

Civil and Structural Stage 3 Report

For the

Ellen Wilkinson Quad,
The University of Manchester

Report Title:	Ellen Wilkinson Quad Civil and Structural Stage 3 Report
Report Reference & Revision:	10939-WML-XX-ZZ-RP-S-0001 rev. 00
Client:	Arcadis LLP
Issue Date:	21 July 2023
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1.0 Introduction

- 1.1 The scope of this report concerns the Stage 3 Civil and Structural aspects of the Ellen Wilkinson Quad Improvement project.
- 1.2 It is intended to provide the client and the wider design team with pertinent civil and structural input to the scheme to facilitate informed decisions on the project.
- 1.3 An initial design report has been produced by the architect describing the key requirements of the project and the development of the scheme to date.
- 1.4 This report will review architectural proposal to date and provide discussion on the civil and structural aspects and implications of the scheme.

2.0 The Project

- 2.1 Ellen Wilkinson building is part of The University of Manchester campus and the existing Quad area is flanked by the Contact Theatre
- 2.2 To accommodate a much-needed external space for the students and staff to relax, socialise, learning and collaboration.
- 2.3 This Stage 3 report focuses on option developed to revitalise the Quad area.
- 2.4 Current proposals are to introduce new pathways, pond, seating and table to the lower level with retaining wall structure around the upper level.



Fig 2.1 Extract from Architect's Preliminary Layout

3.0 Existing Site

- 3.1 The existing quad is surrounded by Ellen Wilkinson to the north and west with Contact Theatre building to east and south with entrances from the Blyton Road to the east and Brisbane Street to south.
- 3.2 Currently serves by flag paving for pedestrians and an existing raised level hard surface area on the south side of the quad.
- 3.3 There is a central statue feature with hard surfacing surround.

4.0 Engineering Design Brief

- 4.1 The structures will be designed in accordance with the current British/European Standards, Codes of Practice, Health and Safety legislation, Building Regulations and good design practice.
- 4.2 Retaining wall structures are to be introduced to the upper level and stairs to the south of the quad area with max height for the retaining wall to be 900mm above ground level.
- 4.3 Balustrade to be supported off the retaining wall.
- 4.4 Retaining and foundations are also to be introduced to the seating area to the middle of the quad area.
- 4.5 Louvre fence and gate to be introduced to the east entrance from Blyton Street.
- 4.6 Foundations to be introduced for the gate posts for the fixings and support of the louvre fences. Louvre fences' support posts to be fixed to the adjacent existing walls.
- 4.7 The gate is to be introduced to the south entrance from Brisbane Street. The gate support posts to be fixed to the existing adjacent walls.
- 4.8 A new structural slab to be introduced for the relocated existing sculpture to central focal point.
- 4.9 A structural slab is also to be introduced for the large seating with a feature backrest opposite the sculpture.
- 4.10 See Appendix 1 for structural drawings.

