



Angmering Water Lane – Water Lane, WSCC

ref: 1772

Culvert Management Plan

On behalf of Barratt David Wilson Trading Limited

Project Ref: 46353/1500 | Rev: P02 | Date: 19 March 2021

Registered Office: Buckingham Court Kingsmead Business Park, London Road, High Wycombe, Buckinghamshire, HP11 1JU
Office Address: Caversham Bridge House, Waterman Place, Reading, Berkshire RG1 8DN
T: +44 (0)118 950 0761 E: PBA.Reading@stantec.com

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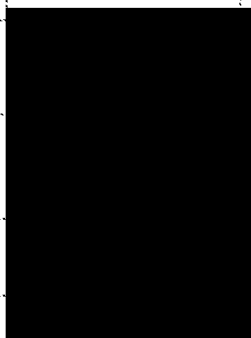
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	Name	Position	Signature	Date
Prepared by:	Richard Flagg Arjun Gorssain	Apprentice Engineer Graduate		19.03.2021
Reviewed by:	Sam Djanie Rob Riddington	Associate Director		19.03.2021
Approved by:	Peter Chong	Director		19.03.2021
For and on behalf of Stantec UK Limited				

Revision	Date	Description	Prepared	Reviewed	Approved
P01	19.03.2021	1 st Issue	RF/ AG	SD / RR	PC
P02	26.03.2021	2 nd Issue	RF/ AG	SD / RR	PC

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1 Introduction

1.1 Scope

- 1.1.1 Stantec UK Limited (Stantec) has been commissioned by Barratt David Wilson Trading Limited (Barratts) to provide a 'Management Plan' for the Angmering Culvert for the period between completion of the culvert construction and its adoption by West Sussex County Council (WSCC). Below is an extract from the decision notice (document ref: A_179_20_RES – Decision Notice – 05.02.2021) issued by Arun District Council to Barratts.
- 1.1.2 *"Prior to the commencement of development, a scheme to establish who will manage and maintain the culvert associated with this development shall be submitted for approval in writing by the Local Planning Authority.*
- 1.1.3 *The scheme shall be fully implemented and subsequently maintained, in accordance with the scheme's timing / phasing arrangements, or within any other period as may subsequently be agreed in writing by the Local Planning Authority.*
- 1.1.4 *Reason: To ensure the structural integrity of the flood defences and thereby reducing the risk of flooding and to reduce the risk of flooding to the proposed development and future users, in accordance with Policy D DM1 and Policy W DM2 of the Arun Local Plan. It is considered necessary for this to be a pre-commencement condition to ensure there is an adequate maintenance programme in place prior to the adoption of the structure."*
- 1.1.5 This report describes the management activities for the Angmering culvert at intervals described in section 4. It is anticipated that adoption of the culvert will take place within two years of construction and is likely to be after the 12 month defects period, therefore the focus of this management plan is on the first two years after construction. However, typical maintenance activities for the culvert beyond two years are also mentioned in the report to provide a basis for further maintenance activities to be carried out by Barratts if the structure is not adopted within the anticipated period.

2 Structure Details

2.1 Structural Form

- 2.1.1 The proposed structure consists of precast concrete box-sections, precast concrete wingwalls and embankment carrying an access road from Water Lane to the Barratts development site. The access road is a 2-lane single carriageway with a footway / verge on each side. The culvert spans the Black Ditch watercourse which is non-navigable. N1 galvanized steel parapets are connected to concrete headwalls at the edges of the culvert.

The structure is located approximately two miles from the seafront at Angmering.

2.2 Key Dimensions

- 2.2.1 The dimensions in Table 1 are taken from drawing 46353-STN-SBR-1772-DR-CB-0006 Rev P03, in **Appendix A**. This drawing supersedes Rev P01 in the Decision Notice.

Table 1: Proposed structure key dimensions

Element	Dimension
Culvert Clear Span between abutment faces	3.5m
Total Culvert Width	12.2m
Internal Culvert Height	3.15m
Parapet Height	1.4m

3 Structure Extents Covered by Management Plan

3.1.1 The management plan sets out the activities necessary to protect the integrity of the new culvert and associated infrastructure. The implementation of the plan will maintain the Black Ditch and avoid increased flood risk to the area, the proposed development and future users. The extents of the structure covered by this management plan are as listed below and within the area shown in drawing 36353-2002-SK007, contained in **Appendix B**.

- Precast reinforced concrete box culvert.
- Precast reinforced concrete head walls.
- Precast reinforced concrete wing walls.
- Galvanized steel parapets
- Carriageway surfacing
- Foot / Cycleway surfacing
- Access walkways / steps
- Weep holes
- Watercourse embankments to the north-east and south-west of the structure
- Surface water outfalls (<300mm diameter) to the Black Ditch
- Culvert invert

3.1.2 The full extent of the wider area to be offered for adoption is shown in drawing 36353-2002-SK006, contained in **Appendix C**.

