A1 Birtley to Coal House

Scheme Number: TR010031

Applicant's Responses to ExA's Second Written Questions - Appendix 2.0J - Structure Options Report 5 - Eighton Lodge North, Slip Road and South Underbridges

Planning Act 2008

Rule 8(1)(b)

Infrastructure Planning (Examination Procedure Rules) 2010

Volume 7

April 2020

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Examination Procedure Rules) 2010

A1 Birtley to Coal House Development Consent Order 20[xx]

Applicant's Response to ExA's Second Written Questions - Appendix 2.0J - Structure Options Report 5 - Eighton Lodge North, Slip Road and South Underbridges

Rule number:	Rule 8(1)(b)
Planning Inspectorate Scheme Reference	TR010031
Application Document Reference	N/A
Author:	A1 Birtley to Coal House Project Team, Highways England

Version	Date	Status of Version
Rev 0	20 April 2020	Application Issue

A1

Birtley to Coal House Improvement Scheme

Structure Option Report 5

EIGHTON LODGE NORTH, SLIP ROAD AND SOUTH UNDERBRIDGES

Structure No. A1/441.00, A1/440.90//6, A1/440.90

STKEY 16440, 16441, 8883

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April 2018

A1 BIRTLEY TO COAL HOUSE IMPROVEMENT SCHEME

STRUCTURE OPTION REPORT 5

EIGHTON LODGE NORTH, SLIP ROAD AND SOUTH UNDERBRIDGES

Highways England

Date: April 2018

Project No: HE PIN 551462
WSP Ref: 70015226

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QUALITY MANAGEMENT

ISSUE/REVISION SUITABILITY	FIRST ISSUE P01 S1	REVISION 1	REVISION 2	REVISION 3
Remarks	Issue for comments	Final Issue – End of Stage 3 – Preliminary Design		
Date	February 2018	April 2018		
Prepared by	Shehed Al-Shalechy	Giovanna Brunetti Barchetta		
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Checked by	Hitan Mistry	Hitan Mistry		
Signature	HM	HM		
Authorised by	Nigel Rawcliffe	Nigel Rawcliffe		
Signature	NR	NR		
Project number	PIN: 551462 WSP ref: 70015226			
Report number	HE551462-WSP-SBR-BCH-RP-S-1700_059			
File reference	HE551462-WSP-SBR-BCH-RP-S-1700_059_P02			

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EXECUTIVE SUMMARY

WSP have been commissioned under the CDF contract to progress the Stage 3 Preliminary design works to increase the capacity of the route between A1 Junction 65 (Birtley) to Junction 67 (Coalhouse). The scheme involves upgrading from the existing Dual 2-Lane All-Purpose provision to a Dual 3-Lane All-Purpose Provision for this section of the road.

The work to date has identified 3No. underbridges at junction 66 (Eighton Lodge Bridges) which would need structural widening to accommodate the proposed improvement works. The extent of the widening is tabulated below:

	EIGHTON LODGE SLIP ROAD	**EIGHTON LODGE NORTH BRIDGE**	**EIGHTON LODGE SOUTH BRIDGE**
Existing overall cross section (include northbound + southbound decks)	27.9m	27.9m	27.2m
Proposed overall cross section (include northbound + southbound decks)	36.2m	36.2m	36.2m
Extent of the structural widening to the deck carrying the northbound carriageway	4.0m	4.0m	2.5m
Extent of the structural widening to the deck carrying the southbound carriageway	5.5m	5.5m	8.5m
The proposed highway cross section is based on preliminary design information and the final cross section shall be verified at detailed design.			

Based on the study to date it is recommended that conventional asymmetrical widening of the existing Eighton lodge bridges be assessed and developed at detailed design. The indicative construction cost (excluding preliminaries) associated with the structural widening works at the three bridges is provided below:

- Eighton Lodge Slip Road Bridge Structural Widening: Prestress beam and RC deck on extended RC cantilever abutments and flared RC wingwalls on spread foundations. Estimated Cost £1million
- Eighton Lodge North Bridge Structural Widening: Prestress beam and RC deck on extended RC cantilever abutments and flared RC wingwalls on Piled foundations. Estimated Cost £1.2million
- Eighton Lodge South Bridge Structural Widening: Prestress beam and infill deck on extended RC cantilever abutments and flared RC wingwalls on spread foundations. Estimated Cost £1million

It is recommended the following be undertaken to verify the finding of this report and provide clarity on the works to be developed at detailed design.

- Liaison with the HE PM team to confirm whether the complete replacement of Eighton Lodge South Bridge is feasible for further consideration, if confirmed to not be feasible (due to cost /programme and TM implications) this option can be discounted completely.
- Undertake a detailed level survey of the three bridges to confirm the headroom constraint associated with the proposed bridge widening works. This is considered to be critical at Eighton Lodge South Bridge.
- Further site investigation to determine the location of existing service that may impact the proposed works.

1. INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1 WSP has been commissioned by Highways England to develop a scheme proposal for the A1 Birtley to Coal House Improvement Scheme.

1.1.2 The scheme development forms part of the Newcastle/Gateshead Western Bypass (NGWB) and is located on the A1 between Junction 65 (Birtley) to Junction 80 (Seaton Burn). The scheme is part of Highway England's strategic road network serving the metropolitan area of Tyne and Wear.

1.1.3 The project is located between the Junction 65 and Junction 67 on the NGWB and is 4.2km in length. The existing carriageway layout is:

- Southbound: Two lanes between Junction 67 (Coal House) and Junction 66 (Eighton Lodge) with an additional approaching lane between North Side Overbridge and Junction 66. Three Lanes between Junction 66 (Eighton Lodge) and Junction 65 (Birtley). The existing speed limit is 50mph between Junction 67 (Coal House) and North Side Overbridge and 70 mph thereafter.
- Northbound: Two lanes with a lane gain/drop between Junction 65 (Birtley) and Junction 66 (Eighton Lodge) and two lanes between Junction 66 (Eighton Lodge) and Junction 67 (Coal House). The existing speed limit is 50mph throughout.

1.1.4 The A1 NGWB is one of the most congested highway links in the North- East region with more than 110,000 vehicles using the route every day on the busiest section. Therefore, the junction has been identified as requiring the improvement to its existing layout in order to achieve the scheme objective.

1.1.5 At present, the junction has a significant adverse impact on; journey time reliability at peak time, route resilience, safety and environmental impacts.

1.1.6 The scheme objectives for the Junction improvement are structured around the Government's main objectives for transport, being

- To increase the capacity of the A1 between Junction 65 (Birtley) to Junction 67 (Coal House) from existing two lanes to three full standard lanes – to improve the safety for all road users and contribute to the Government's current safety strategy targets.
- Lanes gain/drop between the Junctions
- Replacement of the Allerdene Bridge to achieve optimum whole life costs taking in account future maintenance and operation, and disruption to users.
- New Junction layout at Coal House

1.1.7 The existing Allerdene Railway Bridge has a number of inherent design/construction deficiencies which cannot be easily resolved due to the complex structural form (half joints) and site constraints. The intention is for the existing Allerdene Bridge to be replaced as part of the A1 Birtley to Coal House Improvement Scheme.

1.1.8 Two alignment options were assessed for the replacement of Allerdene Bridge. These are:

- Option 1A - Replacement of Allerdene Railway Bridge as close as possible to the existing structure to enable the retention of Coal House interchange.
- Option 1B - Widening/Replacement of Allerdene Railway Bridge with a wider structure in its existing location and retention of Coal House Interchange and the existing alignment as far as is possible.

1.1.9 Works undertaken during PCF Stage 2 – Route Selection, confirmed Option 1A was the preferred option to be progressed onto the next stage and beyond. Refer to Appendix A for schematic plans of the preferred route.

1.1.10 The scheme is currently progressing within PCF Stage 3: Preliminary Design. The work to date has identified 3No. under bridges at junction 66 (Eighton Lodge Bridges) would need structural widening to accommodate the proposed improvement works.

1.2 REPORT OBJECTIVES

1.2.1 This Structures Options Report has been prepared to assess the constraints/challenges associated with the widening of the 3no. under bridges at junction 66. The three structures of interest are:

- Eighton Lodge Slip Road Underpass STKEY 16441
- Eighton Lodge North Underpass STKEY16440
- Eighton Lodge South Underpass STKEY 8883

1.2.2 The report shall provide a recommendation on the proposed widening works to be further developed at PCF Stage 5 (detailed design).

1.2.3 Upon completion and sign off, this report shall provide Highways England with sufficient information/justification for seeking approval/funding to progress the scheme within the next stage of development.

2. EXISTING STRUCTURE

2.1 GENERAL DESCRIPTION

2.1.1 The 3No. structures discussed in this report are defined in SMIS with the following discrete structure keys/Nos:

Eighton Lodge Slip Road (OS Grid reference 426527E, 557592N)

- A1/440.90//6
- STKEY 16441

Eighton Lodge North Underbridge (OS Grid reference 426682E, 557517N)

- A1/441.00
- STKEY 16440

Eighton Lodge South Underbridge (OS Grid Reference 426801E, 557466N)

- A1/440.90
- STKEY 8883

2.2 EIGHTON LODGE SLIP ROAD UNDERBRIDGE

2.2.1 Eighton Lodge Slip Road Underbridge carries the A1 dual 2 lane carriageway with central reserve and additional southbound climbing lane, over the Junction 66 roundabout.

2.2.2 The bridge comprises a single span, simply supported composite beam and slab structure built circa 1987.

2.2.3 The bridge has a total skew span between the centre line of the bearings of approximately 19.0m. The skew angle is 26 degrees.

2.2.4 The superstructure comprises precast pre-tensioned concrete beams (M3 at 1000mm centres and UM3 outer edge beams) with an in-situ reinforced concrete slab (160mm thick). The north and southbound decks are divided into two structurally independent decks (south deck is wider) by a central longitudinal movement joint. In-situ reinforced concrete diaphragms are positioned at the ends of the deck.

2.2.5 The end supports are in situ reinforced concrete cantilever abutment walls with integral in-situ reinforced concrete wing walls cantilevered off the abutment stem with spread footing foundations.

2.2.6 Buried joints are provided at both ends of the structure.

2.2.7 Each deck is simply supported with each beam supported on individual rubber bearings. Fixity is provided in the transverse and longitudinal directions on the east abutment by 6No stainless steel dowels. 4No Type 3 shear keys provide transverse restraint only at the west abutment.

2.2.8 The record drawings indicate the existing steel parapets comprise group P2, 113kph, type parapets with mesh infill (equivalent to current N2 containment in accordance with TD19/06).

2.2.9 The central reserve has a two sided safety barrier (tensioned corrugated type) common to both the northbound and southbound carriageway.

2.2.10 Refer to Appendix B-1 for existing structure records.

2.3 EIGHTON LODGE NORTH UNDERBRIDGE

2.3.1 Eighton Lodge North Underbridge caries the A1 dual 2 lane carriageway with central reserve over the Junction 66 roundabout.

2.3.2 The bridge comprises a single span, simply supported composite beam and slab structure built circa 1987.

2.3.3 The bridge has a total skew span between the centre line of the bearings of approximately 22.5m. The skew angle is 4 degrees.

2.3.4 The superstructure comprises precast pre-tensioned concrete beams (M6 at 1000mm centres and UM6 outer edge beams) with an in-situ reinforced concrete slab (160mm thick). The north and southbound decks are divided into two structurally independent decks (south deck is wider) by a central longitudinal movement joint. In-situ reinforced concrete diaphragms are positions at the ends of the deck.

2.3.5 The end supports are in situ reinforced concrete cantilever abutment walls with integral in-situ reinforced concrete wing walls cantilevered off the abutment stem with a combination of vertical and raked 600mm diameter bore piled foundations.

2.3.6 Buried joints are provided at both ends of the structure

2.3.7 Each deck is simply supported with each beam supported on individual rubber bearings. Fixity is provided in the transverse and longitudinal directions on the east abutment by 6No stainless steel dowels. 4No Type 3 shear keys provide transverse restraint only at the west abutment.

2.3.8 The record drawings indicate the existing steel parapets comprise group P2, 113kph, type parapets with mesh infill (equivalent to current N2 containment in accordance with TD19/06).

2.3.9 The central reserve has a two sided safety barrier (tensioned corrugated type) common to both the northbound and southbound carriageway.

2.3.10 Refer to Appendix B-2 for existing structure records.

2.4 EIGHTON LODGE SOUTH UNDERBRIDGE

2.4.1 Eighton Lodge South Underbridge caries the A1 dual 2 lane carriageway with central reserve, over the Junction 66 roundabout.

2.4.2 The bridge is a single span, simply supported concrete beam infill deck structure. The bridge has a skew angle of 0°. SMIS records indicate the structure was built circa. 1972.

2.4.3 Total clear span of the bridge deck is approximately 45'0" (13.7m). The bearings are set square to the abutments at 2'0" (610mm) from the front of the abutment face. Span to centre line of the bearings is approximately 49'0" (14.9m).

2.4.4 The superstructure constitutes pre-stressed concrete T beams with in-situ concrete infill and 3" (76.2mm) thick concrete slab. The beams act compositely with a 3" (76.2mm) thick concrete deck with reinforcement mesh. The northbound and southbound carriageways are each supported on two structurally independent decks separated by a central 1" (25.4mm) wide longitudinal movement joint.

2.4.5 The deck is simply supported with each beam supported on individual elastomeric bearings. The deck is free to slide at the east abutment with steel/rubber laminated bearings and is fixed at the west abutment with plain rubber pad bearings. Fixity is provided in the transverse and longitudinal directions at the west abutment by dowels cast in the end diaphragm.

2.4.6 The substructure comprises cantilevered RC abutments and RC wingwalls on spread foundations. The wingwalls are structurally independent of the abutments. The wingwalls have a masonry facing.

2.4.7 Buried joints are provided at both ends of the structure.

2.4.8 Record drawings indicate existing steel parapets comprise group P2, 113kph, type parapets with mesh infill (equivalent to current N2 containment in accordance with TD19/06).

2.4.9 Details of the restraint system within the central reserve is not available. However, the high level inspection of the structure indicates presence of a metallic N2 type VRS system.

2.4.10 Refer to Appendix B-3 for existing structure records.

2.5 STRUCTURE CAPACITY

2.5.1 Reference to the structures management information system (SMIS) records indicate Eighton Lodge Slip Road and Eighton Lodge North bridge was originally design to sustain full HA and 45 units HB with associated HA loading. There are no records to suggest these structures have been previously assessed since its original design. The abnormal load capacity for STGO/SO was also unknown prior to this study.

2.5.2 Eighton Lodge South Bridge was previously assessed and certified in 1995. The assessment confirmed the structure was able to sustain 40t ALL and 45 units HB loading. However the assessment to determine the abnormal load capacity for STGO/SO was not undertaken.

2.5.3 As part of this study. The three bridges were assessed to determine the abnormal load capacity. The assessment was undertaken in accordance with the following Approval in Principal documents countersigned by Highways England.

- AIP for the Assessment of Eighton Lodge Slip Road and North bridge, Report Reference HA551462-WSP-SBR-BCH-RP-S-1700-053, countersigned June 2017
- AIP for the Assessment of Eighton Lodge South bridge, Report Reference HA551462-WSP-SBR-BCH-RP-S-1700-054, countersigned June 2017

2.5.4 The three Eighton lodge bridges were assessed for the following STGO and SO vehicles in accordance with BD86/11.

- SV80
- SV100
- SV150
- SV Train
- SOV 250
- SOV 350

2.5.5 The tables below provided details of the assessed capacity of the three structures

STRUCTURE	ASSESSMENT RESULTS	COMMENTS
Eighton Lodge Slip Road (19m span)	Able to sustain: SV80/100/150 and Train with associated HA SOV250 and 350 with associated HA Accidental wheel and vehicle loading in accordance with BD21/01	Superstructure able to sustain abnormal loading up to SOV350 with no restrictions
Eighton Lodge North Bridge (22.5m span)	Able to sustain: SV80/100/150 and Train with associated HA SOV250 and 350 with associated HA Accidental wheel and vehicle loading in accordance with BD21/01	Superstructure able to sustain abnormal loading up to SOV350 with no restrictions
Eighton Lodge South Bridge (15m span)	Able to sustain: SV80/100/150 and Train with associated HA SOV250 and 350 with associated HA Accidental wheel and vehicle loading in accordance with BD21/01	Superstructure able to sustain abnormal loading up to SOV350 with no restrictions

Table 2.1 STGO/SOV Assessment Results

2.5.6 The results indicate the three bridges can sustain abnormal loading up to and including the SOV250/350 without major strengthening works to the existing bridge decks.

2.5.7 A comparison of the worst case support reactions for the 45 unit HB with associated HA against the SOV250/350 with associated HA showed the total applied loads at each structure to be comparable (within 10-20%). This indicates the loads on the existing bearings and substructure (design based on 45 unit HB) would be within acceptable limits and therefore would not require modification/replacement to sustain the higher level of SOV type abnormal loading.

2.6 STATUTORY UNDERTAKERS INFORMATION

2.6.1 Details of existing services within the scheme boundary are shown on the following drawings (attached in Appendix A Indicative Schematic Plans):

- HE551462-WSP-VUT-BCH-DR-D-00001
- HE551462-WSP-VUT-BCH-DR-D-00002
- HE551462-WSP-VUT-BCH-DR-D-00003

2.6.2 Services information indicate the following services are located within the footways beneath the bridges.

EIGHTON LODGE SLIP ROAD	EIGHTON LODGE NORTH BRIDGE	EIGHTON LODGE SOUTH BRIDGE
None identified to date	NG109: Northern Gas VF102: Vodafone V104: Virgin Media NP108: Northern Power grid BT107: British telecom NW111: Northumbrian Water	V105: Virgin Media

Table 2.2 Services below the Eighton Lodge Bridges

2.6.3 There is currently some ambiguity regarding the services being carried through the existing decks of the three Eighton Lodge bridges.

2.6.4 The services above and below the deck of the three Eighton Lodge bridges would need to be verified prior to any works to widen the structures. At this stage it is assumed all services potentially impacting the works to the three bridges will be suitably protected/diverted to accommodate the works on site.

2.7 MAINTENANCE & INSPECTION SUMMARY

2.7.1 The reports tabulated below has been referred to determine the condition of the three Eighton Lodge bridges. These reports were supplemented by a rudimentary survey (equivalent to a General Inspection) undertaken in August 2017. Refer to Appendix D for details of site photos/defects recorded during the survey.

STRUCTURE REFERENCE	INSPECTION TYPE	INSPECTION DATE	AGENT
EIGHTON LODGE SLIP ROAD	General Inspection (SMIS)	04.08.2014	A-One+ - Area 14
	Special Inspection (SMIS)	05.08.2013	A-One+ - Area 14
	Principal Inspection (SMIS)	24.07.2012	A-One+ - Area 14
	General Inspection (SMIS)	28.10.2010	A-One+ - Area 14
EIGHTON LODGE NORTH BRIDGE	General Inspection (SMIS)	16.10.2013	A-One+ - Area 14
	Principal Inspection (SMIS)	20.12.2011	A-One+ - Area 14
	General Inspection (SMIS)	26.01.2010	A-One+ - Area 14
	General Inspection (SMIS)	19.02.2008	A-One+ - Area 14
EIGHTON LODGE SOUTH BRIDGE	General Inspection (SMIS)	04.08.2014	A-One+ - Area 14
	Special Inspection (SMIS)	05.08.2013	A-One+ - Area 14
	Principal Inspection (SMIS)	24.07.2012	A-One+ - Area 14
	General Inspection (SMIS)	20.10.2010	A-One+ - Area 14

Table 2.3 Inspection Summary Table for the Eighton Lodge Bridges

2.7.4 In summary the inspection reports and survey information indicate the bridges are in good condition with no significant defects that impact the integrity/load bearing capacity of the bridges. However, outstanding maintenance actions have been recorded in the last GI that will eventually need to be addressed to prolong the service life of the structure.

2.7.5 The table below provided details of outstanding maintenance work at the three bridges. It would be prudent to consider incorporating some of the outstanding maintenance works to be undertaken during the A1 Birtley to Coalhouse Improvement Scheme, thereby taking advantage of the traffic management that will be required to facilitate the site works. It is expected that most of the outstanding maintenance items would be addressed as part of the works to modify the highway cross section and accommodate the structural widening works (discussed in Section 3 of this report).

WORK ELEMENT	WORK TO BE UNDERTAKEN AS PART OF THE A1B2CH WIDENING SCHEME	WORKS CONSIDERED AS MAINTENANCE. TO BE COMPLETE BY THE MAC	ESTIMATED COST
Eighton Lodge Slip Road Underbridge			
Concrete repairs - Fill in test holes and repair spalled area also cracked area to west abutment, delaminated areas to west abutment and south east wing wall, replace mortar to parapet bases	YES	-	£10,000 (Based on 2013 PI)
Remove pigeon excrement, clean bearing shelves and drainage channels - investigate drainage and install anti bird measures	NO	YES	£10,000 (Based on 2013 PI)
Clean off parapets and paint;	YES : Structural widening will facilitate this.	-	£10,000 (Based on 2013 PI)

Table 2.4 Outstanding maintenance works to be incorporated as part of the A1B2CH scheme

WORK ELEMENT	WORK TO BE UNDERTAKEN AS PART OF THE A1B2CH WIDENING SCHEME	WORKS CONSIDERED AS MAINTENANCE	ESTIMATED COST
Eighton Lodge North Bridge			
Concrete repairs where required and fill in unfilled shutter hole	YES	-	£50,000 (Based on 2014 PI)
Paint parapets and replace mesh panels	YES : Structural widening will facilitate this.	-	£30,000 (Based on 2014 PI)
Replace mastic sealants- Remove the existing filler material and de-bonding sealant and replace with same.	YES : Structural widening will facilitate this.	-	£2,000 (Based on 2014 PI)
Extensive pigeon nesting and excrement to west and east bearing shelves, drainage channels blocked - remove excrement, flush out drainage channels and install anti bird measures	NO	YES	£15,000 (Based on 2014 PI)
Surfacing - Reseal bitumen to surfacing	YES : Included as part of the highway alignment modification	-	£1,000 (Based on 2014 PI)
Eighton Lodge South Underbridge			
Concrete repairs to parapet edge beams. Mastic sealant failing	YES : Structural widening will facilitate this.	-	£20,000 (Based on 2014 PI)
Parapet corrosion and paint loss.	YES : Structural widening will facilitate this.	-	£15,000 (Based on 2014 PI)
Concrete - Extensive delamination and spalling to south edge beam soffit and cracking to outer face with seepage - repair	YES : Structural widening will facilitate this.	-	£25,000 (Based on 2014 PI)
Parapet - Area of parapet mesh missing to north parapet west end - replace	NO	YES – Safety critical should be complete by the MAC	£1,500 (Based on 2014 PI)
Abutment - Concrete repairs & crack injection where required	YES	-	£30,000 (Based on 2014 PI)
Replace de-bonding movement joint sealants	YES : Included as part of the highway alignment modification	-	£30,000 (Based on 2014 PI)

Table 2.4 Cont. Outstanding maintenance works to be incorporated as part of the A1B2CH scheme

3. STRUCTURAL MODIFICATION

3.1 HIGHWAY ALIGNMENT

3.1.1 Proposed improvements to the highway alignment currently comprises widening of the existing carriageway between J65 (Birtley) and J67 (Coal House) with a lane gain/lane drop between the junctions on both northbound and southbound carriageways.

3.1.2 The **southbound carriageway** will be 50mph with an urban all-purpose cross section from J67 (Coal House) to Smithy Lane approximately. Beyond this to J65 (Birtley) the speed limit will be 70mph with a **rural all-purpose** cross section. The **northbound carriageway** will be 50mph to dual 3-lane **urban all-purpose** cross-section throughout the length of the scheme.

3.1.3 The above results in the overall cross section to the Eighton lodge bridges increasing as per the table below. One thing to note is the extent of the widening to the existing bridge decks carrying the northbound carriageway is less than the decks carrying the southbound carriageway (i.e. asymmetrical widening). This is due to the removal of the 1m hard strip requirement when applying the urban cross section.

STRUCTURE REFERENCE	DETAILS	LENGTH (M) APPROX.
EIGHTON LODGE SLIP ROAD	Existing overall cross section (include northbound + southbound decks)	27.9m
	Proposed overall cross section (include northbound + southbound decks)	36.2m
	Extent of the structural widening to the deck carrying the northbound carriageway	4.0m
	Extent of the structural widening to the deck carrying the southbound carriageway	5.5m
EIGHTON LODGE NORTH BRIDGE	Existing overall cross section (include northbound + southbound decks)	27.9m
	Proposed overall cross section (include northbound + southbound decks)	36.2m
	To the deck carrying the northbound carriageway	4.0m
	To the deck carrying the Southbound carriageway	5.5m

STRUCTURE REFERENCE	DETAILS	LENGTH (M) APPROX.
EIGHTON LODGE SOUTH BRIDGE	Existing overall cross section (include northbound + southbound decks)	27.2m
	Proposed overall cross section (include northbound + southbound decks)	36.2m
	To the deck carrying the northbound carriageway	2.5m
	To the deck carrying the Southbound carriageway	8.5m
The proposed highway cross section is based on preliminary design information and the final cross section shall be verified at detailed design.		

Table 2.5 Extent of the Structural Widening to the Three Eighton Lodge Bridges

3.1.6 Details of the issues and challenges associated with conventional widening are discussed in Section 3.2 of this report.

3.2 STRUCTURAL IMPLICATION OF CONVENTIONAL WIDENING

3.2.1 Below is a list of some of the key assumptions and constraints considered when developing the conventional asymmetrical widening proposal at the three Eighton Lodge bridges;

- Provision of a simple cost effective solution
- Structure should be able to sustain the desired level of abnormal loading (SOV250/350)
- The structural from of the widened deck shall be similar to the existing to maintain structural and aesthetic compatibility
- The maintenance requirements of the proposed widened structure should be no more onerous than those required to maintain the existing structure
- Ensure a minimum of 2 lanes of traffic (both directions) are maintained on the A1 during construction
- Ensure the minimum maintained headroom (5.03m) in accordance with TD27/05 is achieved upon completion of the works

3.2.2 Based on previous experience, conventional widening of the three bridges with similar type structures would provide the most cost effective robust solution. Therefore alternative structural forms have not been considered.

3.2.3 The abnormal load assessment of the three bridges has confirmed that the existing deck extent would be able to sustain the desired abnormal loading without any major strengthening works. The widened extent shall also be designed to sustain the required abnormal loading to avoid the need for abnormal load movement restrictions.

3.2.4 The extension of the existing deck using similar sized precast beams and RC deck slab (as per Eighton Lodge Slip and North bridges) or precast beams with infill deck (as per Eighton Lodge South) is preferred. This would enable the deck to be widened with a compatible structural form and section stiffness. This would simplify the load distribution between the existing and new deck extent and the design process.

3.2.5 Longitudinal expansion joints between the new and existing bridge deck could potentially result in significant maintenance problems. Therefore it is assumed the widened bridge deck shall be joined to the existing thereby eliminating the need for longitudinal joints that are susceptible to water ingress. At Eighton Lodge Slip and North bridges (similar type deck) it is anticipated the parapet plinth would need to be removed via hydro-demolition and the existing transverse reinforcement be lapped onto new reinforcement for the widened deck extent. At Eighton Lodge South Bridge the existing RC edge beam (supporting the parapet) would need to be removed to facilitate widening of the deck with a similar prestressed beam and infill deck structural form. The connection/stitch between the existing and new deck extent at the three bridges would need to be reviewed in detail during PCF Stage 5 (detailed design).

3.2.6 Another potential construction issue when tying the new and existing decks together is associated with vibration. When the deck is concreted, the connection between the new and existing deck will vibrate if traffic continues to use the remaining part of the deck. This could potentially lead to bonding/cracking issues. Consideration will need to be given to the provision of a TM layout that allows for a sufficient traffic free clearance zone to be maintained (to limit the risk of debonding/cracking associated with vibration) whilst also ensuring the desired minimum levels of traffic (2 lanes both directions) is maintained during the works.

3.2.7 The structural widening of the three bridge decks will require the substructure to be extended accordingly. It is anticipated the widened substructure would comprise RC abutment walls (similar to existing) with new flared RC wing walls to provide improved working room for structural backfilling operations. Foundations to the widened substructure is discussed in Section 4 of this report. The main area of concern to be reviewed during PCF Stage 5 detailed design is the risk of differential settlement between the existing and new widened structure (particularly where spread footing are deployed). Consideration would need to be given to measures to mitigate against differential settlement (ground surcharge period/ground stabilisation etc.) if required.

3.2.8 Spot heights, using a laser disto-measure, were taken at the three bridges during the site survey in August 2017. Details of headroom survey (both elevations) are provided in Appendix D-2, a summary of which is tabulated below.

3.2.9 The spot heights confirm that the existing bridges currently provide in excess of the minimum maintained headroom of 5.03m as specified in TD27/05. The deck soffit profile is such that at all three bridges the deck slopes up from the North to the South elevation.

3.2.10 The carriageway profiles under the three bridges have been plotted/extended beyond the original structure based on the extrapolation of spot level information. Based on the assumption that the new deck extension would follow the profile of the existing deck, the headroom at the new widened structure has also been estimated.

3.2.11 Based on the survey information available, it appears the provision of the minimum desired headroom will not be an issue for the proposed widening works at Eighton Lodge Slip and North bridges. The estimated critical headroom (north elevation) at these bridges is expected to be in excess of the minimum 5.03m maintained headroom. The limiting headroom is also expected be in excess of the 5.3m clearance required for new structures.

3.2.12 It appears the critical headroom (north elevation) at Eighton Lodge South bridge would fail to satisfy the minimum 5.03m maintain headroom if the widening were to follow the profile of the existing deck soffit.

3.2.13 Consideration would need to be given to one or more of the following approaches to ensure the minimum maintained headroom is achieved at Eighton Lodge South bridge:

- Value engineer/rationalise the extent of the widening to the north elevation/southbound carriageway (reduced lane widths, verge widths etc.) thereby reducing the extent of the widening and consequent reduction to headroom.

- Structural widening on the north elevation side could be designed to not follow the profile of the existing deck. Alternatively the extension could comprise a uniform level soffit or a 1 in 40 upward slope towards the end of the deck thereby improving the clearance. Sub surface drainage (including outlet) would need to be carefully considered and incorporated to prevent ponding of sub surface water within the shallow V trough on the deck.

- Localised regrading of the roundabout to increase the clearance at the structure.

3.2.14 Detailed survey information and subsequent analysis is required at all three bridges to accurately ascertain the impact of the structural widening on the headroom clearance.

STRUCTURE REFERENCE	EXISTING HEADROOM AT EACH ELEVATION	EXISTING SPOT HEIGHT(M)	ESTIMATED SPOT HEIGHT(M): BASED ON THE WIDENED STRUCTURE
EIGHTON LODGE SLIP ROAD	North Elevation (Southbound Carriageway side)	6.388m	6.287m
	South Elevation (Northbound Carriageway side)	6.918m	6.962m
EIGHTON LODGE NORTH BRIDGE	North Elevation (Southbound Carriageway side)	5.776m	5.501m
	South Elevation (Northbound Carriageway side)	7.195m	7.370m
EIGHTON LODGE SOUTH BRIDGE	North Elevation (Southbound Carriageway side)	5.215m	<5.03m (not acceptable)
	South Elevation (Northbound Carriageway side)	6.716m	6.823m
Headroom to be confirmed with accurate level survey data.			

Table 2.6 Existing and proposed headroom clearances at the three Eighton Lodge Bridges

3.2.15 Refer to Appendix E for Outline General Arrangement Drawings for the three widened structures.

3.2.16 Below are details of the indicative construction cost (excluding preliminaries) associated with the structural widening works at the three bridges. The estimates are based on previous similar type works and shall be verified at detailed design. The Highways England cost estimating team has not been consulted for any costing information for this study.

- Eighton Lodge Slip Road Bridge Structural Widening: Prestress beam and RC deck on extended RC cantilever abutments and flared RC wingwalls on spread foundations. Estimated Cost £1million

- Eighton Lodge North Bridge Structural Widening: Prestress beam and RC deck on extended RC cantilever abutments and flared RC wingwalls on Piled foundations. Estimated Cost £1.2million

- Eighton Lodge South Bridge Structural Widening: Prestress beam and infill deck on extended RC cantilever abutments and flared RC wingwalls on spread foundations. Estimated Cost £1million

4. GROUND INVESTIGATION

4.1 EXISTING GROUND CONDITIONS

4.1.1 A Geotechnical Design Report is not yet available for the project and will be prepared, defining suitable parameters for the design and acceptable foundations, following completion of a ground investigation at the site. The preliminary choice of foundation solution for each bridge has been considered appropriate based on the records and findings at the site location, taken from the Preliminary Sources Study Report (PSSR) for the wider Birtley to Coalhouse Scheme (HA544664-WSP-HGT-S01-RP-GE-0600-P-01).

4.1.2 Historical ground investigation data from the British Geological Survey (BGS) and Highways Agency Geotechnical Data Management System (HAGDMS) is available within the vicinity of the Eighton Lodge underbridges, and is presented within the PSSR. With reference to the PSSR, the following ground conditions are anticipated at the underbridge locations.

4.1.3 Made ground associated with the existing highway embankments/abutments is present above the strata detailed here.

4.1.4 Underlying Ground Conditions

- → Made ground: identified as being between 1.2 m thick and 2.3 m thick. The material primarily consists of sandy clay, with gravels of sandstone, brick and concrete and occasional cobbles of tarmac, slag, coal, bricks and concrete. Due to the heterogeneous nature of made ground the composition of the material is likely to vary across the Eighton Lodge junction, over,
- → Glacial till deposits: between 1.6 m and 8.1 m thick and primarily consisting of interbedded bands of clay, sandy clay, sand and gravel with locally cobbles of sandstone; over,
- → Pennine Middle Coal Measures bedrock: base not proven (maximum thickness recorded as 46.0 m) primarily consisting of interbedded layers of sandstone, mudstone and coal and locally with a weathered layer on top of the stratum.

4.1.5 Shallow coal seams are recorded as having been worked beneath the site. The shallowest coal seams are the High Main, Metal, Five Quarter, Main and Maudlin seams, with the shallowest coal seam (High Main Seam) encountered between approximately 4.5 m below ground level and 13.2 m below ground level.

4.1.6 Deeper coal seams, at depth greater than 70 m bgl, have also been worked beneath the site and include the Maudlin, Low, Hutton, Tilley and Top Busty Seams.

4.1.7 Groundwater strikes were recorded within the glacial till and Middle Coal Measures on the available historical borehole records in the vicinity of the Slip Road and North bridges, but not the South Underbridge.

4.1.8 No historical groundwater monitoring results have been obtained for any of the historical borehole records in the vicinity of the Eighton Lodge bridges. However, groundwater bodies are likely in the following strata:

- → At shallow depths within the glacial till deposits; and,
- → At a greater depth within the weathered horizon of the Pennine Middle Coal Measures.

4.2 RISKS ASSOCIATED WITH FOUNDATION WORKS

The geotechnical risks for the wider site are presented within the PSSR. These risks have been reviewed and further assessed in the 'Live' Project Risk Registers. Pertinent geotechnical risks in relation to the proposed bridge foundations are summarised in Table 4.1.

RISK CAUSE	RISK EVENT	PRIMARY RISK IMPACT	RISK RATING*
Engineering Properties of the Ground	There is a risk that the ground model, and the behaviour of such, is different (worse) from that assumed at this stage.	Construction delays and remedial design requirements, and potential cost and programme implications.	Medium
Instability of Existing Bridge	There is a risk that the proposed works may undermine / destabilise the existing bridge structures.		**Low** – North Underbridge (piled foundations) **Medium** – South and Slip Road Underbridges (shallow foundations)
Differential Settlement between Existing and Proposed Structures	There is a risk that the movement of the new structure will be greater than the existing structure There is a risk of differential settlement occurring between the proposed and existing structures.		**Low** – North Underbridge (piled foundations) **Medium** – South and Slip Road Underbridges (shallow foundations)
Instability of Existing Earthworks	There is a risk that the existing earthworks at the site are not as stable as assumed at this stage.		Medium
Instability caused by shallow mine workings	There is a risk that the structure will be adversely impacted by collapse of shallow coal mine workings, which may require grouting during construction.		High
Groundwater	There is a risk that the groundwater model is different (worse) from that assumed at this stage.		Medium
Contaminated Soils	There is a risk that the assessment of contaminated soils undertaken at this stage is not accurate.		Medium
Unexploded Ordnance (UXO)	The site is located within an area of low bomb risk, there is a risk that UXO might be encountered beneath the site.	Construction delays and requirement for safe deactivation / disposal.	Low
Buried Services	There is a risk that buried services might be encountered during excavation of proposed foundations.	Construction delays and potential cost and programme implications.	Medium
* Current assessed level based on Highways England PID and Risk Matrix (v12, August 2015).			

Table 4.1 Pertinent geotechnical risks in relation to the proposed bridge foundations

4.3 DETAILS OF ADDITIONAL GROUND INVESTIGATION REQUIRED TO INFORM THE DETAILED DESIGN PROCESS

4.3.1 Additional ground investigation has been scoped and is currently being undertaken. Drawings HE551462-WSP-HGT-BCH-DR-GE-00023 to HE551462-WSP-HGT-BCH-DR-GE-00033 shows the exploratory hole locations of the proposed ground investigation required to inform the detailed design. The proposed ground investigation includes the following:

- → Cable percussion boreholes to rock head to identity ground conditions within the superficial deposits and confirm rockhead levels;
- → Rotary cored boreholes to circa 9 m below rockhead to determine rock quality and strength; and,
- → Rotary open hole boreholes, for an additional 3 to 8 m to investigate the presence of coal seams and historical mining.
- → Groundwater monitoring to be undertaken.

4.3.2 Each of the above ground investigation methodologies may be undertaken at the same location / exploratory hole through follow-on methods, i.e. cable percussion to rockhead; follow-on with rotary core from rockhead to 9 m below rockhead; and follow-on with open hole to proposed borehole depth. The current proposed ground investigation includes 6 (six) exploratory hole locations, two at each of the Eighton Lodge bridge locations.

4.3.3 The ground investigation shall be reported in a Ground Investigation Report (in line with HD 22/08) once completed.

4.4 REVIEW OF FOUNDATION REQUIREMENTS FOR EIGHTON LODGE UNDERBRIDGES

4.4.1 The final Eighton Lodge Underbridge foundations shall be determined through assessment of the bearing capacity of the founding materials (influenced by the ultimate limit state), settlement analysis of the foundations (influenced by serviceability limit state) and interaction with the existing structure.

4.4.2 The proposed structural widening options for all three of the Eighton Lodge Underbridges comprise the asymmetrical widening of the bridge superstructure. Table 8 summarises the widening to the northbound and southbound carriageways at each of the underbridge locations.

Table 4.2: Eighton Lodge Underbridges Extents of Widening

UNDERBRIDGE	WIDENING TO THE NORTHBOUND CARRIAGEWAY	WIDENING TO THE SOUTHBOUND CARRIAGEWAY
Eighton Lodge Slip Road	4.0 m	5.5 m
Eighton Lodge North	4.0 m	5.5 m
Eighton Lodge South	2.5 m	8.5 m

The existing bridges are founded on:

- → Eighton Lodge North – piled foundations and bankseats
- → Eighton Lodge South – shallow foundations
- → Eighton Lodge Slip Road – shallow foundations

4.4.3 For any proposed foundation solution the presence of historical shallow mining is required to be determined. If encountered / suspected to be present beneath the bridges, the historical mining is likely to be most appropriately mitigated through a drilling and grouting solution. It may be considered appropriate to extend any piles through remediated mined seams and broken ground if these are proven to be present near to the proposed pile toe level.

4.4.4 Given the potential for shallow coal mine workings beneath the site, it is considered that grouting of these workings may be required during construction. No records have been obtained to suggest that the workings were treated as part of the original construction of the structure. The extent of such workings (and possible previous grouting works) will be assessed as part the proposed ground investigation.

4.4.5 It is anticipated that the retaining walls adjacent to each of the existing bridges will require partial demolition to allow the widening works to be constructed. Significant temporary works will be required to retaining the existing embankment slopes during construction. The location/extent/morphology of this temporary works should be taken into account during the detailed design process.

4.5 EIGHTON LODGE NORTH BRIDGE

4.5.1 The substructure for the asymmetrical widening of the North bridge would comprise the construction of a reinforced concrete abutment and wing walls on piled foundations to accommodate the widening.

4.5.2 The foundations of the widened structure are proposed to match the existing foundations as closely as possible. The existing foundations comprise 600 mm diameter concrete bored piles and reinforced concrete pile caps.

4.5.3 Given the additional live loading to be accommodated by the proposed extensions, and dependent on the ground conditions encountered during the proposed ground investigation, the new piled foundations may have to be increased in diameter, length and/or number.

4.5.4 Detailed design of any piled solution is likely to be the responsibility of the specialist Piling Contractor (and reported within a Geotechnical Design Report in line with HA 22/08). The use of other piling techniques may also be appropriate for the scheme and may be proposed by the Contractor.

4.6 EIGHTON LODGE SOUTH AND SLIP ROAD UNDERBRIDGES

4.6.1 The sub structure for the asymmetrical widening of the Slip Road and South bridge would comprise the construction of a reinforced concrete abutment and wing walls on shallow spread foundation.

4.6.2 The foundations of the widened bridges, are proposed to match the existing foundations as closely as possible (shallow foundations). These bridges are anticipated to be on shallow foundations founding within the glacial till deposits or on shallow bedrock. Should the ground investigation indicate that suitable founding strata is at a greater than anticipated depth a piled foundation solution may be required for the widened sections.

4.6.3 The final foundation solution shall be assessed following the proposed ground investigation.

4.6.4 Given the additional live loading to be accommodated by the proposed extensions, and dependent on the ground conditions encountered during the proposed ground investigation, the new shallow foundations may have to be increased in dimensions and/or a piled foundation solution designed.

4.6.5 Given that the proposed foundations for the South and Slip Road Underbridges tie into the existing structures there is the potential for differential settlement to occur between the new and existing structures. The shallow foundations of the proposed structure are anticipated to settle. In comparison, given the length of time that the existing structures have been present on site they are likely to have already undergone the majority of their settlement. The anticipated magnitude of total settlement and differential settlement between the existing structures and proposed structures shall be assessed at the detailed design stage following the completion of the intrusive ground investigation and laboratory testing.

5. CONCLUSION & RECOMMENDATIONS

5.1 CONCLUSION

5.1.1 The work to date has identified 3No. underbridges at junction 66 (Eighton Lodge Bridges) would need structural widening to accommodate the proposed improvement works. The extent of the widening is tabulated below:

	EIGHTON LODGE SLIP ROAD	EIGHTON LODGE NORTH BRIDGE.	EIGHTON LODGE SOUTH BRIDGE
Existing overall cross section (include northbound + southbound decks)	27.9m	27.9m	27.2m
Proposed overall cross section (include northbound + southbound decks)	36.2m	36.2m	36.2m
Extent of the structural widening to the deck carrying the northbound carriageway	4.0m	4.0m	2.5m
Extent of the structural widening to the deck carrying the southbound carriageway	5.5m	5.5m	8.5m
The proposed highway cross section is based on preliminary design information and the final cross section shall be verified at detailed design.			

Table 5.1: Eighton Lodge Underbridges Extents of Widening Works

5.1.2 It is considered that conventional asymmetrical widening of the existing bridges (extension of the sub structure elements and the deck to suit) would provide a simple cost effective robust solution for accommodating the new highway alignment.

5.1.3 The previous inspection reports and survey information indicate the three bridges are in good condition with no significant defects that impact the integrity/load bearing capacity of the bridges. However outstanding maintenance actions have been recorded in the last GI that will eventually need to be addressed to prolong the service life of the structure. It is expected that most of the outstanding maintenance items would be addressed as part of the works to modify the highway cross section and accommodate the structural widening.

5.1.4 The abnormal load assessment of the three bridges has confirmed that the existing deck extent can sustain the desired abnormal loading without any major strengthening works. The widened extent would also be designed to sustain the required abnormal loading to avoid the need for abnormal load movement restrictions.

5.1.5 Below are details of the indicative construction cost (excluding preliminaries) associated with the structural widening works at the three bridges

- Eighton Lodge Slip Road Bridge Structural Widening: Prestress beam and RC deck on extended RC cantilever abutments and flared RC wingwalls on spread foundations. Estimated Cost £1million
- Eighton Lodge North Bridge Structural Widening: Prestress beam and RC deck on extended RC cantilever abutments and flared RC wingwalls on Piled foundations. Estimated Cost £1.2million
- Eighton Lodge South Bridge Structural Widening: Prestress beam and infill deck on extended RC cantilever abutments and flared RC wingwalls on spread foundations. Estimated Cost £1million

5.1.6 One option not discussed in this report, is the complete replacement of the deck at Eighton Lodge South Bridge. Whilst the structure is in good condition at present it does have a lower residual service life (circa 20 years less) compared with the other Eighton Lodge bridges constructed in the late 80s.

Replacing Eighton Lodge Slip Road Bridge as part of the A1B2CH improvement works (Estimated Cost £2.5 million - refer to outline GA in Appendix E) would take advantage of the extensive TM expected to be in place to facilitate the scheme works. However the replacement of Eighton Lodge South Bridge would need to be balanced against the increase in scheme cost/construction programme and impact on the TM phasing.

5.2 RECOMMENDATION

5.2.1 Based on the study to date it is recommended that conventional asymmetrical widening of the existing Eighton Lodge bridges be assessed and developed at detailed design.

5.2.2 It is recommended the following actions are undertaken to verify the finding of this report and provide clarity on the works to be developed at detailed design.

- Liaison with the HE PM team to confirm whether the complete replacement of Eighton Lodge South Bridge is feasible for further consideration, if confirmed to not be feasible (due to cost /programme and TM implications) can be ruled out completely.
- Undertake a detailed level survey of the three bridges to confirm the headroom constraints associated with the proposed bridge widening works. This is considered to be critical at Eighton Lodge South Bridge
- Further site investigation to determine the location of existing services that may impact the proposed works

Appendix A

INDICATIVE SCHEMATIC PLAN OF THE PREFERRED ROUTE

APPENDIX A-1

INDICATIVE SCHEMATIC PLANS

DO NOT SCALE

Millimetres 0 10 100

A1

Showing indicatively Gantries SG001&SG002 at chainages -1460 & -480 respectively
AIP - Tubular Steel Cantilever Gantries
STKEY TBC
Ref SOR09

Gantry SG003
AIP - Tubular Steel Cantilever Gantry
STKEY TBC
Ref SOR09

Retaining wall 1
AIP - Reinforced Concrete Wall
STKEY TBC
Ref SOR10

Gantry SG004
AIP - Long Span Truss Type Cantilever Gantry
STKEY TBC
Ref SOR09

Gantry SG005
AIP - Super Span Truss Portal Gantry
STKEY TBC
Ref SOR09

Kingsway Viaduct Underbridge
OS Grid Ref: 424900E, 558550N
STKEY 16271
Structure No. A1/433.30
AIP - Kingsway Viaduct
Ref SOR01

JUNCTION 67 - COALHOUSE
(424955,558553)

Retaining wall 5
AIP - Continuous Bored Piles Retaining Wall
STKEY TBC
Ref SOR10

Gantry SG006
AIP - Long Span Truss Type Cantilever Gantry
STKEY TBC
Ref SOR09

Retaining wall 2
AIP - Sheet Piles Retaining Wall
STKEY TBC
Ref SOR10

CR Retaining wall 1
STKEY TBC
Ref SOR10

Retaining wall 3
AIP - Reinforced Earth Retaining Wall
STKEY TBC
Ref SOR10

Retaining wall 4
AIP - Reinforced Earth Retaining Wall
STKEY TBC
Ref SOR10

Allerdene Culvert
OS Grid Ref: 425370E, 558520N
STKEY 8879
Structure No. A1/443.30
AIP - Allerdene Culvert
Ref SOR02

Allerdene Railway Underbridge
OS Grid Ref: 425480E, 558489N
STKEY 8880
Structure No. A1/443.00/Q
AIP - Allerdene Railway Bridge
Ref SOR03

Smithy Lane Overbridge
OS Grid Ref: 425760E, 558280N
STKEY 16439
Structure No. A1/442.50
AIP - Smithy Lane Overbridge
Ref SOR04

Gantry SG007
AIP - Super Span Truss Portal Gantry
STKEY TBC
Ref SOR09

Gantry SG008
AIP - Long Span Truss Type Cantilever Gantry
STKEY TBC
Ref SOR09

Gantry SG009
AIP - Long Span Truss Type Cantilever Gantry
STKEY TBC
Ref SOR09

Gantry SG010
AIP - Long Span Truss Type Cantilever Gantry
STKEY TBC
Ref SOR09

ALLERDENE CULVERT EXTENSION AND DRAINAGE DITCH TO BE REALIGNED.

PROPOSED ALLERDENE UNDERBRIDGE TO BE CONSTRUCTED OFFLINE.

KEY
- EXISTING STRUCTURE
- PROPOSED STRUCTURE
- PROPOSED RETAINING WALL
- PROPOSED HIGHWAYS FENCE LINE
- RETAINED EXISTING HIGHWAYS FENCE LINE
- REMOVED EXISTING HIGHWAYS FENCE LINE
- NEW CARRIAGEWAY CONSTRUCTION
- EXISTING CARRIAGEWAY TO BE RETAINED
- PROPOSED DRAINAGE DITCH
- NETWORK RAIL LAND BOUNDARY

Rev.	Date	Description	By	Chk'd	App'd
P01	05/09/16	FOR INFORMATION	JAC		
P02	07/09/16	MINOR AMENDMENTS TO EBKS & STRUCTURES, CHAINAGE ADDED	JWL	CP	NGR
P03	07/09/16	ISSUED FOR PUBLIC CONSULTATION	JWL	SG	NGR
P04	10/02/17	DESIGN DEVELOPMENT POST PUBLIC CONSULTATION	JWL	SG	NGR

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Client: Working on behalf of highways england

Project Title: A1 BIRTLEY TO COALHOUSE

Drawing Title: OPTION 1A - OFFLINE REPLACEMENT OF ALLERDENE RAILWAY BRIDGE WITH RETENTION OF COAL HOUSE JCT GENERAL ARRANGEMENT SHEET 1 OF 3

Scale	Drawn	Checked	Approved	Authorised
1:1250	J.Longmore	S.Ghosh	N.Rawcliffe	---
Original Size	Date	Date	Date	Date
A1	10/02/17	10/02/17	10/02/17	---

Drawing Status: INITIAL STATUS OR WIP — Suitability: S0

Drawing Number: Project HE551462 | Originator WSP | Volume HGN | Location BCH | Type DR | Role D | Number 10004 — Project Ref. No. — Revision P04

Millimetres 100 0 10

DO NOT SCALE

A1

CR Retaining wall 2
STKEY TBC
Ref SOR10

Gantry SG011
AIP - Long Span Truss Type Cantilever Gantry
STKEY TBC
Ref SOR09

Gantry SG013
AIP - Super Span Truss Portal Gantry
STKEY TBC
Ref SOR09

Gantry SG012
AIP - Long Span Truss Type Cantilever Gantry
STKEY TBC
Ref SOR09

CR Retaining wall 3
STKEY TBC
Ref SOR10

Eighton Lodge Slip Road Underbridge
OS Grid Ref: 426527E, 557592N
STKEY 16441
Structure No. A1/440.90//6
AIP - Widening of Eighton Lodge North & Slip Road Underbridges
Ref SOR05

ANGEL OF THE NORTH

A167 DURHAM ROAD

EXTENT OF WORKS

A1 SB

A1 NB

CUTTING B

CUTTING C

CUTTING D

Gantry SG014
AIP - Super Span Truss Portal Gantry
STKEY TBC
Ref SOR09

Eighton Lodge North Underbridge
OS Grid Ref: 426682E, 557517N
STKEY 16440
Structure No. A1/441.00
AIP - Widening of Eighton Lodge North & Slip Road Underbridges
Ref SOR05

JUNCTION 66 - EIGHTON LODGE
(426739,557494)

B1296 LONG BANK

Eighton Lodge South Underbridge
OS Grid Ref: 426801E, 557466N
STKEY 8883
Structure No. A1/440.90
AIP - Widening of Eighton Lodge South Bridge
Ref SOR05

Longbank Bridleway Underbridge
OS Grid Ref: 427169E, 557294N
STKEY 26280
Structure No. A1/440.80
AIP - Longbank Underpass
Ref SOR06

Gantry SG016
AIP - Super Span Truss Portal Gantry
STKEY TBC
Ref SOR09

Gantry SG015
AIP - Super Span Truss Portal Gantry
STKEY TBC
Ref SOR09

CR Retaining wall 4
STKEY TBC
Ref SOR10

Gantry SG017
AIP - Long Span Truss Type Cantilever Gantry
STKEY TBC
Ref SOR09

NORTH DENE

LONG BANK

EIGHTON LODGE CULVERT; STRUCTURE KEY 15468. STRUCTURE IS APPROXIMATELY 18m BELOW GROUND LEVEL SO WILL BE UNAFFECTED.