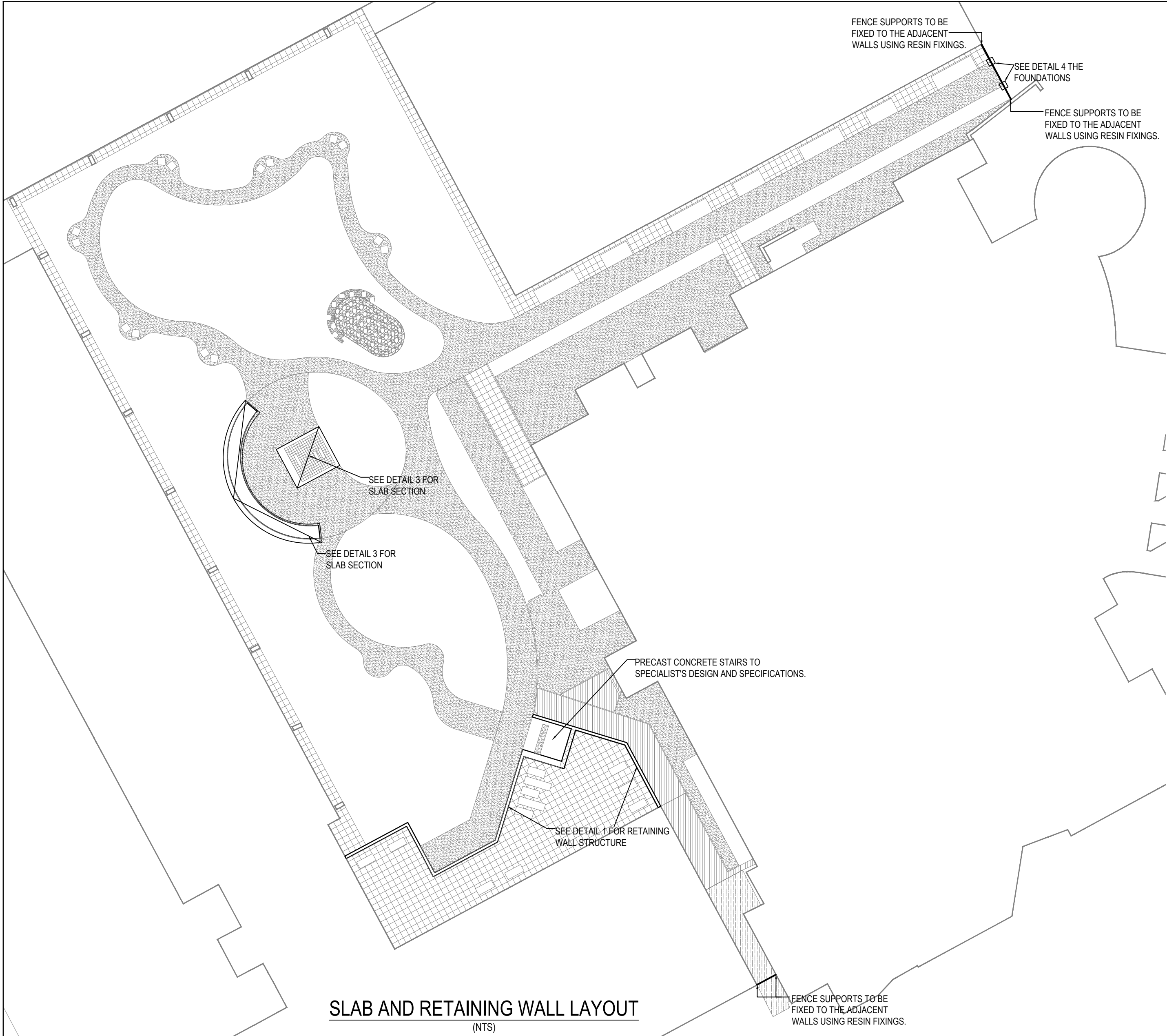
5.0 Drainage

- 5.1 The existing paving slab is being replaced with the new permeable surface using the resin bonded gravel.
- 5.2 The Quad appears reasonably well served by surface discharge points and assumed combined drainage. It is intended to drain surface water outflows to the existing assumed combined sewer pipe below ground.
- 5.3 Slot drains and channel drains are to be introduced to collect the surface water from the paved surfaces.
- 5.4 The surface water is to be discharged to the existing into the existing assumed combined sewer pipe below ground running across the site.
- 5.5 It is recommended for the existing RWP connections to be investigated to confirm the combined sewer pipes. A CCTV survey is recommended to achieve this end.
- 5.6 With the proposed surfacing in the quad area the drainage requirements have been reduced compared to the existing.
- 5.7 See Appendix 2 for drainage layout.

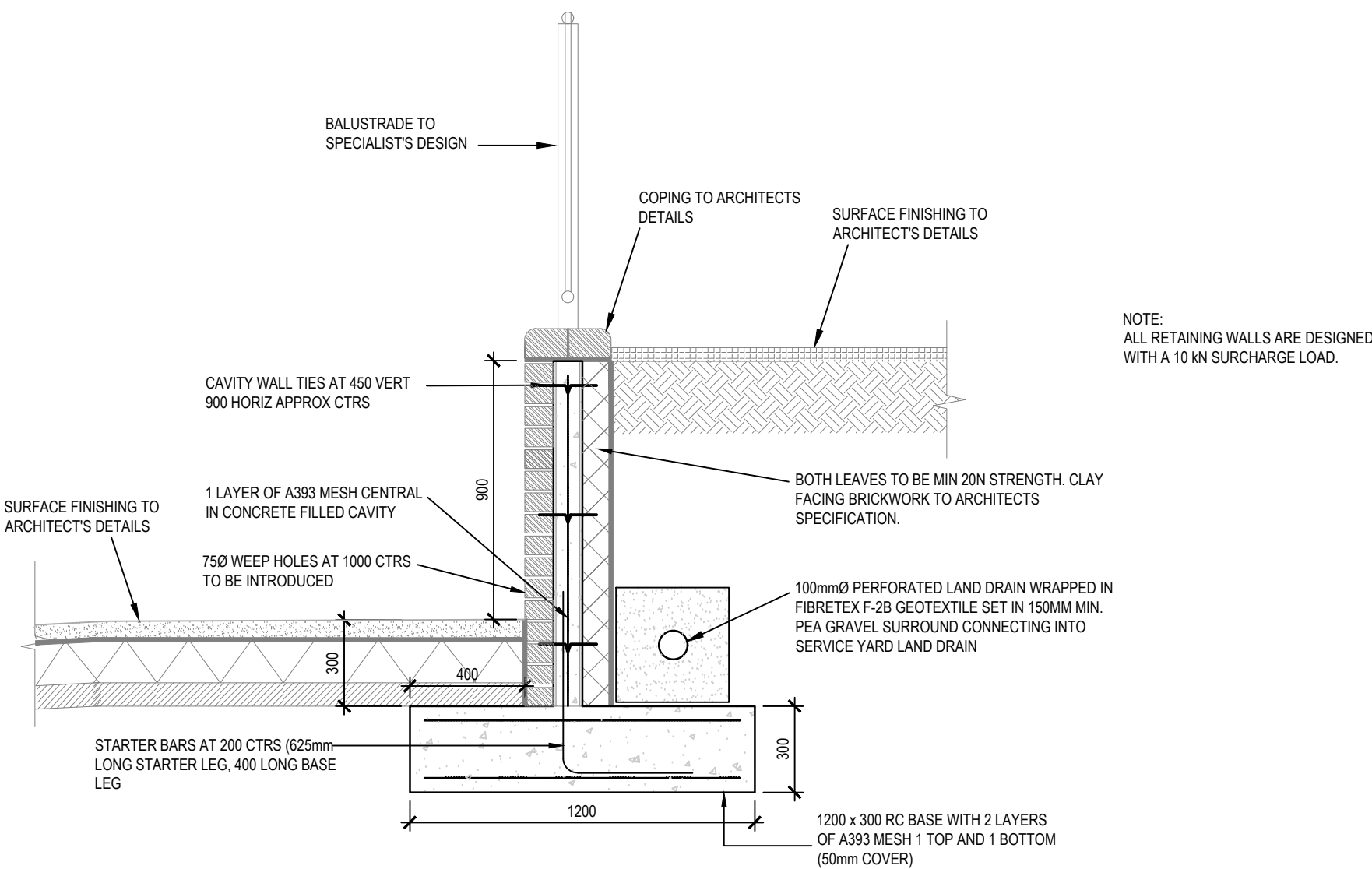
6.0 Elements for Measure

- 6.1 Contractor to allow for the foundations for the fence posts to the back of the seating areas. Currently assumed that the foundations are to be designed by specialist, i.e., fence manufacturer/designer. Allow for 10 m³ of concrete.
- 6.2 Allow 5 m³ of concrete for soft spots under the foundations.
- 6.3 A CCTV survey is recommended to confirm the existing drain systems in the area.

