

Structural Design Calculations

Project:

BRUNSWICK MILL

EXTRACT FROM MAIN STRUCTURAL DESIGN

Carpark Wall—Temporary Support

Client:

ARROWSMITH GROUP

Date.	19/08/2024
Revision	P01
Status.	PRELIMINARY
Project Ref	23178-HW-24-RP-S-9002

	<u>Contract/Job:</u> BRUNSWICK MILL		<u>Job No:</u> 23178	
	<u>Part of Works</u> BRIEF		<u>Calc Sh. No:</u> 1.2 1	<u>Rev:</u> -
	<u>Drawing No:</u> 23178-HW-23-XX-RP-S-1025	<u>Calculation By/Date:</u> JH / Feb 2023	<u>Checked by/Date:</u> CW / Aug/24	
Ref	Calculations			
INTRODUCTION The following document is an exact from the main calcalution document and provides structural information on the temporary design of a portion of masonry wall that is to remain following demolition works.				
DESIGN SUMMARY				
SUPERSTRUCTURE The existng external masonry wall is situated adjacent the Canal towpath and supports the roof timbers of a single storey building. To comply with Hertitage requirements it is proposed to remove all the surrounding building structure but leave the external masonry wall 'free standing' To ensure that the wall remains stable, a steel support frame is to be installed. The steel frame will be designed to cantilever from it's support base to resist the lateral wind forces applied to the wall.				
FOUNDATIONS A concrete base foundation has been adopted. The foundations have been designed assuming a ground bearing pressure of 100kN/m ²				
REGULATIONS & DESIGN GUIDANCE • BS 6399-1:1996 • BS 6399-2:1997 • BS 5950-1:2000 -				

<div></div>		<u>Contract/ Job:</u>		<u>Job No:</u>	
		BRUNSWICK MILL		23178	
		<u>Part of Works</u>		<u>Calc Sh. No:</u>	<u>Rev:</u>
		PROJECT DESIGN LOAD SUMMARY		1.2. 2	P01
<u>Drawing No:</u>		<u>Calculation By/Date:</u>		<u>Checked by/Date:</u>	
S/1025		JH		CW /Aug/24	
Ref	Calculations				
	UNFACTORED LOADINGS	DEAD		LIVE	
	EXTERNAL WALLS				
	1 No. 350mm Thick Stone Block Wall	4.50	kN/m ²		
	1No. Skins of Plaster	0.15	kN/m ²		
		4.65	kN/m ²		
	INTERNAL BLOCK WALL - (SINGLE SKIN)				
	215mm Block	3.70	kN/m ²		
	2No. Skins of Plaster	0.10	kN/m ²		
		3.80	kN/m ²		
	INTERNAL PARTITION WALL				
	100mm Stud	0.40	kN/m ²		
	1No. Skins of Plaster	0.20	kN/m ²		
		0.60	kN/m ²		
	GROUND FLOOR				
	150mm Thick Ground Bearing Slab	3.60	kN/m ²		
	70mm Screed	1.25	kN/m ²		
	Finishes	0.10	kN/m ²		
		4.95	kN/m ²		
	UPPER FLOORS				
	Finishes	0.05	kN/m ²		
	Boarding	0.10	kN/m ²		
	0.15m Topping	2.70	kN/m ³		
	Acoustic Overlay	0.10	kN/m ²		
	0.275m (average masonry thickness)	5.50	kN/m ²		
	Fire board	0.10	kN/m ²		
	Ceiling & Services	0.10	kN/m ²		
		8.65	kN/m ²		
	REPLACEMENT TIMBER FLOOR				
	Finishes	0.05	kN/m ²		
	Boarding	0.25	kN/m ²		
	Timber Joists	0.30	kN/m ³		
	Ceiling & Services	0.10	kN/m ²		
		0.70	kN/m ²		
	IMPOSED				
	Domestic			1.50	kN/m ²
	Roof			0.75	kN/m ²

GENERAL NOTES

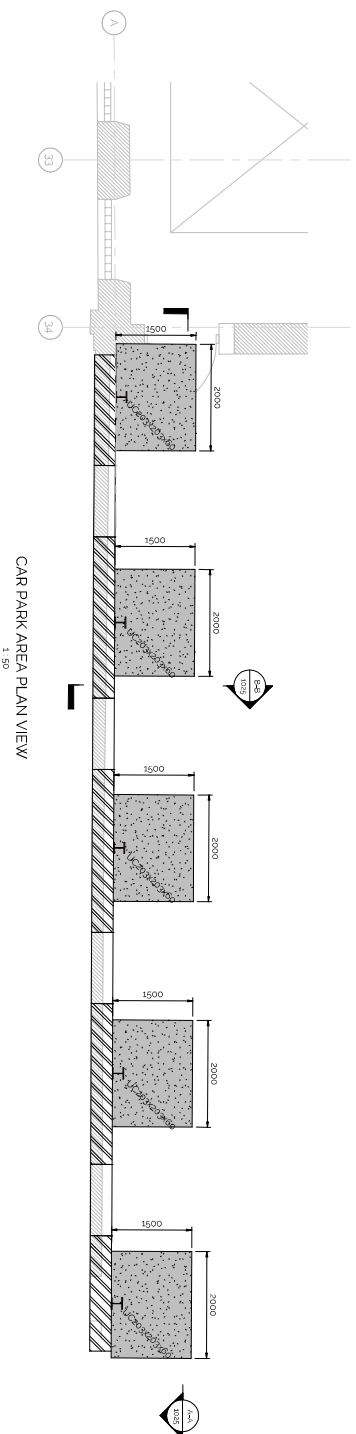
1. NO DIMENSIONS TO BE SCALED OFF THE DRAWING.
2. THE DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, SPECIFICATIONS AND ENGINEERS DRAWINGS.
3. ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS NOTED OTHERWISE.
4. ALL LEVELS, ARE IN METRES, UNLESS NOTED OTHERWISE.
5. ANY OCCUPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