A167 NEWCASTLE BANK

KEY

- EXISTING STRUCTURE
- PROPOSED STRUCTURE
- PROPOSED HIGHWAYS FENCE LINE
- EXISTING HIGHWAYS FENCE LINE
- REMOVED EXISTING HIGHWAYS FENCE LINE
- NEW CARRIAGEWAY CONSTRUCTION
- EXISTING CARRIAGEWAY TO BE RETAINED
- PROPOSED FOOTPATH DIVERSION
- EXISTING FOOTPATH
- PROPOSED SIGNAL
- EXISTING SIGNAL

Rev.	Date	Description	By	Chk'd	App'd
P01	05/09/16	FOR INFORMATION	JAC		
P02	07/09/16	MINOR AMENDMENTS TO EMKS & STRUCTURES, CHAINAGE ADDED	JWL	CP	NGR
P03	07/09/16	ISSUED FOR PUBLIC CONSULTATION	JWL	SG	NGR
P04	10/02/17	DESIGN DEVELOPMENT POST PUBLIC CONSULTATION	JWL	SG	NGR

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Client
Working on behalf of
highways england

Project Title
A1 BIRTLEY TO COALHOUSE

Drawing Title
OPTION 1A - OFFLINE REPLACEMENT OF ALLERDENE RAILWAY BRIDGE WITH RETENTION OF COAL HOUSE JCT GENERAL ARRANGEMENT SHEET 2 OF 3

Scale	Drawn	Checked	Approved	Authorised
1:1250	J.Longmore	S.Ghosh	N.Rawcliffe	---
Original Size	Date	Date	Date	Date
A1	10/02/17	10/02/17	10/02/17	---

Drawing Status: INITIAL STATUS OR WIP
Suitability: S0

Drawing Number
Project: HE551462 | Originator: WSP | Volume: HGN
Location: BCH | Type: DR | Role: D | Number: 10005
Project Ref. No.
Revision: P04

DO NOT SCALE

Millimetres 0 10 100

A1

North Dene Footbridge
OS Grid Ref: 427538E, 557089N
STKEY 8886
Structure No. A1/440.30
AIP - North Dene Footbridge
Ref SOR07

Gantry SG018
AIP - Long Span Truss Type Cantilever Gantry
STKEY TBC
Ref SOR09

Retaining wall 6
AIP- King Post Retaining Wall
STKEY TBC
Ref SOR10

Gantry SG020
AIP - Super Span Truss Portal Gantry
STKEY TBC
Ref SOR09

Gantry SG019
AIP - Super Span Truss Portal Gantry
STKEY TBC
Ref SOR09

NEW BUILDING DEVELOPEMENT

CRATHIE

A1 SB

A1 NB

CUTLINE E

EXTENT OF WORKS

North Side Overbridge
OS Grid Ref: 428090E, 556770N
STKEY 8887
Structure No. A1/439.70
AIP - North Side Bridge
Ref SOR08

JUNCTION 65 - BIRTLEY
(428150,556714)

A1231 SB

A1231 NB

A1(M) SB

A1(M) NB

A194(M) NB

KEY

- EXISTING STRUCTURE
- PROPOSED RETAINING WALL
- PROPOSED HIGHWAYS FENCE LINE
- EXISTING HIGHWAYS FENCE LINE
- REMOVED EXISTING HIGHWAYS FENCE LINE
- NEW CARRIAGEWAY CONSTRUCTION
- EXISTING CARRIAGEWAY TO BE RETAINED
- PROPOSED FOOTPATH DIVERSION
- EXISTING FOOTPATH
- PROPOSED SIGNAL
- EXISTING SIGNAL

Rev.	Date	Description	By	Chk'd	App'd
P01	05/09/16	FOR INFORMATION	JAC		
P02	07/09/16	MINOR AMENDMENTS TO EWKS & STRUCTURES, CHAINAGE ADDED	JWL	CP	NGR
P03	07/09/16	ISSUED FOR PUBLIC CONSULTATION	JWL	SG	NGR
P04	10/02/17	DESIGN DEVELOPMENT POST PUBLIC CONSULTATION	JWL	SG	NGR

WSP PARSONS BRINCKERHOFF
Three White Rose Office Park,
Millshaw Park Lane,
Leeds,
LS11 0DL
Tel: +44 (0)113 395 6200
www.wsp-pb.com

Client: Working on behalf of highways england

Project Title: A1 BIRTLEY TO COALHOUSE

Drawing Title: OPTION 1A - OFFLINE REPLACEMENT OF ALLERDENE RAILWAY BRIDGE WITH RETENTION OF COAL HOUSE JCT GENERAL ARRANGEMENT SHEET 3 OF 3

Scale	Drawn	Checked	Approved	Authorised
1:1250	J.Longmore	S.Ghosh	N.Rawcliffe	---
Original Size: A1	Date: 10/02/17	Date: 10/02/17	Date: 10/02/17	Date: ---

Drawing Status: INITIAL STATUS OR WIP — Suitability: S0

Drawing Number: Project HE551462 | Originator WSP | Volume HGN | Location BCH | Type DR | Role D | Number 10006

Project Ref. No.

Revision: P04

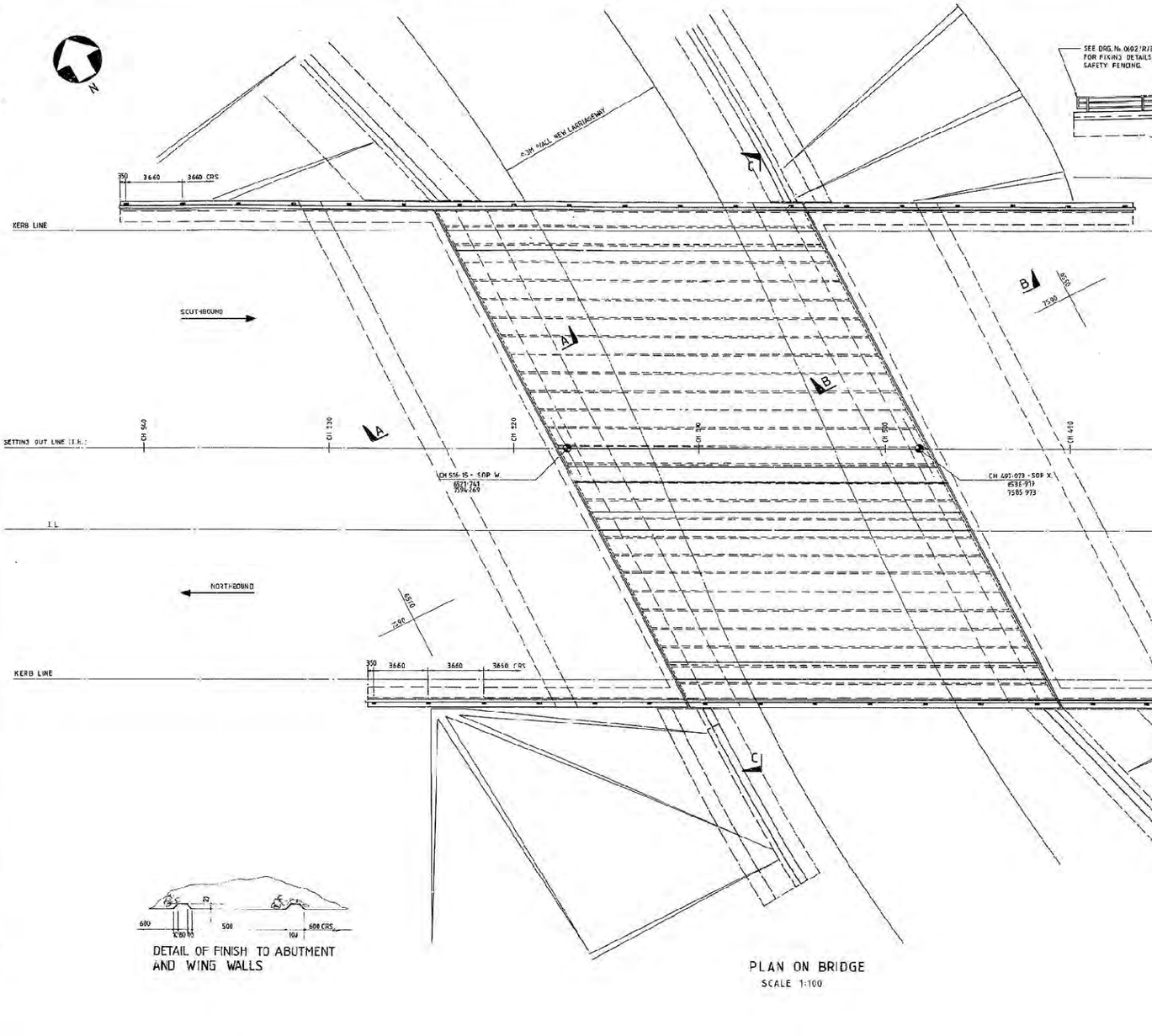
Appendix B

AS BUILT INFORMATION

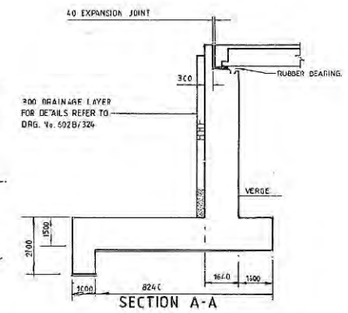
highways england

APPENDIX B-1

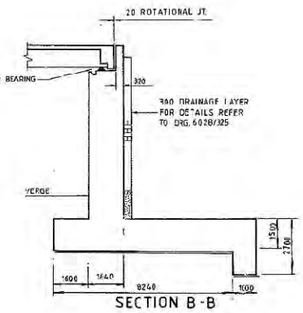
EIGHTON LODGE SLIP ROAD



SOUTH ELEVATION
SCALE 1-100

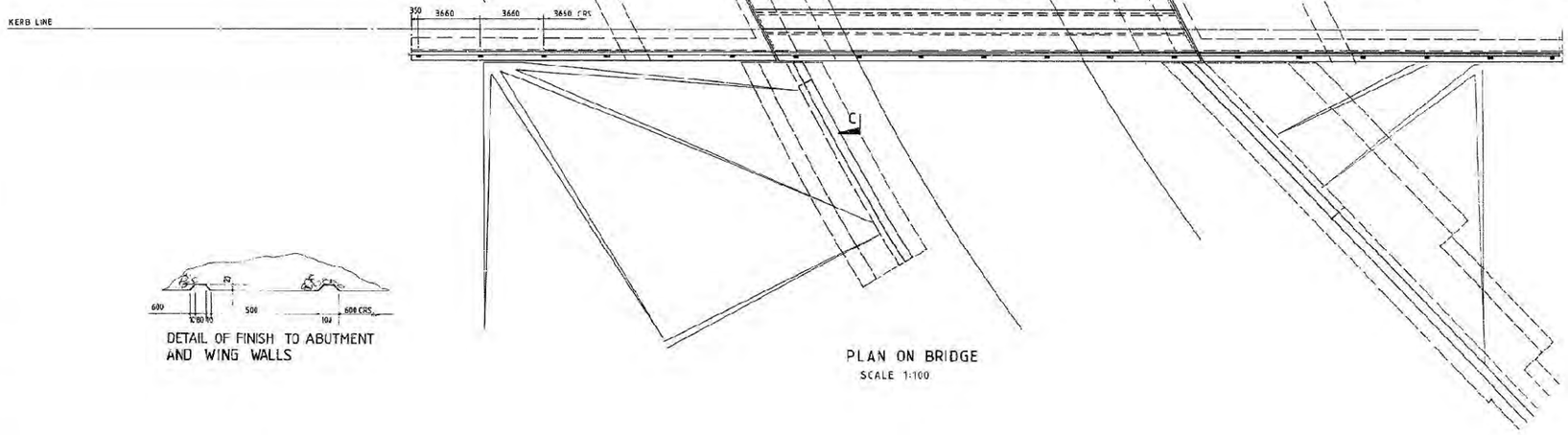


SECTION A-A
SCALE 1:100

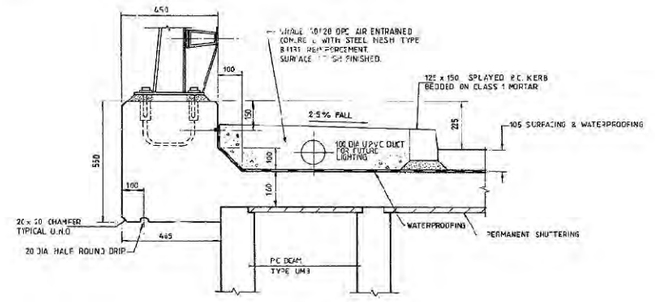


SECTION B-B
SCALE 1:100

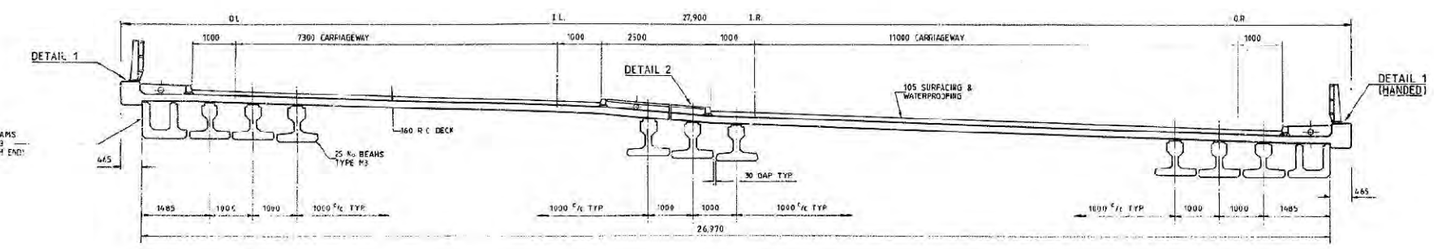
DETAIL OF FINISH TO ABUTMENT AND WING WALLS



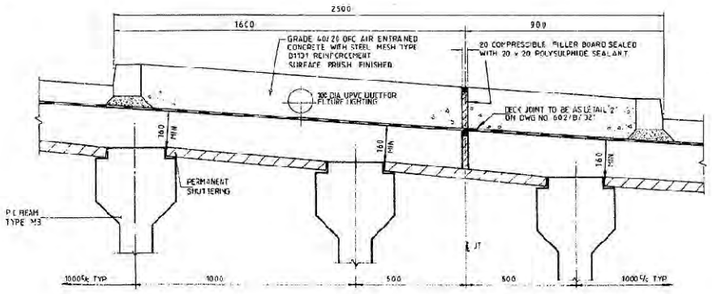
PLAN ON BRIDGE
SCALE 1:100



DETAIL 1
SCALE 1:10



SECTION C-C
SCALE 1:50



DETAIL 2
SCALE 1:10

CONSULTING ENGINEERS
MOTT HAY & ANDERSON
Pearl Assurance House, New Bridge Street
Newcastle upon Tyne NE1 8BN. tel.0632 616666

DEPARTMENT OF TRANSPORT
NORTHERN REGION
F.R.Whitehead B.Sc.,C.Eng., M.I.C.E.
Director of Transport — Northern Regional Office
Walther House, Gallowgate, Newcastle upon Tyne

REV.	DATE	AMENDMENT DETAILS	BY
A	28.1.87.	COORDINATES & LEVELS AMENDED, OUTER LINES ADDED. INNER AND OUTER LINES LABELLED.	W.J.W.
B	17-3-87	CENTRES OF PARAPET FENCE POSTS AMENDED.	W.J.W.
AC	DEC 87	AS CONSTRUCTED	

REV.	DATE	AMENDMENT DETAILS	BY

REFERENCE DRAWINGS

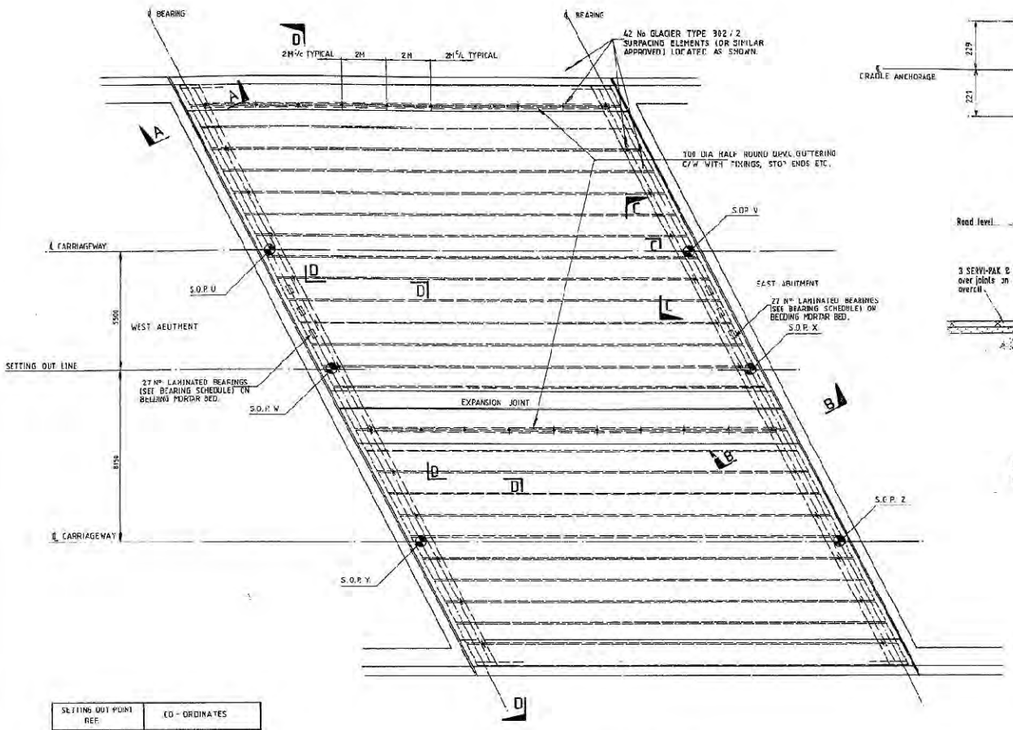
NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES ALL CHAINAGES ARE IN METRES
2. ABBREVIATIONS :-
CH CHAINAGE
c/c CENTRE TO CENTRE
SOP SETTING OUT POINT
℄ CENTRE LINE
U.N.O. UNLESS NOTED OTHERWISE

A69 EIGHTON LODGE JUNCTION IMPROVEMENT

TITLE
SLIP ROAD BRIDGE
GENERAL ARRANGEMENT

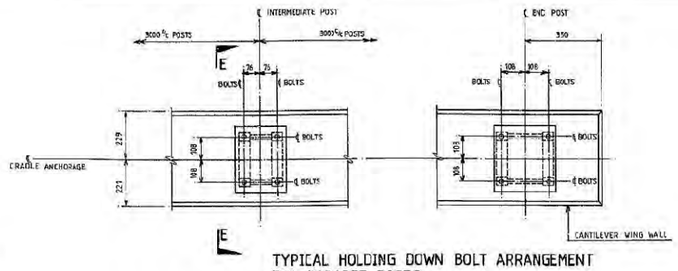
DRAWN	CHECKED	APPROVED	DATE	SCALE	MOTT DRAWING No.	REV.
			FEBRUARY 1986	AS NOTED	602/B/320	AC

DRG. No. 602/B/321

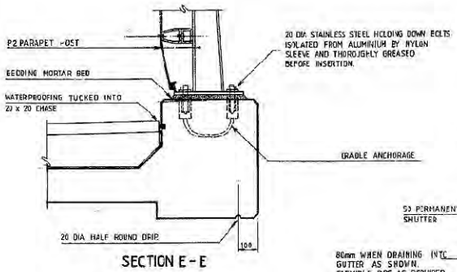


PLAN ON DECK
SCALE 1:100

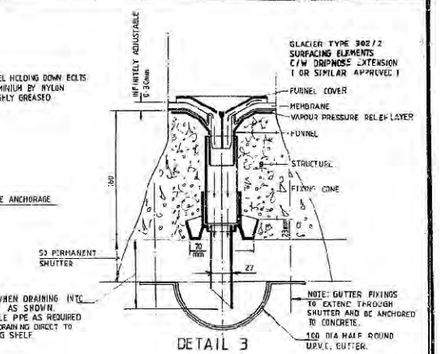
SETTING OUT POINT REF.	CO-ORDINATES	
S.O.P. U	6521.801 7600.343	E N
S.O.P. V	6490.067 7592.040	E N
S.O.P. W	6521.718 7574.260	E N
S.O.P. X	6538.596 7585.298	E N
S.O.P. Y	6521.639 7565.217	E N
S.O.P. Z	6538.796 7574.989	E N



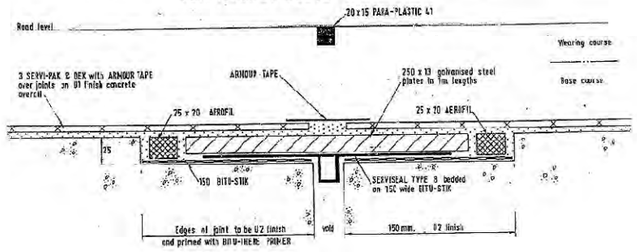
TYPICAL HOLDING DOWN BOLT ARRANGEMENT FOR PARAPET POSTS



SECTION E-E

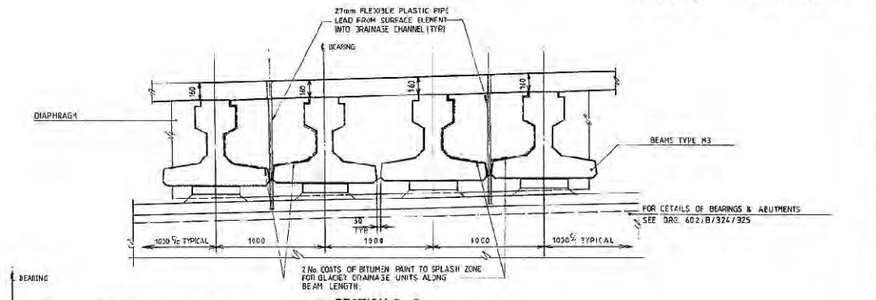


DETAIL 3



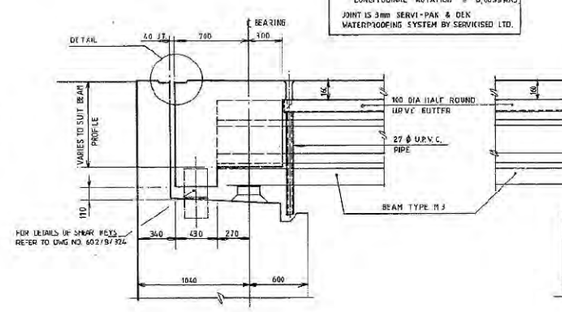
BURIED DECK EXPANSION JOINT FOR MOVEMENTS 10 - 20 mm. ±10

DETAIL 1 - MOVEMENT JOINT

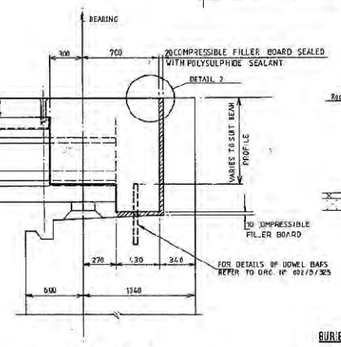


SECTION C-C
SCALE 1:20

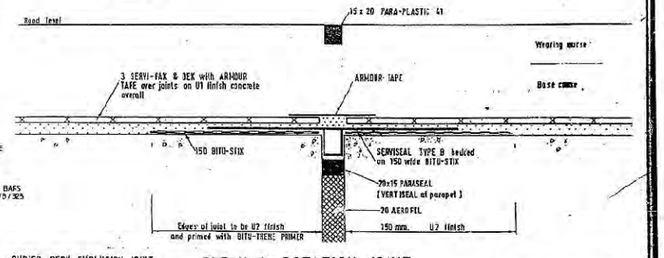
JOINT SPECIFICATION
LONGITUDINAL MOVEMENT = 20 mm
LATERAL MOVEMENT = 5 mm
LONGITUDINAL ROTATION = 0.0035 RAD
JOINT IS 3mm SERVI-PAK & DEK WATERPROOFING SYSTEM BY SERVICISED LTD.



SECTION A-A
SCALE 1:20



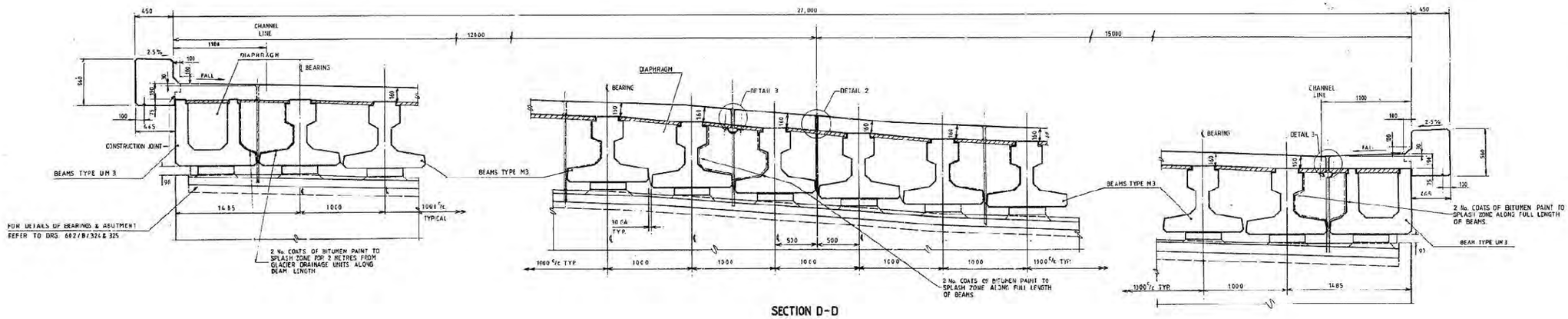
SECTION B-B
SCALE 1:20



BURIED DECK EXPANSION JOINT FOR MOVEMENTS UP TO 10 mm. ±5

DETAIL 2 - ROTATION JOINT

JOINT SPECIFICATION
LONGITUDINAL MOVEMENT = 5mm
LATERAL MOVEMENT = 5mm
LONGITUDINAL ROTATION = 0.0035 RAD
JOINT IS 3mm SERVI-PAK & DEK WATERPROOFING SYSTEM BY SERVICISED LTD.



SECTION D-D
SCALE 1:20

CONCRETE SPECIFICATION

INSITU DECK (NOT INCLUDING PARAPET EDGE BEAM)	
GRADE	40
CEMENT	O.P.C.
NOMINAL MAX SIZE OF AGGREGATE	20 mm.
MINIMUM CEMENT CONTENT	300 kg/m³
MAX. WATER / CEMENT RATIO	0.53
INSITU DECK (PARAPET EDGE BEAM)	
GRADE	40
CEMENT	O.P.C.
NOMINAL MAX. SIZE OF AGGREGATE	20 mm.
MINIMUM CEMENT CONTENT	350 kg/m³
MAX WATER / CEMENT RATIO	0.45
AIR CONTENT OF FRESH CONCRETE	5%

CONSULTING ENGINEERS
MOTT HAY & ANDERSON
Pearl Assurance House, New Bridge Street
Newcastle upon Tyne NE1 8BR. Tel.0632 xxxxx

DEPARTMENT OF TRANSPORT
NORTHERN REGION
F.B.Whitehead B.Sc.,C.Eng., M.I.C.E.
Director of Transport — Northern Regional Office
Whitley House, Gallowgate, Newcastle upon Tyne

REV.	DATE	AMENDMENT DETAILS	BY
A	20.1.87	COORDINATES AND SURFACING THICKNESS AMENDED, CHANNEL LINES LABELLED.	WJW
AC	DEC 87	AS CONSTRUCTED	

REV.	DATE	AMENDMENT DETAILS	BY

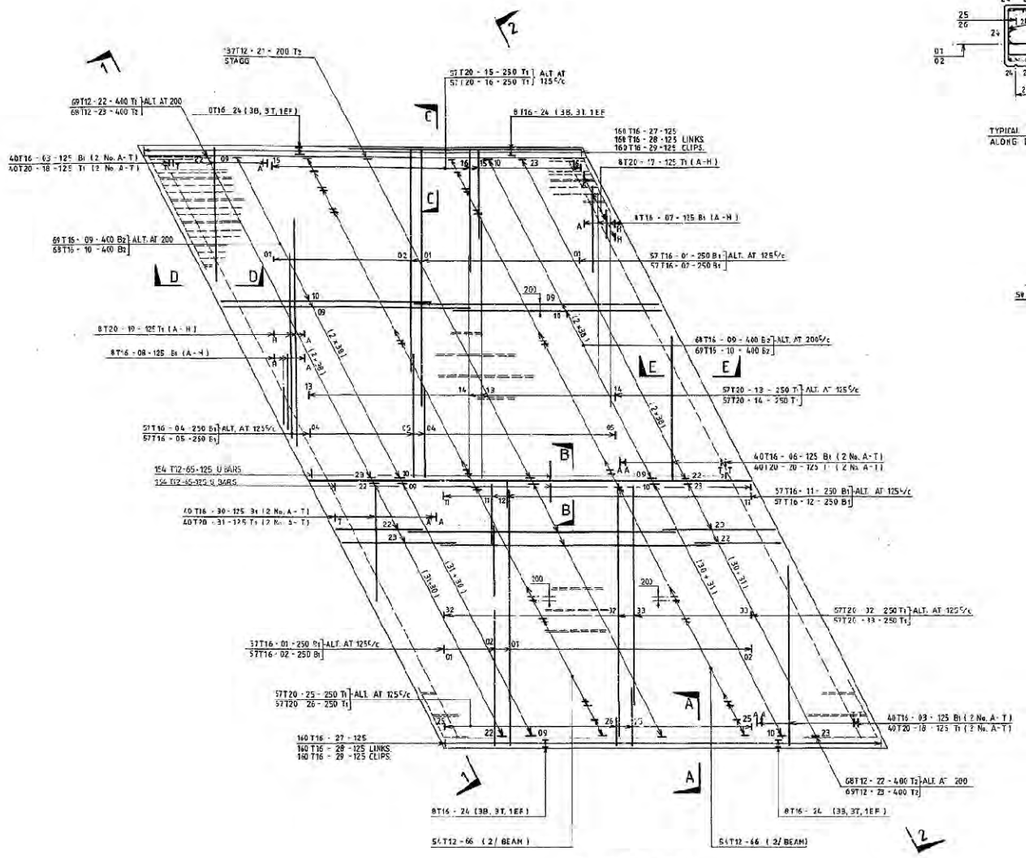
REFERENCE DRAWINGS

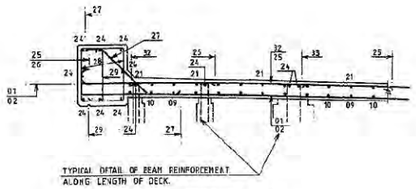
NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE
2. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM
3. CONCRETE GRADE TO BE -
   INSITU DECK SLAB SEE SPECIFICATION
   PRECAST BEAMS - SEE DRG. 602/B/313
4. CEMENT SHALL BE ORDINARY PORTLAND CEMENT
5. FORMWORK SHALL BE -
   CANTILEVER SOFFITS AND UPSTAND - CLASS F3
   DIAPHRAGM END EXPOSED FACE - CLASS F3
   REMAINING DIAPHRAGM - CLASS F2
   DECK SOFFIT BETWEEN BEAMS - PERMANENT SHUTTER
6. CONCRETE FINISHES ON UNFORMED SURFACES TO BE
   UNDER WATERPROOFING - CLASS U2
   ELSEWHERE - CLASS U3
7. COVER PLATE TO EXPANSION JOINT TO BE HOT DIPPED GALVANISED
8. ABBREVIATIONS - S.O.P. - SETTING OUT POINT
   ℄ - CENTRE LINE
9. NOTE - CANTILEVERS TO BE CONSTRUCTED AFTER MAIN INSITU DECK SEE SECTION D-D USING AIR ENTRAINED CONCRETE
10. TESTING OF BEAMS - 2 No BEAM OF ENGINEERS CHOICE
11. USE OF PROPRIETARY ITEMS NOTED IS NOT MANDATORY AND SUITABLE ALTERNATIVES WILL BE CONSIDERED.

A69 EIGHTON LODGE JUNCTION IMPROVEMENT

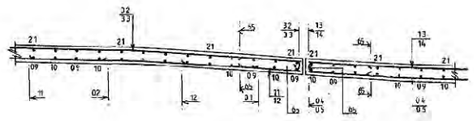
TITLE: SLIP ROAD BRIDGE
DECK LAYOUT

DRAWN	CHECKED	APPROVED	DATE	SCALE	MBA DRAWING No	REV.
[redacted]			FEBRUARY 1986	1:100, 1:20, 1:10	602/B/321	AC

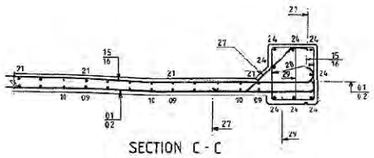




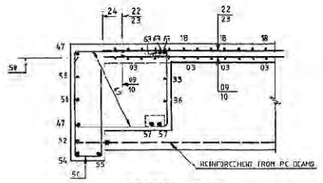
SECTION A-A
1:20



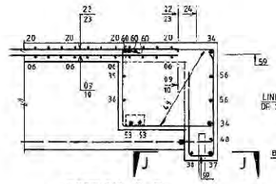
SECTION B-B
1:20



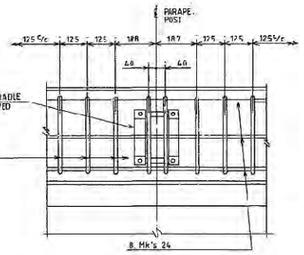
SECTION C-C
1:20



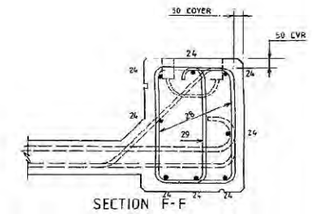
SECTION D-D
1:20



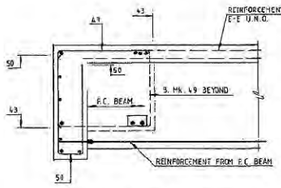
SECTION E-E
1:20



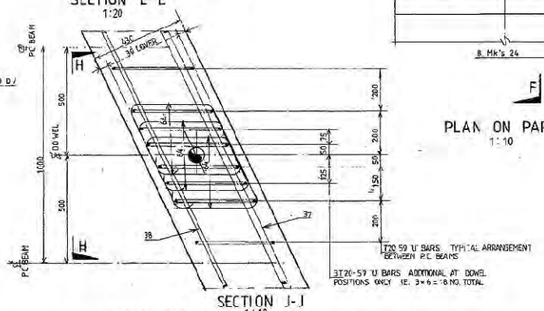
PLAN ON PARAPET
1:10



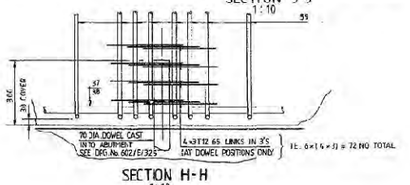
SECTION F-F
1:10



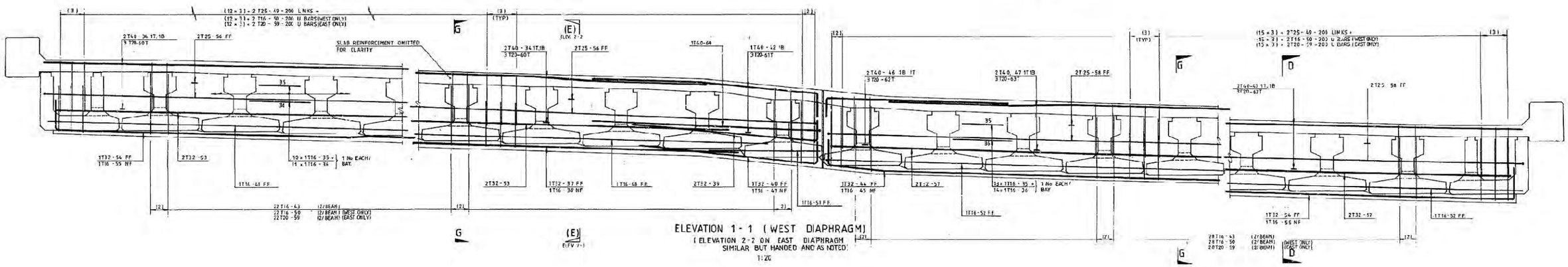
SECTION G-G
1:20



SECTION J-J
1:10



SECTION H-H
1:10



ELEVATION 1 - 1 (WEST DIAPHRAGM)
(ELEVATION 2-2 ON EAST DIAPHRAGM SIMILAR BUT HANDED AND AS NOTED)
1:20

CONSULTING ENGINEERS
MOTT HAY & ANDERSON
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Newcastle upon Tyne NE1 8BH. Telex: 53666

DEPARTMENT OF TRANSPORT
NORTHERN REGION
F.D.Whitehead B.Sc.,C.Eng., M.I.C.E.
Director of Transport — Northern Regional Office
Wellbar House, Gallowgate, Newcastle upon Tyne

REV.	DATE	AMENDMENT DETAILS	BY
A		MINOR AMENDMENT MARKED THUS (A)	
AL	DEC 87	AS CONSTRUCTED.	

REV.	DATE	AMENDMENT DETAILS	BY

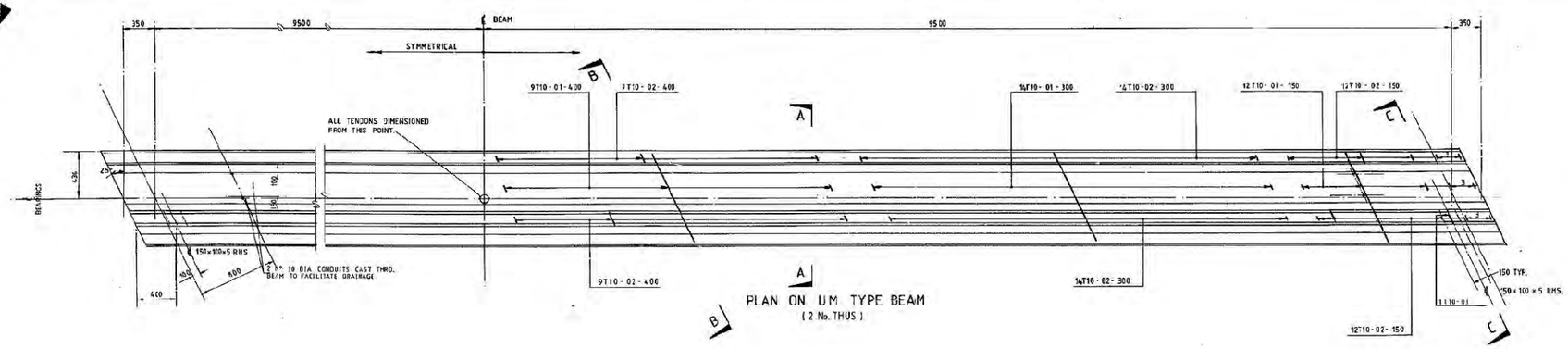
REFERENCE DRAWINGS

NOTES
1. FOR GENERAL ARRANGEMENT OF DECK REFER TO DRG. 0602/B/321.
2. CONC. COVER TO BE 30 mm TO ANY REINFORCEMENT. U.N.O.
3. ALL REINFORCEMENT SHOWN IS LISTED ON BENDING SCHEDULE Nos. 0602/B/322 SHEETS 01 TO 07 INC.
4. MIN. LAPS :- (f_y = 460 N/mm²)
   T16 = 700 mm
   T20 = 900
   T25 = 1125
   T32 = 1440
   T40 = 1800
5. REINFORCEMENT SHALL BE :-
   MILD STEEL TO BS 4449:1978
   HIGH YIELD TO BS 4449:1978
   DEFORMED BAR
6. REINFORCEMENT SHALL BE BENT IN ACCORDANCE WITH SERIES 15025 AND 15035.

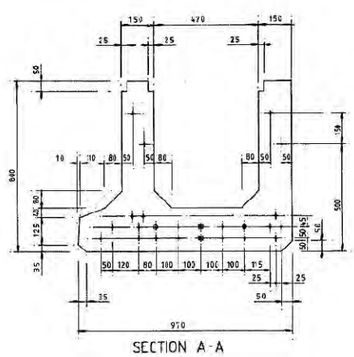
A69 EIGHTON LODGE JUNCTION IMPROVEMENT

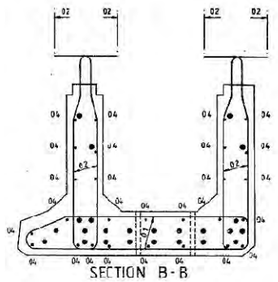
TITLE: SLIP ROAD BRIDGE DECK REINFORCEMENT

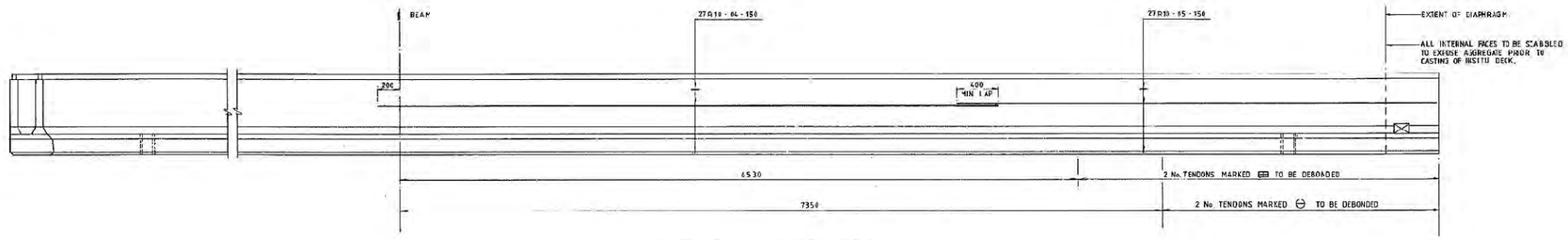
DRAWN	CHECKED	APPROVED	DATE	SCALE	MHA DRAWING No.	REV.
[redacted]			FEBRUARY 1986	AS NOTED	602 / B / 322	AC



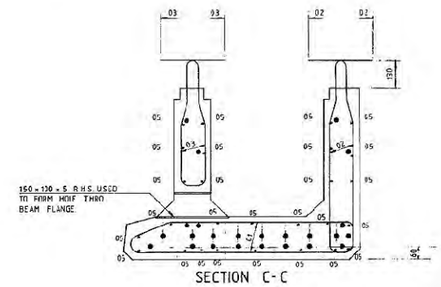
PLAN ON UM TYPE BEAM
(2 No. THUS)



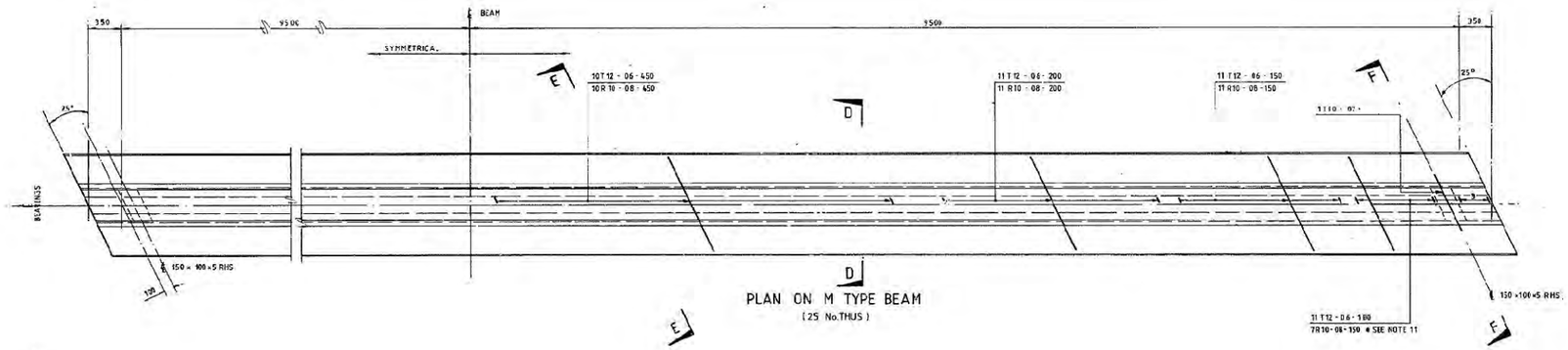




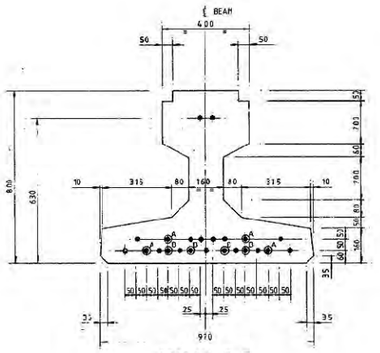
ELEVATION ON UM TYPE BEAM

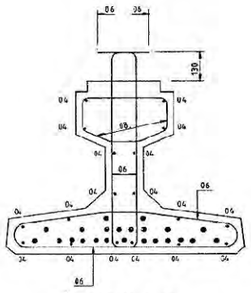


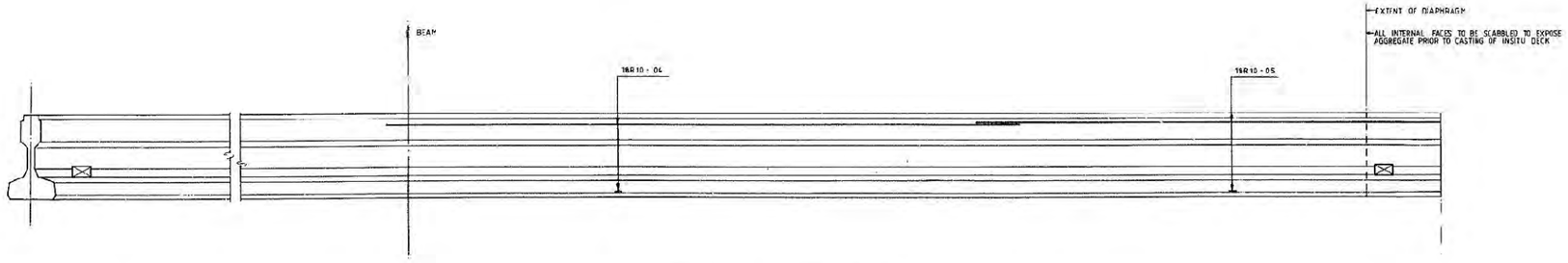
SECTION C-C



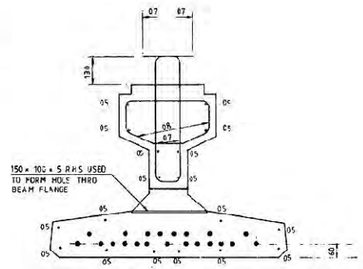
PLAN ON M TYPE BEAM
(2 No. THUS)







ELEVATION ON M TYPE BEAM



SECTION F-F

TENDON NOTES

- STRAND TO PROTRUDE 150 FROM EACH END
- TO BE DEBONDED 3066mm FROM EACH END
- TO BE DEBONDED 1260mm FROM EACH END

CONCRETE SPECIFICATION

BEAMS	
GRADE	50
CEMENT	OPC
NOMINAL MAX SIZE OF AGGREGATE	20mm
MINIMUM CEMENT CONTENT	325 Kg/m³
MAX WATER/CEMENT RATIO	0.53

CONSULTING ENGINEERS
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Newcastle upon Tyne NE1 8BB. Telephone 0632 [illegible]

DEPARTMENT OF TRANSPORT
NORTHERN REGION
F.B. Whitehead B.Sc., C.Eng., M.I.C.E.
Director of Transport — Northern Regional Office
Walker House, Gallowgate, Newcastle upon Tyne

REV.	DATE	AMENDMENT DETAILS	BY
A		SKEW DIRECTION CHANGED.	
B	10 6 87	ECCUPLERS - BAR MARKS 9 - 10 DELETED. NOTE 14 ADDED.	
AL	DEC 87	A.S. CONSTRUCTED.	

REV.	DATE	AMENDMENT DETAILS	BY

REFERENCE DRAWINGS

NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. ABBREVIATIONS :-
   R MILD STEEL
   T HIGH YIELD STEEL
   B BOTTOM
   c/c CENTRE TO CENTRE
   RHS RECTANGULAR HOLLOW SECTION
3. FORMWORK SHALL BE :- ALL FORMED SURFACES - CLASS F3 UNLESS OTHERWISE NOTED.
4. UNFORMED SURFACES TO TOP OF BEAMS SHALL BE LEVELLED & FOLLOWING INITIAL SET SHALL BE BROUGHT TO UNIFORM CAMBER AND EXPOSE THE LARGEST AGGREGATE.
5. CONCRETE SHALL BE :- ALL BEAMS - 50/20 UNLESS OTHERWISE STATED.
6. CEMENT SHALL BE ORDINARY PORTLAND THROUGHOUT
7. REINFORCEMENT SHALL BE :- MILD STEEL TO BS 4449 : 1978 HIGH YIELD TO BS 4449 : 1978 DEFORMED BAR
8. MINIMUM COVER TO REINFORCEMENT SHALL BE :- 25mm INSIDE FACE 30mm OUTER FACE
9. REINFORCEMENT SHALL BE BENT IN ACCORDANCE WITH SERIES 10B25 AND 15B35
10. PRESTRESSING (STRAND) BEAM TYPES M/UM
    a. STRAND SIZE - 15.2mm DIA STABILIZED STRAND
    b. STRAND SPECIFICATION SHALL BE :- NOMINAL STEEL AREA 938 x2 / 165mm² MINIMUM BREAKING LOAD 232 / 310 KN RELAXATION (TO BS 3617) LOW
    c. CONCRETE STRENGTH AT TRANSFER TO EXCEED 40 N/mm²
    d. THE STRESSING FORCE PER STRAND SHALL BE 174/210 KN
    e. NUMBER OF STRANDS 23/24
11. OMITTED
12. TESTING OF BEAMS :- 2 No. M3 BEAMS OF THE ENGINEER'S CHOICE SHALL BE TESTED IN ACCORDANCE WITH CLAUSE 17.7 OF THE SPECIFICATION. TEST LOADS ARE TO BE 159 KN APPLIED AT THIRD POINTS ON THE LENGTH OF THE BEAM.
13. ALL REINFORCEMENT SHOWN IS LISTED ON BENDING SCHEDULE REF 602/B/323 SHEETS 01 & 02
14. ALL STRANDS TO PROTRUDE 1000 mm FROM EACH END OF ALL BEAMS.

A69 EIGHTON LODGE JUNCTION IMPROVEMENT

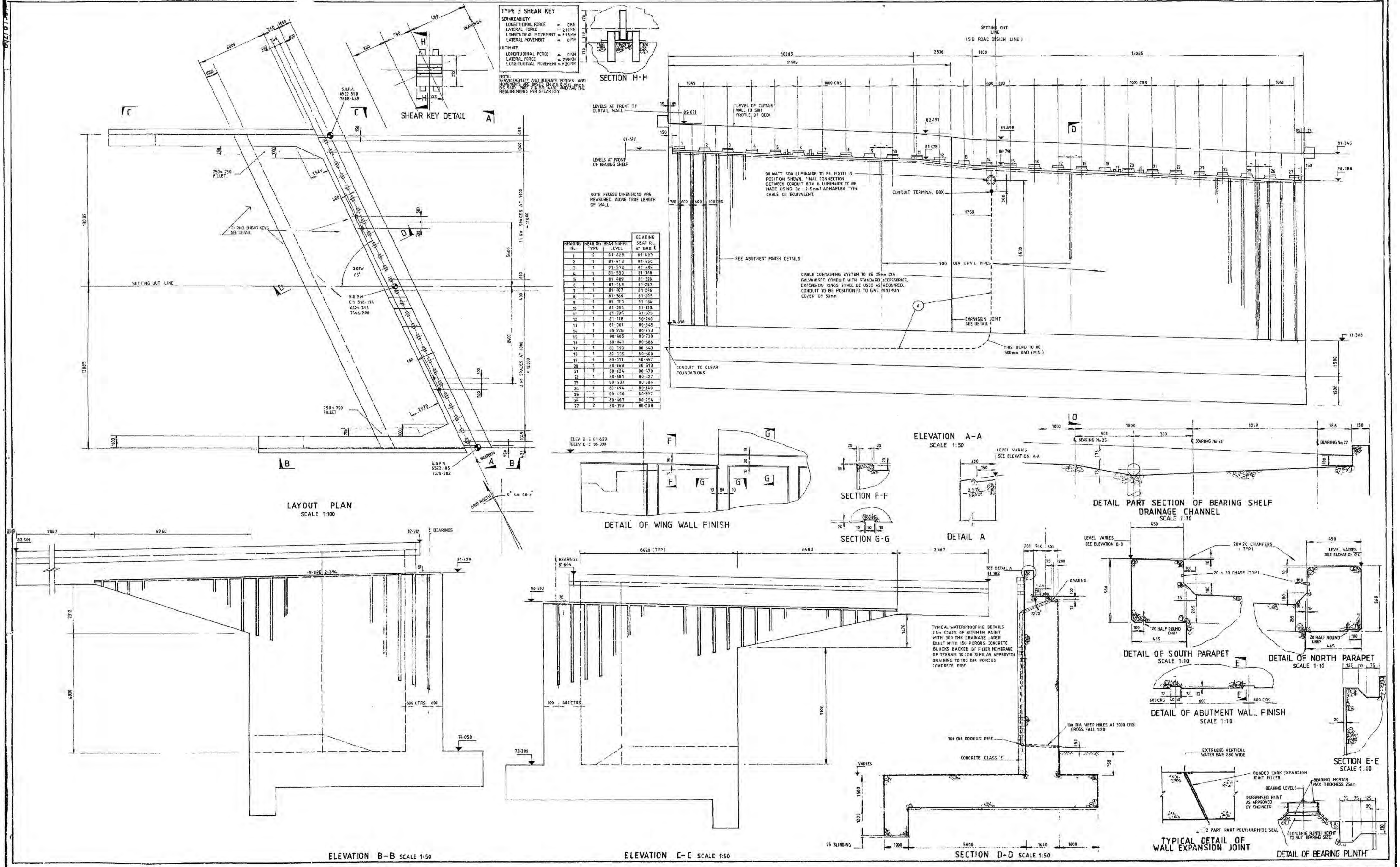
TITLE: SLIP ROAD BRIDGE PRECAST BEAMS

DRAWN	DESIGNED	APPROVED	DATE
[redacted]			FEBRUARY 1988

SCALE: 1:20, 1:10

NRA DRAWING No. 602/B/323

REV: AL



TYPE 3 SHEAR KEY

SERVICEABILITY
- LONGITUDINAL FORCE = 0 KN
- LATERAL FORCE = 210 KN
- LONGITUDINAL MOVEMENT = ±15 MM
- LATERAL MOVEMENT = 0 MM

ULTIMATE
- LONGITUDINAL FORCE = 0 KN
- LATERAL FORCE = 290 KN
- LONGITUDINAL MOVEMENT = ±20 MM

NOTE:
SERVICEABILITY AND ULTIMATE FORCES AND MOVEMENTS ARE BASED ON γ_{fL} & γ_{f3} FROM BS 5400 PART 2 & BD 14/82 AND ARE THE REQUIREMENTS PER SHEAR KEY

NOTE RECESS DIMENSIONS ARE MEASURED ALONG TRUE LENGTH OF WALL.