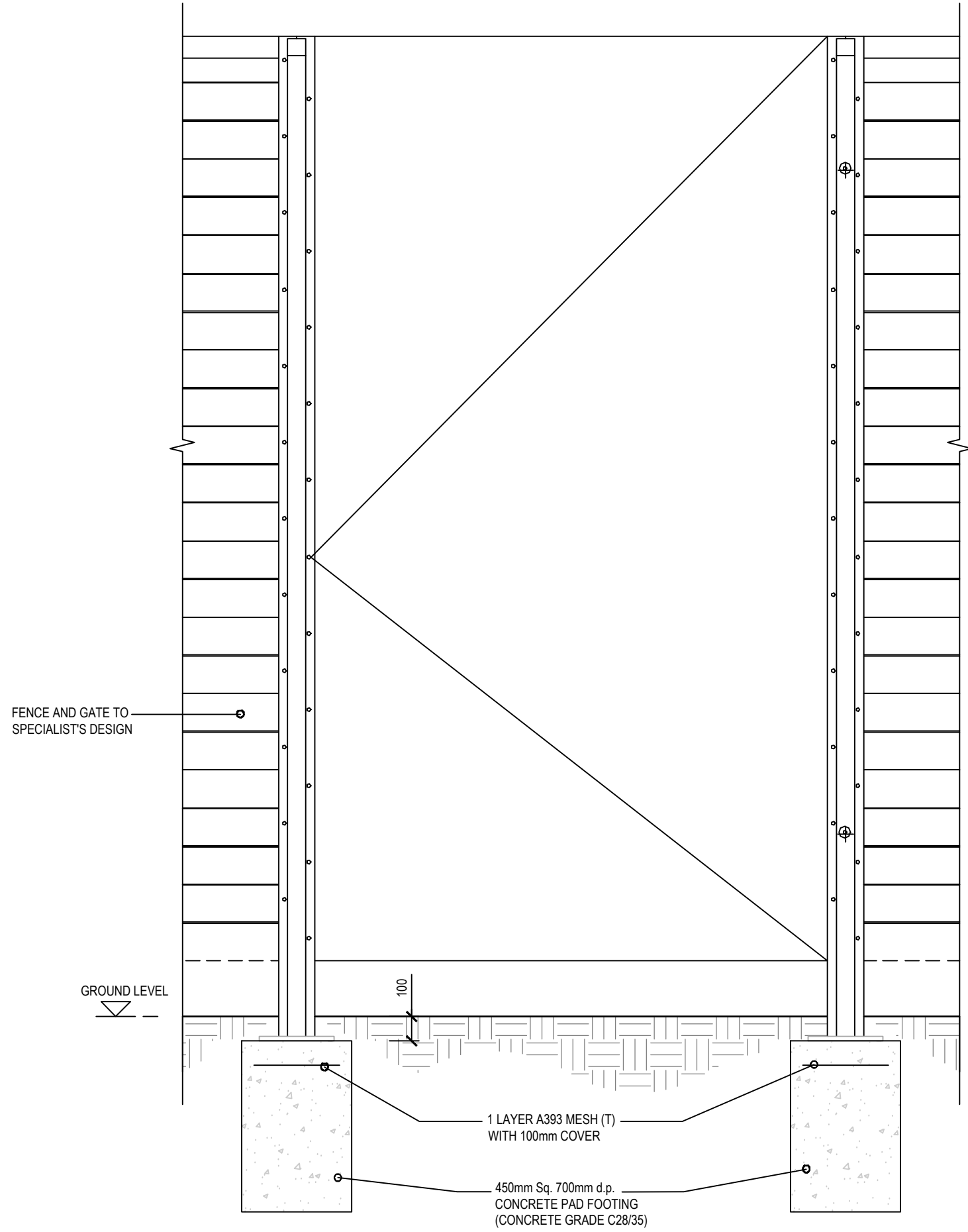
APPENDIX 1



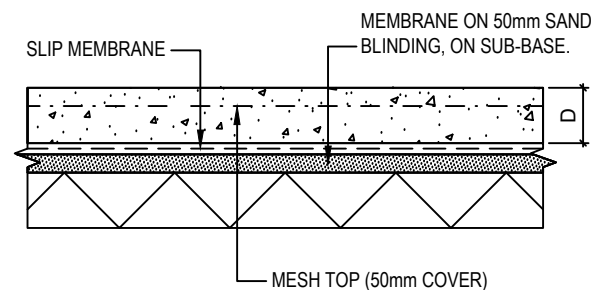
SLAB AND RETAINING WALL LAYOUT
(NTS)



DETAIL 1
TYPICAL CAVITY REINFORCED RETAINING WALL SECTION
(SCALE 1:20)



DETAIL 4
GATE & FENCE POST FOUNDATIONS
(SCALE 1:20)



DETAIL 3
EXTERNAL SLAB DETAIL
(SCALE 1:20)

GENERAL NOTES

- DO NOT SCALE FROM THIS DRAWING WORK TO FIGURED DIMENSIONS ONLY.
- NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING IS ALLOWED WITHOUT PRIOR PERMISSION IN WRITING.
- ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.
- THE CONTRACTOR SHALL INCORPORATE ALL THE REQUIREMENTS OF THE PRE-TENDER STAGE HEALTH AND SAFETY PLAN.

RESIDUAL RISK REGISTER -

REFER TO WML CIVIL / STRUCTURAL DESIGN RISK REGISTER IN ADDITION TO THE HAZARDS / RISKS NORMALLY ASSOCIATED WITH THE TYPE OF WORKS INDICATED ON THIS DRAWING. NOTE THE FOLLOWING:-

- OVERLOADING OF THE RETAINING STRUCTURES. ALLOWABLE LOAD TO BE LIMITED TO 10 kN DURING CONSTRUCTION AND FOR MAINTENANCE DURING USE.

