

**DESIGN NOTES:**

- REFER TO EUROCOMP DESIGN CODE TABLE 4.13 FOR THE FIBRE REINFORCED PLASTIC/ POLYMER (FRP) CHARACTERISTIC MATERIAL PROPERTIES ASSUMED. THE POSTS ARE TO BE MANUFACTURED USING E-GLASS ROVING AND POLYESTER PULTRUSION.
- A LATERAL SERVICEABILITY DEFLECTION OF L/120mm MAX. IS ADOPTED TO GOVERN THE POST AND SLEEPER SECTIONS DESIGN FOR THIS EXAMPLE CALCULATION.
- DESIGNER TO DETERMINE THE LIMITING DEFLECTION FOR ANY PROJECT SITE-SPECIFIC RETAINING WALL SYSTEM DESIGN.
- SINGLE LAYER WPC SLEEPERS ARE ADOPTED IN THIS DESIGN EXAMPLE.
- BUILDER/CONTRACTOR TO SUBMIT LOAD-DEFLECTION TESTING RESULTS AND DIMENSIONAL CHECKS OF WPC ELEMENTS FOR REVIEW AND CERTIFICATION OF A REGISTERED ENGINEER PRIOR TO CONSTRUCTION.
- ALL PIERS ARE ASSUMED TO MOVE AT LEAST 0.01H DUE TO ACTIVE SOIL PRESSURE BEING MOBILISED.
- ALL CONCRETE PIERS SHALL BE GRADE N32, WITH 100mm STANDARD SLUMP AND 10mm MAX. AGGREGATE.
- SURCHARGE LOADING AND FOUNDATION SOIL PROPERTIES ADOPTED ARE ASSUMPTION ONLY. THIS NEEDS TO BE CONFIRMED BY SOIL LABORATORY TEST AND GEOTECHNICAL INVESTIGATION.
- NO CONSTRUCTION ACTIVITY IS ALLOWED WITHIN THE 1.5m ZONE OF INFLUENCE FROM THE WALL. ALLOWABLE CONSTRUCTION TOLERANCE DURING INSTALLATION IS +/- 5mm.
- MANUFACTURERS TO PROVIDE RELEVANT TESTING CERTIFICATES CARRIED OUT IN AUSTRALIA APPROVED LABORATORY NATA AGENCY AS WELL AS STRUCTURAL CAPACITY CERTIFICATION BY A QUALIFIED REGISTERED ENGINEER.
- DRAINAGE FILTER MUST BE DESIGNED BASED OF PERMEABILITY BY STORMWATER ENGINEER.
- ANY RETAINING WALL DESIGN ABOVE 800mm IN HEIGHT MUST HAVE AN RPEQ DESIGN CERTIFICATION AS PER NATIONAL CONSTRUCTION CODE.
- THIS DESIGN EXAMPLE RETAINING WALL IS FOR CIVIL ONLY AND IT MUST NOT FORM PART OF A BUILDING IN ANY MEANS.

**EXAMPLE DESIGN PARAMETERS ADOPTED**

DESIGN PARAMETER	VALUE	DESCRIPTION	UNIT
SURCHARGE, q	5.0	SURCHARGE (LIVE LOAD)	kPa, kN/m <sup>2</sup>
EFFECTIVE INTERNAL FRICTION ANGLE, $\phi$	25	EFFECTIVE INTERNAL FRICTION ANGLE OF SOIL AS PER AS 4678	DEGREES
REDUCTION FACTOR FOR $\tan(\phi)$	0.85	SOIL REDUCTION FACTOR AS PER AS 4678	UNITLESS
EFFECTIVE COHESION OF RETAINED SOIL, c'	0	CHARACTERISTIC EFFECTIVE COHESION OF SOIL AS PER AS 4678	kPa, kN/m <sup>2</sup>
EFFECTIVE COHESION OF FOUNDATION SOIL, c'	5	CHARACTERISTIC EFFECTIVE COHESION OF SOIL AS PER AS 4678	kPa, kN/m <sup>2</sup>
REDUCTION FACTOR FOR c'	0.7	APPARENT COHESION REDUCTION FACTOR FOR IN-SITU MATERIAL	UNITLESS
RETAINED SOIL UNIT WEIGHT	19	BULK UNIT WEIGHT OF THE FILL BEHIND THE WALL	kN/m <sup>3</sup>
FOUNDATION SOIL UNIT WEIGHT	18	BULK UNIT WEIGHT OF FOUNDATION SOIL	kN/m <sup>3</sup>
LOAD FACTOR FOR SURCHARGE	1.5	ULTIMATE LIMIT STATE	UNITLESS
HEIGHT OF WATER TABLE	N/A	HYDROSTATIC PRESSURE HEAD	m
Hf, FENCE HEIGHT	1.8	FENCE	m
Pw, WIND PRESSURE	0.75	DESIGN SERVICE WIND PRESSURE	kPa, kN/m <sup>2</sup>

NOTE: PARAMETERS ADOPTED IN TABLE ABOVE IS FOR TYPICAL EXAMPLE. CONTRACTOR/BUILDER TO CONFIRM WITH THE DESIGN ENGINEER FOR FURTHER CLARIFICATION ON DIFFERENT SOIL TYPE PARAMETERS.