BEARING No.	BEARING TYPE	BEAM SOFFIT LEVEL	BEARING SEAT RL. AT BRG ℄
1	2	81·629	81·493
2	1	81·613	81·450
3	1	81·572	81·409
4	1	81·530	81·368
5	1	81·489	81·328
6	1	81·448	81·287
7	1	81·407	81·246
8	1	81·366	81·205
9	1	81·325	81·164
10	1	81·284	81·123
11	1	81·235	81·075
12	1	81·118	80·960
13	1	81·001	80·845
14	1	80·928	80·773
15	1	80·885	80·730
16	1	80·841	80·686
17	1	80·798	80·643
18	1	80·755	80·600
19	1	80·711	80·557
20	1	80·668	80·513
21	1	80·624	80·470
22	1	80·581	80·427
23	1	80·537	80·384
24	1	80·494	80·340
25	1	80·450	80·297
26	1	80·407	80·254
27	2	80·390	80·208

ELEV. B-B 81·629
ELEV. C-C 80·390

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Wellbar House, Gallowgate, Newcastle upon Tyne

REV.	DATE	AMENDMENT DETAILS	BY	REV	DATE	AMENDMENT DETAILS	BY	REFERENCE DRAWINGS
A	28-8-86	AMENDMENT MARKED THUS (A)						
B	28-1-87	LEVELS COORDINATES & CHAINAGES AMENDED.	W.J.W.					
C	13-2-87	WING WALLS & PARAPETS AMENDED	W.J.W.					
D	17-3-87	WING WALLS AMENDED TO SUIT CRASH BARRIERS	W.J.W.					
E	6-4-87	DIMENSIONAL DISCREPANCIES CORRECTED	W.J.W.					
AC	DEC 87	AS CONSTRUCTED						

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES
   ALL CHAINAGES & LEVELS ARE IN METRES
2. ABBREVIATIONS:-
   CH CHAINAGE
   S.O.P. SETTING OUT POINT
3. 2 COATS OF BITUMINOUS EMULSION WATERPROOFING APPLIED TO:
   a. ALL PIER AND ABUTMENT BEARING SHELVES
   b. ALL CURTAIN WALLS
   c. ALL STRUCTURAL CONCRETE BELOW GROUND LEVEL
4. CONCRETE TO WINGWALLS ABOVE THE INCLINED CHAMFERED FEATURE IS CLASS 40/20 OPC WITH 5% AIR ENTRAINING AGENT

CONCRETE SPECIFICATION

SUBSTRUCTURE

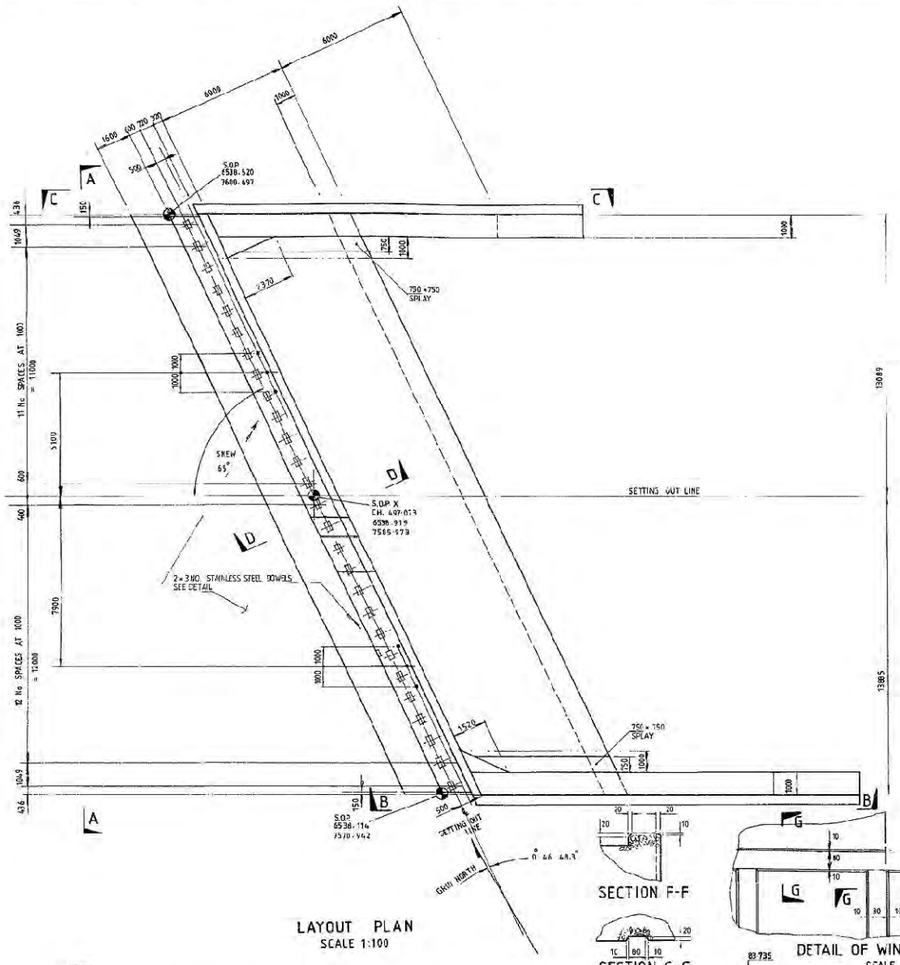
GRADE	40
CEMENT	SRC
NOMINAL MAX. SIZE OF AGGREGATE	20 mm
MINIMUM CEMENT CONTENT	360 kg/m³
MAX. WATER / CEMENT RATIO	0·45

NOTE: IN ADDITION TO ABOVE SPEC. ABUTMENT STEM AND PARAPET EDGE BEAMS TO HAVE 5% AIR ENTRAINMENT

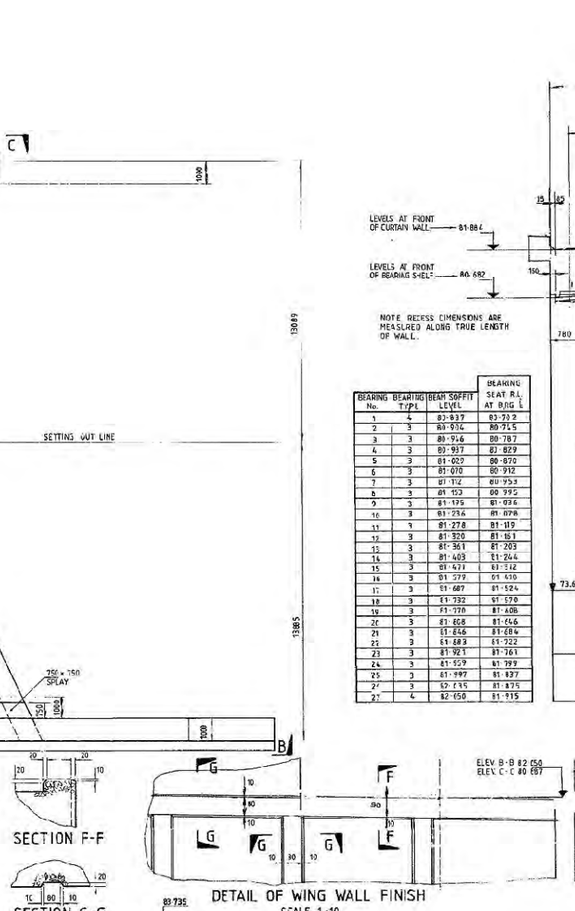
A69 EIGHTON LODGE JUNCTION IMPROVEMENT

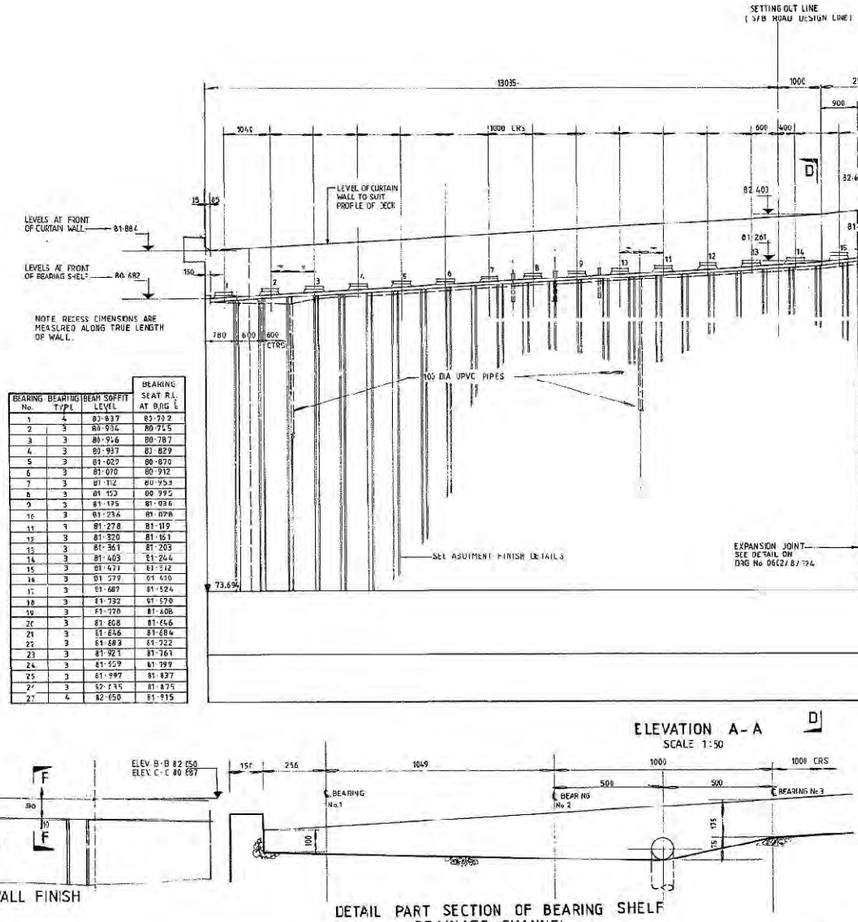
TITLE: SLIP ROAD BRIDGE — WEST ABUTMENT DETAILS

DRAWN	CHECKED	APPROVED	DATE	SCALE	MHA DRAWING No.	REV.
[redacted]			FEBRUARY 1986	1:100, 1:50, 1:10	602/B/324	AC



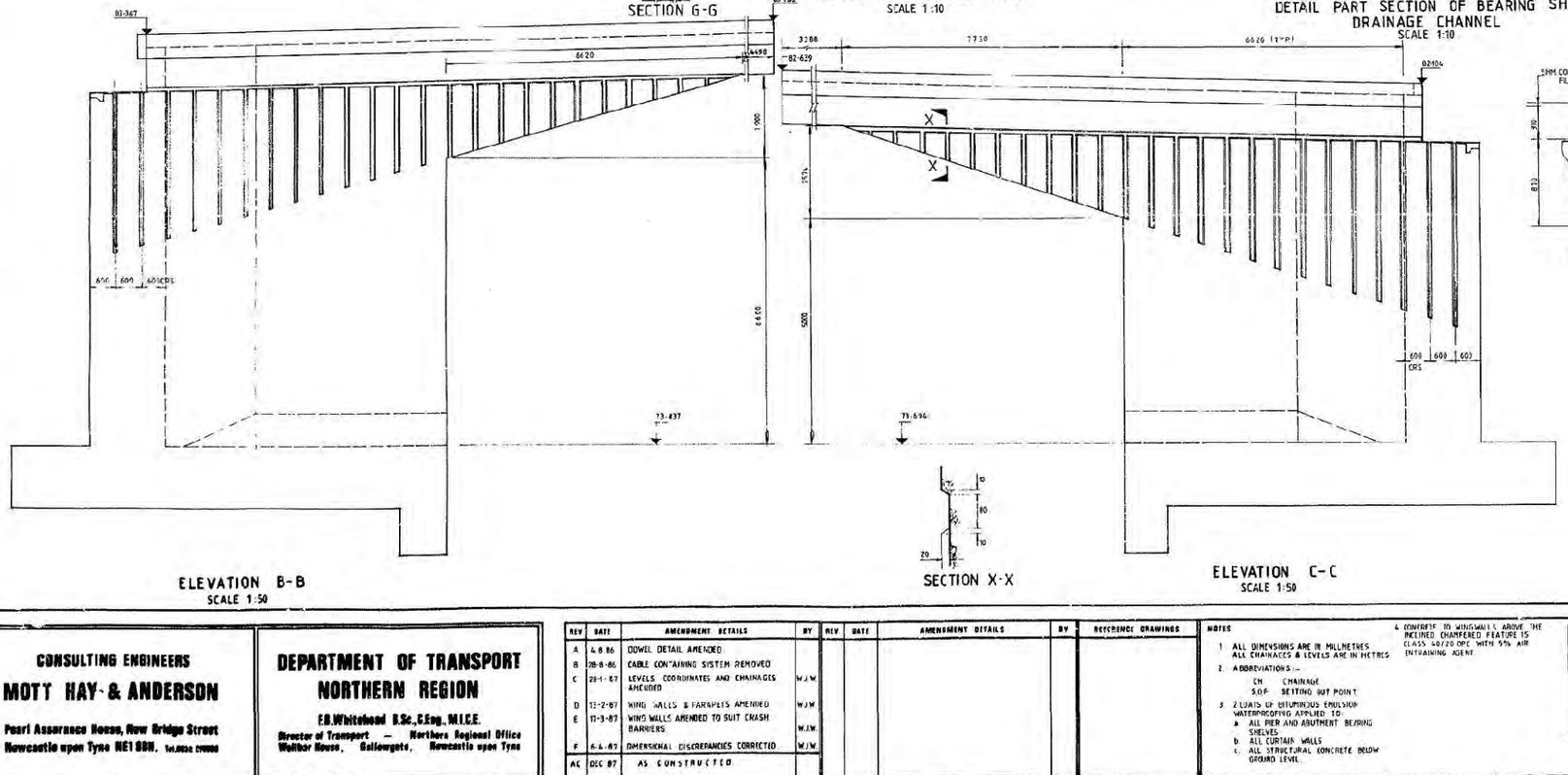
LAYOUT PLAN
SCALE 1:100





ELEVATION A-A
SCALE 1:50

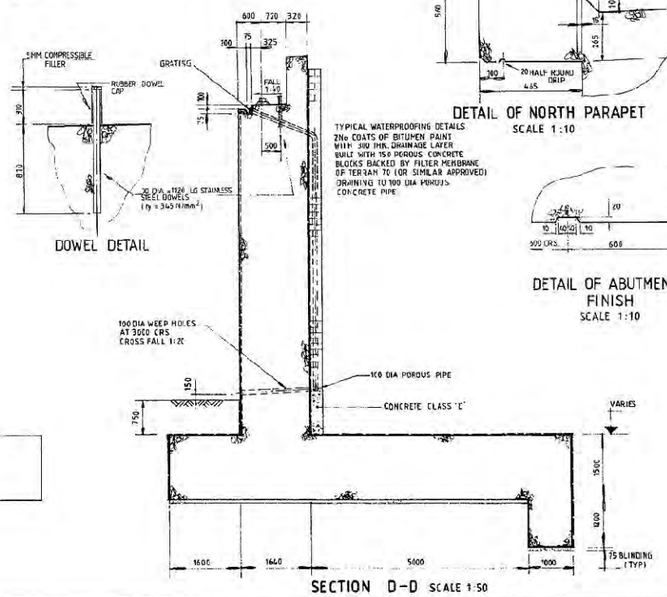
BEARING No.	BEARING TYPE	BEAM SOFFIT LEVEL	BEARING SEAT R.L. AT B/G ℄
1	4	83·937	83·702
2	3	80·904	80·715
3	3	80·916	80·787
4	3	81·937	81·829
5	3	81·022	80·870
6	3	81·070	80·912
7	3	81·112	80·953
8	3	81·153	80·995
9	3	81·195	81·036
10	3	81·236	81·078
11	3	81·278	81·119
12	3	81·320	81·161
13	3	81·361	81·203
14	3	81·403	81·244
15	3	81·471	81·312
16	3	81·579	81·410
17	3	81·687	81·524
18	3	81·732	81·570
19	3	81·778	81·608
20	3	81·858	81·646
21	3	81·846	81·684
22	3	81·883	81·722
23	3	81·921	81·761
24	3	81·959	81·799
25	3	81·997	81·837
27	3	82·035	81·875
27	4	82·050	81·915



ELEVATION B-B
SCALE 1:50

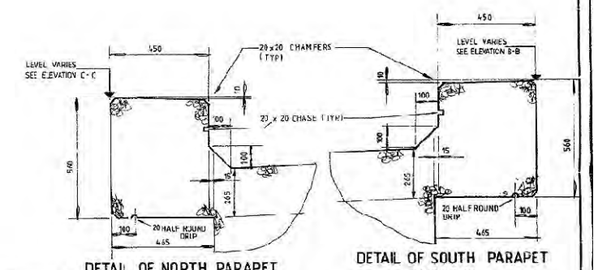
SECTION X-X

ELEVATION C-C
SCALE 1:50



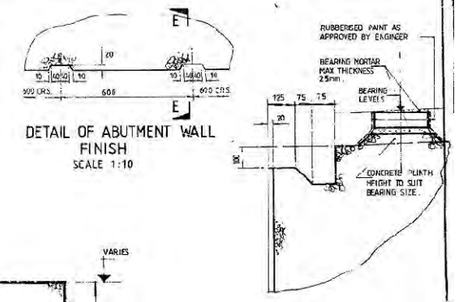
DOWEL DETAIL

SECTION D-D SCALE 1:50



DETAIL OF NORTH PARAPET
SCALE 1:10

DETAIL OF SOUTH PARAPET
SCALE 1:10



DETAIL OF ABUTMENT WALL FINISH
SCALE 1:10

SECTION E-E
SCALE 1:10

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Director of Transport — Northern Regional Office
Walker House, Gallowgate, Newcastle upon Tyne

REV	DATE	AMENDMENT DETAILS	BY
A	4.8.86	DOWEL DETAIL AMENDED	
B	28-8-86	CABLE CONTAINING SYSTEM REMOVED	
C	28-1-87	LEVELS COORDINATES AND CHAINAGES AMENDED	W.J.W.
D	13-2-87	WING WALLS & PARAPETS AMENDED	W.J.W.
E	17-3-87	WING WALLS AMENDED TO SUIT CRASH BARRIERS	W.J.W.
F	6.4.87	DIMENSIONAL DISCREPANCIES CORRECTED	W.J.W.
AC	DEC 87	AS CONSTRUCTED	

REV	DATE	AMENDMENT DETAILS	BY

REFERENCE DRAWINGS

NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES ALL CHAINAGES & LEVELS ARE IN METRES
2. ABBREVIATIONS :–
   CH CHAINAGE
   S.O.P SETTING OUT POINT
3. 2 COATS OF BITUMINOUS EMULSION WATERPROOFING APPLIED TO :
   a. ALL PIER AND ABUTMENT BEARING SHELVES
   b. ALL CURTAIN WALLS
   c. ALL STRUCTURAL CONCRETE BELOW GROUND LEVEL
4. CONCRETE TO WINGWALLS ABOVE THE INCLINED CHAMFERED FEATURE IS CLASS 40/20 OPC WITH 5% AIR ENTRAINING AGENT.

CONCRETE SPECIFICATION

SUBSTRUCTURE	
GRADE	40
CEMENT	SRC
NOMINAL MAX. SIZE OF AGGREGATE	20mm
MINIMUM CEMENT CONTENT	360kg/m³
MAX. WATER/CEMENT RATIO	0.45

NOTE:- IN ADDITION TO ABOVE SPEC ABUTMENT STEM AND PARAPET EDGE BEAMS TO HAVE 5% AIR ENTRAINMENT

A69 EIGHTON LODGE JUNCTION IMPROVEMENT

TITLE: SLIP ROAD BRIDGE
EAST ABUTMENT DETAILS

DRAWN	CHECKED	APPROVED	DATE
[redacted]			FEBRUARY 1986

SCALE	MHA DRAWING No.	REV.
1:100, 1:50 & 1:10	602/B/325	AC

PLAN ON BASE

ELEVATION B-B

ELEVATION C-C

SECTION D-D

SECTION E-E

SECTION F-F

SECTION G-G

ELEVATION A-A

SECTION H-H

SECTION J-J

AREAS OF SHEAR LINKS REQ'D 2 NO SHOWN THUS

PART PLAN ON BEARING SHELF SHOWING TYPICAL LINK ARRANGEMENT

DETAIL 'A'

CONSULTING ENGINEERS	DEPARTMENT OF TRANSPORT
MOTT HAY & ANDERSON	**NORTHERN REGION**
Pearl Assurance House, New Bridge Street, Newcastle upon Tyne NE1 8BH. Tel. 0632 610666	F.B. Whitehead B.Sc., C.Eng., M.I.C.E. Director of Transport — Northern Regional Office Tyne House, Gallowgate, Newcastle upon Tyne

REV.	DATE	AMENDMENT DETAILS	BY
AC	DEC 87	AS CONSTRUCTED	

REV.	DATE	AMENDMENT DETAILS	BY

REFERENCE DRAWINGS

NOTES

1) FOR GENERAL ARRANGEMENT SEE DWG NO 602/B/324
2) REFER TO BENDING SCHEDULE NOS 602/B/326 SHEETS 01 TO 11 INC
3) REINFORCEMENT COVER IS TO BE: 70 MM TO OUTSIDE FACE OF FRONT WALL FEATURE. 50 MM ELSEWHERE. (U.N.O)
4) LAP LENGTHS SPECIFIED ARE MINIMUM.

A69 EIGHTON LODGE JUNCTION IMPROVEMENT

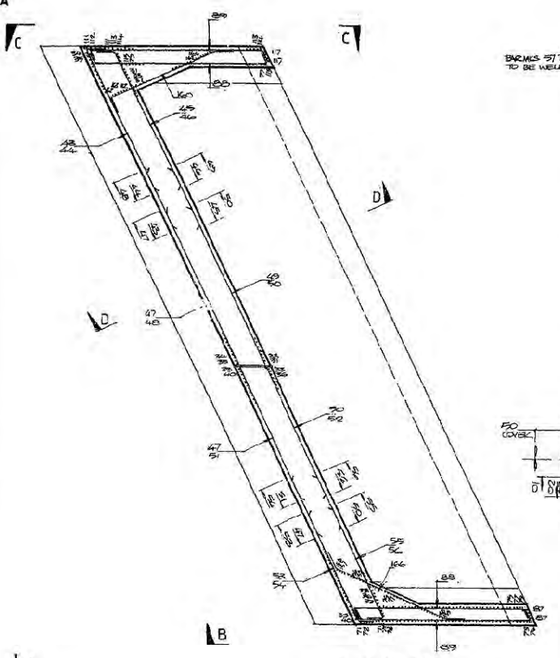
TITLE: SLIP ROAD BRIDGE WEST ABUTMENT REINFORCEMENT DETAILS

DRAWN	CHECKED	APPROVED	DATE
[redacted]			FEBRUARY 1986

SCALE: 1:50 & 1:20

MHA DRAWING No.: 602/B/326

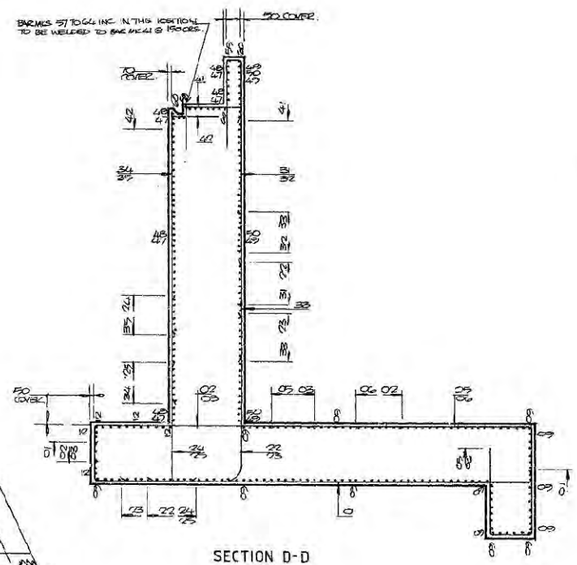
REV.: AC

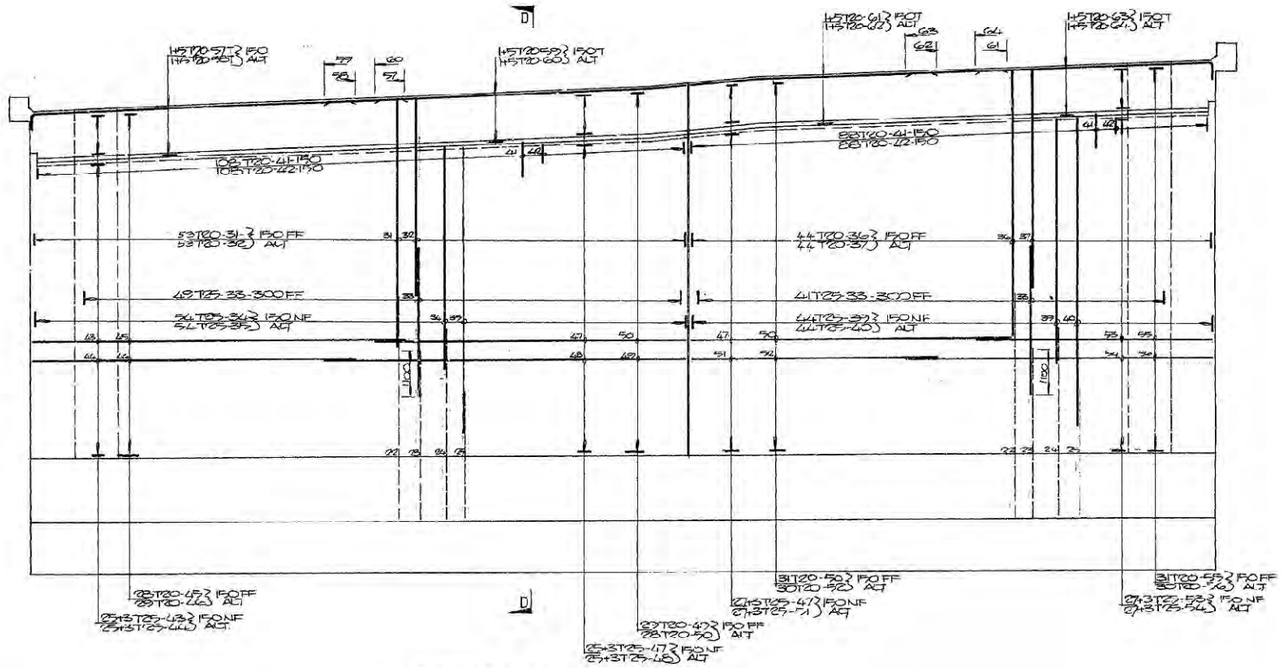


PLAN ON BASE

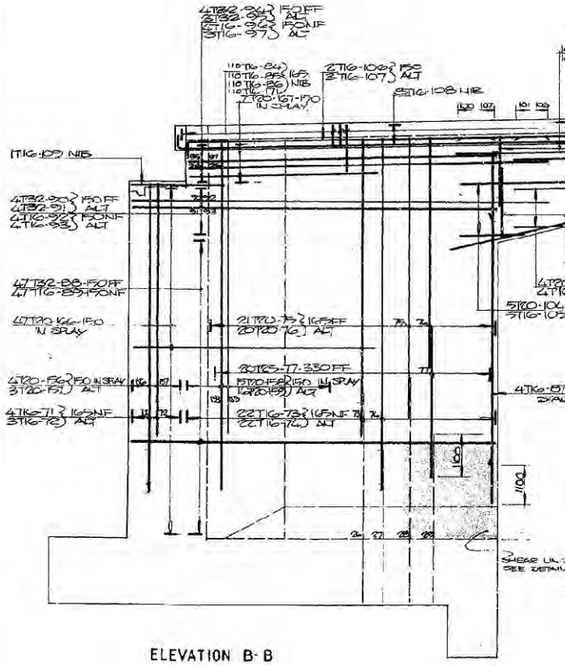
NOTE: BASE REINFORCEMENT SIMILAR TO WEST ABUTMENT SEE DWG NO. 602/326

SCALE 1:100

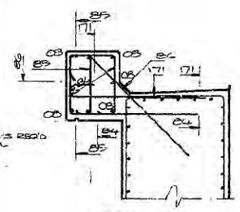




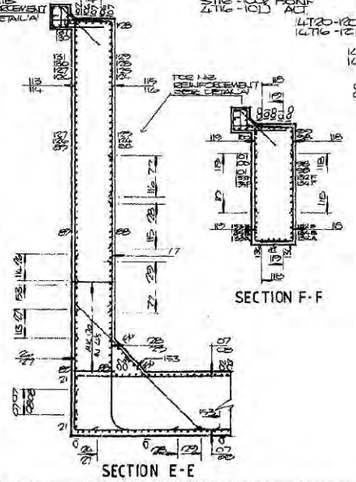
ELEVATION A-A



ELEVATION B-B

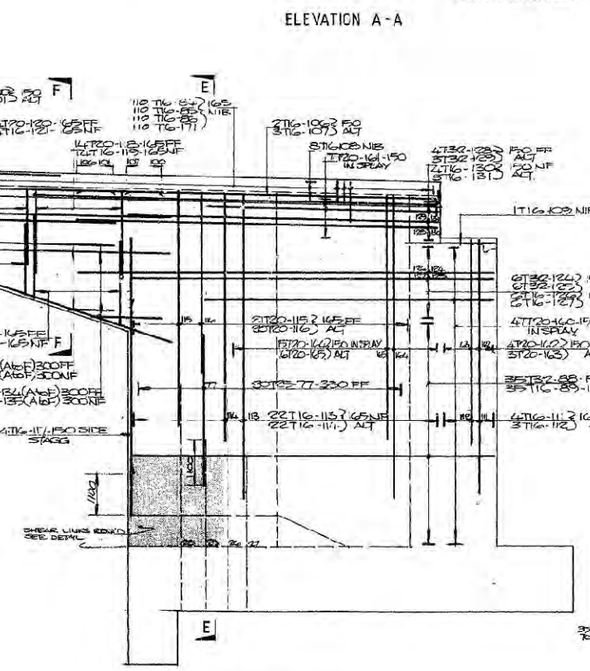


DETAIL 'A'

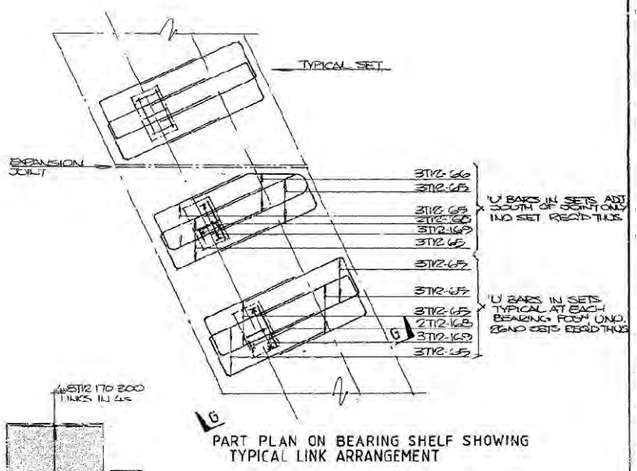


SECTION E-E

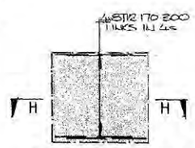
SECTION F-F



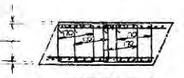
ELEVATION C-C



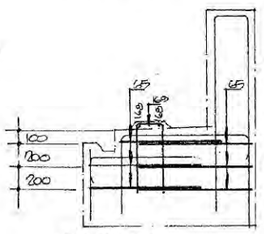
PART PLAN ON BEARING SHELF SHOWING TYPICAL LINK ARRANGEMENT



AREAS OF SHEAR LINKS REQ'D 2 NO. SHOWN THUS



SECTION H-H



SECTION G-G

CONSULTING ENGINEERS

MOTT HAY & ANDERSON

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DEPARTMENT OF TRANSPORT
NORTHERN REGION

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REV.	DATE	AMENDMENT DETAILS	BY
AC	DEC 87	AS CONSTRUCTED.	

REV.	DATE	AMENDMENT DETAILS	BY

REFERENCE DRAWINGS

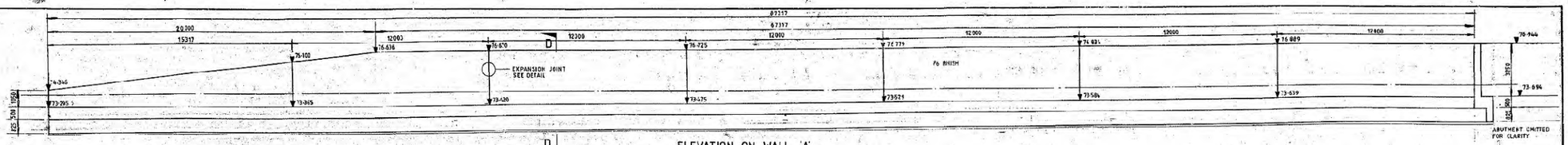
NOTES
1) FOR GENERAL ARRANGEMENT SEE DWG NO 602/B/325
2) REFER TO BENDING SCHEDULE NOS 602/327 SHEETS 01 TO 11 INC.
3) REINFORCEMENT COVER IS TO BE : 70 MM TO OUTSIDE FACES OF FRONT WALL, FEATURE 50 MM ELSEWHERE (U.N.O.).
4) ALL LAPS SPECIFIED ARE MINIMUM.

A69 EIGHTON LODGE JUNCTION IMPROVEMENT

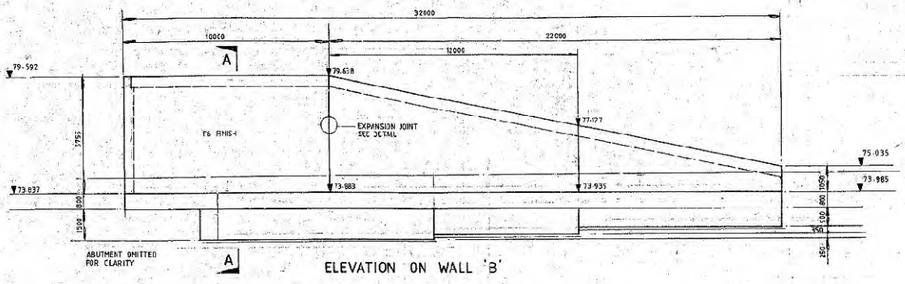
TITLE: SLIP ROAD BRIDGE EAST ABUTMENT REINFORCEMENT DETAILS

DRAWN	CHECKED	APPROVED	DATE	SCALE	MHA DRAWING No.	REV.
[redacted]			FEBRUARY 1986	1:50 & 1:20	602/B/327	AC

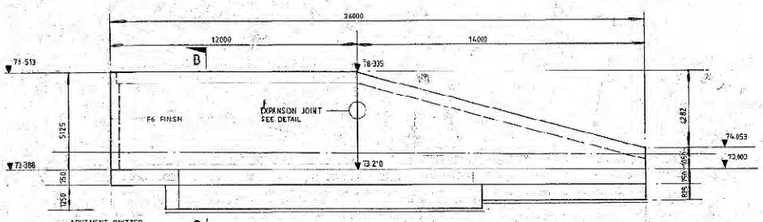
602/B/330



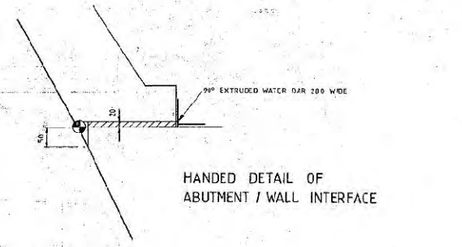
ELEVATION ON WALL 'A'

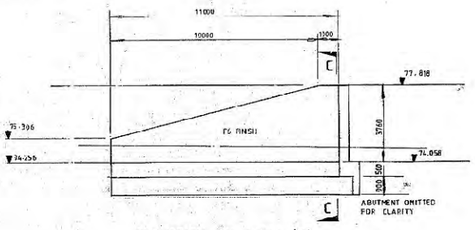


ELEVATION ON WALL 'B'

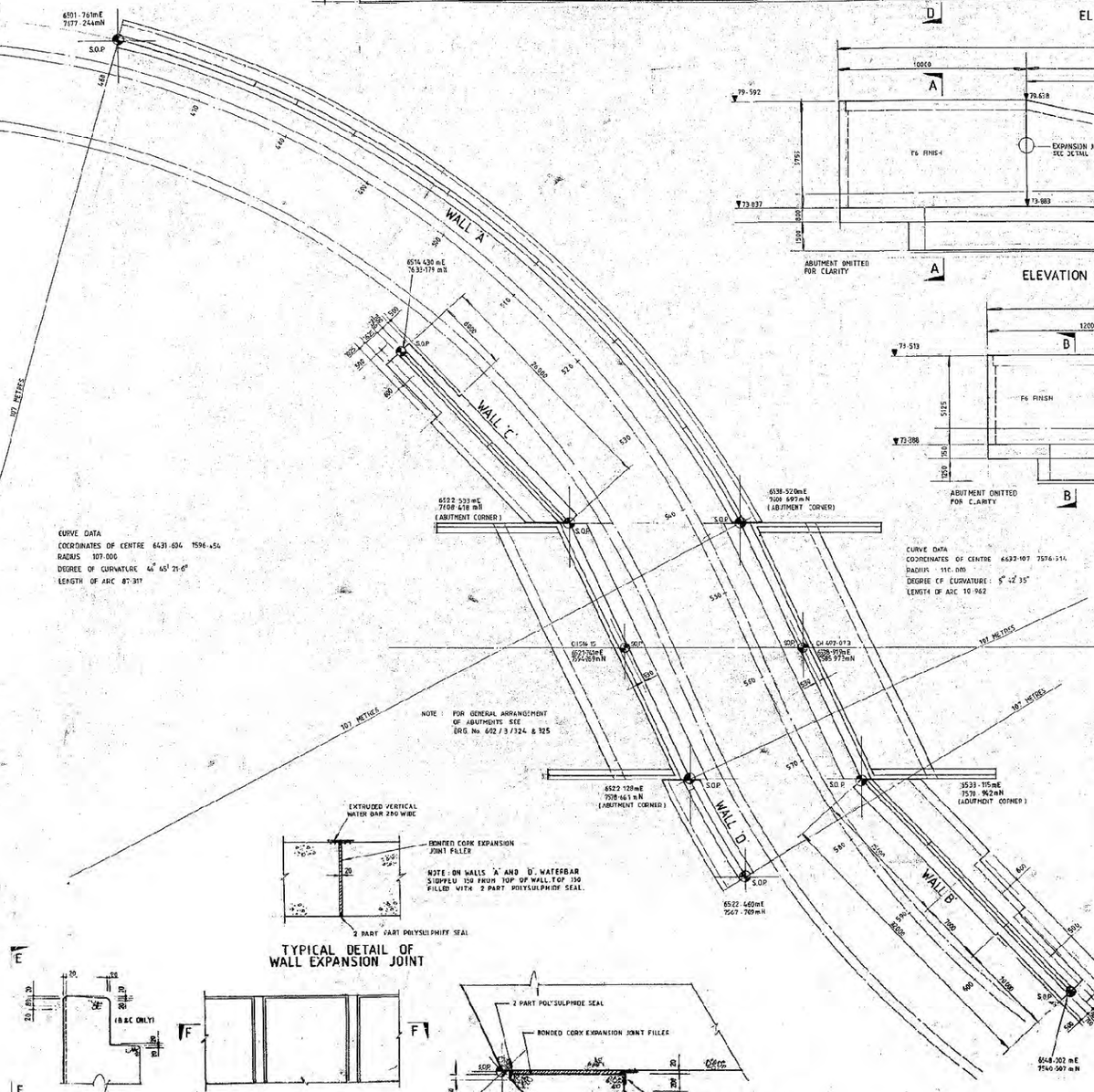


ELEVATION ON WALL 'C'

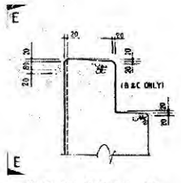




ELEVATION ON WALL 'D'

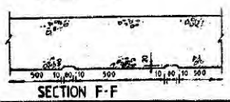


TYPICAL DETAIL OF WALL EXPANSION JOINT

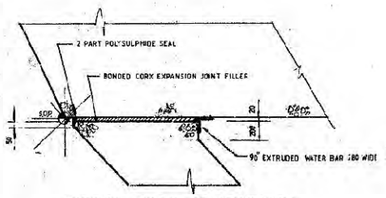


TYPICAL DETAIL AT TOP OF WALL

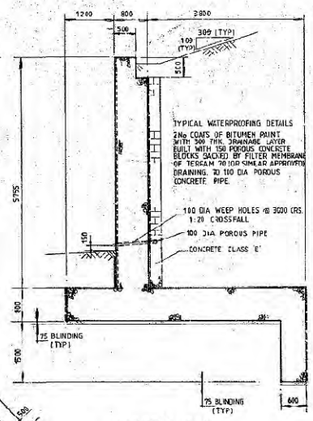
SECTION E-E



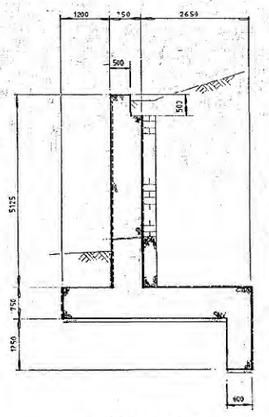
SECTION F-F



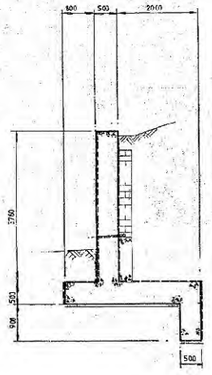
TYPICAL DETAIL OF ABUTMENT/ WALL INTERFACE



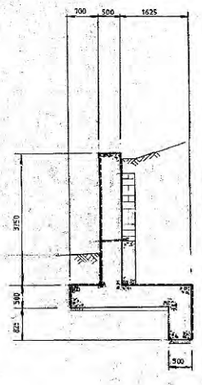
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

CONCRETE SPECIFICATION	
RETAINING WALLS	
GRADE	40
CEMENT	SRC
NOMINAL MAX SIZE OF AGGREGATE	20mm
MINIMUM CEMENT CONTENT	360 Kg/m³
MAX WATER/CEMENT RATIO	0.45

IN ADDITION TO ABOVE SPEC STEMS OF RETAINING WALL IS TO HAVE 5% AIR ENTRAINMENT

CONSULTING ENGINEERS
MOTT HAY & ANDERSON
Pearl Assurance House, New Bridge Street
Newcastle upon Tyne NE1 8BS. Tel.0632 [illegible]

DEPARTMENT OF TRANSPORT
NORTHERN REGION
F.B.Whitehead B.Sc.,C.Eng., M.I.C.E.
Director of Transport — Northern Regional Office
Walker House, Saltwergate, Newcastle upon Tyne

REV.	DATE	AMENDMENT DETAILS	BY
A	20.1.87	COORDINATES AND CHAINAGES AMENDED	W/W
AC	DEC 87	AS CONSTRUCTED.	

REV.	DATE	AMENDMENT DETAILS	BY

REFERENCE DRAWINGS

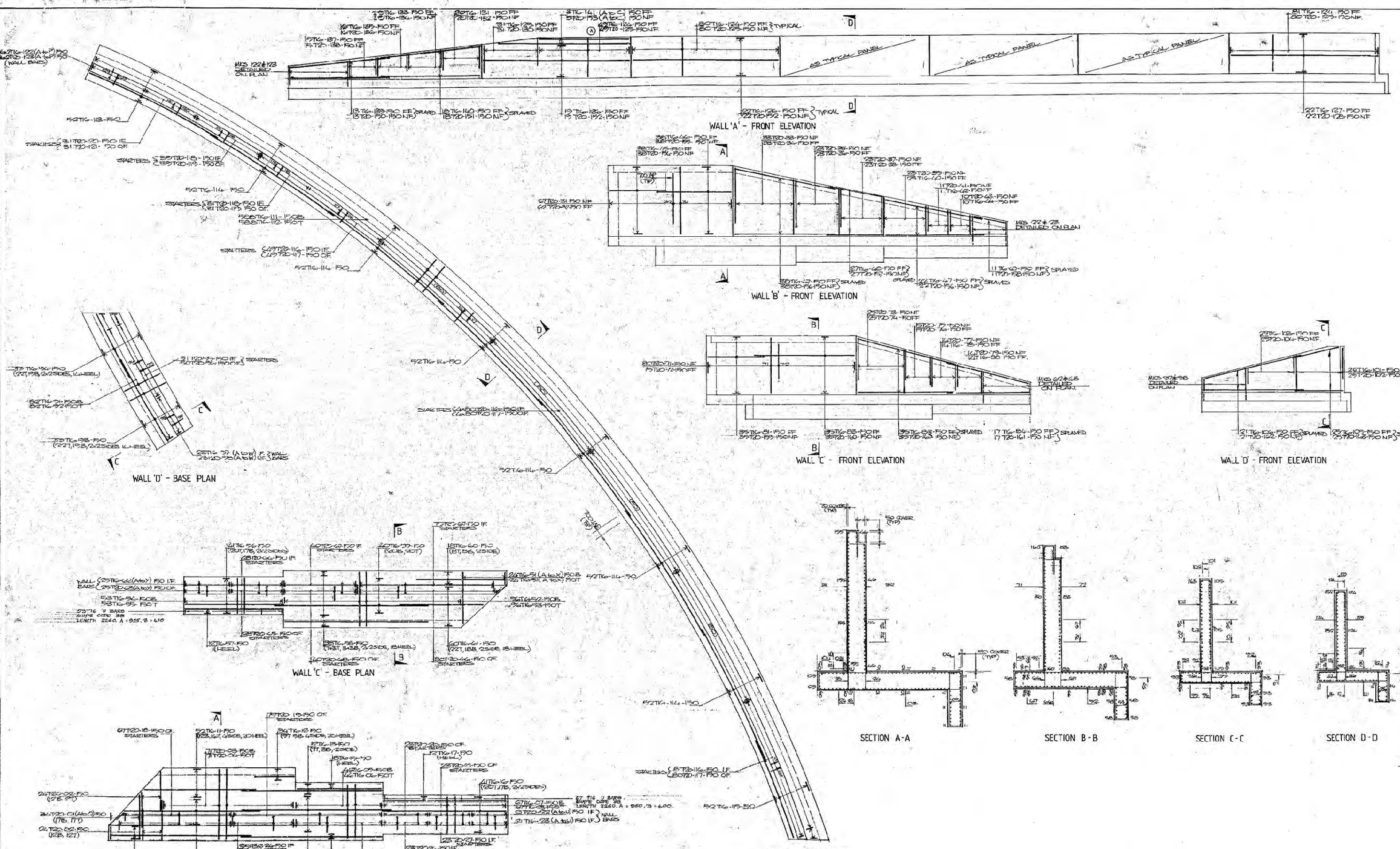
NOTES
1 ALL DIMENSIONS ARE IN MILLIMETRES ALL CHAINAGES & LEVELS ARE IN METRES
2 ABBREVIATIONS :
CH CHAINAGE
SOP SETTING OUT POINT
3 2 COATS OF BITUMINOUS EMULSION WATERPROOFING APPLIED TO ALL STRUCTURAL CONCRETE BELOW GROUND LEVEL

A69 EIGHTON LODGE JUNCTION IMPROVEMENT

TITLE
SOUTHBOUND SLIP ROAD
RETAINING WALL DETAILS

DRAWN	CHECKED	APPROVED	DATE
[redacted]			FEBRUARY 1988

SCALE 1:200, 1:100, 1:50, 1:20
NRA DRAWING No. 602/B/330
REV. AC



CONSULTING ENGINEERS **MOTT HAY & ANDERSON** Pearl Assurance House, New Bridge Street Newcastle upon Tyne NE1 8BH. Tel 0632 [illegible]	**DEPARTMENT OF TRANSPORT** **NORTHERN REGION** F.B.Whitehead B.Sc.(Eng)., M.I.C.E. Director of Transport – Northern Regional Office Walker House, Gallowgate, Newcastle upon Tyne

REV.	DATE	AMENDMENT DETAILS	BY
A		MINOR AMENDMENT MARKED THUS (A)	
AC	DEC 87	AS CONSTRUCTED.	

REV.	DATE	AMENDMENT DETAILS	BY	REFERENCE DRAWINGS

NOTES
1) FOR GENERAL ARRANGEMENT SEE DNG NO 602/B/380
2) REFER TO BENDING SCHEDULE NOS 602/331 SHEETS 01 TO 16 INC.
3) REINFORCEMENT COVER IS TO BE : 70 MM TO FRONT FACE OF WALL
50 MM ELSEWHERE.
4) LAP LENGTHS SPECIFIED ARE MINIMUM.

