

Footbridge (WBC ref: 3114) Footing Design Emm Brook Restoration

Footbridge Approval in Principle

South East Rivers Trust

Document no: A120099-TGEE-M0-XX-RP-C-0003

Revision: P02

Date: 23/01/2026



Document Issue Record

Project:	Footbridge (WBC ref: 3114) Footing Design Emm Brook Restoration
Report Title:	Footbridge Approval in Principle
Client:	South East Rivers Trust
Document No:	A120099-TGEE-M0-XX-RP-C-0003
Revision:	P02
Status	S3 - Suitable for review and comment (for approval)
Date:	23/01/2026
Filename:	A120099-TGEE-ZZ-XX-RP-C-0003 P01

Rev	Date	Description and Purpose of Issue	Prepared	Reviewed	Approved
P01	21/11/24	First Issue	GJD	JJF	APM
P02	23/01/26	Updated to align with Bridge 3111 comments	JJF	JJF	APM

Issuing Office:	Tony Gee and Partners LLP, 8th Floor, International House, Dover Place Ashford, Kent, TN23 1HU
Tel:	+44 1233 639787
Email:	ashford@tonygee.com

Contents

Introduction	1
1. Highway Details	2
1.1. Type of Highway	2
1.2. Permitted traffic speed	2
1.3. Existing restrictions	2
2. Site Details	2
2.1. Obstacles crossed	3
3. Proposed Structure	3
3.1. Description of structure and design working life	3
3.2. Structural type	4
3.3. Foundation type	4
3.4. Span arrangements	4
3.5. Articulation arrangements	5
3.6. Classes and levels	5
3.7. Road restraint systems requirements	5
3.8. Proposals for water management	6
3.9. Proposed arrangements for future maintenance and inspection	6
3.10. Environment and sustainability	6
3.11. Durability, material and finishes	7
3.12. Risks and hazards considered for design, execution, maintenance and demolition. Consultation with and/or agreement from Overseeing Organisation	8
3.13. Estimated cost of proposed structure together with other structural forms considered (including where appropriate proprietary manufactured structure), and the reasons for their rejections (including comparative whole life costs with dates of estimates)	9
3.14. Proposed arrangements for construction	9
3.15. Resilience and security	10
4. Design Criteria	10
4.1. Actions	10
4.2. Heavy or high load route requirements and arrangements being made to preserve the route, including any provision for future heavier loads or future widening	12
4.3. Proposed minimum headroom to be provided	12
4.4. Authorities consulted, and any special conditions required	12
4.5. Standards and documents listed in the technical approval schedule (TAS)	13

4.6.	Proposed Departures from standards given in 4.5	13
4.7.	Proposed Departures from standards concerning methods for dealing with aspects not covered by standards in 4.5	14
5.	Structural Analysis	14
5.1.	Methods of analysis proposed for superstructure, substructure and foundations	14
5.2.	Description and diagram of idealised structure to be used for analysis	14
5.3.	Assumptions intended for calculation of structural element stiffness	14
5.4.	Proposed range of soil parameters to be used in the design of earth retaining elements	14
6.	Geotechnical Conditions	15
6.1.	Acceptance of recommendations of the ground investigation report (reference/dates) to be used in the design and reasons for any proposed changes	15
6.2.	Summary of design for highway structure in the ground investigation report	15
6.3.	Differential settlement to be allowed for in the design of the structure	17
6.4.	If the ground investigation 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	17
7.	Check	17
7.1.	Proposed Category and Design Supervision Level	18
7.2.	If Category 3, name of proposed Independent Checker	18
7.3.	Erection proposals or temporary works for which Type S and P Proposals will be required, listing structural parts of the permanent structure affected with reasons	18
8.	Drawings and Documents	18
8.1.	List of drawings (including numbers) and documents accompanying the submission	18
9.	The above is submitted for acceptance	19
10.	The above is rejected / agreed subject to the amendments and conditions shown below	19

Appendix

Appendix A – CDM Review

Appendix B – Drawing

Appendix C – TAS

Introduction

South East Rivers Trust (SERT) are undertaking a project at Emm Brook, Woosehill, Wokingham, with the aim to reinstate a historic channel east of the current watercourse to improve fish passage and restore the watercourse to its original natural state. This channel interfaces with a footpath at 3No. locations for which provision of footbridges are required.

Tony Gee and Partners (TG) has been appointed by SERT to undertake the design of the foundations associated with these 3No. footbridges as part of a wider development to reinstate a bypass channel.

This AIP relates to the design of the most northern of the three proposed footbridge (WBC ref. 3114). This AIP covers the footbridge and associated footings. The new footbridge is required to maintain public access along an existing right of way for pedestrian traffic.

Note that, for consistency with the other structures on the scheme (and noting that the footpaths provided are 3m wide and not for vehicular use), the bridge width has been designed at 3.5m clear width (a 0.5m reduction from the 4m width in the previous AIP submission for this structure).

The proposed geometry of the structure is shown in the drawings in Appendix B of this document.

This AIP is based on DMRB CG300 Appendix A. Model form of Approval in Principle for the design of bridges and other highway structures where UK National Standards (Eurocodes) are used.

1. Highway Details

1.1. Type of Highway

The proposed footbridge is to bridge the reinstated Emm Brook stream. Footbridge at Bridge 3114 is to act as a footpath only, with a width provided at 3.5m clear such that, should the existing path be upgraded in the future, that the bridge can perform as an unsegregated shared use path (cycles and pedestrian traffic).

1.2. Permitted traffic speed

Presence of maintenance vehicle only – limited to 10mph.

1.3. Existing restrictions

The site is located within a predominantly residential setting. The installation of the new footbridge will require a temporary closure of the existing footpath.

A temporary culverted crossing has been installed at this location as part of the Greenways scheme. This design proposal is for provision of the permanent bridge crossing, with the existing culvert removed and the banks reprofiled to suit the channel geometry.

The new bridge with associated footings are to be installed across a newly dug bypass channel. Access for the bridge footing construction will be via land from the north.

Utility searches have identified a LV cable in the vicinity of the structure, crossing the channel (to the north). This is to be identified and location confirmed in advance of excavation works being undertaken. Refer to drawing A120099-TGEE-ZZ-XX-DR-C-0101 in Appendix B for indicative location.

2. Site Details

The location of the two bridges is indicated in Figure 1



Figure 1. Approximate location of bridge

Footbridge 3114 is proposed to cross the new section of bypass channel located at NGR: SU 7984569227.

The existing location has a temporary footpath crossing a small piped culvert with concrete bagwork headwalls installed in accordance with Wokingham Borough Council standard detail WSD/500/12 which is to be removed in its entirety.

2.1. Obstacles crossed

Footbridge 3114 will cross the newly dug bypass channel.

3. Proposed Structure

3.1. Description of structure and design working life

Footbridge 3114 consists of a hardwood (D70) timber footbridge with a 4.1 m total length (3.76m bearing c/c, 3.45m clear span) and clear width of 3.5m. The soffit shall be located at +44.76mOD to achieve 300mm freeboard to the 1 in 10Yr flood level. The foundations shall be a reinforced concrete L-wall with associated wing walls.

The bridges shall be integrated with the existing footpaths through local regrading of the adjacent paths with access ramps constructed from imported or site won fill, as required.

Table 1. Structure design working life

Element	Design Working Life	Period to First Routine Maintenance	Routine Maintenance by Employer	Unacceptable Repair / Replacement
Hardwood timber (Bridge components)	50 years*	1 year (less depending on season)	For first few seasons regular wetting of structure during hot weather should be undertaken to limit cracks and warping during the initial drying out process. Removal of leaves each autumn.	Replacement of defective items (i.e. deck plank, parapet posts, parapet rails)
Bridge fixtures, fittings & finishes	50 years*	15 years	Visual inspection. Re-coat of localised affected areas as required.	Replacement of defective/corroded fittings
Reinforced concrete footings	100 years*	100 years	None	Cutting out / replacement of defective / spalled concrete and corroded reinforcement

Bridge bearings	50 years*	5 years	Clear/clean debris from bearing plinth	Bearing failure requiring premature replacement
Ancillaries (e.g. funnel fencing)	15 year	5 year	Visual inspection, tighten bolts if required	Failure of elements

*Rationale considers footbridge to 50 year design life requiring replacement like for like at year 50 to achieve 100 year total design life.

Other non-structural components and ancillaries will require replacement on a more frequent basis.

All the above assume General Inspections and Principal Inspections undertaken at 2/6 year intervals.

3.2. Structural type

3.2.1. Footbridge 3114

Footbridge 3114 shall be supplier designed, consisting of D70 hardwood timber for all structural members (primary beams, decking, stanchion etc).

Structural configuration shall be provision of timber bearers at each abutment with primary beams spanning between abutments. Structural decking members shall span between primary beams.

Handrailing and stanchion to be formed of timber, stanchion affixed directly to the external longitudinal beams.

All fixings shall be stainless steel grade A4-70 of greater.

3.3. Foundation type

The bridge foundations consist of a reinforce concrete L-wall with integrated wingwalls. A bearing shelf shall be incorporated into the L-wall.

Wingwalls will return orthogonal to the channel towards the heel of the L wall extending a sufficient distance such that stability of the footpath is maintained as the channel banks regrade to a natural stable angle of repose in the long term condition.

3.4. Span arrangements

Footbridge 3114 shall have a 4.1m total length. Indicative plan layout is shown below.

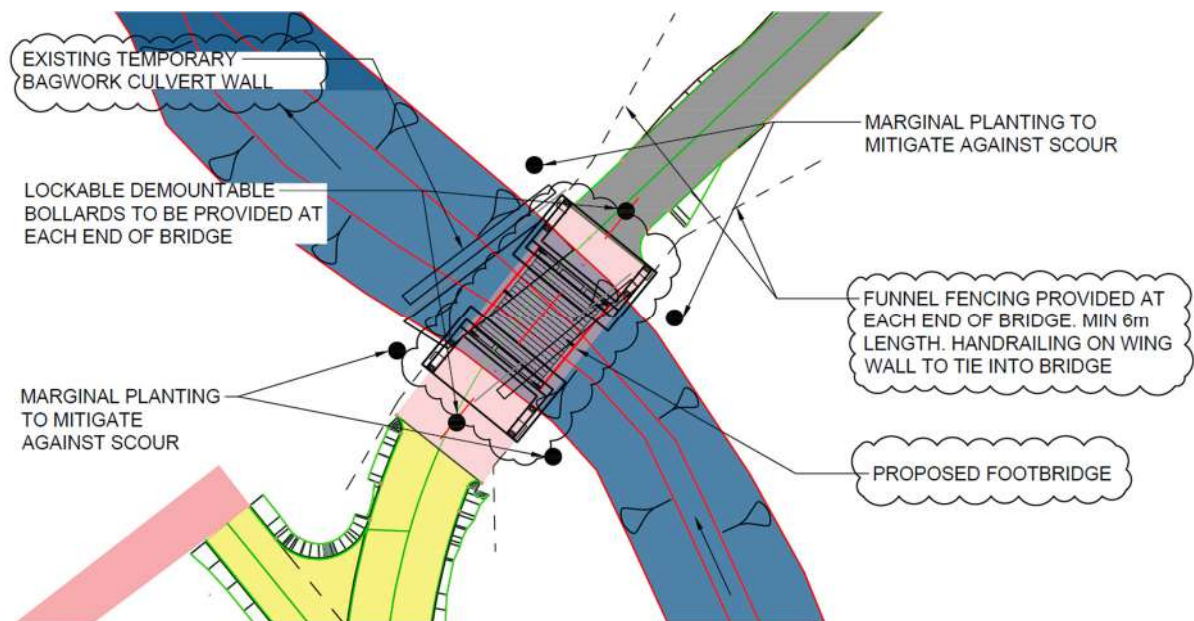


Figure 2. Plan view of bridge 3114 (extract from drawing A119099-TGEE-ZZ-XX-DR-C-0101)

The plan view of the proposed bridge interfacing with the Greenway path is shown in Figure 3. Note the existing temporary culvert with blockwork headwall is shown, which will be removed in its entirety.

