will remain at least 1.2m above the proposed footpath levels once the works</p>	No impact

Structure Ref.	Structure Type	Name/ Description	Structure ID	Jurisdiction	Structure Comments	Impact
					are completed, which is considered necessary for future electrification plans of the railway.	
5.30	Retaining Wall	Retaining wall to low courtyard,42 Manor Street		Private	<p>Existing retaining wall approximately 1.5m high, roadside being the elevated side.</p> <p>Retaining wall is constructed of granite stone panels approx. 1m wide, 150mm thick with vertical mortar joints, mortar joints are in fair condition. Road widening reduces traffic offset to approximately 1.9m to basement wall.</p> <p>Liaison with landowner has ascertained that no cellar structure exists below the footpath.</p>	No impact
5.31	Retaining Wall	Retaining wall to low courtyard,32-37 Manor Street		Private	<p>Existing retaining wall approximately 1.5m high is part of a cellar structure under dwelling, road side being the elevated side.</p> <p>Retaining wall is constructed of granite stone panels approx. 1m wide, 150mm thick with vertical mortar joints, mortar joints are in fair condition.</p> <p>Kerbline is realigned by approximately 200mm max to allow for the installation of an inbound cycle track.</p> <p>General traffic lane offset from retaining wall is being increased therefore it is assumed there will be no impact to structure.</p>	No impact

Structure Ref.	Structure Type	Name/ Description	Structure ID	Jurisdiction	Structure Comments	Impact
5.32	Retaining Wall	Retaining wall to low courtyard, Blackhall Court		Private	Existing retaining wall approximately 3.0m high is part of a cellar structure under dwelling, road side being the elevated side. Wall consists of granite panels to street level, horizontal mortar capping, then a further 500mm upstand height above footpath level. Structure not impacted by proposed works	No impact
5.33	Retaining Wall	Retaining wall to low courtyard, 69-70 Queen Street		Private	Existing retaining wall approximately 2.5m high is part of a cellar structure under dwelling, road side being the elevated side. Retaining wall constructed of stone panels with mortar joints. Structure not impacted by proposed works	No impact
5.34	Retaining Wall	Retaining wall to low courtyard, 72a Queen Street		Private	Existing retaining wall approximately 2.5m high is part of a cellar structure under dwelling, road side being the elevated side. Wall consists of granite panels to street level, horizontal mortar capping, then a further 500mm upstand height above footpath level. Wall retains road around a very narrow courtyard. Wall in poor condition. Structure not impacted by proposed works	No impact
5.35	Retaining Wall	Retaining wall to Phoenix Industrial Park / Gowan Motors Retail Group		Private	There is an existing retaining wall which retains the road embankment adjacent commercial properties along the R147 inbound. - The wall adjacent Phoenix Industrial Park is approximately 130 m long, with a maximum retained height of 2.4 m.	No impact

Structure Ref.	Structure Type	Name/ Description	Structure ID	Jurisdiction	Structure Comments	Impact
					<p>- The wall adjacent Gowan Motors Retail Group is approximately 120 m long, with a maximum retained height of 1.6 m.</p> <p>It is assumed that the wall comprises a concrete wall on pad footing, clad with masonry.</p> <p>The proposed road configuration moves the kerb line closer to the wall at this location. Hence, the wall was assessed to determine if the structure would be impacted by the proposed configuration.</p> <p>While the proposed road configuration will place the kerb line closer to the wall, it will still be sufficiently far enough away so as not to impact on the wall. Furthermore, alongside the Phoenix Park Industrial Estate and for a 30m length alongside the western end of Gowan Motors Retail Park, the existing footpath, which is located directly behind the wall, will be moved further back away from the wall, reducing its impact. There is no increase in surface levels behind the wall.</p> <p>Following this assessment, it is determined that there is no impact on the existing wall due to the proposed road works in this area.</p>	
5.36	Retaining Wall	Retaining wall to Ashtown Gate		Private	<p>The R147 inbound carriageway is to be widened adjacent to the Ashtown Gate Building in Ashtown, resulting in the kerb line moving approximately 1.8m closer to the building premises. The building comprises a basement structure extending 2 levels below ground. The basement wall aligns with the boundary wall for the property.</p> <p>Drawings for the existing building were acquired and a site inspection of the basement was undertaken for the</p>	No Impact

Structure Ref.	Structure Type	Name/ Description	Structure ID	Jurisdiction	Structure Comments	Impact
					<p>purpose of better understanding the structure and compiling information to carry out a structural assessment.</p> <p>The basement wall was structurally assessed for the impact of moving the kerb line closer to the boundary wall. The assessment concluded that while there was a marginal increase in load effects on the wall, these were minimal and assessed to be well within the structural capacity of the wall. Hence, no modification to this structure is proposed.</p>	
5.37	Retaining Wall	Retaining wall between 1-5 Herbert Road and N3 westbound carriageway		Private / FCC	<p>The existing retaining wall contains the toe of the N3 embankment adjacent property along Herbert Road.</p> <p>The proposed carriageway works on the N3 will not result in a change to the embankment at this location. It is not proposed to alter either the levels of the embankment nor widen out the width of the embankment at this location.</p> <p>Hence, the structure is not impacted by the proposed works at this location.</p>	No impact

4 Structural Impact Summary

This assessment has found that 15 out of 37 structures are impacted by the Proposed Scheme; these structures are summarised within Table 2.

