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## **East Sussex County Council Transport and Environment**

### **Bexhill to Hastings Link Road S04 Ninfield Road Overbridge Approval in Principle**

**Doc. Ref: B1297000-PH2/1600.06a/0004  
Revision 0  
September 2012**



**Project:** Bexhill to Hastings Link Road  
**Client:** East Sussex County Council  
**Document title:** Ninfield Road Overbridge AIP  
**Ref. No:** B1297000-PH2/1600.06a/0004  
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	Originated by	Checked by	Reviewed by	Approved by
<b>ORIGINAL</b>	NAME R Hutt	NAME P Blackle	NAME P Blackle	NAME R. Davenport S. Guruparan
DATE 07/09/2012	INITIALS [Redacted]	INITIALS [Redacted]	INITIALS [Redacted]	INITIALS [Redacted]
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## Revision Summary

Client: East Sussex County Council      Transport and Environment  
Project: Bexhill to Hastings Link Road      Job No: B1297000  
Document Title: S04 Ninfield Road overbridge AIP

REVISION / DATE	COMMENT
Rev 0 07/09/12	<p>Amended to incorporate TAA comments raised on Phase 1 AIP ref. JB-B1297000-PH1/1600.06a/0004(rev 0)</p> <p>Superstructure modified to steel composite deck based on Submission 3 VE option.</p> <p>Articulation modified to remove longitudinally fixity. Semi-integral end-screen detail added.</p> <p>Construction proposals included.</p> <p>BHLR mainline verge Departure added.</p> <p>Geotechnical information updated.</p>



## 1. HIGHWAY DETAILS

### 1.1 Type of highway

Over - A269 Ninfield Road single carriageway urban highway

Under - Bexhill to Hastings Link Road - single carriageway urban all purpose road, approximately 7.3m wide with 2.5m verge on east and west sides.

### 1.2 Permitted traffic speed

Over: 30 mph

Under: 40 mph

### 1.3 Existing restrictions

The existing bridge at the site consists of a brick arch span having a square span of 7.8m and skew span of 8.2m between abutments.

The existing bridge carries a 7.3m wide kerbed road with minimum 2.4m wide paved footway verges on each side

The existing bridge has brick masonry parapets.

## 2. SITE DETAILS

### 2.1 Obstacles crossed

Single carriageway urban highway over Bexhill to Hastings Link Road

## 3. PROPOSED STRUCTURE

### 3.1 Description of structure

The structure is a single span overbridge carrying the A269 Ninfield Road over the BHLR. The deck consists of fabricated and painted steel beams, acting compositely with a reinforced concrete slab, and a reinforced concrete end screen diaphragm wall.

The deck parapets will be cast insitu reinforced concrete with brick cladding on both sides. Copings will be formed with in situ reinforced concrete; although the traffic speed on the side road would not preclude adoption of precast concrete copings should that be preferred by the Contractor following constructability reviews.

The deck is simply supported on reinforced concrete bankseats cast to the top of concrete faced contiguous bored piled abutments.

The existing brickwork wing walls are retained and incorporated. The wall will be underpinned as necessary if required in order to accommodate re-profiling of the ground around the wall toe areas.

The OS grid reference for the structure is 574302.0E, 109031.4N.

### 3.2 Structural type

The deck consists of fabricated steel beams acting compositely with a concrete slab. The reinforced concrete deck slab will be cast on non-participating Glass Reinforced Plastic (GRP) permanent formwork.

The deck end screen/diaphragm is in accordance with the semi-integral configuration of BA 42/96.

### 3.3 Foundation type

Embedded contiguous bored piles.

### 3.4 Span arrangements

Square span	17.919m	Skew angle	16.6 degrees
Skew span	18.698m		

### 3.5 Articulation arrangements

The deck is simply supported at both ends via bearings, forming a semi-integral structure. The bearings sit on capping beams to embedded contiguous reinforced concrete bored pile abutments.

Bearings to be generally free-sliding with transverse fixity provided by 1 No sliding guided bearing on each abutment.

Type 2 (Asphaltic plug) joints are proposed at the approach embankment/deck interfaces.

### 3.6 Types of road restraint systems

Reinforced concrete parapet with brick cladding on both sides and steeple coping. Overall height of parapet equal to 1000mm.

Containment standard/working width N2/W4, as defined by RRRAP assessment.

### 3.7 Proposed arrangements for maintenance and inspection

Inspection and maintenance of the lower levels of the substructure, the deck surface and inner parapet faces can be carried out at ground level from footpaths and verges.

The bridge soffit, upper substructure areas and the outer parapet faces will be inspectable from a platform or MEWP.

Foundations will not be visible or accessible for inspection.

Jacking points will be provided for bearing replacement as necessary. Services pipes and badger pipes are either continuously sleeved or locally sleeved through the end screen walls. Sleeves will contain bellows mechanisms if appropriate, although due to the short span it is unlikely they will be required. Jacking for bearing removal would typically be limited to a couple of mm which would generally be accommodated by the annulus between sleeve and pipe.

#### 3.7.1 Traffic management

A single lane closure of the link road will be required to facilitate inspection and maintenance of the deck soffit, bearings, upper faces of abutments and wing walls and outer faces of parapets.

#### 3.7.2 Access

Access to the structure is via the Bexhill to Hastings Link Road under and Ninfield Road over.

Inspection of the deck soffit, bearings, upper faces of abutments and wing walls and outer faces of parapets can be carried from a mobile elevated working platform.

The interior faces of the piped badger passage in the bridge deck and the buried passages under the approaches will not be accessible for inspection other than by



CCTV type survey.

3.8.1 **Materials and finishes – relating to new construction only and not to elements of existing structure retained in new works**

Concrete	Element	Limiting Exposure Class
C40/50	Deck slab top	XC3
	Cantilever soffit	XD1
C40/50	Parapet beams	XD1
C40/50	Parapet walls	XC3/4
C40/50	Parapet copings	XD3
C40/50	Bankseats soil face	XD1
	air face	XD3
C32/40	Contiguous bored piles	DC-4z. Note A

Note A ACEC class is AC-4z in natural ground therefore Design Chemical Class for pile design will be DC-4z. Refer to Geotechnical Summary Sheet for detail.

**Reinforcement** All reinforcement to be grade 500B or 500C deformed bars to BS 4449:2005.

**Structural steelwork** Steel beams: Grade S355J2+N in accordance with BS EN 10025.

No intermediate web stiffeners to be visible on external face of the completed structure.

**Parapets** Brick-clad reinforced concrete

Concrete class C40/50

Brickwork Category F Class B to BS3921, water absorption not greater than 4.5%.

**Backfill to abutments and retaining walls** Where applicable backfill will be Class 6N or 6P in accordance with the SHW

The contiguous bored pile abutments will be constructed against the existing ground

**Concrete Finishes**

Deck soffit Permanent formwork (GRP). F2 to cantilever soffit.  
U4

Surfaces to receive waterproofing

Top of parapet plinth U3

Sides of parapet plinth F3

Abutment cladding F6 (grooved patterned profile finish)

Sides of parapet stem wall F1

Buried formed surfaces F1

Buried unformed surfaces U1

Wing walls Existing brickwork

**Protection**

The deck surface, between parapet interfaces, will be protected using a bridge deck waterproofing system.

All accessible concrete surfaces in contact with or below ground level to receive 2 coats of a

bituminous waterproofing system in accordance with the SHW

### 3.8.2 Sustainability issues

The existing brickwork wing walls will be retained and where possible, reclaimed bricks will be used for cladding the reinforced concrete parapets.

### 3.9 Risks and hazards considered

Standard construction methods are anticipated with normally associated risks and hazards. A design hazard log and risk assessment process is active for the scheme.

Stability of the existing mass brick gravity retaining walls, demolition of the existing brick arch structure and the proximity of temporary service and traffic diversions are site specific hazards.

### 3.10 Estimated cost of proposed structure together with other structural forms considered and the reasons for their rejection including comparative whole-life costs with dates of estimates.

Other structural forms were discussed and appraised in Amey report number 262701/012 'Bexhill to Hastings Link Road, Preliminary Design, Structures Options Report' and the addendum to it numbered 262701/060

### 3.11 Proposed arrangements for construction

Ninfield Bridge carries the A269 through Bexhill and is a strategic transport corridor in the Bexhill area used by several bus services. As such we appreciate that we can not close this road for the demolition and the construction of the new bridge which is on the same alignment.

The methodology of constructing the new bridge is a critical issue, in terms of minimising disruption to the travelling public. In order to mitigate the impact of these works we would look to undertake and complete the works to Woodsgate Park over bridge first, to provide an alternative route for local traffic and residents. Following the reopening of Woodsgate Park over bridge we would commence works at Ninfield Bridge.