FABRIC REINFORCED EXTERNAL CONCRETE HARDSTANDING SPECIFICATION:

NOTE-SPECIFICATION APPROPRIATE FOR 5m.S.A AND SUB-GRADE CBR 5%

SLAB THICKNESS [mm]	- 150
REINFORCEMENT	- A252
CONCRETE QUALITIES	- C 28/35 PUMPABLE WITH 3.5% AIR ENTRAINMENT (MIN.)
EXPOSURE CLASSES	- XF 4XC3/4
PERMITTED CEMENT TYPES	- A B
AGGREGATE COURSE	- TO BS-882-FREEZE/THAW RESISTING
AGGREGATE SAND	- TO BS-882
NOMINAL MAX. SIZE [mm]	- 20
MIN. CEMENT CONTENT [kg/m³]	- 320
MAX. FREE WATER CEMENT RATIO [kg/m³]	- 0.55
MAX. CEMENT CONTENT	- 400
SLUMP [mm]	- S 20
FINISH	- BRUSHED DIRECTION TO SUIT FALL. WITH EDGING TROWEL TO REMOVE SHARP ARISING TO ALL JOINTS
SURFACE TOLERANCE	- 3mm UNDER 3m STRAIGHT EDGE
(CLAUSE 702D O.T. SPECIFICATION FOR HIGHWAY WORKS)	- ±6mm FROM DESIGN LEVELS.
SLIP MEMBRANE	- 1200GAUGE POLYTHENE
SUB-BASE SURFACE TOLERANCE [mm]	- +0-25mm FROM DATUM
THICKNESS [mm]	- 150

P02	DESIGN UPDATED BASED ON REVISED LAYOUT	31/10/ 23	RZ	AJL
P01	PRELIMINARY ISSUE	JUL 23	RZ	AJL
Rev.	Amendment	Date	By	Chkd

Project

ELLEN WILKINSON QUAD

Client

ARCADIS LLP

Title

QUAD FOUNDATION & RETAINING WALL ARRANGEMENT AND DETAILS

WML Job No.

10892

Drawn

RZ

Checked

AJL

Date

21 JULY 2023

Scale

AS NOTED @ A1

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Drawing No.

Project

Originator

Volume

Level

Type

Role

Number

Rev

10892 - WML - 00 - 00 - DR - S - 0100 P02

APPENDIX 2



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FOR DETAILS OF MATERIALS AND WORKMANSHIP REFER TO THE SPECIFICATION.

PRELIMINARY

P02	AMENDED TO SUIT REVISED PROPOSED LAYOUT.	31.10.23	KPT	JH
P01	FIRST ISSUE.	21.07.23	RZ	AJL
Rev.	Amendment	Date	By	Chkd

Project
ELLEN WILKINSON QUAD

Client
ARCADIS LLP

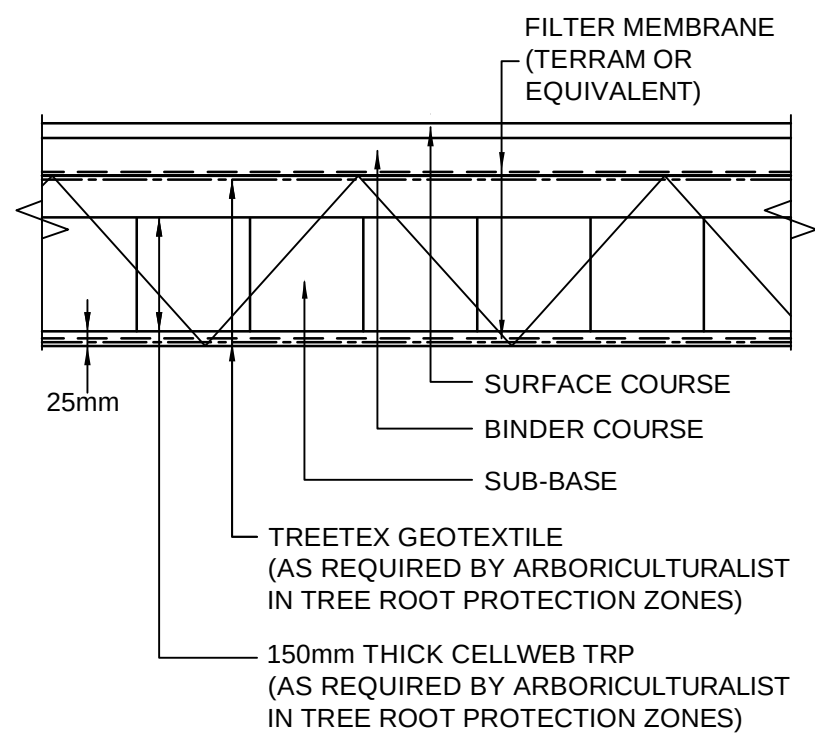
Title
PROPOSED DRAINAGE LAYOUT

WML Job No. 10892	Drawn RZ	Checked JH	Date 21.07.2023	Scale 1 TO 200 AT A1
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Drawing No.	Project	Originator	Volume	Level	Type	Role	Number	Rev
10892	WML	XX	XX	DR	C	1000	P02	



ALL WORKS TO BE IN ACCORDANCE WITH THE REQUIREMENTS OF BS594987:2010 GENERALLY.

SURFACE COURSE
20mm
MATERIAL AC10 SURF PA

BINDER COURSE
50mm
MATERIAL AC20 BIN PA

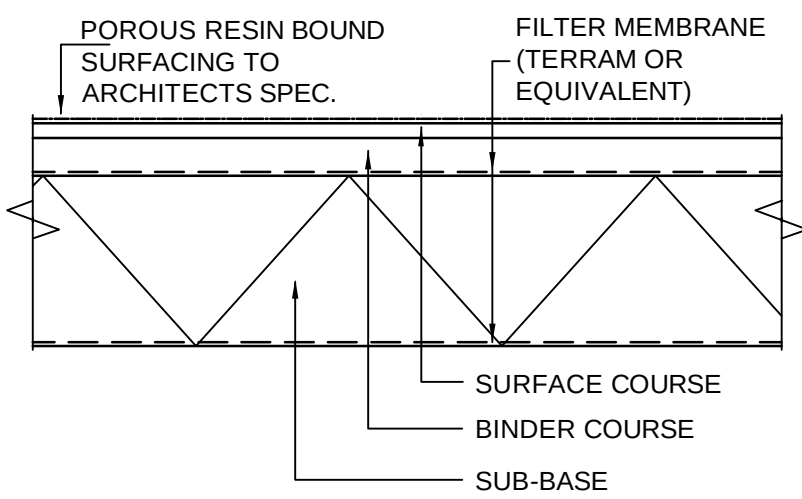
GRANULAR SUBBASE
MIN 325mm CLEAN
ANGULAR STONE TYPE 4/20