A69 EIGHTON LODGE JUNCTION IMPROVEMENT

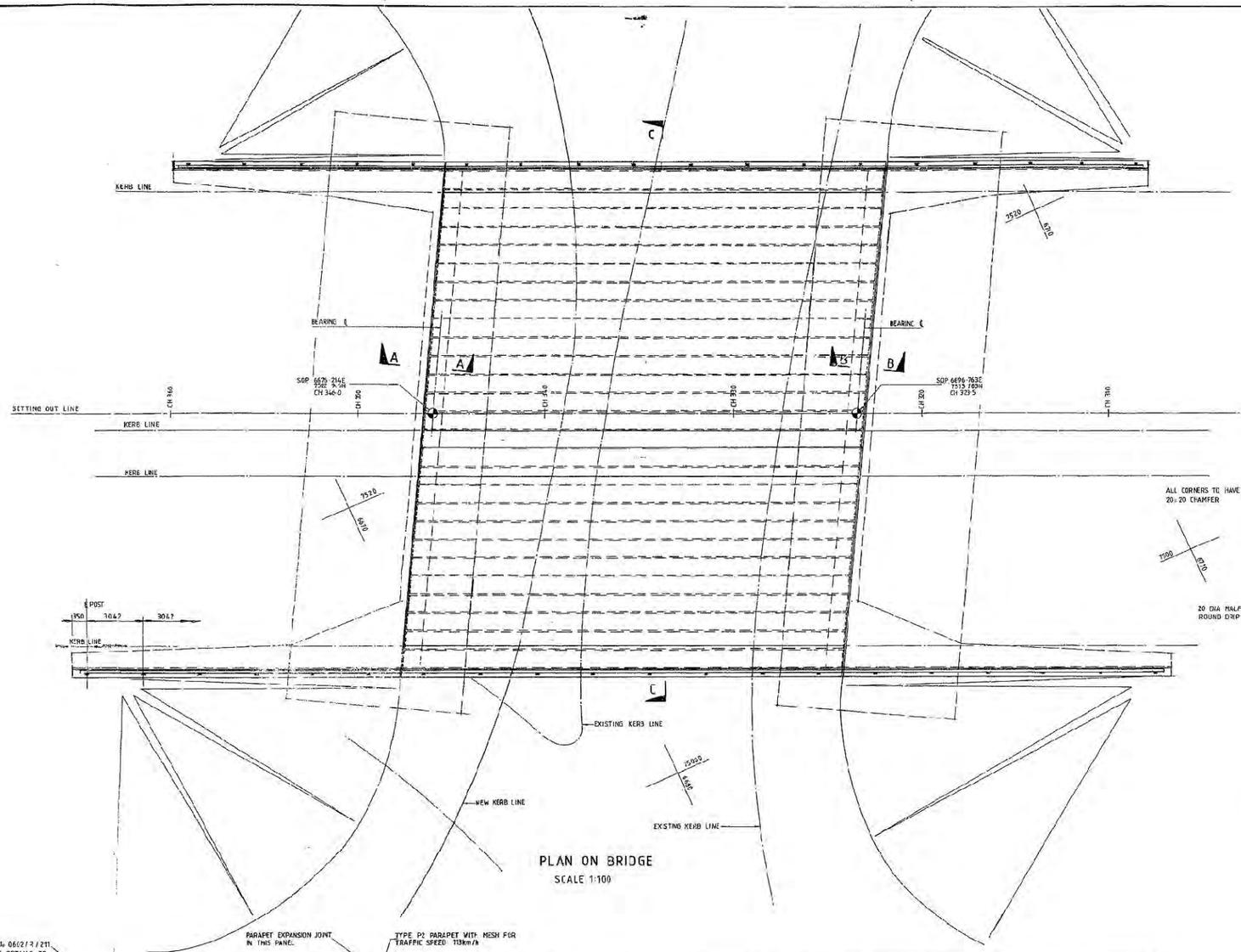
TITLE: SOUTHBOUND SLIP ROAD RETAINING WALLS REINFORCEMENT

DRAWN	CHECKED	APPROVED	DATE	SCALE	MNL DRAWING No.	REV.
[redacted]			FEBRUARY 1988	1:100 & 1:50	602 / B / 331	AC

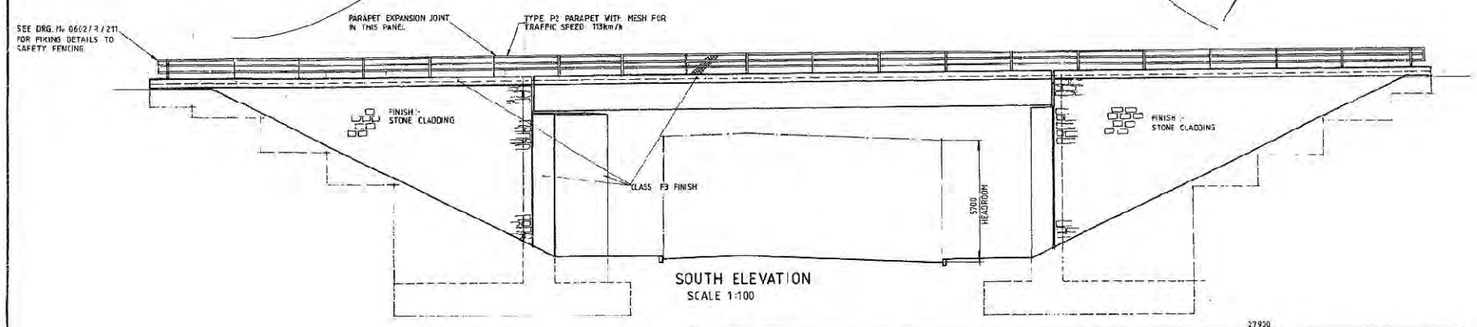
highways england

APPENDIX B-2

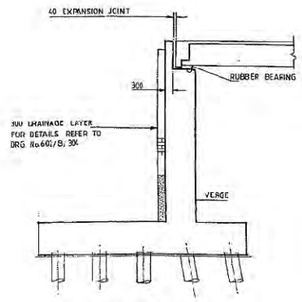
EIGHTON LODGE NORTH BRIDGE



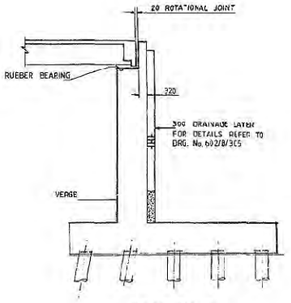
PLAN ON BRIDGE
SCALE 1:100



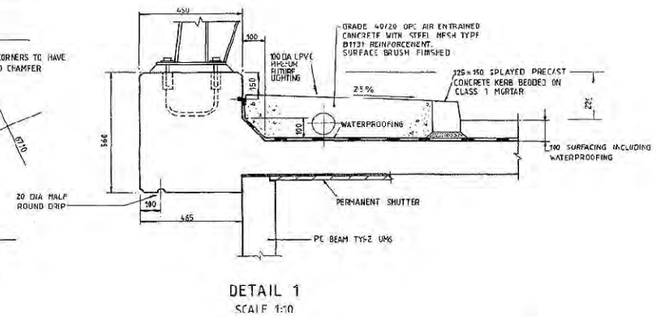
SOUTH ELEVATION
SCALE 1:100



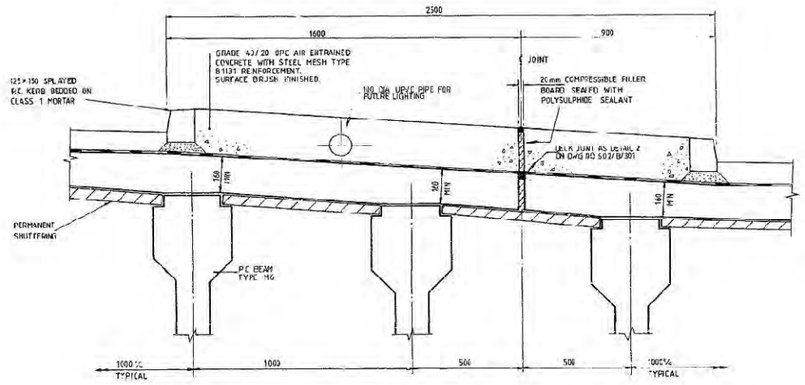
SECTION A-A
SCALE 1:100



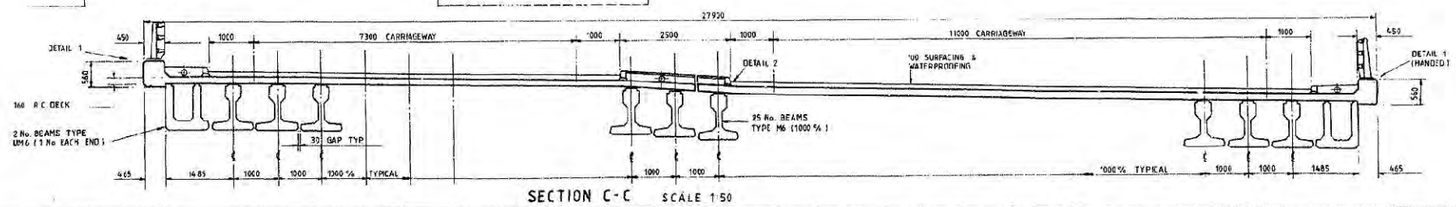
SECTION B-B
SCALE 1:100



DETAIL 1
SCALE 1:10



DETAIL 2
SCALE 1:10



SECTION C-C SCALE 1:50

CONSULTING ENGINEERS
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Pearl Assurance House, New Bridge Street
Newcastle upon Tyne NE1 8BH. Tel.0632 [redacted]

DEPARTMENT OF TRANSPORT
NORTHERN REGION
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Director of Transport — Northern Regional Office
Wellbar House, Gallowgate, Newcastle upon Tyne

REV.	DATE	AMENDMENT DETAILS	BY
AC	DEC 87	AS CONSTRUCTED	

REV.	DATE	AMENDMENT DETAILS	BY

REFERENCE DRAWINGS

NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES
2. ALL CHAINAGES ARE IN METRES.
3. ABBREVIATIONS :-
℄/C - CENTRE TO CENTRE
℄ - CENTRE LINE
SOP - SETTING OUT POINT

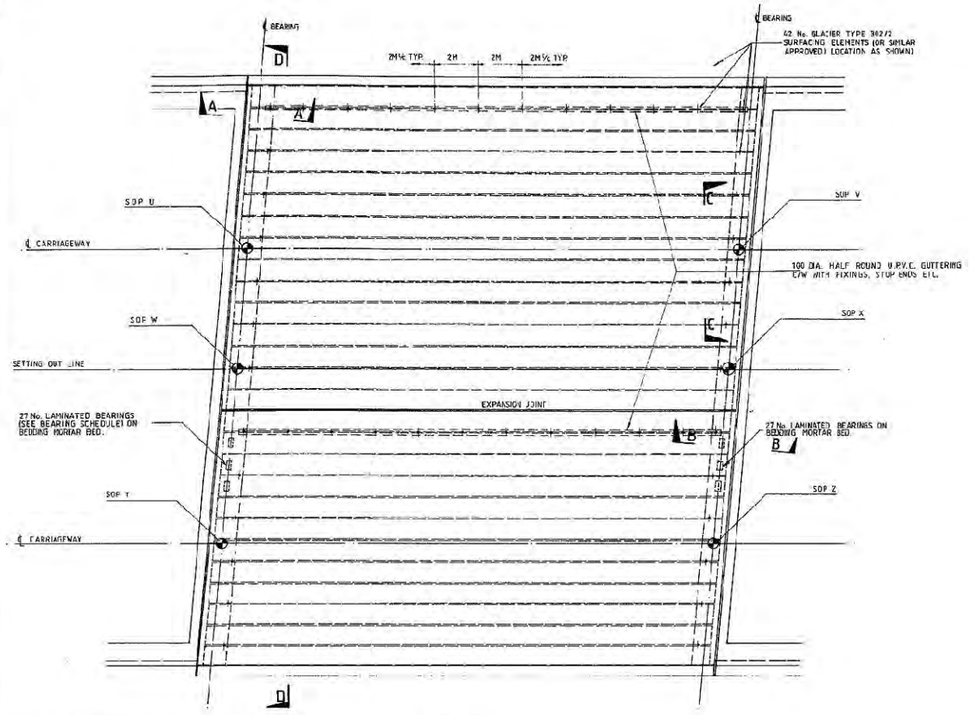
A69 EIGHTON LODGE JUNCTION IMPROVEMENT

TITLE
EIGHTON LODGE ROUNDABOUT BRIDGE
GENERAL ARRANGEMENT

DRAWN	CHECKED	APPROVED	DATE
[redacted]			FEBRUARY 1986

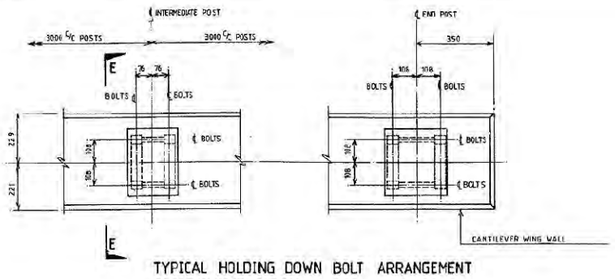
SCALE	MHA DRAWING No.	REV.
AS NOTED	602/B /300	AC

602/B/301

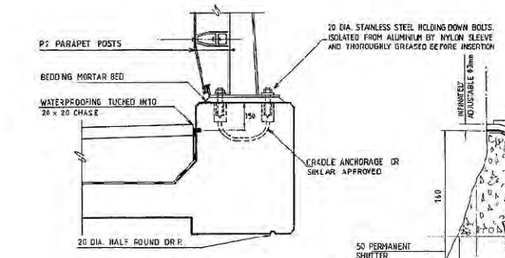


SETTING OUT POINT REF.	CO-ORDINATES
S.O.P. U	6676 853 E 7527 773 N
S.O.P. V	6659 442 E 7518 670 N
S.O.P. W	6676 714 E 7522 946 N
S.O.P. X	6696 703 E 7515 785 N
S.O.P. Y	6672 244 E 7515 793 N
S.O.P. Z	6692 732 E 7586 630 N

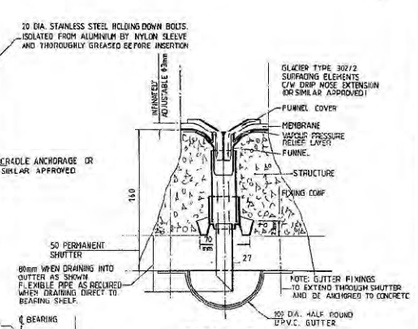
PLAN ON DECK
1:100



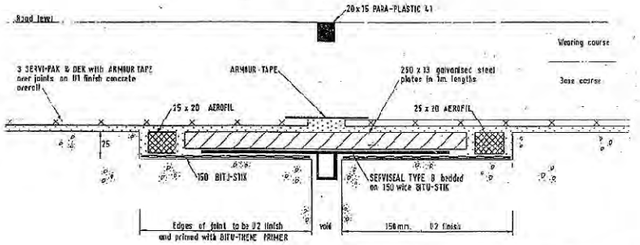
TYPICAL HOLDING DOWN BOLT ARRANGEMENT FOR PARAPET POSTS



SECTION E-E



DETAIL 3



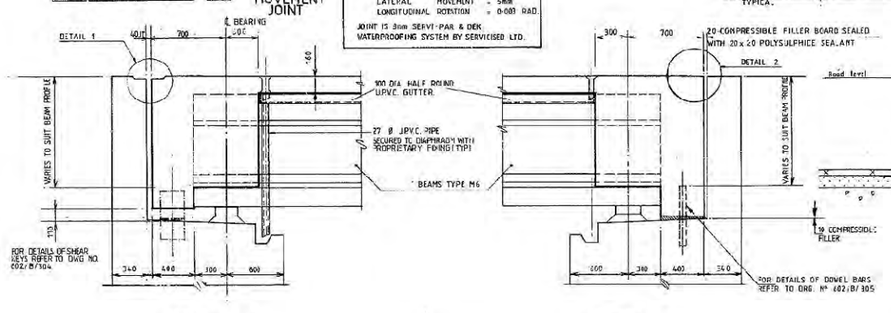
BURIED DECK EXPANSION JOINT
FOR MOVEMENTS 13 - 20 mm. ±10

DETAIL 1
MOVEMENT JOINT

JOINT SPECIFICATION

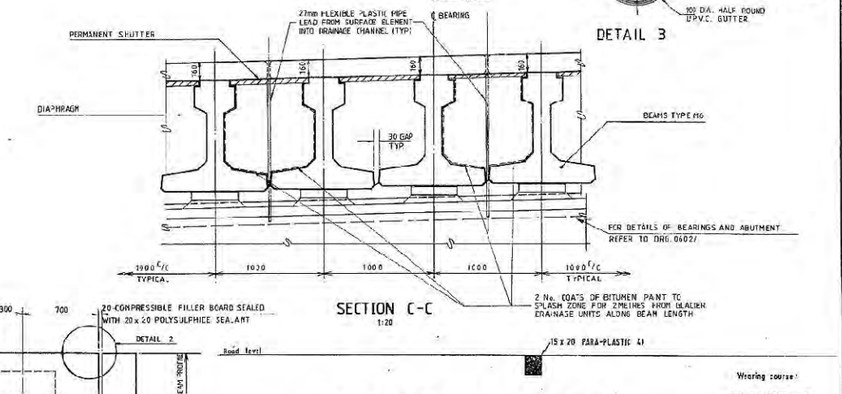
LONGITUDINAL	MOVEMENT	= 20mm
LATERAL	MOVEMENT	= 5mm
LONGITUDINAL	ROTATION	= 0-003 RAD

JOINT IS 3mm SERVI-PAR & DEK WATERPROOFING SYSTEM BY SERVICISED LTD.

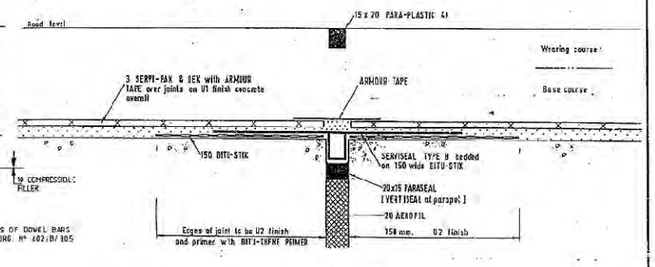


SECTION A-A
1:20

SECTION B-B
1:20



SECTION C-C
1:20



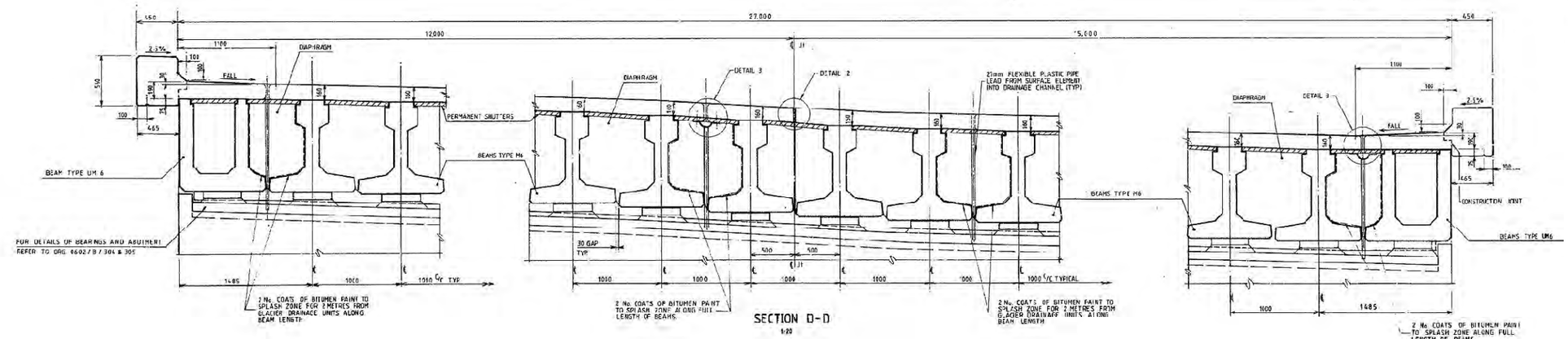
BURIED DECK EXPANSION JOINT
FOR MOVEMENTS UP TO 10 mm. ±5

DETAIL 2
ROTATION JOINT

JOINT SPECIFICATION

LONGITUDINAL	MOVEMENT	= 5mm
LATERAL	MOVEMENT	= 5mm
LONGITUDINAL	ROTATION	= 0-003 RAD

JOINT IS 3mm SERVI-PAK & DEK WATERPROOFING SYSTEM BY SERVICISED LTD



SECTION D-D
1:20

CONCRETE SPECIFICATION

INSITU DECK (NOT INCLUDING PARAPET EDGE BEAM)		
GRADE		40
CEMENT		U.P.C.
NOMINAL MAX SIZE OF AGGREGATE		20mm
MINIMUM CEMENT CONTENT		300 kg/m³
MAX WATER / CEMENT RATIO		0·53
INSITU DECK (PARAPET EDGE BEAM)		
GRADE		40
CEMENT		U.P.C.
NOMINAL MAX SIZE OF AGGREGATE		20mm
MINIMUM CEMENT CONTENT		360 kg/m³
MAX WATER / CEMENT RATIO		0·45
AIR CONTENT OF FRESH CONCRETE		5%

CONSULTING ENGINEERS
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DEPARTMENT OF TRANSPORT
NORTHERN REGION
F.D.Whitehead B.Sc.,C.Eng., M.I.C.E.
Director of Transport — Northern Regional Office
Wolfson House, Gallowgate, Newcastle upon Tyne

REV.	DATE	AMENDMENT DETAILS	BY
AC	DEC 87	AS CONSTRUCTED.	

REV.	DATE	AMENDMENT DETAILS	BY

REFERENCE DRAWINGS

NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM
3. CONCRETE GRADE TO BE :-
   INSITU DECK SLAB SEE SPECIFICATION
   PRECAST BEAMS - SEE CRG. 0602/B/303
4. CEMENT SHALL BE ORDINARY PORTLAND CEMENT
5. FORMWORK SHALL BE :-
   CANTILEVER SOFFITS AND UPSTAND - CLASS F3
   DIAPHRAGM END EXPOSED FACE - CLASS F3
   REMAINING DIAPHRAGM - CLASS F2
   DECK SOFFIT BETWEEN BEAMS - PERMANENT SHUTTER
6. CONCRETE FINISHES ON UNFORMED SURFACES TO BE
   UNDER WATERPROOFING - CLASS U2
   ELSEWHERE - CLASS U3
7. COVER PLATE TO EXPANSION JOINT TO BE HOT DIPPED GALVANISED
8. ABBREVIATIONS :- S.O.P. - SETTING OUT POINT
   ℄ - CENTRE LINE
9. NOTE :- CANTILEVERS TO BE CONSTRUCTED AFTER MAIN INSITU DECK SEE SECTION D-D USING AIR ENTRAINED CONCRETE
10. TESTING OF BEAMS - 2№ BEAM OF ENGINEERS CHOICE SHALL BE TREATED IN ACCORDANCE WITH CLAUSE 17(1) OF SPEC.
11. USE OF PROPRIETARY ITEMS NOTED IS NOT MANDATORY AND SUITABLE ALTERNATIVES WILL BE CONSIDERED BY THE ENGINEER

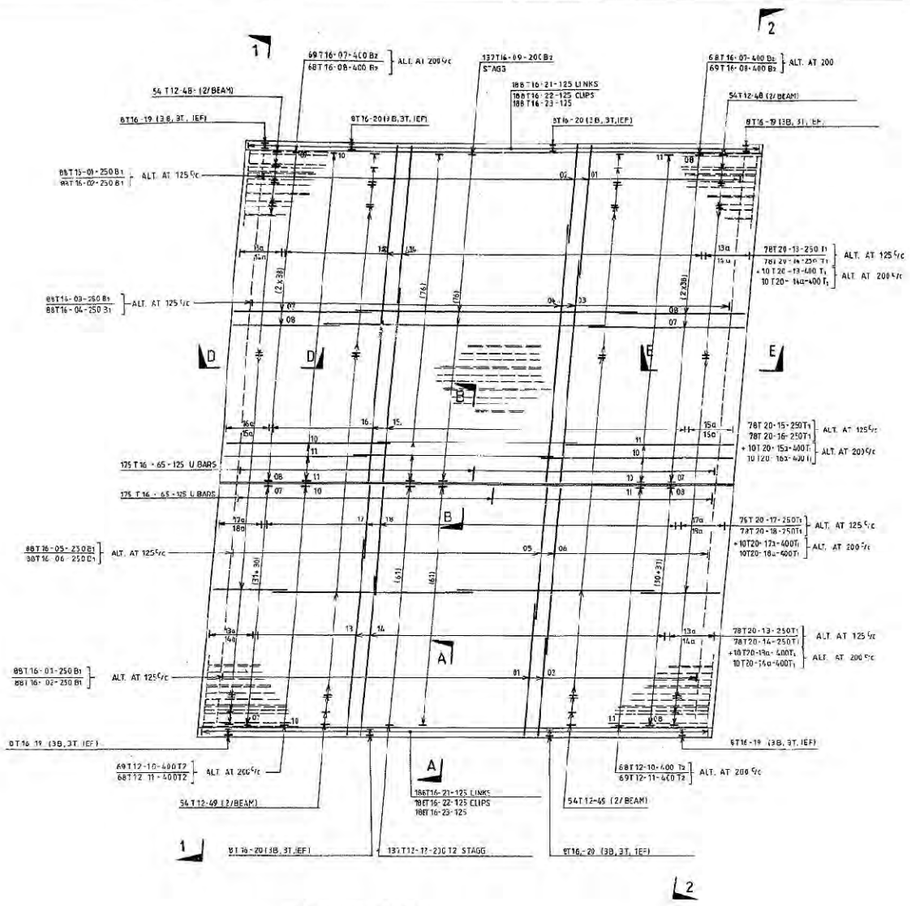
A69 EIGHTON LODGE JUNCTION IMPROVEMENT

DRAWN	CHECKED	APPROVED	DATE
[redacted]			FEBRUARY 1986

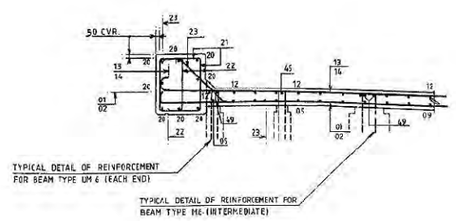
TITLE
EIGHTON LODGE ROUNDABOUT BRIDGE
DECK LAYOUT

SCALE	MM4 DRAWING No.	REV.
AS NOTED	602 / B / 301	AC

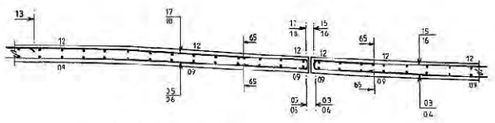
SHA No. 602/B/302



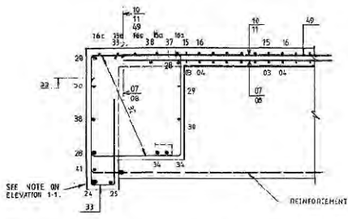
PLAN ON DECK



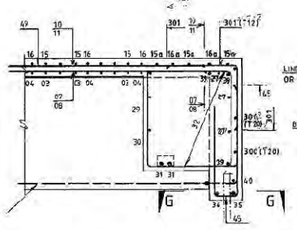
SECTION A-A
(SECTION C-C SIMILAR BUT HANDED)



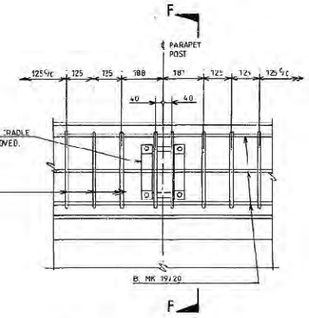
SECTION B-B



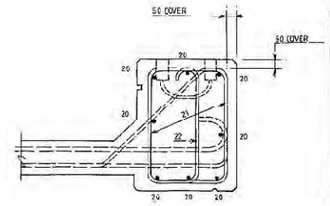
SECTION D-D



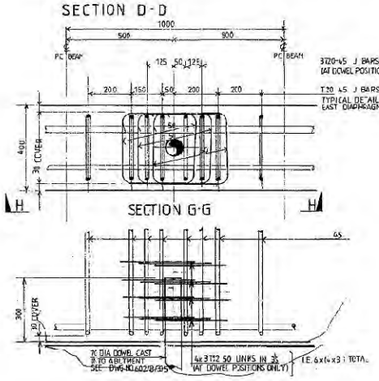
SECTION E-E



PLAN ON PARAPET

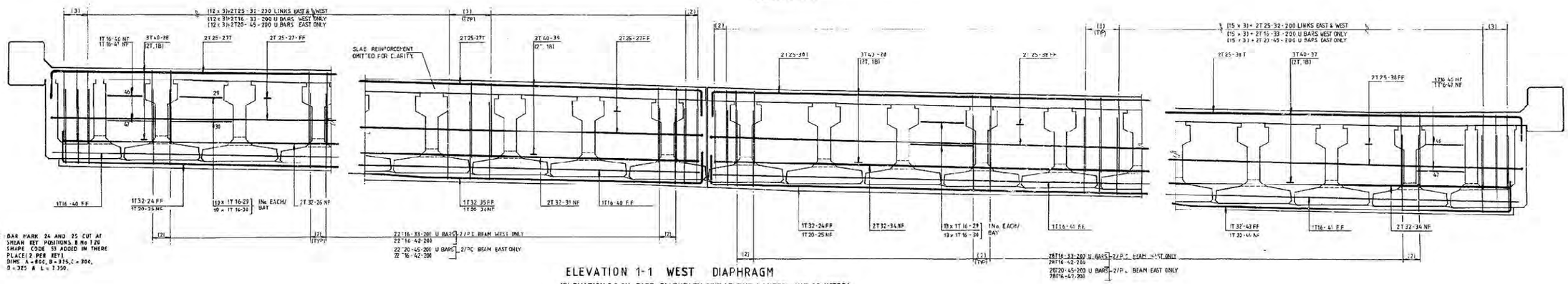


SECTION F-F



SECTION G-G

SECTION H-H



NOTE: BAR MARK 24 AND 25 CUT AT SHEAR KEY POSITIONS, B No 1 20 SHAPE CODE 53 ADDED IN THERE PLACE (2 PER KEY). DIMS A = 400, B = 375, C = 300, D = 325 & L = 1350.

ELEVATION 1-1 WEST DIAPHRAGM
(ELEVATION 2-2 ON EAST DIAPHRAGM SIMILAR BUT HANDED AND AS NOTED)

CONSULTING ENGINEERS
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DEPARTMENT OF TRANSPORT
NORTHERN REGION
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Director of Transport — Northern Regional Office
Wellbar House, Gallowgate, Newcastle upon Tyne

REV.	DATE	AMENDMENT DETAILS	BY
A	1-7-87	AMENDMENTS TO BAR MARKS 13 - 18	
AC	DEC 87	AS CONSTRUCTED	

REV.	DATE	AMENDMENT DETAILS	BY

REFERENCE DRAWINGS

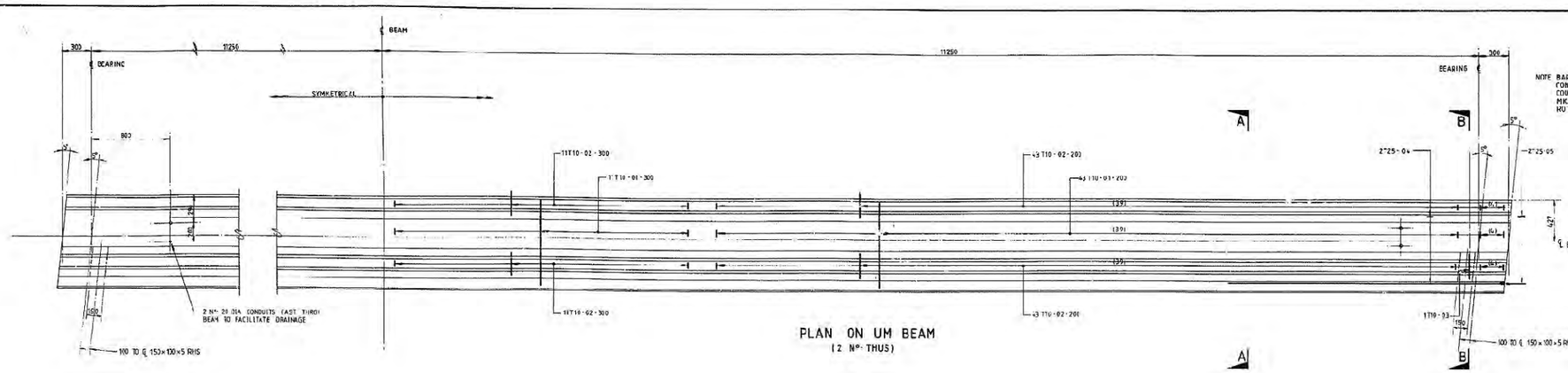
NOTES
1. FOR GENERAL ARRANGEMENT OF DECK REFER TO DRG 0602/301
2. CONC COVER TO BE 30mm TO ANY REINFORCEMENT U.N.O.
3. ALL REINFORCEMENT SHOWN IS LISTED ON BENDING SCHEDULE Nos. 0602/B/301 SHEETS 01 AND 02 NC.
4. MIN LAPS :- (f_y = 460 N/mm²)
   T 16 - 700mm
   T 20 - 900
   T 25 - 1125
   T 32 - 1440
   T 40 - 1800
5. REINFORCEMENT SHALL BE :- MILD STEEL TO BS 4449 : 1978 HIGH YIELD TO BS 4449 : 1978 DEFORMED BAR.
6. REINFORCEMENT SHALL BE BENT IN ACCORDANCE WITH SERIES 15025 AND 15035

A69 EIGHTON LODGE JUNCTION IMPROVEMENT

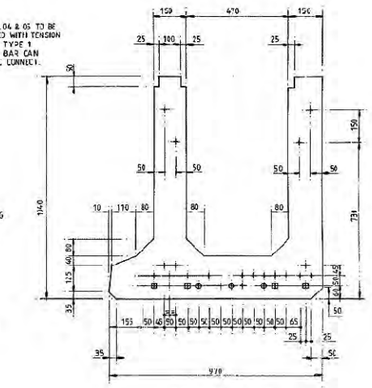
TITLE
EIGHTON LODGE ROUNDABOUT BRIDGE
DECK REINFORCEMENT

DRAWN	CHECKED	APPROVED	DATE	SCALE	SHA DRAWING No.	REV.
			FEBRUARY 1986	1:100, 1:20, 1:10	602/B/302	AC

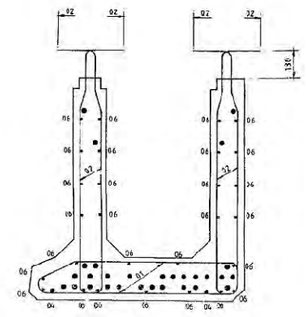
DWG No. 602/B/303



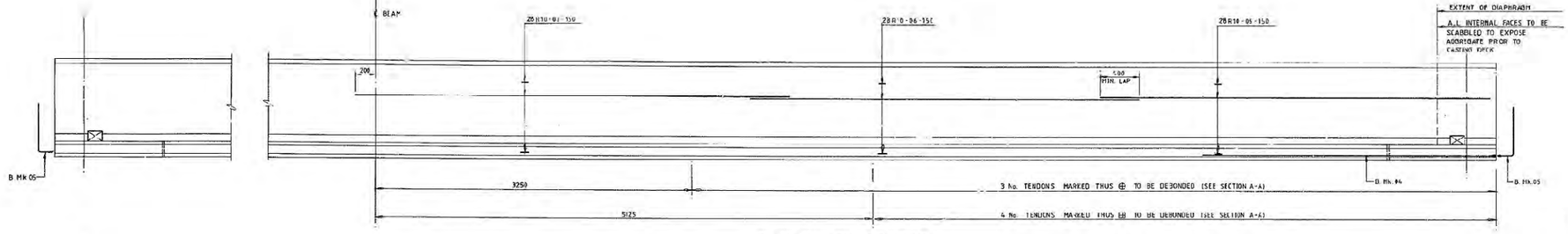
PLAN ON UM BEAM
(2 No. THUS)



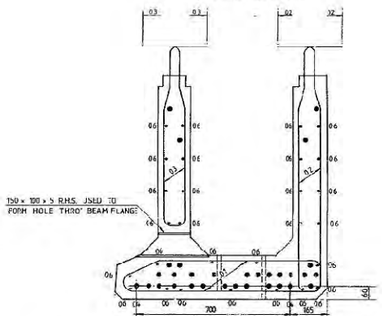
SECTION A-A
SHOWING TENDON ARRANGEMENT



SECTION A-A
SHOWING REINFORCEMENT

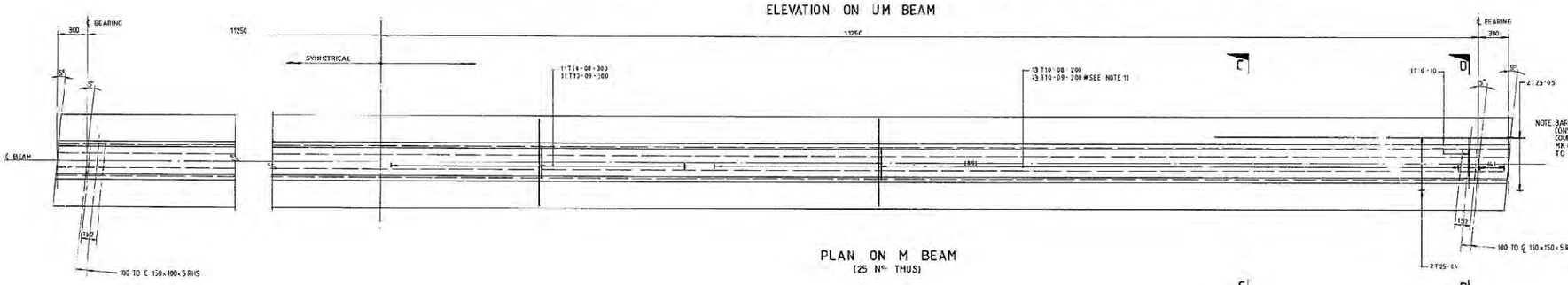


ELEVATION ON UM BEAM

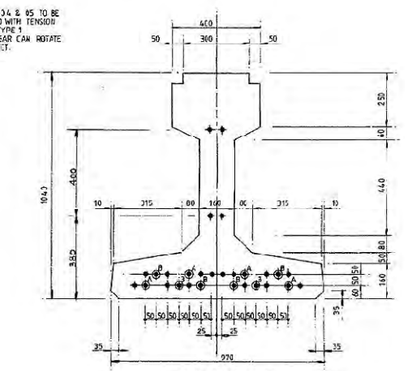


SECTION B-B

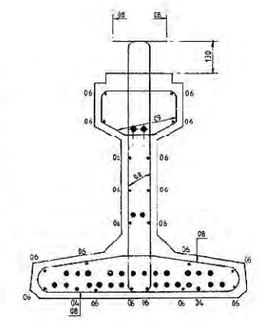
NOTE: ⊕ DENOTES DEBONDED
⊞ TENDONS - SEE ELEVATION



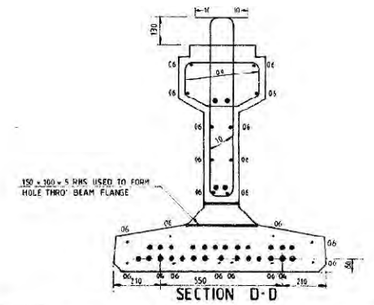
PLAN ON M BEAM
(25 No. THUS)



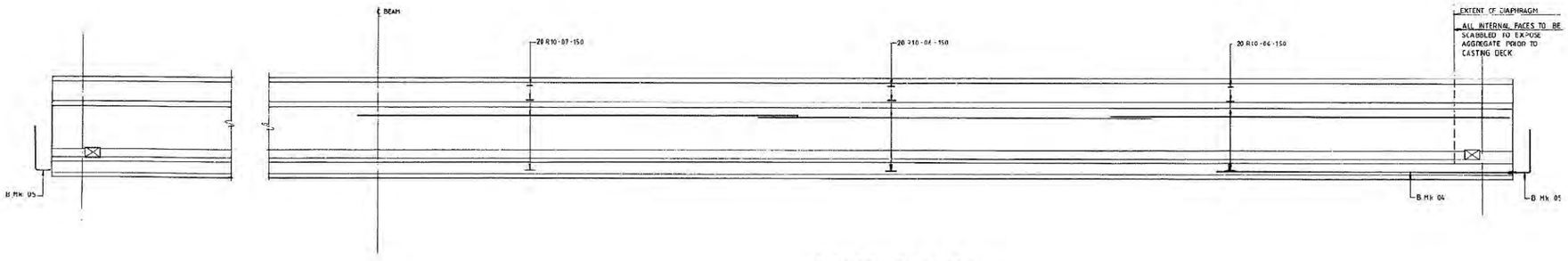
SECTION C-C
SHOWING TENDON ARRANGEMENT.



SECTION C-C
SHOWING REINFORCEMENT



SECTION D-D



ELEVATION ON M BEAM

TENDON NOTES

- STRAND TO PRETRUDE 150 FROM EACH END
- ⊕ TO BE DEBONDED 2760mm FROM EACH END
- ⊞ TO BE DEBONDED 1310mm FROM EACH END

CONCRETE SPECIFICATION

BEAMS	
GRADE	50
CEMENT	OPC
NOMINAL MAX SIZE OF AGGREGATE	20mm
MINIMUM CEMENT CONTENT	325 kg/m³
MAX. WATER/CEMENT RATIO	0.53

CONSULTING ENGINEERS
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NORTHERN REGION
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Walker House, Gallowgate, Newcastle upon Tyne

REV.	DATE	AMENDMENT DETAILS	BY	REV.	DATE	AMENDMENT DETAILS	BY
AC	DEC 87	AS CONSTRUCTED					

REFERENCE DRAWINGS

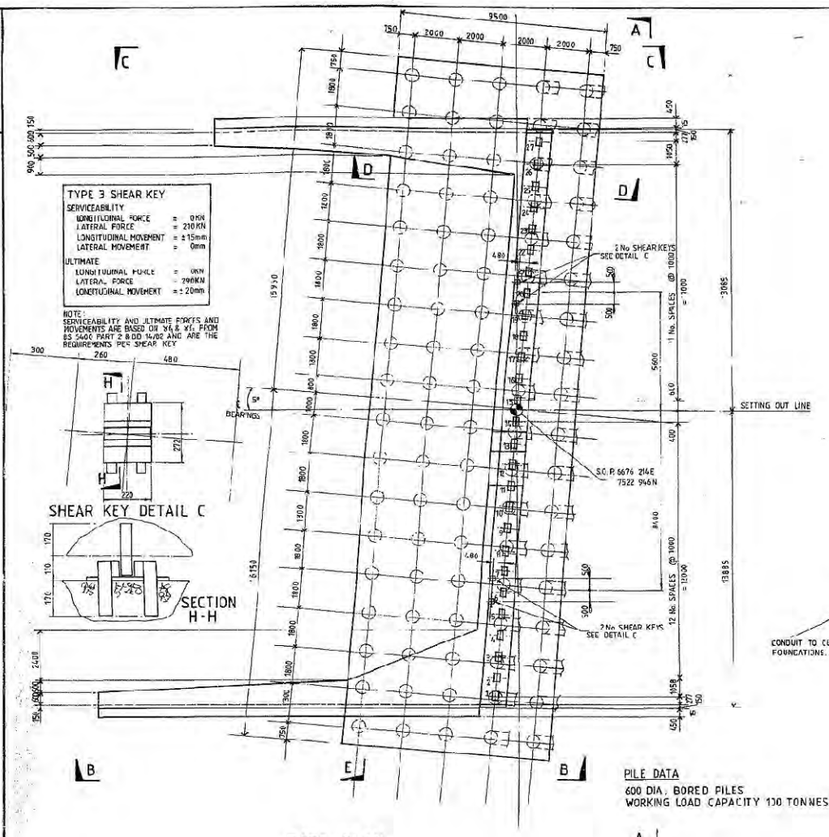
NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. ABBREVIATIONS -
   R M.I.O STEEL
   T HIGH YIELD STEEL
   c/c CENTRE TO CENTRE
   RHS RECTANGULAR HOLLOW SECTION
3. FORMWORK SHALL BE -
   ALL FORMED SURFACES - CLASS F3 UNLESS OTHERWISE NOTED.
4. UNFORMED SURFACES TO TOP OF BEAMS SHALL BE LEVELLED & FOLLOWING INITIAL SET SHALL BE BRUSHED TO REMOVE LAITENCE AND EXPOSE THE LARGEST AGGREGATE
5. CONCRETE SHALL BE -
   ALL BEAMS - 50/20 UNLESS OTHERWISE STATED
6. CEMENT SHALL BE ORDINARY PORTLAND THROUGHOUT
7. REINFORCEMENT SHALL BE -
   MILD STEEL TO BS 4449:1978
   HIGH YIELD TO BS 4449:1978
   DEFORMED BAR
8. MINIMUM COVER TO REINFORCEMENT SHALL BE -
   25mm INSIDE FACE. 30mm OUTER FACE.
9. REINFORCEMENT SHALL BE BENT IN ACCORDANCE WITH SERIES 13025 AND 13035
10. PRESTRESSING (STRAND) BEAM TYPES M/UM
    a. STRAND SIZE - 15.2 mm DIA STABILIZED STRAND
    b. STRAND SPECIFICATION SHALL BE -
       NOMINAL STEEL AREA 138.7/165 mm²
       MINIMUM BREAKING LOAD 282/309 KN
       RELAXATION (10 BS 3617) LOW
    c. CONCRETE STRENGTH AT TRANSFER TO EXCEED 40 N/mm²
    d. THE STRESSING FORCE PER STRAND SHALL BE 174/210 KN
    e. NUMBER OF STRANDS 28/29.
11. OMITTED.
12. TESTING OF BEAMS -
    2 No. M4 BEAMS OF THE ENGINEERS CHOICE SHALL BE TESTED IN ACCORDANCE WITH CLAUSE 2711 OF THE SPECIFICATION. TEST LOADS ARE TO BE 759kN APPLIED AT THIRD POINTS ON THE LENGTH OF THE BEAM.
13. ALL REINFORCEMENT SHOWN IS LISTED ON BENDING SCHEDULE No. 602/B/303 SHEETS 01 AND 02

A69 EIGHTON LODGE JUNCTION IMPROVEMENT

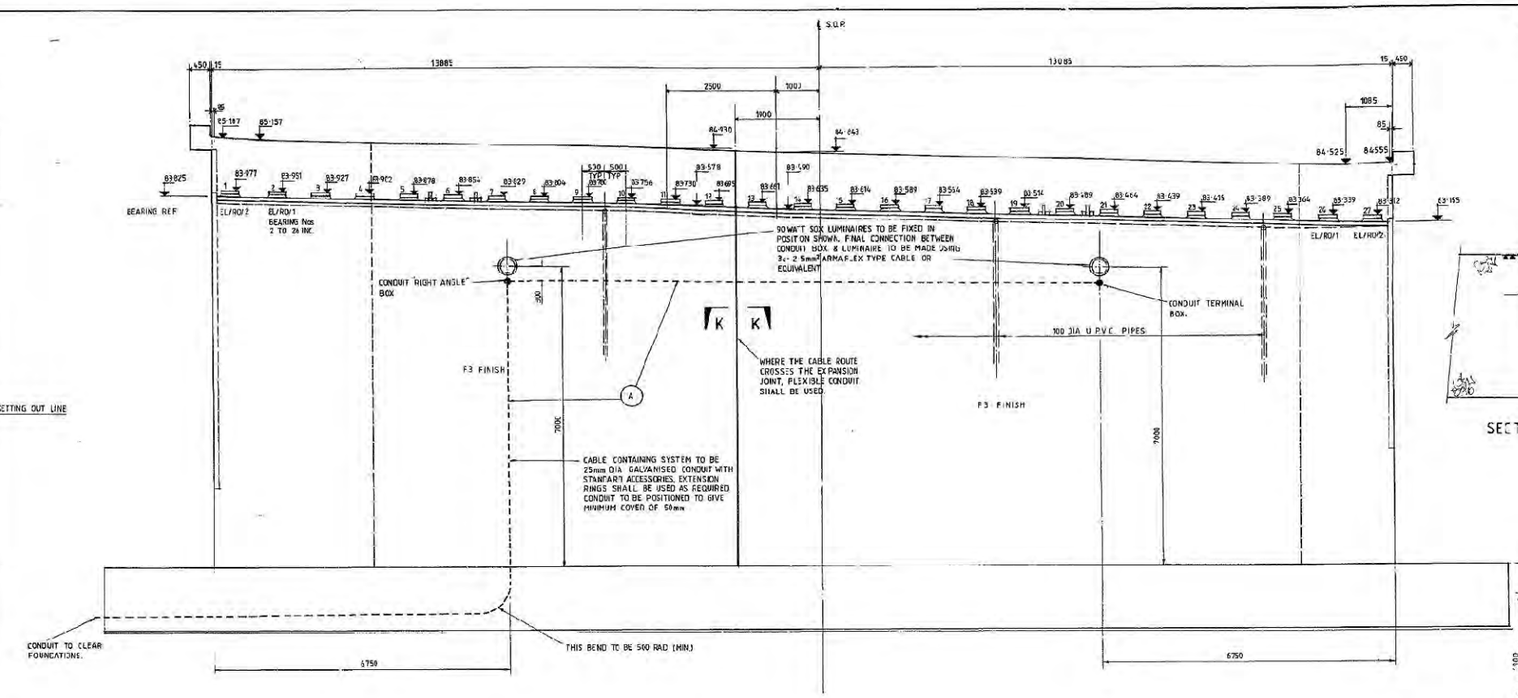
TITLE
EIGHTON LODGE ROUNDABOUT BRIDGE
PRECAST BEAMS

DRAWN	CHECKED	APPROVED	DATE
[redacted]			FEBRUARY 1986

SCALE 1:20, 1:10
MHA DRAWING No. 602/B/303
REV. AC

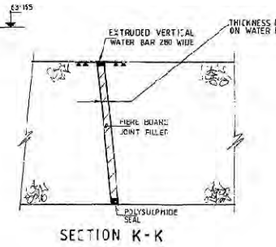


BASE PLAN

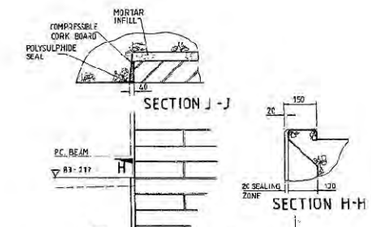


ELEVATION A-A

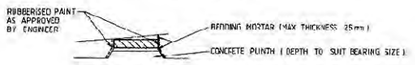
NOTES:-
(A) 2 COATS OF BITUMINOUS EMULSION WATERPROOFING APPLIED TO :-
1 ALL PIER AND ABUTMENT BEARING SHELVES.
2 ALL CURTAIN WALLS.
3 ALL STRUCTURAL CONCRETE BELOW GROUND LEVEL.



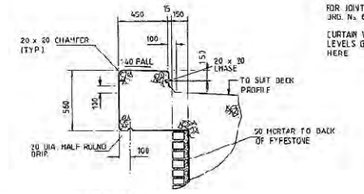
SECTION K-K



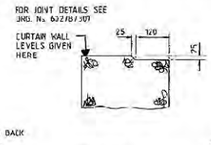
SECTION J-J



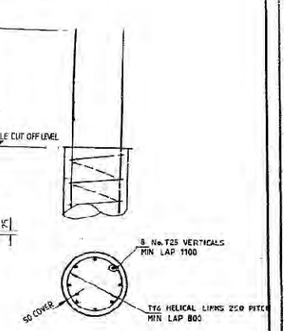
BEARING PLINTH



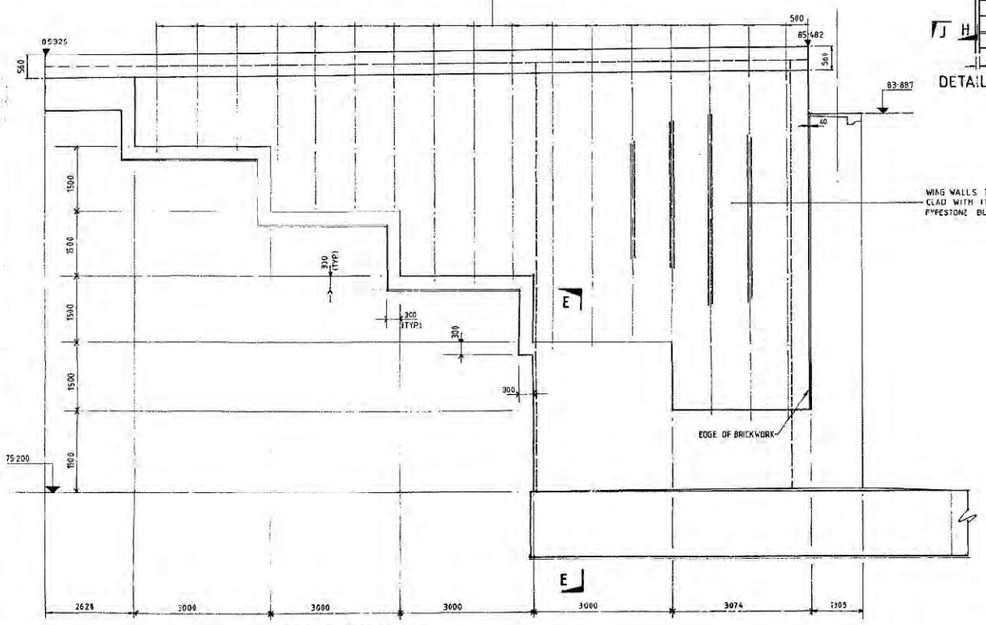
DETAIL 'A'



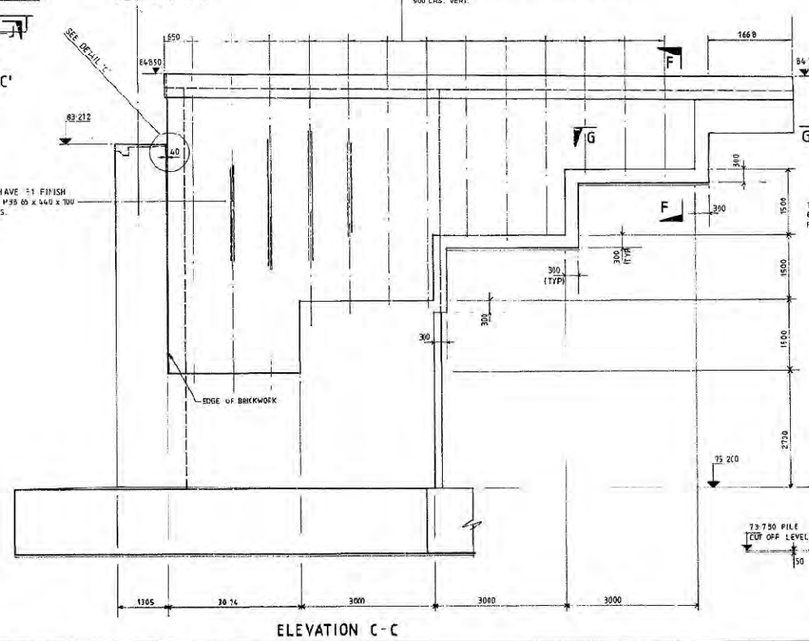
DETAIL 'B'



TYPICAL PILE REINFORCEMENT

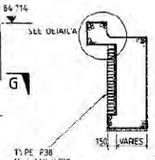


ELEVATION B-B

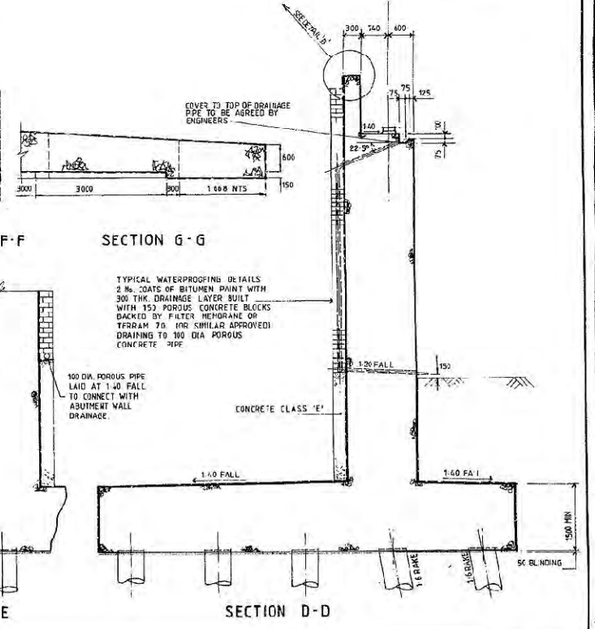


ELEVATION C-C

DETAIL 'C'



SECTION F-F



SECTION G-G

SECTION E-E

SECTION D-D

CONSULTING ENGINEERS
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Director of Transport — Northern Regional Office
Wellbar House, Gallowgate, Newcastle upon Tyne

REV.	DATE	AMENDMENT DETAILS	BY
A	2.9.86	AMENDMENT MARKED THUS (A)	
D	15.4.87	DIMENSIONAL DISCREPANCIES CORRECTED.	W.J.W.
AC	DEC 87	AS CONSTRUCTED.	