The following suggested sequence of works allows for the bridge to be rebuilt whilst maintaining one lane of traffic south bound. North bound traffic will be diverted along the newly constructed BHLR from Belle Hill Junction and up the Sidleys Goods Yard access ramp to access the A269 towards Ninfield. A weekend closure may be required to demolish the existing bridge.

- The area to the East of the existing bridge will be backfilled with suitable material up to the same level as the existing A269 carriageway. The fill will be temporarily supported adjacent to the existing Ninfield Bridge utilising reinforced earth support.
- The Statutory Utilities will be diverted via the filled area, so that no services are present within the existing structure or within the footprint of the new structure. This work will be undertaken under single way working traffic lights.
- The West side footpath will be closed to pedestrians and the East side footpath diverted on the filled area.
- South bound traffic will also be diverted onto the filled area and segregated from the existing structure and pedestrians with the use of Temporary Vertical Concrete Barriers.

- North Bound Traffic will be diverted up the new BHLR from Belle Hill Junction and on to A269 via Sidley Goods Yard access. Note this access will be made one way. The existing Ninfield Bridge will then be closed to traffic.
- Contiguous bored piles will then be installed for the new abutments and the bearing shelves and ballast walls constructed. The existing Ninfield Bridge brick wingwalls will be retained to act as the wingwalls for the new structure.
- The existing structure will then be demolished during a weekend closure of the A269. South Bound traffic being diverted via Buxton Drive, Woodsgate park and London Road.
- The new bridge deck could then either be constructed in situ or adjacent to the structure and then moved into position to reduce the overall duration of the works.
- Services would be re-diverted into the new deck;
- Surfacing / finishings to the bridge would then be completed, The completed bridge would open to unrestricted traffic.
- The fill to the East side of the bridge would then be removed and incorporated into the permanent works. The temporary Bailey bridge would be removed and traffic diverted onto the new section of bridge deck. Traffic would remain in single way working. A weekend closure would be required.

#### **3.11.1 Traffic management**

Various temporary closures, diversions and traffic management layouts will be required, as described above.

#### **3.11.2 Service diversions**

The temporary diversions of gas, electricity, water and telecoms services including fibre optic cables will be required, as described above. These services will be moved again to cross the new Ninfield Road Overbridge.

#### **3.11.3 Interface with existing structures**

The existing arch structure and abutments will be demolished. The existing wingwalls are to be retained, where practicable.

The level of the new deck is constrained by approach road and footpath alignments and by the existing two foul sewers currently located in the existing crossing.

## **4. DESIGN CRITERIA**

### **4.1 Live loading , Headroom**

#### **4.1.1 Loading relating to normal traffic under AW regulations and C&U regulations**

Full HA loading in accordance with BD 37/01

#### **4.1.2 Loading relating to General Order traffic under STGO regulations**

30 units of HB loading on any one notional lane only in accordance with BD 37/01

**4.1.3 Footway or footbridge live loading**

Footway loading in accordance with BD 37/01.

**4.1.4 Loading relating to Special Order Traffic, provision for exceptional abnormal loads or indivisible loads, including location of vehicle track on deck cross-section**

None

**4.1.5 Any special loading not covered above**

Vehicle collision loading (BD 60/04).

Jacking points will be provided between permanent bearing positions. The bridge will be designed to carry full HA design load during bearing replacement.

**4.1.6 Heavy or high load route requirements and arrangements being made to preserve the route, including any provision for future heavier loads or future widening.**

Neither the BHLR nor Ninfield Road are heavy or high load routes

**4.1.7 Minimum headroom provided**

A minimum headroom of 5.3m will be provided to the BHLR after allowing for deflections arising from dead load, live load and settlement.

**4.1.8 Authorities consulted and any special conditions required****Authority Consulted****Special Requirement**

1. ESCC

Construction of Woodsgate Park Overbridge and Ninfield Road Overbridge will be phased such that one or other bridge span will be open to vehicular and pedestrian traffic at all times.

2. ESCC

A269 Ninfield Road to maintain minimum single lane traffic at all times.

3. Environment Agency

A badger passage will be provided within the bridge deck with pipe passages connecting to the cutting/embankment slopes from the wing walls.

**4.2 List of relevant documents from the TAS**

See Appendix A

**4.2.1 Additional relevant standards  
BS 6779; Part 2; 1992**

Highway parapets for bridges and other structures -  
Part 2: Specification for vehicle containment parapets of concrete construction

BS 6779; Part 4; 1999	Highway parapets for bridges and other structures - Part 4: Specification for parapets of reinforced and unreinforced masonry construction
BS 8500; Part 1; 2006	Concrete; Complementary British Standard to BS EN 206-1; Method of specifying and guidance for the specifier
BS 8500; Part 2; 2006	Concrete; Complementary British Standard to BS EN 206-1; Specification for constituent materials and concrete
CHE Memorandum 227/08	The Impregnation Of Reinforced and Prestressed Concrete Highway Structures Using Hydrophobic Pore Lining Impregnants

#### 4.3 Proposed Departures from Standards given in 4.2 and 4.2.1

- Departure D3: Verges over/under Structures
- Implementation of CHE Memorandum 227/08 - Deletion of requirement for impregnation with hydrophobic pore lining impregnant
- Implementation of IAN 96/07 Rev 1 Guidance On Implementing Results Of Research On Bridge Deck Waterproofing
- Use of permanent formwork with deflection characteristics exceeding span/300

See Appendix E

#### 4.4 Proposed methods for dealing with aspects not covered by Standards in 4.2 and 4.2.1

Not applicable

### 5. STRUCTURAL ANALYSIS

#### 5.1 Methods of analysis proposed for superstructure, substructure and foundations

The deck is to be analysed by plane linear elastic grillage analysis using LUSAS or SUPERSTRESS software for vertical loads, assuming simple supports. Deck analysis to cover all temporary and permanent stages of construction including the effects of formwork used for deck cantilever construction but excluding beam lifting condition.

Analysis of deck slab for local effects to be carried out using a metre strip or Pucher chart method assuming that the slab is one way spanning and continuous over main girders.

The substructure embedded pile abutments will be analysed for the effects of soil structure interaction using standard software for the purpose.

#### 5.2 Description and diagram of idealised structure to be used for analysis.

Refer to Appendix D for diagram of idealised structure(s).

Model layout will be based on the recommendations given in 'Bridge Deck Behaviour, Second Edition' by E.C. Hambly.

**5.3 Assumptions intended for calculation of structural element stiffness**

Element stiffness for composite steel / concrete members will be determined in accordance with BS5400; Part 3-2000 as implemented by BD 13/06, Part 4-1990 as implemented by BD 24/92 and Part 5-2005 as implemented by BD 16/82.

Element stiffness for concrete members will be determined in accordance with BS5400; Part 4; 1990; Clause 4.4 using full elastic uncracked member cross sections ignoring.

Global member stiffness for analysis will be determined as either composite or non-composite as appropriate to the construction or permanent stage under consideration.

**5.4 Proposed earth pressure coefficients (  $k_a$ ,  $k_o$ , or  $k_p$  ) to be used in the design of earth retaining elements**

For the analysis of earth retaining elements,  $k_a$  will be used for stability calculations and  $k_o$  for structural element design. A representative peak angle of friction of  $35^\circ$  will be used, for which  $k_a = 0.27$ ;  $k_p = 3.69$  and  $k_o = 0.43$  (calculated in accordance with BD 30/87).

For class 6N backfill to the end screens, the mobilised earth pressure  $K^*$  in accordance with BA 42/96 shall be considered for the design of the end screens.

**6. GEOTECHNICAL CONDITIONS****6.1 Acceptance of recommendations of Section 8 of the Geotechnical Report to be used in the design and reasons for any proposed changes.**

Section 2 of the Geotechnical Report has not been completed at this stage.

**6.2 Geotechnical Report Highway Structure Summary Information**

A draft Geotechnical Report Highway Structure Summary sheet based on the information available in Part 1 of the Geotechnical Report is attached in Appendix C. A full Geotechnical Report Highway Structure Summary sheet and extracts from the completed Geotechnical Report Section 2 will be produced following development of the Geotechnical Report.

**6.3 Differential settlement to be allowed for in the design of the structure.**

The structure is founded on contiguous piles extending to the stiff to very stiff Ashdown Formation. An allowance of 10mm differential settlement between adjacent supports is considered in the design.

**6.4 If the Geotechnical Report is not yet available, state when the results are expected and list the sources of information used to justify the preliminary choice of foundations.**

The preliminary choice of foundation is discussed in the draft Geotechnical Report Highway Structure Summary sheet contained in Appendix C. Part 2 of the Geotechnical Report, including Section 2 Highway Structures, is expected to be completed in Phase 2 of the project.

**7. CHECKING****7.1 Proposed category of structure**  
Category 2**7.2 If Category 3, name of proposed Independent checkers.**  
Not applicable

7.3 Erection proposals or temporary works for which an independent check will be required, listing parts of the structure affected with reasons for recommending an independent check.