FOUNDATION NOTES

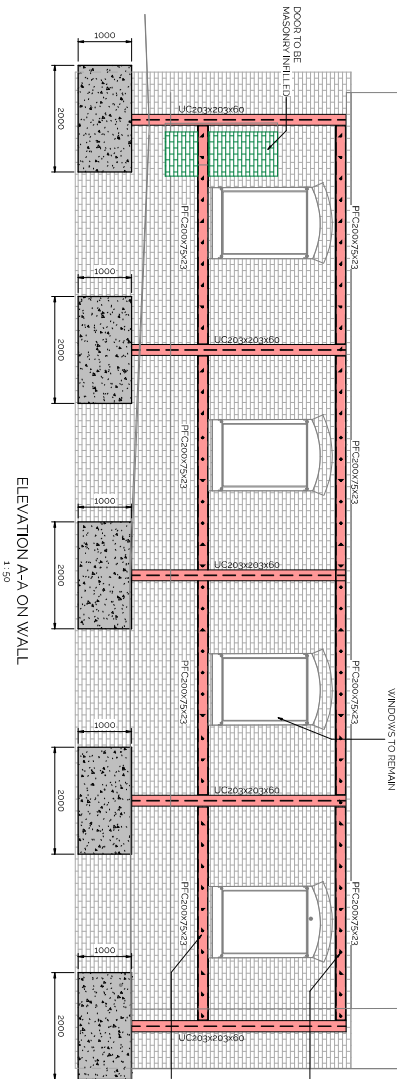
1. THE USE OF PILE DRIVEN FOR FOUNDATION WORKS SHALL BE IN ACCORDANCE WITH THE BRITISH STANDARD CODE OF PRACTICE FOR FOUNDATIONS.
2. THE REPORT SHALL IDENTIFY THE VARIETY OF ANY MATERIALS, THE REQUIRED GROUND CONDITIONS OF INTEREST, SPECIFIC RECOMMENDATIONS FOR FOUNDATION DEPTH.
3. ALL OBSERVATIONS ON FOUNDATIONS, WHERE SPACES ARE SHOWN BE REMOVED FOR THE ENTRY OF THE FOUNDATION WORKS AND BOUGHT TO THE APPROVAL OF THE ENGINEER.
4. EXCAVATION FOR SUPPORT AND PROPOSED OF GROUND WATER SHALL BE CONSIDERED UNDER THE BASIS OF THE GROUND.
5. FOUNDATIONS DESIGNED ON THE BASIS THAT GROUND BEARING CAPACITY TO BE.