REV.	DATE	AMENDMENT DETAILS	BY

REFERENCE DRAWINGS

NOTES
1. WORKING LOAD OF PILES IS 100 TONNES
2. LENGTH OF PILE TO BE SOCKETED INTO SOUND ROCK (3 x DIAMETER)
3. PILE LENGTHS HAVE BEEN ESTIMATED TO VARY FROM 9 METRES TO 11.5 METRES.
4. BEARING SHELF LEVELS AT ℄ OF BEARINGS

CONCRETE SPECIFICATIONS

SUBSTRUCTURE		PILES	
GRADE	40	GRADE	30
CEMENT	SRC	CEMENT	SRC
NOMINAL MAX. SIZE OF AGGREGATE	20mm	NOMINAL MAX. SIZE OF AGGREGATE	20mm
MINIMUM CEMENT CONTENT	360 kg/m³	MINIMUM CEMENT CONTENT	390 kg/m³
MAX. WATER / CEMENT RATIO	0.45	MAX. WATER/CEMENT RATIO	0.45

NOTE:- IN ADDITION TO ABOVE SPEC. ABUTMENT STEM AND PARAPET EDGE BEAMS TO HAVE 5% AIR ENTRAINMENT.

A69 EIGHTON LODGE JUNCTION IMPROVEMENT

TITLE
EIGHTON LODGE
ROUNDABOUT BRIDGE
WEST ABUTMENT DETAILS

DRAWN	CHECKED	APPROVED	DATE	SCALE	MHA DRAWING No.	REV.
[redacted]			FEBRUARY 1986	1:100 & 1:50	602/B /304	AC

NOTES:-
① 2 COATS OF BITUMINOUS EMULSION WATERPROOFING APPLIED TO :
1. ALL PIER AND ABUTMENT BEARING SHELVES
2. ALL CURTAIN WALLS
3. ALL STRUCTURAL CONCRETE BELOW GROUND LEVEL

BASE PLAN
SCALE 1:100

TYPICAL PILE REINFORCEMENT

PILE DATA
90 No. 600 DIA BORED PILES.
WORKING LOAD CAPACITY
100 TONNES.

ELEVATION A-A
SCALE 1:50

SECTION J-J

SECTION G-G

SECTION H-H

DETAIL 'C'

SECTION F-F

BEARING PLINTH

DETAIL 'A'

DOWEL DETAIL

ELEVATION B-B
SCALE 1:50

ELEVATION C-C SCALE 1:50

SECTION E-E

SECTION D-D

REV.	DATE	AMENDMENT DETAILS	BY
A	4-8-86	DOWEL DETAIL AMENDED	
B	25-8-86	CABLE CONTAINING SYSTEM REMOVED	
C	15-4-87	DIMENSIONAL DISCREPANCIES CORRECTED	W.J.W.
AC	DEC 87	AS CONSTRUCTED	

REV.	DATE	AMENDMENT DETAILS	BY

REFERENCE DRAWINGS

NOTES
1. WORKING LOAD OF PILES IS 100 TONNES
2. LENGTH OF PILE TO BE SOCKETED INTO SOUND ROCK = 3 x DIAMETER.
3. PILE LENGTHS HAVE BEEN ESTIMATED TO VARY FROM 9 METRES TO 11.5 METRES.
4. BEARING SHELF LEVELS AT ℄ OF BEARINGS

CONCRETE SPECIFICATIONS

SUBSTRUCTURE		PILES	
GRADE	40	GRADE	30
CEMENT	SRC	CEMENT	SRC
NOMINAL MAX SIZE OF AGGREGATE	20mm	NOMINAL MAX SIZE OF AGGREGATE	20mm
MINIMUM CEMENT CONTENT	360 Kg/m³	MINIMUM CEMENT CONTENT	390 Kg/m³
MAX. WATER / CEMENT RATIO	0.45	MAX. WATER / CEMENT RATIO	0.45

NOTE - IN ADDITION TO ABOVE SPEC. ABUTMENT STEM AND PARAPET EDGE BEAMS TO HAVE 5% AIR ENTRAINMENT.

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DEPARTMENT OF TRANSPORT
NORTHERN REGION
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Director of Transport — Northern Regional Office
Walker House, Gallowgate, Newcastle upon Tyne

A69 EIGHTON LODGE JUNCTION IMPROVEMENT

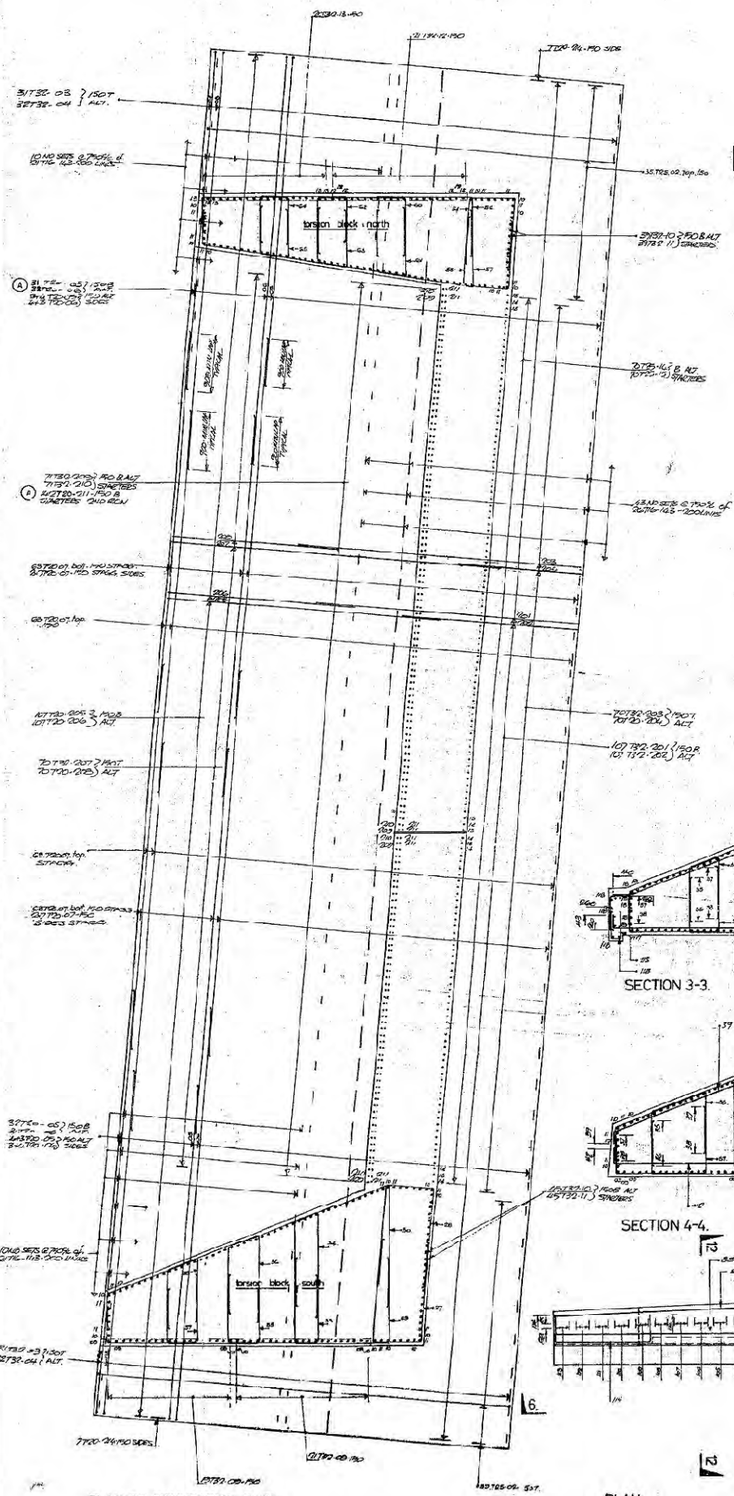
TITLE
EIGHTON LODGE
ROUNDABOUT BRIDGE
EAST ABUTMENT DETAILS

[redacted] DATE FEBRUARY 1986

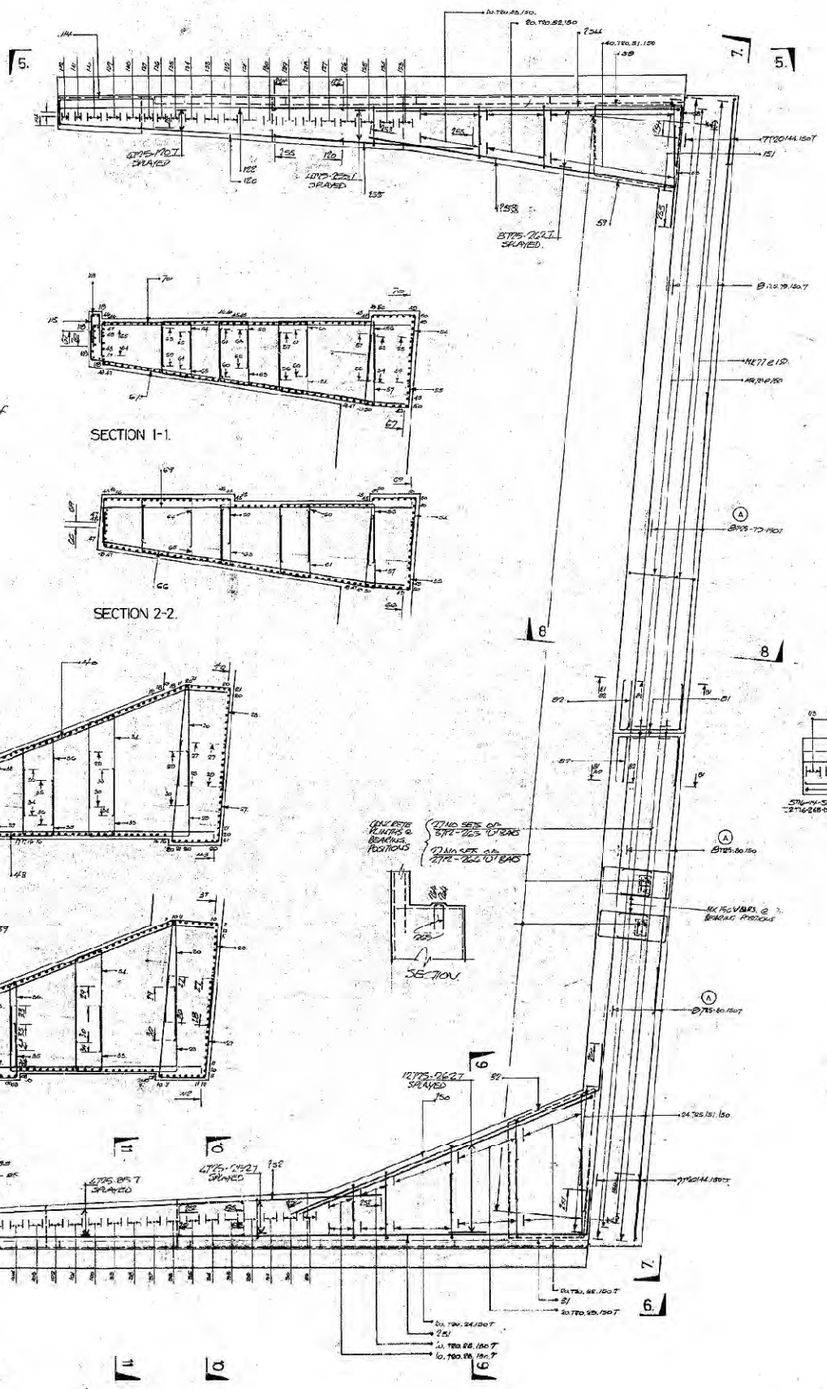
SCALE 1:50 1:100

NHA DRAWING No. 602/B/305

REV. AC



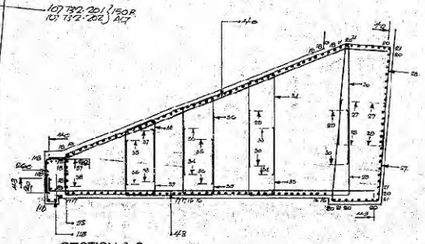
PLAN OF FOUNDATION BASE
WEST ABUTMENT



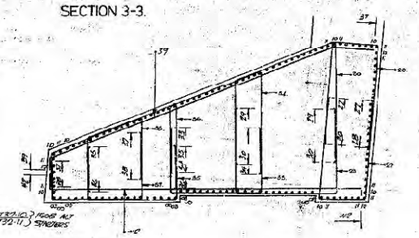
PLAN

SECTION 1-1.

SECTION 2-2.

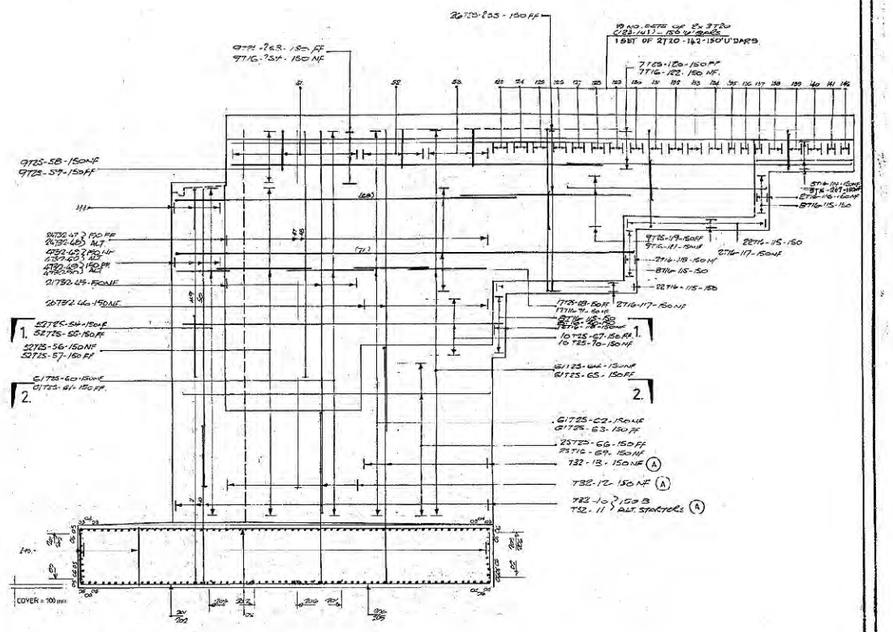


SECTION 3-3.

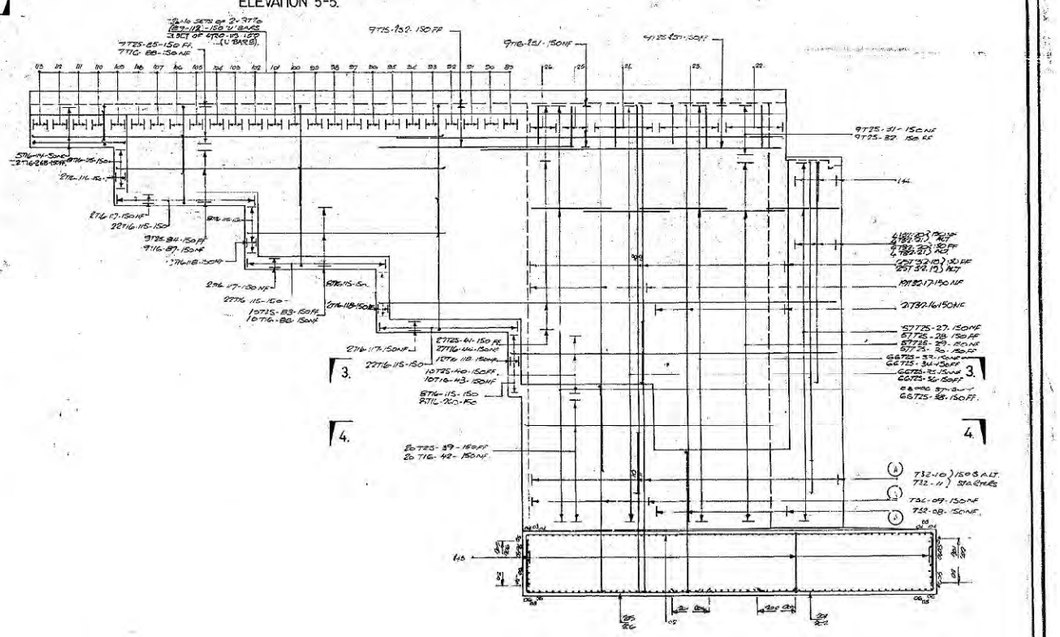


SECTION 4-4.

SECTION



ELEVATION 5-5.



ELEVATION 6-6.

CONSULTING ENGINEERS	DEPARTMENT OF TRANSPORT
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Pearl Assurance House, New Bridge Street Newcastle upon Tyne NE1 8BH. Tel 0632 [illegible]	F.B. Whitehead B.Sc., C.Eng., M.I.C.E. Director of Transport – Northern Regional Office Walther House, Gallowgate, Newcastle upon Tyne

REV.	DATE	AMENDMENT DETAILS	BY
A		MINOR AMENDMENTS MARKED THUS (A)	
AC	DEC 87	AS CONSTRUCTED	

REV.	DATE	AMENDMENT DETAILS	BY

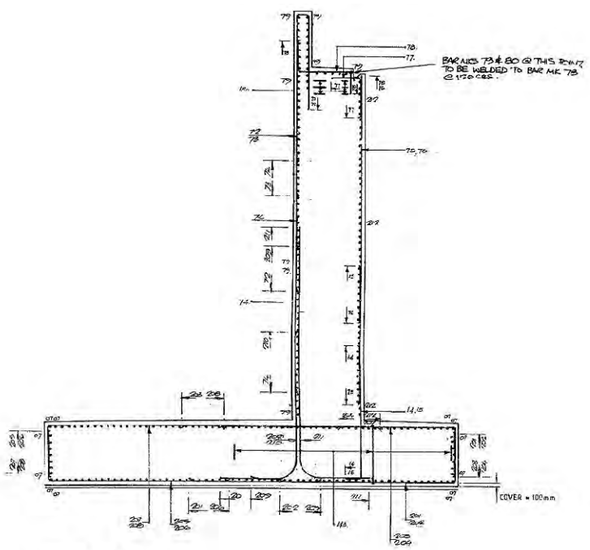
REFERENCE DRAWINGS

NOTES
1. for sections 7-7 8-8 9-9 10-10 11-11 12-12, see drawing no. 602/B/307
2. for general arrangement see drawing no. 602/B/304
3. refer to bending schedules nos. 602/306 sheets 01-09 incl.
4. cover to reinforcement to be 50mm unless stated otherwise.

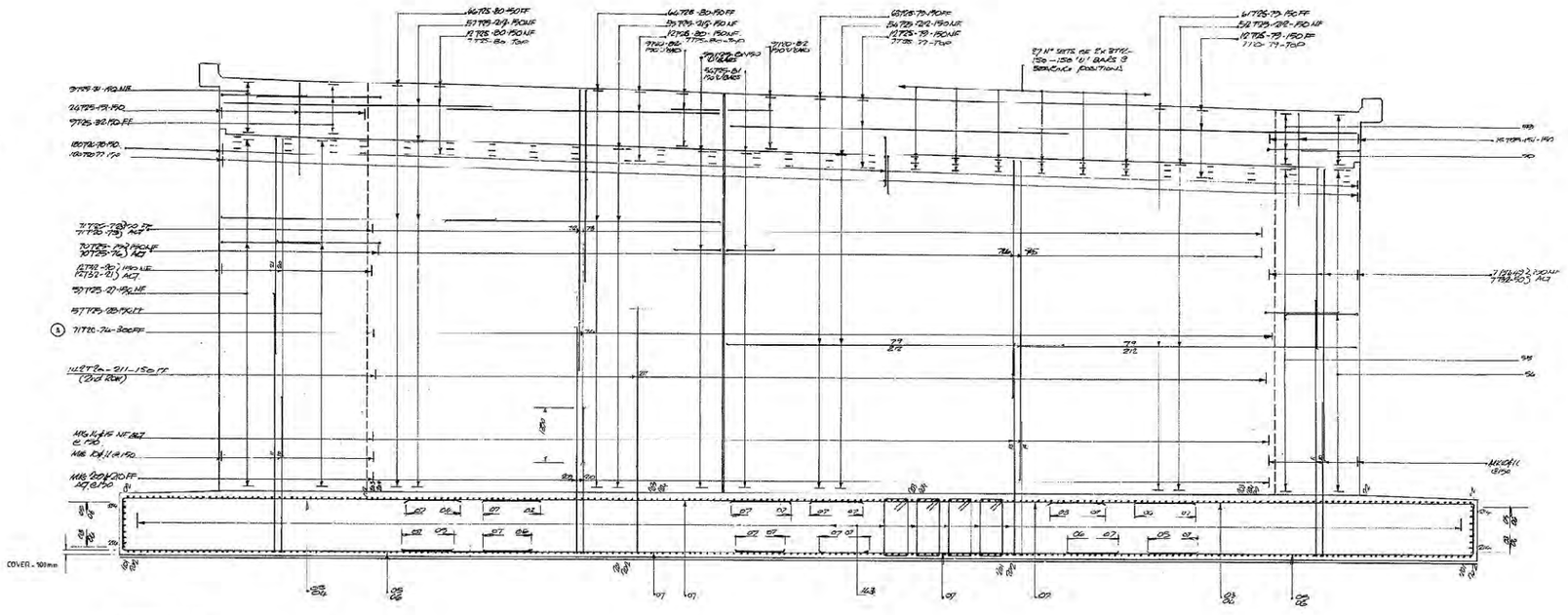
A69 EIGHTON LODGE JUNCTION IMPROVEMENT

TITLE
EIGHTON LODGE ROUNDABOUT BRIDGE
WEST ABUTMENT
REINFORCEMENT DETAILS SHEET 1

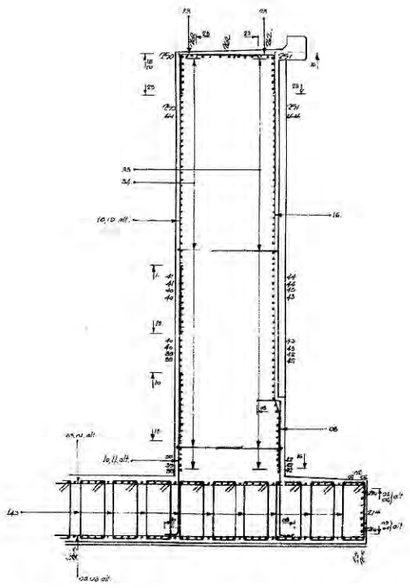
DRAWN	CHECKED	APPROVED	DATE	SCALE	MHA DRAWING No.	REV.
			FEBRUARY 1986	1:50	602/B/306	AC



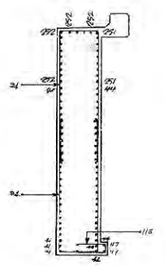
SECTION 8-8



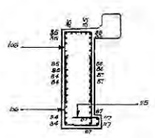
SECTION 7-7



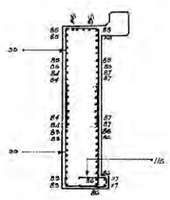
SECTION 9-9



SECTION 10-10

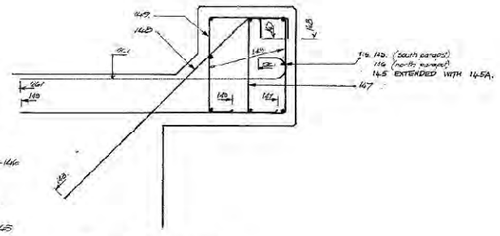


SECTION 12-12



SECTION 11-11

PILE REINFORCEMENT



CONSULTING ENGINEERS
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Newcastle upon Tyne NE1 8BH. Tel.0632 [illegible]

DEPARTMENT OF TRANSPORT
NORTHERN REGION
F.B.Whitehead B.Sc.,C.Eng., M.I.C.E.
Director of Transport – Northern Regional Office
Walker House, Saltwergate, Newcastle upon Tyne

REV.	DATE	AMENDMENT DETAILS	BY
A		MINOR AMENDMENT MARKED THUS (A)	
AC	DEC 87	AS CONSTRUCTED	

REV.	DATE	AMENDMENT DETAILS	BY

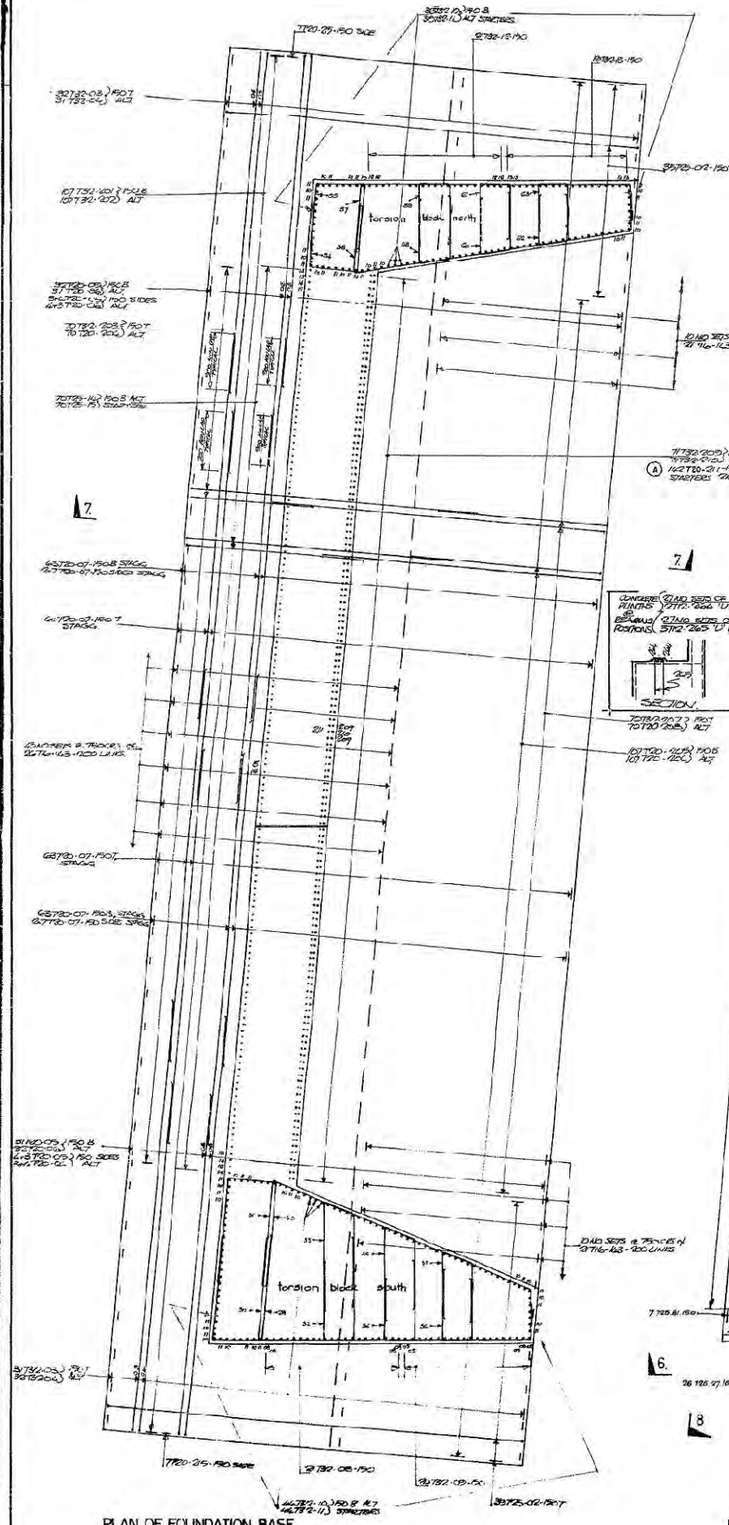
REFERENCE DRAWINGS

NOTES
1. for location of sections 7-7, 8-8, 9-9, 10-10, 11-11, 12-12, see drawing no 602/B/306
2. for general arrangement see drawing no 602/B/304
3. refer to bending schedules nos. 602/306 sheets 01-09 incl.
4. cover to reinforcement to be 50 mm except where noted otherwise

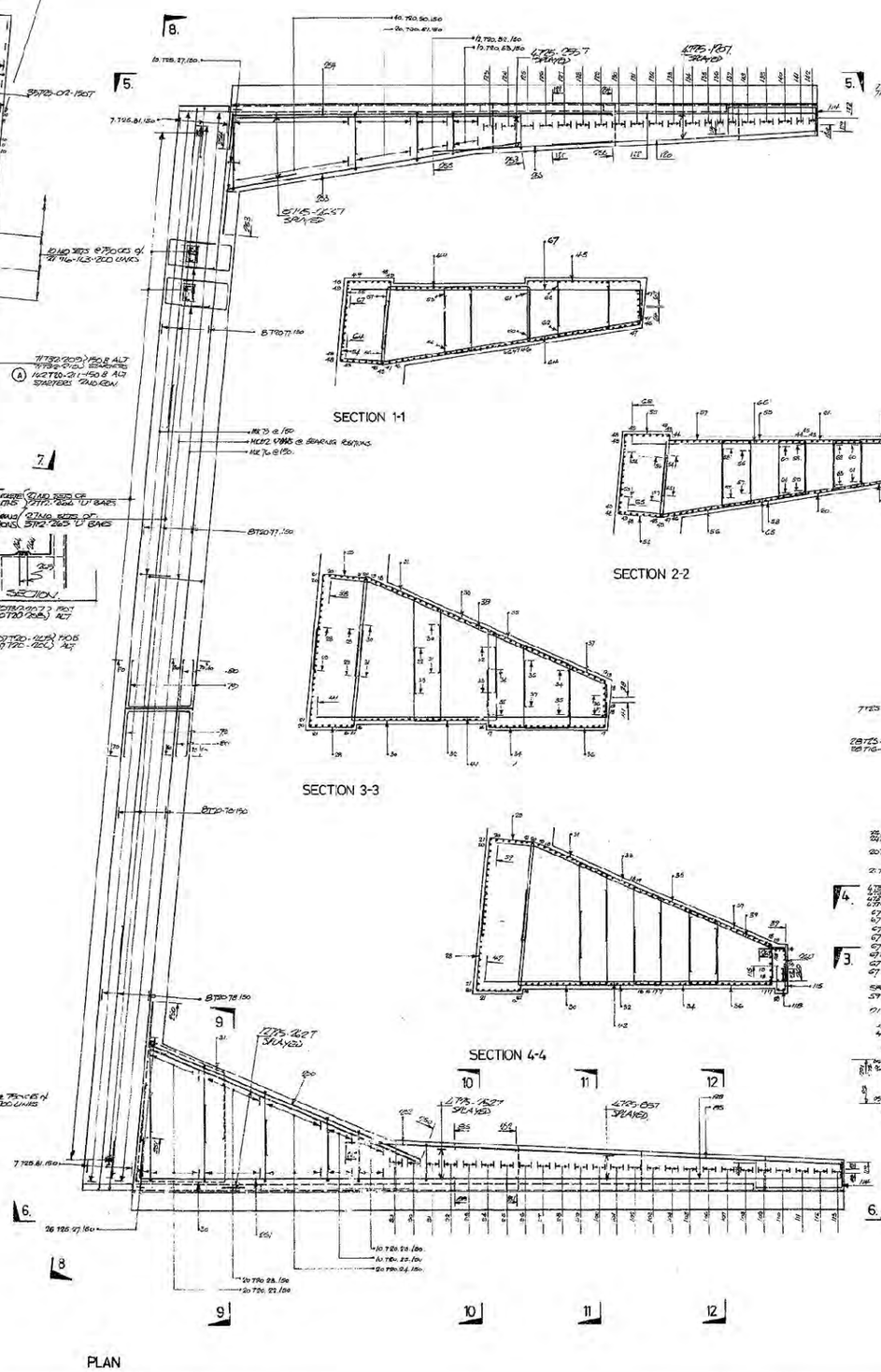
A69 EIGHTON LODGE JUNCTION IMPROVEMENT

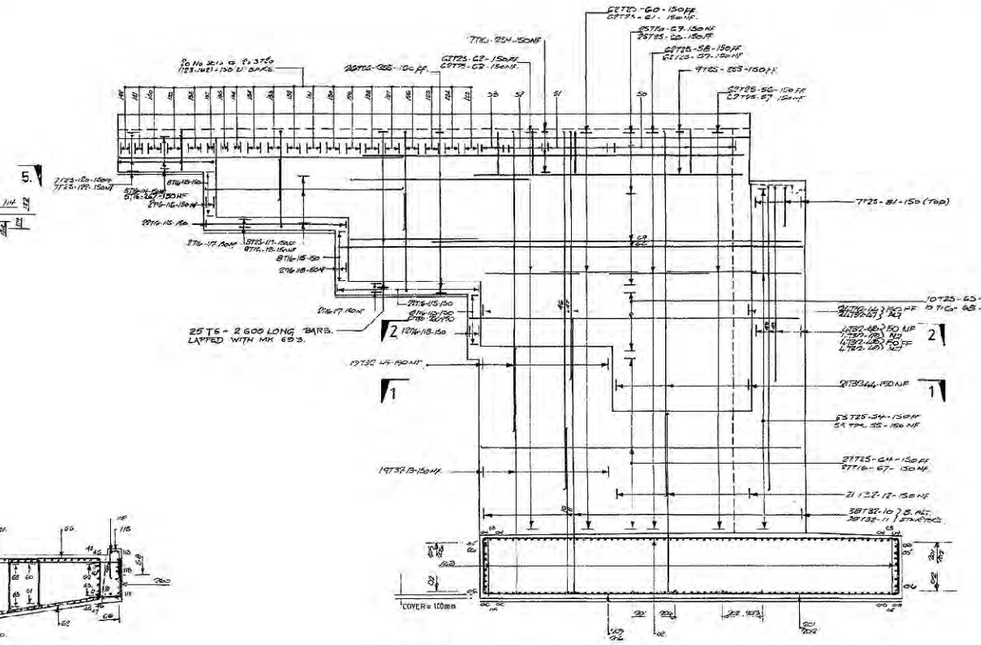
TITLE
EIGHTON LODGE ROUNDABOUT BRIDGE
WEST ABUTMENT
REINFORCEMENT DETAILS SHEET 2

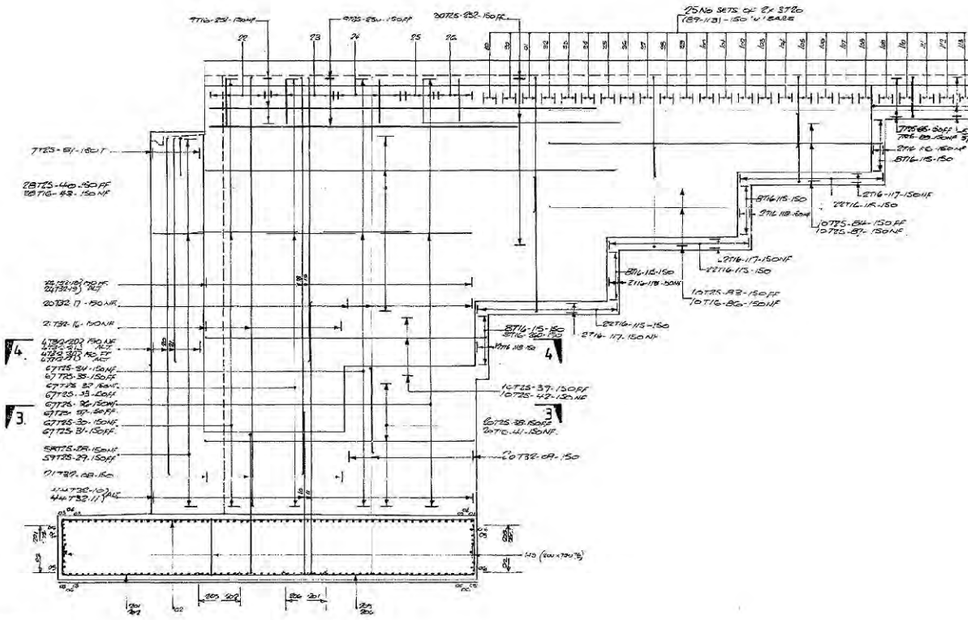
DRAWN	CHECKED	APPROVED	DATE	SCALE	MHA DRAWING No.	REV.
			FEBRUARY 1986	1:50	602 / B / 307	AC



PLAN OF FOUNDATION BASE
EAST ABUTMENT







CONSULTING ENGINEERS	DEPARTMENT OF TRANSPORT
MOTT HAY & ANDERSON	**NORTHERN REGION**
Pearl Assurance House, New Bridge Street Newcastle upon Tyne NE1 8BH. Tel. 0632	F.B.Whitehead B.Sc.,C.Eng.,M.I.C.E. Director of Transport — Northern Regional Office Walker House, Mosley Street, Newcastle upon Tyne

REV.	DATE	AMENDMENT DETAILS	BY
A		MINOR AMENDMENT MARKED THUS (A)	
AC	DEC 87	AS CONSTRUCTED	

REV.	DATE	AMENDMENT DETAILS	BY

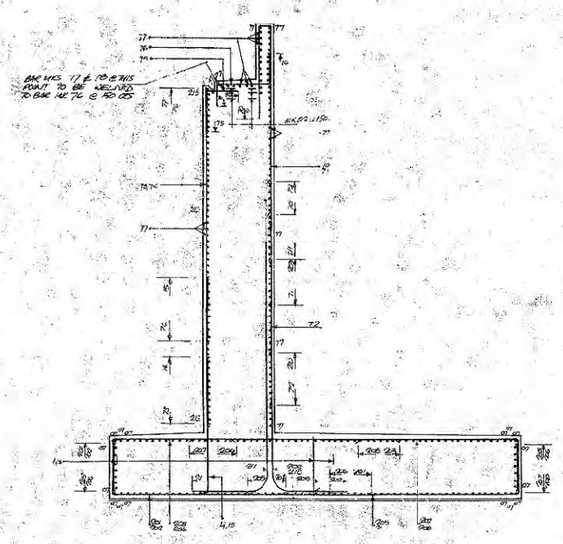
REFERENCE DRAWINGS

NOTES
1. FOR SECTIONS 7-7, 8-8, 9-9, 10-10, 11-11, 12-12 SEE DRG No. 602/B/309
2. FOR GENERAL ARRANGEMENT SEE DRAWING No. 602/B/305
3. REFER TO BENDING SCHEDULE Nos. 602/308 SHEETS 01-06 INCL.
4. COVER TO REINFORCEMENT TO BE 50mm UNLESS STATED OTHERWISE

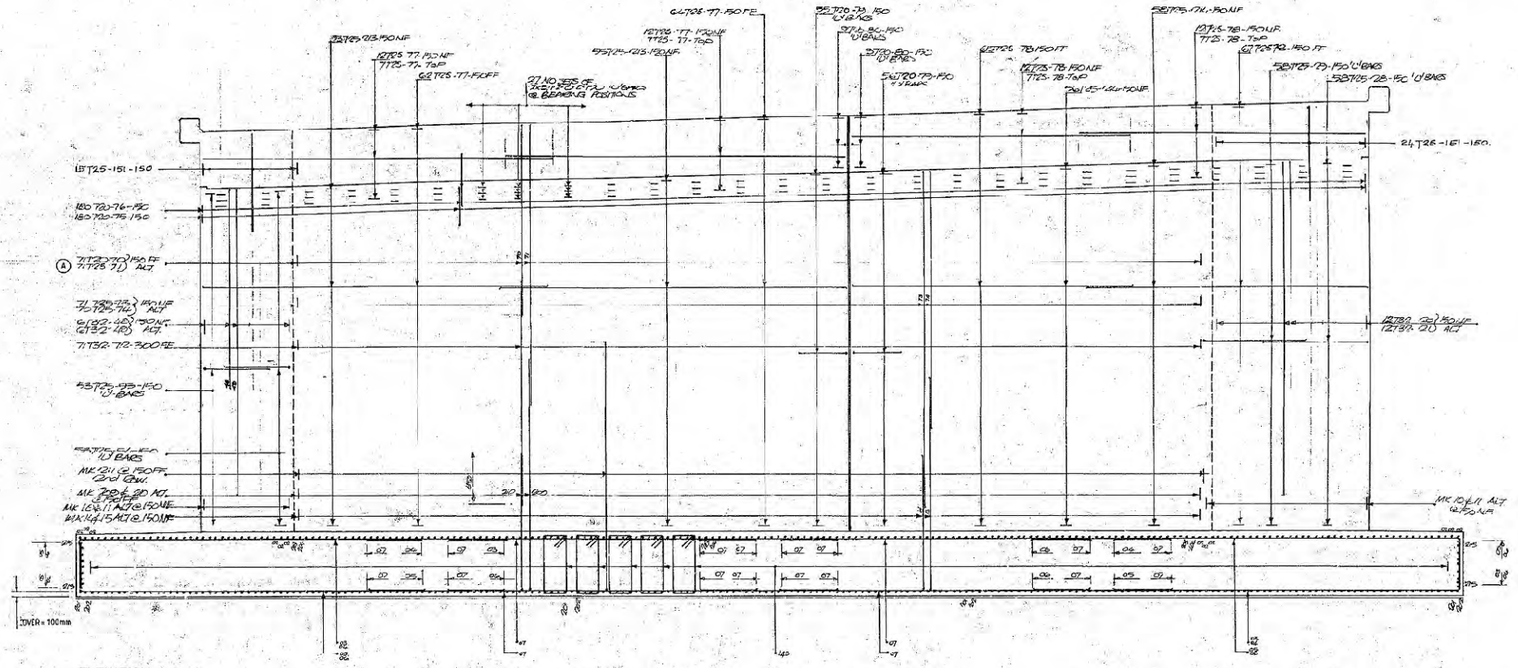
A69 EIGHTON LODGE JUNCTION IMPROVEMENT

TITLE: EIGHTON LODGE ROUNDABOUT BRIDGE
EAST ABUTMENT
REINFORCEMENT DETAILS SHEET 1

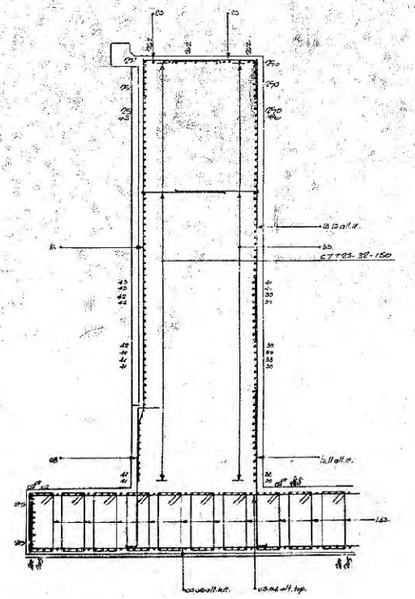
DRAWN	CHECKED	APPROVED	DATE	SCALE	NRA DRAWING No.	REV
[redacted]			FEBRUARY 1986	1:50	602/B/308	AC



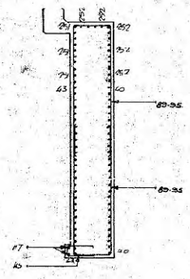
SECTION 7-7



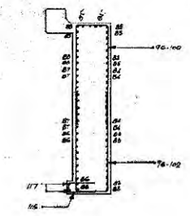
ELEVATION 8-8.



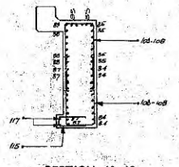
SECTION 9-9



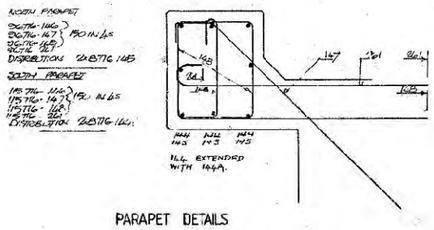
SECTION 10-10



SECTION 11-11



SECTION 12-12



PARAPET DETAILS

CONSULTING ENGINEERS
MOTT HAY & ANDERSON
Pearl Assurance House, New Bridge Street
Newcastle upon Tyne NE1 8BH. Tel.0632 29001

DEPARTMENT OF TRANSPORT
NORTHERN REGION
F.B.Whitehead B.Sc.,C.Eng.,M.I.C.E.
Director of Transport — Northern Regional Office
Walker House, Gallowgate, Newcastle upon Tyne

REV.	DATE	AMENDMENT DETAILS	BY
A		MINOR AMENDMENT MARKED THUS (A)	
AC	DEC 87	AS CONSTRUCTED	

REV.	DATE	AMENDMENT DETAILS	BY

REFERENCE DRAWINGS

NOTES
1. FOR LOCATION OF SECTIONS 7-7, 8-8, 9-9, 10-10, 11-11, 12-12 SEE DRG No. 602/B/306
2. FOR GENERAL ARRANGEMENT SEE DRAWING No. 602/B/305
3. REFER TO BENDING SCHEDULE Nos. 602/308 SHEETS 91-DP/NCL
4. COVER TO REINFORCEMENT TO BE 50mm EXCEPT WHERE NOTED OTHERWISE

A69 EIGHTON LODGE
JUNCTION IMPROVEMENT

TITLE
EIGHTON LODGE ROUNDABOUT BRIDGE
EAST ABUTMENT
REINFORCEMENT DETAILS SHEET 2

DRAWN	CHECKED	APPROVED	DATE
[redacted]			FEBRUARY 1986

SCALE	MH4 DRAWING No.	REV.
1:50	602/B/309	AC

highways england

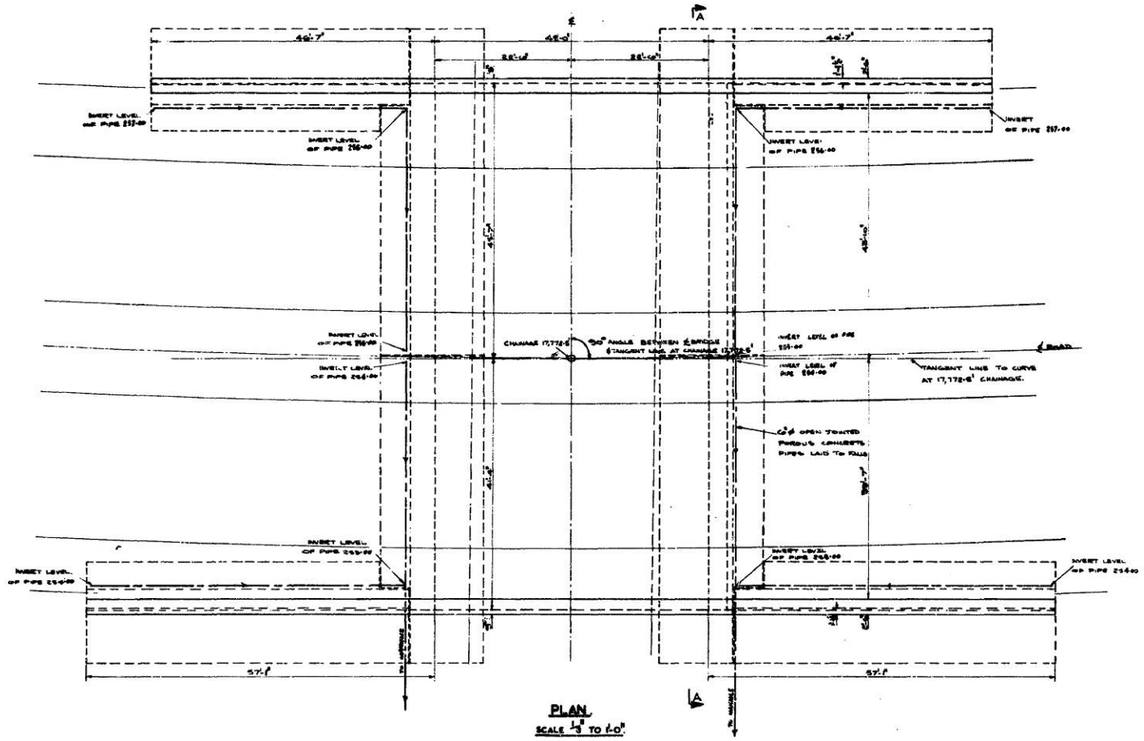
APPENDIX B-3

EIGHTON LODGE SOUTH BRIDGE

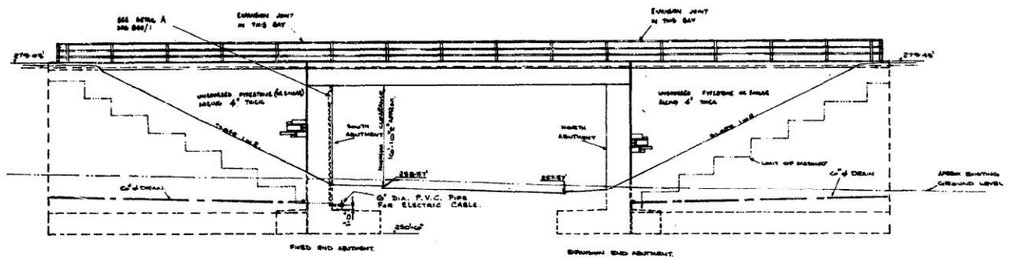
MINISTRY OF TRANSPORT

DURHAM COUNTY COUNCIL

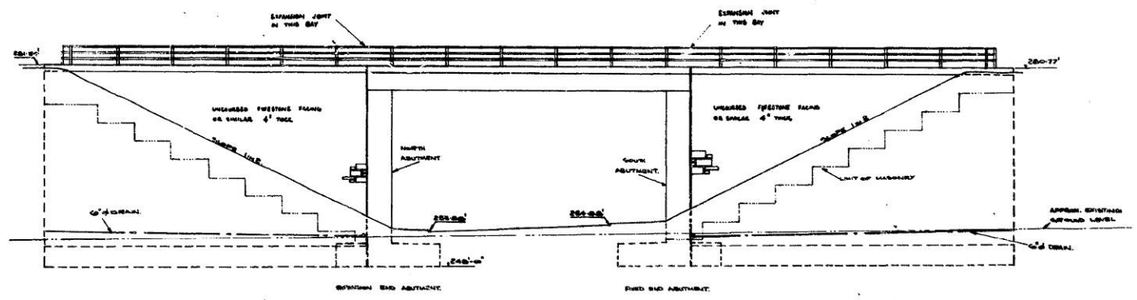
LONDON - EDINBURGH - THURSO TRUNK ROAD A1 - EIGHTON LODGE



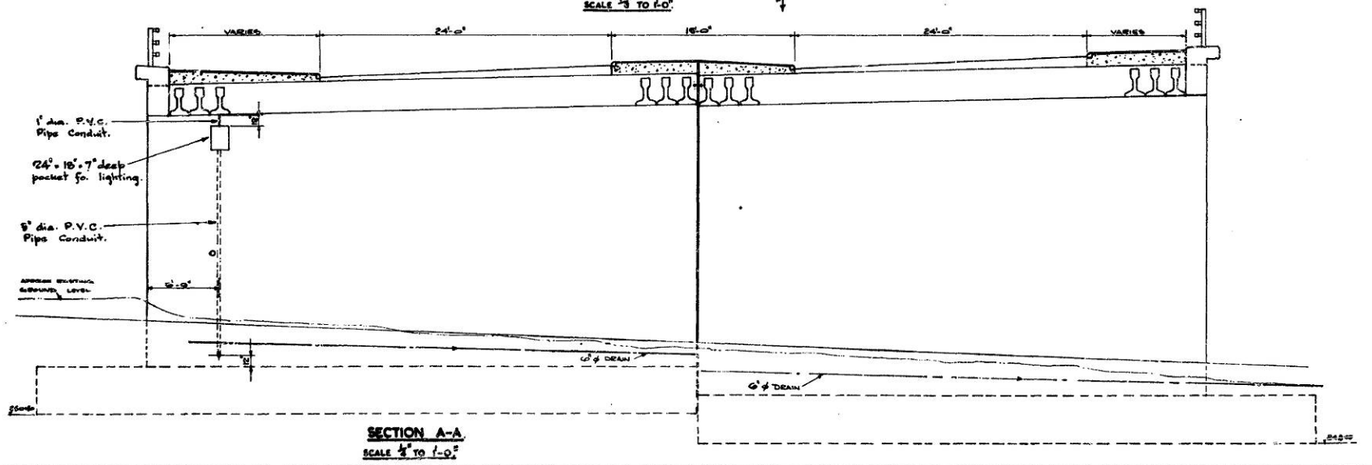
PLAN.
SCALE 1/8" TO 1'-0"



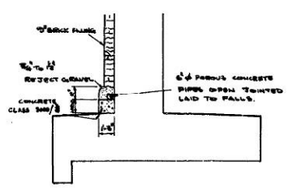
EAST ELEVATION.
SCALE 1/8" TO 1'-0"



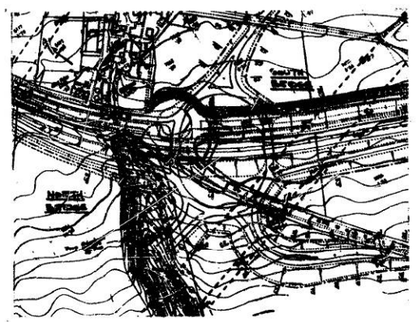
WEST ELEVATION.
SCALE 1/8" TO 1'-0"



SECTION A-A.
SCALE 1/8" TO 1'-0"



TYPICAL SECTION SHOWING DRAINAGE DETAILS
SCALE 1/4" TO 1'-0"



KEY PLAN
SCALE 1/1800

AMENDMENTS
1. DETAIL FOR LIGHTING BOOT ADDED. 15-12-1969
2. DRAINAGE LAYOUT AMENDED. 15-12-1969

EIGHTON LODGE ROUNDABOUT - SOUTH BRIDGE.