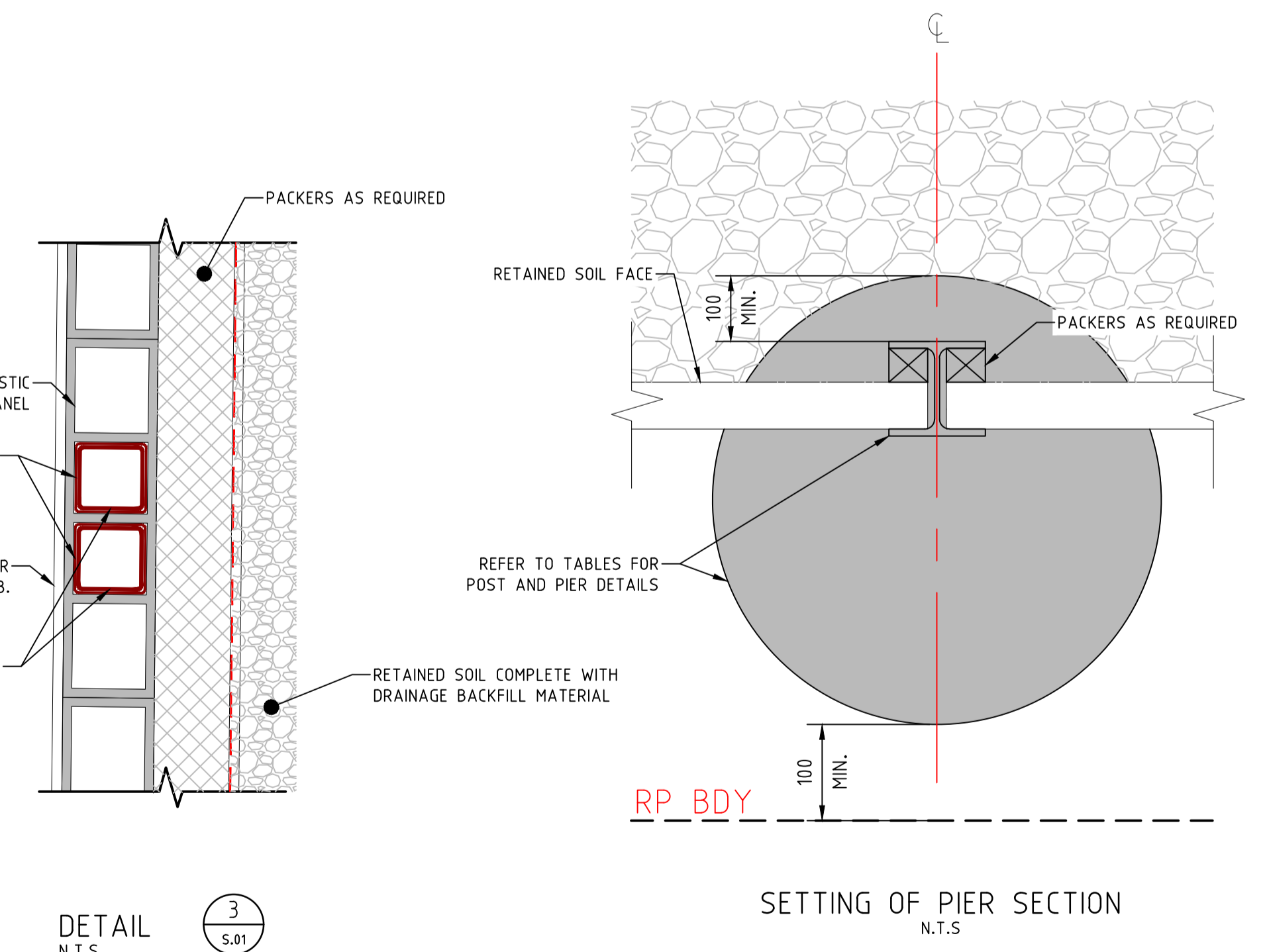
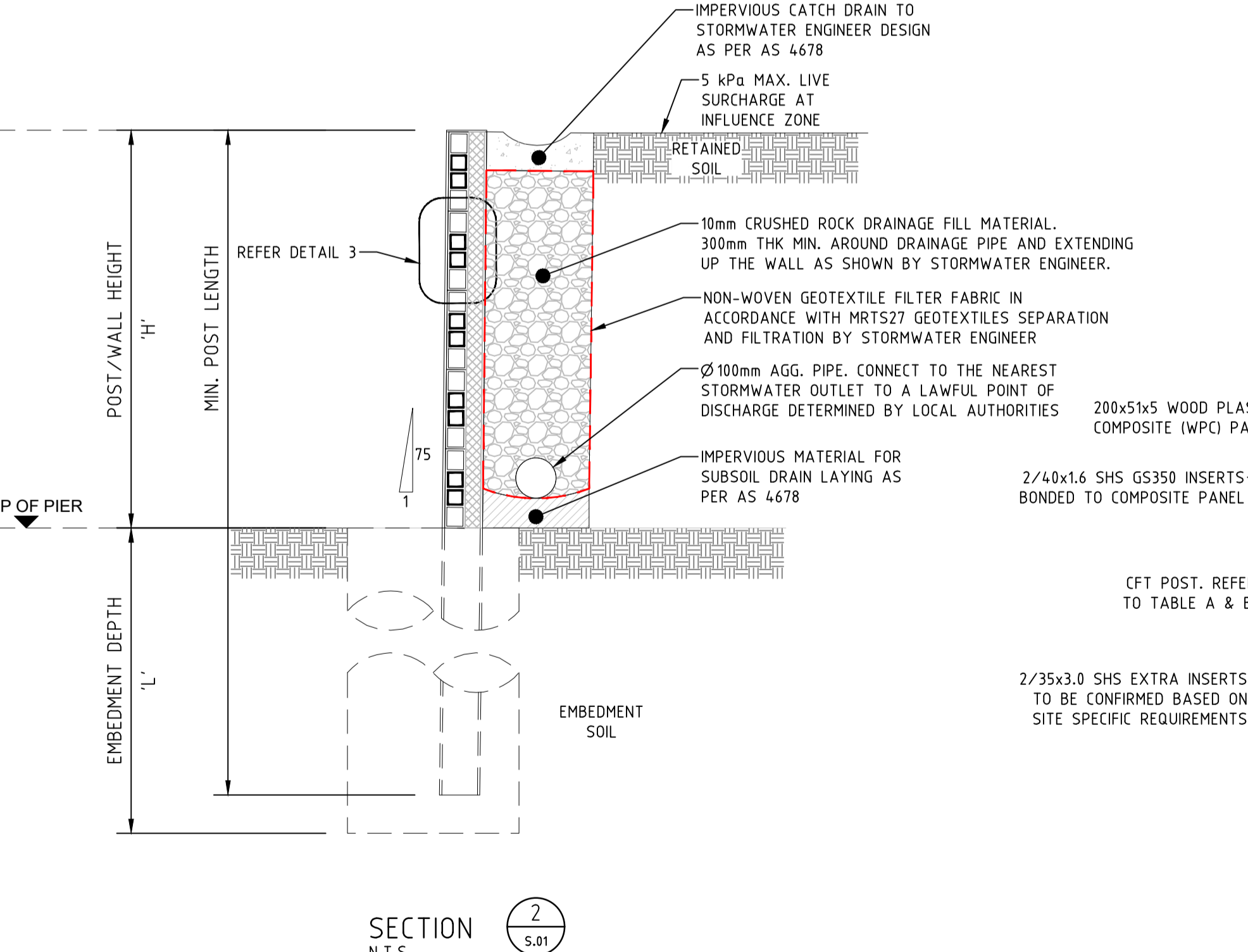
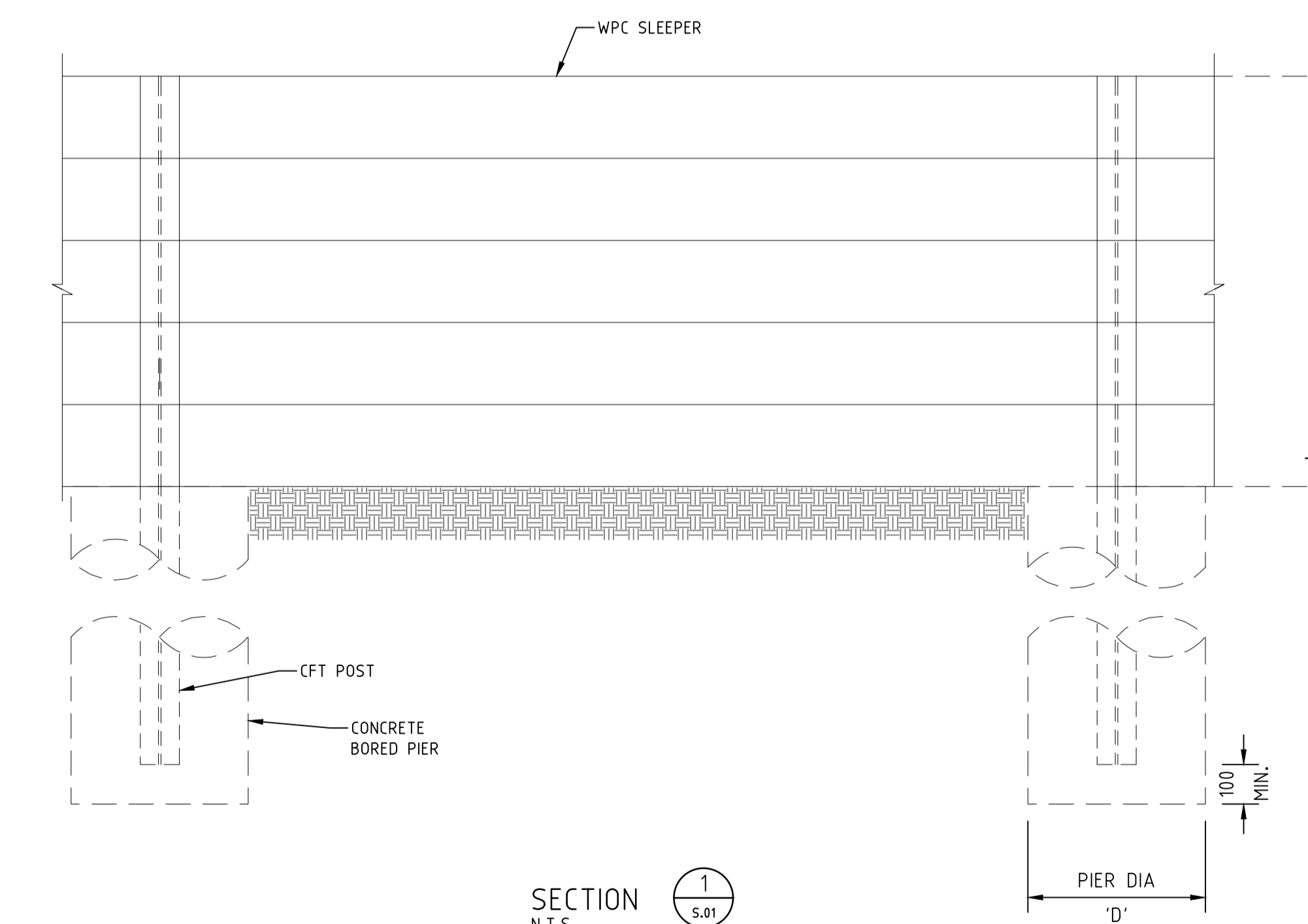