4 Schedule of Maintenance Activities

4.1 General Maintenance Requirements

4.1.1 The maintenance activities required to maintain the integrity of the structure are as described in the 'Well-managed Highway Infrastructure' and grouped into the following classifications:

- Regular Maintenance – these include inspections, structural reviews / assessments and routine maintenance.
- Programmed Maintenance – these include preventative maintenance works to maintain the condition of the structure, renewal of components of the structure that have finite service lives (e.g., expansion joints), upgrading or replacement of the structure.
- Reactive Maintenance - emergency repairs or essential maintenance works typically to make the structure safe.

4.2 Maintenance Activities Within Management Plan

4.2.1 Since this management plan focuses on the first two years of the service life of the culvert, the maintenance activities considered are the ones that are classified as routine or reactive.

4.2.2 Routine maintenance activities are minor works carried out on a regular or cyclic basis that help to maintain the condition and functionality of the structure and reduce the need for more expensive maintenance works. The routine maintenance activities for this culvert are as follows:

- Cleaning out of drainage systems (i.e., weep holes in abutments and wing walls).
- Removal of vegetation around the structure.
- Removal of blockages (including silt) in watercourse.

4.2.3 In addition to the routine maintenance activities listed above, reactive maintenance in the form of emergency repairs may be required following accidental damage to any part of the structure. Reactive maintenance activities would be managed through a call-out procedure agreed between Barratts and WSCC. Under the call-out, Barratts would provide WSCC with a dedicated telephone number to contact if there is an emergency. Barratts would respond to any emergency call-outs within 4hrs of reporting to ensure the structure is made safe for users and / or any significant obstructions to the watercourse cleared to prevent flooding or injury / fatality to the public.

4.2.4 It is recommended that the culvert and area around the structure are inspected during and following flood events. This will monitor for blockages in the channel and culvert that may impact on water levels and result in increased flood risk.

4.3 Frequency of Maintenance Activities

4.3.1 The maintenance activities identified under this management plan have been tabulated below together with the frequency of undertaking such activities. 'As required' frequency generally relates to reactive maintenance works which are necessitated by flood events or accidental damage to the structure.

- 4.3.2 This management plan covers the period from the completion of the culvert construction to its adoption by WSCC. Upon adoption, it is anticipated that WSCC will develop its own management plan which will include some or all of the types of maintenance activities mentioned in Section 4.1 of this report. It is further anticipated that the intervals for principal and general inspections would be risk-based in line with good current practice.