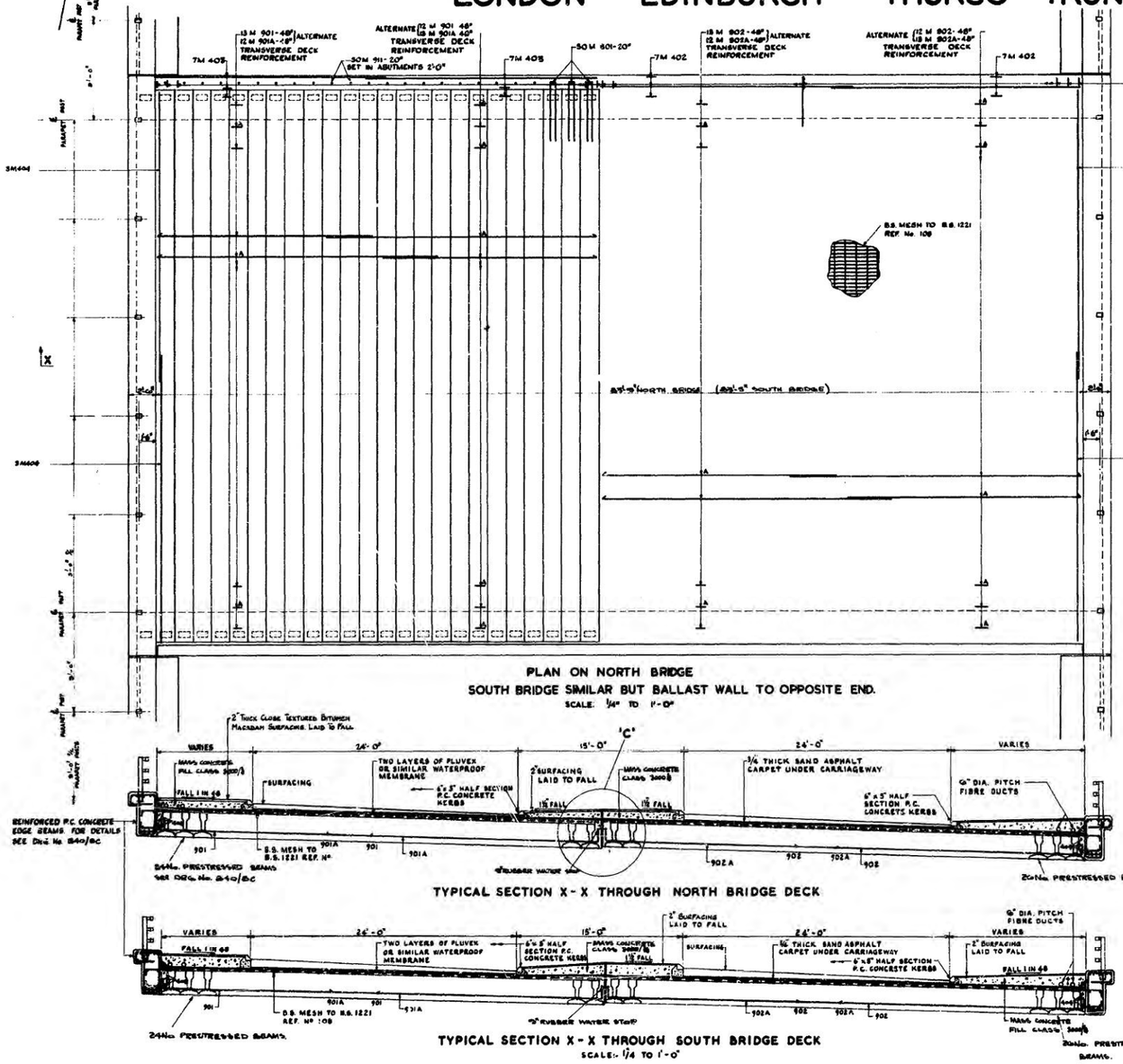
DRAWING NUMBER
840/2A

W.H.B. COTTON M.I.C.E.,
COUNTY ENGINEER & SURVEYOR,
COUNTY HALL,
DURHAM.

MINISTRY OF TRANSPORT

Agents:- DURHAM COUNTY COUNCIL

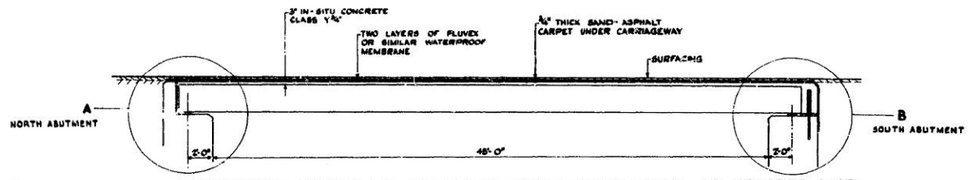
LONDON – EDINBURGH – THURSO TRUNK ROAD A1 — EIGHTON LODGE



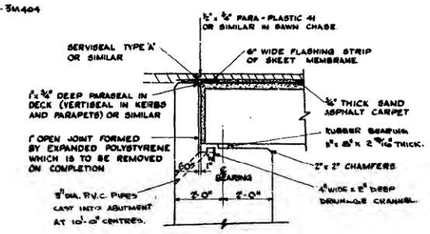
PLAN ON NORTH BRIDGE
SOUTH BRIDGE SIMILAR BUT BALLAST WALL TO OPPOSITE END.
SCALE: 1/16" TO 1'-0"

TYPICAL SECTION X-X THROUGH NORTH BRIDGE DECK

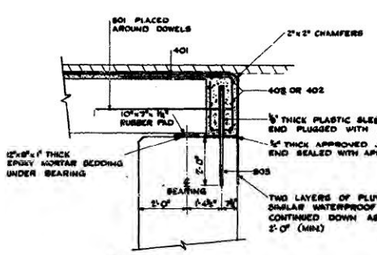
TYPICAL SECTION X-X THROUGH SOUTH BRIDGE DECK
SCALE:- 1/4 TO 1'-0"



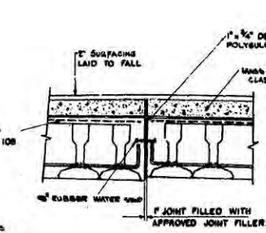
LONGITUDINAL SECTION L-L FOR NORTH BRIDGE—SOUTH BRIDGE TO OPPOSITE HAND.
SCALE: 1/16" TO 1'-0"



DETAIL 'A'
SCALE: 1/2" TO 1'-0"



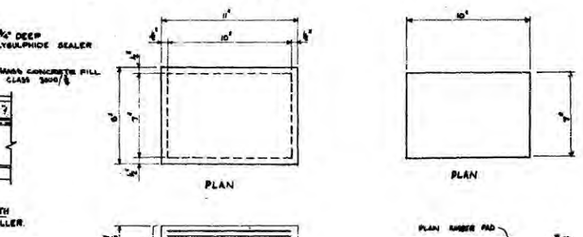
DETAIL 'B'
SCALE: 1/2" TO 1'-0"



DETAIL 'C'
SCALE: 1/2" TO 1'-0"

DESIGN REQUIREMENTS OF RUBBER BEARINGS

	EXPANSION BEARING	FIXED BEARING
DEAD LOAD	0 TONS	0 TONS
DEAD LOAD + LIVE LOAD	24 TONS	24 TONS
ACCEPTABLE VERTICAL DEFLECTION UNDER:- (1) LIVE LOAD	0·050 INS	0·02 INS
(2) LIVE LOAD + DEAD LOAD	0·16 INS	0·035 INS
LONGITUDINAL MOVEMENT REQUIRED	0·99 INS	NIL



SHORE HARDNESS OF RUBBER 50°
104 NO. REQUIRED THUS AT EXPANSION ENDS
SHORE HARDNESS OF RUBBER 70°
104 NO. REQUIRED THUS AT FIXED ENDS

DETAILS OF RUBBER BEARINGS
SCALE 3" TO 1'-0"

AMENDMENTS
1. Details of Rubber Bearings Added. 15-12-1969
2. Reinforcement in Concrete Edge Beams Amended. 23-7-70

EIGHTON LODGE ROUNDABOUT — NORTH & SOUTH BRIDGES —— DECK DETAILS

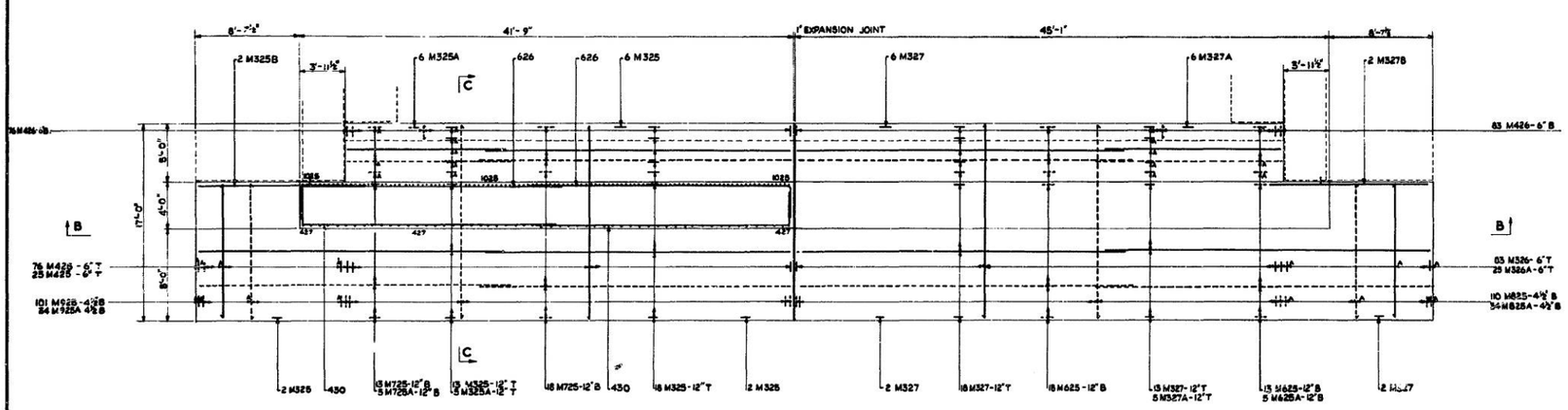
DRAWING NUMBER
840/38

W. H. B. COTTON M.I.C.E.
COUNTY ENGINEER & SURVEYOR
COUNTY HALL
DURHAM

MINISTRY OF TRANSPORT

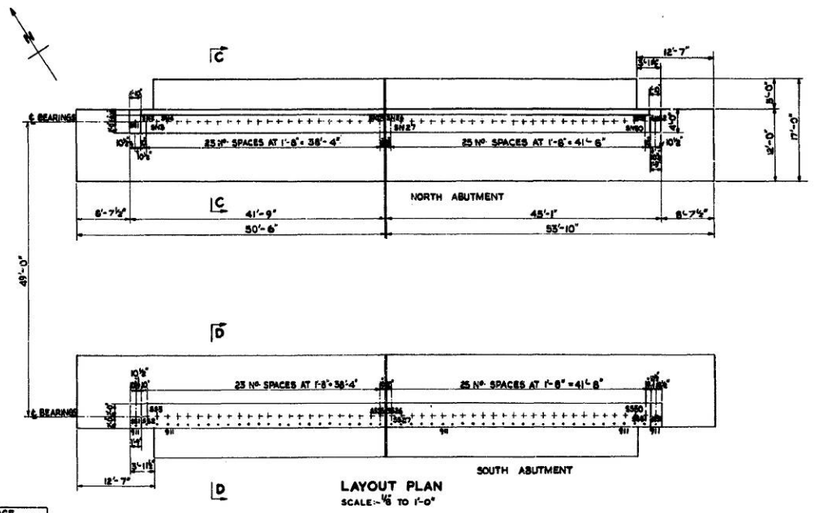
Agents:- DURHAM COUNTY COUNCIL

LONDON - EDINBURGH - THURSO TRUNK ROAD A1 - EIGHTON LODGE



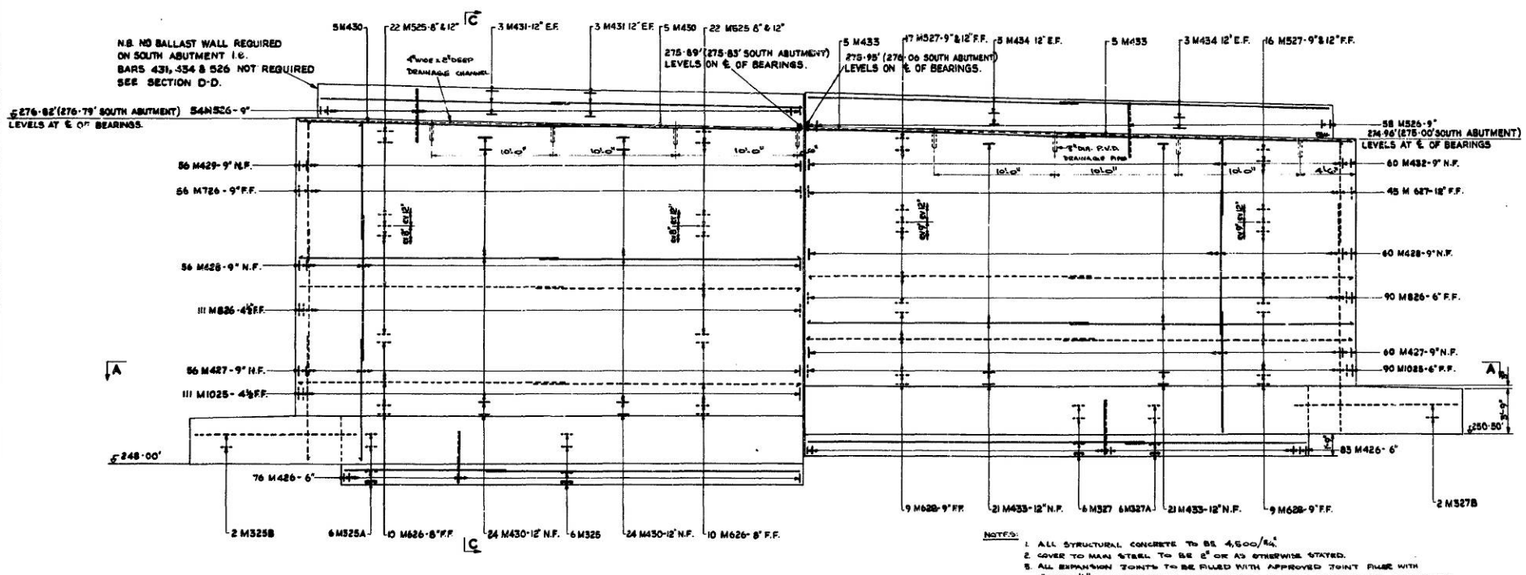
SECTIONAL PLAN A-A NORTH ABUTMENT

(REINFORCEMENT IN SOUTH ABUTMENT SIMILAR BUT LAYOUT AS PER LAYOUT PLAN)



LAYOUT PLAN

SCALE:- 1/16 TO 1'-0"



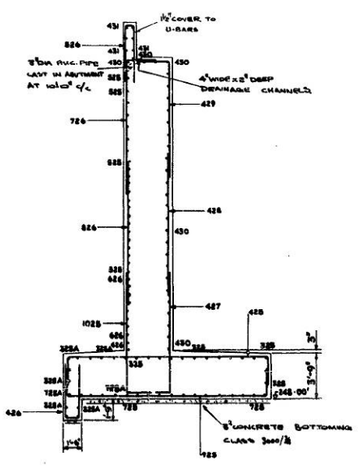
SECTIONAL ELEVATION B-B

(REINFORCEMENT IN SOUTH ABUTMENT SIMILAR BUT NO BALLAST WALL)

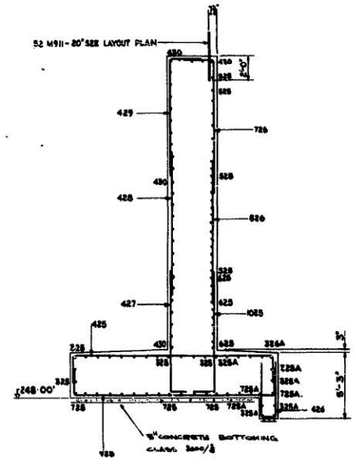
NOTES:

1. ALL STRUCTURAL CONCRETE TO BE 4,600/¾"
2. COVER TO MAIN STEEL TO BE 2" OR AS OTHERWISE STATED.
3. ALL EXPANSION JOINTS TO BE FILLED WITH APPROVED JOINT FILLER WITH INSIDE ½" DEEP APPROVED POLYSULPHIDE SEALER BETWEEN ALL HORIZONTAL AND VERTICAL FACES EXPOSED SEALER TO BE OF APPROVED LIGHT COLOUR.
4. BACK OF ABUTMENTS TO BE FILLED WITH SELECTED RUBBLE.
5. BACK OF ABUTMENTS TO BE PAINTED WITH TWO COATS OF APPROVED BITUMASTIC PAINT.
6. ALL CONSTRUCTION JOINTS TO BE PROVIDED WITH 4" WIDE P.V.C. WATERSTOP.

SOUTH BRIDGE			
NORTH ABUTMENT BEARING PAD Nº & N.	BEARING LEVEL AT CENTRE	SOUTH ABUTMENT BEARING PAD Nº & S.	BEARING LEVEL AT CENTRE
SN1	277·12	SS1	276·91
2	277·10	2	276·89
3	277·06	3	276·85
4	277·02	4	276·81
5	276·98	5	276·77
6	276·94	6	276·73
7	276·90	7	276·69
8	276·86	8	276·65
9	276·82	9	276·61
10	276·78	10	276·57
11	276·74	11	276·53
12	276·70	12	276·49
13	276·66	13	276·45
14	276·62	14	276·41
15	276·58	15	276·37
16	276·54	16	276·33
17	276·50	17	276·29
18	276·46	18	276·25
19	276·42	19	276·21
20	276·38	20	276·17
21	276·34	21	276·13
22	276·30	22	276·09
23	276·26	23	276·06
24	276·22	24	276·01
25	276·18	25	275·97
26	276·30	26	276·16
27	276·26	27	276·12
28	276·22	28	276·08
29	276·18	29	276·04
30	276·14	30	276·00
31	276·09	31	275·95
32	276·06	32	275·91
33	276·01	33	275·87
34	275·97	34	275·83
35	275·93	35	275·79
36	275·89	36	275·75
37	275·85	37	275·71
38	275·81	38	275·67
39	275·77	39	275·63
40	275·73	40	275·59
41	275·68	41	275·54
42	275·64	42	275·50
43	275·60	43	275·46
44	275·56	44	275·42
45	275·52	45	275·38
46	275·48	46	275·34
47	275·44	47	275·30
48	275·40	48	275·26
49	275·36	49	275·22
50	275·32	50	275·18
51	275·28	51	275·14
52	275·24	52	275·10



TYPICAL SECTION C-C NORTH ABUTMENT



TYPICAL SECTION D-D SOUTH ABUTMENT

AMENDMENTS

EIGHTON LODGE ROUNDABOUT — SOUTH BRIDGE - ABUTMENTS

DRAWING NUMBER

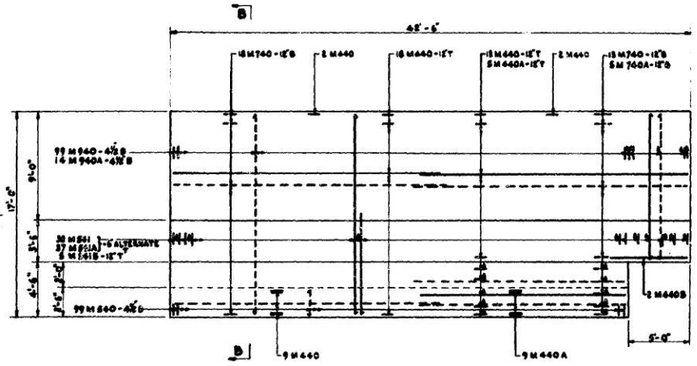
840/5

W. H. B. COTTON M.I.C.E.
COUNTY ENGINEER & SURVEYOR
COUNTY HALL
DURHAM

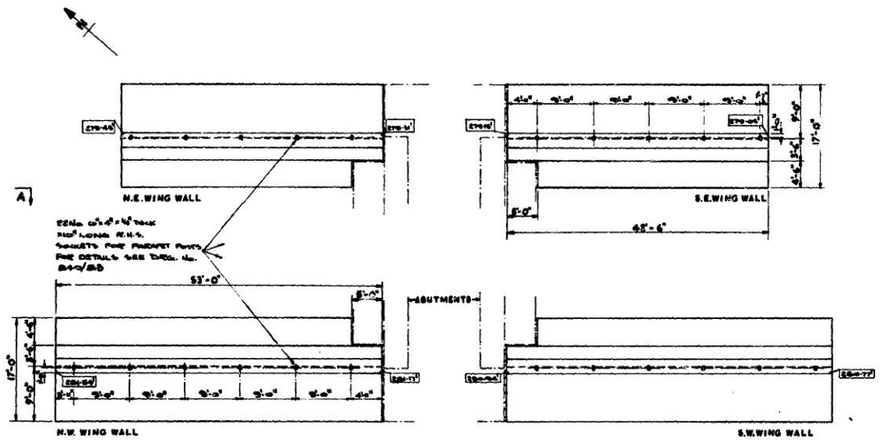
MINISTRY OF TRANSPORT

Agents:- DURHAM COUNTY COUNCIL

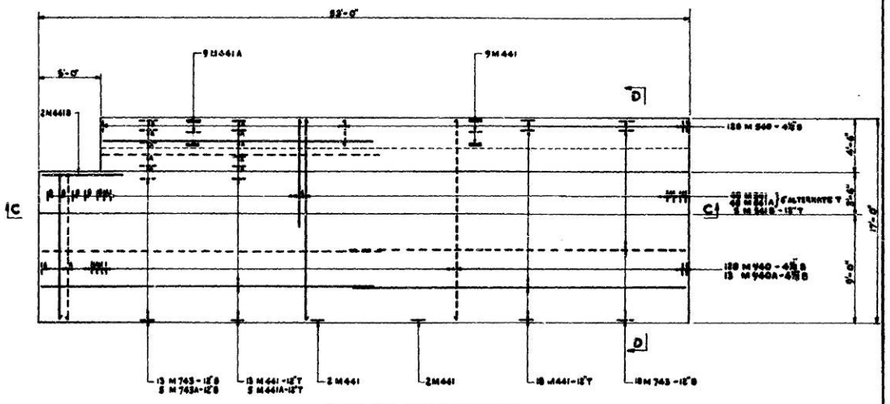
LONDON – EDINBURGH – THURSO TRUNK ROAD A1 – EIGHTON LODGE



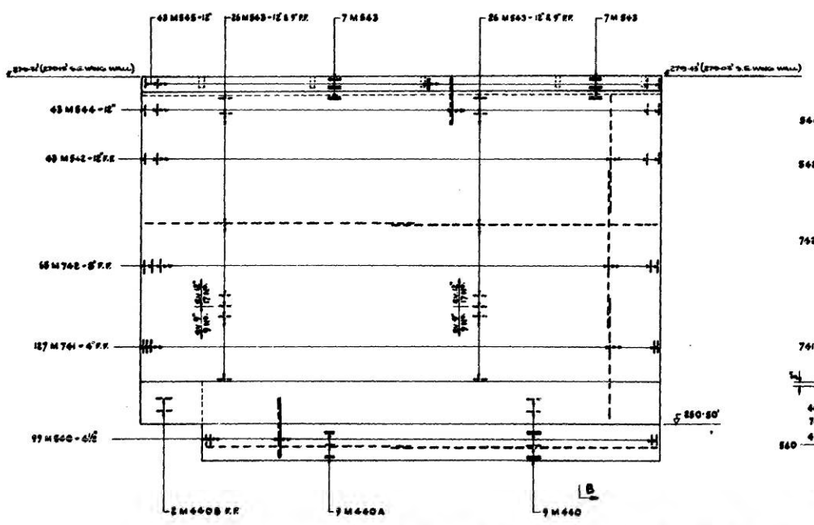
PLAN ON N.E. WING WALL
(S.E. WING WALL SIMILAR BUT TO OPPOSITE HAND)
SCALE:- 1/4 TO 1'-0"



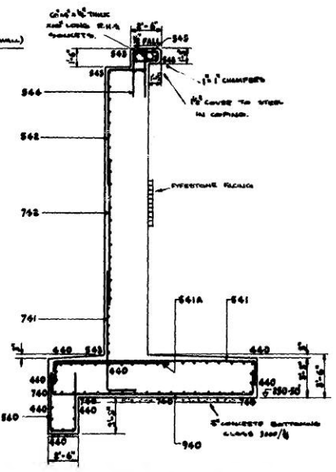
LAYOUT PLAN SOUTH BRIDGE
SCALE:- 1/8 TO 1'-0"



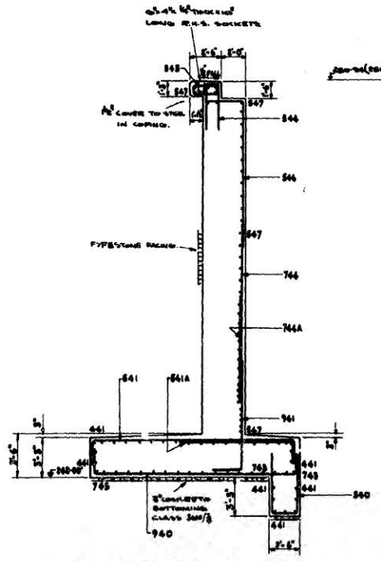
PLAN ON S.W. WING WALL
(N.W. WING WALL SIMILAR BUT TO OPPOSITE HAND)
SCALE:- 1/4 TO 1'-0"



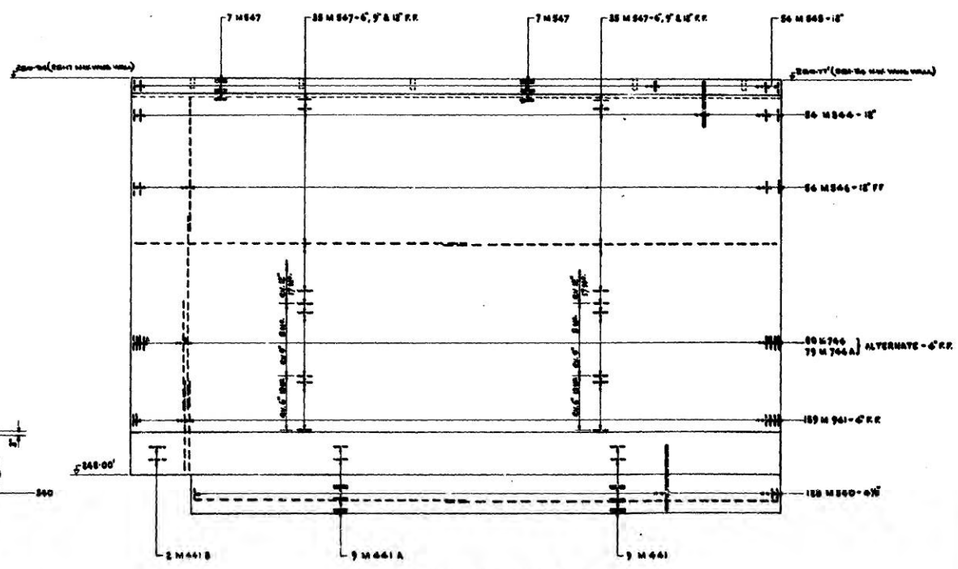
SECTIONAL ELEVATION A - A
(S.E. WING WALL SIMILAR EXCEPT AS NOTED)



TYPICAL SECTION B - B



TYPICAL SECTION D - D



SECTIONAL ELEVATION C - C
(N.W. WING WALL SIMILAR EXCEPT AS NOTED)

NOTES:
1. ALL STRUCTURAL CONCRETE TO BE 4,500/3/4".
2. COVER TO MAIN STEEL TO BE 2" OR AS OTHERWISE STATED.
3. ALL EXPANSION JOINTS TO BE FILLED WITH APPROVED FILLER WITH ½" WIDE x ½" DEEP APPROVED POLYSULPHIDE SEALER BETWEEN ALL HORIZONTAL AND VERTICAL FACES. EXPOSED SEALER TO BE OF APPROVED LIGHT COLOUR.
4. BACK OF WING WALLS TO BE FILLED WITH SELECTIVE BUBBLE.
5. BACK OF WING WALLS TO BE PAINTED WITH TWO COATS OF APPROVED BITUMASTIC PAINT
6. ALL CONSTRUCTION JOINTS TO BE PROVIDED WITH 4" WIDE PVC WATERSTOP

AMENDMENTS

EIGHTON LODGE ROUNDABOUT - SOUTH BRIDGE – DETAILS OF WING WALLS.

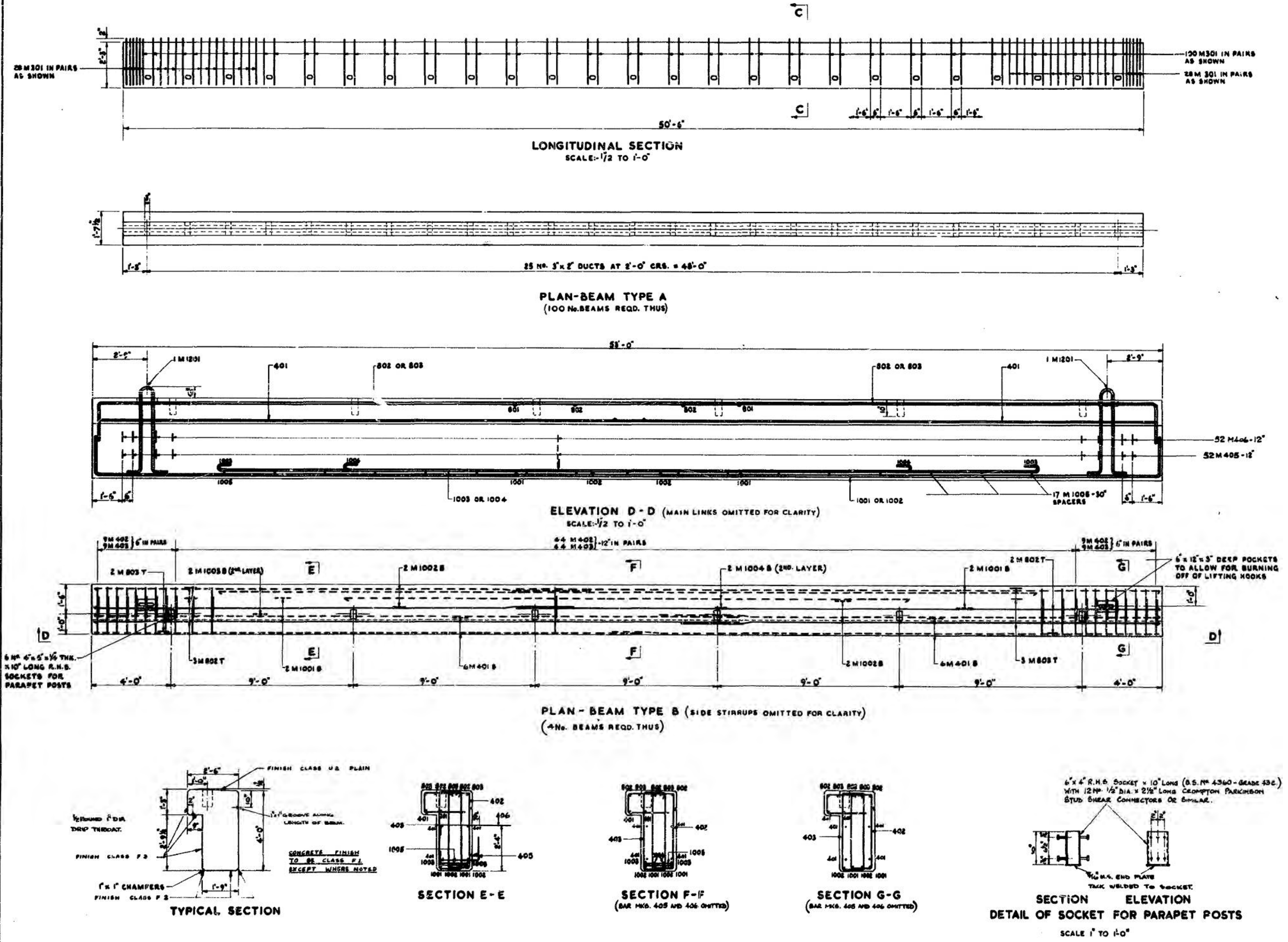
DRAWING NUMBER
B40/7

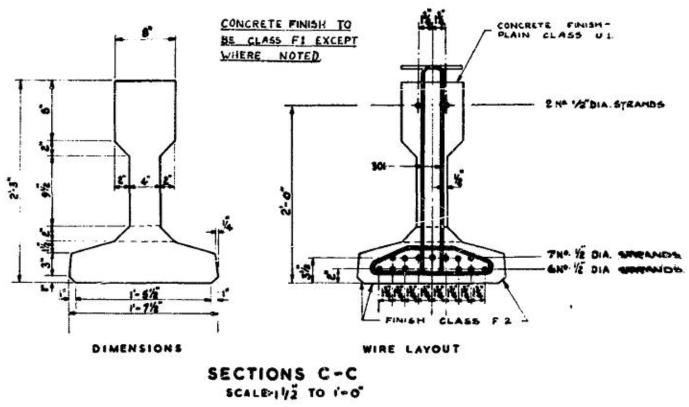
W. H. B. COT...
COUNTY ENGINEER...
COUNTY HA...
DURHAM

MINISTRY OF TRANSPORT

Agents:- DURHAM COUNTY COUNCIL

LONDON — EDINBURGH — THURSO TRUNK ROAD A1 — EIGHTON LODGE





NOTES: FOR PRESTRESSED CONCRETE BEAMS

1. BEAM SECTIONS ARE THOSE RECOMMENDED BY THE PRESTRESSED CONCRETE DEVELOPMENT GROUP TYPE "A" SECTION (VII) WITH 4"x 2" TRANSVERSE HOLES.
2. MINIMUM CUBE STRENGTH OF CONCRETE AT TRANSFER TO BE 6,000 LBS/SQ. IN.
3. MINIMUM CUBE STRENGTH OF CONCRETE AT 28 DAYS TO BE 7,500 LBS/SQ. IN.
4. STRANDS TO BE 1/2" DIAMETER H.T.S. (7 No. WIRES PER STRAND) OF 100 TONS/SQ. IN. ULTIMATE TENSILE STRENGTH.
5. STRESSING LOAD PER STRAND TO BE 26,000 LBS.
6. WIRES TO BE OVER STRESSED BY 10% OF THE INITIAL STRESS FOR A PERIOD OF 2 MINUTES DURING THE TENSIONING OPERATION, OR USED STRESS RELIEVED STRANDS TO B.S. 2691.

NOTES: FOR REINFORCED CONCRETE BEAMS

1. CONCRETE IN REINFORCED CONCRETE PRECAST BEAMS TO BE OF CLASS "4500/3/4"
2. LIFTING HOOKS TO BE BURNT OFF AFTER ERECTION

NOTES: FOR PRESTRESSED & REINFORCED CONCRETE BEAMS.

1. TYING WIRE TO BE 16. G. SOFT ANNEALED IRON WIRE
2. CEMENT SHALL BE ORDINARY PORTLAND OR RAPID HARDENING PORTLAND CEMENT.

LOCATION	BAR MARK	TYPE & SIZE	No. OFF PER BEAM	TOTAL No.	LENGTH		DESCRIPTION
PRESTRESSED BEAM TYPE A	301	R10	156	14800	4'-3"		
SIDE STIRRUPS	406	R12	52	208	4'-0"		3'-6"
REINFORCED CONCRETE BEAM TYPE B	1001	R32	4	16	34'-0"		32'-0"
MAIN STEEL	1002	R32	4	16	26'-9"		ELEVATION PLAN
MAIN STEEL	1003	R32	2	8	40'-0"		36'-0"
MAIN STEEL	1004	R32	2	8	30'-0"		
SPACER	1005	R32	17	68	1'-5"		STRAIGHT
MAIN STEEL	802	R25	5	20	34'-0"		
MAIN STEEL	803	R25	5	20	35'-9"		ELEVATION PLAN
MAIN STEEL	401	R12	12	48	27'-3"		STRAIGHT
LINKS	402	R12	62	248	14'-0"		
LINKS	403	R12	62	248	10'-0"		
SIDE STIRRUPS	405	R12	52	208	3'-9"		3'-0" 1'-3"
LIFTING HOOK BEAM TYPE B.	1201	R40	2	8	10'-6"		6'-2½" 6"

Tests On Prestressed Beams		
Loading Test At 28 Days		Predicted Camber At 28 Days
Test Load At Each 1/3rd. Point	Maximum Deflection At Center Under Test Load	For A Beam Supported At Its Design Bearing Points And Subject To Self Weight Only
6·10 Tons	1½"	1⅜"

AMENDMENTS
1. NUMBER OF BEAMS TYPE B INCREASED FROM 2 TO 4 AND SCHEDULE AMENDED TO SUIT.
2. REVISION OF NOTES. 26-11-1969
3. NOTES FOR REINFORCED CONCRETE BEAMS ADDED. 26-11-1969
4. REINFORCEMENT IN CONCRETE BEAMS AMENDED 23-7-70
... BENDING SCHEDULE ONLY

ROUNDABOUT — NORTH & SOUTH BRIDGES — PRESTRESSED & PRECAST BEAM DETAILS.

DRAWING NUMBER
840/8D

W. H. B. COTTON M.I.C.E.
COUNTY ENGINEER & SURVEYOR,
COUNTY HALL,
DURHAM

Appendix C

STATUTORY UNDERTAKES INFORMATION

highways england

APPENDIX C-1

STATUTORY UNDERTAKERS DRAWINGS

JUNCTION 67 - COAL HOUSE
(424955,558553)

NOTES

1. LOCATION OF SERVICE PLANT SHOWN ON THIS DRAWING HAS BEEN OBTAINED FROM C2 STATUTORY UNDERTAKERS RETURNS AND IS SHOWN INDICATIVELY. THE STATUTORY UNDERTAKERS ARE TO SATISFY THEMSELVES OF THE LOCATION AND EXTENTS OF SERVICE PLANT.
2. REFER TO SECTION 3.10 OF THE TECHNICAL APPRAISAL REPORT FOR DETAILS OF THE DIVERSION WORKS PROPOSED.

KEY

- BT DUCT
- IC INSTALCOM
- W NORTHUMBRIAN WATER COMBINED
- W NORTHUMBRIAN WATER FOUL
- W NORTHUMBRIAN WATER ABANDONED
- W NORTHUMBRAIN WATER SURFACE
- W NORTHUMBRIAN WATER TREATED
- W NORTHUMBRIAN WATER DISTRIBUTION
- W NON NORTHUMBRIAN WATER PRIVATE
- G NORTHERN GAS LOW PRESSURE
- G NORTHERN GAS MEDIUM PRESSURE
- G NORTHERN GAS INTERMEDIATE PRESSURE
- G NORTHERN GAS REGIONAL HIGH PRESSURE
- T VIRGIN MEDIA CABLE
- E NORTHERN POWER GRID CABLE
- C VODAFONE CABLE
- IC01 UTILITY REFERNCE
- EXISTING STRUCTURE
- PROPOSED STRUCTURE
- PROPOSED HIGHWAYS FENCE LINE
- NEW CARRIAGEWAY CONSTRUCTION
- EXISTING CARRIAGEWAY TO BE RETAINED
- PROPOSED DRAINAGE DITCH
- PROPOSED SIGNAL
- EXISTING SIGNAL

SAFETY, HEALTH AND ENVIRONMENTAL SYMBOL LEGEND

INDICATES A RESIDUAL RISK AS A WARNING

Suit	Rev	Date	Description	Des	Chk	App
S2	P1.0	08/01/2016	FOR INFORMATION	RA	COP	NGR

Designer
WSP PARSONS BRINCKERHOFF
Three White Rose Office Park, Millshaw Park Lane, Leeds, LS11 0DL
Tel: +44 (0)113 395 6200, Fax: +44 (0)113 395 6201
http://www.wspgroup.com

Client
highways england

Project Title
A1 BIRTLEY TO COAL HOUSE

Drawing Title
STATUTORY UNDERTAKERS
OPTION 2
SHEET 1 OF 3

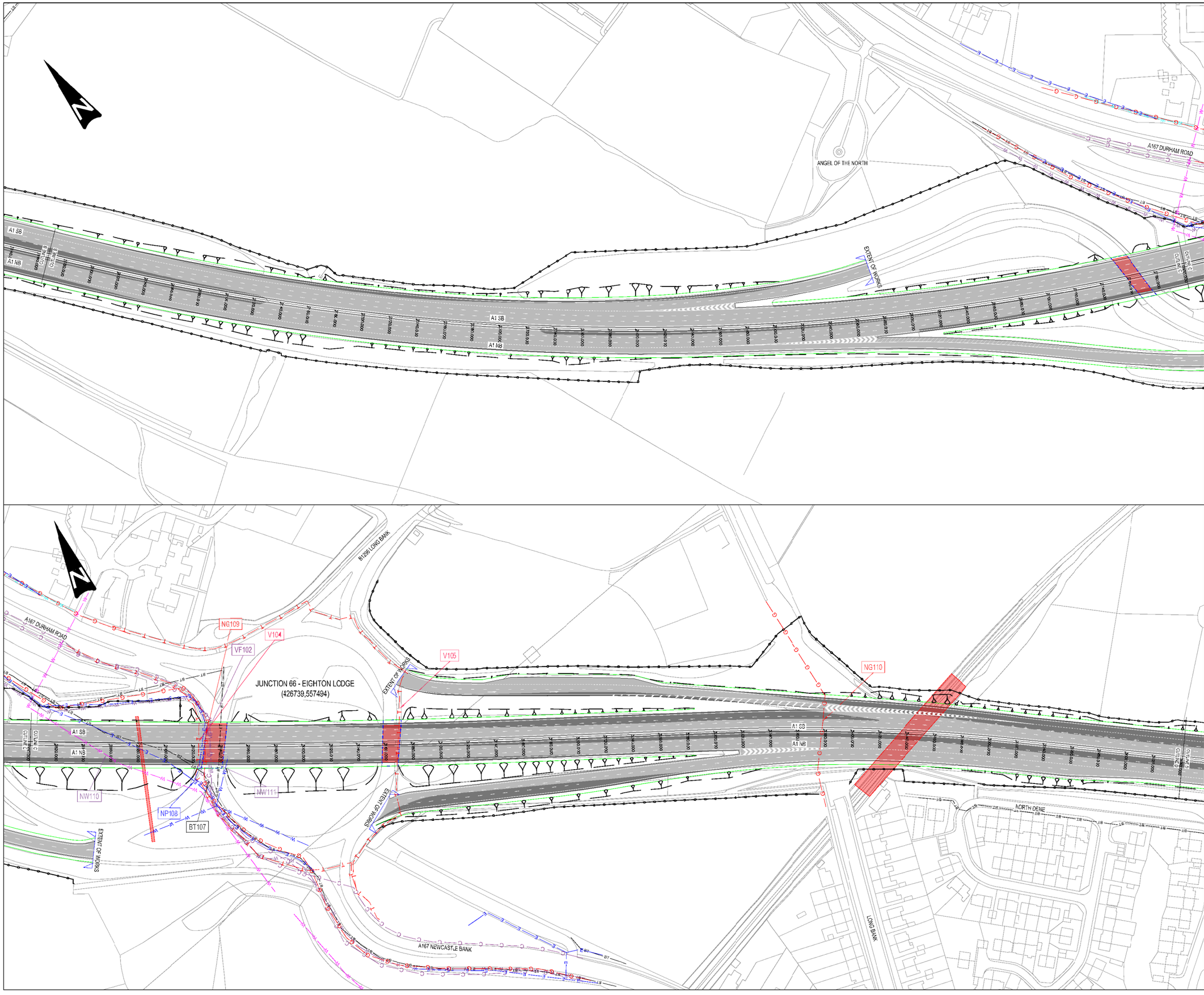
Scale	Drawn	Designed	Checked	Approved	QR CODE
1:1250	LCB	IAK	COP	NGR	
Size	Date	Date	Date	Date	
A1	06/01/2016	08/01/2016	08/01/2016	08/01/2016	

Status: FOR INFORMATION
Suitability: S2
Drawing Number: HA551462 - WSP - VUT - BCH - DR - D - 2700_026
Revision: P1.0

Status S2 | Drawing Number HA551462 - WSP - VUT - BCH - DR - D - 2700_026 | Rev P1.0

A1 0 625 1250 DO NOT SCALE

Status S2 | Drawing Number HA551462 - WSP - VUT - BCH - DR - D - 2700_027 | Rev P1.0



NOTES

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2. REFER TO SECTION 3.10 OF THE TECHNICAL APPRAISAL REPORT FOR DETAILS OF THE DIVERSION WORKS PROPOSED.