A typical section of footbridge 3114 is shown in Appendix B

3.5. Articulation arrangements

Footbridge 3114: Timber footbridges are not susceptible to significant thermal effects for spans of this magnitude. Lateral restraint shall be provided at bearing locations as the soffit of the bridge is below a 1:100 year flood level.

3.6. Classes and levels

3.6.1. Consequence Class

Consequence Class- CC2 (medium as defined by Table B1 of BS EN 1990:2002.)

3.6.2. Reliability Class

Reliability Class- RC2 (in accordance with Table A.2 of Highways Agency Interim Advice Note (IAN) 124/11)

3.6.3. Inspection Level

Inspection Level-IL2 (in accordance with table B4 of BS EN 1990:2002 and Table A.2 of IAN 124/11)

3.7. Road restraint systems requirements

Hardwood timber handrail to be designed to resist pedestrian loads in accordance with BS EN 1991-1-1 + NA. No allowance for vehicle restraint systems. Refer to section 4.

No mesh infill is to be provided (refer to Section 4.6).

Additional handrailing at each end of the bridge to form a “funnel” for pedestrians shall be reviewed during detailed design.

3.8. Proposals for water management

Based on the flood modelling received, the 1 in 10 year flood level is below the soffit of this structure with a freeboard of 300mm.

The backfill to the rear of the abutment is to be extended beyond the rear of the abutment to permit draining of the more permeable backfill (to avoid “tanking” of the granular backfill between the abutment wingwalls). Localised scour mitigation to be reviewed at detailed design, either marginal planting, rock rolls or coir matting.

Top of bearing shelf to be laid with a crossfall (min 1:40 gradient) towards the river (alternatively a 10mm total fall may be provided).

3.9. Proposed arrangements for future maintenance and inspection

3.9.1. Traffic management

No traffic management is envisaged.

3.9.2. Arrangements for future maintenance and inspection of structure.

Inspections of the bridge structures and flood control structure will be undertaken during periods of low flow with access from the channel bank. . Average water level is approx. 300mm with low flow conditions less than 200mm at low velocity. In river working will be required to inspect the bearing shelf.

3.9.3. Access arrangements to structure

The structure can be accessed from the adjacent channel banks and footpath. Presumed access for underside inspection undertaken either during periods of low flow or with temporary dams installed.

Clear height for inspection provided approx. 1.4m at beam locations.

3.10. Environment and sustainability

A structurally efficient solution will be designed to minimise the amount of material used. Proposal minimises bridge span to permit use of a timber structure to avoid requirements to maintain bearings and repaint structural steelwork.

At the end of the working life of the structure, the reinforced concrete can be crushed and reused as aggregate.

Timbers shall be sustainably sourced FSC certified and sourced from suppliers that are FLEGT Category A (Forest Law Enforcement, Governance and Trade) licensed, as per Environment Agency requirements.

3.10.1. Special environmental considerations

The works will be taking place adjacent to the Emm Brook. Concrete works are planned as part of the footing construction. Care is to be taken to ensure no materials enter the watercourse during construction.

3.11. Durability, material and finishes

3.11.1. Concrete

Specification

Reinforced concrete works shall generally be C40/50 meeting the requirements in Table 2.

Table 2. Concrete specification

Strength	C40/50
Maximum w/c ratio	0.40
Maximum aggregate size:	20mm
Min cement/combination content:	380 kg/m ³
Permitted combination types:	CEM II/B-S (S>25%) CEM II/B-P+SR CEM II/B-Q+SR CEM II/B-V+SR CEM III/A+SR

All concrete mixes shall be in accordance with the relevant clauses of BS 8500-1, BS 8500-2 and BS EN 206 and MCHW Series 1700. Exposure classes shall be in accordance with BS 8500-1.

Crack widths where relevant will be limited to 0.3mm in accordance with Table NA.2 of UK NA to BS EN 1992-2.

Exposure class and cover

Table 3. Element Exposure Class and Cover

Structural Element	Compressive strength class	Exposure Class			Cover
		XC	XD	XF	
Concrete footing	C40/50	XC3/4	XD3	XF2	50+Δc

The minimum allowance for deviation, Δc shall be taken as 15mm for concrete cast against formwork or blinding. Casting of reinforced concrete directly against soil shall not be permitted.

Reinforcement

Reinforcement grade - 500N/mm² to BS 4449 Grade B500B or B500C in accordance with BS EN 10080, BS8666 and supplied by UK CARES accredited supplier where material is fully traceable.

Proposed finishes

Concrete finishes, shall be in accordance with MCHW 1708:

- Exposed faces generally – F3
- Hidden formed surfaces – F1
- Buried unformed surfaces – U2

Class F1. A dense finish with no grout or mortar loss with the specified cover to embedded metal and achieving the specified dimensional tolerances.

Class F3. As the requirements of F1 and the resulting finish shall be smooth and of uniform texture and appearance. The formwork lining shall leave no stain on the concrete and shall be so joined and fixed to its backing that it imparts no blemishes. It shall be of the same type and obtained from only one source throughout any one structure. The Contractor shall make good any imperfections in the finish. Internal ties and embedded metal parts shall not be used.

Class U1 finish. The concrete shall be levelled and screeded to produce a uniform surface to the profile shown on the drawings. No further work shall be applied to the surface unless it is used as a first stage for another class of finish.

Class U2 finish. After the concrete has hardened sufficiently, the Class U1 finish shall be floated by hand or machine sufficiently only to produce a uniform surface free from screed marks.

3.11.2. Steel

All fixings to be grade A4-70 stainless steel (or better).

3.11.3. Timber (general)

Timber to be Ekki (D70).

3.11.4. Decking Boards

All decking boards to be Ekki (D70) or GRP composite decking. All decking boards are to have a grooved finish to enhance grip with min 2No. anti-slip strips for each board.

3.11.5. Backfill

All imported backfill, where required, shall be class 6N to MCHW Series 600.

3.12. Risks and hazards considered for design, execution, maintenance and demolition. Consultation with and/or agreement from Overseeing Organisation

Refer to CDM designers risk assessment included in Appendix A. The design philosophy is in accordance with the CDM regulations and best practice guidance.

3.13. Estimated cost of proposed structure together with other structural forms considered (including where appropriate proprietary manufactured structure), and the reasons for their rejections (including comparative whole life costs with dates of estimates)

High level costings undertaken for bridge structures in 2021, as provided below based on indicative arrangement.

Approximate cost of the foundation and footings, inclusive of temporary works and mobilisation: Circa £56,000.

Approximate costing of bridge structure: Circa £31,000.

Costing to be finalised after detailed design phase.

Note that significant discussions were held around the use of timber for the proposed bridge relating to maintenance burden, long term cost implications and experience from Wokingham Borough Council (WBC) on managing similar assets. As a result of these discussions, timber has been accepted by asset managers at WBC in the best interests of the overall scheme.

3.14. Proposed arrangements for construction

3.14.1. Construction of structure

The following construction sequence is proposed:

1. Closure of footpath.
2. Set up site/mobilisation
3. Establish ecological mitigation and complete devegetation works
4. Construction of working platforms and haul roads for access as required
5. Install temporary dams/overpumping as required.
6. Removal of existing culvert and associated bagwork
7. Excavation works and construction of footings
8. Installation of bridges and control structure
9. Profile ramp to tie into existing footpath
10. Finishing works
11. Landscaping as required
12. Remove site compound

3.14.2. Traffic management

Pedestrian foot traffic along the footpath will be temporarily closed during the installation of the footings and bridges.

3.14.3. Service diversions

Existing LV service to be identified on site and confirmed suitably remote from work area to not require diversion. If found to be impacted by works, diversion or isolation shall be required. The previous AIP (reference 65205113-SWE-ZZ-00-T-C-0001) confirmed that this has been relocated and the location on the service searches are unlikely to be accurate.

3.14.4. Interface with existing structures

Existing culvert and associated concrete bagwork headwall to be removed as part of the works.

3.15. Resilience and security

Construction works to be carried out within site boundary protected with fencing where possible.

4. Design Criteria

4.1. Actions

4.1.1. Permanent actions

All permanent actions are as outlined in BS EN 1991-1-1 and its UK National Annex.

- Plain concrete: 24kN/m³
- Reinforced concrete: 25kN/m³
- Steel: 78.5 kN/m³
- Timber 10.8kN/m³ (Ekki)

Permanent actions acting on the footbridge and footbridge foundations shall be determined in accordance with the relevant documents set out in the TAS list.

Permanent actions shall be derived in accordance with BS EN 1997 utilising soil properties outlined in Section 6.

Loading will be applied and combined in accordance with BS EN 1990 and BS EN 1991 as amended by the relevant national annex for both ULS and SLS.

4.1.2. Snow, wind and thermal actions

Snow loading will be ignored in accordance with BS EN 1991-1-3 Clause NA 4.1.1, as on ordinary bridges the accumulation of any material quantity of snow will effectively reduce the traffic loads such that the combined mass of snow and traffic loading will not exceed the nominal live load.

Wind loading to be calculated in accordance with BS EN 1991-1-4 (including national annex) for a return period of 50 years. The basic wind data is to be based on the wind velocity for Emm Brook, England assuming an altitude of $A = 40\text{m}$. Base wind speed, $v_b = 22.4\text{m/s}$.

Thermal actions shall not be considered as not significant for a timber footbridge of this span.

4.1.3. Actions relating to normal traffic under AW regulations and C&U regulations

Not applicable.

4.1.4. Actions relating to General Order traffic under STGO regulations

Not applicable.

4.1.5. Footway or footbridge variable actions

Pedestrian Loads

Two load models will be considered, these are as follows:

- In accordance with BS EN 1991-2:2003 cl 5.3.2.1, the footbridge will be designed for a vertical uniformly distributed live load of 5kN/m^2 . This is to be applied over the entire footbridge.
- In accordance with BS EN 1991-2:2003 cl 5.3.2.2, the footbridge will be designed for a point load of 10kN acting on a $100\text{mm} \times 100\text{mm}$ square.

Parapet Loads

Horizontal parapet loads to be 1.6kN/m in accordance with table NA.8 to BS EN 1991-1-1-2002 noting crowding unlikely.