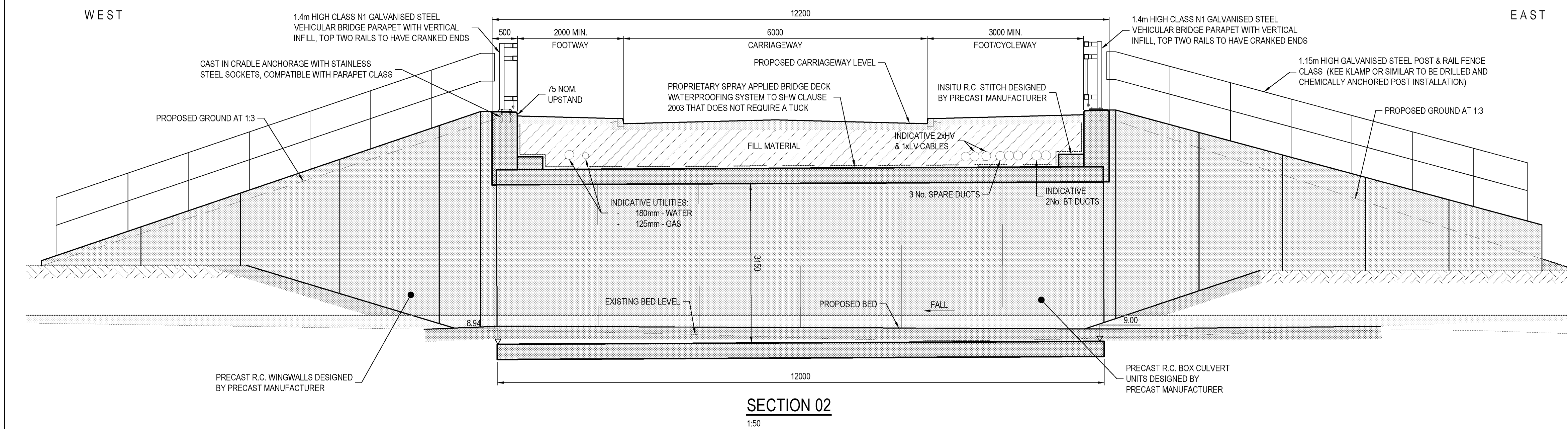
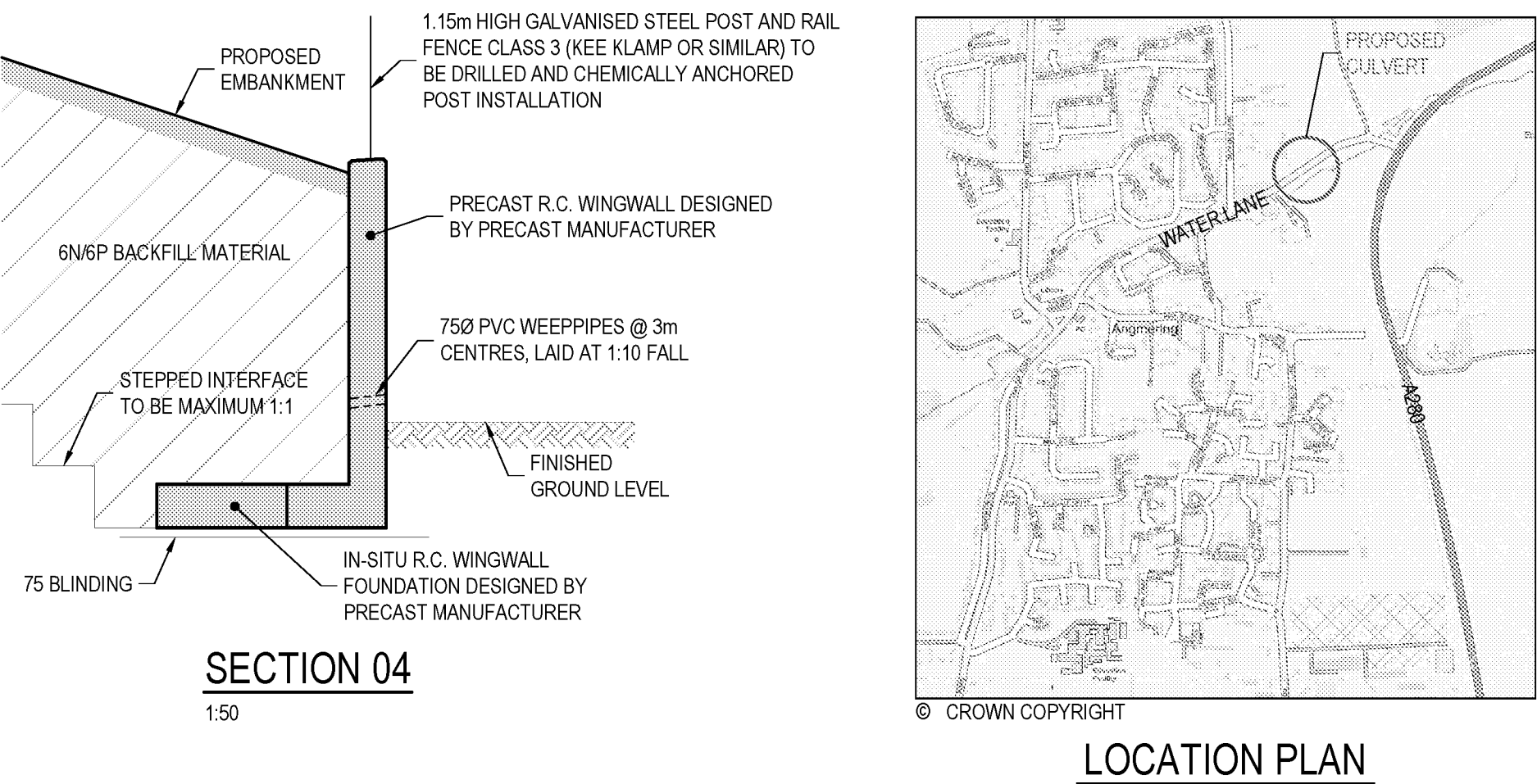
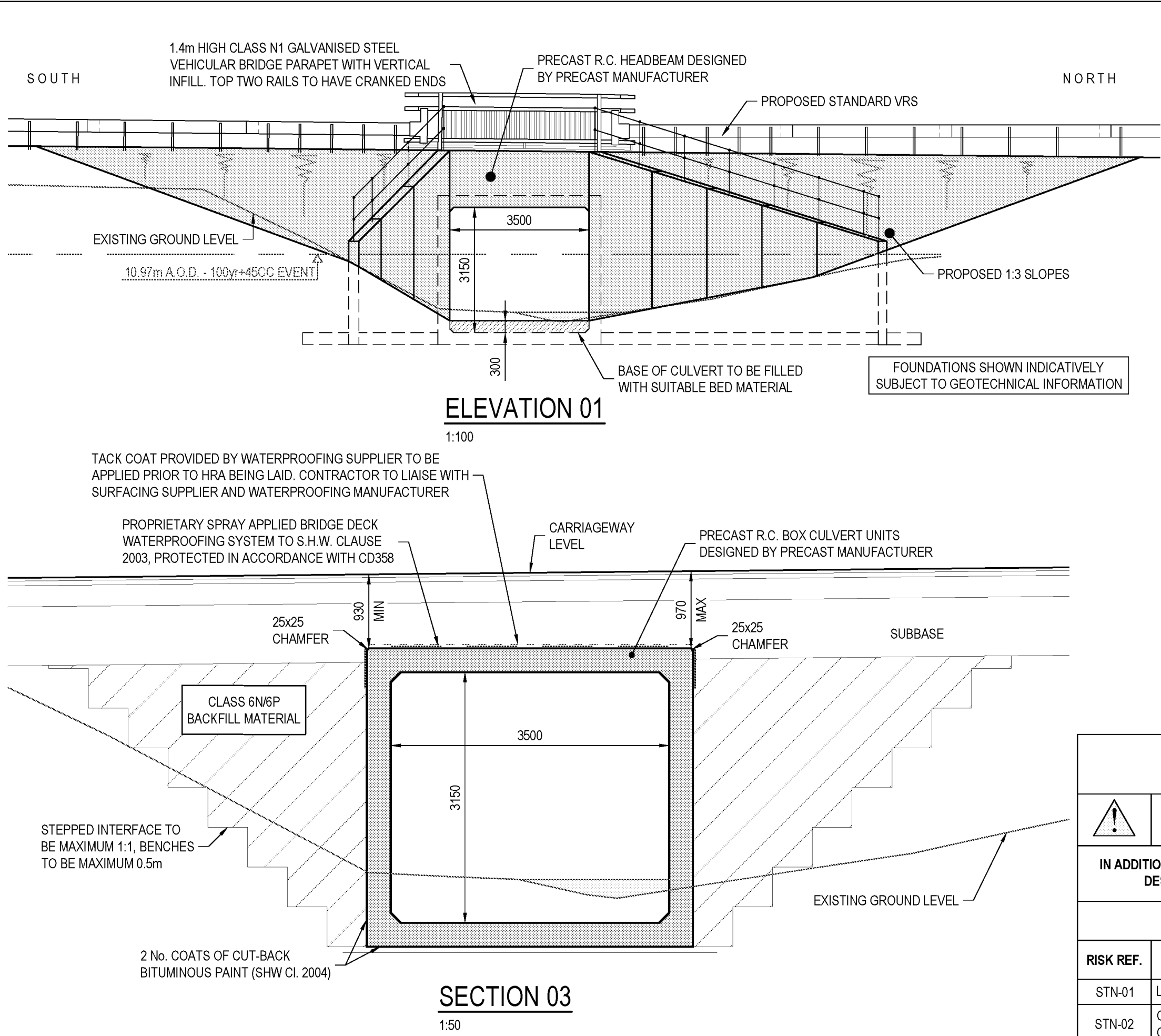