Table 2: Impacted Structures

Structure Ref.	Structure Type	Name/ Description
5.03	Retaining wall	Retaining wall between northern edge of R121 and Whitestown estate
5.04	Embankment	Embankment to the N3 from the L3020 Blanchardstown
5.05	Embankment & Retaining wall	Embankment and retaining wall adjacent to the L3020 at Ebay building
5.07	Culvert	Tolka River Culvert under N3
5.08	Cantilever Gantry	Navan Road N3
5.09	Portal Gantry	Navan Road N3 Gantry SG-057
5.11	Bridge	Mill Road Bridge
5.12	Portal Gantry	Navan Road N3 Gantry SG-059
5.15	Retaining wall	Retaining Wall at N3 eastbound off-slip.
5.16	Bridge	N3 Overbridge at eastbound off-slip
5.17	Retaining wall	Retaining wall between northbound and southbound carriageway
5.23	Bridge	M50 interchange Bridge
5.25	Portal Gantry	Navan Road R147 Gantry SG-061
5.26	Portal Gantry	Navan Road R147 Gantry SG-062
5.28	Portal Gantry	Navan Road R147 Gantry SG-063

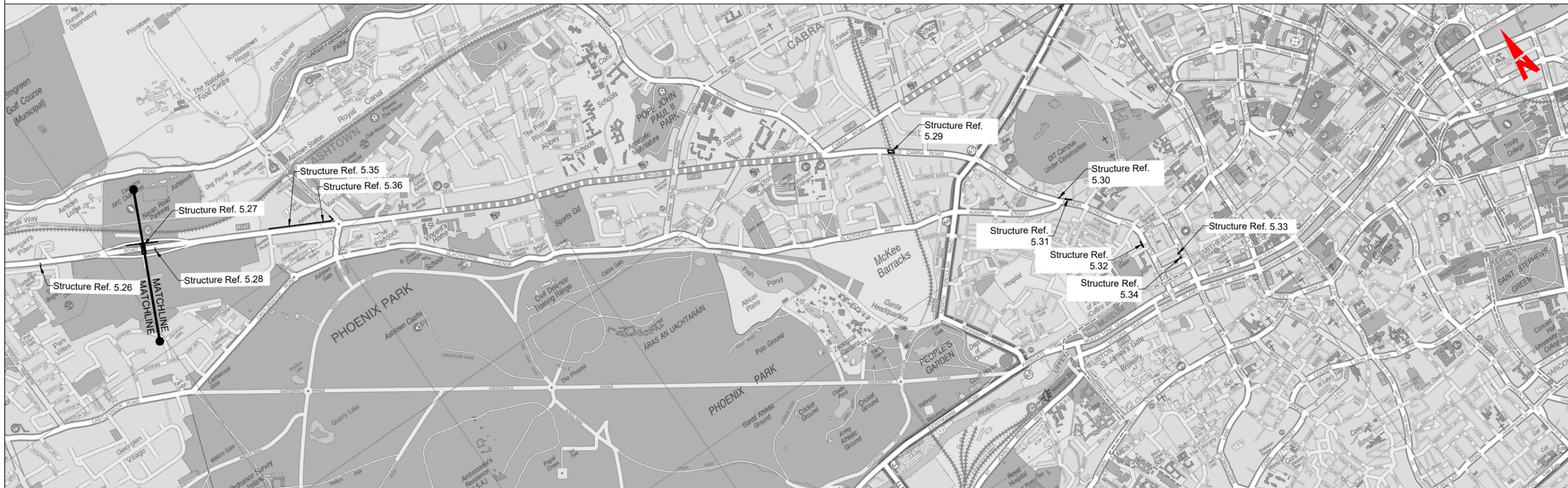
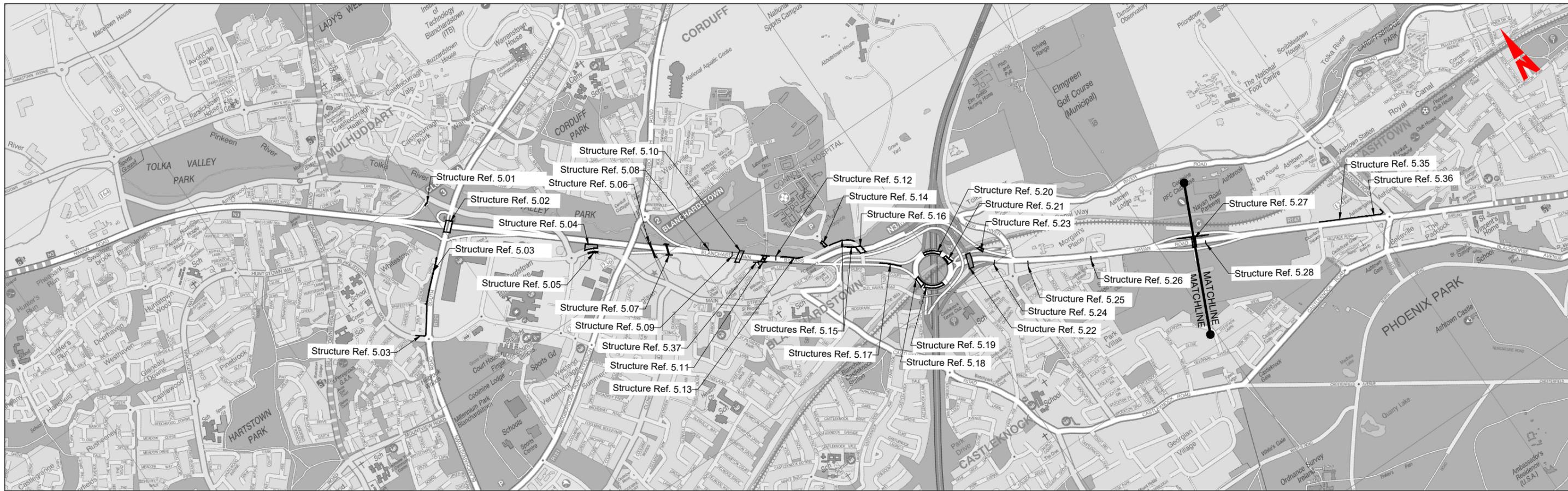
5 Further work