STEELWORK NOTES

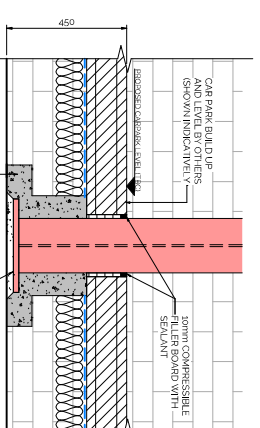
1. THE ABSENCE OF A PROTECTIVE STEELWORK PROTECTION IN THE CASE OF A FALL FROM HEIGHT SHALL BE PROHIBITED. THE PROTECTIVE STEELWORK SHALL BE CONSTRUCTED IN SUCH A MANNER THAT IT PREVENTS THE FALL OF PERSONS FROM THE WORKING LEVELS OF THE STEELWORK PROTECTION PROVIDED BY A PLATE OR STRUTTING.
2. STRUCTURAL STEELWORK TO BE PROTECTED BY A PLATE OR STRUTTING SHALL BE PROTECTED BY A PLATE OR STRUTTING WITH A MINIMUM PROTECTION HEIGHT OF 1.10 M.
3. CONNECTIONS BETWEEN PLATE AND STRUTTING ELEMENTS TO BE PROTECTED SHALL BE STABILIZED BY THE STEELWORK CONNECTIONS.
4. THE STEELWORK CONNECTIONS SHALL BE PROTECTED BY A PLATE OR STRUTTING WITH A MINIMUM PROTECTION HEIGHT OF 1.10 M.
5. ALL STEELWORK CONNECTIONS TO BE PROTECTED BY A PLATE OR STRUTTING SHALL BE PROTECTED BY A PLATE OR STRUTTING WITH A MINIMUM PROTECTION HEIGHT OF 1.10 M.
6. PROTECTIVE STEELWORK SHALL BE PROTECTED BY A PLATE OR STRUTTING WITH A MINIMUM PROTECTION HEIGHT OF 1.10 M.
7. ALL STEELWORK BELOW PROTECTION LEVEL TO BE PROTECTED WITH A PLATE OR STRUTTING WITH A MINIMUM PROTECTION HEIGHT OF 1.10 M.
8. CONNECTIONS BETWEEN PLATE AND STRUTTING ELEMENTS TO BE PROTECTED SHALL BE STABILIZED BY THE STEELWORK CONNECTIONS.
9. THE STEELWORK CONNECTIONS SHALL BE PROTECTED BY A PLATE OR STRUTTING WITH A MINIMUM PROTECTION HEIGHT OF 1.10 M.
10. ALL STEELWORK CONNECTIONS TO BE PROTECTED BY A PLATE OR STRUTTING SHALL BE PROTECTED BY A PLATE OR STRUTTING WITH A MINIMUM PROTECTION HEIGHT OF 1.10 M.
11. ALL STEELWORK CONNECTIONS TO BE PROTECTED BY A PLATE OR STRUTTING SHALL BE PROTECTED BY A PLATE OR STRUTTING WITH A MINIMUM PROTECTION HEIGHT OF 1.10 M.
12. ALL STEELWORK CONNECTIONS TO BE PROTECTED BY A PLATE OR STRUTTING SHALL BE PROTECTED BY A PLATE OR STRUTTING WITH A MINIMUM PROTECTION HEIGHT OF 1.10 M.
13. CONNECTIONS BETWEEN PLATE AND STRUTTING ELEMENTS TO BE PROTECTED SHALL BE STABILIZED BY THE STEELWORK CONNECTIONS.
14. THE STEELWORK CONNECTIONS SHALL BE PROTECTED BY A PLATE OR STRUTTING WITH A MINIMUM PROTECTION HEIGHT OF 1.10 M.