Vehicle Loads

The footings will be designed for vehicle access up to 5 tonnes (Ref Wokingham Borough Council, E.Pilgrim c. 2020). Allowance shall be made for one axle to be loaded to 60% of the total vehicular load with a dynamic factor of 1.1 applied. Note load combinations to be as per table 5.1 to BS EN 1991-2.

Demountable bollards shall be placed at either end of the bridge to prohibit unauthorised vehicles accessing the footbridge.

4.1.6. Actions relating to Special Order traffic, provision for exceptional abnormal indivisible loads including location of vehicle track on deck cross section

Not applicable.

4.1.7. Accidental actions

Debris accumulation load to be considered in accordance with CD356 equation 7.41 based on a blockage ratio of 1.0, $C_D = 1.9$ for the water velocity coincident with a 100year flood event at 0.18m/s .

Debris impact load to be considered utilising equation 7.51 of CD356. This considers that any floating debris requires sufficient water depth in order to migrate downstream such that the flood level considered is approx. 1:10YR flood event with a velocity of 0.24m/s (interpolated from 1 in 2 year and 1 in 100yr velocity).

The possible debris that can enter the stream between Bridge 3112 and Bridge 3114 consist of mature Alders. Based on the stream orientation and width, it is considered that the largest length debris that can enter the channel and migrate downstream to bridge 3114 would be c.6m length and 450mm dia for a total mass of c. 750kg (conservatively assuming wet density at 780kg/m³). Note that in practice, it is considered unlikely that the relatively narrow stream geometry would permit passage of debris of this size as any branches/protruding sections would be expected to block the channel rather than flowing downstream.

This load will be applied to the abutments or the bridge in separate loadcases in isolation (i.e. not combined with any other variable actions).

4.1.8. Action during construction

Not applicable.

4.1.9. Any special action not considered above

Water Load

- In accordance with BS 6349-1-2:2016 Annex E.1, steady current drag forces will be determined on the flood control structure based on a water velocity of 0.18m/s and a flood level of +45.67mOD for a 1 in 100-year event.
- A sensitivity will be undertaken considering current drag force based on a water velocity of 0.3m/s at a flood level of 44.26mOD.

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

Not applicable.

4.3. Proposed minimum headroom to be provided

The level of footbridge 3114 soffit will be an average +44.76mOD.

Minimum headroom between bridge beam and channel invert is provided as follows:

Channel invert and underside of beam – 1.48m

Beam depth provides additional headroom for inspection when personnel are under bridge but between beams.

4.4. Authorities consulted, and any special conditions required

The following organisations shall be consulted with regards to special conditions and requirements during the detailed design stage:

- South East River Trust
- Wokingham Borough Council
- Environmental Agency
 - Flood modelling results discussed in section 4.6. Significant departures from cross sections shown in Appendix B are not permitted without further EA approval.

4.5. Standards and documents listed in the technical approval schedule (TAS)

See Appendix C

4.5.1. Additional relevant Standards

None proposed.

4.6. Proposed Departures from standards given in 4.5

Bridge Freeboard (soffit level)

Proposed departure is to set soffit level to provide 300mm freeboard at the 1 in 10 year flood level (departure from CD356 requirement for 600mm freeboard at the 1 in 100 year event).

Summary data for levels, flow, velocity and flood events are provided in the table below, which demonstrate that peak velocity occurs at low return periods (1 in 2 yr flood) with velocities reducing as water levels increase due to attenuation of the area. It is proposed to provide freeboard to the 1 in 10 year level. The freeboard provided is proposed at 300mm rather than 600mm recognising the relatively minor size of the channel, the presence of the flow control device at Bridge 3112 which prevents debris entering the channel and the limited potential for significant debris to accumulate within the Emm Brook. No separate DfS application is to be provided.

Brdge ID	Max Flow (level, mOD)	Velocity at max flow	Flood level @ 1 in 2 yr mOD	Flood level @ 1 in 10 yr mOD	Flood level @ 1 in 100 yr mOD	1 in 100 yr velocity	Soffit level (revised), mOD	Freeboard (1 in 10 YR)	Freeboard (1 in 100 YR)
3114	43.572	0.3m/s	44.26	44.46	45.67	0.18m/s	44.76	0.3	-0.91

Debris loading

Proposed debris loading is as stated in section 4.1.7. The derogation from CD356 is to use the reduced mass of a “sturdy log” proportional to the characteristics of the stream rather than the 3t minimum required in this document (clause 4.21). The implications of the proposed reduced mass is approximately a 35% reduction in lateral impact load from the CD356 minimum for impact to main river structures. No separate DfS application is to be provided.

Pedestrian restraint (omission of mesh infill)

Pedestrian restraint is to be provided through a guardrail type arrangement. No mesh infill is to be provided and no separate DfS application is to be provided.

4.7. Proposed Departures from standards concerning methods for dealing with aspects not covered by standards in 4.5

None proposed.

5. Structural Analysis

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

Foundations

The bridge footings are which will be analysed by means of hand calculations and in-house spreadsheets.

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

Figure 3 below demonstrates a simplified idealised structure that will be used for analysis of the bridge footings.

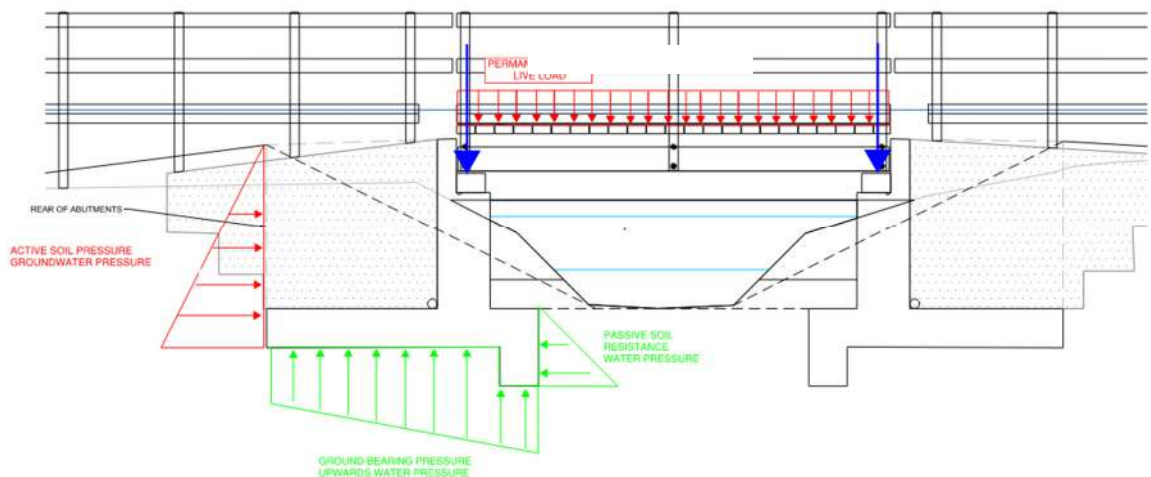


Figure 3. Idealised load diagram for bridge structure, flow control structure and foundation loading

5.3. Assumptions intended for calculation of structural element stiffness

The stiffness of concrete sections shall be considered based on cracked section properties where the section is behaving under tension and/or bending. Uncracked section properties shall be utilised when under direct compression only.

5.4. Proposed range of soil parameters to be used in the design of earth retaining elements

See Section 6.

6. Geotechnical Conditions

6.1. Acceptance of recommendations of the ground investigation report (reference/dates) to be used in the design and reasons for any proposed changes

The geotechnical parameters for design have been adopted based on the information in the previous AIP reference “65205113-SWE-ZZ-00-T-C-0001” (Sweco, 2023). Key findings replicated in section 6.2.

6.2. Summary of design for highway structure in the ground investigation report

The following design parameters apply:

Table 4. Ground model adopted for design (ground level at circa +44.4mOD)

Strata	Top Level (mBGL)	Layer Thickness (m)
Made Ground	0	1
Alluvium	1	1.2
Oxford Clay Formation	2.2	Unknown

Groundwater was encountered at 4.70mbgl (but ground water regime expected to be linked to maintained water level in channel post construction).

Characteristic geotechnical parameters

The ground properties to be used in the design is as below:

Table 5. Characteristic geotechnical properties adopted for design

Stratum	γ kN/m ³	c', k kPa	ϕ'_{cv}, k °	c_u, k kPa	E_u MPa	E' MPa
Backfill	18	0	38	0	N/A	12
Top Soil	18	0	20	5	1.75	1.5
Alluvium	18	0	25	40*	15.75	12.6
London Clay Formation	20	0	23	75	26.25	21

*Proposed structure intended to be founded in the cohesive alluvium layer. Formation to be verified as a cohesive material on site with Cu validated by hand shear vane testing (min 3No.) prior to foundation construction.

Earth pressure coefficients for the design of the footings will be calculated in accordance with Appendix C of BS EN 1997-1 using Design Approach 1.

The following load conditions are considered (note 1), 2) and 3) are for short term conditions for which cohesive strata will respond in an undrained manner).

Condition	Surcharge	Ground water level (retained)	Ground water level (in channel)
1) Channel Dry	5 kPa or 5t vehicle	44.19mOD (1m retained water level)	N/A
2) Channel Flood (1 in 100Yr)	N/A	45.67mOD	45.67mOD
3) Channel Flood (1 in 10 YR)	5 kPa or vehicle	44.46mOD	44.46mOD
4) Long term condition (drained soil properties utilised)	2.5 kPa	43.072mOD	43.472mOD

Table 6. Outline design utilization of footings under the design loadcases.

SPREAD FOUNDATIONS										
CONDITION	FOUNDIN G LEVEL ² (mAOD)	ULS UTILISATION (%)						BEARING RESISTANCE (kPa)		DEGREE OF UTILIS. ¹ (%)
		BEARING		SLIDING		OVERTURNING				
		C1	C2	C1	C2	C1	C2	C1	C2	
1) CHANNEL DRY	42.29mO D (key) 42.69mO D (base)	35	37	80	89	43	35	226.7	162.7	89
2) CHANNEL FLOOD (1 IN 100YR)	42.29mO D (key) 42.69mO D (base)	40	43	77	61	69	63	192.6	138.1	77
3) CHANNEL FLOOD (1 IN 10YR)	42.29mO D (key) 42.69mO D (base)	29	32	71	68	64	50	224.4	161.0	71
4) LONG TERM CONDITION	42.29mO D (key) 42.69mO D (base)	65	93	96	92	43	42	99.0	52.3	93

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

Significant differential settlement not envisaged to occur. Maximum differential settlement of 20mm permitted.

6.4. If the ground investigation 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

A review of the raw data has been undertake and design properties derived sufficient to inform the design process. Completion of a GIR and GDR shall not be undertaken to reflect the relative low complexity of the project.

7. Check

¹ The maximum of the six utilisation values reported in columns 5-10. Utilisation values reported in columns 5-10 should be the maximum calculated from the drained or the undrained analysis.

7.1. Proposed Category and Design Supervision Level

Structure Category 1 and Design Supervision Level 2.

The detailed design of the bridge foundations will be carried out by Tony Gee and Partners.

The detailed design and check of the bridge structure will be carried out by Sarum Hardwood Structures Ltd.

Design and check certification will be supplied by the respective designers of the superstructure and substructure.