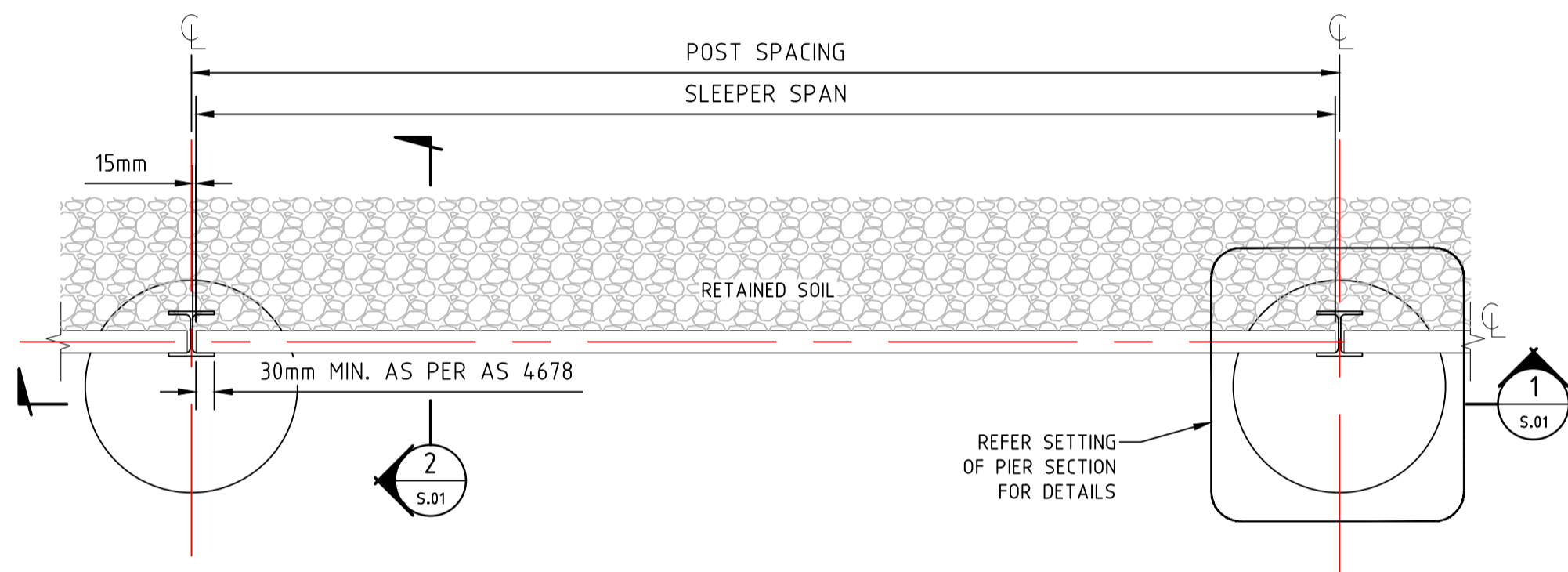
**TABLE A DESIGN SPECIFICATION OF WOOD PLASTIC COMPOSITE + BONDED SHS WITHOUT 1.8m FENCE**