ASSUMED CBR
3% (SUBJECT TO
CONFIRMATION OF CBR
TESTS BY SITE
INVESTIGATION
SPECIALIST)

ADDITIONAL FILLING REQUIRED TO SUIT PROPOSED
LEVELS TO USE TYPE 3 SUB-BASE OR CLEAN ANGULAR
STONE TYPE 4/20.

NOTE:
ALL MATERIAL WITHIN 450mm OF SURFACE LEVEL TO BE
NON-FROST SUSCEPTIBLE.

NEW POROUS ASPHALT PEDESTRIAN AREA CONSTRUCTION (SUBJECT TO OCCASIONAL VEHICULAR OVERRUN)



MEASURES AS ADJACENT DETAIL RE INSTALLATION IN
TREE ROOT PROTECTION ZONES

ALL WORKS TO BE IN ACCORDANCE WITH THE
REQUIREMENTS OF BS594987:2010 GENERALLY.

SURFACE COURSE
20mm
MATERIAL AC10 SURF PA

BINDER COURSE
50mm
MATERIAL AC20 BIN PA

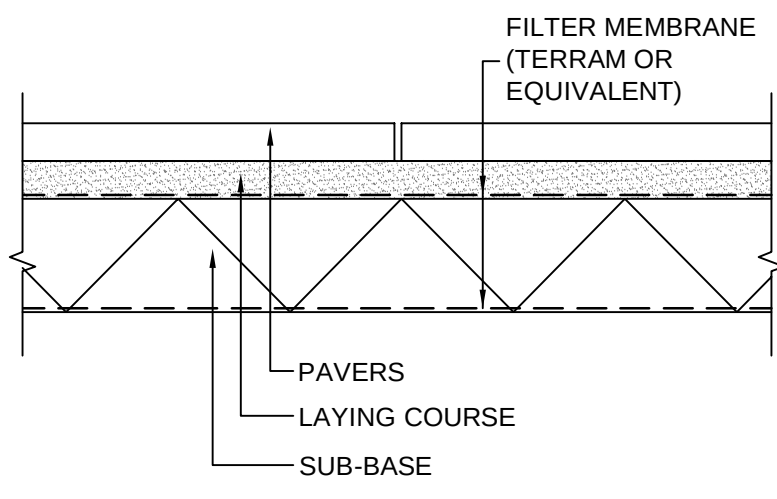
GRANULAR SUBBASE
MIN 225mm CLEAN
ANGULAR STONE TYPE 4/20

ASSUMED CBR
3% (SUBJECT TO
CONFIRMATION OF CBR
TESTS BY SITE
INVESTIGATION
SPECIALIST)

ADDITIONAL FILLING REQUIRED TO SUIT PROPOSED
LEVELS TO USE TYPE 3 SUB-BASE OR CLEAN ANGULAR
STONE TYPE 4/20.

NOTE:
ALL MATERIAL WITHIN 450mm OF SURFACE LEVEL TO BE
NON-FROST SUSCEPTIBLE.

NEW POROUS ASPHALT PEDESTRIAN AREA CONSTRUCTION WITH RESIN BOUND GRAVEL OVERLAY (NOT SUBJECT TO VEHICULAR OVERRUN)



MEASURES AS ADJACENT DETAIL RE INSTALLATION IN
TREE ROOT PROTECTION ZONES

DETAILS TO BE CONFIRMED UPON RECEIPT OF
CONFIRMATION BY OTHERS OF ACTUAL BLOCK PAVERS
TO BE USED.

ALL WORKS TO BE IN ACCORDANCE WITH BS7533-3
GENERALLY.

PAVER THICKNESS:
TO ARCHITECT'S SPEC.
PAVER MATERIAL:
TO ARCHITECT'S SPEC.
LAYING COURSE:
50mm THICK, 2mm TO 6.3mm
GRADED GRIT TO
BS EN 7533-13

GRANULAR SUB-BASE:
225mm THICK HIGHWAYS
AGENCY TYPE 3 GRANULAR
MATERIAL OR CLEAN
ANGULAR STONE TYPE 4/20.

JOINTING:
NARROW JOINTS TO
ARCHITECT'S SPEC.

MATERIAL:
2mm TO 6.3mm GRADED
GRIT TO BS EN 7533-13

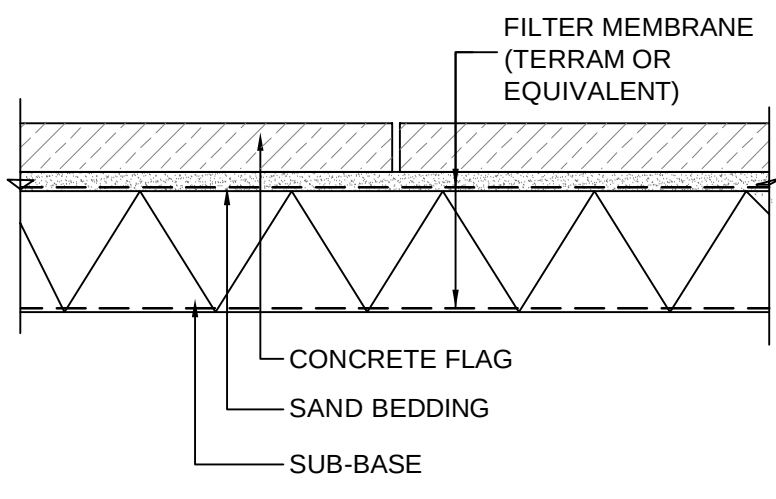
LAYING PATTERN:
TO ARCHITECT'S SPEC.