7.2. If Category 3, name of proposed Independent Checker

Not applicable.

7.3. Erection proposals or temporary works for which Type S and P Proposals will be required, listing structural parts of the permanent structure affected with reasons

Not applicable.

8. Drawings and Documents

8.1. List of drawings (including numbers) and documents accompanying the submission

Refer to Appendix B for the following General Arrangement Drawings

A120099-TGEE-ZZ-XX-DR-C-0001	Existing Location Plan
A120099-TGEE-ZZ-XX-DR-C-0101 P01	Proposed – General Arrangement
A120099-TGEE-ZZ-XX-DR-C-0103 P01	Proposed – Bridge 3114 -Section and Footings

9. The above is submitted for acceptance

Signed.....

Name.....Josh Fletcher.....Tony Gee Design Team Leader

Engineering Qualifications.....CEng MICE.....

Name of Organisation.....Tony Gee and Partners.....

Date.....23/01/2026.....

Signed.....

Name.....Tom Leonard.....Tony Gee Check Team Leader

Engineering Qualifications.....CEng MICE.....

Name of Organisation.....Tony Gee and Partners.....

Date.....23/01/2026.....

10. The above is rejected / agreed subject to the amendments and conditions shown below

Signed.....

Name.....Andrew Cook.....

Position Held.....Associate Director.....

Engineering Qualifications.....BEng CEng MICE.....

TAA.....WSP, working for and on behalf of Wokingham Borough Council.....

Date.....(as per digital signature).....

Comments

3.7 – Mesh infill to the parapets should be provided but its omission and proposed lack of a DfS (in 4.6) is accepted.

3.7 – Fence post fixings into the wingwalls shall either be cast in or chemical anchors (mechanical / expansion anchors are not permitted).

4.6 – Proposed lack of a DfS for the reduced freeboard and associated debris loading is accepted.

6.4 – Hand shear vane testing to be specified to validate the founding layer against the anticipated strata.

8.1 - Drawing 0101 is rev P04 (not P01), drawing 0103 is rev P02 (not P01).

8.1 - Drawing 0103, overall length of bridge is 4.100m (not 4.115m)

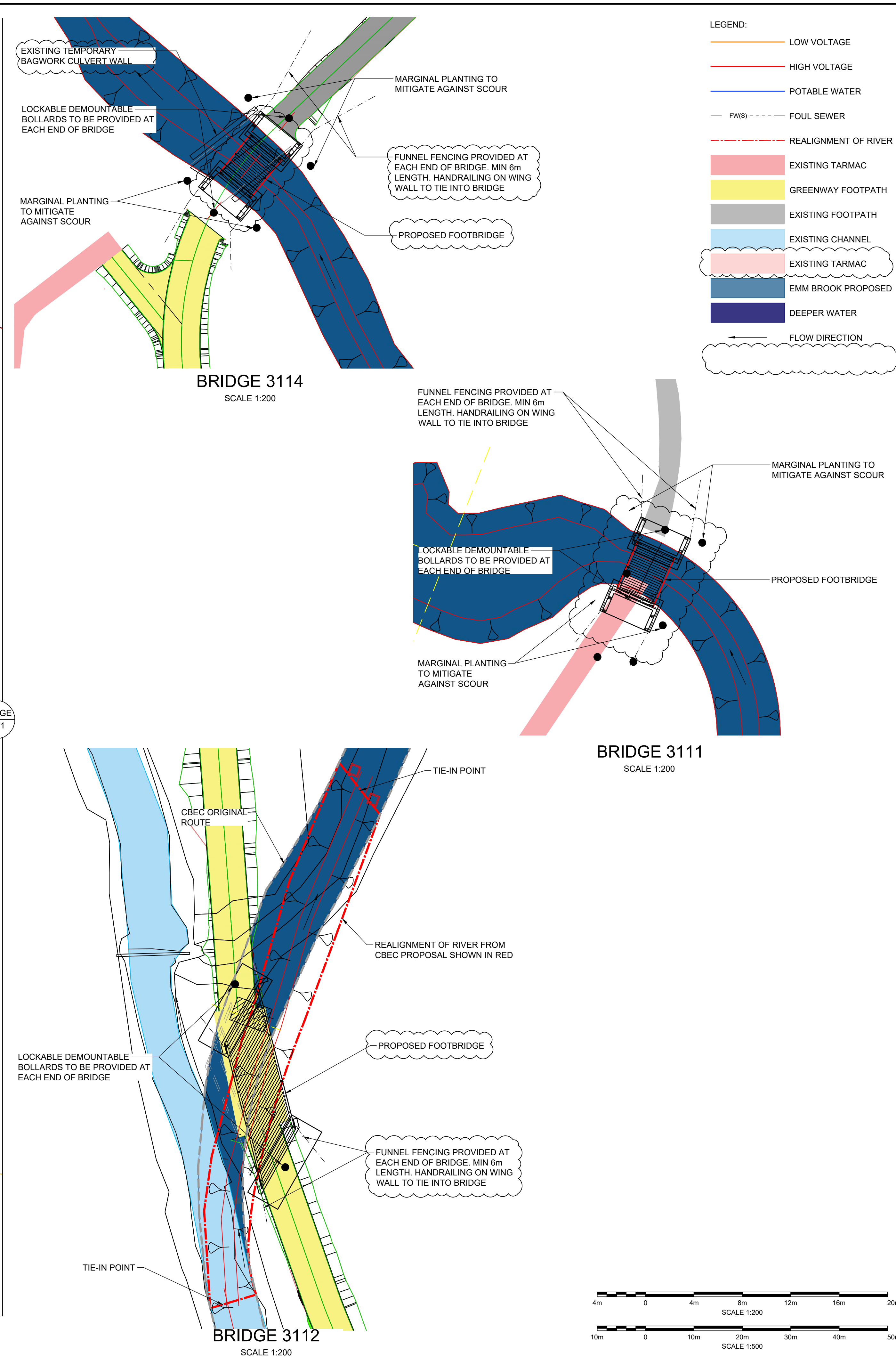
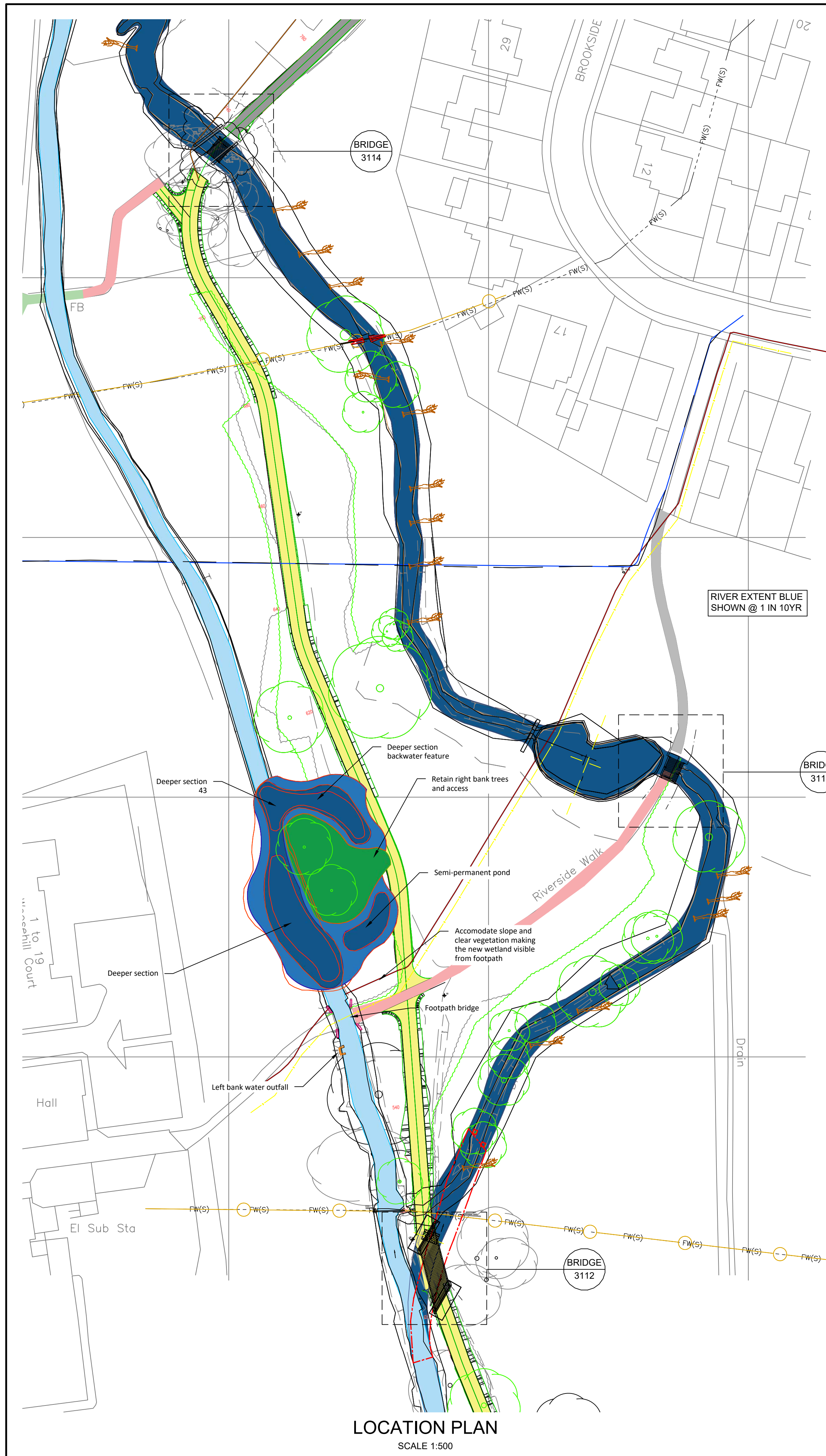
Appendix A - CDM Review

Activity/ Element	Design item giving rise to risk	Consequence of item giving rise to risk	Persons at risk		Design action to eliminate risk or reduce risk	Residual risk – risks that cannot be designed out and required control action by others	Status (live / Closed)	COMDE
Item No.			Site works area	Others				
Bridge Footings								
1.	Unexploded Ordnance UXO	Explosion, contamination and fatalities	✓	✓		Contractor to use the mitigation measures developed in conjunction with UXO consultant.	Live	C
2	High channel levels during flooding	Risk of drowning	✓			Contractor to monitor weather conditions.		
3	Activities adjacent to water and / or over water and excavations.	Chance of personnel or plant falling into the water resulting in drowning and / or injury. Risk of drowning.	✓		Edge protection systems (pedestrian and/or vehicle as appropriate) to be provided where possible.	The works will be undertaken by an experienced contractor who will apply appropriate risk assessment and safety measures. Training of site operatives.	Live	C O M
4.	Manual handling and ergonomics associated with heavy components.	Falling personnel or objects.	✓		Minimise size / weight of elements with efficient design as far as possible.	Automated mechanical methodology to be employed where practical. Residual manual handling and ergonomics to be considered at detailed design.	Live	C