POST/WALL HEIGHT 'H'	SPAN OF SLEEPERS 'S' (MAX.)	FRP POST SIZE	POST SPACING (C/C)	CONCRETE PIER DETAILS	
				DIAMETER 'D'	PIER DEPTH 'L'
0.21m TO 0.40m	2400mm	100CFT	2430mm	450mm	1.20m
0.41m TO 0.60m	2400mm	100CFT	2430mm	450mm	1.20m
0.61m TO 0.8m	2400mm	100CFT	2430mm	450mm	1.50m
0.81m TO 1.00m	2400mm	100CFT	2430mm	450mm	1.90m

**TABLE B DESIGN SPECIFICATION OF WOOD PLASTIC COMPOSITE + BONDED SHS WITH 1.8m FENCE**

POST/WALL HEIGHT 'H'	SPAN OF SLEEPERS 'S' (MAX.)	FRP POST SIZE	POST SPACING (C/C)	CONCRETE PIER DETAILS	
				DIAMETER 'D'	PIER DEPTH 'L'
0.21m TO 0.40m	2400mm	100CFT	2430mm	450mm	1.40m
0.41m TO 0.60m	2400mm	100CFT	2430mm	450mm	1.40m
0.61m TO 0.8m	2400mm	100CFT	2430mm	450mm	1.80m
0.81m TO 1.00m	2400mm	100CFT	2430mm	450mm	2.10m

FOR INFORMATION ONLY  
NOT FOR CONSTRUCTION



**CMT engineers**  
 P: (07) 3849 8388  
 M: PO BOX 79, CAPALABA QLD 4157  
 A: S2 / L2, 96 MOUNT GRAVATT, CAPALABA RD, UPPER MOUNT GRAVATT QLD 4122  
 E: info@cmtengineers.com.au

**CLIENT:**  
**FITTA GREENER BETTER FITTA**  
 FITTA GROUP  
 P: 1300 616 291  
 A: Fitta Head Office, 200 Holt St, Pinkenba  
 E: info@fittagroup.com.au

REV	DATE	DESCRIPTION	DRAWN	AUTH
A	08.12.2022	FOR INFORMATION ONLY	KST	CMT

**PROJECT:**  
WOOD PLASTIC COMPOSITES (WPC) + SHS BONDED RETAINING WALL

**DRAWING TITLE:**  
DESIGN EXAMPLE FOR 2.4M LONG WPC SLEEPERS & 100MM CFT POST

**PROJECT NUMBER/SHEET:** C21-178 S.01 **REVISION:** A

THIS DRAWING IS CONFIDENTIAL AND IS NOT TO BE REPRODUCED IN ANY FORM AS A WHOLE OR IN PART WITHOUT EXPRESS WRITTEN PERMISSION FROM CMT ENGINEERS. THE EXISTING SERVICES INFORMATION SHOWN HAS NOT BEEN CONFIRMED ON SITE AND IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ANY SERVICES RELEVANT PRIOR TO THE START OF CONSTRUCTION. IF IN DOUBT - ASK.