None

## 8. DRAWINGS AND DOCUMENTS

8.1 List of drawings and documents accompanying the submission.

Appendix A TAS dated February 2009

Appendix B	Drawing No	Title
	B1297000-PH2/1600.01a/9041	Ninfield Road Overbridge General Arrangement

Appendix C Geotechnical Information

Appendix D Idealised Structure

Appendix E Departures from Standards





9 THE ABOVE IS SUBMITTED FOR ACCEPTANCE

9.1 Submission by designer

Signed 

Name: P. Blackie

Position: Structures team leader, Jacobs

Engineering Qualifications: BEng(Hons), CEng MICE

Date: 04/09/12

9.2 Endorsement by contractor

Signed 

Name: S. LAPTHORN

Engineering Qualifications: MEng (Hons) CEng MICE.

Position: Design Coordinator

Hochtief Vinci Joint Venture

Date: 20/09/12

10. THE ABOVE IS REJECTED/AGREED SUBJECT TO THE AMENDMENTS AND CONDITIONS SHOWN BELOW.

Reviewed:

Name:

Engineering qualifications:

Date:

Signed:

Name:  
TAA

Engineering qualifications:

Date:



## Appendix A List of Relevant Documents

Schedule of Design Documents Relating to Highway Bridges and Structures; February 2009

### *British Standards*

BS 5268; Part 2; 2002	Structural Use of Timber
BS 5400	Steel concrete and composite bridges
Part 1; 1988	General Statement (see BD 15 )
Part 2; 1978	Specification for loads (see BD 14 )
Part 3; 2000	CP for design of steel bridges (see BD 13 )
Part 4; 1990	CP for design of concrete bridges (see BD 24 )
Part 5; 1979	CP for design of composite bridges (see BD 16)
Part 9; 1983	Bridge bearings (see BD 20)
Part 10; 1980	CP for fatigue (see BD 9)
BS 5628; Part 1; 1992	Unreinforced Masonry
BS 5930; 1999	Site Investigations
BS 6031; 1981	Earthworks
BS 8002; 1994	Earth retaining structures
BS 8004; 1986	Foundations
BS 8118; 1991	The structural use of aluminium
BS EN 1317-1-1998; Road Restraint Systems – Part 1	Terminology and general criteria for test methods
BS EN 1317-2-1998; Road Restraint Systems – Part 2	Performance classes, impact test acceptance criteria and test methods for safety barriers
BS EN 1317-3-2000; Road Restraint Systems – Part 3	Performance classes, impact test acceptance criteria and test methods for crash cushions
DD ENV 1317-4-2002; Road Restraint Systems – Part 4	Terminals and transitions
BS EN 14388; 2005	Road traffic noise reducing devices – Specification

### *Miscellaneous*

Circular Roads No 61/72 – Routes for heavy and high abnormal loads.

Railway Group Approved Code of Practice GC/RC5510: Recommendations for the Design of Bridges (2000)  
(for full list of other Network Rail Standards, refer to RSSB, Railway Safety and Standards Board)

Simplified Tables of External Loads on Buried Pipelines (1986)

Traffic Management Act 2004

***The Manual of Contract Documents for Highway Works (MCDHW)***

- Volume 1: Specification for Highway Works 1998, including amendments to May 2009
- Volume 2: Notes for Guidance on the Specification for Highway Works 1998, including amendments to May 2009
- Volume 3: Highway Construction Details 1991, including amendments to November 2008

***The Design Manual for Roads and Bridges (DMRB)***

- Bridges and Structures ( BA Series )** *Reproduced on following pages*
- Bridges and Structures ( BD Series )** *Reproduced on following pages*
- Bridges and Structures, Technical Memoranda ( BE Series )** *Reproduced on following pages*

***Traffic Engineering and Control, Standards ( TD Series )***

- TD 9/93 Road layout and geometry. Highway link design
- TD 19/06 Requirement of Road Restraint Systems & correction No. 1
- TD 27/05 Cross Sections and headroom
- TD 36/93 Subways for pedestrians and cyclists, layout and dimensions

***Highways, Advice Notes ( HA Series )***

- HA 59/92 Mitigating Against Effects on Badgers
- HA 80/99 Nature Conservation Advice in Relation to Bats
- HA 84/01 (1) Nature Conservation and Biodiversity
- HA 97/01 Nature Conservation Management Advice in Relation to Dormice
- HA 98/01 Nature Conservation Management Advice in Relation to Amphibians

***Highways, Standards (HD Series )***

- HD 22/08 Managing Geotechnical Risk

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	<b>ADVICE NOTES - BRIDGES AND STRUCTURES (BA SERIES)</b>
BA 9/81	The Use of BS 5400: Part 10: 1980. Code of Practice for Fatigue Amendment No. 1
BA 16/97	The Assessment of Highway Bridges and Structures. Amendment No. 1 Amendment No.2
BA 19/85	The Use of BS 5400: Part 3: 1982
BA 24/87	Early Thermal Cracking of Concrete Amendment No. 1
BA 26/94	Expansion Joints for Use in Highway Bridge Decks
BA 28/92	Evaluation of Maintenance Costs in Comparing Alternative Designs for Highway Structures
BA 30/94	<del>Strengthening of Concrete Highway Structures Using Externally Bonded Plates</del>
BA 34/90	<del>Technical Requirements for the Assessment and Strengthening Programme for Highway Structures</del>
BA 35/90	<del>Inspection and Repair of Concrete Highway Structures</del>
BA 36/90	The Use of Permanent Formwork
BA 37/92	<del>Priority Ranking of Existing Parapets</del>
BA 38/93	<del>Assessment of the Fatigue Life of Corroded or Damaged Reinforcing Bars</del>
BA 39/93	<del>Assessment of Reinforced Concrete Half-joints</del>
BA 40/93	<del>Tack-Welding of Reinforcing Bars</del>
BA 41/98	The Design and Appearance of Bridges
BA 42/96	The Design of Integral Bridges [Incorporating Amendment No. 1 dated May 2003]
BA 43/94	<del>Strengthening, Repair and Monitoring of Post-tensioned Concrete Bridge Decks</del>
BA 44/96	<del>Assessment of Concrete Highway Bridge and Structures</del>
BA 47/99	Waterproofing and Surfacing Concrete Bridge Decks
BA 50/93	<del>Post-tensioned Concrete Bridges: Planning, Organisation and Methods for Carrying Out Special Inspections</del>
BA 51/95	<del>The Assessment of Concrete Structures Affected by Steel Corrosion</del>
BA 52/94	<del>The Assessment of Concrete Highway Structures Affected by Alkali-Silica Reaction</del>
BA 53/94	Bracing Systems and the Use of U-Frames in Steel Highway Bridges
BA 54/94	<del>Load Testing for Bridge Assessment</del>
BA 55/06	The Assessment of Bridge Substructures and Foundations, Retaining Walls and Buried Structures
BA 56/96	<del>The Assessment of Steel Highway Bridges and Structures</del>
BA 57/01	Design for Durability
BA 58/94	<del>Design of Bridges and Concrete Structures with External Unbonded Prestressing</del>
BA 59/94	<del>Design of Highway Bridges for Hydraulic Action</del>
BA 61/96	<del>The Assessment of Composite Highway Bridges</del>
BA 67/96	Enclosure of Bridges
BA 68/97	Crib Retaining Walls
BA 72/03	Maintenance of Road Tunnels

**ADVICE NOTES - BRIDGES AND STRUCTURES (BA SERIES)**

BA 74/06	Assessment of Scour at Highway Bridges
BA 80/99	Use of Rock Bolts
BA 82/00	Formation of Continuity Joints in Bridge Decks
BA 83/02	Cathodic Protection for Use in Reinforced Concrete Highway Structures
BA 84/02	Use of Stainless Steel Reinforcement in Highway Structures
BA 85/04	Coatings for Concrete Highway Structures & Ancillary Structures
BA 86/06	Advice Notes on the Non-Destructive Testing of Highway Structures
BA 87/04	Management of Corrugated Steel Buried Structures
BA 88/04	Management of Buried Concrete Box Structures
BA 92/07	The Use of Recycled Concrete Aggregates in Structural Concrete
BA 93/09	Structural Assessment of Bridges with Deck Hinges