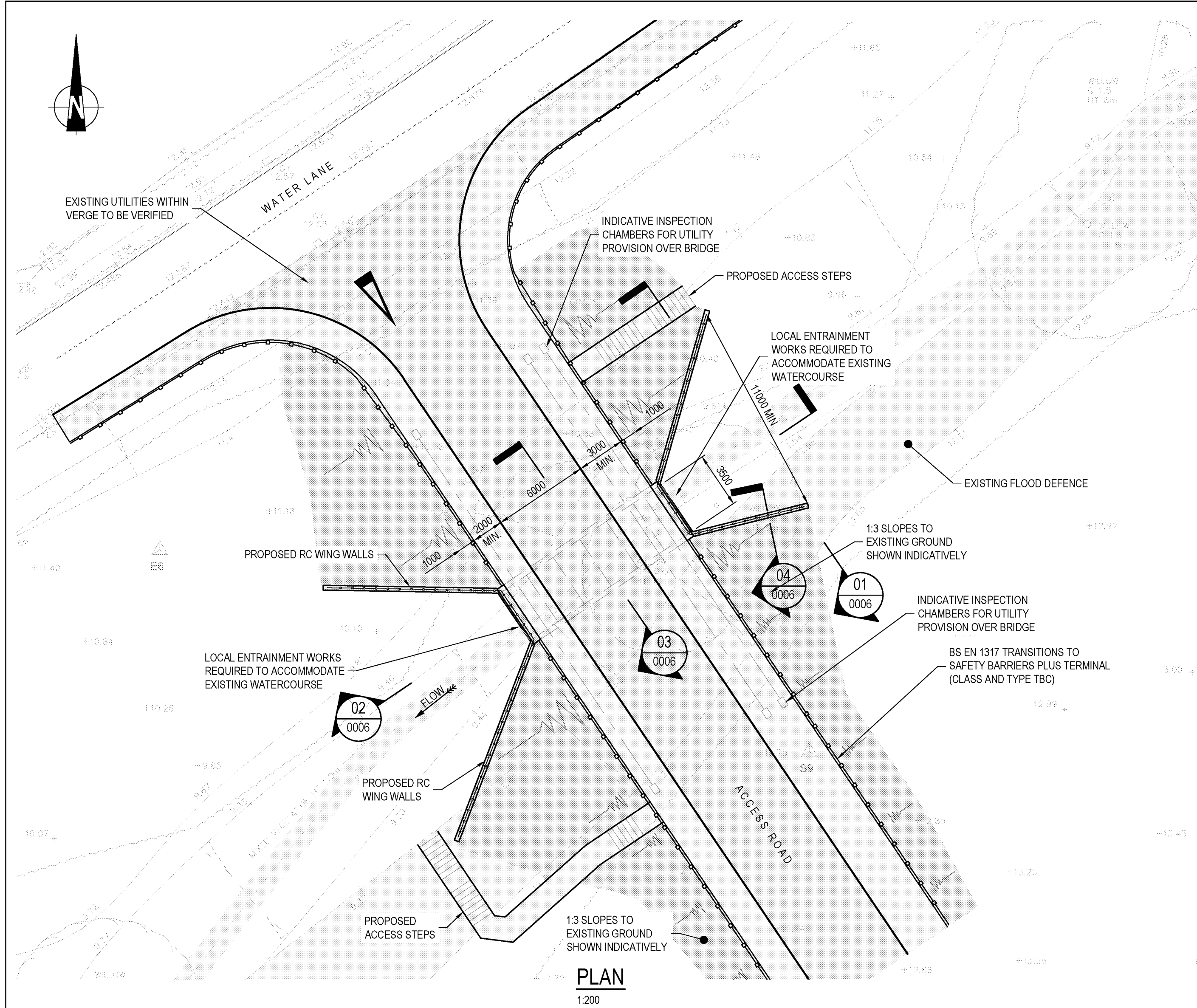
Table 2: Maintenance Activities Frequency