**DESIGN NOTES:**

- REFER TO EUROCOMP DESIGN CODE TABLE 4.13 FOR THE FIBRE REINFORCED PLASTIC/ POLYMER (FRP) CHARACTERISTIC MATERIAL PROPERTIES ASSUMED. THE POSTS ARE TO BE MANUFACTURED USING E-GLASS ROVING AND POLYESTER PULTRUSION.
- A LATERAL SERVICEABILITY DEFLECTION OF L/120mm MAX. IS ADOPTED TO GOVERN THE POST AND SLEEPER SECTIONS DESIGN FOR THIS EXAMPLE CALCULATION.
- DESIGNER TO DETERMINE THE LIMITING DEFLECTION FOR ANY PROJECT SITE-SPECIFIC RETAINING WALL SYSTEM DESIGN.
- SINGLE LAYER WPC SLEEPERS ARE ADOPTED IN THIS DESIGN EXAMPLE.
- BUILDER/CONTRACTOR TO SUBMIT LOAD-DEFLECTION TESTING RESULTS AND DIMENSIONAL CHECKS OF WPC ELEMENTS FOR REVIEW AND CERTIFICATION OF A REGISTERED ENGINEER PRIOR TO CONSTRUCTION.
- ALL PIERS ARE ASSUMED TO MOVE AT LEAST 0.01H DUE TO ACTIVE SOIL PRESSURE BEING MOBILISED.
- ALL CONCRETE PIERS SHALL BE GRADE N32, WITH 100mm STANDARD SLUMP AND 10mm MAX. AGGREGATE.
- SURCHARGE LOADING AND FOUNDATION SOIL PROPERTIES ADOPTED ARE ASSUMPTION ONLY. THIS NEEDS TO BE CONFIRMED BY SOIL LABORATORY TEST AND GEOTECHNICAL INVESTIGATION.
- NO CONSTRUCTION ACTIVITY IS ALLOWED WITHIN THE 1.5m ZONE OF INFLUENCE FROM THE WALL. ALLOWABLE CONSTRUCTION TOLERANCE DURING INSTALLATION IS +/- 5mm.
- MANUFACTURERS TO PROVIDE RELEVANT TESTING CERTIFICATES CARRIED OUT IN AUSTRALIA APPROVED LABORATORY NATA AGENCY AS WELL AS STRUCTURAL CAPACITY CERTIFICATION BY A QUALIFIED REGISTERED ENGINEER.
- DRAINAGE FILTER MUST BE DESIGNED BASED OF PERMEABILITY BY STORMWATER ENGINEER.
- ANY RETAINING WALL DESIGN ABOVE 800mm IN HEIGHT MUST HAVE AN RPEQ DESIGN CERTIFICATION AS PER NATIONAL CONSTRUCTION CODE.
- THIS DESIGN EXAMPLE RETAINING WALL IS FOR CIVIL ONLY AND IT MUST NOT FORM PART OF A BUILDING IN ANY MEANS.

**EXAMPLE DESIGN PARAMETERS ADOPTED**

DESIGN PARAMETER	VALUE	DESCRIPTION	UNIT
SURCHARGE, q	5.0	SURCHARGE (LIVE LOAD)	kPa, kN/m <sup>2</sup>
EFFECTIVE INTERNAL FRICTION ANGLE, $\phi$	25	EFFECTIVE INTERNAL FRICTION ANGLE OF SOIL AS PER AS 4678	DEGREES
REDUCTION FACTOR FOR $\tan(\phi)$	0.85	SOIL REDUCTION FACTOR AS PER AS 4678	UNITLESS
EFFECTIVE COHESION OF RETAINED SOIL, c'	0	CHARACTERISTIC EFFECTIVE COHESION OF SOIL AS PER AS 4678	kPa, kN/m <sup>2</sup>
EFFECTIVE COHESION OF FOUNDATION SOIL, c'	5	CHARACTERISTIC EFFECTIVE COHESION OF SOIL AS PER AS 4678	kPa, kN/m <sup>2</sup>
REDUCTION FACTOR FOR c'	0.7	APPARENT COHESION REDUCTION FACTOR FOR IN-SITU MATERIAL	UNITLESS
RETAINED SOIL UNIT WEIGHT	19	BULK UNIT WEIGHT OF THE FILL BEHIND THE WALL	kN/m <sup>3</sup>
FOUNDATION SOIL UNIT WEIGHT	18	BULK UNIT WEIGHT OF FOUNDATION SOIL	kN/m <sup>3</sup>
LOAD FACTOR FOR SURCHARGE	1.5	ULTIMATE LIMIT STATE	UNITLESS
HEIGHT OF WATER TABLE	N/A	HYDROSTATIC PRESSURE HEAD	m
Hf, FENCE HEIGHT	1.8	FENCE	m
Pw, WIND PRESSURE	0.75	DESIGN SERVICE WIND PRESSURE	kPa, kN/m <sup>2</sup>

NOTE: PARAMETERS ADOPTED IN TABLE ABOVE IS FOR TYPICAL EXAMPLE. CONTRACTOR/BUILDER TO CONFIRM WITH THE DESIGN ENGINEER FOR FURTHER CLARIFICATION ON DIFFERENT SOIL TYPE PARAMETERS.