**STANDARDS - BRIDGES AND STRUCTURES (BD SERIES)**

BD 2/05	Technical Approval of Highway Structures
BD 7/01	Weathering Steel for Highway Structures
BD 9/81	Implementation of BS 5400: Part 10: 1980. Code of Practice for Fatigue
BD 10/97	Design of Highway Structures in Areas of Mining Subsidence
BD 12/01	Design of Corrugated Steel Buried Structures with Spans Greater than 0.9 Metres and up to 8.0 Metres
BD 13/06	Design of Steel Bridges. Use of BS 5400: Part 3: 2000
BD 15/92	General Principles for the Design and Construction of Bridges. Use of BS 5400: Part 1: 1988
BD 16/82	Design of Composite Bridges. Use of BS 5400: Part 5: 1979 Amendment No. 1
BD 20/92	Bridge Bearings. Use of BS 5400: Part 9: 1983
BD 21/01	The Assessment of Highway Bridges and Structures
BD 24/92	Design of Concrete Bridges. Use of BS 5400: Part 4: 1990
BD 27/86	Materials for the Repair of Concrete Highway Structures
BD 28/87	Early Thermal Cracking of Concrete Amendment No. 1
BD 29/04	Design Criteria for Footbridges
BD 30/87	Backfilled Retaining Walls and Bridge Abutments
BD 31/01	The Design of Buried Concrete Box and Portal Frame Structures
BD 33/94	Expansion Joints for Use in Highway Bridge Decks
BD 34/90	Technical Requirements for the Assessment and Strengthening Programme for Highway Structures
BD 35/06	Quality Assurance Scheme for Paints and Similar Protective Coatings
BD 36/92	Evaluation of Maintenance Costs in Comparing Alternative Designs for Highway Structures
BD 37/01	Loads for Highway Bridges

**STANDARDS - BRIDGES AND STRUCTURES (BD SERIES)**

BD 41/97	Reinforced Clay Brickwork Retaining Walls of Pocket Type and Grouted Cavity type Construction Use of BS 5628: Part 2: 1995
BD 42/00	Design of Embedded Retaining Walls and Bridge Abutments
BD 43/03	The Impregnation of Reinforced and Prestressed Concrete Highway Structures using Hydrophobic Pore-Lining Impregnants
BD 44/95	The Assessment of Concrete Highway Bridges and Structures
BD 45/93	Identification Marking of Highway Structures
BD 46/92	Technical Requirements for the Assessment and Strengthening Programme for Highway Structures [Stage 2 – Modern Short Span Bridges]
BD 47/99	Waterproofing and Surfacing of Concrete Bridge Decks
BD 48/93	The Assessment and Strengthening of Highway Bridge Supports
BD 49/04	Design Rules for Aerodynamic Effects on Bridges
BD 50/92	Technical Requirements for the Assessment and Strengthening Programme for Highway Structures Stage 3 – Long Span Bridges
BD 51/98	Portal and Cantilever Signs/Signal Gantries
BD 53/95	Inspection and Records for Road Tunnels
BD 54/93	Post-tensioned Concrete Bridges, Prioritisation of Special Inspections
BD 56/96	The Assessment of Steel Highway Bridges and Structures
BD 57/01	Design for Durability
BD 58/94	The Design of Concrete Highway Bridges and Structures with External and Unbonded Prestressing Design of Highway Bridges for Vehicle Collision Loads
BD 60/04	Design of Highway Bridges for Vehicle Collision Loads
BD 61/96	The Assessment of Composite Highway Bridges
BD 62/07	As Built, Operational and Maintenance Records for Highway Structures
BD 63/07	Inspection of Highway Structures
BD 65/97	Design Criteria for Collision Protector Beams
BD 67/96	Enclosure of Bridges
BD 68/97	Crib Retaining Walls
BD 70/03	Strengthened/Reinforced Soils and Other Fills for Retaining Walls and Bridge Abutments Use of BS8006: 1995, incorporating Amendment No. 1 (Issue 2 March 1999)
BD 74/00	Foundations
BD 78/99	Design of Road Tunnels
BD 79/06	The Management of sub-Standard Highway Structures
BD 81/02	Use of Compressive Membrane Action in Bridge Decks
BD 82/00	Design of Buried Rigid Pipes
BD 84/02	Strengthening of Concrete Bridge Supports Vehicle Impact Using Fibre Reinforced Polymers
BD 85/08	Strengthening Highway Structures Using Externally Bonded Fibre Reinforced Polymer
BD 86/07	The Assessment of Highway Bridges and Structures For The Effects of Special Types General Order (STGO) and Special Order (SO) Vehicles
BD 87/05	Maintenance Painting of Steelwork

**STANDARDS - BRIDGES AND STRUCTURES (BD SERIES)**

BD 89/03	The Conservation of Highway Structures
BD 90/05	Design of FRP Bridges and Highway Structures
BD 91/04	Unreinforced Masonry Arch Bridges
BD 94/07	Design of Minor Structures
BD 95/07	Treatment of Existing Structures on Highway widening Schemes

**TECHNICAL MEMORANDA - BRIDGES (BE SERIES)**

BE 13	Fatigue Risk in Bailey Bridges
BE 23	Shear Key Decks Amendment No. 1 to Annex
BE 5/75	Rules for the Design and Use of Freyssinet Concrete Hinges in Highway Structures
BE 7/04	Departmental Standard (Interim) Motorway Sign/Signal Gantries

**INTERIM ADVICE NOTES (IAN)**

IAN 117/08 Rev 1	Certification of combined kerb and drainage products
IAN 116/08	Nature conservation advice in relation to bats
IAN 104/07	The Anchorage of Reinforcement and Fixings in Hardened Concrete
IAN 97/07	Assessment and upgrading of existing parapets
IAN 96/07r1	Guidance on implementing Results of Research on Bridge Deck Waterproofing
IAN 95/07	Revised Guidance Regarding the Use of BS8500(2006) For the Design and Construction of Structures Using Concrete
IAN 91/07	Interim Advice on the identification of "Particularly at Risk" supports
IAN 70/06	Implementation of New Reinforcement Standards
IAN 69/05	Design for Maintenance
IAN 48/03	Measures To Minimise The Risk of Sulphate Attack (Including Thaumasite) - New Construction and Structures Under Construction
IAN 47/02	Post Tensioned Grouted Duct concrete Bridges
IAN 41/02	European Cement Standards
IAN 05/96	BD 24/92 The Design of Concrete Highway Bridges and Structures. Use of BS 5400: Part 4:1990
IAN 04/96	BD 44/95 The Assessment of Concrete Highway Bridges and Structures
IAN 03/96	BA 50/93 Post Tensioned concrete Bridges