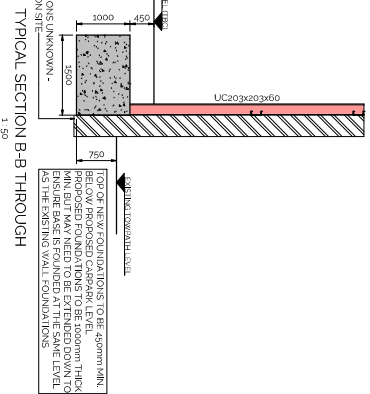
CAR PARK AREA PLAN VIEW



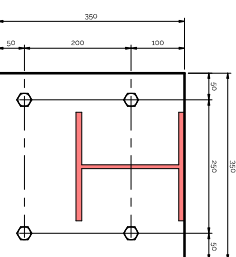
ELEVATION A-A ON WALL



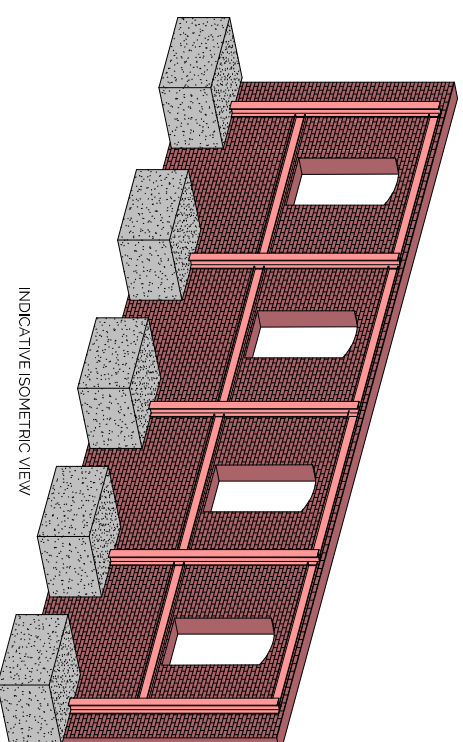
COLUMN ENCASEMENT DETAIL



TYPICAL SECTION B-B THROUGH



BASEPLATE DETAIL



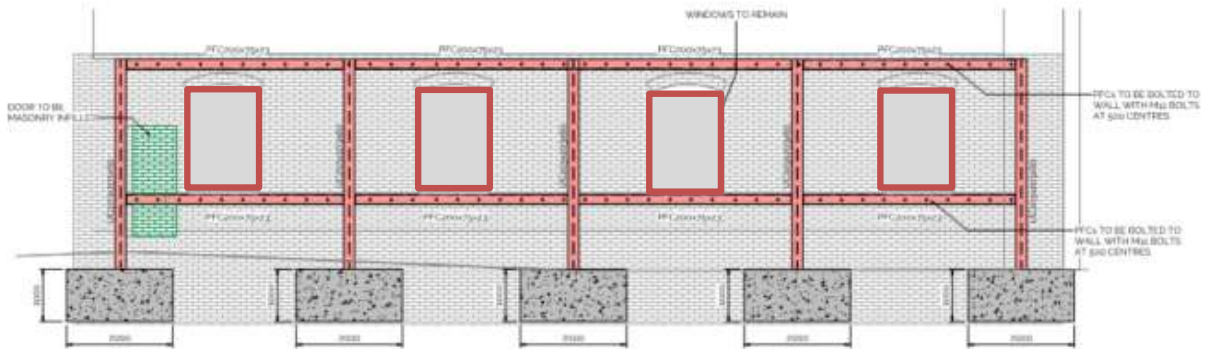
INDICATIVE ISOMETRIC VIEW

BRUNSWICK MILL - MANCHESTER																							
Drawing Title																							
CAR PARK WALL RETAINING DETAILS																							
Engineer																							
																							
																							
Client																							
COORDINATION																							
<table border="1"> <thead> <tr> <th>Scale</th> <th>Drawn</th> <th>Checked</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>As indicated</td> <td>RH</td> <td>CW</td> <td>02.05.24</td> </tr> <tr> <td>Drawings Number</td> <td colspan="3">Rev.</td> </tr> <tr> <td>23178-HW-23-00-DR-S-1025</td> <td colspan="3">P05</td> </tr> <tr> <td colspan="4">BIM Drawing Reference</td> </tr> </tbody> </table>				Scale	Drawn	Checked	Date	As indicated	RH	CW	02.05.24	Drawings Number	Rev.			23178-HW-23-00-DR-S-1025	P05			BIM Drawing Reference			
Scale	Drawn	Checked	Date																				
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Contract/ Job: BRUNSWICK MILL		Job No: 23178	
Part of Works FOUNDATION DESIGN		Calc Sh. No: 1.2. 4	Rev: P01
Drawing No:	Calculation By/Date: DH	Checked by/Date: CW	

Ref Calculations

FOUNDATION LOAD TAKE-DOWN



Length of wall Panel = 6.00 m
Wall thickness = 0.30 m
Internal Wall Height = 3.70 m

LATERAL LOAD ACTING ON WALL 1

Wind load to be supported
6.00 m x 0.78 kN/m² wk = 4.68 kN/m

Total load /m gk = 4.68 kN/m

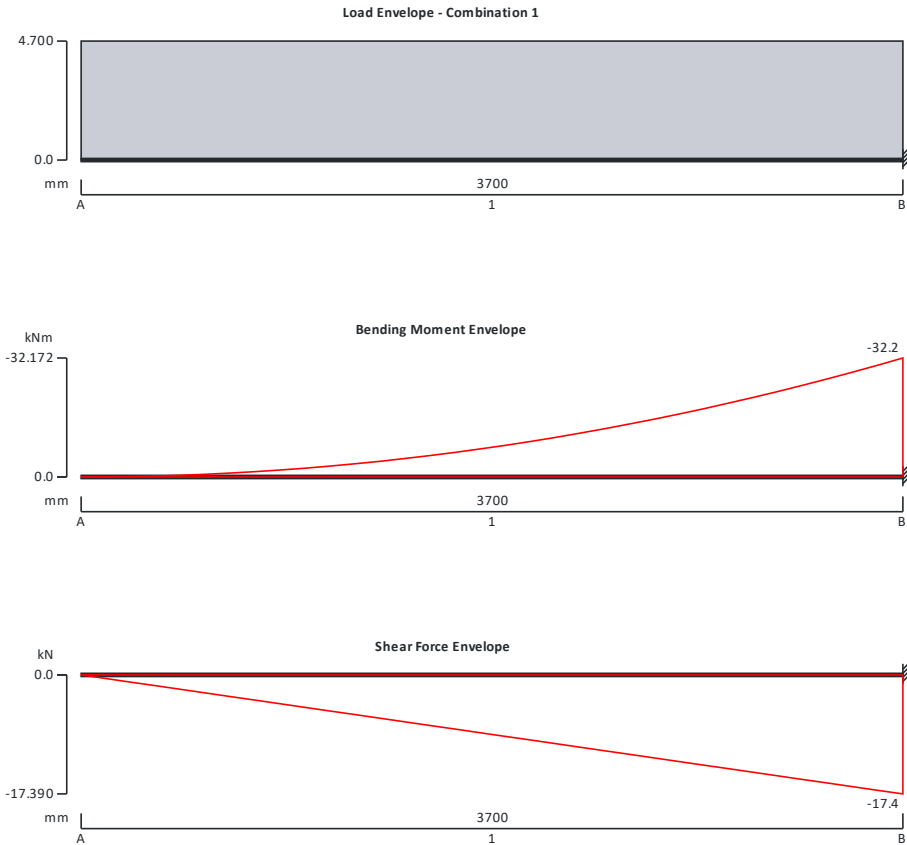
From Tedds Analysis use:
203x203x52UC Columns

	Project			Job no.	
	Brunswick - Carpark Wall Support Column			23178	
	Calcs for			Start page no./Revision	
	Column			1.2 5	
	Calcs by	Calcs date	Checked by	Checked date	
	JH	19/08/2024	CW		