The following structures require a structural assessment based on the extent of alterations required to accommodate the proposed scheme. These assessments will be documented as part of the bridge specific preliminary design reports:

- Tolka River Bridge under N3 (Structure Ref. 5.07)
- Mill Road Bridge (Structure Ref. 5.11)

Appendix A

Drawing



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d. Information concerning the position of apparatus shown on this drawing is based on drawings supplied by the utility owners and/or the utility works contractor, whilst every care has been taken in the preparation of this drawing, positions should be taken as approximate and are intended for general guidance only and no representation is made by the NTA as to the accuracy, completeness, sufficiency or otherwise of this drawing and the position of the apparatus. The information contained herein does not purport to be comprehensive or final as the apparatus is subject to being altered and/or superseded. Recipients should not rely on this information. Any liabilities are hereby expressly disclaimed.

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Project Ireland 2040
 Building Ireland's Future

Rev	Date	Drn	Chk'd	App'd	Description
M01	25/03/2022	SK	CG	BD	ISSUE FOR PHASE 4: PLANNING

Client: **NTA**
 Udarás Náisiúnta Iompair
 National Transport Authority

Engineering Designer: **ARUP**

Date: 25/03/2022 Scale: 1:10000 @ A1
 1:20000 @ A3

Project Code: BCIDC Originator Code: ARP

Drawn: SK Checked: CG Approved: BD

OMS Code: 268401-00

Programme Title: BUSCONNECTS DUBLIN CORE BUS CORRIDORS INFRASTRUCTURE WORKS			
Drawing Title: BLANCHARDSTOWN TO CITY CENTRE CORE BUS CORRIDOR SCHEME EXISTING STRUCTURES			
Drawing File Name: BCIDC-ARP-STR_GA-0005_XX_00-DR-CB-0001	Sheet Number: 01 of 01	Status: A	Rev: M01