ASSUMED CBR: 3% (SUBJECT TO CONFIRMATION OF CBR
TESTS BY SITE INVESTIGATION SPECIALIST AFTER SITE
STRIP)

ADDITIONAL FILLING REQUIRED TO RAISE SURFACE
LEVEL FOLLOWING SITE STRIP TO BE IN ACCORDANCE
WITH D20. (SH803 TYPE 3 GSB).

ALL MATERIAL WITHIN 450mm OF SURFACE LEVEL TO BE
NON-FROST SUSCEPTIBLE.

NEW PERMEABLE BLOCK PAVING CONSTRUCTION (NOT SUBJECT TO VEHICULAR OVERRUN)



MEASURES AS ADJACENT DETAIL RE INSTALLATION IN
TREE ROOT PROTECTION ZONES

DETAILS TO BE CONFIRMED UPON RECEIPT OF
CONFIRMATION BY OTHERS OF ACTUAL FLAGS TO BE
USED.

SUB-BASE:
225mm THICK HIGHWAYS
AGENCY TYPE 3 GRANULAR
MATERIAL OR CLEAN
ANGULAR STONE TYPE 4/20

LAYING COURSE:
25mm THICK, 2mm TO 6.3mm
GRADED GRIT TO
BS EN 7533-13

FLAGS:
TO ARCHITECT'S SPEC.

MANUFACTURER:
TO ARCHITECT'S SPEC.

PRODUCT REFERENCE:
TO ARCHITECT'S SPEC.

COLOUR / FINISH:
TO ARCHITECT'S SPEC.

METHOD OF MANUFACTURE:
TO ARCHITECT'S SPEC.

NOMINAL SIZES:
TO ARCHITECT'S SPEC.

JOINTING:
2mm TO 6.3mm GRADED
GRIT TO BS EN 7533-13

WIDTH:
8mm MIN TO ARCHITECT'S
SPEC.

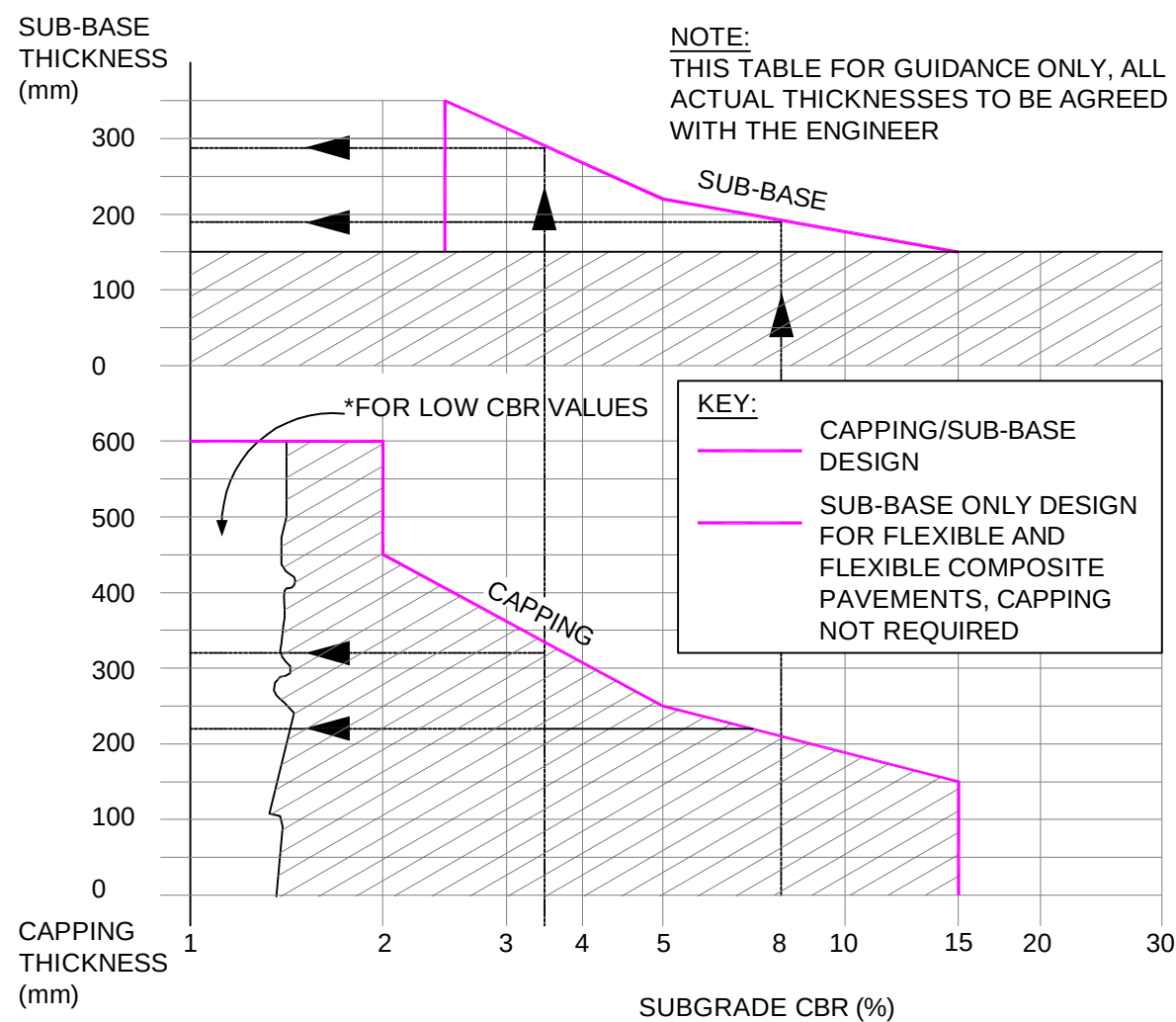
BOND:
TO ARCHITECT'S SPEC.