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- W — NORTHUMBRIAN WATER TREATED
- W — NORTHUMBRIAN WATER DISTRIBUTION
- W — NON NORTHUMBRIAN WATER PRIVATE
- G — NORTHERN GAS LOW PRESSURE
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- E — NORTHERN POWER GRID CABLE
- C — VODAFONE CABLE
- IC01 — UTILITY REFERNCE
- EXISTING STRUCTURE
- PROPOSED STRUCTURE
- PROPOSED HIGHWAYS FENCE LINE
- NEW CARRIAGEWAY CONSTRUCTION
- EXISTING CARRIAGEWAY TO BE RETAINED
- PROPOSED DRAINAGE DITCH
- PROPOSED SIGNAL
- EXISTING SIGNAL

SAFETY, HEALTH AND ENVIRONMENTAL SYMBOL LEGEND

INDICATES A RESIDUAL RISK AS A WARNING

Suit	Rev	Date	Description	Des	Chk	App
S2	P1.0	08/01/2016	FOR INFORMATION	IAK	COP	NGR

Designer
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http://www.wspgroup.com

Client: highways england

Project Title: A1 BIRTLEY TO COAL HOUSE

Drawing Title: STATUTORY UNDERTAKERS OPTION 2 SHEET 2 OF 3

Scale	Drawn	Designed	Checked	Approved	QR CODE
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Size	Date	Date	Date	Date	
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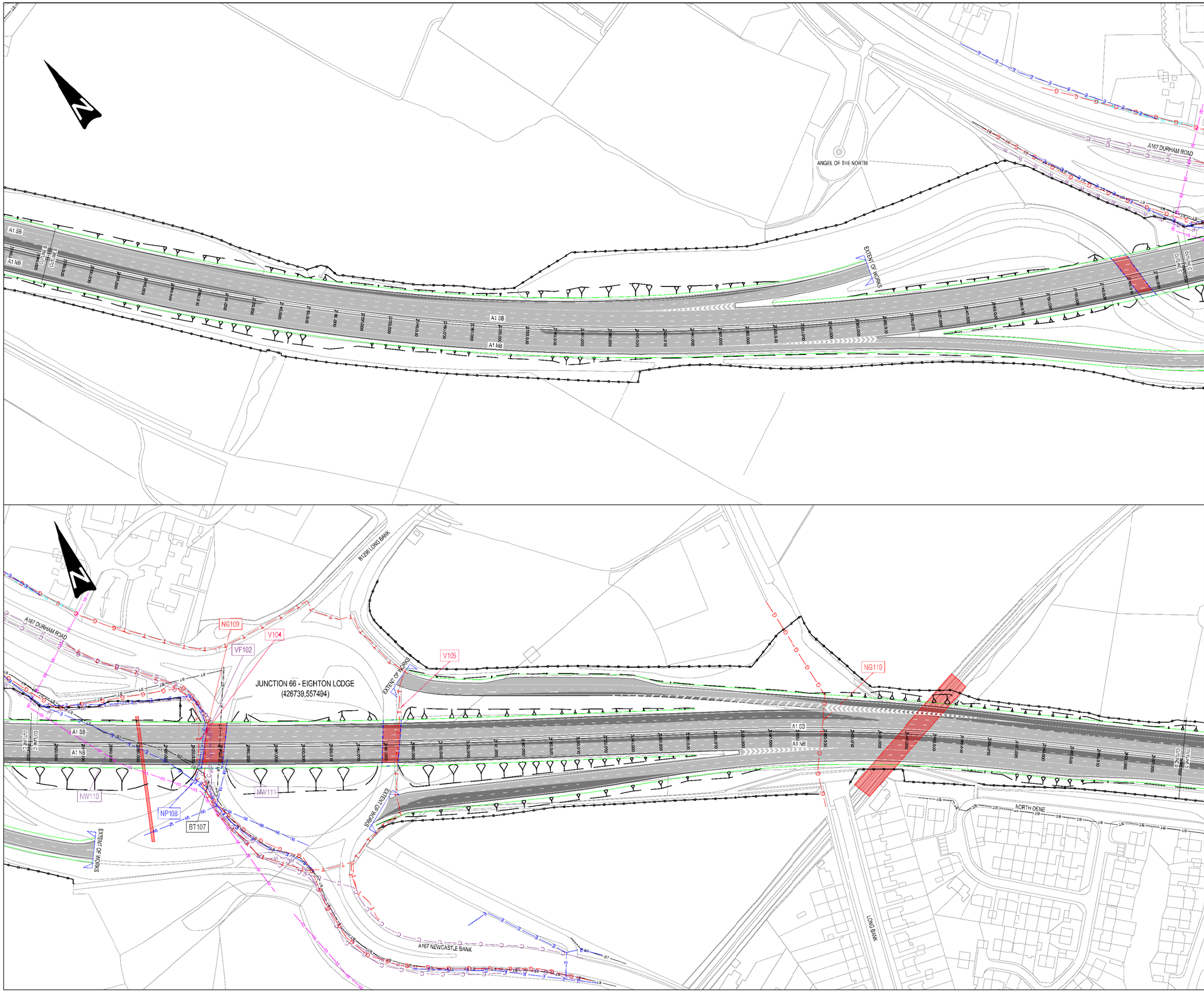
Status: FOR INFORMATION — Suitability: S2

Drawing Number: HA551462 - WSP - VUT - BCH - DR - D - 2700_027 — Revision: P1.0

A1 0 5m 10m DO NOT SCALE

Status S2 | Drawing Number HA551462 - WSP - VUT - BCH - DR - D - 2700_027 | Rev P1.0



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SAFETY, HEALTH AND ENVIRONMENTAL SYMBOL LEGEND

INDICATES A RESIDUAL RISK AS A WARNING

Suit	Rev	Date	Description	Des	Chk	App
S2	P1.0	08/01/2016	FOR INFORMATION	IAK	COP	NGR

Designer
WSP PARSONS BRINCKERHOFF
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http://www.wspgroup.com

Client: highways england

Project Title: A1 BIRTLEY TO COAL HOUSE

Drawing Title: STATUTORY UNDERTAKERS OPTION 2 SHEET 2 OF 3

Scale	Drawn	Designed	Checked	Approved	QR CODE
1:1250	LCB	IAK	COP	NGR	
Size	Date	Date	Date	Date	
A1	06/01/2016	06/01/2016	06/01/2016	06/01/2016	

Status: FOR INFORMATION — Suitability: S2

Drawing Number: HA551462 - WSP - VUT - BCH - DR - D - 2700_027 — Revision: P1.0

A1 0 5m 10m DO NOT SCALE

Appendix D

SITE PHOTOGRAPHS AND HEADROOM INFORMATION

APPENDIX D-1

SITE PHOTOGRAPHS EIGHTON LODGE SLIP/NORTH AND SOUTH BRIDGES

Photograph 1
Debris on the West footway

Photograph 2
South elevation- Staining due to water leakage at joints

Photograph 3
Bridge Soffit

Photograph 4
South Abutment due to water leakage

Photograph 5
South Elevation

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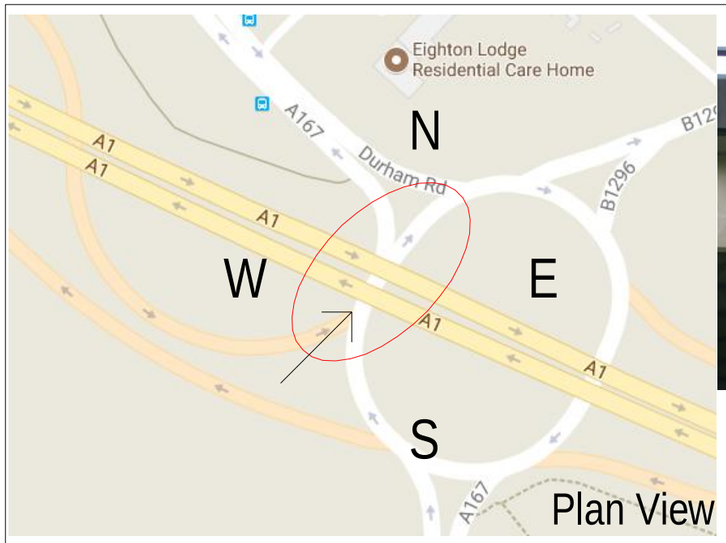
http://www.wsp.com

Project:
A1 BIRTLEY TO COAL HOUSE IMPROVEMENT SCHEME

Title:
Eighton Lodge Slip Road bridge



Photograph 1+2
North Elevation - Staining at bearing level

Photograph 3
North Elevation- Staining due to water leakage

Photograph 4
Bridge Soffit

Photograph 5
North abutmanet- Staining due to water leakage

Photograph 6
North Elevation

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Project:
A1 BIRTLEY TO COAL HOUSE IMPROVEMENT SCHEME

Title:
Eighton Lodge North bridge

Photograph 1 , 2 amd 3
Typical view of spalling of concrete at abutment wall

Photograph 4
Bridge Soffit

Photograph 5
North Abutment- Staining at bearings

Photograph 6
Vertical crack on the abutment wall

Photograph 7
North Elevation

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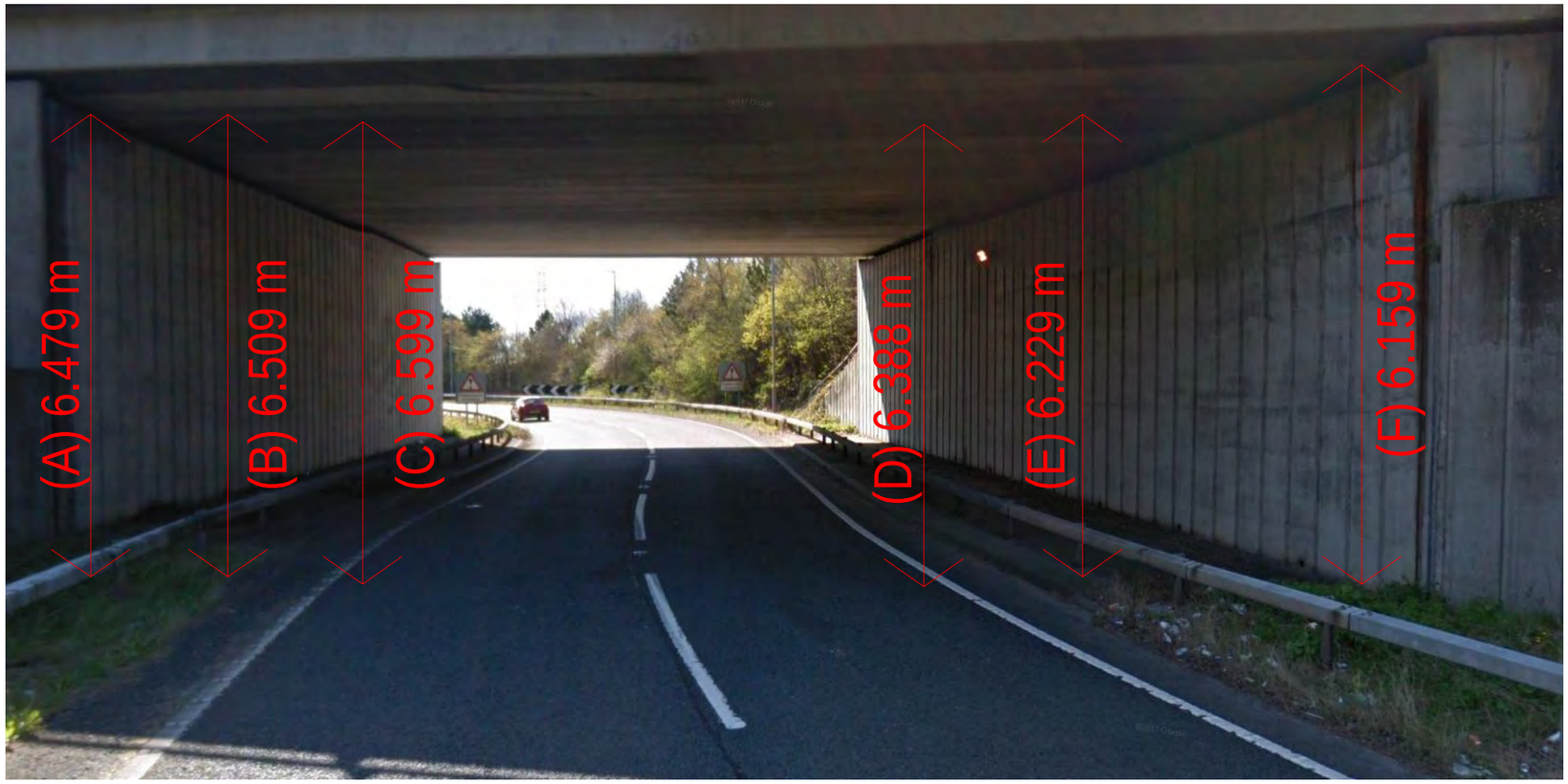
Project:
A1 BIRTLEY TO COAL HOUSE IMPROVEMENT SCHEME

Title:
Eighton Lodge South bridge

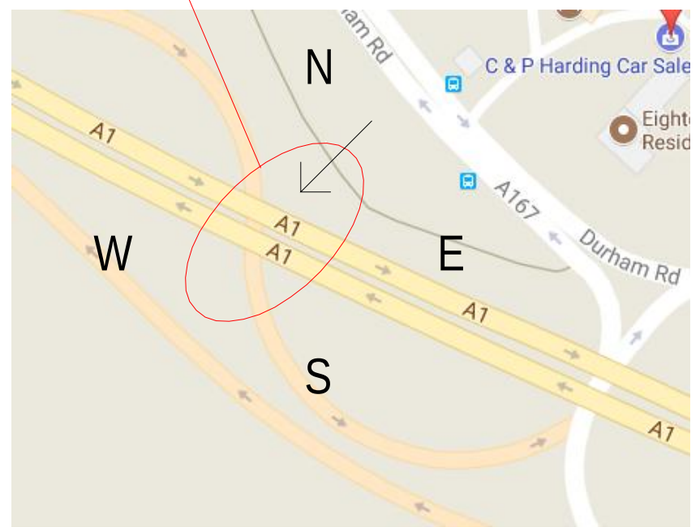
highways england

APPENDIX D-2

HEADROOM INFORMATION EIGHTON LODGE SLIP/NORTH AND SOUTH BRIDGES



Slip Road Bridge



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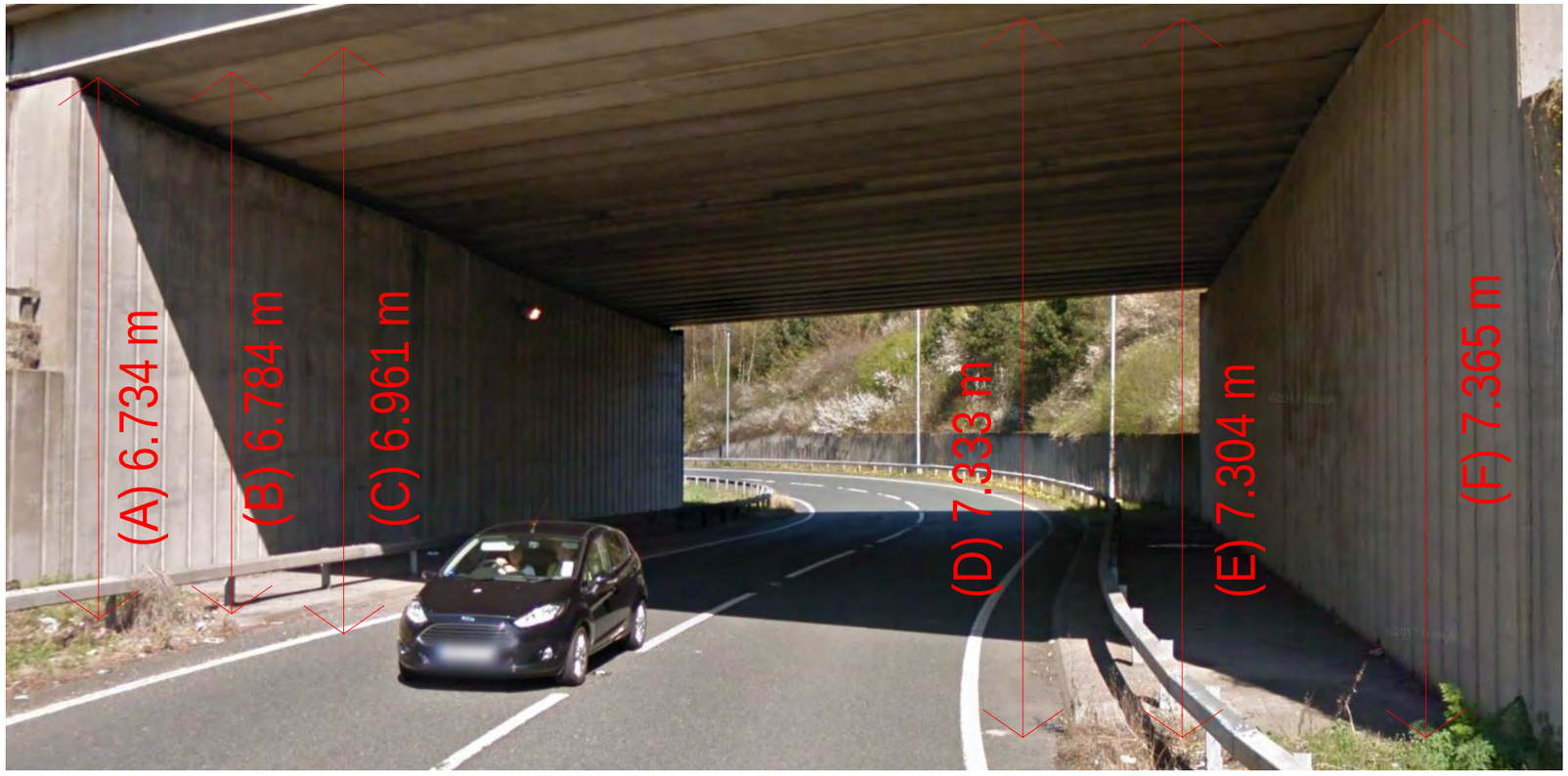
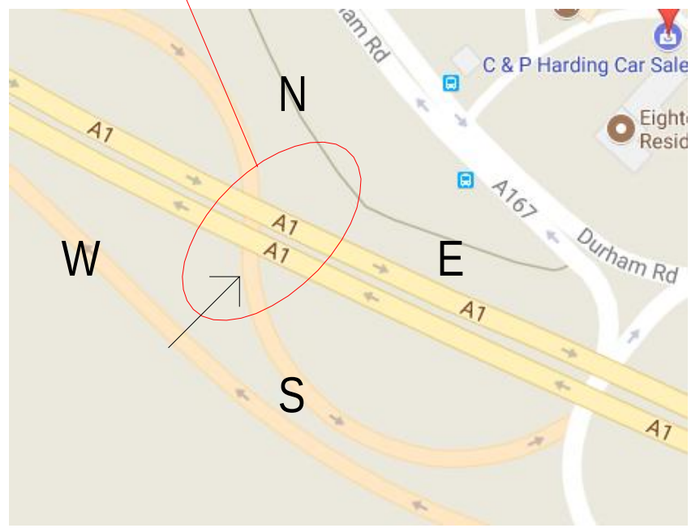
Project:
A1 BIRTLEY TO COAL HOUSE IMPROVEMENT SCHEME

Title:
Eighton lodge Slip Road bridge headroom values for North elevation



Slip Road Bridge



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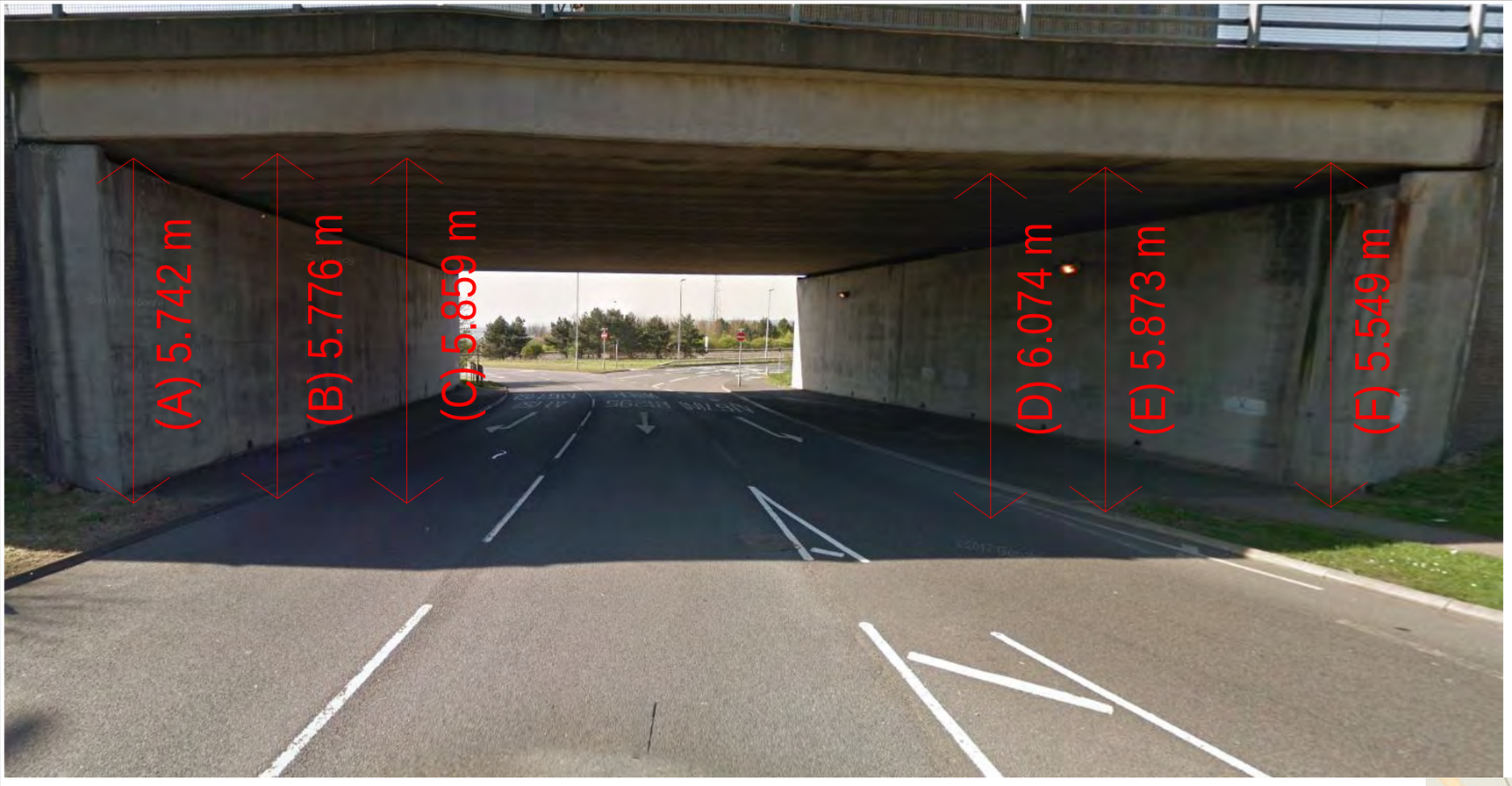
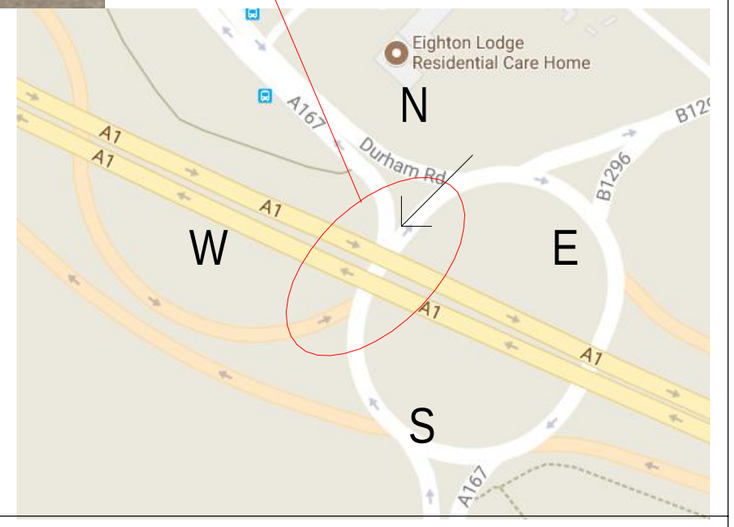
Project:
A1 BIRTLEY TO COAL HOUSE IMPROVEMENT SCHEME

Title:
Eighton Lodge Slip Road bridge headroom values for South elevation



North Bridge



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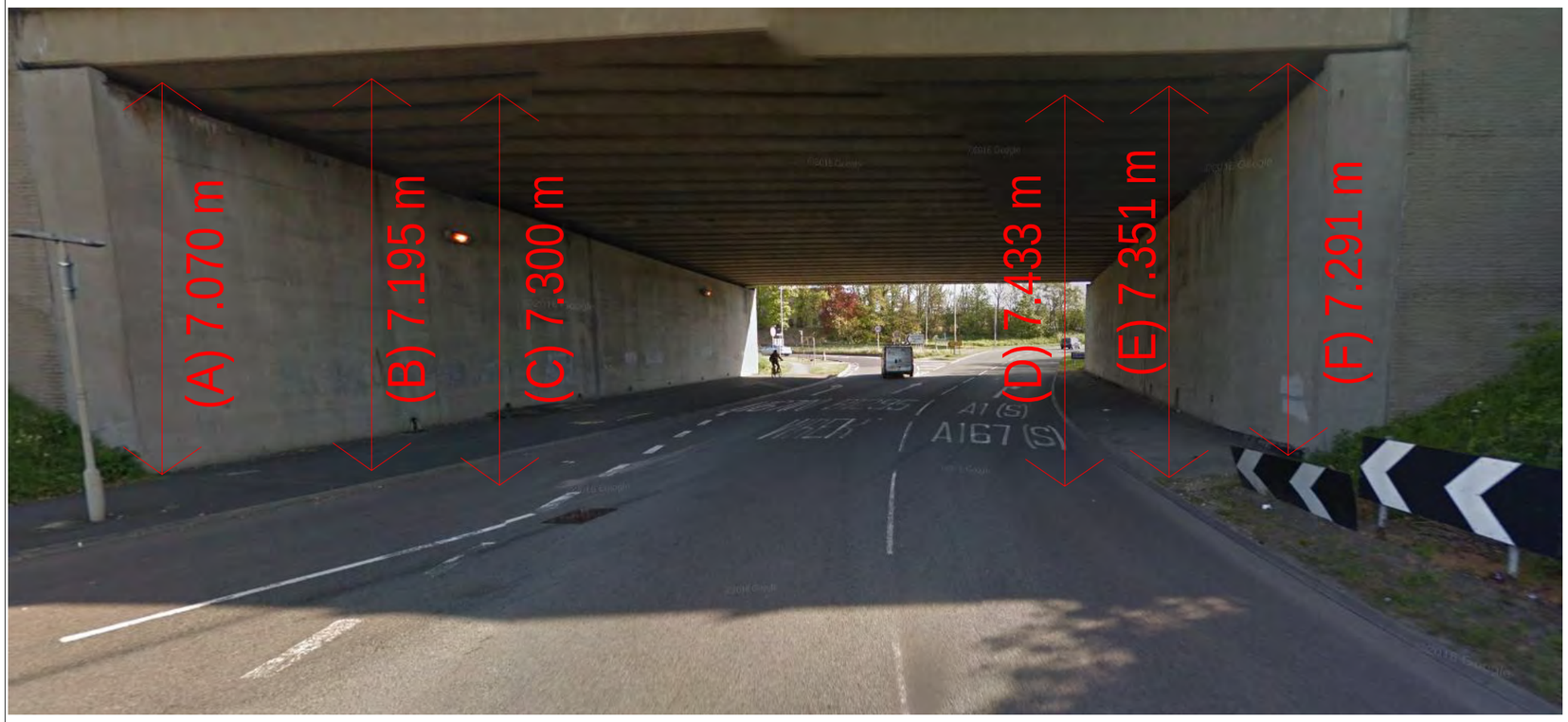
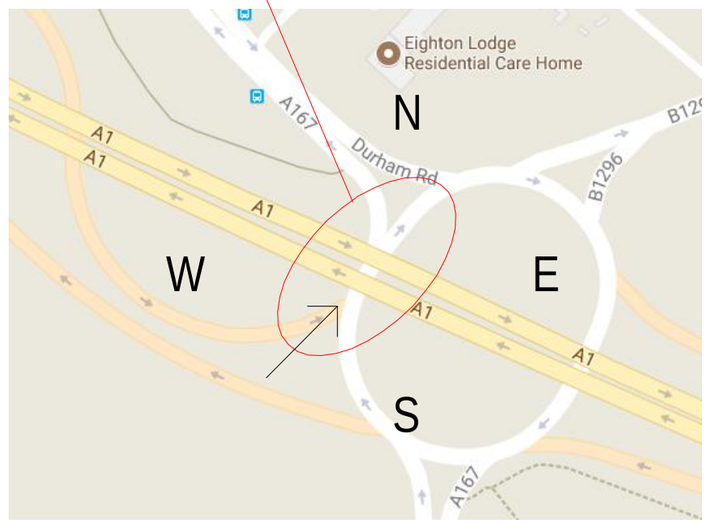
Project:
A1 BIRTLEY TO COAL HOUSE IMPROVEMENT SCHEME

Title:
Eighton Lodge North bridge headroom values for North elevation



North Bridge



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Project:
A1 BIRTLEY TO COAL HOUSE IMPROVEMENT SCHEME

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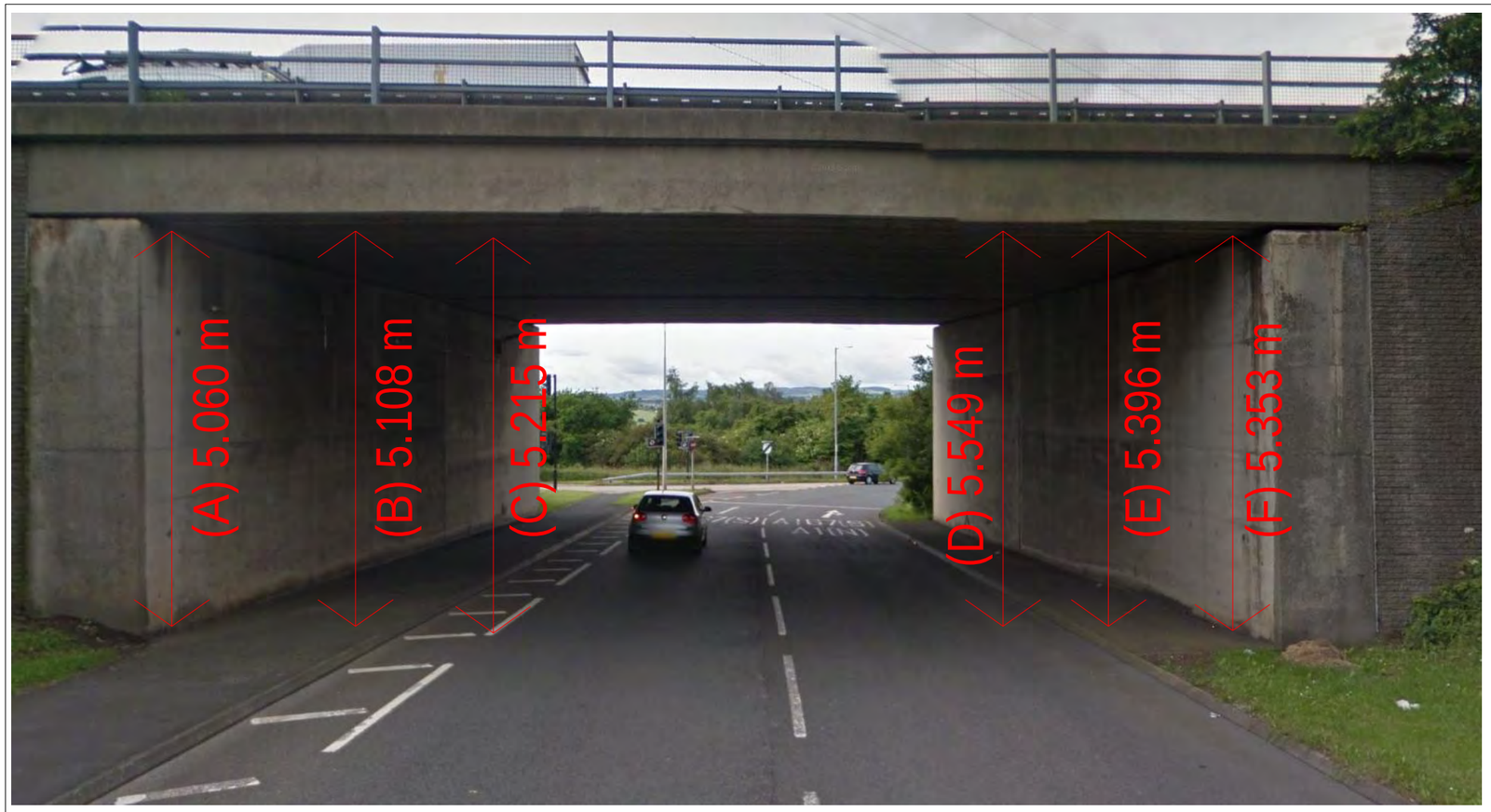
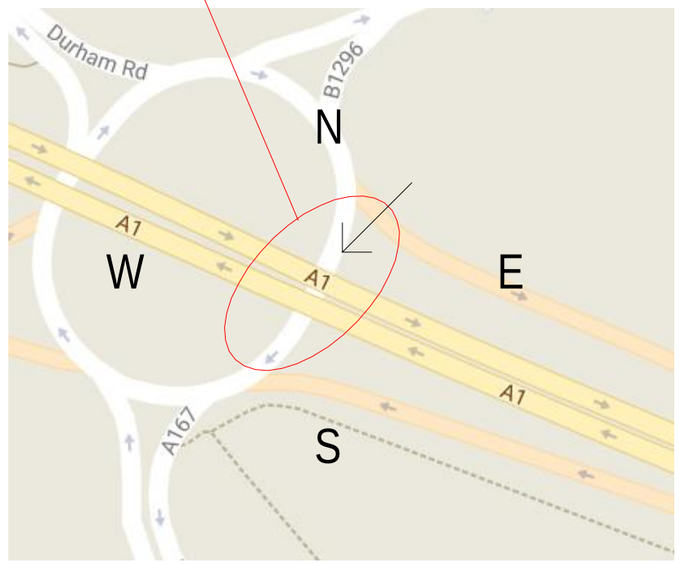
Eighton Lodge North bridge headroom values for South elevation



South Bridge



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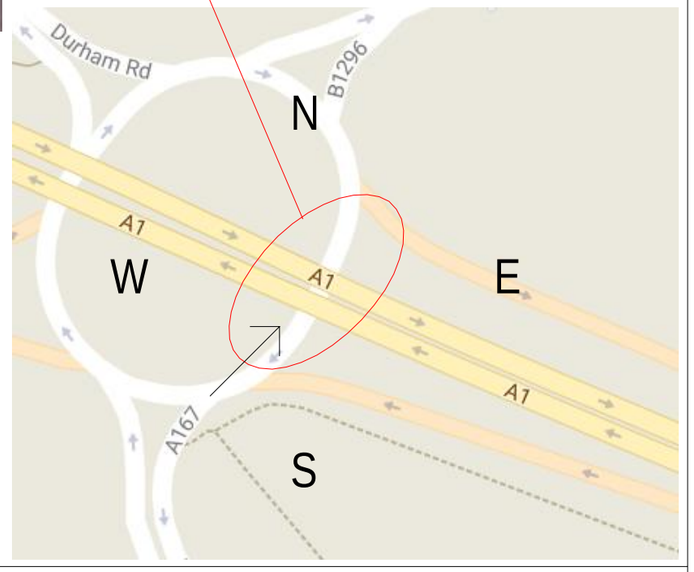
Project:
A1 BIRTLEY TO COAL HOUSE IMPROVEMENT SCHEME

Title:
Eighton Lodge South bridge headroom values for North elevation

South Bridge



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Project:
A1 BIRTLEY TO COAL HOUSE IMPROVEMENT SCHEME

Title:
Eighton Lodge South bridge headroom values for South elevation

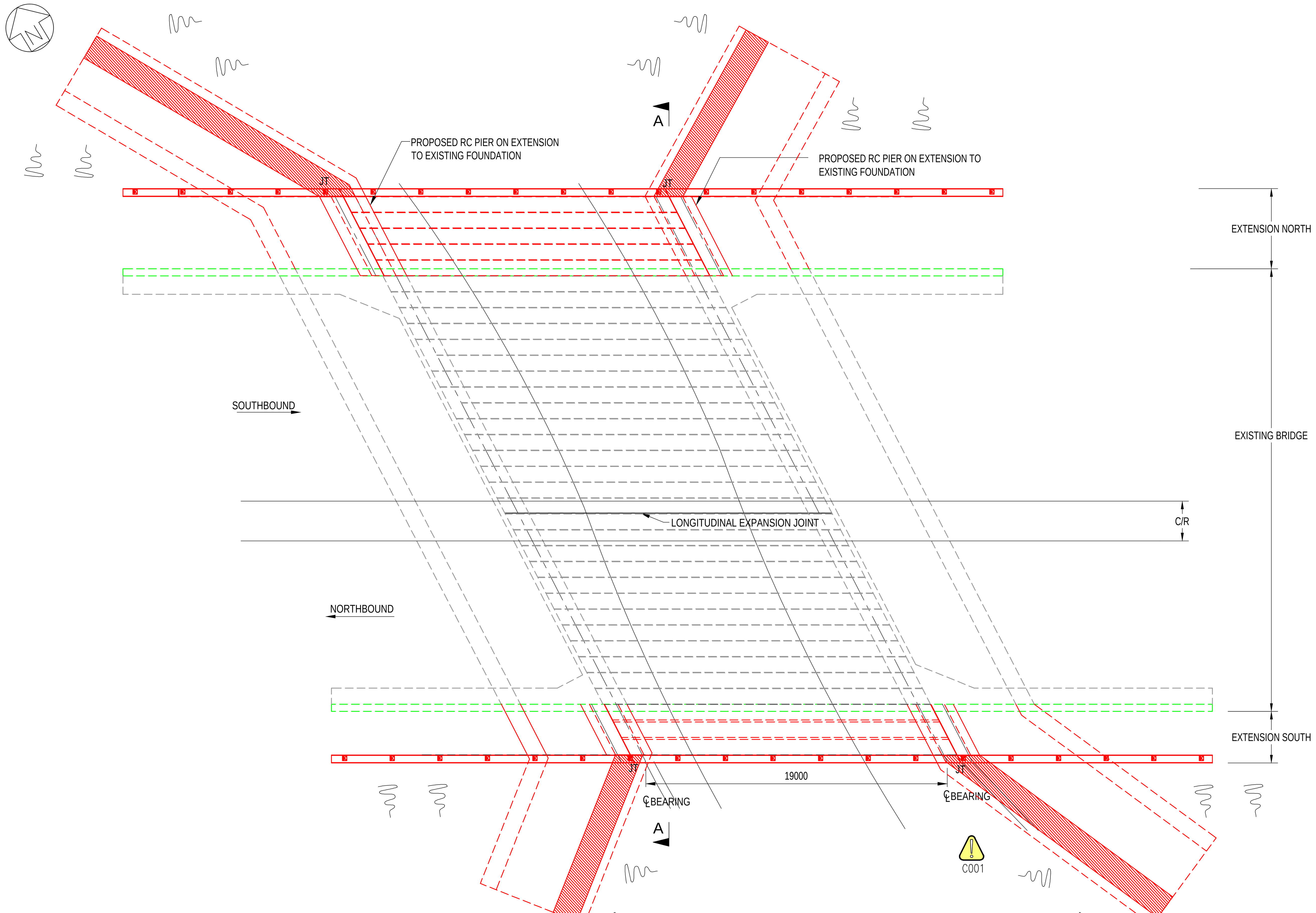
Appendix E

PROPOSED GENERAL ARRANGEMENT DRAWINGS - WIDENING

highways england

APPENDIX E-1

EIGHTON LODGE SLIP ROAD GENERAL ARRANGEMENT



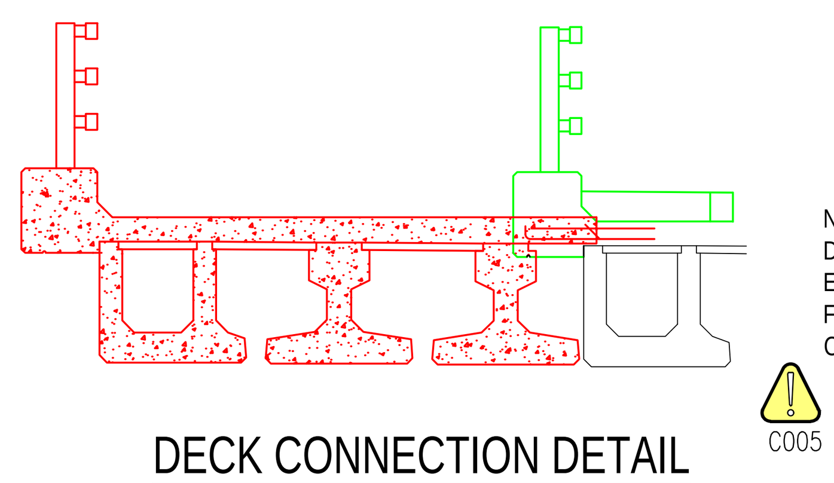
PLAN ON BRIDGE

SCALE 1:200

LEGENDS

- PROPOSED
- EXISTING
- REMOVED & MODIFIED

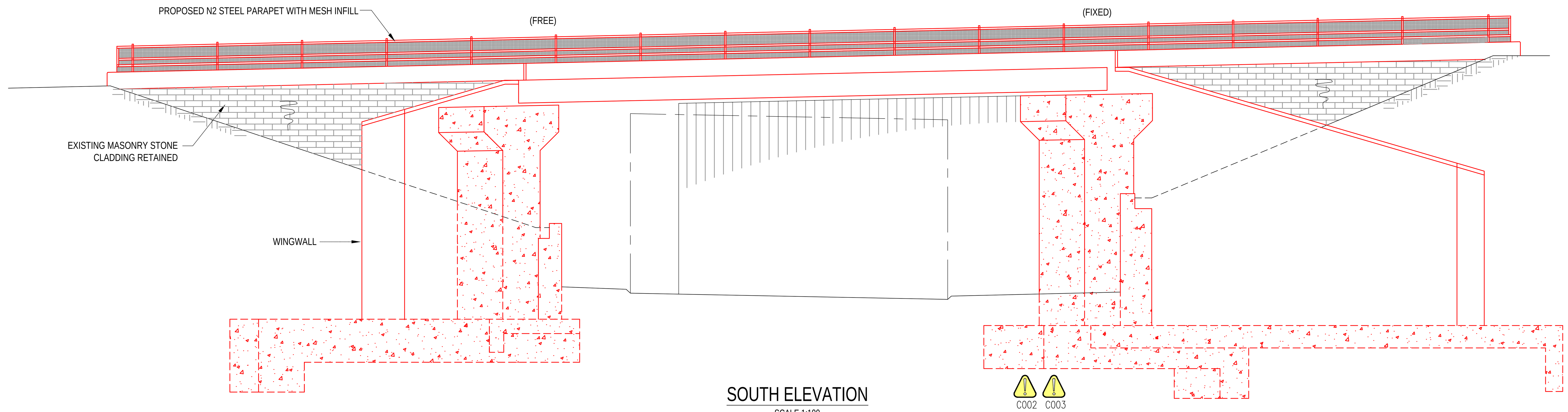
S.No	Material	Type	Length	Qty	Unit
1	Beams	M3	20.0	6.0	Nos
2	Beams	UMB3	20.0	2.0	Nos
3	Concrete			900.0	cum
4	Steel			225.0	tonne



NEW RC DECK AND DECK DIAPHRAGM TO BE CONNECTED TO EXISTING BRIDGE BY DRILLED AND FIXED DOWEL BARS OR CONNECTED ONTO EXISTING REBAR.

DECK CONNECTION DETAIL

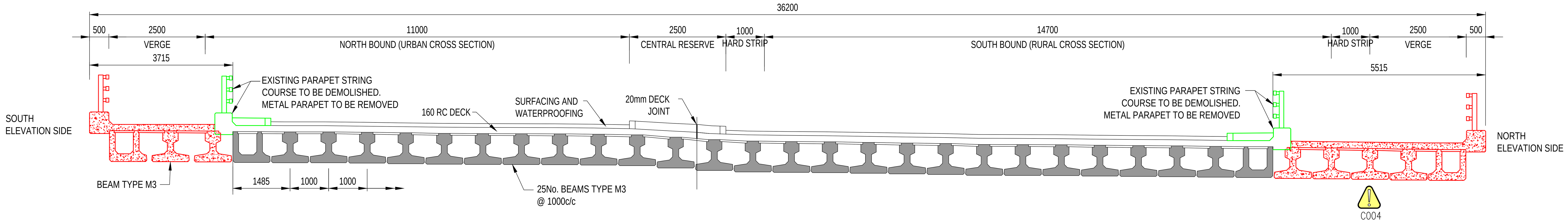
SCALE 1:50



NOTE
PILED PIER FOUNDATION AND STEM TO BE FIXED TO THE EXISTING ABUTMENT BASE AND EXISTING ABUTMENT END FACE USING DOWEL BARS

SOUTH ELEVATION

SCALE 1:100



SECTION A-A

SCALE 1:75

GENERAL NOTES

1) STRUCTURAL BRIDGE DETAILS & EXTENT OF WIDENING PROVIDED ON THIS DRAWING IS INDICATIVE ONLY BASED ON LIMITED INFORMATION AVAILABLE TO DATE
2) THE SIZE OF STRUCTURAL ELEMENTS ARE BASED PRELIMINARY CALCULATION AND PREVIOUS SIMILAR TYPE WORKS. ALL INFORMATION IS SUBJECT TO DETAILED DESIGN PRIOR TO FINAL CONFIRMATION
3) DETAILS PROVIDED ARE FOR INFORMATION ONLY. INDICATIVE CONSTRUCTION COST ESTIMATES ARE BASED ON PREVIOUS SIMILAR TYPE WORKS
4) THE FOLLOWING CRITICAL INFORMATION IS REQUIRED TO VERIFY THE FEASIBILITY OF THE PROPOSED OPTION AND DEVELOPED THIS FURTHER AT DETAILED DESIGN (IF PREFERRED)
   - TOPOGRAPHICAL SURVEY - CONFIRM GEOMETRIC PARAMETERS AND SITE CONSTRAINTS
   - SITE INVESTIGATION INFORMATION - CONFIRM FOUNDATION PARAMETERS
   - LIAISON WITH HIGHWAY ENGLAND/CONTRACTOR - CONFIRM TRAFFIC MANAGEMENT REQUIREMENTS
   - LIAISON WITH STATUTORY UNDERTAKERS - CONFIRM EXISTING/NEW SERVICES IMPACTED BY THE WORKS
5) ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE
6) ALL LEVELS ARE IN METERS UNLESS NOTED OTHERWISE
7) DO NOT SCALE IN CASE OF ANY DOUBTS, OMISSIONS OR ERRORS SEEK CLARIFICATION FROM THE DESIGNER

OPTION SPECIFIC NOTES

1) THE OPTION HAS BEEN DEVELOPED BASED ON THE FOLLOWING ASSUMPTIONS
   - DESIGN LOADING: LM1, LM2, LM4, SV 80 TO 196 & SOV 250/350
   - HIGHWAY CROSS SECTION BASED ON PRELIMINARY ALIGNMENT DESIGN BY WSP HIGHWAYS
   - DESIGN LIFE FOR THE NEW ELEMENTS: 120 YEARS
   - ITS IS ACCEPTABLE FOR THE NEW BRIDGE WORKS TO BE CONSTRUCTED ON THE SAME ALIGNMENT AS THE EXISTING.
   - FOR DETAILS OF THE EXISTING STRUCTURE REFER RECORD DRAWINGS
2) KEY MATERIALS (GRADE/STRENGTH)
   - CONCRETE TO BE MINIMUM STRENGTH CLASS C40/50 TO BE 8500 UNLESS NOTED OTHERWISE
   - ALL REINFORCEMENT TO BE GRADE B500B TO BS 4449:2005

INDICATIVE CONSTRUCTION SEQUENCE

- ESTABLISH SITE COMPOUND
- CONSTRUCT EXTENT OF ABUTMENT FOUNDATION & ABUTMENT (TO BE CONNECTED BY DOWELS)
- CONSTRUCT WING WALL FOUNDATION & WING WALL
- DISCUSS TRAFFIC MANAGEMENT/COUNTER FLOW REQUIREMENT AND GET APPROVAL FROM HIGHWAY ENGLAND FOR CONSTRUCTION
- REMOVE EXISTING EDGE BEAM AND CUT DECK (EXTENT AS SHOWN IN DRAWING) OF SOUTH OR NORTHBOUND DECK
- DRILL EXISTING DECK/BEAMS FOR ANCHORS (DO NOT INSTALL ANCHORS AT THIS STAGE)
- INSTALL BEAMS
- INSTALL ANCHORS
- CONSTRUCT DECK & PARAPET PLINTH
- REMOVE THE EXISTING DECK SURFACING
- INSTALL COMBINED WATERPROOFING SURFACING, DECK JOINT & PARAPET ETC
- SWITCH THE TRAFFIC ON CONSTRUCTED DECK AND REPEAT SAME STAGE FOR OTHER SIDE
- CLEAR THE SITE

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

CONSTRUCTION:

REF C001 - WORKING ADJACENT TO LIVE TRAFFIC
REF C002 - DIFFERENTIAL SETTLEMENT OF EXISTING/NEW STRUCTURE
REF C003 - CONFLICT WITH SERVICES
REF C004 - HEAVY LIFTING OF BEAMS
REF C005 - INTERFACE RISK BETWEEN NEW/EXISTING STRUCTURES

SAFETY, HEALTH AND ENVIRONMENTAL SYMBOL LEGEND

INDICATES A RESIDUAL RISK AS A WARNING

Suit	Rev	Date	Description	Des	Chk	App

Designer

Three White Rose Office Park, Millshaw Park Lane, Leeds, LS11 0DL, UK
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Client

Project Title

A1 BIRTLEY TO COAL HOUSE

Drawing Title

EIGHTON LODGE SLIP ROAD UNDERBRIDGE
PROPOSED GENERAL ARRANGEMENT
(CONVENTIONAL WIDENING WITH WING WALLS)

Scale	Drawn	Designed	Checked	Approved
AS SHOWN @ A1	SJ	RM	HM	HM
Size: A1	Date: 07/02/2018	Date: 07/02/2018	Date: 07/02/2018	Date: 07/02/2018

Status: PRELIMINARY

Suitability: S0

Drawing Number: HE551462-WSP-SBR-BR004-DR-S-00003

Revision: P01

HE551462-WSP-SBR-BR004-DR-S-00003 S0 P01

DO NOT SCALE

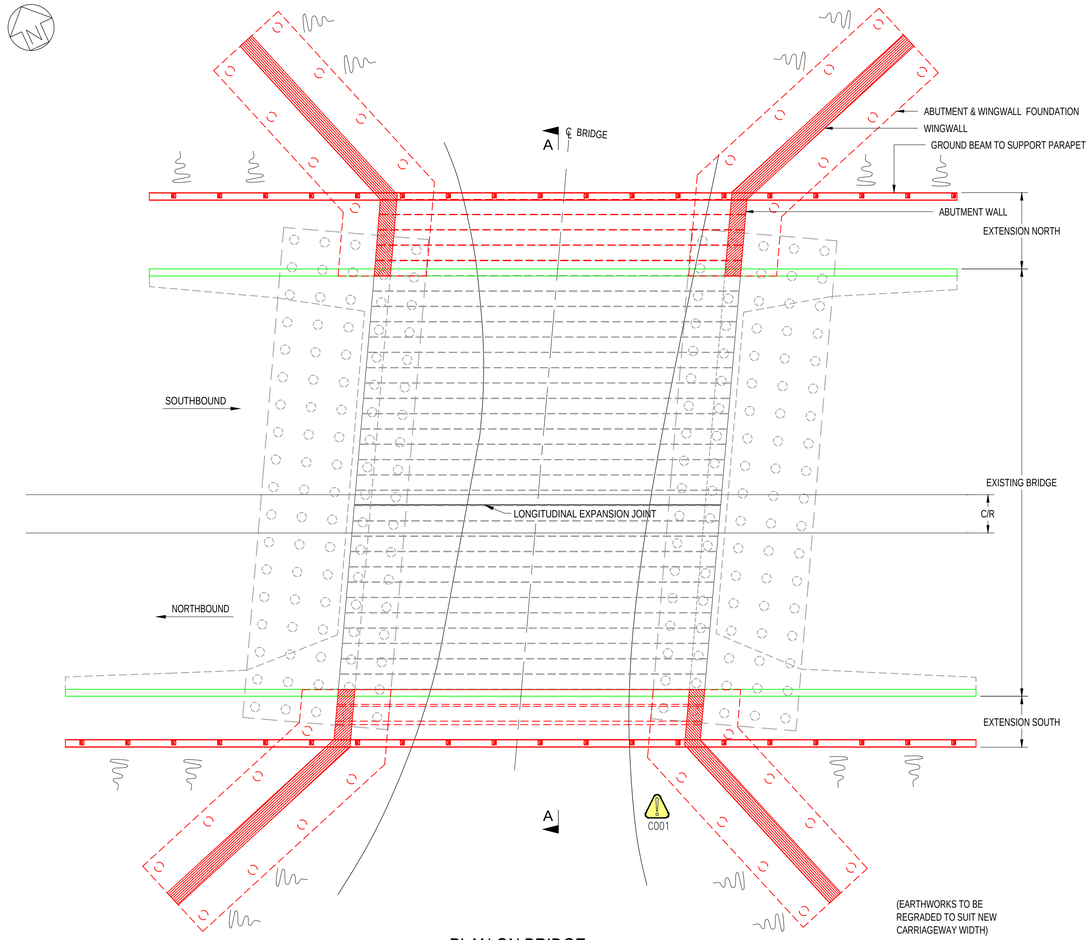
A1

highways england

APPENDIX E-2

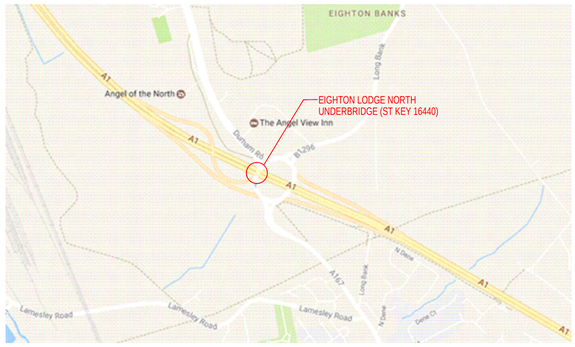
EIGHTON LODGE NORTH BRIDGE GENERAL ARRANGEMENT

P01 | HE551462-WSP-SBR-BR005-DR-S-00003 | S0



(EARTHWORKS TO BE REGRADED TO SUIT NEW CARRIAGEWAY WIDTH)

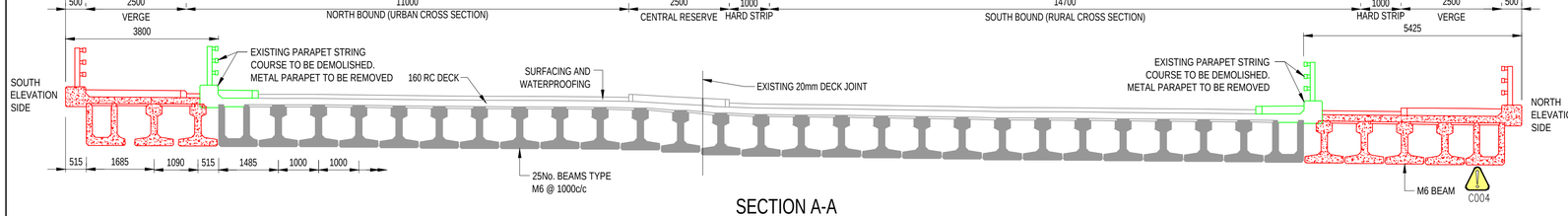
PLAN ON BRIDGE
SCALE 1:200



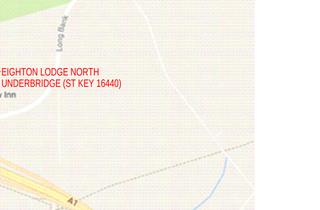
LOCATION PLAN
NTS

NORTH ELEVATION

SOUTH ELEVATION

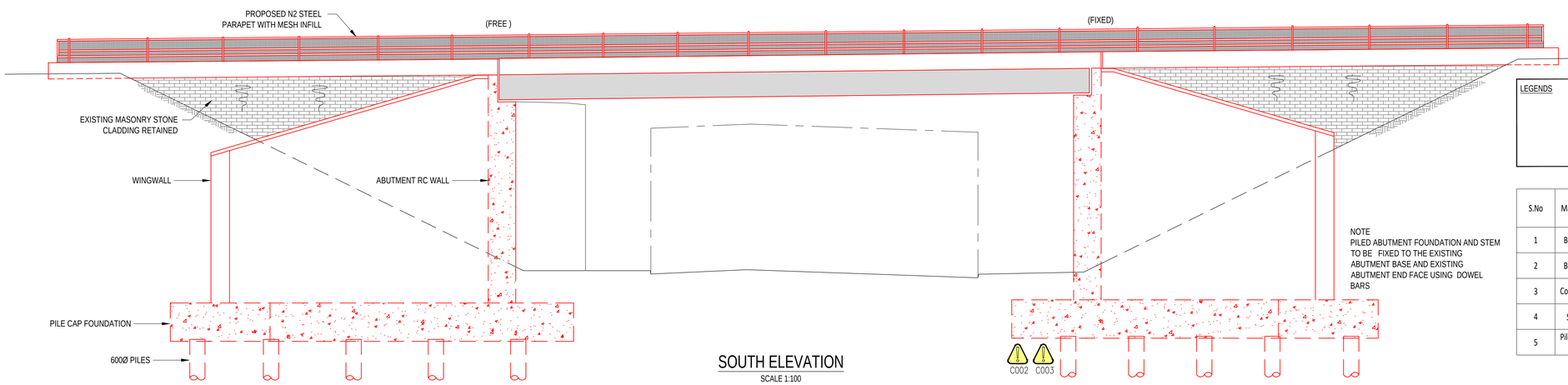


SECTION A-A
SCALE 1:75



NEW RC DECK TO BE CONNECTED TO EXISTING BRIDGE BY DRILLED AND FIXED DOWEL BARS OR CONNECTED ONTO EXISTING REBAR.