DO NOT SCALE USE FIGURED DIMENSIONS ONLY

Appendix B

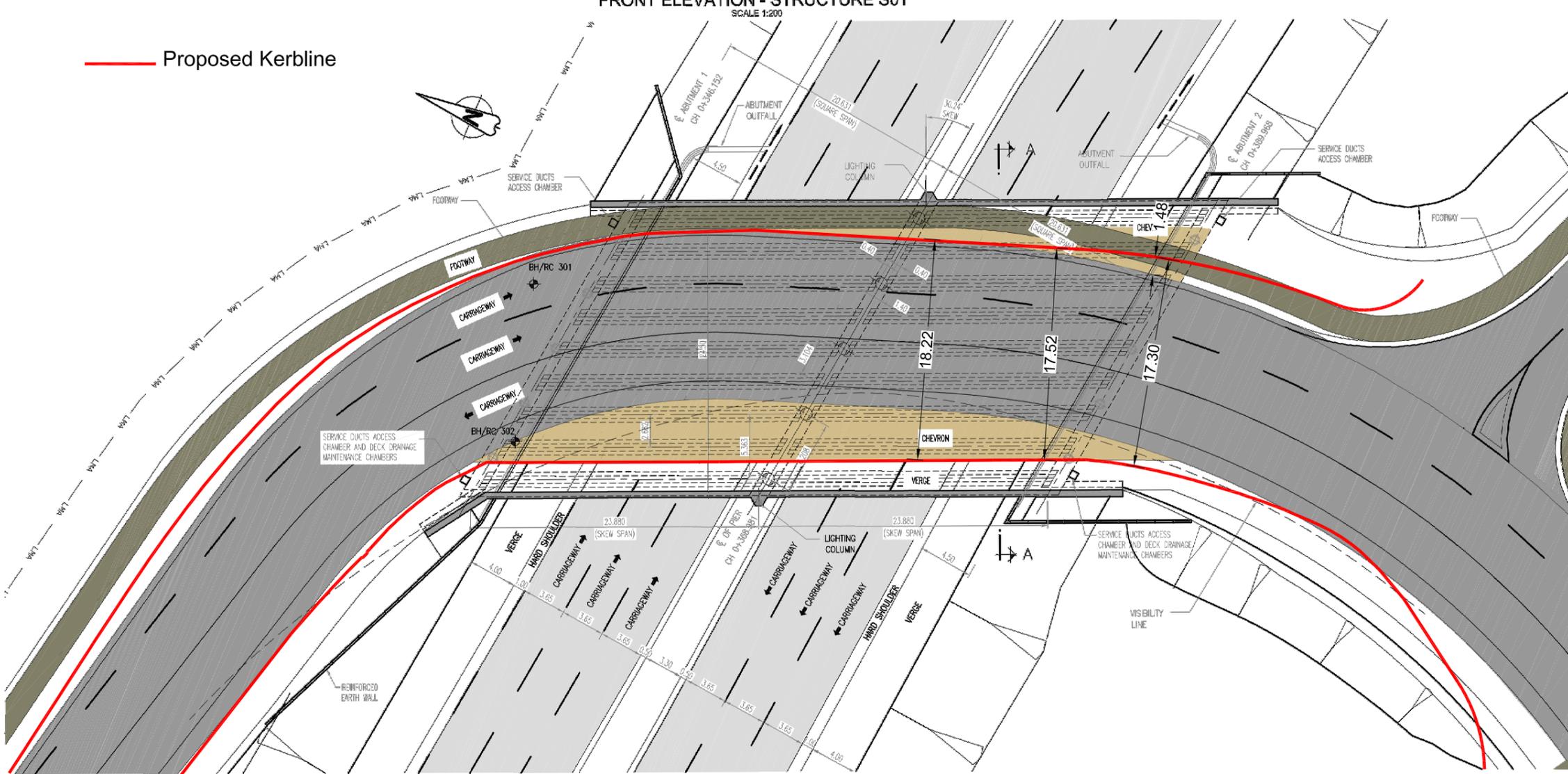
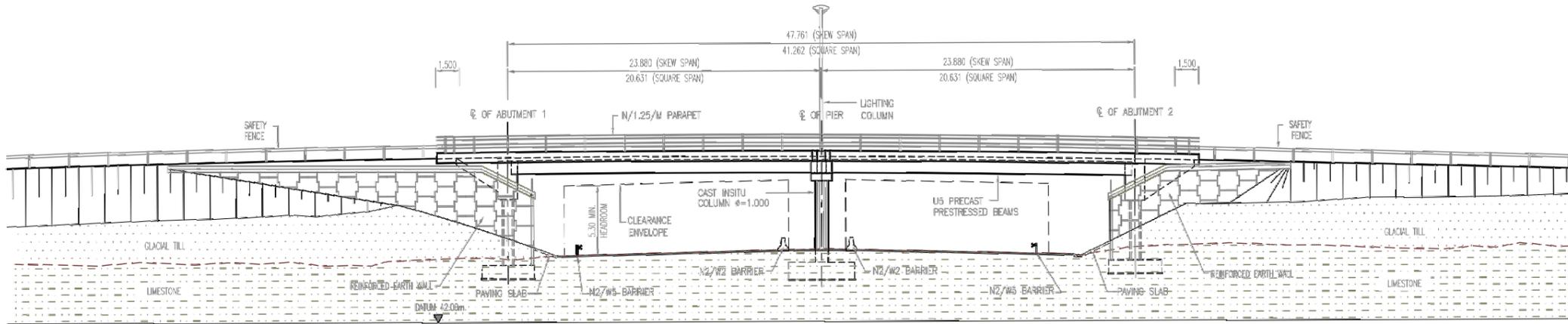
Structure ref 5.16