ASSUMED CBR:
3% (SUBJECT TO
CONFIRMATION OF CBR
TESTS BY SITE
INVESTIGATION
SPECIALISTS AFTER SITE
STRIP)

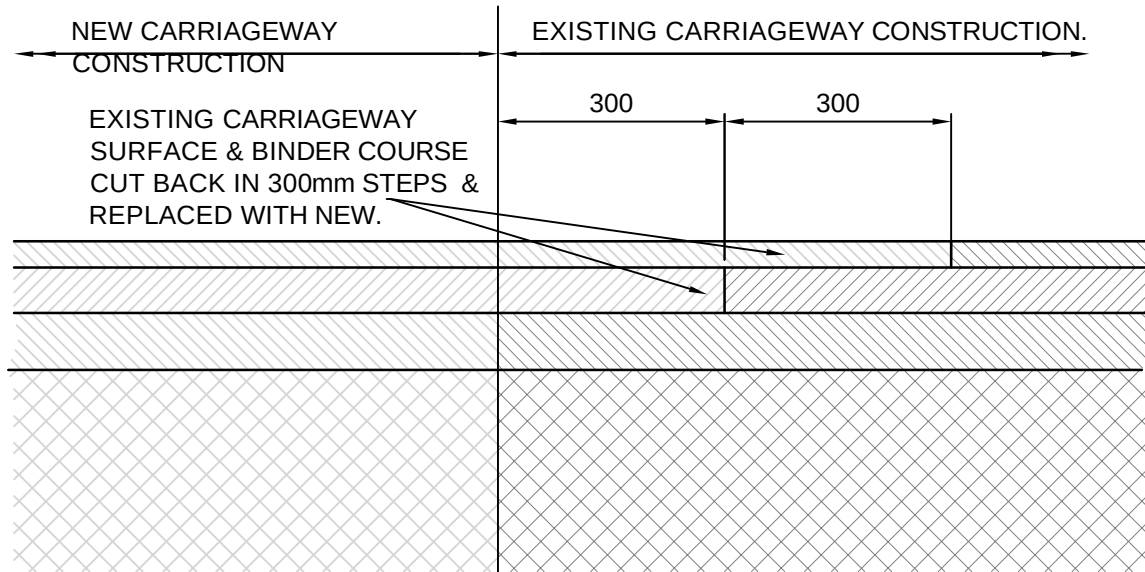
ADDITIONAL FILLING REQUIRED TO RAISE SURFACE
LEVEL FOLLOWING SITE STRIP TO BE IN ACCORDANCE
WITH P20 (SHW 803 TYPE 1 GSB)

ALL MATERIALS WITHIN 450mm OF SURFACE LEVEL TO
BE NON-FROST SUSCEPTIBLE.

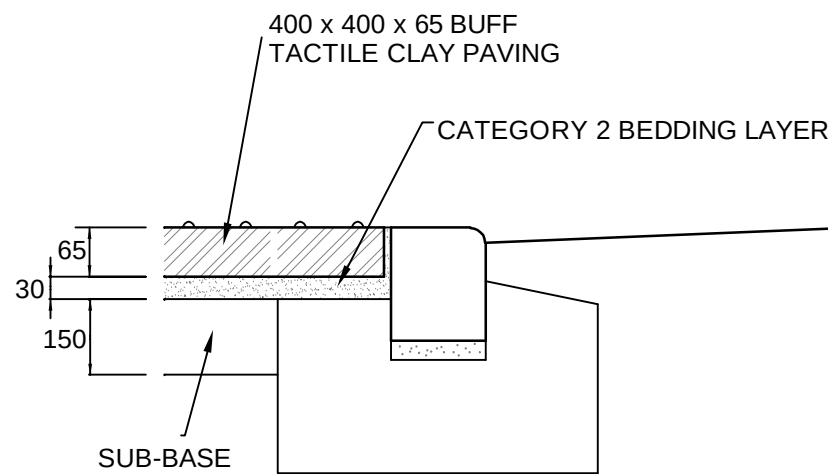
NEW PERMEABLE CONCRETE FLAG CONSTRUCTION (NOT SUBJECT TO VEHICULAR OVERRUN)