Activity/ Element	Design item giving rise to risk	Consequence of item giving rise to risk	Persons at risk		Design action to eliminate risk or reduce risk	Residual risk – risks that cannot be designed out and required control action by others	Status (live / Closed)	COMDE
			Site works area	Others				
5.	Lifting operations – new bridges, steelwork, prefabricated rebar cages and shutters.	Falling Objects Crane located too close to the new footings causing settlement, cracking or failure	✓		Efficient design to reduce size of elements and therefore number of lifts. Bridge designer to agree with the Contractor the acceptable crane loads and support locations.	Experienced contractor to plan lifts and provide suitable briefing and PPE to staff. Temporary works designs to consider lift operations. Contractor to ensure that crane supports are situated at a sufficient distance from the footings.	Live	C
6.	Contaminated land	Working with locally present contaminated soil/water during excavation work. Health hazard.	✓		Review ground investigation data on contamination. Assist contractor for mitigation.	Contractor to use the mitigation measures. Use suitable PPE	Live	C
7.	Striking of live services Striking foul sewer line	Electric shocks, water leaks etc. Health Hazard	✓	✓	As-built records of existing services to be provided by Client at detailed design stage	Striking of unknown services, Striking live services. Carry out a subsurface investigation (CAT scan or similar) so that works can be planned to avoid services where possible.	Live	C

Activity/ Element	Design item giving rise to risk	Consequence of item giving rise to risk	Persons at risk		Design action to eliminate risk or reduce risk	Residual risk – risks that cannot be designed out and required control action by others	Status (live / Closed)	COMDE
			Site works area	Others				
8.	Pedestrian areas, risk of members of the public entering the water.	Members of the public injured or drowning.		✓		Communicate to the contractor and client the safety equipment needed. Inform the client of the need to maintain safety equipment.	Live	M O
9.	Limited headroom for inspection	Inability to inspect. Danger to inspector	✓		Concrete L-wall solution adopted with concrete wing walls to permit adequate headroom for inspection at bearing shelf. Design solution adopted removes need for elastomeric bearings significantly reducing criticality of this inspection.	Possible maintenance requirement to remove accreted silt prior to inspection	Live	O M
10.	Scour of river bed leading to loss of stability of foundation.	Excessive movement of foundation, eventual failure.		✓	Bed level installed 300mm higher than required for design purposes with accretion expected. Maintenance intervention level noted on drawing.	Bed level to be checked during surveys and filling of scour holes undertaken should intervention level be breached.	Live	M O

Appendix B – Drawing



DO NOT SCALE FROM THIS DRAWING

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

2. ALL LEVELS ARE IN METRES AOD UNLESS NOTED OTHERWISE.

3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE FOLLOWING:

A120099-TGEE-ZZ-XX-DR-C-0103 BRIDGE 3114 PROPOSED SECTION

A120099-TGEE-ZZ-XX-DR-C-0104 PROPOSED BRIDGE 3111 FOOTINGS

A120099-TGEE-ZZ-XX-DR-C-0105 PROPOSED BRIDGE 3112 FOOTINGS

A120099-TGEE-ZZ-XX-DR-C-0106 PROPOSED BRIDGE 3114 FOOTINGS.

4. TOPOGRAPHICAL SURVEY HAS BEEN TAKEN FROM MARVIN AND PARTNERS LIMITED, DRAWING No. 23/5988.

5. FOOTPATH LOCATION HAS BEEN TAKEN FROM GREENWAYS ROUTE B - GENERAL ARRANGEMENT, DRAWING No. 1901-GWB-PH2.1-101 REV. D.

6. PROPOSED NEW RIVER ALIGNMENT HAS BEEN TAKEN FROM SUPPLIED DWG. FILE 'Emm Brook - DESIGN Conditions - Dec2020 - cbec'.

P04	GJB	JJF	APM	23/01/26	BRIDGES 3114 & 3111 REVISED
P03	JJF	JJF	APM	16/01/26	TITLE CHANGE BOLLARDS ADDED
P02	AEP	JF	OAA	07/11/25	UPDATED
P01	AEP	GJD	APM	21/11/24	FIRST ISSUE
REV.	BY	CHKD	APPD	DATE	DESCRIPTION
CODE		DRAWING STATUS			
S2		FOR INFORMATION			

Tony Gee and Partners LLP

8th Floor, International House

Dover Place,

Ashford, Kent.

TN23 1HU

Tel: 01233 639787

www.tonygee.com

Consulting Engineers

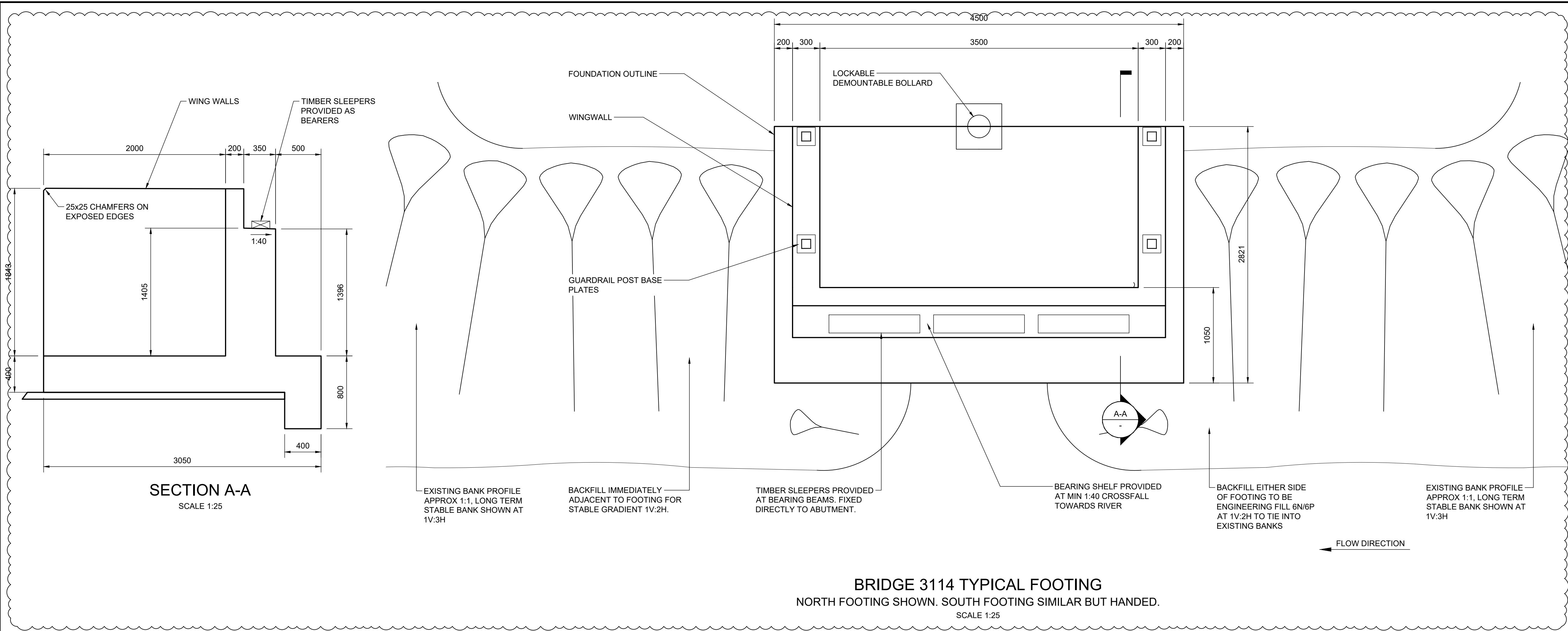
ON BEHALF OF

EMM BROOK RESTORATION
BRIDGE FOOTING DESIGN

PROPOSED
STRUCTURES
LOCATION PLAN

DRAWING No.
A120099-TGEE-ZZ-XX-DR-C-0101

DRAWN : AEP	DESIGNED : GJD	REVISION
SCALE : AS SHOWN	ORIGINAL SIZE : A1	P04



DO NOT SCALE FROM THIS DRAWING

NOTES

1.

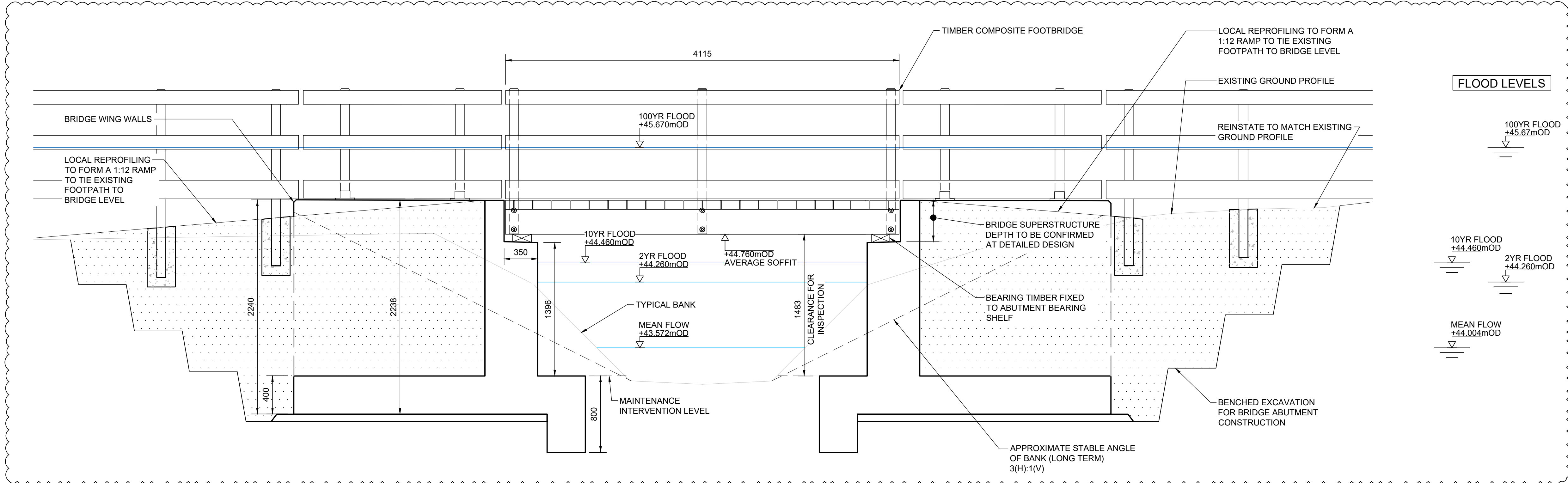
ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

2.

ALL LEVELS ARE IN METRES AOD UNLESS NOTED OTHERWISE.

3.