DO NOT SCALE

A1

ecocommer

File: M50PPP_S01-N3_D12_011607 Rev C.dwg
Date: May 19, 2011 12:48pm
Printed by: ecocommer



- NOTES:
- THIS DRAWING SHALL BE READ IN COMBINATION WITH ALL OTHER RELEVANT DRAWINGS AND STA-2 FORM (REF:M50PPP/S01-N3/D12)
 - ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
 - ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM MALIN HEAD.
 - THE POSITION OF BOREHOLES AND SERVICES SHOWN ARE APPROXIMATE.
 - THE POSITION OF STATUTORY UNDERTAKERS PUBLICLY OWNED AND PRIVATELY OWNED SERVICES SHALL BE VERIFIED BY THE CONTRACTOR.
 - ALL CONCRETE TO BE CLASS 40/20 EXCEPT AS FOLLOWS:
EXPOSED ABUTMENT WALLS & INNERSILLS WITHIN THE SPLASH ZONE -CLASS 50/20
PIER -CLASS 50/20
PRECAST EDGE BEAMS -CLASS 50/20
FOOTWAY/VERGE INFILL CONCRETE -CLASS 30/20
PRECAST CONCRETE U BEAMS -CLASS 60/20
THE SLOPE SLOPES, VERGES AND CENTRAL ROSSRIE (EXCLUDING HARD STRIPS) BELOW THE PLAN AREA OF BRIDGES OVER THE PROJECT ROAD SHALL PAVED SLAB WITH WIDE IN SITU CONCRETE KERB ALL AROUND.
 - ALL EXPOSED CONCRETE SURFACES SHALL HAVE A MINIMUM 50% GROUND GRANULATED BLAST FURNACE SLAG AND SURFACE INFREGINATION IN ACCORDANCE WITH THE SPECIFICATION
 - BRIDGE DECK WATERPROOFING SHALL BE TWO COAT SPRAY APPLIED BETWEEN PARAPET UPSTAND TO A HEIGHT OF 100mm MINIMUM ABOVE ADJACENT DECK SLAB LEVEL. VERTICAL FACES OF DECK ENDS SHALL BE WATERPROOFED TO 200mm BELOW CONSTRUCTION JOINT
 - ALL CONCRETE BURIED SURFACES SHALL BE TREATED WITH TWO COATS OF EPOXY RESIN WATERPROOF IN ACCORDANCE WITH THE SPECIFICATION.
 - FINISHES TO STRUCTURES SHALL BE AS FOLLOWS:
a. UNFORMED SURFACES
-UNFORMED BURIED ELEMENTS -U1
-ALL SURFACES EXPOSED TO VIEW EXCLUDING AREAS TO RECEIVE SPRAYED DECK WATERPROOFING IE PARAPET EDGE BEAMS, TOP OF WALLS -U3
-SURFACES (ROAD SLABS AND BRIDGE DECKS) TO RECEIVE APPROVED WATERPROOFING SYSTEMS -U4
b. FORMED SURFACES
-BURIED SURFACES -F1
-PARAPET EDGE BEAMS -F3
-END SUPPORTS, INTERMEDIATE SUPPORTS, PRECAST ELEMENTS AND BEAMS, DECK SURFIT. -F4
A PATTERNERED FINISH SHALL BE PROVIDED FOR EXPOSED VERTICAL CONCRETE SURFACES.
 - N/1.25/M PARAPET 1.25m HIGH.
 - THE BARRIER WORKING WIDTH SHALL BE AS FOLLOW:
a. PARAPET AT OVERBRIDGE W2
b. SAFETY FENCE (VERGE) W5
c. BARRIER (MEDIUM) W2
 - NOMINAL COVER SHALL BE AS FOLLOWS:
a. PARAPET FASCIA BEAM 80mm
b. EXPOSED SURFACES WITHIN THE SPLASH ZONE AND BURIED SURFACES 50mm
c. EXPOSED SURFACES WITHOUT THE SPLASH ZONE AND THE BRIDGE DECK 40mm
d. PERMANENT FORMWORK 30mm
 - BACKFILL USED DURING CONSTRUCTION SHALL BE MATERIAL TYPE 6H WITH A MIN/MAX INTERNAL ANGLE OF FRICTION 35°/45°.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION	NONE
MAINTENANCE/CLEANING	NONE
USE	NONE
DECOMMISSIONING/DEMOLITION	NONE

NDP National Development Plan
Transport
NRA National Roads Authority
Dublin City Council
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AB	AS BUILT	31/01/11	RAM						
C	REINFORCED EARTH WALL	T.S.L	06.04.05	M.B.D	RAM				
B	PCR CERTIFICATION	T.S.L	18.02.05	M.B.D	RAM				
A	ISSUED FOR OUTLINE CONCEPTUAL DESIGN	T.S.L	23.01.05	M.B.D	RAM				