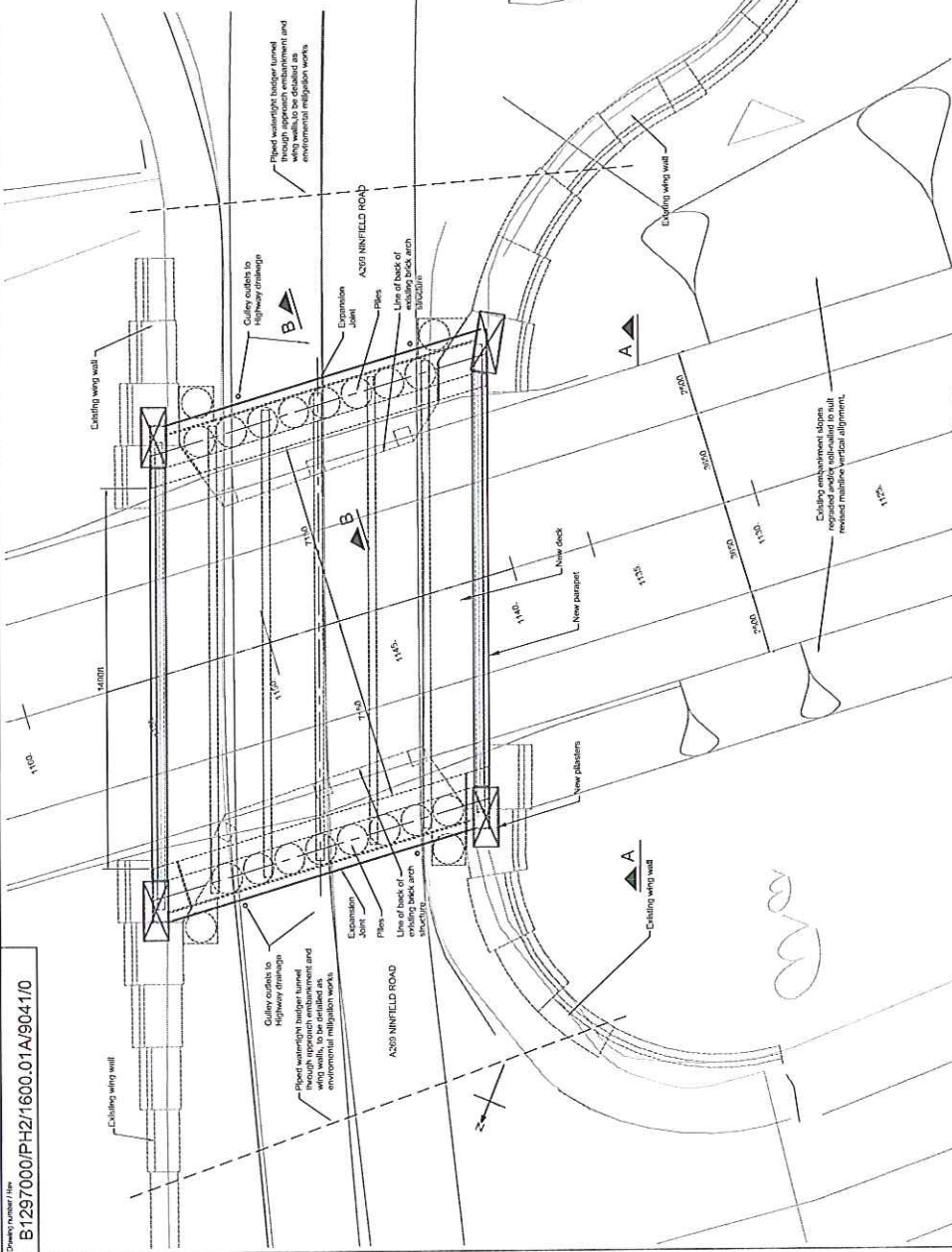
## Appendix B Drawings

Drawing No  
B1297000-PH1/1600.01a/9041

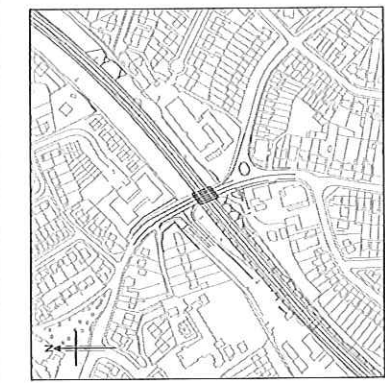
Title  
Ninfield Road Overbridge  
General Arrangement



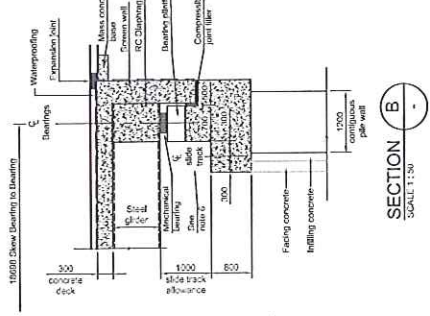
Drawing Number / Rev  
**B1297000-PH2/1600.01A/9041/0**



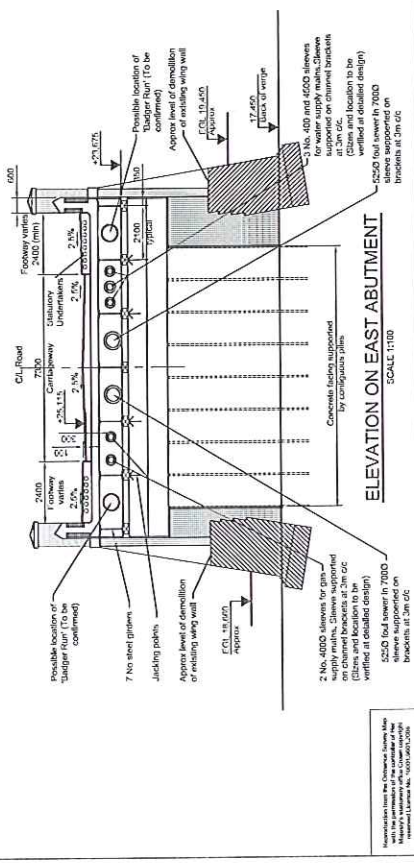
**PLAN**  
 Scale 1:100



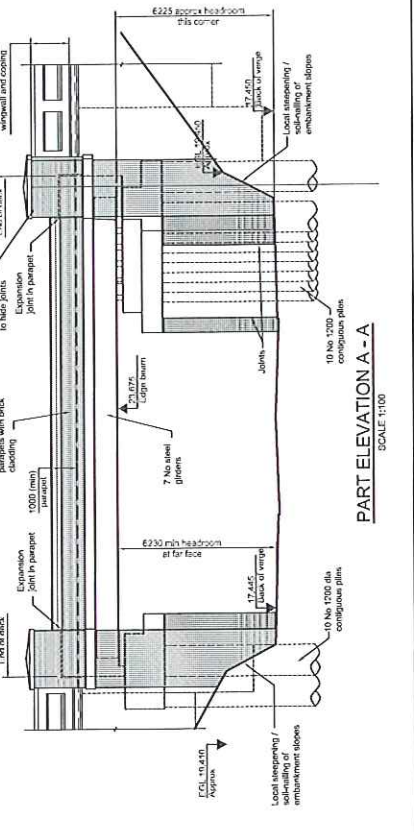
**LOCATION PLAN**  
 Scale 1:2500



**SECTION B**  
 Scale 1:20



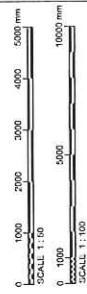
**ELEVATION ON EAST ABUTMENT**  
 Scale 1:100



**PART ELEVATION A-A**  
 Scale 1:100

- All dimensions in millimetres unless noted otherwise.
- All levels in metres above Ordnance Datum - Newlyn.
- Do not scale from this drawing.
- All external angles to have 25 x 25mm chamfers.
- All surface finishes are approximate and subject to change in detailed design stage.
- The bearing shall arrangement shown is provisional. The inclusion of a slab track will be confirmed when the bridge installation methodology is finalized.
- Traffic shall be temporarily diverted to the east (up channage) of the structure during construction.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	
ENVIRONMENTAL INFORMATION	For further information on the environmental aspects of this project, please refer to the 'Main Report'.
CONSTRUCTION	- Temporary shoring / propping of existing brick retaining walls to be considered during demolition works.
MAINTENANCE / CLEANING	
DECOMMISSIONING / DEMOLITION	



Rev.	Date	By	Checked	Description
0	04/04/22	JKH/AM	GA	ISSUE FOR BIDDING
1				ISSUE FOR BIDDING
2				ISSUE FOR BIDDING
3				ISSUE FOR BIDDING
4				ISSUE FOR BIDDING
5				ISSUE FOR BIDDING
6				ISSUE FOR BIDDING
7				ISSUE FOR BIDDING
8				ISSUE FOR BIDDING
9				ISSUE FOR BIDDING
10				ISSUE FOR BIDDING

**JACOBS**  
 100 Brook Hill Drive, Suite 100, Brookline, MA 02146  
 Tel: 781.435.1200  
 Fax: 781.435.1201  
 www.jacobs.com

Client: **HOCHTIEFVINCI JOINT VENTURE**  
 East Sussex County Council  
 Project: **BEXHILL TO HASTINGS LINK ROAD**  
 Drawing Title: **NINFIELD ROAD OVERBRIDGE GENERAL ARRANGEMENT**

Drawing Number: **B1297000-PH2/1600.01A/9041/0**  
 Drawing Date: **13/12/2020**  
 Drawing Scale: **DO NOT SCALE**

Author: **ACI, SHOWN ET AL**  
 Checker: **ACI, SHOWN ET AL**  
 Approver: **ACI, SHOWN ET AL**

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.



## Appendix C Geotechnical Information

**BEXHILL TO HASTINGS LINK ROAD**  
**GEOTECHNICAL SUMMARY INFORMATION**

<b>STRUCTURE NAME</b>		<b>CHAINAGE and OS Grid Reference</b>		
S04 - Ninfield Road Overbridge		Ch 1145      OS: 574302E,109031N		
<b>Rev: 1</b>		<b>DESIGN LIFE: 120 years</b>		
<b>SOILS/GEOLOGY</b>		<b>RELEVANT EXPLORATORY HOLES:</b> BH5, BH6, BH7, BH8, HA3 (ESCC Investigation, 1992)		
<b>Strata</b>		<b>Typical depths<sup>1</sup></b>		
<i>Top of cutting</i>				
Made Ground		26.1 – 25.5m OD		
Ashdown Formation		below 25.5m OD		
<i>Base of cutting</i>				
Ashdown Formation		Below 19.45m OD		
<b>PREVIOUS GROUND HISTORY</b>		Railway cutting, brownfield site		
<b>CONTAMINATED GROUND RISK ASSESSMENT REQUIRED</b>			TBC	
<b>GROUNDWATER</b>				
Groundwater was encountered within the Ashdown Formation at 19.64m OD (5.9m bgl) in BH5 and at 16.1m OD (10.0m bgl) in BH8. No water rise was recorded and no groundwater monitoring was carried out.				
Allowing for seasonal fluctuations, the preliminary design groundwater level is assumed to be at the base of the cutting.				
<b>EARTH PRESSURE VALUE <math>K_0^*</math> <math>K_a^*</math> <math>K_p^*</math></b>				
Refer to Section 5.4 of AIP.				
<b>TYPE OF FOUNDATION</b>		Contiguous Pile Wall		
<b>BEARING CAPACITY</b>				
Structure Element	Founding Stratum	Founding Level (m OD)	Footing Size	Allowable Bearing Pressure (kN/m <sup>2</sup> )