STEEL BEAM ANALYSIS & DESIGN (BS5950)

In accordance with BS5950-1:2000 incorporating Corrigendum No.1

TEDDS calculation version 3.0.08



Support conditions

Support A	Vertically free Rotationally free
Support B	Vertically restrained Rotationally restrained

Applied loading

Beam loads	Wind full UDL 4.7 kN/m
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Load combinations

Load combination 1	Support A	Dead × 1.40
		Imposed × 1.60
		Wind × 1.00
		Dead × 1.40
		Imposed × 1.60
		Wind × 1.00
	Support B	Dead × 1.40
		Imposed × 1.60
		Wind × 1.00
		Dead × 1.40

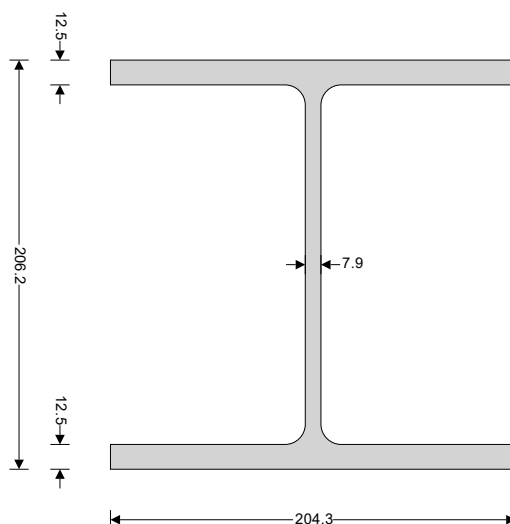
	Project Brunswick - Carpark Wall Support Column			Job no. 23178	
	Calcs for Column			Start page no./Revision 1.2 6	
	Calcs by JH	Calcs date 19/08/2024	Checked by CW	Checked date	

Analysis results

Maximum moment	$M_{\max} = 0 \text{ kNm}$	$M_{\min} = -32.2 \text{ kNm}$
Maximum shear	$V_{\max} = 0 \text{ kN}$	$V_{\min} = -17.4 \text{ kN}$
Deflection	$\delta_{\max} = 10.2 \text{ mm}$	$\delta_{\min} = 0 \text{ mm}$
Maximum reaction at support A	$R_{A_{\max}} = 0 \text{ kN}$	$R_{A_{\min}} = 0 \text{ kN}$
Maximum reaction at support B	$R_{B_{\max}} = 17.4 \text{ kN}$	$R_{B_{\min}} = 17.4 \text{ kN}$
Unfactored wind load reaction at support B	$R_{B_{\text{Wind}}} = 17.4 \text{ kN}$	

Section details

Section type	UC 203x203x52 (BS4-1)
Steel grade	S355
From table 9: Design strength p_y	
Thickness of element	$\max(T, t) = 12.5 \text{ mm}$
Design strength	$p_y = 355 \text{ N/mm}^2$
Modulus of elasticity	$E = 205000 \text{ N/mm}^2$



Lateral restraint

Span 1 has lateral restraint at supports only
Cantilever tip is free
Cantilever support is continuous with lateral and torsional restraint

Effective length factors

Effective length factor in major axis	$K_x = 1.00$
Effective length factor in minor axis	$K_y = 1.00$
Effective length factor for lateral-torsional buckling	$K_{LTA} = 5.00$
	$K_{LTB} = 1.00$

Classification of cross sections - Section 3.5

$$\varepsilon = \sqrt{[275 \text{ N/mm}^2 / p_y]} = 0.88$$

Internal compression parts - Table 11

Depth of section	$d = 160.8 \text{ mm}$	
	$d / t = 23.1 \times \varepsilon \leq 80 \times \varepsilon$	Class 1 plastic

Outstand flanges - Table 11

Width of section	$b = B / 2 = 102.2 \text{ mm}$
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	Project Brunswick - Carpark Wall Support Column			Job no. 23178	
	Calcs for Column			Start page no./Revision 1.2 7	
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$$b / T = 9.3 \times \varepsilon \leq 10 \times \varepsilon$$

Class 2 compact

Section is class 2 compact

Shear capacity - Section 4.2.3

Design shear force

$$F_v = \max(\text{abs}(V_{\max}), \text{abs}(V_{\min})) = 17.4 \text{ kN}$$

$$d / t < 70 \times \varepsilon$$

Web does not need to be checked for shear buckling

Shear area

$$A_v = t \times D = 1629 \text{ mm}^2$$

Design shear resistance

$$P_v = 0.6 \times p_y \times A_v = 347 \text{ kN}$$

PASS - Design shear resistance exceeds design shear force

Moment capacity - Section 4.2.5

Design bending moment

$$M = \max(\text{abs}(M_{s1_max}), \text{abs}(M_{s1_min})) = 32.2 \text{ kNm}$$

Moment capacity low shear - cl.4.2.5.2

$$M_c = \min(p_y \times S_{xx}, 1.2 \times p_y \times Z_{xx}) = 201.4 \text{ kNm}$$