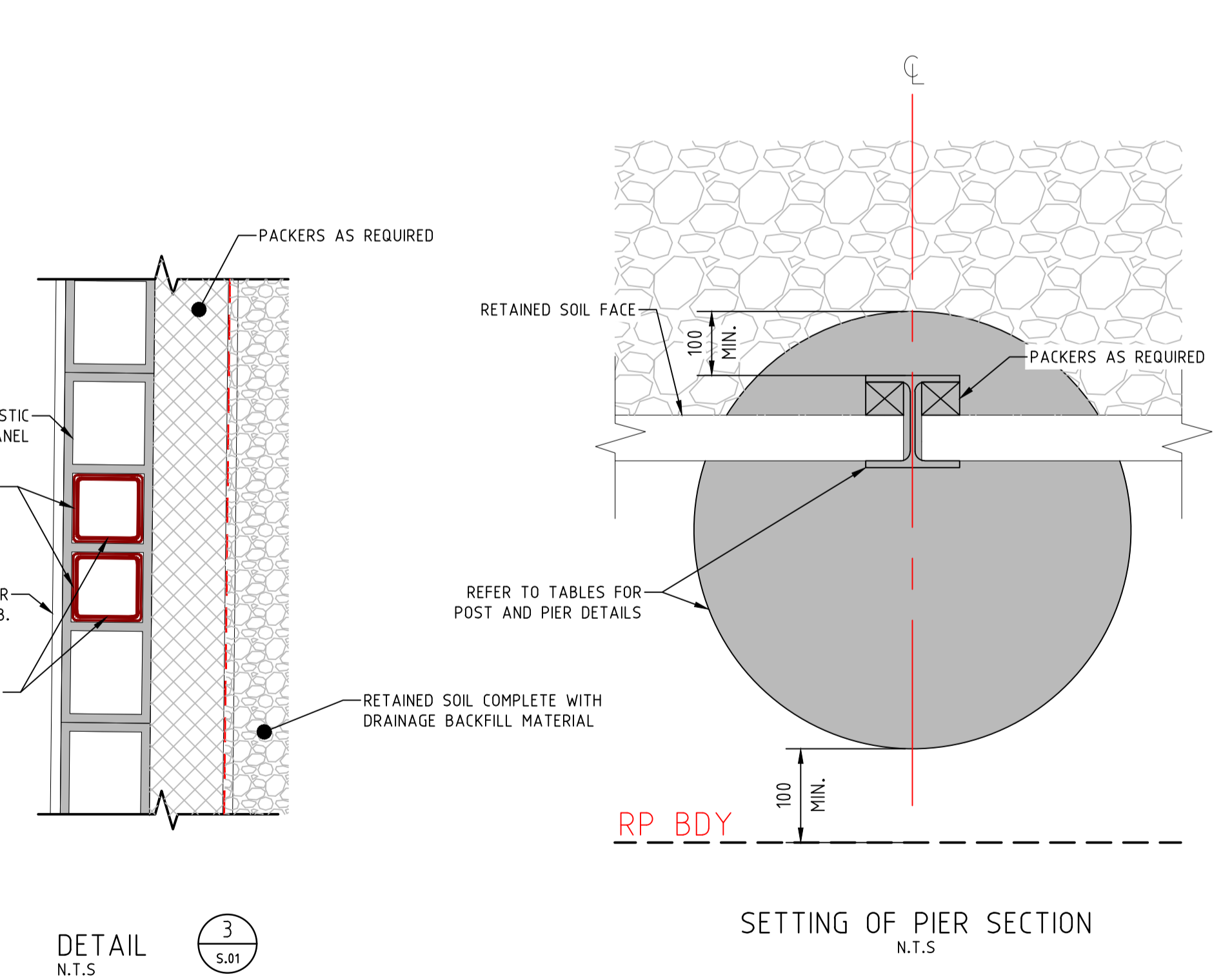
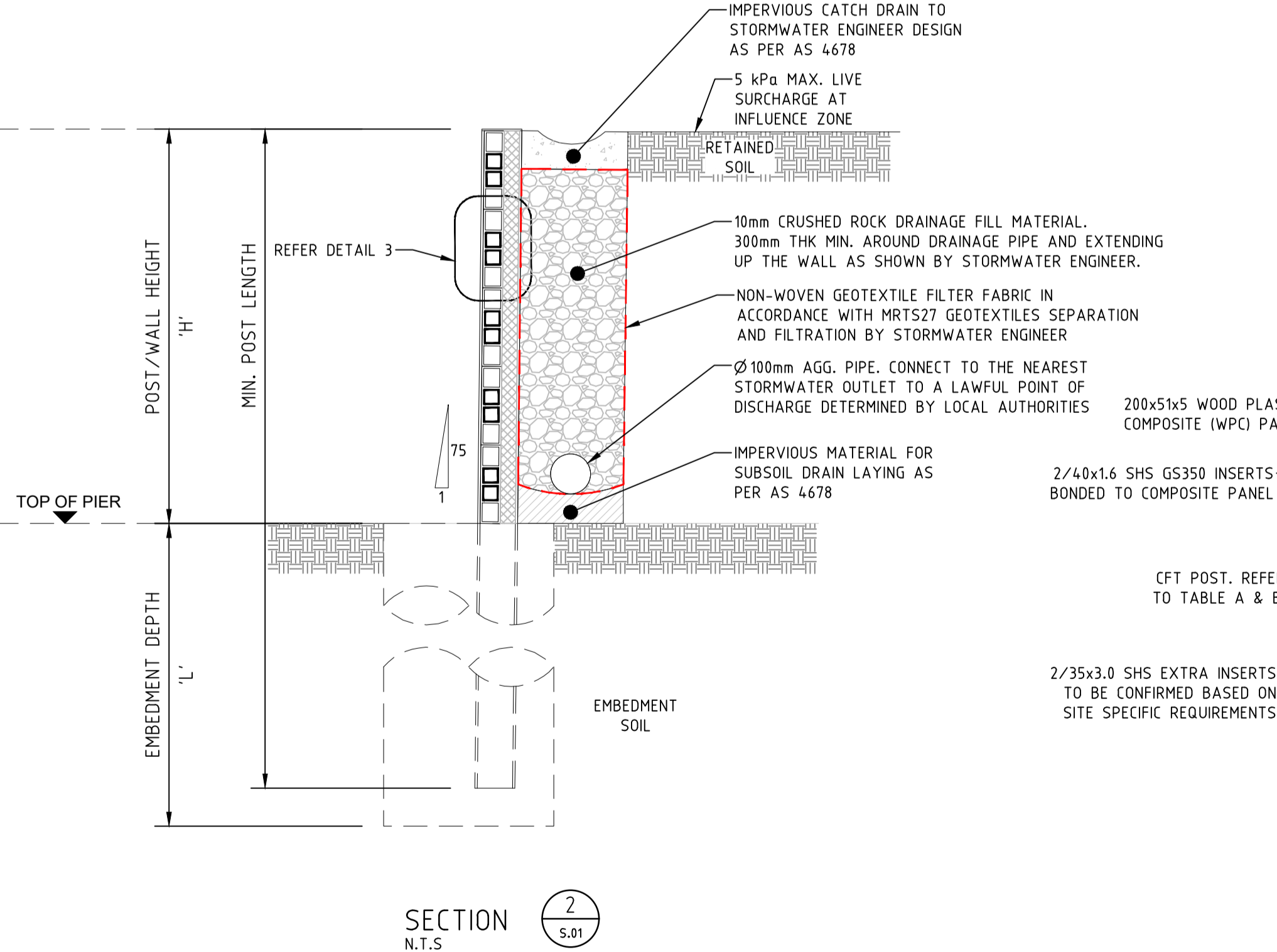
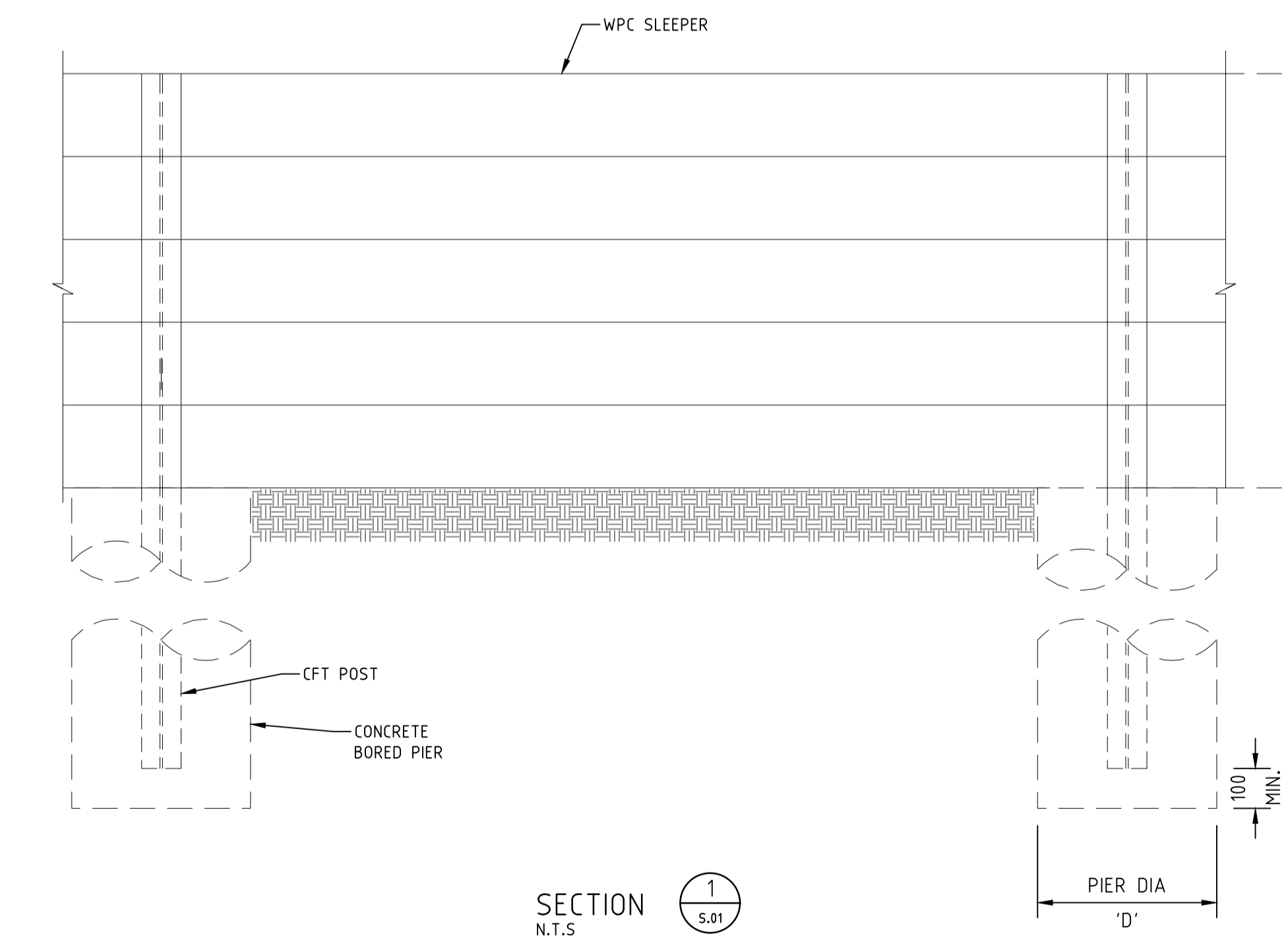