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE FOLLOWING:
A120099-TGEE-ZZ-XX-DR-C-0101 GENERAL ARRANGEMENT



P02	GJB	JJF	APM	23/01/26	SUBSTANTIALLY REVISED
P01	AEP	GJD	APM	21/11/24	FIRST ISSUE
REV.	BY	CHKD	APPD	DATE	DESCRIPTION
CODE		DRAWING STATUS			
S2		FOR INFORMATION			

Tony Gee
www.tonygee.com
Consulting Engineers

ON BEHALF OF

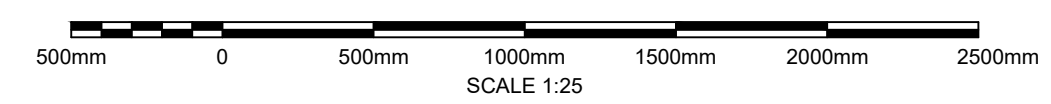
south east rivers trust

EMM BROOK RESTORATION
BRIDGE FOOTING DESIGN

PROPOSED
BRIDGE 3114
FOUNDATIONS & SECTIONS

DRAWING No.
A120099-TGEE-ZZ-XX-DR-C-0103

DRAWN : AEP	DESIGNED : GJD	REVISION
SCALE : 1:25	ORIGINAL SIZE : A1	P02



Appendix C – TAS

APPENDIX C

Technical Approval Schedule (TAS)

Schedule of Documents Relating to Design of Highway Bridges and Structures

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
Eurocode 0	Basis of structural design		
BS EN 1990:2002 +A1:2005	Eurocode 0: Basis of structural design	+A1:2005 Incorporating corrigenda December 2008 and April 2010	See CD 350 section 7 for additional guidance. This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1990:2023
NA to BS EN 1990:2002 + A1:2005	UK National Annex to Eurocode 0 Basis of structural design	National Amendment No.1	See CD 350 section 7 for additional guidance.
Eurocode 1	Actions on structures		
BS EN 1991-1-1:2002	Eurocode 1: Actions on structures. General Actions. Densities, self-weight, imposed load for buildings	Corrigenda December 2004 and March 2009	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1991-1-1:2025
NA to BS EN 1991-1-1:2002	UK National Annex to Eurocode 1: Actions on structures. General Actions. Densities, self-weight, imposed load for buildings	Corrigenda July 2019	
BS EN 1991-1-3:2003 +A1:2015	Eurocode 1: Actions on structures. General Actions. Snow loads	+A1:2015 Incorporating corrigenda December 2004 and March 2009	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1991-1-3:2025
NA + A2:18 to BS EN 1991-1-3:2003 +A1:2015	UK National Annex to Eurocode 1: Actions on structures. General Actions. Snow loads	+A2:2018 Incorporating corrigenda June 2007, December 2015 and October 2018	
BS EN 1991-1-4:2005 +A1:2010	Eurocode 1: Actions on structures. General Actions. Wind actions	+A1:2010 Corrigenda July 2009 and January 2010	

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
NA to BS EN 1991-1-4:2005 + A1:2010	UK National Annex to Eurocode 1: Actions on structures. General Actions. Wind actions	National Amendment No.1	
BS EN 1991-1-5:2003	Eurocode 1: Actions on structures. General Actions. Thermal actions	Corrigenda December 2004 and March 2009	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1991-1-5:2025
NA to BS EN 1991-1-5:2003	UK National Annex to Eurocode 1: Actions on structures. General Actions. Thermal actions	-	
BS EN 1991-1-6:2005	Eurocode 1: Actions on structures. General Actions. Actions during execution	Corrigenda July 2008, November 2012 and February 2013	
NA to BS EN 1991-1-6:2005	UK National Annex to Eurocode 1: Actions on structures. General Actions. Actions during execution	-	
BS EN 1991-1-7:2006 +A1:2014	Eurocode 1: Actions on structures. General Actions. Accidental actions	+A1: 2014 Corrigendum February 2010	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1991-1-7:2025
NA+A1 to BS EN 1991-1-7:2006+A1:2014	UK National Annex to Eurocode 1: Actions on structures. Part 1-7 : Accidental actions	+A1:2014 Incorporating corrigenda August 2014 and November 2015	See CD 350 for additional guidance.
BS EN 1991-2:2003	Eurocode 1: Actions on structures. Traffic loads on bridges	Corrigenda December 2004 and February 2010	See CD 350 section 7 for additional guidance. This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1991-2:2023
NA +A1:2020 to BS EN 1991-2:2003	UK National Annex to Eurocode 1: Actions on structures. Traffic loads on bridges	Corrigendum No.1 Amendment June 2020	See CD 350 section 7 for additional guidance.
Eurocode 2	Design of concrete structures		

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
BS EN 1992-1-1:2004 + A1:2014	Eurocode 2: Design of concrete structures – Part 1-1: General rules and rules for buildings	Incorporating corrigendum January 2008, November 2010 and January 2014	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1992-1-1:2023
NA + A2:2014 to BS EN 1992-1-1:2004 + A1:2014	UK National Annex to Eurocode 2: Design of concrete structures – Part 1-1: General rules and rules for buildings		
BS EN 1992-2:2005	Eurocode 2: Design of concrete structures – Part 2: Concrete bridges – Design and detailing rules	Corrigendum July 2008	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1992-1-1:2023
NA to BS EN 1992-2:2005	UK National Annex to Eurocode 2: Design of concrete structure – Part 2: Concrete bridges – Design and detailing rules	-	
BS EN 1992-3:2006	Eurocode 2: Design of concrete structures – Part 3: Liquid retaining and containment structures		This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1992-1-1:2023
NA to BS EN 1992-3:2006	UK National Annex to Eurocode 2: Design of concrete structures – Part 3: Liquid retaining and containment structures	-	
BS EN 1992-4:2018	Eurocode 2: Design of concrete structures – Part 4: Design of fastenings for use in concrete		
NA to BS EN 1992-4:2018	UK National Annex to Eurocode 2: Design of concrete structures – Part 4: Design of fastenings for use in concrete		
Eurocode 3	Design of steel structures		
BS EN 1993-1-1:2005 + A1:2014	Eurocode 3: Design of steel structures – Part 1-1 General rules and rules for buildings	Corrigenda February 2006 and April 2009	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1993-1-1:2022
NA + A1:2014 to BS EN 1993-1-1:2005 + A1:2014	UK National Annex to Eurocode 3: Design of steel structures – Part 1-1 General rules and rules for buildings	-	

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
BS EN 1993-1-3:2006	Eurocode 3: Design of steel structures — Part 1-3 General rules — Supplementary rules for cold-formed members and sheeting	Corrigendum November 2009	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1993-1-3:2024
NA to BS EN 1993-1-3:2006	UK National Annex to Eurocode 3: Design of steel structures — Part 1-3 Supplementary rules for cold-formed members and sheeting	-	
BS EN 1993-1-4:2006 + A2:2020	Eurocode 3: Design of steel structures — Part 1-4 General rules — Supplementary rules for stainless steels	+ A1:2015 Amendment No. 1 + A2:2020 Amendment No. 2	Supersedes BS EN 1993-1-4:2006 + A1:2015
NA + A1:15 to BS EN 1993-1-4:2006 + A1:2015	UK National Annex to Eurocode 3: Design of steel structures — Part 1-4 Supplementary rules for stainless steels	+ A1:2015 Amendment No. 1	
BS EN 1993-1-5:2006 + A2:2019	Eurocode 3: Design of steel structures — Part 1-5 Plated structural elements	Corrigendum April 2009, + A1:2017 Amendment No. 2, + A2:2019	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1993-1-5:2024
NA + A1:2016 to BS EN 1993-1-5:2006	UK National Annex to Eurocode 3: Design of steel structures — Part 1-5 Plated structural elements	+ A1:2016 Amendment No. 1	
BS EN 1993-1-6:2007 + A1:2017	Eurocode 3: Design of steel structures — Part 1-6 Strength and stability of shell structures	+ A1:2017 Amendment No. 1	
BS EN 1993-1-7:2007	Eurocode 3: Design of steel structures — Part 1-7 Plated structures subject to out of plane loading	Corrigendum April 2009	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1993-1-7:2025
BS EN 1993-1-8:2005	Eurocode 3: Design of steel structures — Part 1-8 Design of joints	Corrigenda December 2005, September 2006, July 2009 and August 2010	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1993-1-8:2024
NA to BS EN 1993-1-8:2005	UK National Annex to Eurocode 3: Design of steel structures — Part 1-8 Design of joints	-	
BS EN 1993-1-9:2005	Eurocode 3: Design of steel structures — Part 1-9 Fatigue	Corrigenda December 2005, September 2006 and April 2009	

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
NA to BS EN 1993-1-9:2005	UK National Annex to Eurocode 3: Design of steel structures — Part 1-9 Fatigue	-	
BS EN 1993-1-10:2005	Eurocode 3: Design of steel structures — Part 1-10 Material toughness and through-thickness properties	Corrigenda December 2005, September 2006 and March 2009	
NA to BS EN 1993-1-10:2005	UK National Annex to Eurocode 3: Design of steel structures — Part 1-10 Material toughness and through thickness properties	-	
BS EN 1993-1-11:2006	Eurocode 3: Design of steel structures — Part 1-11 Design of structures with tension components	Corrigendum April 2009	
NA to BS EN 1993-1-11:2006	UK National Annex to Eurocode 3: Design of steel structures — Part 1-11 Design of structures with tension components	-	
BS EN 1993-1-12:2007	Eurocode 3: Design of steel structures — Part 1-12 Additional rules for the extension of EN 1993 up to steel grades S 700	Corrigendum April 2009	
NA to BS EN 1993-1-12:2007	UK National Annex to Eurocode 3: Design of steel structures — Part 1-12 Additional rules for the extension of EN 1993 up to steel grades S 700	-	
BS EN 1993-2:2006	Eurocode 3: Design of steel structures — Part 2 Steel bridges	Corrigendum July 2009	
NA + A1:2012 to BS EN 1993-2:2006	UK National Annex to Eurocode 3: Design of steel structures — Part 2 Steel bridges	+ A1:2012	
BS EN 1993-5:2007	Eurocode 3: Design of steel structures — Part 5 Piling	Corrigendum May 2009	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1993-5:2025
NA + A1:2012 to BS EN 1993-5:2007	UK National Annex to Eurocode 3: Design of steel structures — Part 5 Piling	+ A1:2012	
Eurocode 4	Design of composite steel and concrete structures		
BS EN 1994-1-1:2004	Eurocode 4: Design of composite steel and concrete structures — Part 1-1 General rules and rules for buildings	Corrigendum April 2009	
NA to BS EN 1994-1-1:2004	UK National Annex to Eurocode 4: Design of composite steel and concrete structures — Part 1-1 General rules and rules for buildings	-	

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
BS EN 1994-2:2005	Eurocode 4: Design of composite steel and concrete structures — Part 2 General rules and rules for bridges	Corrigendum July 2008	
NA to BS EN 1994-2:2005	UK National Annex to Eurocode 4: Design of composite steel and concrete structures — Part 2 General rules and rules for bridges	-	
Eurocode 5	Design of timber structures		
BS EN 1995-1-1:2004 + A2:2014	Eurocode 5: Design of timber structures – Part 1-1 General – common rules and rules for buildings	+ A2:2014 Incorporating corrigendum June 2006	
NA to BS EN 1995-1-1:2004 + A2:2014	UK National Annex to Eurocode 5: Design of timber structures – Part 1-1 General – common rules and rules for buildings	+ A2:2014	
BS EN 1995-2:2004	Eurocode 5: Design of timber structures – Part 2 Bridges	-	
NA to BS EN 1995-2:2004	UK National Annex to Eurocode 5: Design of timber structures – Part 2 Bridges	-	
Eurocode 6	Design of masonry structures		
BS EN 1996-1-1:2005+A1:2012	Eurocode 6: Design of masonry structures — Part 1-1 General rules for reinforced and unreinforced masonry structures	+A1:2012 Corrigenda February 2006 and July 2009	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1996-1-1:2022
NA to BS EN 1996-1-1:2005 +A1:2012	UK National Annex to Eurocode 6: Design of masonry structures — Part 1-1 General rules for reinforced and unreinforced masonry structures	+A1:2012	This document is to be used until 30 March 2028. After which it will be superseded by NA to BS EN 1996-1-1:2022
BS EN 1996-2:2006	Eurocode 6: Design of masonry structures — Part 2 Design considerations, selection of materials and execution of masonry	Corrigendum September 2009	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1996-2:2024
NA to BS EN 1996-2:2006	UK National Annex to Eurocode 6: Design of masonry structures — Part 2 Design considerations, selection of materials and execution of masonry	Corrigendum No.1	
BS EN 1996-3:2006	Eurocode 6: Design of masonry structures — Part 3 Simplified calculation methods for unreinforced masonry structures	Corrigendum October 2009	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1996-3:2023