Effective length for lateral-torsional buckling - Section 4.3.5

Effective length for lateral torsional buckling

$$L_E = 5.0 \times L_{s1} = 18500 \text{ mm}$$

Slenderness ratio

$$\lambda = L_E / r_{yy} = 357.234$$

Equivalent slenderness - Section 4.3.6.7

Buckling parameter

$$u = 0.848$$

Torsional index

$$x = 15.838$$

Slenderness factor

$$v = 1 / [1 + 0.05 \times (\lambda / x)^2]^{0.25} = 0.441$$

Ratio - cl.4.3.6.9

$$\beta_w = 1.000$$

Equivalent slenderness - cl.4.3.6.7

$$\lambda_{LT} = u \times v \times \lambda \times \sqrt{\beta_w} = 133.600$$

Limiting slenderness - Annex B.2.2

$$\lambda_{L0} = 0.4 \times (\pi^2 \times E / p_y)^{0.5} = 30.198$$

$\lambda_{LT} > \lambda_{L0}$ - Allowance should be made for lateral-torsional buckling

Bending strength - Section 4.3.6.5

Robertson constant

$$\alpha_{LT} = 7.0$$

Perry factor

$$\eta_{LT} = \max(\alpha_{LT} \times (\lambda_{LT} - \lambda_{L0}) / 1000, 0) = 0.724$$

Euler stress

$$p_E = \pi^2 \times E / \lambda_{LT}^2 = 113.4 \text{ N/mm}^2$$

$$\phi_{LT} = (p_y + (\eta_{LT} + 1) \times p_E) / 2 = 275.2 \text{ N/mm}^2$$

Bending strength - Annex B.2.1

$$p_b = p_E \times p_y / (\phi_{LT} + (\phi_{LT}^2 - p_E \times p_y)^{0.5}) = 86.8 \text{ N/mm}^2$$

Equivalent uniform moment factor - Section 4.3.6.6

Equivalent uniform moment factor for LTB

$$m_{LT} = 1.000$$

Buckling resistance moment - Section 4.3.6.4

Buckling resistance moment

$$M_b = p_b \times S_{xx} = 49.3 \text{ kNm}$$

$$M_b / m_{LT} = 49.3 \text{ kNm}$$

PASS - Buckling resistance moment exceeds design bending moment

Check vertical deflection - Section 2.5.2

Consider deflection due to dead, imposed and wind loads

Limiting deflection

$$\delta_{lim} = L_{s1} / 360 = 10.278 \text{ mm}$$

Maximum deflection span 1

$$\delta = \max(\text{abs}(\delta_{\max}), \text{abs}(\delta_{\min})) = 10.213 \text{ mm}$$

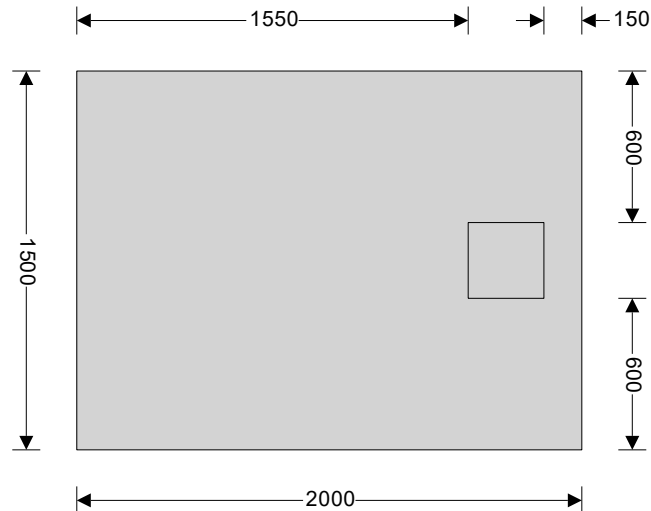
PASS - Maximum deflection does not exceed deflection limit

	<u>Contract/ Job:</u> FOUNDATION DESIGN		<u>Job No:</u> 23178									
	<u>Part of Works</u> LIFT PIT		<u>Calc Sh. No:</u> 1.2. 8	<u>Rev:</u> P01								
	<u>Drawing No:</u>	<u>Calculation By/Date:</u> DH	<u>Checked by/Date:</u> CW									
Ref	Calculations											
	<p>FOUNDATION DESIGN</p> <p>COLUMN FOUNDATION</p> <p>Reactions from Column Design</p> <table> <tr> <td>Vmax</td> <td>=</td> <td>17.40</td> <td>kN</td> </tr> <tr> <td>Mmax</td> <td>=</td> <td><u>32.20</u></td> <td>kNm</td> </tr> </table> <p>From Tedds Analysis Use 2000mm x 1500mm x 1000mm base</p>				Vmax	=	17.40	kN	Mmax	=	<u>32.20</u>	kNm
Vmax	=	17.40	kN									
Mmax	=	<u>32.20</u>	kNm									

	Project Brunswick				Job no. 23178	
	Calcs for Carpark Pad Foundation				Start page no./Revision 1.2. 9	
	Calcs by JH	Calcs date 19/08/2024	Checked by CW	Checked date		