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Eptisa

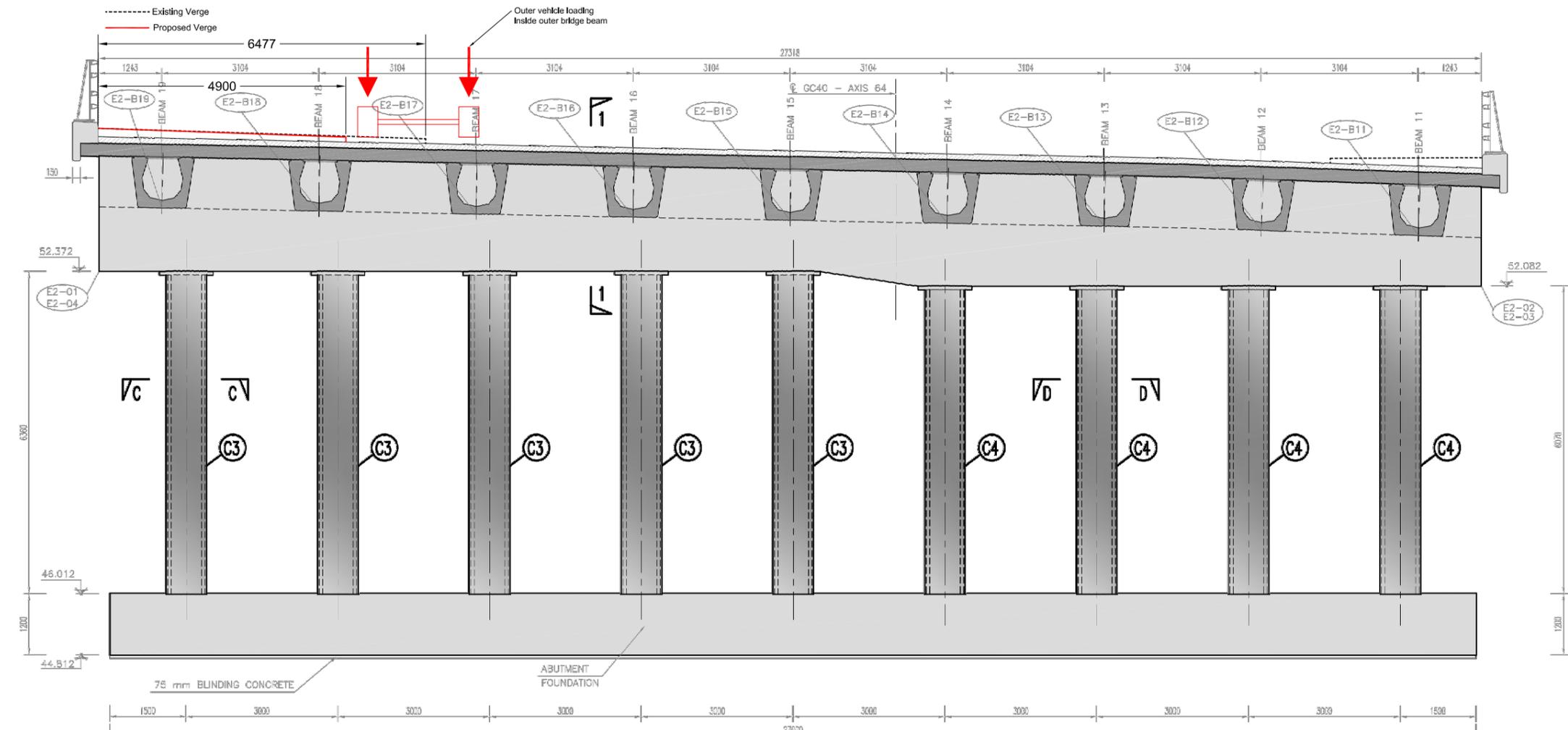
M50 Concession Limited
D&C 50

Title		S01-N3	
GENERAL ARRANGEMENT 01			
Size	Original Scale	Design/Rev	Created
A1	As Shown	T.S.L	M.B.D.
Date	09.04.08	Date	09.04.08
Scale	Drawing Number	Rev	
AB	M50PPP/S01-N3/D12/01	C	