Maintenance Activity	Frequency				
	As required	Weekly	Monthly	Quarterly	Yearly
Initial inspection to check culvert, outfalls and watercourse are functioning as designed (3 months post-construction)	✓ (and 48hrs after storm event)		✓ (for 3 months post-construction)		
Checks for acts of vandalism, including fly tipping, graffiti and fire damage		✓			
Cleaning of carriageway and foot / cycleways of debris left by development construction activities		✓			
Inspection for movement, displacement and settlement of the embankments			✓		
Check and clean out weep holes in abutments and wing walls				✓	
Check carriageway saw-cut for premature wear				✓	
Maintain access steps to structure			✓		
Check and remove debris and accumulated silt in the watercourse	✓ (and 48hrs post flood event)			✓	
Remove invasive vegetation around the culvert, outfalls and access points			✓		
Check carriageway surfacing for fretting, crazing and tracking, carry out suitable repairs				✓	
Check for settlement of the structure				✓	
Check joint sealants between culvert elements for premature perishing				✓	
Visually check the parapet protective system for damage / premature wear					✓
Reactive maintenance activities, i.e., repairs to damaged parapets, embankments slips, fallen trees in watercourse etc.	✓				
During flood events monitor culvert for blockages and for potential increase in water levels. Materials to be removed if able and safe to do so.	✓				
Inspection of watercourse channel upstream and downstream of culvert (within site boundary) to check for damage / loss of vegetation following flood event	✓ (and 48hrs post flood event)				