PAD FOOTING ANALYSIS AND DESIGN (BS8110-1:1997)

Tedds calculation version 2.0.07



Pad footing details

Length of pad footing	$L = 2000$ mm
Width of pad footing	$B = 1500$ mm
Area of pad footing	$A = L \times B = 3.000$ m ²
Depth of pad footing	$h = 1000$ mm
Depth of soil over pad footing	$h_{\text{soil}} = 200$ mm
Density of concrete	$\rho_{\text{conc}} = 23.6$ kN/m ³

Column details

Column base length	$l_A = 300$ mm
Column base width	$b_A = 300$ mm
Column eccentricity in x	$e_{Px_A} = 700$ mm
Column eccentricity in y	$e_{Py_A} = 0$ mm

Soil details

Density of soil	$\rho_{\text{soil}} = 20.0$ kN/m ³
Design shear strength	$\phi' = 25.0$ deg
Design base friction	$\delta = 19.3$ deg
Allowable bearing pressure	$P_{\text{bearing}} = 150$ kN/m ²

Foundation loads

Dead surcharge load	$F_{\text{Gsur}} = 0.000$ kN/m ²
Imposed surcharge load	$F_{\text{Qsur}} = 0.000$ kN/m ²
Pad footing self weight	$F_{\text{swt}} = h \times \rho_{\text{conc}} = 23.600$ kN/m ²
Soil self weight	$F_{\text{soil}} = h_{\text{soil}} \times \rho_{\text{soil}} = 4.000$ kN/m ²
Total foundation load	$F = A \times (F_{\text{Gsur}} + F_{\text{Qsur}} + F_{\text{swt}} + F_{\text{soil}}) = 82.8$ kN

Horizontal loading on column base

Dead horizontal load in x direction	$H_{\text{GxA}} = 0.0$ kN
Imposed horizontal load in x direction	$H_{\text{QxA}} = 0.0$ kN
Wind horizontal load in x direction	$H_{\text{WxA}} = 17.4$ kN
Total horizontal load in x direction	$H_{\text{xA}} = 17.4$ kN

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Dead horizontal load in y direction $H_{GyA} = 0.0$ kN

Imposed horizontal load in y direction $H_{QyA} = 0.0$ kN

Wind horizontal load in y direction $H_{WyA} = 0.0$ kN

Total horizontal load in y direction $H_{yA} = 0.0$ kN

Moment on column base

Dead moment on column in x direction $M_{GxA} = 0.000$ kNm

Imposed moment on column in x direction $M_{QxA} = 0.000$ kNm

Wind moment on column in x direction $M_{WxA} = 33.000$ kNm

Total moment on column in x direction $M_{xA} = 33.000$ kNm

Dead moment on column in y direction $M_{GyA} = 0.000$ kNm

Imposed moment on column in y direction $M_{QyA} = 0.000$ kNm

Wind moment on column in y direction $M_{WyA} = 0.000$ kNm

Total moment on column in y direction $M_{yA} = 0.000$ kNm

Check stability against sliding

Resistance to sliding due to base friction

$$H_{friction} = \max([P_{GA} + (F_{Gsur} + F_{swt} + F_{soil}) \times A], 0 \text{ kN}) \times \tan(\delta) = 29.0 \text{ kN}$$

Passive pressure coefficient

$$K_p = (1 + \sin(\phi')) / (1 - \sin(\phi')) = 2.464$$

Stability against sliding in x direction

Passive resistance of soil in x direction

$$H_{xpas} = 0.5 \times K_p \times (h^2 + 2 \times h \times h_{soil}) \times B \times \rho_{soil} = 51.7 \text{ kN}$$

Total resistance to sliding in x direction

$$H_{xres} = H_{friction} + H_{xpas} = 80.7 \text{ kN}$$

PASS - Resistance to sliding is greater than horizontal load in x direction

Check stability against overturning in x direction

Total overturning moment

$$M_{xOT} = M_{xA} + H_{xA} \times h = 50.400 \text{ kNm}$$

Restoring moment in x direction

Foundation loading

$$M_{xsur} = A \times (F_{Gsur} + F_{swt} + F_{soil}) \times L / 2 = 82.800 \text{ kNm}$$

Axial loading on column

$$M_{xaxial} = (P_{GA}) \times (L / 2 - e_{PxA}) = 0.000 \text{ kNm}$$

Total restoring moment

$$M_{xres} = M_{xsur} + M_{xaxial} = 82.800 \text{ kNm}$$

PASS - Overturning safety factor exceeds the minimum of 1.5 in the x direction

Calculate pad base reaction

Total base reaction

$$T = F + P_A = 82.8 \text{ kN}$$

Eccentricity of base reaction in x

$$e_{Tx} = (P_A \times e_{PxA} + M_{xA} + H_{xA} \times h) / T = 609 \text{ mm}$$