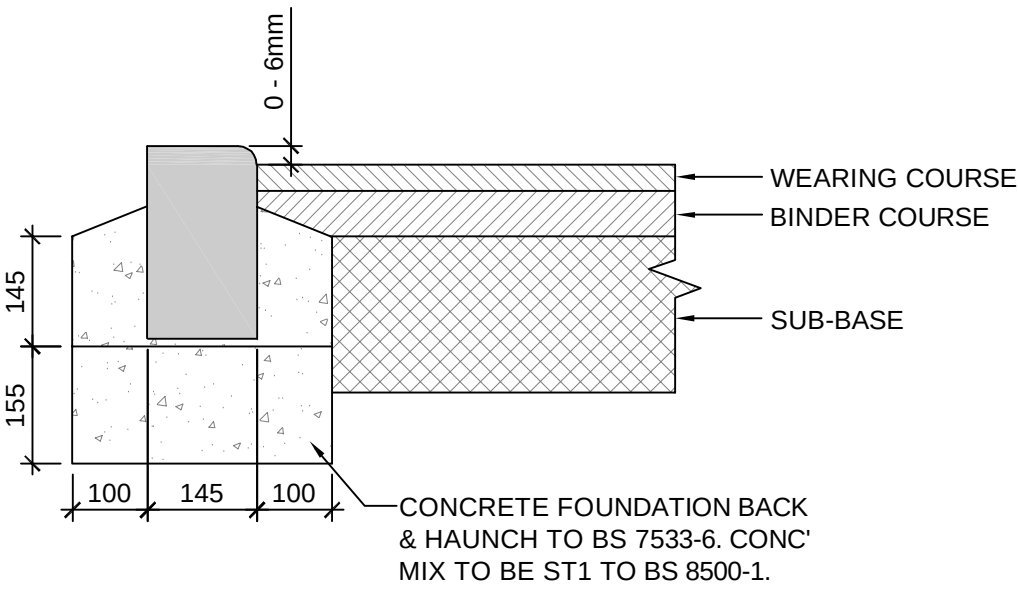
SUB-BASE / CAPPING CBR TABLE



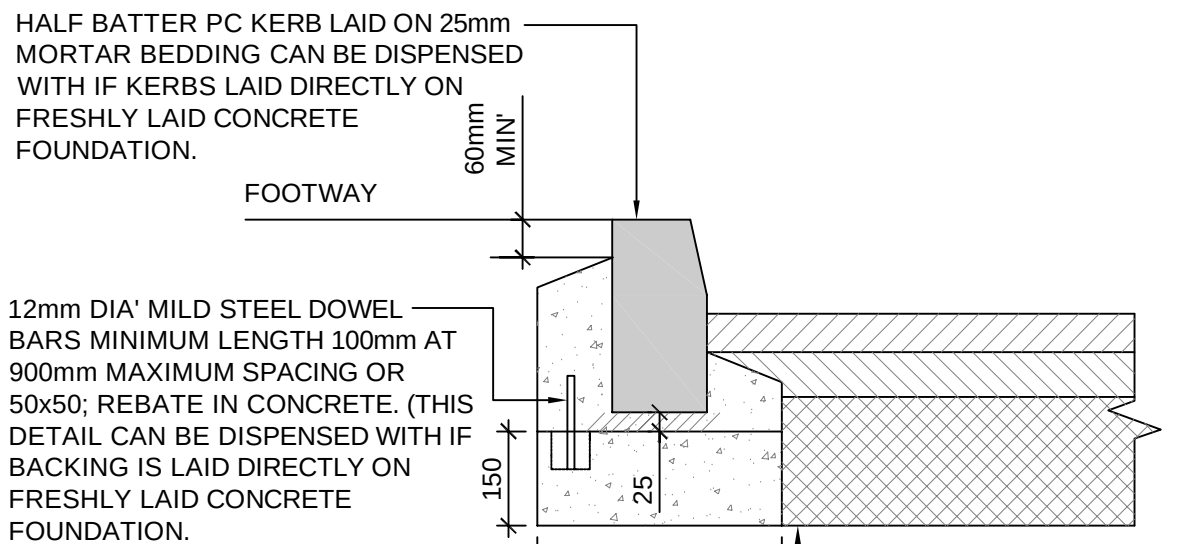
TIE IN TO EXISTING CARRIAGEWAY



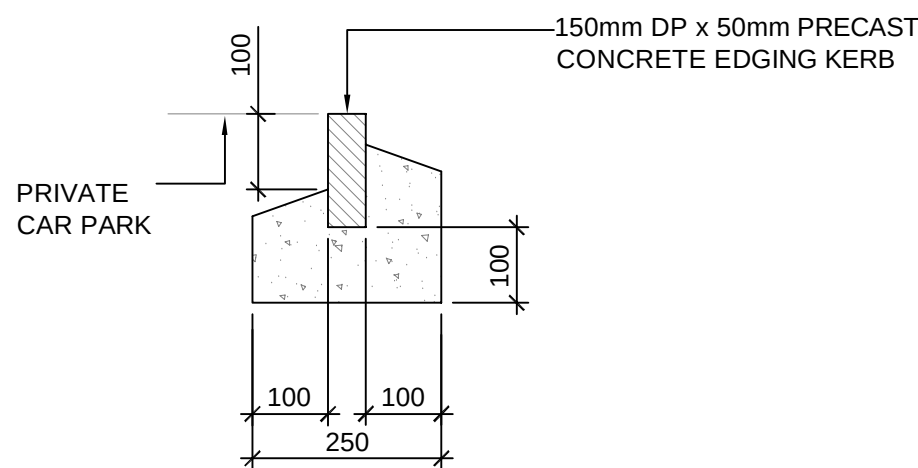
TACTILE PAVING



TYPICAL DROP KERB
[SCALE 1:10]



TYPICAL KERB DETAIL
[SCALE 1:10]



TYPICAL EDGING DROP KERB
[SCALE 1:10]

NOTES:

- CONCRETE BEDDING AND BACKING SHALL BE TYPE ST1 TO BS 8500-1.
- KERBS SHALL COMPLY WITH BS EN 1340.
- CEMENT SHALL BE ORDINARY PORTLAND CEMENT TO BS EN 197-1.
- JOINTS TO KERBS SHALL BE POINTED WITH CLASS (iii) MORTAR.
- CUT LENGTHS OF KERBS ARE TO BE CUT USING A DISC CUTTER MIN. LENGTH 450mm.
- IN THE CASE OF NEW CARRIAGEWAY CONSTRUCTION THE SUB BASE LAYER IS EXTENDED 300mm BEYOND THE BACK OF KERB FOUNDATION THE CONTRACTOR SHALL ALLOW FOR FILLING IN BETWEEN THE ROAD SUB BASE AND THE FOOTWAY FORMATION WITH SUB BASE MATERIAL IN THE RATE FOR KERBING.
- RECONSTRUCTION OF EXISTING CARRIAGEWAY CHANNEL MEASURED SEPARATELY.
- KERBS LAID IN EXISTING CARRIAGEWAY FORMATION-RATE TO INCLUDE INFILL OF OVERBREAK IN FRONT OF KERB WITH CONCRETE TYPE ST.1 TO BINDER COURSE FINISH LEVEL.

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PRELIMINARY

P02	REDRAWN.	31.10.23	KPT	JH
P01	FIRST ISSUE.	19.09.23	RZ	AJL
Rev.	Amendment	Date	By	Chkd

Project
ELLEN WILKINSON QUAD

Client
ARCADIS LLP

Title
TYPICAL EXTERNAL WORKS DETAILS

WML Job No.	Drawn	Checked	Date	Scale
10892	RZ	JH	19.09.2023	N.T.S.

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Drawing No.	Project	Originator	Volume	Level	Type	Role	Number	Rev
10892	WML	XX	XX	DR	C	1001	P02	