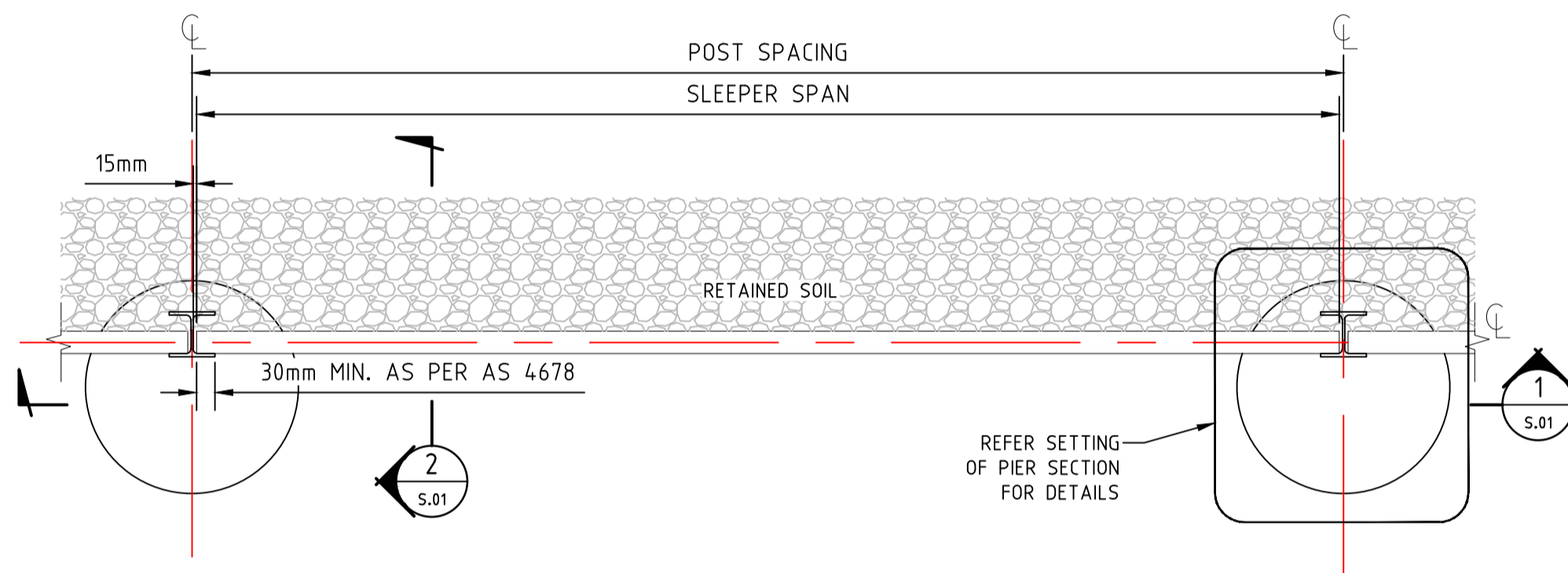
**TABLE A DESIGN SPECIFICATION OF WOOD PLASTIC COMPOSITE + BONDED SHS WITHOUT 1.8m FENCE**