<b>PILE DESIGN : Contiguous Pile Wall</b>					
Structure Element	Founding Stratum	Toe Level (mAOD)	Pile dia (m)	Pile length (m)	Pile working Load (kN)
East and West abutments	Ashdown Formation	3.875	1.2	18	-
<p>Note: Pile lengths and toe levels are approximate – pile cap elevations to be confirmed.</p> <p>Pile type: Contiguous pile wall</p> <p>Criteria for selecting pile toe level: Stability and Capacity</p> <p>Allowance for negative skin friction within design: None</p>					
<b>SETTLEMENT</b>					
Differential settlement to be allowed for between adjacent supports: 10mm					
Differential settlement to be allowed between structure and approach embankment: N/A					
<b>CHEMICAL ANALYSIS</b>					
<p><b>Buried Concrete classification:</b></p> <p>The results of chemical tests on soil samples taken within the urban areas indicate pH values ranging between 3.68 and 10.5 and sulfates (2:1 Water Extract) values of between 10 mg/l and 1150 mg/l. The recommended Design Sulfate and Concrete Classification based on BRE Special Digest 1 (2005) are DS-2 and AC4z respectively</p>					
<b>NOTES</b>					
<ol style="list-style-type: none"> <li>Elevation was not shown on the borehole logs. The levels have been estimated from the ESCC long section drawing (No. 262701\090047 Fieldwork Location Plan and Geological Long Section Sheet 1 of 4).</li> <li>The ground sequence at the site is Made Ground underlain by Ashdown Formation. The Made Ground and the soft clay layer within the Ashdown Formation are not recommended as a bearing stratum due to the risk of bearing failure and differential settlement occurring. The maximum thickness of Made Ground is 1.0m and the soft clay in Ashdown Formation is 0.8m.</li> <li>It is recommended that the structure is founded on the stiff to very stiff Ashdown Formation</li> </ol>					

**EAST SUSSEX COUNTY COUNCIL**  
Highways & Transportation - Soils and Materials Group

Borehole No. **BH5**  
Job No. **CW1257**  
Sheet **1 of 2**

Dates		Coordinates			Site	
29/01/92 - 31/01/92		E N			BEXHILL NORTHERN APPROACH ROAD	
Method		Ground Level			Client	
Shell & Auger.		mOD			DESIGN AND CONSTRUCTION	
Depth m	Sample/Test	Field Records	Level mOD	Depth m (Thick)	Description	Legend
				(1.00)	Trench backfill (FILL)	
				1.00		
				(0.80)	Soft brown/grey silty CLAY	
				1.80		
2.00 - 2.50 2.00 - 2.50	U 1 (136 BLOWS) J 2					
2.50 - 3.00 2.50 - 3.00 2.50 - 3.00	SPT N(32) SJ 3 B 4	4,6/8,8,8,8			Very stiff light grey fissured SILT with occasional orange ironstaining, some fine sand and ironstone nodules	
				(2.90)	(ASHDOWN BEDS)	
3.50 - 4.00 3.50 - 4.00	U 5 (165 BLOWS) J 6	0.2m RECOVERED				
4.00 - 4.50 4.00 - 4.50 4.00 - 4.50	SPT N(66*) SJ 7 B 8	7,11/12,17,21,				
				4.70		
5.00 - 5.50 5.00 - 5.50	U 9 (184 BLOWS) J 10					
5.50 - 6.00 5.50 - 6.00 5.50 - 6.00	SPT N(50) SJ 11 B 12	4,6/10,16,20,4			Very dense light grey fine SAND with some thin clay laminations and occasional orange ironstaining	
				(2.20)	(ASHDOWN BEDS)	
6.50 - 7.00 6.50 - 7.00	U 13 (223 BLOWS) J 14	30/01/92:5.9				
7.00 - 7.50 7.00 - 7.50 7.00 - 7.50	SPT N(50) SJ 15 B 16	16,12/ 10,16,15,9				
				6.90		
8.00 - 8.50 8.00 - 8.50	U 17 (150 BLOWS) J 18				Very stiff medium grey SILT with some orange ironstaining	
8.50 - 9.00 8.50 - 9.00 8.50 - 9.00	SPT N(187*) SJ 19 B 20	38,12/...			(ASHDOWN BEDS)	
9.50 - 10.00 9.50 - 10.00	U 21 (210 BLOWS) J 22					
10.00 - 10.50	SPT N(300*)	50,1/...				
Remarks Trial pit excavated to 2.0m to avoid services Casing to 7.5m SPT's at 9.5m and 10.0m failed to reach test depth						Scab 1:50  Logged by NAA
See key sheet for symbols and abbreviations						281092/1113



**EAST SUSSEX COUNTY COUNCIL**  
Highways & Transportation - Soils and Materials Group

Borehole No. BH5  
Job No. CH1257  
Sheet 2 of 2

Dates 29/01/92 - 31/01/92		Coordinates E N		Site BEXHILL NORTHERN APPROACH ROAD		
Method Shell & Auger.		Ground Level		Client DESIGN AND CONSTRUCTION		
Depth m	Sample/Test	Field Records	Level mOD	Depth m (Thick)	Description	Legend
10.00 - 10.50 10.00 - 10.50	SJ 23 B 24	30/01/92:9.0 31/01/92:7.0		(7.60)	(Continued)	
11.00 - 11.50 11.00 - 11.50 11.00 - 11.50	SPT N(300*) SJ 25 B 26	50,/,...			11.0-11.5m Very dense grey fine SAND	
12.00 - 12.50 12.00 - 12.50 12.00 - 12.50	SPT N(300*) SJ 27 B 28	50,/,...			Very stiff medium grey SILT with some orange ironstaining  (ASHDOWN BEDS)	
13.00 - 13.50 13.00 - 13.50 13.00 - 13.50	SPT N(346*) SJ 29 B 30	50,/,...				
14.00 - 14.50 14.00 - 14.50 14.00 - 14.50	SPT N(300*) SJ 31 B 31	50,/,...				
		31/01/92:7.0		14.50		

Remarks Casing to 7.5m  
SPT's at 11.0m, 12.0m, 13.0m and 14.0m failed to reach test depth

Scale  
1:50

Logged  
by  
NAA

281092/1114

See key sheet for symbols and abbreviations

**EAST SUSSEX COUNTY COUNCIL**  
Highways & Transportation - Soils and Materials Group

Borehole No. **BH6**  
Job No. **CW1257**  
Sheet **1 of 2**

Dates 14/02/92 - 14/02/92					Coordinates E N			Site BEXHILL NORTHERN APPROACH ROAD	
Method Rotary.					Ground Level mOD			Client DESIGN AND CONSTRUCTION	
Depth m	TCR	SCR	RQD	U	Field Records	Level mOD	Depth m (Thick)	Description	Legend
								OPEN HOLED :- No strata description available	
5.00				56			5.00 (0.20) 5.20	Very stiff grey silty CLAY with occasional orange ironstaining	* —
5.50	87	40	19		BROKEN		(1.30)	Weak pale grey fine SANDSTONE with orange ironstaining (ASHDOWN BEDS)	[Cross-hatched pattern]
6.50							6.50		
	97	82	79	214			(2.00)	Stiff to very stiff pale grey SILT with orange ironstaining (ASHDOWN BEDS)	[Cross-hatched pattern]
8.00							8.50		
	99	87	74	107			(0.30) 8.80	Moderately weak thinly laminated pale grey fine SANDSTONE with some ironstaining	[Cross-hatched pattern]
9.50							(2.20)	Moderately weak thinly laminated dark grey and pale grey fine SANDSTONE (ASHDOWN BEDS)	[Cross-hatched pattern]

Remarks: Open holed to 5.0m

Scale: 1:50  
Logged by: HAA  
281092/1132

See key sheet for symbols and abbreviations

**EAST SUSSEX COUNTY COUNCIL**  
Highways & Transportation - Soils and Materials Group

Borehole No. **BH6**  
Job No. **CW1257**  
Sheet **2 of 2**

Dates 14/02/92 - 14/02/92				Coordinates E N			Site BEXHILL NORTHERN APPROACH ROAD	
Method Rotary.				Ground Level mOD			Client DESIGN AND CONSTRUCTION	