Maintenance Activity	Frequency				
	As required	Weekly	Monthly	Quarterly	Yearly
Monitor presence of oil and other contaminants in the vicinity of the culvert			✓		
Inspection of embankment for signs of erosion and failure. Implement remediation strategy as required.	✓ (and 48hrs post flood event)			✓	
Implementation of vegetation management strategy in vicinity of culvert in accordance with overarching landscape management plan	✓			✓	

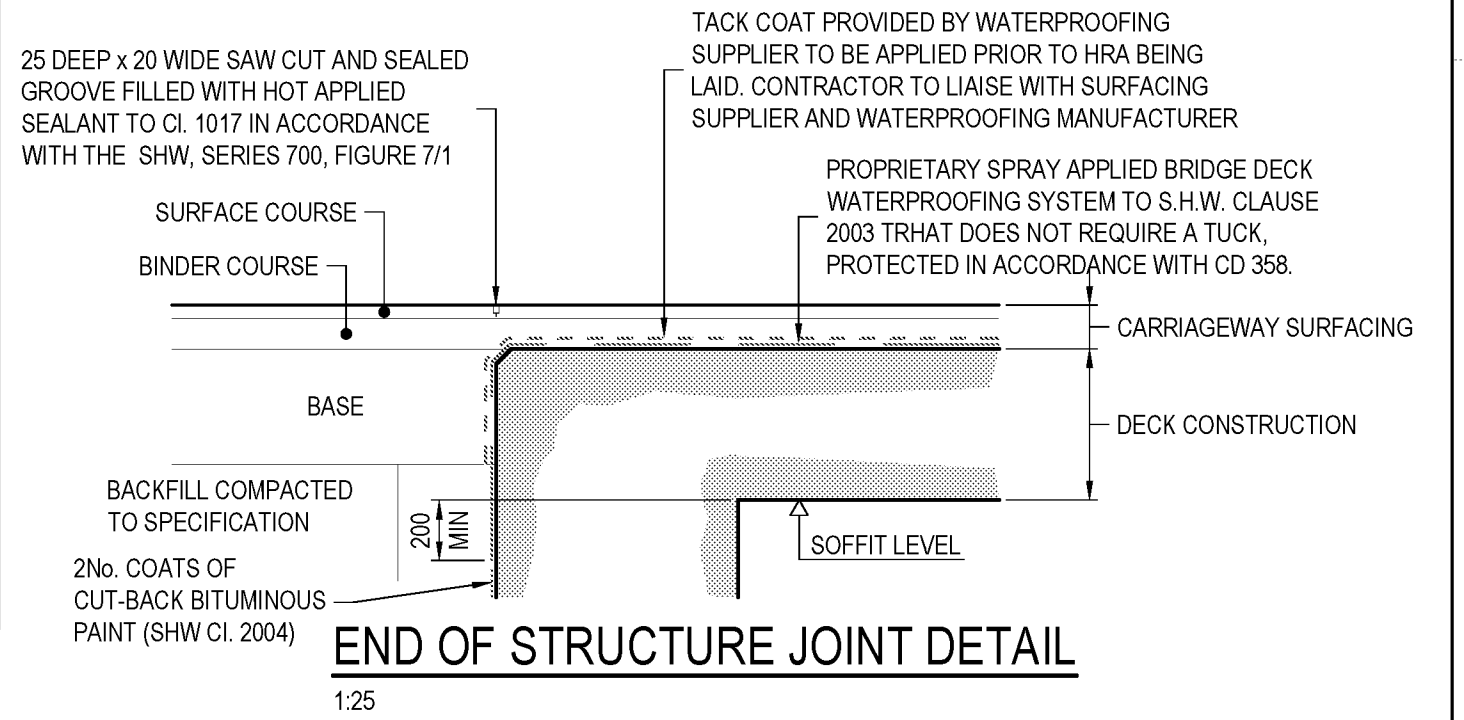
- 4.3.3 All maintenance activities would be recorded and presented to WSCC upon their adoption of the structure.
- 4.3.4 Prior to adoption of the structure an 'Inspection for Acceptance' would be conducted jointly by Barratts and WSCC and any significant defects identified would be rectified by Barratts.