DECK CONNECTION DETAIL
SCALE 1:50



SOUTH ELEVATION
SCALE 1:100

LEGENDS
- PROPOSED
- EXISTING
- REMOVED & MODIFIED

NOTE
PILED ABUTMENT FOUNDATION AND STEM TO BE FIXED TO THE EXISTING ABUTMENT BASE AND EXISTING ABUTMENT END FACE USING DOWEL BARS

S.No	Material	Type	Length	Qty	Unit
1	Beams	M6	24.0	6.0	Nos
2	Beams	UMB6	24.0	2.0	Nos
3	Concrete			900.0	cum
4	Steel			225.0	tonne
5	Piles 600 dia			400.0	m

GENERAL NOTES

1) STRUCTURAL BRIDGE DETAILS & EXTENT OF WIDENING PROVIDED ON THIS DRAWING IS INDICATIVE ONLY BASED ON LIMITED INFORMATION AVAILABLE TO DATE
2) THE SIZE OF STRUCTURAL ELEMENTS ARE BASED PRELIMINARY CALCULATION AND PREVIOUS SIMILAR TYPE WORKS. ALL INFORMATION IS SUBJECT TO DETAILED DESIGN PRIOR TO FINAL CONFIRMATION
3) DETAILS PROVIDED ARE FOR INFORMATION ONLY. INDICATIVE CONSTRUCTION COST ESTIMATES ARE BASED ON PREVIOUS SIMILAR TYPE WORKS
4) THE FOLLOWING CRITICAL INFORMATION IS REQUIRED TO VERIFY THE FEASIBILITY OF THE PROPOSED OPTION AND DEVELOPED THIS FURTHER AT DETAILED DESIGN (IF PREFERRED)
   - TOPOGRAPHICAL SURVEY - CONFIRM GEOMETRIC PARAMETERS AND SITE CONSTRAINTS
   - SITE INVESTIGATION INFORMATION - CONFIRM FOUNDATION PARAMETERS
   - LIAISON WITH HIGHWAYS ENGLAND/CONTRACTOR - CONFIRM TRAFFIC MANAGEMENT REQUIREMENTS
   - LIAISON WITH STATUTORY UNDERTAKERS - CONFIRM EXISTING/NEW SERVICES IMPACTED BY THE WORKS
5) ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE
6) ALL LEVELS ARE IN METERS UNLESS NOTED OTHERWISE
7) DO NOT SCALE IN CASE OF ANY DOUBTS, OMISSIONS OR ERRORS SEEK CLARIFICATION FROM THE DESIGNER

OPTION SPECIFIC NOTES

1) THE OPTION HAS BEEN DEVELOPED BASED ON THE FOLLOWING ASSUMPTIONS
   - DESIGN LOADING: LM1, LM2, LM4, SV 80 TO 196 & SOV 250/350
   - HIGHWAY CROSS SECTION BASED ON PRELIMINARY ALIGNMENT DESIGN BY WSP HIGHWAYS
   - DESIGN LIFE FOR THE NEW ELEMENTS: 120 YEARS
   - ITS IS ACCEPTABLE FOR THE NEW BRIDGE WORKS TO BE CONSTRUCTED ON THE SAME ALIGNMENT AS THE EXISTING.
   - FOR DETAILS OF THE EXISTING STRUCTURE REFER RECORD DRAWINGS
2) KEY MATERIALS (GRADE/STRENGTH)
   - CONCRETE TO BE MINIMUM STRENGTH CLASS C40/50 TO BE 8500 UNLESS NOTED OTHERWISE
   - ALL REINFORCEMENT TO BE GRADE B500B TO BS 4449:2005

INDICATIVE CONSTRUCTION SEQUENCE

- ESTABLISH SITE COMPOUND
- INSTALL PILES FOR ABUTMENTS & WINGWALLS
- CONSTRUCT ABUTMENT & WING WALL PILE CAP & WALLS (FOUNDATION & ABUTMENT TO BE CONNECTED BY DOWELS)
- DISCUSS TRAFFIC MANAGEMENT/COUNTER FLOW REQUIREMENT AND GET APPROVAL FROM HIGHWAY ENGLAND FOR CONSTRUCTION
- CUT EXISTING DECK (EXTENT AS SHOWN IN DRAWING) OF SOUTH OR NORTHBOUND DECK
- DRILL EXISTING DECK/BEAMS FOR ANCHORS (DO NOT INSTALL ANCHORS AT THIS STAGE)
- INSTALL BEAMS
- INSTALL ANCHORS
- CONSTRUCT DECK & PARAPET PLINTH
- REMOVE THE EXISTING DECK SURFACING
- INSTALL COMBINED WATERPROOFING SURFACING, DECK JOINT & PARAPET ETC
- SWITCH THE TRAFFIC ON CONSTRUCTED DECK AND REPEAT SAME STAGE FOR OTHER SIDE

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

CONSTRUCTION:

REF C001 - WORKING ADJACENT TO LIVE TRAFFIC
REF C002 - DIFFERENTIAL SETTLEMENT OF EXISTING/NEW STRUCTURE
REF C003 - CONFLICT WITH SERVICES
REF C004 - HEAVY LIFTING OF BEAMS
REF C005 - INTERFACE RISK BETWEEN NEW/EXISTING STRUCTURES

SAFETY, HEALTH AND ENVIRONMENTAL SYMBOL LEGEND

⚠ INDICATES A RESIDUAL RISK AS A WARNING

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highways england

A1 BIRTLEY TO COAL HOUSE

EIGHTON LODGE NORTH UNDERBRIDGE
PROPOSED GENERAL ARRANGEMENT
(CONVENTIONAL WIDENING)

AS SHOWN @ A1	SJ	RM	HM	HM	
A1	07/02/2018	07/02/2018	07/02/2018	07/02/2018	

PRELIMINARY | S0

HE551462-WSP-SBR-BR005-DR-S-00003 | P01

DO NOT SCALE

A1

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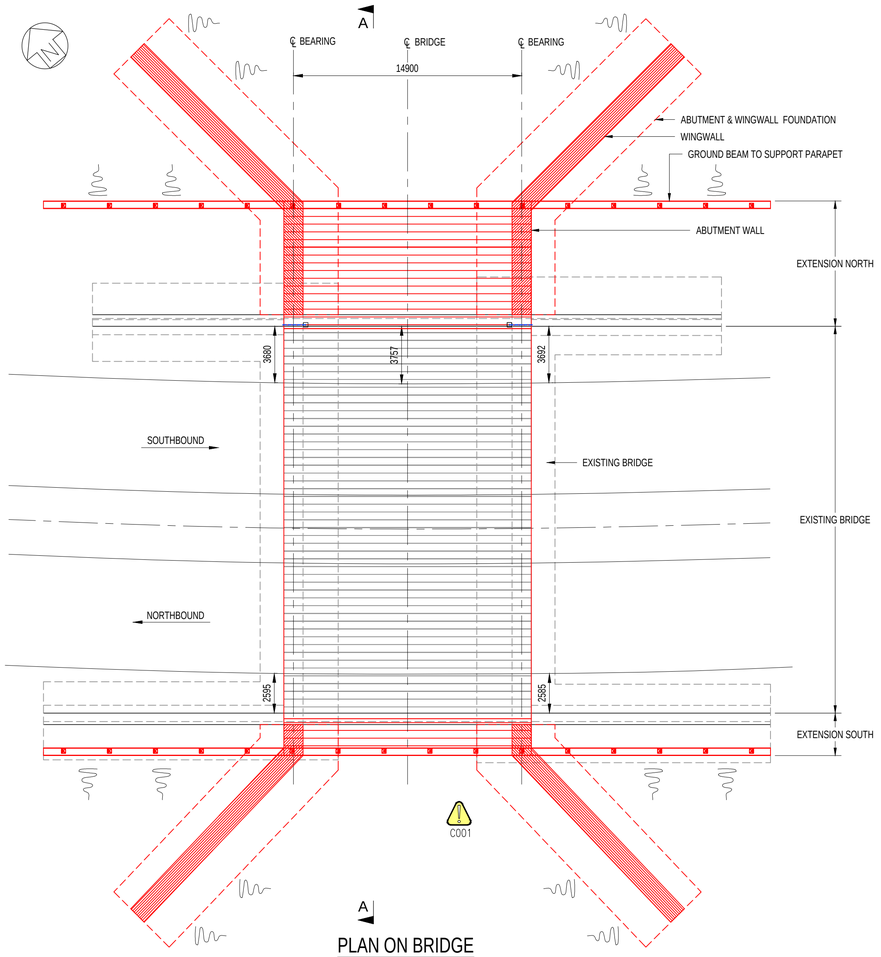
APPENDIX E-3

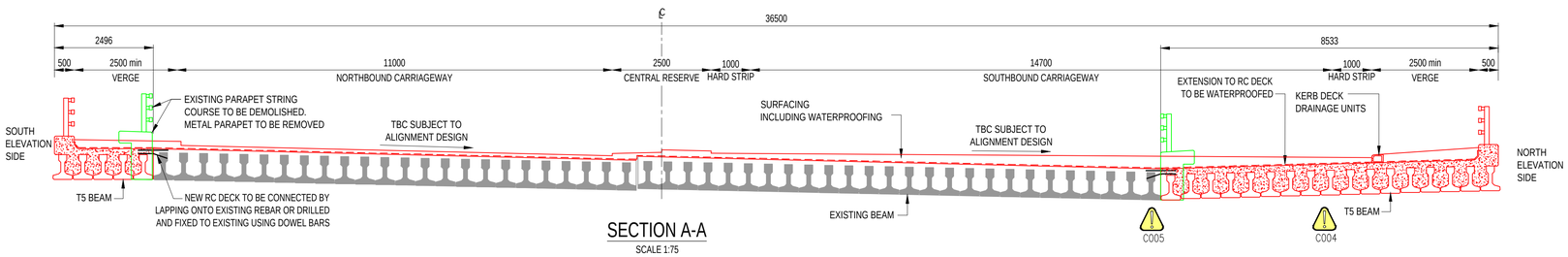
EIGHTON LODGE SOUTH BRIDGE GENERAL ARRANGEMENT

P01
HE551462-WSP-SBR-BR006-DR-S-00002
S0



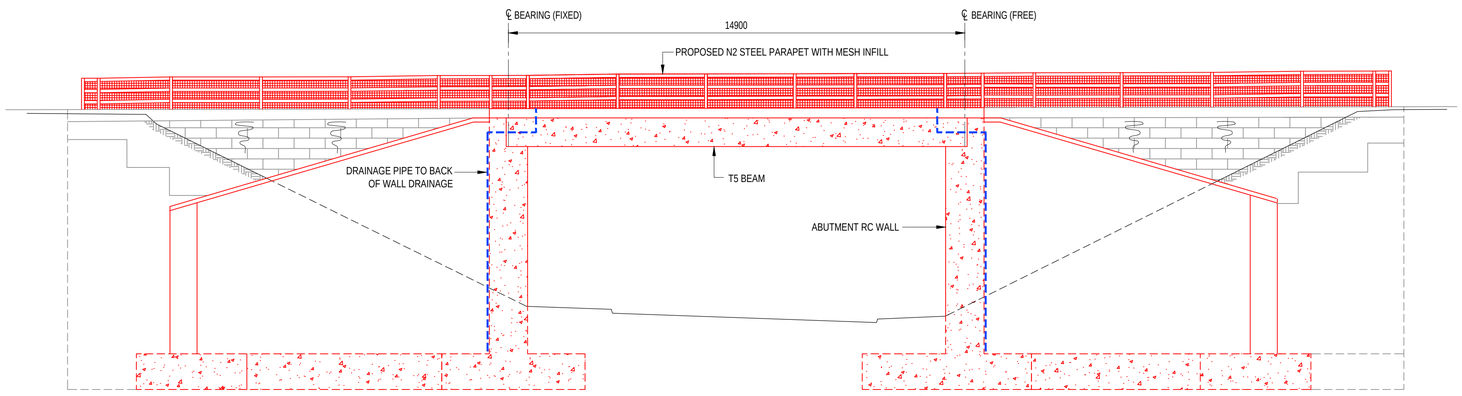
PLAN ON BRIDGE

SCALE 1:200



SECTION A-A

SCALE 1:75

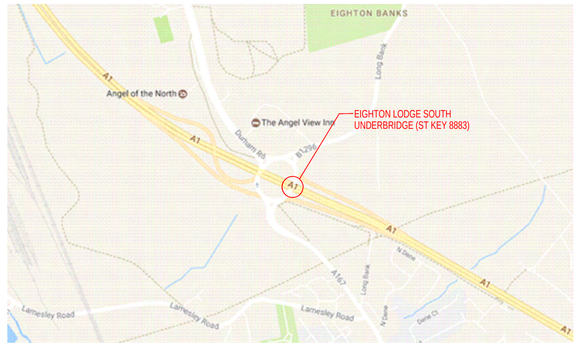


SOUTH ELEVATION

SCALE 1:100

LEGENDS

- PROPOSED
- EXISTING
- REMOVED & MODIFIED



LOCATION PLAN

NTS

EAST ELEVATION

WEST ELEVATION

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
3. DO NOT SCALE IN CASE OF ANY DOUBTS, OMISSIONS OR ERRORS SEEK CLARIFICATION FROM THE DESIGNER.
4. STRUCTURAL BRIDGE DETAILS & EXTENT OF WIDENING PROVIDED ON THIS DRAWING IS INDICATIVE ONLY BASED ON LIMITED INFORMATION AVAILABLE TO DATE.
5. THE SIZE OF STRUCTURAL ELEMENTS ARE BASED PRELIMINARY CALCULATION AND PREVIOUS SIMILAR TYPE WORKS. ALL INFORMATION IS SUBJECT TO DETAILED DESIGN PRIOR TO FINAL CONFIRMATION.
6. DETAILS PROVIDED ARE FOR INFORMATION ONLY. INDICATIVE CONSTRUCTION COST ESTIMATES ARE BASED ON PREVIOUS SIMILAR TYPE WORKS.
7. THE FOLLOWING CRITICAL INFORMATION IS REQUIRED TO VERIFY THE FEASIBILITY OF THE PROPOSED OPTION AND DEVELOPED THIS FURTHER AT DETAILED DESIGN (IF PREFERRED).
   - TOPOGRAPHICAL SURVEY - CONFIRM GEOMETRIC PARAMETERS AND SITE CONSTRAINTS
   - SITE INVESTIGATION INFORMATION - CONFIRM FOUNDATION PARAMETERS
   - LIAISON WITH HIGHWAYS ENGLAND/CONTRACTOR - CONFIRM TRAFFIC MANAGEMENT REQUIREMENTS
   - LIAISON WITH STATUTORY UNDERTAKERS - CONFIRM EXISTING/NEW SERVICES IMPACTED BY THE WORKS

OPTION SPECIFIC NOTES

1. THE OPTION HAS BEEN DEVELOPED BASED ON THE FOLLOWING ASSUMPTIONS.
   - DESIGN LOADING: LM1, LM2, LM4, SV 80 TO 196 & SOV 250/350.
   - HIGHWAY CROSS SECTION BASED ON PRELIMINARY ALIGNMENT DESIGN BY WSP HIGHWAYS.
   - DESIGN LIFE FOR THE NEW ELEMENTS: 120 YEARS.
   - ITS IS ACCEPTABLE FOR THE NEW BRIDGE WORKS TO BE CONSTRUCTED ON THE SAME ALIGNMENT AS THE EXISTING.
   - FOR DETAILS OF THE EXISTING STRUCTURE REFER RECORD DRAWINGS .
2. KEY MATERIALS (GRADE/STRENGTH)
   - CONCRETE TO BE MINIMUM STRENGTH CLASS C40/50 TO BE B500 UNLESS NOTED OTHERWISE.
   - ALL REINFORCEMENT TO BE GRADE B500B TO BS 4449:2005.

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

CONSTRUCTION:

REF C001 - WORKING ADJACENT TO LIVE TRAFFIC
REF C002 - DIFFERENTIAL SETTLEMENT OF EXISTING/NEW STRUCTURE
REF C003 - CONFLICT WITH SERVICES
REF C004 - HEAVY LIFTING OF BEAMS
REF C005 - INTERFACE RISK BETWEEN NEW/EXISTING STRUCTURES

SAFETY, HEALTH AND ENVIRONMENTAL SYMBOL LEGEND

⚠ INDICATES A RESIDUAL RISK AS A WARNING

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A1 BIRTLEY TO COAL HOUSE

EIGHTON LODGE SOUTH UNDERBRIDGE
PROPOSED GENERAL ARRANGEMENT
(CONVENTIONAL WIDENING WITH WINGWALL)

AS SHOWN @ A1	SJ	RM	HM	HM	
A1	07/02/2018	07/02/2018	07/02/2018	07/02/2018	

AIP	S0
HE551462-WSP-SBR-BR006-DR-S-00002	P01

DO NOT SCALE

A1

Appendix F

PROPOSED GENERAL ARRANGEMENT DRAWINGS – SOUTH BRIDGE REPLACEMENT

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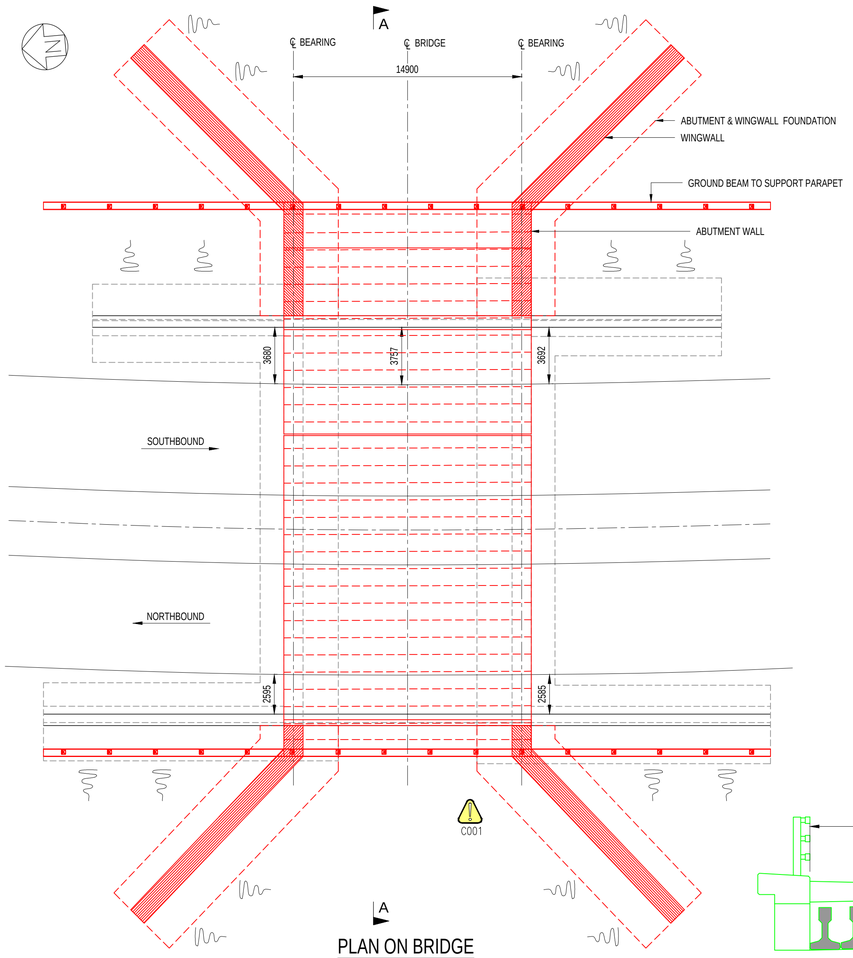
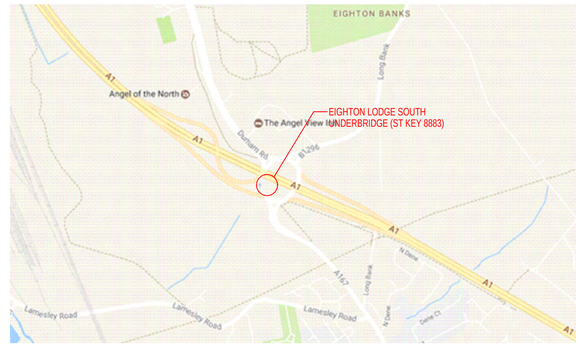
APPENDIX F-1

EIGHTON LODGE SOUTH – REPLACEMENT GENERAL ARRANGEMENT

P01
HE551462-WSP-SBR-BR006-DR-S-00003
S0



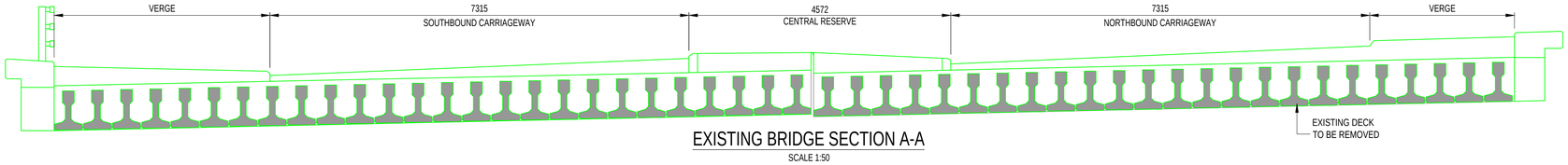
PLAN ON BRIDGE
SCALE 1:200



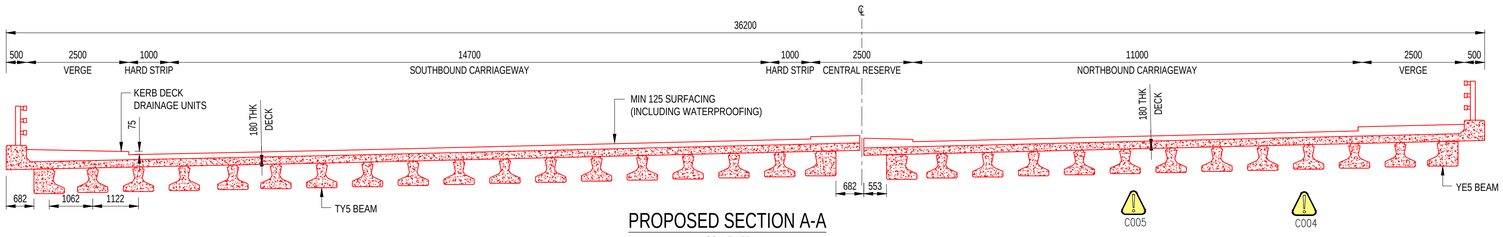
LOCATION PLAN
NTS

EAST ELEVATION

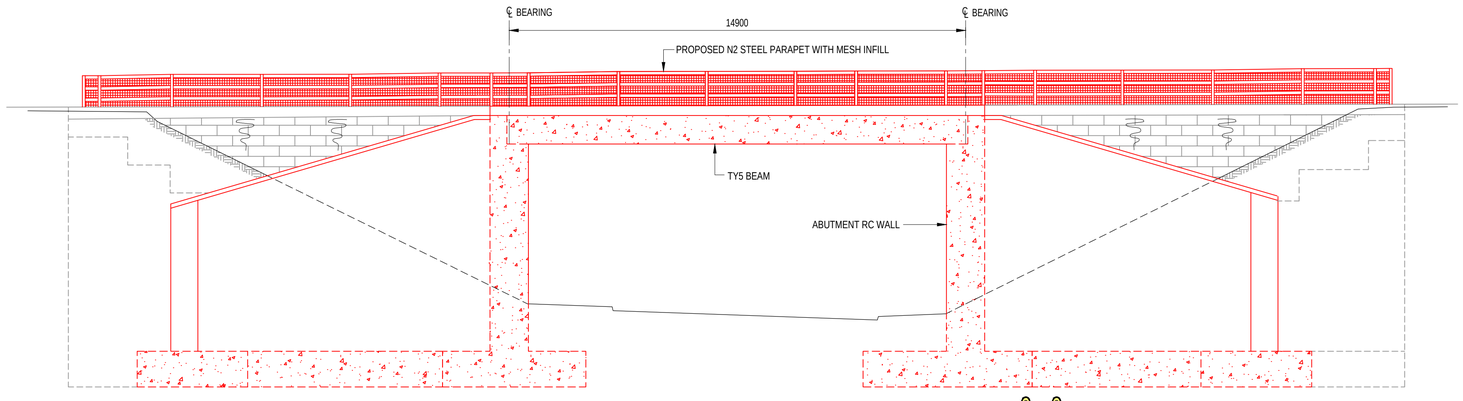
WEST ELEVATION



EXISTING BRIDGE SECTION A-A
SCALE 1:50



PROPOSED SECTION A-A
SCALE 1:75



EAST ELEVATION
SCALE 1:100

LEGENDS

- PROPOSED
- EXISTING
- REMOVED & MODIFIED

S.No	Material	Type	Length	Qty	Unit
1	Beams	TY5	16.0	27.0	Nos
2	Beams	TYE5	16.0	4.0	Nos
3	Concrete			1050.0	cum
4	Steel			262.5	tonne

INDICATIVE CONSTRUCTION SEQUENCE

- ESTABLISH SITE COMPOUND
- CONSTRUCT EXTENT OF ABUTMENT WALL & FOUNDATION (TO BE CONNECTED BY DOWELS)
- CONSTRUCT WING WALL FOUNDATION & WING WALL
- TM CONTRAFLOW TO BE INSTALLED TO FACILITATE DEMOLITION
- REMOVE EXISTING SOUTH OR NORTHBOUND DECK
- INSTALL BEAMS
- CONSTRUCT DECK & PARAPET PLINTH
- INSTALL COMBINED WATERPROOFING SURFACING, DECK JOINT & PARAPET ETC
- SWITCH THE TRAFFIC ON CONSTRUCTED DECK AND REPEAT SAME STAGE FOR OTHER SIDE
- CLEAR THE SITE

GENERAL NOTES

1) OUTLINE DECK REPLACEMENT DETAILS ARE PROVIDEDON THIS DRAWING. INFORMATION IS INDICATIVE ONLY.
2) THE SIZE OF STRUCTURAL ELEMENTS ARE BASED PRELIMINARY CALCULATION AND PREVIOUS SIMILAR TYPE WORKS. ALL INFORMATION IS SUBJECT TO DETAILED DESIGN PRIOR TO FINAL CONFIRMATION.
3) DETAILS PROVIDED ARE FOR INFORMATION ONLY. INDICATIVE CONSTRUCTION COST ESTIMATES ARE BASED ON PREVIOUS SIMILAR TYPE WORKS.
4) THE FOLLOWING CRITICAL INFORMATION IS REQUIRED TO VERIFY THE FEASIBILITY OF THE PROPOSED OPTION AND DEVELOPED THIS FURTHER AT DETAILED DESIGN (IF PREFERRED).
   - TOPOGRAPHICAL SURVEY - CONFIRM GEOMETRIC PARAMETERS AND SITE CONSTRAINTS
   - SITE INVESTIGATION INFORMATION - CONFIRM FOUNDATION PARAMETERS
   - LIAISON WITH HIGHWAY ENGLAND - CONFIRM TRAFFIC MANAGEMENT REQUIREMENTS
   - LIAISON WITH STATUTORY UNDERTAKERS - CONFIRM EXISTING/NEW SERVICES IMPACTED BY THE WORKS
5) ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
6) ALL LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
7) DO NOT SCALE IN CASE OF ANY DOUBTS, OMISSIONS OR ERRORS SEEK CLARIFICATION FROM THE DESIGNER.

OPTION SPECIFIC NOTES

1) OPTION B: COMPRISES THE REMOVAL OF EXISTING DECK AND CONSTRUCTION OF NEW DECK AS SHOWN IN DRAWING.
2) THE OPTION HAS BEEN DEVELOPED BASED ON THE FOLLOWING ASSUMPTIONS
   - DESIGN LOADING: LM1, LM2, LM4, SV 80 TO 196 & SOV 250/350
   - HIGHWAY CROSS SECTION BASED ON PRELIMINARY ALIGNMENT DESIGN BY WSP HIGHWAYS
   - DESIGN LIFE FOR THE NEW ELEMENTS: 120 YEARS
   - ITS IS ACCEPTABLE FOR THE NEW BRIDGE WORKS TO BE CONSTRUCTED ON THE SAME ALIGNMENT AS THE EXISTING.
   - FOR DETAILS OF THE EXISTING STRUCTURE REFER RECORD DRAWINGS
3) KEY MATERIALS (GRADE/STRENGTH)
   - CONCRETE TO BE MINIMUM STRENGTH CLASS C40/50 TO BE 8500 UNLESS NOTED OTHERWISE
   - ALL REINFORCEMENT TO BE GRADE B500B TO BS 4449:2005

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

CONSTRUCTION:

REF C001 - WORKING ADJACENT TO LIVE TRAFFIC
REF C002 - DIFFERENTIAL SETTLEMENT OF EXISTING/NEW STRUCTURE
REF C003 - CONFLICT WITH SERVICES
REF C004 - HEAVY LIFTING OF BEAMS
REF C005 - INTERFACE RISK BETWEEN NEW/EXISTING STRUCTURES

SAFETY, HEALTH AND ENVIRONMENTAL SYMBOL LEGEND

⚠ INDICATES A RESIDUAL RISK AS A WARNING

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A1 BIRTLEY TO COAL HOUSE

EIGHTON LODGE SOUTH UNDERBRIDGE
PROPOSED GENERAL ARRANGEMENT
DECK REPLACEMENT OPTION

AS SHOWN @ A1	SJ	RM	HM	HM	
A1	07/02/2018	07/02/2018	07/02/2018	07/02/2018	

PRELIMINARY — S0

HE551462-WSP-SBR-BR006-DR-S-00003 — P01

DO NOT SCALE

A1

Appendix G

DESIGNERS RISK ASSESSMENT

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APPENDIX G-1

DESIGNERS RISK ASSESSMENT

Way of Working: *Project Delivery*

T446: Design H&S Risk Register

Project No: 70015226-12A

Project Name: Package H: A1 BIRTLEY TO COAL HOUSE- EIGHTON LODGE BRIDGES

Provide Feedback

WSP

Guidance notes *(see guidance notes page for more details)*

Design risk management should be an integral part of the overall design development and designers should think of it in terms of considering constructability, maintainability, etc. Designers only need to document their consideration of risks in this simple risk register format. There is no requirement for quantitative design risk assessments to be carried out/documented and these should be avoided

** Risks should be considered in a logical sequence relating to the location/operational environment, constructability/installability, operability (normal/emergency), maintainability (inc. routine cleaning, replacement, etc.), and alteration/decommissioning/dismantling/demolition, and should be categorised against those headings,*

CIRIA guidance documents C662, C663, C611, C607, etc. provide a useful checklist and detailed guidance on the identification of risks to be considered during design and how those risks might be addressed - see detailed guidance notes for more details

§ Significant residual risks are those which are unusual, not obvious, difficult to manage, or where critical design assumptions apply. The documentation by designers of residual risks that cover well-known and understood hazards should be avoided

Ref	Risk Category* (and Phase where appropriate, *e.g.. location/environment, construction, operation, maintenance, alteration/demolition)*	Work Element/Location (where appropriate)	Hazard or Risk Issue Identified	Risk Management Owner	Design ERIC Action Required (*e.g.. hazard elimination/risk mitigation action, information to be provided to others)*	Significant Temporary Works Requirements/Management Arrangements and/or any Special Erection/Installation Sequences or Requirements	Design Action Status/Final Resolution Notes (*e.g.. traceability of ERIC action, communication of significant residual risk, critical design criteria, etc.*)	Significant Residual Risk§ (Y/N)	Date Logged/ Reviewed	Raised By
1	Construction / Operation / Maintenance	Overall structural from of bridge	Working close to / amongst moving traffic - maintenance of bridge superstructure	Designer / Contractor	Considering their location, it is considered most practical and economical to retain and widen the existing structures. The structures will be designed and detailed to minimize maintenance requirements over their life to minimize work required from the A1	Consideration shall be given for prefabricated elements to minimise on site activities. Contractor to plan TM accordingly and establish a safe system of work.	N/A	N	03/05/2017	Imtiaz Mulla
2	Construction	Method of deck construction	Working close to / amongst moving traffic - construction	Contractor	Works adjacent to live traffic to be minimised by appropriate phasing of works.	Contractor to implement a safe system of work.	Note on drawing highlighting TM requirements as appropriate.	Y	03/05/2017	Imtiaz Mulla
3	Construction	Overall structural form of bridge	Working with concrete - In-situ concrete deck construction require handling of large volumes of concrete, Shuttering requires significant temporary works. Also large reinforcement cages with dangers from impaling and lifting of bars, working at heights etc.	Designer	Insitu deck slab would use permanent formwork that eliminates additional site operations associated with the removal of formwork.	-	N/A	N	03/05/2017	Imtiaz Mulla
4	Construction / Operation / Maintenance	Materials	Working at height - maintenance of concrete subject to exposure to chlorides	Designer	Reinforced concrete within the parapet cantilevers of the proposed widened structure will be subject to direct exposure to de-icing salts from the carriageway. In order to improve the long term durability and consequently reduce maintenance hazards use of stainless steel reinforcement will be considered subject to costing.	-	N/A	N	03/05/2017	Imtiaz Mulla
5	Construction	Method of deck construction	Working at height - erection of bridge beams	Designer / Contractor	Following detailed design, contractor shall, if necessary, provide temporary works to ensure stability of beams in temporary condition. Design to consider designated lifting points.	Designer to review contractor temporary works design to ensure structural adequacy. Appropriate craneage to be used.	Note on drawing indicating erection method(s) to be used.	Y	03/05/2017	Imtiaz Mulla
6	Construction	Method of deck construction	Working at height - Construction of insitu concrete deck	Designer / Contractor	To avoid the use of temporary formwork the design will utilize permanent formwork wherever possible (GRP/GRC planks), in particular the areas between the beams. Use of permanent formwork will restrict working at height to a minimum during deck construction. The deck edge cantilever extensions are to be constructed using temporary formwork supported off the edge beam. Consideration will be given to pre-fixing some of the permanent and temporary formwork to the beams prior to erection to minimise work at height.	Designer to check adequacy of fixing temporary formwork to beams prior to erection.	Note on drawing indicating erection method(s) to be used.	Y	03/05/2017	Imtiaz Mulla
7	Construction	Method of deck construction	Working with lifting devices - erection of bridge beams	Designer / Contractor	Installation of the beams will be carried out by crane from a suitable location adjacent to the bridge. Consideration will be given to locating the crane on the J66 roundabout.	Contractor to implement a safe system of work. Geotech engineer to determine adequacy of ground to support crane during erection.	Note on drawing indicating erection method(s) to be used.	Y	03/05/2017	Imtiaz Mulla
8	Construction	Method of deck construction	Connection to existing deck	Contractor	Rapid strength gain concrete to be used for the casting of the deck slab stitch between existing deck and proposed extension to minimise likelihood of cracking due to the concrete curing time before structure open to live traffic. Guidelines within BA82/00 to be followed.	Contractor to implement a safe system of work. Appropriate TM to be in place during casting of deck slab extension.	Note on drawing highlighting TM requirements as appropriate.	Y	03/05/2017	Imtiaz Mulla
9	Construction	Method of deck construction	New precast beam will require prior delivery arrangements and transportation to site will be problematic, leading to potential road side incidents.	Designer	Detailed design to ensure beam lengths are manageable and are not excessively long etc. to ensure they can be delivered to site with minimal logistical risks. Consideration to be given to potential areas for beams to be stored on site prior to being lifted/installed.	Access to construction area to be designed as part of TM plan.	Contractors to consider method of delivery and erection. Defined loading and unloading areas to be shown on drawings	N	03/05/2017	Imtiaz Mulla
10	Construction	Method of deck construction	Deep excavations for open/pad foundation for substructure construction. Potential risk of collapsing of excavation, entrapment of personnel, overturning of plant and vehicles	Designer	CFA/ bored piled foundation for abutments eliminates risk of deep excavations	Temporary works minimised	N/A	N	03/05/2017	Imtiaz Mulla
11	Construction	Method of deck construction	Instability/movement of GRP deck planks, create gaps and risk of tools/materials falling onto the live roundabout carriageway below	Contractor	Concreting to be done in a controlled manner, to ensure planks are not dislodged	Contractor to implement a suitable safe system of work	N/A	N	03/05/2017	Imtiaz Mulla
12	Construction	Design of Superstructure	Thickness of deck slab extension	Designer	Proposed deck slab extension set at 250mm thick with nominal 125mm thick surfacing. Surfacing on existing structure to be removed and replaced. Existing slab thickness is 160mm (north & slip bridges) & 76mm (south bridge). New surfacing and deck slab thicknesses will be tapered over the deck stitch section to ensure a smooth transition.	Contractor to implement appropriate method of construction.	N/A	N	03/05/2017	Imtiaz Mulla

T446: Design H&S Risk Register

Project No 70015226-12A

Project Name Package H: A1 BIRTLEY TO COAL HOUSE- EIGHTON LODGE BRIDGES

Provide Feedback

WSP

Guidance notes *(see guidance notes page for more details)*

Design risk management should be an integral part of the overall design development and designers should think of it in terms of considering constructability, maintainability, etc. Designers only need to document their consideration of risks in this simple risk register format. There is no requirement for quantitative design risk assessments to be carried out/documented and these should be avoided

** Risks should be considered in a logical sequence relating to the location/operational environment, constructability/installability, operability (normal/emergency), maintainability (inc. routine cleaning, replacement, etc.), and alteration/decommissioning/dismantling/demolition, and should be categorised against those headings,*

CIRIA guidance documents C662, C663, C611, C607, etc. provide a useful checklist and detailed guidance on the identification of risks to be considered during design and how those risks might be addressed - see detailed guidance notes for more details

§ Significant residual risks are those which are unusual, not obvious, difficult to manage, or where critical design assumptions apply. The documentation by designers of residual risks that cover well-known and understood hazards should be avoided

Ref	Risk Category* (and Phase where appropriate, *e.g.. location/environment, construction, operation, maintenance, alteration/demolition)*	Work Element/Location (where appropriate)	Hazard or Risk Issue Identified	Risk Management Owner	Design ERIC Action Required (*e.g.. hazard elimination/risk mitigation action, information to be provided to others)*	Significant Temporary Works Requirements/Management Arrangements and/or any Special Erection/Installation Sequences or Requirements	Design Action Status/Final Resolution Notes (*e.g.. traceability of ERIC action, communication of significant residual risk, critical design criteria, etc.*)	Significant Residual Risk§ (Y/N)	Date Logged/ Reviewed	Raised By
13	Construction	Design of Substructure	Stitching of existing/widened structure - Drilling of dowel holes in existing substructure	Contractor	The proposed abutment extensions are to be stitched connected together using stainless steel dowels. Dowels are to be installed in holes that are drilled in the existing concrete substructures.	Contractor to implement appropriate method of construction and maintain a safe system of work.	N/A	N	03/05/2017	Imtiaz Mulla
14	Construction	Design of Substructure	Stitching of existing/widened structure	Designer / Contractor	Proposed abutment extensions to be detailed with box out section at stitch between existing and proposed widened structure. This will allow extensions to be constructed without developing a structural connection between the existing/widened structure. The stitches will be made following an agreed hold period to allow initial soil settlement to occur (geotech to confirm length of hold soil settlement period).	Geotech engineer to advise on length of hold period to allow initial soil settlement to occur.	Note on drawing highlighting proposed hold period prior to stitching existing/widened structure.	Y	03/05/2017	Imtiaz Mulla
15	Operation / Maintenance	Design of Substructure	Abnormal vehicle loading	Designer	The bridge deck extensions have been designed to accommodate the SOV 350 vehicle. The existing deck has been assessed for the effects of the SOV 350 vehicle and has been found to have insufficient capacity. All movements of SOV vehicles over the bridge deck shall be strictly controlled such that they may only travel within the proposed widened portion of the A1.	-	N/A	N	XX/05/2017	Imtiaz Mulla
16	Construction	Design of Substructure	Pile Construction	Designer / Contractor	Care must be taken when removing the soil material adjacent to existing structural foundations to avoid undermining them. Areas of loose material to be confirmed in the GI. Any overdig to be approved by geotech team.	Contractor to implement appropriate method of construction and maintain a safe system of work. Geotech engineer to advise on suitability of construction methods.	Note on drawing highlighting any special temporary works requirements.	Y	03/05/2017	Imtiaz Mulla
17	Construction	Design of Substructure	Excavation for abutment extensions	Designer / Contractor	Care must be taken when removing the soil material adjacent to existing structural foundations to avoid undermining them. Areas of loose material to be confirmed in the GI. Any overdig to be approved by geotech team.	Contractor to implement appropriate method of construction and maintain a safe system of work. Geotech engineer to advise on suitability of construction methods.	Note on drawing highlighting any special temporary works requirements.	Y	03/05/2017	Imtiaz Mulla
18	Construction / Operation / Maintenance	Statutory Undertakers Services	Damage to services during construction of substructure for widened structure	Contractor	Service requirements to be confirmed prior to constructions. Details to be included in appendix 1/16 of the works information. Any proposed services to be located within the verges to simplify access.	-	Appropriate note/reference to be put on drawings relating to the proposed service ducts provided and their location (TBC). Appropriate note/reference to be put on drawing for the location of existing services.	Y	03/05/2017	Imtiaz Mulla
19	Construction	Construction Waste Disposal	Site vehicles using public highways to transport excess materials to disposal sites. Mud on roads, airborne contamination during/after transit	Contractor	Identify agreed route where disruption will be minimised and how the site will be accessed by construction traffic during works.	Wheel washing facility to be used on site to minimise mud tracked onto road network. Tarpaulins and straps to be checked before deliveries leave site. Appropriate encapsulation to be done to ensure any waste material is not exposed to the environment.	Contractor to plan all site deliveries and make suppliers aware of these. To be defined in TM plan.	N	03/05/2017	Imtiaz Mulla
20	Demolition	Demolition of deck edge	Removal of existing deck edge - instability of existing structure	Designer	To facilitate widening of existing superstructure and maintain structural continuity at the deck edge, a portion of the deck edge under the verges will require demolition. This will include concrete stringcourse beam. Consideration shall be given to the best method for their demolition including hydrodemolition.	Designer to assess effect of the deck edge removal on the load carrying capacity of existing structure. Contractor to be notified of any temporary requirements during demolition (i.e. reduction of traffic lane widths).	Risk to be added to drawings	Y	03/05/2017	Imtiaz Mulla
21	Demolition	Demolition of deck edge	Removal of existing deck edge - debris falling onto live carriageway below	Demolition contractor	To facilitate widening of existing superstructure and maintain structural continuity at the deck edge, a portion of the deck edge under the verges will require demolition. This will include concrete stringcourse beam. Consideration shall be given to the best method for their demolition including hydrodemolition.	Contractor to implement a suitable safe system of work including encapsulation during demolition process to prevent debris from falling onto live carriageway below. TM to be planned accordingly.	Risk to be added to drawings	Y	03/05/2017	Imtiaz Mulla

Appendix H

WSP/HE CORRESPONDENCE

Al-Shalechy, Shehed

From: Sunderland, Martin <Martin.Sunderland@highwaysengland.co.uk>
Sent: 21 May 2018 15:51
To: Mistry, Hitan
Cc: Al-Shalechy, Shehed; Mulla, Imtiaz; Wilkes, Nicola; Dennis, Stephen; Meikle, Jessica; Rawcliffe, Nigel; Gladstone, Peter; Akram, Irfan; Mehta, Rakesh
Subject: RE: A1B2CH - Issue of the Eighton Lodge SOR Response to comments 20-04-18
Attachments: A1B2CH eighton lodge bridges SOR comments 19-04-18TAAresponse.docx

Hitan

Good afternoon to you, hope you are enjoying the nice weather.

I confirm that all the comments for the proposed SOR are closed out.

Regards

Martin Sunderland
Safety, Engineering & Standards
Senior Structures Advisor
Highways England | Lateral | 8 City Walk | Leeds | LS11 9AT
Tel: 0300 470 6165 | [redacted]
Web: http://www.highways.gov.uk

Learn more about Structures Delivery by visiting our Portal Homepage
A web version of this Homepage is currently unavailable.

From: Mistry, Hitan [mailto:Hitan.Mistry@wsp.com]
Sent: 20 April 2018 16:15
To: Sunderland, Martin
Cc: Al-Shalechy, Shehed; Mulla, Imtiaz; Wilkes, Nicola; Dennis, Stephen; Meikle, Jessica; Rawcliffe, Nigel; Gladstone, Peter; Akram, Irfan; Mehta, Rakesh
Subject: RE: A1B2CH - Issue of the Eighton Lodge SOR Response to comments 20-04-18

Martin,

Good to meet you today. Please find attached our response to the comments sheet for the Eighton Lodge SOR. This refers to our meeting today and decisions regarding the works at Eighton Lodge South bridge.

Once your satisfied with the comments, we shall amend and issue the final version of the SOR incorporating the agreed changes.

Regards

Hitan Mistry
Associate Director

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Three White Rose Office Park, Millshaw Park Lane, Leeds LS11 0DL

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From: Sunderland, Martin [mailto:Martin.Sunderland@highwaysengland.co.uk]
Sent: 16 April 2018 14:56
To: Mistry, Hitan <Hitan.Mistry@wsp.com>
Cc: Al-Shalechy, Shehed <Shehed.Al-Shalechy@wsp.com>; Mulla, Imtiaz <Imtiaz.Mulla@wsp.com>; Wilkes, Nicola <Nicola.Wilkes@highwaysengland.co.uk>; Dennis, Stephen <Stephen.Dennis@highwaysengland.co.uk>; Meikle, Jessica <Jessica.Meikle@highwaysengland.co.uk>; Rawcliffe, Nigel <Nigel.Rawcliffe@wsp.com>
Subject: RE: A1B2CH - Issue of the Eighton Lodge SOR for HE SES comment/approval. Progress to date 01-03-18
Importance: High

Hitan

Thank you for your email below and for the SOR for the three Eighton Lodge Bridges.

I apologise for the length of time it has taken me to reply for this report.

I have reviewed the SOR for the proposed widening proposals for the three Eighton Lodge Structures, and two of the bridges are relatively straight forward (Eighton Lodge North and Eighton Lodge Slip Rd), but one of them (Eighton Lodge South) has more than option, and these options have implications for future headroom under this structure.

Headroom
Minimum maintained headroom allowable for a structure is **5.03m** as defined in TD27/05 and the Highways Act.
Minimum headroom for a new structure is **5.3m** (+sag + allowance for settlement + allowance for deflection) as defined in TD27/05

Of note is that **5.03m** is not a number that can be used for design of a new overbridge, and in theory this would also apply to substantial deck extensions.
However if an existing bridge had a headroom of 5.03m or slightly more, a Dep from Standard would probably approved based on site specific circumstances.
Whereas if an existing bridge has a carriageway headroom of 6.719m (South Elevation) leading to 5.215m (North Elevation)

Eighton Lodge South Bridge (ELS)
ELS has a carriageway headroom of 6.719m (South Elevation) leading to 5.215m (North Elevation), and therefore does not quite meet new design standards of 5.3m, but it is reasonable close (subject to a new level survey).
The results of these measurements for Eighton Lodge South Bridge is that if it was widened at its North side following the same soffit and deck profile as the existing bridge the resulting headroom would be less than 5.03m.
The options to overcome this potential headroom deficiency stated in the SOR for this bridge are:

3.2.13 Consideration would need to be given to one or more of the follo
minimum maintained headroom is achieved at Eighton Lodge Soutl

- Value engineer/rationalise the extent of the widening to th carriageway (reduced lane widths, verge widths etc.) thereb widening and consequent reduction to headroom.

- Structural widening on the north elevation side could be desig the existing deck. Alternatively the extension could comprise a upward slope towards the end of the deck thereby improvir drainage (including outlet) would need to be carefully consider ponding of sub surface water within the shallow V trough on the

- Localised regrading of the roundabout to increase the clearanc

The above options are worth exploring, however this may potentially still not easily result in the provision of the headroom clearance required.

Another option that has been mentioned in the SOR is the complete re-decking of this structure, with the provision of 5.3m headroom at the North Elevation pinch point.
This would option would obviously cost more, and would have implications for the scheme in both traffic management and program.

I have jotted down a few advantages/disadvantages for this option below.

Eighton Lodge South - Widening Options (advantages/disadvantages)		
Works Required	**Conventional widening of existing deck**	**Remove existing bridge construct new d**
Cost estimate	£1.0M	TBC (circa £2.5
Headroom provision	Substandard may need a Dep from Standard (disadvantage)	Fully compliant with St
Design life of superstructure	mixture of new construction and 1972 bridge deck	New bridge deck with design life
existing bridge deck bearings	Unaffected	replaced
Substructure	works to widen abutments and construct new wing walls same for both options (neutral)	works to widen abutme construct new wing walls both options (neut
Existing deck	hydro dem of edges	existing deck remo
Tying into existing deck	Problem with vibration, TM requirement	None
TM requirement for A1	Most works can be constructed without affecting SRN (apart from tying in	Works will need careful maintain traffic flows
Apparatus in SRN and bridge decks	Neutral	Neutral
TM required on roundabout if reprofiling vertical alignment	potentially high	None
TM required to land bridge beams etc	Neutral	Neutral

Horizontal alignment on SRN	Potential issues, could affect drainage	None
Vertical alignment on SRN	None	Potential issue

I have contact our SES Policy Specialist for TD27/05 issues (Hideo Takano) to discuss with him the implications of a Departure from Standard for this type of bridge widening scheme and the Headroom requirements.

In order for us to make a more informed decision I would like you (subject to Nicolas approval) to consider this option further to enable all implications to be considered including buildability, viability and a robust cost estimate, all discussed in a revised SOR.

Regards

Martin Sunderland
Safety, Engineering & Standards
Senior Structures Advisor
Highways England | Lateral | 8 City Walk | Leeds | LS11 9AT
Tel: 0300 470 6165 | [redacted]
Web: http://www.highways.gov.uk

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From: Mistry, Hitan [mailto:Hitan.Mistry@wsp.com]
Sent: 01 March 2018 00:36
To: Sunderland, Martin
Cc: Al-Shalechy, Shehed; Mulla, Imtiaz; Gladstone, Peter; Akram, Irfan; Mehta, Rakesh; Wilkes, Nicola; Dennis, Stephen; Meikle, Jessica; Rawcliffe, Nigel; Tziolas, Michail; Jariwala, Mohammad Ibrahim
Subject: RE: A1B2CH - Issue of the Eighton Lodge SOR for HE SES comment/approval. Progress to date 01-03-18

Evening Martin,

Just to let you know the SOR for Eighton Lodge Bridges (the one I have kept promising to issue) has finally been posted (too big to email) for the HE SES review/approval.
Please could you send me an email to confirm receipt of the posted report (CD also provided). That completes the submission of all the SORs required for A1B2CH scheme.
In summary there are only three outstanding SORs that we await your comment/approval these are:

- SOR ALLERDENE CULVERT
- SOR RETAINING WALLS
- SOR EIGHTON LODGE BRIDGES

Our attention now turns to preparing outline AIPs for the recommended structures works recorded in the various SORs. Our understanding for preparing the AIPs at preliminary design is to establish the design philosophy/assumptions, and highlight any queries/issues so that they can be reviewed now or readily resolved at detailed design to streamline the AIP approval process.

The first two AIPs to be issued by the end of the week are;

- Kingsway Viaduct AIP – asymmetrical widening with a steel composite
- Longbank AIP – Extension via a CSBS

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APPENDIX H-1

CLOSE OUT CORRESPONDENCE

Structures Options Report	Name of Project:	A1 Birtley to Coalhouse
(Bridges and other Highway Structures)	Name of Bridge/Structure:	Eighton Lodge North, South and Slip Rd Bridges
	Structure Ref No:	N/A

Safety Engineering & Standards (SES) Record Sheet

		Comments Sheet Document Control			
		Comment sheet version	**Date HA comment sheet**	**Date Designer's reply sent**	**Notes**
Document Ref	SBR-BCH-RP-S-1700-059	**A 16.04.18**	**16-04-18**	**20-04-18**	
		B			
SOR version		**C**			
		D			
SOR Date	Feb 2018	**E**			

No	**Section**	**Initial comment (HE response) and further comments on Designer's reply**	**Designer's reply**	**Accepted by HE**
1	Executive Summary	I confirm that the complete replacement of Eighton Lodge South Bridge neds to be further explored.	As discussed and agreed during a meeting between the HE PM team/HE SES and WSP on the 20/04/18, the review of the complete deck replacement option is not required at this stage. WSP are to review the proposed widening works to Eighton Lodge South and determine the compromise to be made regarding limiting headroom, drainage and alignment design that satisfies all parties. We have cross checked the survey undertaken	Accepted

		I also confirm agreement for an urgent detailed level survey of the three bridges with respect to headroom constraints, and the investigation of statutory undertakers apparatus that may impact the proposed works.	on site during the SOR preparation with the latest 3-D topographical survey information. We confirm the headroom referred in the report correlate well which measurements on site. Therefore we consider that a further detailed headroom survey is not required. Statutory Undertaker investigation are on-going. Details of which should be available to inform the works at detailed design.	
2	2.6.3	"Ambiguity regarding services being carried through the existing three Eighton Lodge Bridges" Notes, if existing edge beams are to be left in place as part of the planned works, hopefully any existing services in these bridge decks will be unaffected. However the existing edge beams could be in poor condition, and once tested for chlorides and spalling concrete etc, it may make sense to replace them dependant on their condition.	Based on the proposed highway alignment it is anticipated that any services within the existing verges shall be relocated into the new reconstructed verges as part of the widening works. Based on a survey during the SOR and reference to previous PI reports. It appears the edge beam to the Slip and North bridges are in good condition and therefore can be retained. The existing parapet upstand to the Slip and	Accepted

			North bridges, directly within the slash zone of the carriageway and most susceptible to chloride ingress, shall be demolished and reconstructed as part of the works and therefore minimise the risk of retaining existing deck elements with high levels of chloride ingress. The existing edge beam to the South bridge is of RC construction and would be demolished to facilitate the deck widening works.	
3	3.1.3	"Removal of the 1.0m hard strip requirement when applying the urban cross section". Is this a requirement or a minimum standard? If we are widening the bridges anyway, would it be worth considering keeping the 1.0m hard strip even though it is not required by TD27 for an Urban motorway with a speed limit of <60mph.	The Urban all-purpose (no hardstrips) cross section is to standard. Including a hardstrip would be an overprovision. At this stage there are no perceived benefits that would warrant this additional provision.	accepted
4	3.2.4	I confirm agreement with this paragraph for the form of the structural widening.	Noted.	accepted
5	3.2.5	I confirm agreement that the form any widening should be joined to the existing deck, thus eliminating the need for a longitudinal joint.	Noted	accepted
6	3.2.12 3.2.13	I have contacted the HE policy specialist responsible for TD27/05, in particular "headrooms at structures".	As discussed during a meeting between the HE PM team/HE SES and WSP on the 20/04/18,	accepted

		I have asked for an opinion with regards to the requirement for the headroom requirement at an extension to an existing bridge, i.e is the requirement 5.3m or 5.03. I am still awaiting a response to this question, which would have implications for Eighton Lodge South Bridge.	It has been agreed that widening would be permitted as long as the minimum 5.03m maintained headroom is not compromised. However a departure from standard would need to be submitted to record this proposal. WSP shall explore options to maximise the headroom above the minimum requirement prior to detailed design.	
7	3.2.18	Previous para is numbered 3.2.14	Noted, paragraphs shall be renumbered	accepted
8	4.2	First para “Error! Reference source not found.”	Noted, to be formatted correctly	
9	4.6 4.6.2 4.6.5	Generally agree with what is stated in this section, in theory it is best to match the existing foundations as closely as possible. The existing bridges where constructed over 30 years ago and presumably any settlement has taken place long ago. As we will be concerned with differential settlement the form of any proposed foundations should be to minimise this differential settlement, and this criteria would be the deciding factor for any foundation proposals, spread, piled or otherwise.	Noted, the preferred foundation shall be confirmed at detailed design. The decision shall be based on a detailed review/assessment of the GI data and shall ensure differential settlement is limited as much as reasonably practical.	accepted
10	5.1.6	Subject to agreement with the PM, I would like to ask that the option to completely replace Eighton Lodge South Bridge be considered and included as a quantified option in this report.	See response to comment no.1	accepted

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If you have any enquiries about this document A1BirtleytoCoalhouse@highwaysengland.co.uk or call 0300 470 4580*.

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