Depth m	TCR	SCR	RQD	W	F&H Records	Level mOD	Depth m (Thick)	Description	Legend
11.00	90	63	34	107			11.00	(Continued) Moderately weak thinly laminated dark grey and pale grey fine SANDSTONE  (ASHDOWN BEDS)	[Hatched Legend]
11.70	58	15	0	BROKEN 267					
12.50				33					
12.90				BROKEN			(4.50)	Weak thinly laminated dark grey SILTSTONE and pale grey fine SANDSTONE laminations with occasional orange ironstaining	[Hatched Legend]
13.20	80	26	10	50					
14.00								(ASHDOWN BEDS)	
15.50	74	41	0	71			15.50	Very stiff fissured grey slightly silty CLAY  (ASHDOWN BEDS)	[Symbol Legend]
17.00	100	13	0	188			17.00		

Remarks Open holed to 5.0m

Scale 1:50  
Logged by NAA

281092/1133

See key sheet for symbols and abbreviations

**EAST SUSSEX COUNTY COUNCIL**  
Highways & Transportation - Soils and Materials Group

Borehole No. BH7  
Job No. CW1257  
Sheet 1 of 2

Dates					Coordinates			Site	
17/02/92 - 20/02/92					E N			BEXHILL NORTHERN APPROACH ROAD	
Method					Ground Level			Client	
Rotary.					mOD			DESIGN AND CONSTRUCTION	
Depth m	TCR	SCR	RQD	lf	Field Records	Level mOD	Depth m (Tick)	Description	Legend
							(5.00)	OPEN HOLED :- No strata description available	
5.00					BROKEN		5.00		
5.80	75	44	36				(1.50)	Moderately strong thinly laminated grey medium SANDSTONE with orange ironstaining (ASHDOWN BEDS)	[Pattern]
6.50					350		6.50		
							(1.00)	Very stiff grey SILT with some orange ironstaining (ASHDOWN BEDS)	[Pattern]
8.00					150		7.50		
8.30							(0.50)	Weak thinly laminated pale grey fine SANDSTONE with orange ironstaining	[Pattern]
					150		8.00		
	47	57	36				(1.50)	Very stiff grey SILT with occasional moderately strong dark grey fine SANDSTONE bands (ASHDOWN BEDS)	[Pattern]
9.50					BROKEN		9.50		
9.80								Weak thinly laminated dark grey silty SANDSTONE	[Pattern]

Remarks Open holed to 5.0m

Scale 1:50

Logged by NAA

281092/1134

See key sheet for symbols and abbreviations

**EAST SUSSEX COUNTY COUNCIL**  
Highways & Transportation - Soils and Materials Group

Borehole No. **BH7**  
Job No. **CW1257**  
Sheet **2 of 2**

Dates 17/02/92 - 20/02/92		Coordinates E N		Site BEXHILL NORTHERN APPROACH ROAD
Method Rotary.		Ground Level mOD		Client DESIGN AND CONSTRUCTION

Depth m	TCR	SCR	RQD	W	Field Records	Level mOD	Depth m (Thick)	Description	Legend
10.20	81	14	0	100	BROKEN		(3.00)	(Continued)	
11.00									
12.50	69	45	12	71			12.50		
14.00	94	55	11	150			(2.60)	Very stiff thinly laminated dark grey SILT (ASHDOWN BEDS)	
15.50	94	30	9	83			15.10		
16.50	91	9	0	188					
17.00							(4.00)	Very stiff fissured blue grey slightly clayey SILT (ASHDOWN BEDS)	
17.50	95	8	0	125	BROKEN				
18.00									
19.50	58	63	40	150			19.10 (0.40) 19.50	Very stiff grey SILT	

Remarks Open holed to 5.0m

Scale  
1:50  
Logged  
by  
HAA

281092/1134

See key sheet for symbols and abbreviations

**EAST SUSSEX COUNTY COUNCIL**  
Highways & Transportation - Soils and Materials Group

Borehole No. BH8  
Job No. CW1257  
Sheet 1 of 2

Dates		Coordinates			Site	
26/02/92 - 27/02/92		E N			BEXHILL NORTHERN APPROACH ROAD	
Method		Ground Level			Client	
Shell & Auger.		mOD			DESIGN AND CONSTRUCTION	
Depth m	Sample/Test	Field Records	Level mOD	Depth m (thick)	Description	Legend
				(0.70)	Firm to stiff brown silty clay with brick and old road construction materials (FILL)	
				0.70	Stiff grey brown silty CLAY	
1.50 - 2.00	U 1 (237 BLOWS)			(0.40)	Very stiff light grey SILT with some fine SAND and orange ironstaining (ASHDOWN BEDS)	
1.50 - 2.00	J 2			1.10		
2.00 - 2.50	SPT N(75*)	7,14/18,22,10,		(1.60)	Very stiff thinly laminated grey becoming dark grey very slightly clayey SILT with orange ironstaining (ASHDOWN BEDS)	
2.00 - 2.50	SJ 3			2.70		
2.00 - 2.50	B 4					
3.00 - 3.50	U 5 (196 BLOWS)				Very stiff thinly laminated grey becoming dark grey very slightly clayey SILT with orange ironstaining (ASHDOWN BEDS)	
3.00 - 3.50	J 6			(1.80)		
3.50 - 4.00	SPT N(42)	2,5/8,8,14,12				
3.50 - 4.00	SJ 7					
3.50 - 4.00	B 8					
4.50 - 5.00	U 9 (122 BLOWS)	NO PENETRATION		4.50	Very stiff grey SILT with some thin laminations and some ironstaining (ASHDOWN BEDS)	
4.50 - 5.00	J 10			(1.20)		
5.00 - 5.50	SPT N(FAILED*)	15,35/...				
5.00 - 5.50	SJ 11					
5.00 - 5.50	B 12					
		25/02/92:DRY				
		26/02/92:DRY				
6.00 - 6.50	U 13 (FAILED)	NO PENETRATION		5.70	Very stiff pale grey fine SAND with some thin clayey silt bands and orange ironstaining (ASHDOWN BEDS)	
6.00 - 6.50	J 14			(1.50)		
6.50 - 7.00	SPT N(*)	40,10/...				
6.50 - 7.00	SJ 15					
6.50 - 7.00	B 16					
7.50 - 8.00	SPT N(*)	20,30/...		7.20	Very stiff fissured grey SILT with orange ironstaining (ASHDOWN BEDS)	
7.50 - 8.00	SJ 17			(2.30)		
7.50 - 8.00	B 18					
8.50 - 9.00	SPT N(*)	42,8/...				
8.50 - 9.00	SJ 19					
8.50 - 9.00	B 20					
9.50 - 10.00	SPT N(*)	40,10/...		9.50	Very stiff grey slightly clayey SILT with occasional fine sand and silt layers and some ironstaining	
9.50 - 10.00	SJ 21					
9.50 - 10.00	B 22					
Remarks		Water added to assist boring 0.0-11.0m Casing to 1.5m			Scale 1:50	
					Logged by NAA	
See key sheet for symbols and abbreviations					281092/1619	

**EAST SUSSEX COUNTY COUNCIL**  
Highways & Transportation - Soils and Materials Group

Borehole No. BH8  
Job No. CH1257  
Sheet 2 of 2

Dates		Coordinates		Site		
26/02/92 - 27/02/92		E	N	BEXHILL NORTHERN APPROACH ROAD		
Method		Ground Level		Client		
Shell & Auger.		mOD		DESIGN AND CONSTRUCTION		
Depth m	Sample/Test	Field Records	Level mOD	Depth m (Total)	Description	Legend
10.50 - 11.00	SPT N(*)	50, /, /, /			(continued)	
10.50 - 11.00	SJ 23					
10.50 - 11.00	B 24	26/02/92:8.0				
		27/02/92:7.7				
11.50 - 12.00	SPT N(*)	50, /, /, /			Very stiff grey slightly clayey SILT with occasional fine sand and silt layers and some ironstaining	
11.50 - 12.00	SJ 25					
11.50 - 12.00	B 26			(5.50)		
12.50 - 13.00	SPT N(*)	24, 26, /, /, /			(ASHDOWN BEDS)	
12.50 - 13.00	SJ 27					
12.50 - 13.00	B 28					
13.50 - 14.00	SPT N(*)	40, 10, /, /, /				
13.50 - 14.00	SJ 29					
13.50 - 14.00	B 30					
14.50 - 15.00	SPT N(*)	50, /, /, /				
14.50 - 15.00	SJ 31					
14.50 - 15.00	B 32	27/02/92:11.5		15.00		
Remarks		Water added to assist boring 0.0-11.0m Casing to 1.5m				Scale 1:50
						Logged by NAA
						281092/1621
See key sheet for symbols and abbreviations						

**EAST SUSSEX COUNTY COUNCIL**  
Highways & Transportation - Soils and Materials Group

Trial Pit No. **HA 3**  
Job No. **CH1257**  
Sheet **1 of 1**

Dates 13/04/92 - 13/04/92		Coordinates E N		Site BEXHILL NORTHERN APPROACH ROAD	
Method Trialpit.		Ground Level mOD		Client DESIGN AND CONSTRUCTION	
Sample/Test		Level mOD	Depth m (thick)	Description	Legend
Depth m	Sample/Test				
			(0.10) 0.10	Topsoil with limestone fragments (FILL)	
			(0.20) 0.30	Loose black slag and ash (FILL)	
			(0.40)	Firm brown silt with bricks and chalk fragments, flint pebbles, steel bars and timber (FILL)	
			0.70	Loose flint gravel (FILL)	
			(0.20) 0.90	Very stiff pale grey/brown SILT with siltstone layers and occasional orange ironstaining	
			(0.80)	(ASHDOWN BEDS)	
			1.70		

Remarks Standing level of water in hole at 1.1m depth. Could not auger deeper due to siltstone layer.