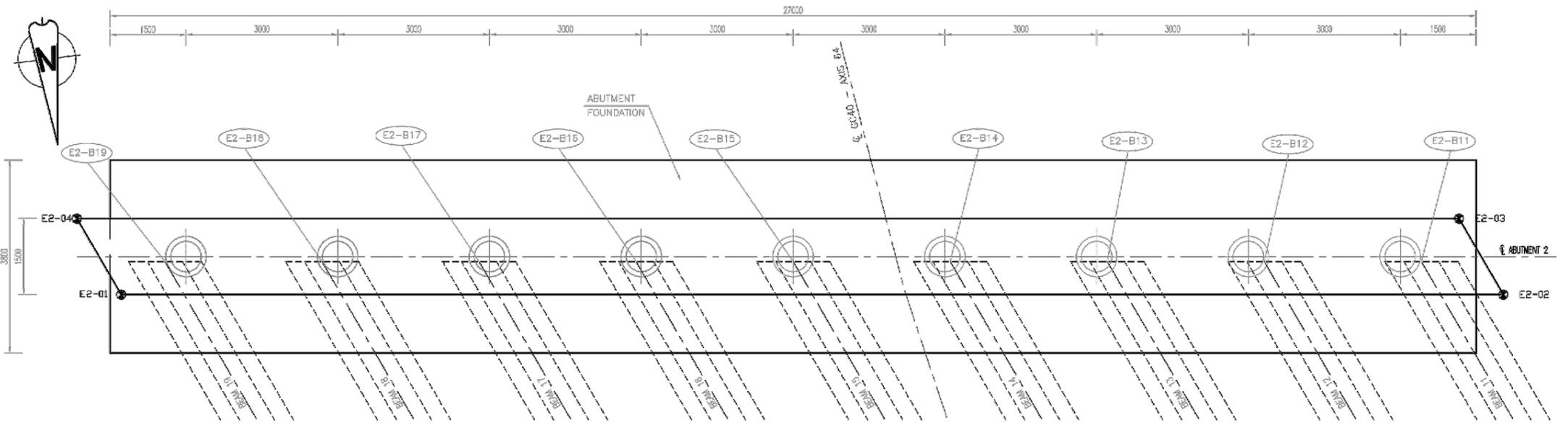
DO NOT SCALE

A1

File: M50PPP-S01-N3-D12-009 Rev A.dwg
 Date: May 19, 2011 - 12:51 pm
 Plotted by: coconnor



SOUTH ELEVATION
SCALE 1:50



PLAN
SCALE 1:50

SETTING OUT POINTS

ABUTMENT 2				
ORDER	POINT	E	N	Z
1	E2-01	308785.419	238415.008	53.372
2	E2-02	308758.316	238418.431	52.082
3	E2-03	308758.996	238416.834	52.082
4	E2-04	308786.098	238413.410	53.372

NOTES:

- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND STA-2 FORM (REF:M50PPP/S01-N3/D12)
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
- ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM MAUN HEAD.
- THE POSITION OF BOREHOLES AND SERVICES SHOWN ARE APPROXIMATE.
- THE POSITION OF STATUTORY UNDERGROUNDS PUBLICLY OWNED AND PRIVATELY OWNED SERVICES SHALL BE VERIFIED BY THE CONTRACTOR.
- ALL CONCRETE TO BE CLASS C40/50 EXCEPTS AS FOLLOWS:
 EXPOSED ABUTMENT WALLS & WINGWALLS
 WITHIN THE SPLASH ZONE -CLASS C50/60
 DECK SLAB -CLASS C50/60
 PIER -CLASS C50/60
 PRECAST EDGE BEAMS -CLASS C50/60
 FOOTWAY/AVERAGE INFILL CONCRETE -CLASS C30/37
 PRECAST CONCRETE J BEAMS -CLASS C50/60
 THE SIDE SLOPES, VERGES AND CENTRAL RESERVE (EXCLUDING HARD STRIPS) BELOW THE PLAN AREA OF BRIDGES OVER THE PROJECT ROAD SHALL BE PAVED WITH WIDE IN-SITU CONCRETE KERB ALL AROUND.
- ALL EXPOSED CONCRETE SURFACES SHALL HAVE A MINIMUM 50% GROUND GRANULATED BLAST FURNACE SLAG AND SURFACE IMPROVEMENT IN ACCORDANCE WITH THE SPECIFICATION
- BRIDGE DECK WATERPROOFING SHALL BE TWO COAT SPRAY APPLIED BETWEEN PARAPET LIFTS AND TO A HEIGHT OF 100mm MINIMUM ABOVE ADJACENT DECK SLAB LEVEL. VERTICAL FACES OF DECK ENDS SHALL BE WATERPROOFED TO 200mm BELOW CONSTRUCTION JOINT
- ALL CONCRETE BURIED SURFACES SHALL BE TREATED WITH TWO COATS OF EPOXY RESIN WATERPROOF IN ACCORDANCE WITH THE SPECIFICATION
- FINISHES TO STRUCTURES SHALL BE AS FOLLOWS:
 a. UNFORMED SURFACES
 -UNFORMED BURIED ELEMENTS -U1
 -ALL SURFACES EXPOSED TO VIEW, EXCLUDING AREAS TO RECEIVE SPRAYED DECK WATERPROOFING & PARAPET EDGE BEAMS, TOP OF WALLS, -U3
 -SURFACES (ROAD SLABS AND BRIDGE DECKS) TO RECEIVE APPROVED WATERPROOFING SYSTEMS. -U4
 b. FORMED SURFACES
 -BURIED SURFACES, -F1
 -PARAPET EDGE BEAMS, -F3
 -END SUPPORTS, INTERMEDIATE SUPPORTS, PRECAST ELEMENTS AND BEAMS, DECK SFFIT. -F4
 A PATTERNED FINISH SHALL BE PROVIDED FOR EXPOSED VERTICAL CONCRETE SURFACES.
 11. N/1.25/M PARAPET 1.25m HIGH
 12. THE BARRIER WORKING WIDTH SHALL BE AS FOLLOWS:
 a. PARAPET AT OVERBRIDGE W2
 b. SAFETY FENCE (VERGE) W3
 c. BARRIER (MEDIAN) W2
 13. NOMINAL COVER SHALL BE AS FOLLOWS:
 a. IN SITU STRICH TO THE CANTILEVER) 80mm
 b. EXPOSED SURFACES WITHIN THE SPLASH ZONE AND BURIED SURFACES 50mm
 c. EXPOSED SURFACES WITHOUT THE SPLASH ZONE 40mm
 d. BRIDGE DECK (PROTECTED BY WATERPROOFING) 40mm
 e. PERMANENT FORMWORK 30mm
 f. BRIDGE DECK (EXPOSED) 40mm
 14. BACKFILL USED DURING CONSTRUCTION SHALL BE MATERIAL TYPE B1 WITH A MIN/MAX INTERNAL ANGLE OF FRICITION 35°/45°.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS

CONSTRUCTION	NONE
MAINTENANCE/CLEANING	NONE
USE	NONE
DECOMMISSIONING/DEMOLITION	NONE

AB	AS BUILT	31.01.11	RAN						
A	FOR CERTIFICATION	13.08.08	RAN	A	- FOR APPROVAL	T.S.L.	13.08.08	M.B.D.	RAN
Sket	Purpose of Issue	Date	Auth	Rev	Description	By	Date	Chk'd	Auth

ATKINS
 2000 Wilton, 8500 Wilton
 100 Wilton Road, Dublin 15
 Tel: 01 452 2000
 Fax: 01 452 2000

Eptisa
 GROUP EP

PPP Company

M50
 M50 Concession Limited

Client

D&C 50
 D&C 50

File: S01-N3

ABUTMENT 2. ELEVATION

Rev	Original Scale	Design/Drawn	Checked	Authorised
A1	As Shown	T.S.L.	M.B.D.	RAN
Scale:	Drawing Number	Date	Date	Date
AB	M50PPP/S01-N3/D12/009	13.08.08	13.08.08	13.08.08

Appendix C

Risk Assessment for Vehicle Restraint System

Hazard Type, Start and End Coordinates	Is Hazard within the Clear Zone? (Y/N)	Can the Hazard be Mitigated? (Y/N)	(1) Hazard Ranking	Sinuosity Index (SI)	(2) Sinuosity Ranking	(3a) Collision Rate Threshold	(3b) Collision Rate Ranking	4) Risk of a Vehicle Leaving the Road	(5) Overall Risk Rating	Distance of Hazard (m)	VRS to be Installed (Y/N) Start and End Coordinates	Reasons for Installing / Not Installing the VRS
Ch. 2+730 1 Nearside: Existing structural piers	Y	N	H	1.14	H	Below Expected Collision Rate	L	M	H	1.0	Y	<p>A compliant VRS with respect to set-back cannot be accommodated at this location within the current extents of the highway cross-section.</p> <p>The assessment concludes a high overall risk rating.</p> <p>Due to the constraints at this location (namely the distance of hazard – 2.1m from edge of running lane), it is determined that VRS (H2, VI2 concrete step barrier) can potentially be provided at this location.</p> <p>It should be noted that the desirable 1.2m VRS set-back cannot be achieved due to the available width to the bridge structural piers</p>

Hazard Type, Start and End Co-ordinates	Is Hazard within the Clear Zone? (Y/N)	Can the Hazard be Mitigated? (Y/N)	(1) Hazard Ranking	Sinuosity Index (SI)	(2) Sinuosity Ranking	(3a) Collision Rate Threshold	(3b) Collision Rate Ranking	4) Risk of a Vehicle Leaving the Road	(5) Overall Risk Rating	Distance of Hazard (m)	VRS to be Installed (Y/N) Start and End Coordinates	Reasons for Installing / Not Installing the VRS
												therefore a reduced VRS set-back of 0.5m is proposed at this location (in conjunction with an adjacent nearside carriageway hard-strip, 0.6m in width).