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
NA +A1:2014 to BS EN 1996-3:2006	UK National Annex to Eurocode 6: Design of masonry structures — Part 3 Simplified calculation methods for unreinforced masonry structures	+A1:2014	
Eurocode 7	Geotechnical design		
BS EN 1997-1:2004+A1:2013	Eurocode 7: Geotechnical design – Part 1 General rules	+A1:2013 Corrigendum February 2009	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1990:2023, BS EN 1997-1:2024, BS EN 1997-3:2025
NA+A2:2022 to BS EN 1997-1:2004+A1:2013	UK National Annex to Eurocode 7: Geotechnical design – Part 1 General rules	+A1:2013 Incorporating Corrigendum No.1, Amendment 1 – July 2014 and Amendment 2 - 2022	Supersedes NA+A1:2014 to BS EN 1997- 1:2004+A1:2013
BS EN 1997-2:2007	Eurocode 7: Geotechnical design – Part 2 Ground investigation and testing	Corrigendum June 2010	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1997-3:2025, BS EN 1997-2:2024
NA to BS EN 1997-2:2007	UK National Annex to Eurocode 7: Geotechnical design – Part 2 Ground investigation and testing	-	This document is to be used until 30 March 2028. After which it will be superseded by NA to BS EN 1997-2:2024
Eurocode 8	Design of structures for earthquake resistance		
BS EN 1998-1:2004 + A1:2013	Eurocode 8: Design of structures for earthquake resistance — Part 1 General rules, seismic actions and rules for buildings	Corrigendum June 2009, January 2011 and March 2013	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1998-1-1:2024
NA to BS EN 1998-1:2004	UK National Annex to Eurocode 8: Design of structures for earthquake resistance — Part 1 General rules, seismic actions and rules for buildings	-	

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
BS EN 1998-2:2005+A2:2011	Eurocode 8: Design of structures for earthquake resistance — Part 2 Bridges	Corrigenda February 2010 and February 2012	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1998-2:2025
NA to BS EN 1998-2:2005	UK National Annex to Eurocode 8: Design of structures for earthquake resistance — Part 2 Bridges	-	
BS EN 1998-5:2004	Eurocode 8: Design of structures for earthquake resistance — Part 5 Foundations, retaining structures and geotechnical aspects	-	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1998-5:2024
NA to BS EN 1998-5:2004	UK National Annex to Eurocode 8: Design of structures for earthquake resistance — Part 5 Foundations, retaining structures and geotechnical aspects	-	
Eurocode 9	Design of aluminium structures		
BS EN 1999-1-1:2007 + A2:2013	Eurocode 9: Design of aluminium structures — Part 1-1 General structural rules	+ A2:2013 Incorporating corrigendum March 2014	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1999-1-1:2023
NA to BS EN 1999-1-1:2007 + A1:2009	UK National Annex to Eurocode 9: Design of aluminium structures — Part 1-1 General structural rules	National Amendment No.1 Corrigendum No.1	
BS EN 1999-1-3:2007 + A1:2011	Eurocode 9: Design of aluminium structures — Part 1-3 Structures susceptible to fatigue	+ A1:2011	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1999-1-3:2023
NA to BS EN 1999-1-3:2007 + A1:2011	UK National Annex to Eurocode 9: Design of aluminium structures — Part 1-3 Structures susceptible to fatigue	+ A1:2011	This document is to be used until 30 March 2028. After which it will be superseded by NA to BS EN 1999-1-3:2023

Eurocodes and associated UK National Annexes			
Eurocode part	Title	Amendment / Corrigenda	Notes
BS EN 1999-1-4:2007 +A1:2011	Eurocode 9: Design of aluminium structures — Part 1-4 Cold formed structural sheeting	+ A1:2011 Corrigendum November 2009	This document is to be used until 30 March 2028. After which it will be superseded by BS EN 1999-1-4:2023
NA to BS EN 1999-1-4:2007	UK National Annex to Eurocode 9: Design of aluminium structures — Part 1-4 Cold formed structural sheeting	-	This document is to be used until 30 March 2028. After which it will be superseded by NA to BS EN 1999-1-4:2023

Bsi Published Documents		
<i>For guidance only unless clauses are otherwise specified in CD 350 Appendix A.</i>		
Published Document reference	Title	Notes
PD 6687-1:2020	Background paper to the UK National Annexes to BS EN 1992-1 and BS EN 1992-3	Supersedes PD 6687-1:2010 See CD 350 clauses 3.6, 4.1, 4.2 and Appendix A for additional guidance. Clause 3.6 in CD 350 refers to clause 2.5 in PD 6687-1, this is now clause 4.5 in PD 6687-1 Clause 4.2 in CD 350 refers to clause 2.22 in PD 6687-1, this is now clause 4.21.4 in PD 6687-1
PD 6687-2:2008	Recommendations for the design of structures to BS EN 1992-2:2005	See CD 350 clauses 4.1, 4.2 and Appendix A for additional guidance.
PD 6688-1-1:2011	Recommendations for the design of structures to BS EN 1991-1-1	See CD 350 Appendix A for additional guidance.
PD 6688-1-4:2015	Background paper to the UK National Annex to BS EN 1991-1-4	See CD 350 Appendix A for additional guidance.
PD 6688-1-7:2009 +A1:2014	Recommendations for the design of structures to BS EN 1991-1-7	See CD350 clause 3.7 and Appendix B for additional guidance.
PD 6688-2:2011	Recommendations for the design of structures to BS EN 1991-2	See CD 350 Appendix A for additional guidance.
PD 6694-1:2011 + A1:2020	Recommendations for the design of structures subject to traffic loading to BS EN 1997-1	Incorporating Corrigendum 1 Jan 2022 & Corrigendum 2 Jul 2023 See CD 350 Appendix A for additional guidance.
PD 6695-1-9:2008	Recommendations for the design of structures to BS EN 1993-1-9	See CD 350 Appendix A for additional guidance.
PD 6695-1-10:2009	Recommendations for the design of structures to BS EN 1993-1-10	See CD 350 Appendix A for additional guidance.

Bsi Published Documents		
<i>For guidance only unless clauses are otherwise specified in CD 350 Appendix A.</i>		
Published Document reference	Title	Notes
PD 6695-2:2008 + A1:2012 Incorporating Corrigendum No.1	Recommendation for the design of bridges to BS EN 1993	See CD 350 Appendix A for additional guidance.
PD 6696-2:2007 + A1:2012	Background paper to BS EN 1994-2 and the UK National Annex to BS EN 1994-2	See CD 350 Appendix A for additional guidance.
PD 6698:2009	Recommendations for the design of structures for earthquake resistance to BS EN 1998	See CD 350 section 7 for additional guidance.
PD 6702-1:2009 + A1:2019	Structural use of aluminium. Recommendations for the design of aluminium structures to BS EN 1999	Amended 31 May 2019
PD 6703:2009	Structural bearings – Guidance on the use of structural bearings	
PD 6705-2:2020	Structural use of steel and aluminium. Execution of steel bridges conforming to BS EN 1090-2. Guide	Replaces PD 6705-2:2010 + A1:2013
PD 6705-3:2009	Recommendations on the execution of aluminium structures to BS EN 1090-3	

Execution Standards referenced in British Standards or Eurocodes		
Execution Standard reference	Title	Notes
BS EN 1090-1:2009+A1:2011	Execution of steel structures and aluminium structures - Part 1: Requirements for conformity assessment of structural components	
BS EN 1090-2:2018+A1:2024	Execution of steel structures and aluminium structures. Technical requirements for the execution of steel structures	Supersedes BS EN 1090-2:2018
BS EN 1090-3:2019	Execution of steel structures and aluminium structures – Part 3: Technical requirements for aluminium structures	Supersedes BS EN 1090-3:2008
BS EN 13670:2009 Incorporating corrigenda October 2015 and November 2015	Execution of concrete structures	

Product Standards referenced in British Standards or Eurocodes		
Product Standard reference	Title	Notes

Product Standards referenced in British Standards or Eurocodes		
Product Standard reference	Title	Notes
BS EN 206:2013+A2:2021	Concrete – Specification, performance, production and conformity	Supersedes BS EN 206:2013+A1:2016
BS EN 1317-1:2010	Road Restraint Systems – Part 1 – Terminology and general criteria for test methods	
BS EN 1317-2:2010	Road Restraint Systems – Part 2 – Performance classes, impact test acceptance criteria and test methods for safety barriers.	
BS EN 1317-3:2010	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 – Performance classes, impact test acceptance criteria and test methods for terminals and transitions of safety barriers.	<i>Draft BS EN 1317-4 for public comment published in June 2012</i>
BS EN 1317-5:2007+A2:2012	Road Restraint Systems – Part 5 – Product requirements and evaluation of conformity for vehicle restraint systems	Incorporating corrigendum August 2012 <i>Draft prEN 1317-5 for public comment published in December 2013</i>
PD CEN/TR 16949:2016	Road Restraint System – Pedestrian restraint system - Pedestrian parapets	<i>Bsi Published Document / CEN Technical Report published in July 2016</i> <i>(This document should not be used. The requirements of BS 7818:1995 apply.)</i>
PD CEN/TS 1317-7:2023	Road restraint systems – Part 7: Performance characterisation and test methods for terminals of safety barriers	<i>Replaces Draft prEN 1317-7</i> <i>(All terminals should be in accordance with this document or ENV1317-4.)</i>
PD CEN/TS 17342:2019	Road restraint systems – Motorcycle road restraint systems which reduce the impact severity of motorcyclist collisions with safety barriers	<i>Replaces PD CEN/TS 1317-8:2012</i> <i>(This document should not be used.)</i>
PD CEN/TR 17081:2018	Design of fastenings for use in concrete – Plastic design of fastenings with headed and post-installed fasteners	
BS EN 1337-1:2000	Structural bearings – Part 1: General Design Rules	
BS EN 1337-2:2004	Structural bearings – Part 2: Sliding elements	
BS EN 1337-3:2005	Structural bearings – Part 3: Elastomeric bearings	
BS EN 1337-4:2004	Structural bearings – Part 4: Roller bearings	Corrigendum No.1 March 2007
BS EN 1337-5:2005	Structural bearings – Part 5: Pot bearings	