Plan

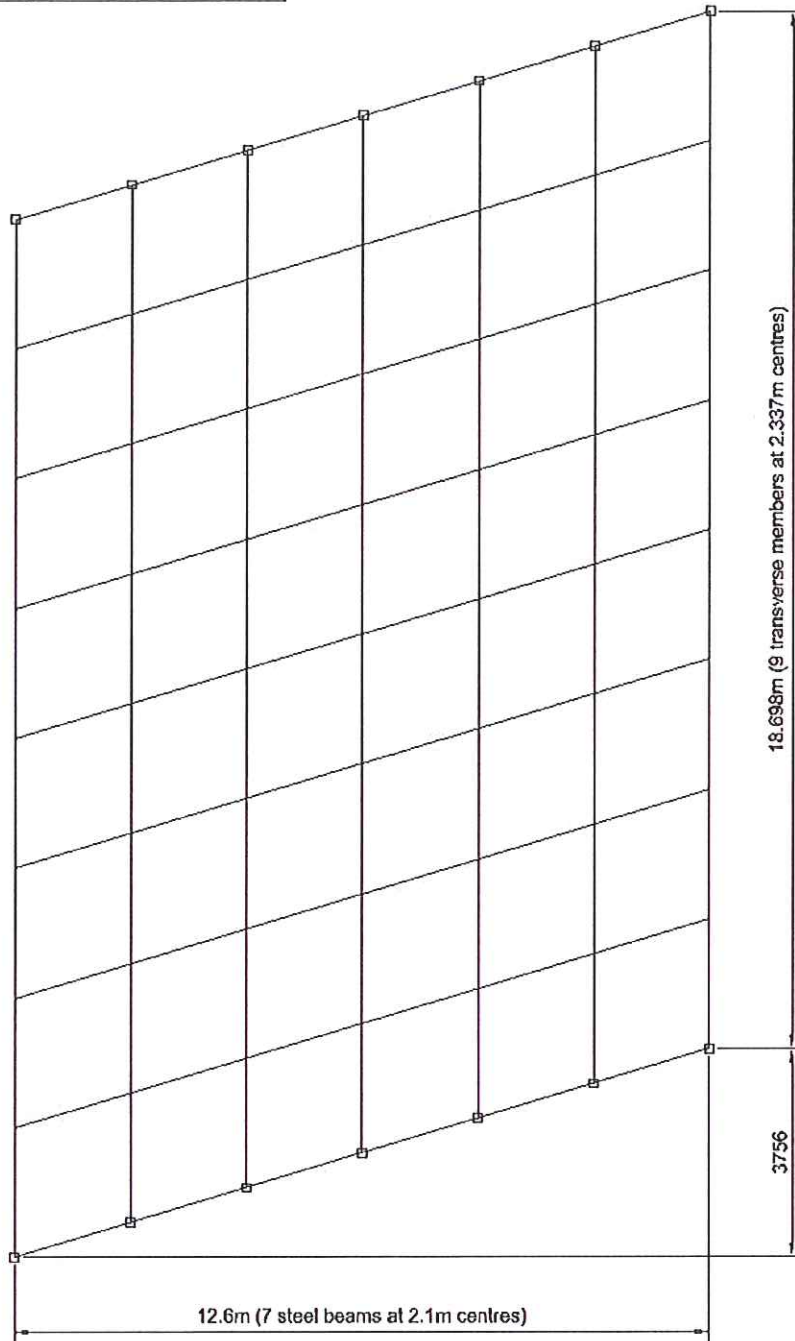
Scale  
1:25

Logged by  
HAA

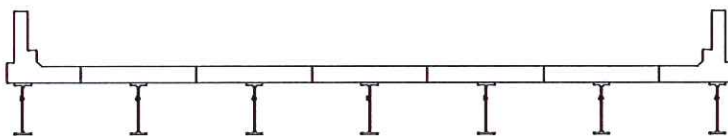


## Appendix D Idealised Structure

### Grillage Analysis of Deck



□ Pinned end support



## Appendix E Departures from Standards

### Departure D3: Verges over/under Structures

#### Nature of Departure

A standard verge width of 2.5m has been applied along the scheme mainline. Where the mainline crosses over an underbridge, or under an overbridge, it has been decided to reduce the verge width to provide associated cost savings on structure construction. Verge widths will also be reduced on sideroads and accommodation works structures. The verges will be reduced to the minimum allowed, while ensuring necessary Stopping Sight Distance is maintained. The verge width will be tapered to the reduced width over an acceptable distance. Where verge widening has been provided around bends to maintain SSD these verges will not be minimised.

#### Reason for Departure

This departure is sought to minimise construction costs for the structures by minimising the necessary deck width. This departure is requested as the DMRB Standards require the verge width to be continuous and maintained over/under all structures. This leads to excessive structure widths which are uneconomical.

#### Mitigation Factors

There are no pedestrian facilities over any of the mainline structures so verge reduction will not impact NMUs in the majority of cases. On the accommodation overbridges, there will only be a minor usage, and the likelihood of NMUs coming into conflict with farm vehicles is minimal. In addition, these departures are only requested over short distances over/under structures.

#### Implications for Safety

Though a reduced verge width will mean vehicles running closer to either the abutments or parapets, a safe minimum required width will be provided. Where deemed necessary as a result of the RRRAP assessment, vehicle barriers will be installed to reroute any errant vehicles away from the parapets or abutments.

### Departure - Deflection of permanent formwork units

BA 36/90 Clause 4.1.7 states that deflection of permanent formwork 4 hours after completion of concreting should not exceed 1/300 of the span of the formwork unit. It is proposed to use proprietary EMJ steel reinforced GRP permanent formwork units as permanent formwork to the concrete deck soffit. These units do not comply with the provisions of BD 36/90 Clause 4.1.7 and a Departure is sought to permit their use.

The reason for the deflection limit in BD 60 is not stated. There are several potential reasons for limiting deflection:

- Aesthetics/visual acceptability
- Avoidance of additional weight due to extra concrete required to make up the sag
- Consequent adverse effects on the design (extra dead weight and additional quantity) Compliance with design assumptions relating to reinforcement positioning and bar bending
- Risk of the deflected formwork units slipping off the support

In the case of the BHLR, the response to these concerns is as follows:

- It is unlikely that the sag in the formwork will be perceptible from ground level. There is no ready visual reference to which the sag can be related.

- 
- The additional weight of concrete will be allowed for in the design and in the measure for the Initial Target Cost
  - The design assumptions will allow for the additional dead weight and the effects of the additional sag on the reinforcement positioning and bar bending, including the provision of cover and calculation of crack widths.
  - The width of the EMJ units will be chosen so that there is a sufficient and safe overlap of the units onto the beam flanges to obviate concerns regarding units slipping off supports.
  - Design assumptions for deflections will be taken from EMJ product data, interpolating for intermediate span lengths and thicknesses of slab if necessary. Load testing as per Cl 4.1.6 will not be carried out.

### **Departure - Hydrophobic Pore Lining Impregnant**

BD 43/03 specifies various requirements for the impregnation of highway structures with hydrophobic pore lining impregnant. Following the completion of research into the long term effectiveness of hydrophobic pore lining impregnants on concrete highway structures, the Highways Agency is temporarily suspending requirements to apply all such impregnants as set out in BD43/03.

This suspension is detailed in CHE Memorandum 227/08 - The Impregnation Of Reinforced and Prestressed Concrete Highway Structures Using Hydrophobic Pore Lining Impregnants

This Departure seeks to apply this suspension to structures on the BHLR – i.e. the impregnant will not be applied.

This will not preclude the opportunity to apply impregnant in the future should this be required.

### **Departure # Implementation of IAN 96**

This Departure seeks approval:

- to delete the requirement for an Additional Protective layer of sand asphalt to waterproofing unless required by an individual waterproofing system.
- to permit the application of bridge deck waterproofing to concrete less than 28 days old, providing this is in accordance with the waterproofing manufacturer's requirements and the provision of special additional coating or treatment to the concrete surface as required.

The above to be in accordance with IAN 96 and all associated provisions of IAN 96 shall apply.