**Appendix A Drawing 46353-STN-SBR-1772-DR-
CB-0006 Rev P03**



- ### NOTES
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
 - THE SPECIFICATION SHALL BE THE 'SPECIFICATION FOR HIGHWAY WORKS', PUBLISHED BY THE STATIONERY OFFICE (FORMERLY HMSO) INCLUDING REVISIONS UP TO APRIL 2020 AND CONTRACT SPECIFIC NUMBERED APPENDICES.
 - ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
 - ALL LEVELS ARE IN METRES AND RELATIVE TO ORDNANCE DATUM (NEWLYN).
 - ALL CO-ORDINATES ARE IN METRES AND RELATIVE TO ORDNANCE SURVEY GRID. TOPOGRAPHICAL DATA - SURVEY GRID RELATES TO OS NATIONAL GRID. PLEASE NOTE THE SURVEY WAS ORIGINALLY PRODUCED ON METRIC SCALE FACTOR 1 AND HAS BEEN RETROSPECTIVELY CONVERTED TO OS NATIONAL GRID.
 - ALL PROPRIETARY PRODUCTS SHALL BE APPROVED BY THE OVERSEEING ORGANISATION AND SHALL BE PLACED STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND SPECIFICATIONS. WHERE OUTLINES OF PROPRIETARY PRODUCTS ARE SHOWN ON THE DRAWINGS, SUCH DETAILS ARE INDICATIVE ONLY.
 - THIS DRAWING IS BASED UPON THE FOLLOWING SUPPLIED DIGITAL INFORMATION:
 - TOPOGRAPHICAL SURVEY PROVIDED BY MK SURVEYS, DATED SEPT 2019.
 - PRELIMINARY HIGHWAY ALIGNMENT: Drg. REFERENCE x.pr_design.dwg
- THE GEOMETRY DEPICTED IN THIS DRAWING HAS BEEN DETERMINED FROM THE FOLLOWING:
- THE DEPARTMENT FOR TRANSPORTATION / HIGHWAYS ENGLAND DESIGN MANUAL FOR ROADS AND BRIDGES.
- REFER TO APPROVAL IN PRINCIPLE DOCUMENT 46353-1504-AIP-001 FOR STRUCTURAL MATERIALS AND FINISHES (i.e. CONCRETE GRADES, CONCRETE FINISHES, ETC.)
 - UTILITY SERVICE POSITIONS SHOWN INDICATIVELY.
 - PARAPET, TRANSITION, SAFETY BARRIER AND TERMINAL SUPPLY AND INSTALLATION IS TO BE BY LICENSED COMPANIES HAVING THIRD PARTY VERIFIED UK HIGHWAYS ENGLAND SECTOR SCHEME 5A & 5B (FOR PARAPETS) AND/OR 2B (FOR OTHER ITEMS) APPROVAL AND A QUALITY MANAGEMENT SCHEME IN ACCORDANCE WITH ISO 9001 OR 9002.
 - THE DECK SHALL BE PROTECTED WITH A BBA CERTIFIED PROPRIETARY BRIDGE DECK WATERPROOFING SYSTEM, RETURNED OVER THE DECK ENDS. ALL OTHER BURIED CONCRETE SURFACES TO RECEIVE TWO COATS OF BITUMINOUS PAINT TO CLAUSE 2004 OF THE SPECIFICATION OF HIGHWAY WORKS.

CDM, HEALTH, SAFETY AND ENVIRONMENTAL NOTES		
	DENOTES THE LOCATION OF RISK. FOR MORE INFORMATION REFER TO RISK REFERENCE AND DESCRIPTION	
IN ADDITION TO THE HAZARDS AND THE RISKS NORMALLY ASSOCIATED WITH THE FORM OF CONSTRUCTION DESCRIBED ON THE DRAWINGS, THE FOLLOWING RESIDUAL RISKS SHOULD BE CONSIDERED		
P - DETAILED DESIGN, C - CONSTRUCTION, S - IN SERVICE / MAINTENANCE, D - DECOMMISSIONING / DEMOLITION		
RISK REF.	RISK DESCRIPTION	RISK PHASE
STN-01	LIFTING, HANDLING AND TRANSPORTATION OF PRECAST ELEMENTS BY VARIOUS METHODS.	C
STN-02	CONSTRUCTION VEHICLES MAY WISH TO TRAFFIC OVER BOX CULVERT BEFORE ROAD OPENS. CONTRACTOR TO REFER TO DESIGNER FOR ALLOWABLE LOADS.	C
STN-03	EXISTING SERVICES TO BE DIVERTED.	C
STN-04	CONSTRUCTION VEHICLES MAY WISH TO TRAFFIC OVER BOX CULVERT BEFORE ROAD OPENS.	C
STN-05	CONSTRUCTION VEHICLES MAY WISH TO TRAFFIC OVER BOX CULVERT BEFORE ROAD OPENS. CONTRACTOR TO REFER TO PRECAST DESIGNER FOR ALLOWABLE LOADS	C/D

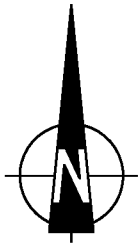


P03	REISSUED FOR TECHNICAL APPROVAL	04.03.21	AJA	GG	PC
P02	FOR TECHNICAL APPROVAL	16.02.21	AJA	GG	PC
P01	PLANNING	29.10.20	JS	HJ	PC
Mark	Revision	Date	Drawn	Chkd	Appd

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Drawing Issue Status					
FOR APPROVAL					
WATER LAKE, ANGMERING PROPOSED BOX CULVERT WSCC REF: 1772 GENERAL ARRANGEMENT					
Client					
Date of 1st Issue 29.10.2020		Designed HJ	Drawn JS	stantec.com/uk	
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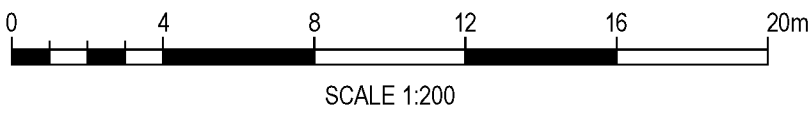
Appendix B Drawing 46353-2002-SK007



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KEY:

CULVERT MANAGEMENT AREA



Mark	Revision	Date	Drawn	Chkd	Appd
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Drawing Issue Status