POST/WALL HEIGHT 'H'	SPAN OF SLEEPERS 'S' (MAX.)	FRP POST SIZE	POST SPACING (C/C)	CONCRETE PIER DETAILS	
				DIAMETER 'D'	PIER DEPTH 'L'
0.21m TO 0.40m	2400mm	125CFT	2430mm	450mm	1.20m
0.41m TO 0.60m	2400mm	125CFT	2430mm	450mm	1.20m
0.61m TO 0.8m	2400mm	125CFT	2430mm	450mm	1.50m
0.81m TO 1.00m	2400mm	125CFT	2430mm	450mm	1.90m

**TABLE B DESIGN SPECIFICATION OF WOOD PLASTIC COMPOSITE + BONDED SHS WITH 1.8m FENCE**

POST/WALL HEIGHT 'H'	SPAN OF SLEEPERS 'S' (MAX.)	FRP POST SIZE	POST SPACING (C/C)	CONCRETE PIER DETAILS	
				DIAMETER 'D'	PIER DEPTH 'L'
0.21m TO 0.40m	2400mm	125CFT	2430mm	450mm	1.40m
0.41m TO 0.60m	2400mm	125CFT	2430mm	450mm	1.40m
0.61m TO 0.8m	2400mm	125CFT	2430mm	450mm	1.80m
0.81m TO 1.00m	2400mm	125CFT	2430mm	450mm	2.10m

FOR INFORMATION ONLY  
NOT FOR CONSTRUCTION



**CMT engineers**  
 P: (07) 3849 8388  
 M: PO BOX 79, CAPALABA QLD 4157  
 A: S2 / L2, 96 MOUNT GRAVATT CAPALABA RD, UPPER MOUNT GRAVATT QLD 4122  
 E: info@cmtengineers.com.au

**CLIENT:**  
**FITTA GREENER BETTER FITTA**  
 FITTA GROUP  
 P: 1300 616 291  
 A: Fitta Head Office, 200 Holt St, Pinkenba  
 E: info@fittagroup.com.au

REV	DATE	DESCRIPTION	DRAWN	AUTH
A	08.12.2022	FOR INFORMATION ONLY	KST	CMT

**PROJECT:**  
WOOD PLASTIC COMPOSITES (WPC) + SHS BONDED RETAINING WALL

**DRAWING TITLE:**  
DESIGN EXAMPLE FOR 2.4M LONG WPC SLEEPERS & 125MM CFT POST

**PROJECT NUMBER/SHEET:** C21-178 S.02 **REVISION:** A

THIS DRAWING IS CONFIDENTIAL AND IS NOT TO BE REPRODUCED IN ANY FORM AS A WHOLE OR IN PART WITHOUT EXPRESS WRITTEN PERMISSION FROM CMT ENGINEERS. THE EXISTING SERVICES INFORMATION SHOWN HAS NOT BEEN CONFIRMED ON SITE AND IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ANY SERVICES RELEVANT PRIOR TO THE START OF CONSTRUCTION. IF IN DOUBT - ASK.