Product Standards referenced in British Standards or Eurocodes		
Product Standard reference	Title	Notes
BS EN 1337-6:2004	Structural bearings — Part 6: Rocker bearings	
BS EN 1337-7:2004	Structural bearings — Part 7: Spherical and cylindrical PTFE bearings	
BS EN 1337-8:2007	Structural bearings — Part 8: Guide bearings and restraint bearings	
BS EN 1337-9:1998	Structural bearings — Part 9: Protection	
BS EN 1337-10:2003	Structural bearings — Part 10: Inspection and maintenance	Corrigendum No.1 November 2003
BS EN 1337-11:1998	Structural bearings — Part 11: Transport, Storage and Installation.	
BS EN 10025-1:2004	Hot rolled products of structural steels Part 1: General technical delivery conditions.	
BS EN 10025-2:2019	Hot rolled products of structural steels Part 2: Technical delivery conditions for non-alloy structural steels.	Supersedes BS EN 10025-1:2004
BS EN 10025-3:2019	Hot rolled products of structural steels Part 3: Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels.	Supersedes BS EN 10025-3:2004
BS EN 10025-4:2019+A1:2022	Hot rolled products of structural steels Part 4: Technical delivery conditions for thermomechanical rolled weldable fine grain structural steels.	Supersedes BS EN 10025-4:2019
BS EN 10025-5:2019	Hot rolled products of structural steels — Part 5: Technical delivery conditions for structural steels with improved atmospheric corrosion resistance	Supersedes BS EN 10025-5:2004
BS EN 10025-6:2019+A1:2022	Hot rolled products of structural steels — Part 6: Technical delivery conditions for flat products of high yield strength structural steels in the quenched and tempered condition.	Supersedes BS EN 10025-6:2019
BS EN 10080:2005	Steel for the reinforcement of concrete — Weldable reinforcing steel — General	
BS EN 10210-1:2006	Hot finished structural hollow sections of non-alloy and fine grain steels — Part 1: Technical delivery conditions	
BS EN 10210-2:2019	Hot finished structural hollow sections — Part 2: Tolerances, dimensions and sectional properties	Supersedes BS EN 10210-2:2006
BS EN 10248-1:2023	Hot rolled sheet piling of non-alloy steels. Technical delivery conditions	Supersedes BS EN 10248-1:1996

Product Standards referenced in British Standards or Eurocodes		
Product Standard reference	Title	Notes
BS EN 10248-2:2024	Hot rolled sheet piling of non alloy steels. Tolerances on shape and dimensions	Supersedes BS EN 10248-2:1996
BS EN 12063:2024	Execution of special geotechnical work. Sheet pile walls.	Supersedes BS EN 12063:1999
BS EN 13369:2023	Common rules for precast concrete products	Supersedes BS EN 13369:2018
BS EN 14388:2005	Road traffic noise reducing devices	There is a 2015 version, however the 2015 version is not harmonised.
BS EN 15050:2007 + A1:2012	Precast concrete products — Bridge elements	See CD 350 clause 3.8.1 for additional guidance.
BS EN 15258:2008	Precast concrete products — Retaining wall elements	

British Standards		
British Standard reference	Title	Notes
BS 4449:2005+A3:2016	Steel for the reinforcement of concrete	No longer covers plain round bar. (See BS4482 up to 12mm dia, see BS EN 10025-1 for larger sizes and dowels. See BS EN 13877-3 for dowel bars in concrete pavements.)
BS 5896:2012	Specification for high tensile steel wire and strand for the prestressing of concrete	
BS 7818:1995	Specification for pedestrian restraint systems in metal	Incorporating Corrigendum No.1 May 2004 and Corrigendum No.2 September 2006 Currently the requirements of BS 7818:1995 are to be used instead of PD CEN/TR 16949:2016
BS 8002:2015	Code of practice for earth retaining structures	
BS 8004:2015 +A1 2020	Code of practice for foundations	Amendment +A1:2020
BS 8006-1:2010+A1:2016	Code of practice for strengthened/reinforced soils and other fills	
BS 8500-1:2023	Concrete – Complementary British Standard to BS EN 206: Method of specifying and guidance for the specifier.	Supersedes BS 8500-1:2015+A2:2019
BS 8500-2:2023	Concrete – Complementary British Standard to BS EN 206: Specification for constituent materials and concrete.	Supersedes BS 8500-2:2015+A2:2019

British Standards		
BS 8666:2020	Scheduling, dimensioning, bending and cutting of steel reinforcement for concrete	Supersedes BS 8666:2005

The Manual Contract Document for Highway Works (MCHW)		
MCHW reference	Title	Notes
MCHW Volume 1: October 2022	Specification for Highway Works	Specification compliant with the execution standards must be used. A Departure is necessary for the parts where a compliant revision has not been published. Amendments October 2022 Supersedes April 2022 version
MCHW Volume 2: October 2022	Notes for guidance on the Specification for Highway Works	Notes for guidance compliant with the execution standards must be used. A Departure is necessary for the parts where a compliant revision has not been published. Amendments October 2022 Supersedes November 2021 version
MCHW Volume 3: February 2017	Highway Construction Details	

The Design Manual for Roads and Bridges (DMRB)		
DMRB reference	Title	Notes
GG 101 Revision 0.1.0	Introduction to the Design Manual for Roads and Bridges	Replaces GG 101 Revision 0
GG 102 Revision 0	Quality Management Systems for Highway Design	Replaces GD 02/16
GG 103 Revision 0	Introduction and general requirements for sustainable development and design	
GG 104 Revision 0.1.0	Requirements for Safety Risk Assessment	Replaces GG 104 Revision 0
GG 184 Revision 0	Specification for the use of Computer Aided Design	Replaces IAN 184/16
CG 300 Revision 0.2.0	Technical approval of highway structures	Supersedes CG 300 Revision 0.1.0
CG 302 Revision 0	As built, operational and maintenance records for highway structures	Supersedes BD 62/07
CG 303 Revision 0	Quality assurance scheme for paints and similar protective coatings	Supersedes BD 35/14
CG 305 Revision 0	Identification marking of highway structures	Supersedes BD 45/93
CG 501 Revision 2	Design of highway drainage systems	Supersedes HD 33/16, TA 80/99
CD 127 Revision 1.0.1	Cross-sections and headrooms	Replaces TD 27/05 and TD 70/08
CD 350 Revision 0	The design of highway structures	Supersedes BD 100/16, BA 57/01, BD 57/01 and IAN 124/11

The Design Manual for Roads and Bridges (DMRB)		
DMRB reference	Title	Notes
CD 351 Revision 0	The design and appearance of highway structures	Supersedes BA 41/98
CD 352 Revision 0.0.1	Design of road tunnels	Supersedes CD 352 Revision 0
CD 353 Revision 0	Design criteria for footbridges	Supersedes BD 29/17
CD 354 Revision 1.1.0	Design of minor structures	Supersedes CD 354 Revision 1
CD 355 Revision 0	Application of whole-life costs for design and maintenance of highway structures	Replaces BD 36/92 and BA 28/92
CD 356 Revision 1	Design of highway structures for hydraulic action	Supersedes BA 59/94
CD 357 Revision 1	Bridge expansion joints	Replaces BD 33/94, BA 26/94, IAN 168/12 and IAN 169/12
CD 358 Revision 2.4.0	Waterproofing and surfacing of concrete bridge decks	Supersedes CD 358 Revision 2.3.0
CD 359 Revision 0	Design requirements for permanent soffit formwork	Supersedes BA 36/90 and IAN 131/11
CD 360 Revision 2	Use of compressive membrane action in bridge decks	Supersedes BD 81/02
CD 361 Revision 0	Weathering steel for highway structures	Supersedes BD 7/01
CD 362 Revision 1	Enclosure of bridges	Replaces BD 67/96 and BA 67/96
CD 363 Revision 0	Design rules for aerodynamic effects on bridges	Replaces BD 49/01
CD 364 Revision 0	Formation of continuity joints in bridge decks	Replaces BA 82/00
CD 365 Revision 1	Portal and cantilever signs/signals gantries	Replaces BD 51/14, IAN 193/16, BE 7/04
CD 366 Revision 0	Design criteria for collision protection beams	Replaces BD 65/14
CD 367 Revision 0	Treatment of existing structures on highways widening schemes	Replaces BD 95/07
CD 368 Revision 0	Design of fibre reinforced polymer bridges and highway structures	Replaces BD 90/05
CD 369 Revision 0	Surface protection for concrete highway structures	Replaces BA 85/04
CD 371 Revision 0	Strengthening highway structures using fibre-reinforced polymers and externally bonded steel plates	Replaces BD 85/08, BD 84/02
CD 372 Revision 0	Design of post-installed anchors and reinforcing bar connections in concrete	Supersedes IAN 104/15
CD 373 Revision 0	Impregnation of reinforced and prestressed concrete highway structures using hydrophobic pore-lining impregnants	Supersedes BD 43/03
CD 374 Revision 0	The use of recycled aggregates in structural concrete	Supersedes BA 92/07
CD 375 Revision 1	Design of corrugated steel buried structures	Supersedes BD 12/01
CD 376 Revision 0	Unreinforced masonry arch bridges	Replaces BD 91/04
CD 377	Requirements for road restraint	Supersedes TD 19/06

The Design Manual for Roads and Bridges (DMRB)		
DMRB reference	Title	Notes
Revision 4	systems	
CD 622 Revision 1	Managing geotechnical risk	Replaces HD 22/08, BD 10/97 and HA 120/08
CS 461 Revision 0	Assessment and upgrading of in-service parapets	Supersedes BA 37/92 and IAN 97/07
CS 462 Revision 0	Repair and management of deteriorated concrete highway structures	Supersedes BA 35/90 and BA 52/94
GD 304 Revision 2	Designing health and safety into maintenance	Replaces IAN 69/15
LA 104 Revision 1	Environmental assessment and monitoring	Supersedes HA 205/08, HD 48/08, IAN 125/15, and IAN 133/10
LA 106 Revision 1	Cultural heritage assessment	Supersedes HA 208/07, HA 60/92, HA 75/01
LA 110 Revision 0	Material assets and waste	Supersedes IAN 153/11
LA 113 Revision 1	Road drainage and the water environment	Supersedes HD 45/09
LD 119 Revision 0	Roadside environmental mitigation and enhancement	Formerly LA 119, which superseded HA 65/94 and HA 66/95
Interim Advice Notes		
IAN reference	Title	Notes
IAN 105/08	Implementation of construction (design and management) 2007 and the withdrawal of SD 10 and SD 11	This document has been withdrawn without replacement.

Miscellaneous		
Standard reference	Title	Notes
CIRIA C543	Bridge Detailing Guide	
CIRIA C686	Safe Access for Maintenance and Repair	
CIRIA C760	Guidance on embedded retaining wall design	
CIRIA C766	Control of cracking caused by restrained deformation in concrete	Supersedes C660
CIRIA C777	General fixings – guidance on selection and whole-life management	

Additional Standards		
Additional standards needed for a particular design should be listed here.		
Reference	Title	Notes

Additional Standards		
Additional standards needed for a particular design should be listed here.		
Reference	Title	Notes