Eccentricity of base reaction in y

$$e_{Ty} = (P_A \times e_{PyA} + M_{yA} + H_{yA} \times h) / T = 0 \text{ mm}$$

Check pad base reaction eccentricity

$$\text{abs}(e_{Tx}) / L + \text{abs}(e_{Ty}) / B = 0.304$$

Base reaction acts outside of middle third of base

Calculate pad base pressures

$$q_1 = 0.000 \text{ kN/m}^2$$

$$q_2 = 0.000 \text{ kN/m}^2$$

$$q_3 = 2 \times T / [3 \times B \times (L / 2 - \text{abs}(e_{Tx}))] = 94.044 \text{ kN/m}^2$$

$$q_4 = 2 \times T / [3 \times B \times (L / 2 - \text{abs}(e_{Tx}))] = 94.044 \text{ kN/m}^2$$

Minimum base pressure

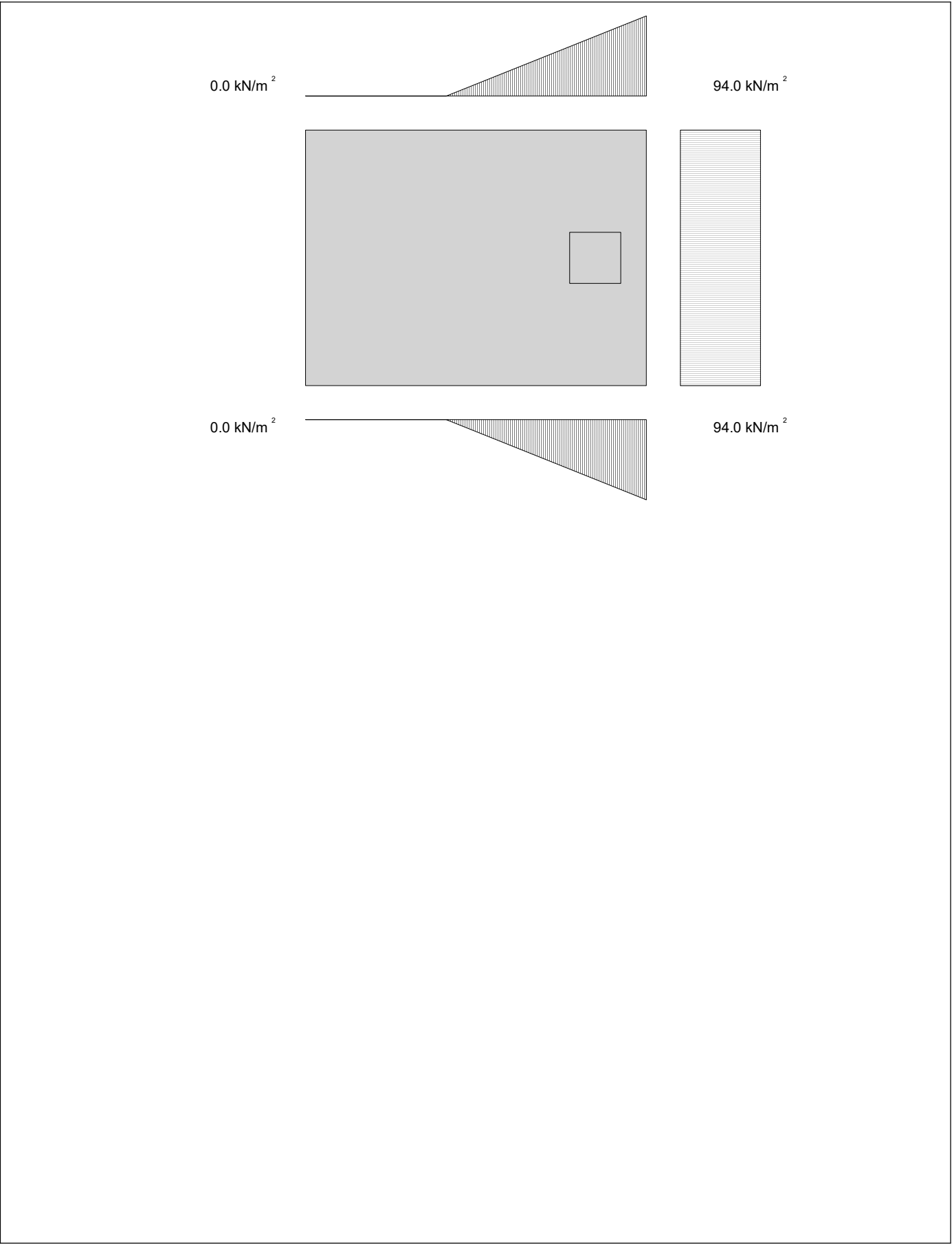
$$q_{\min} = \min(q_1, q_2, q_3, q_4) = 0.000 \text{ kN/m}^2$$

Maximum base pressure

$$q_{\max} = \max(q_1, q_2, q_3, q_4) = 94.044 \text{ kN/m}^2$$

PASS - Maximum base pressure is less than allowable bearing pressure

	Project				Job no.	
	Brunswick				23178	
	Calcs for				Start page no./Revision	
	Carpark Pad Foundation				1.2. 11	
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	JH	19/08/2024	CW			





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