FOR INFORMATION

WATER LANE, ANGMERING

CULVERT MANAGEMENT AREA

Client

BARRATT
HOMES

DAVID WILSON HOMES
WHERE QUALITY LIVES

Date of 1st Issue
26.03.2021

A1 Scale
1:200

Drawing Number
46353/2002/SK007

Designed
-

Checked
SM

Drawn
MJP

Approved
-

Revision
-

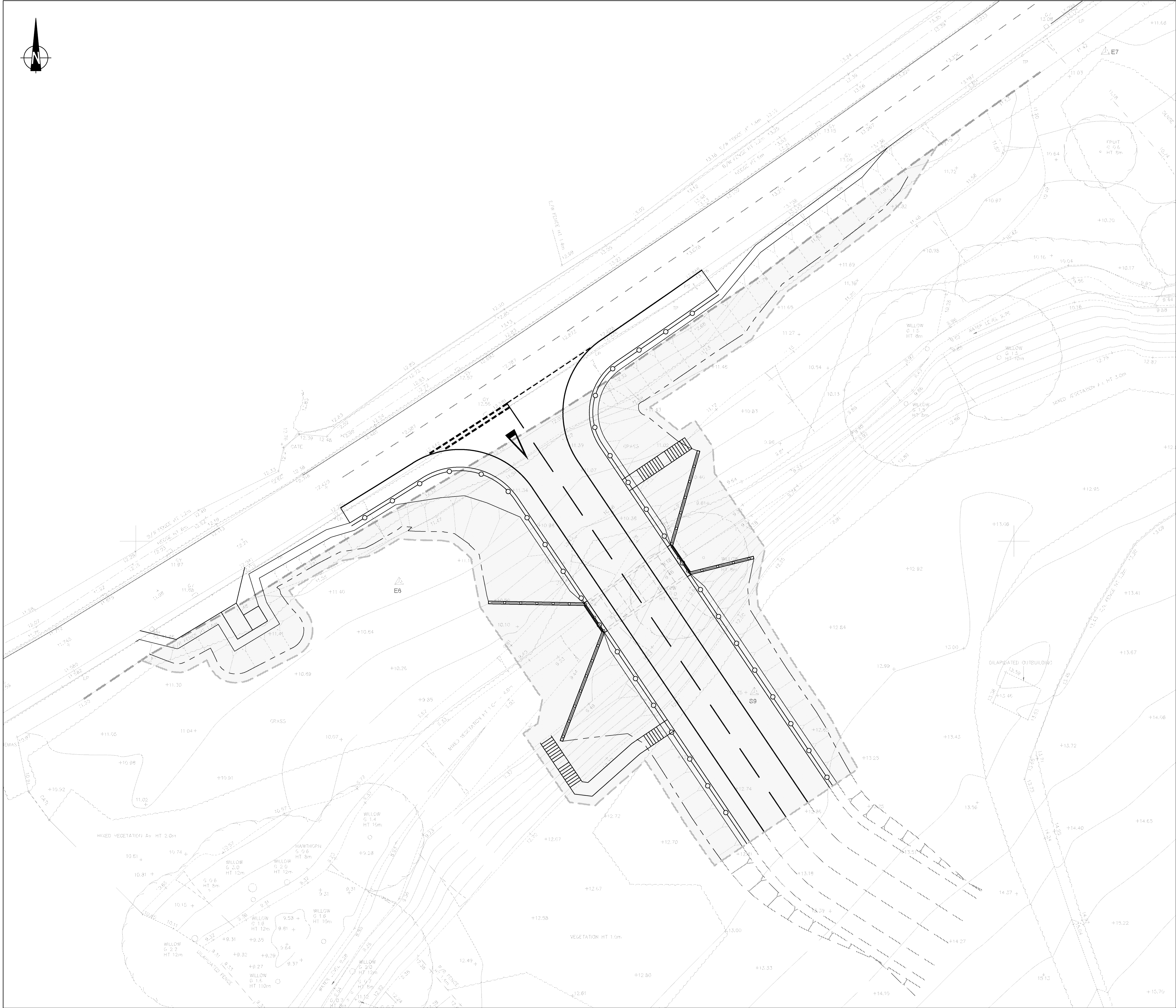
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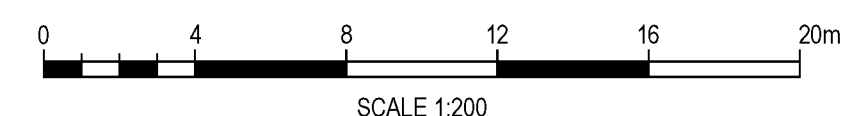
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Appendix C Drawing 46353-2002-SK006



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ADOPTED HIGHWAY BOUNDARY
LAND TO BE ADOPTED BY HIGHWAY AUTHORITY



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WATER LANE, ANGMERING

HIGHWAY ADOPTION LAYOUT

Client



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