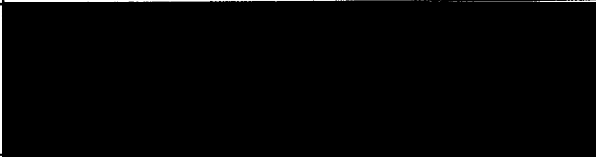




PHILIP WRIGHT
ASSOCIATES

STRUCTURAL CALCULATIONS
FOR
STEEL PODIUM AND FOUNDATIONS
FOR APARTMENTS
GREENWOOD ROAD
WYTHENSHAW

SHEET 1-81

CONTRACT NO. 2500	PHILIP WRIGHT ASSOCIATES LTD 21 UNION STREET RAMSBOTTOM BURY BL0 9AN	
DECEMBER 2022		

PROPOSED APARTMENTS
GREENWOOD ROAD WYTHENSHAW
STEELWORK DESIGN

DESIGN SYNOPSIS

PROPOSED DEVELOPMENT

The development is to consist of a detached apartment block with an irregular footprint on a splayed alignment with a basement car park. The building above the ground floor is of three stories and is to be of timber frame construction with the ground floor of a concrete on metal deck slab supported on a steel frame. The timber frame to be designed by the timber frame specialist.

STRUCTURE:

GROUND FLOOR

Metal deck composite slab and steel frame, on irregular steel column grid to suit car park layout.

Timber frame loadings provided by the timber frame supplier.

FOUNDATIONS

Combination of pad foundations and perimeter reinforced concrete retaining wall, all bearing into mudstone.

STABILITY:

MAIN BUILDING

The stability of the building provided by the diaphragm action of internal floors onto the load bearing internal/external timber frame walls. The stability of the steel frame by a combination of direct bearing onto the retaining wall and internal cross bracing.



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Contract

W17126021M0

Contract No.

2500

Sheet No.

1

Rev.

Date.

DEC 22

Consulting Structural Engineers

Part of Structure

Beam

LOADING

GROUND FLOOR

DEAD

SCREED	1.80				
150 MD50 COMP SLAB	3.42				
DECKING	0.11				
FINISHES }					
SERVICES }	0.70				
CEILING }					
SWT STEEL	0.15				
TOTAL	6.18	KN/m ²		ULT	8.65 KN/m ²

IMPOSED

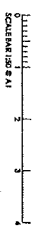
RESIDENTIAL	1.50				
PARTITIONS	1.00				
TOTAL	2.50	KN/m ²		ULT	4.00 KN/m ²
TOTAL	8.68	KN/m ²			12.65 KN/m ²

Y= 1.458

TERRACE

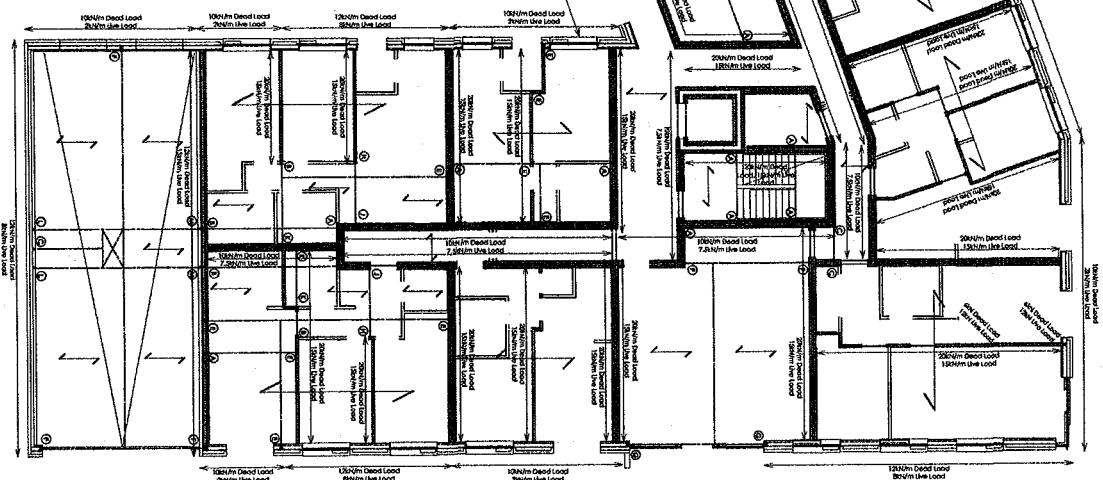
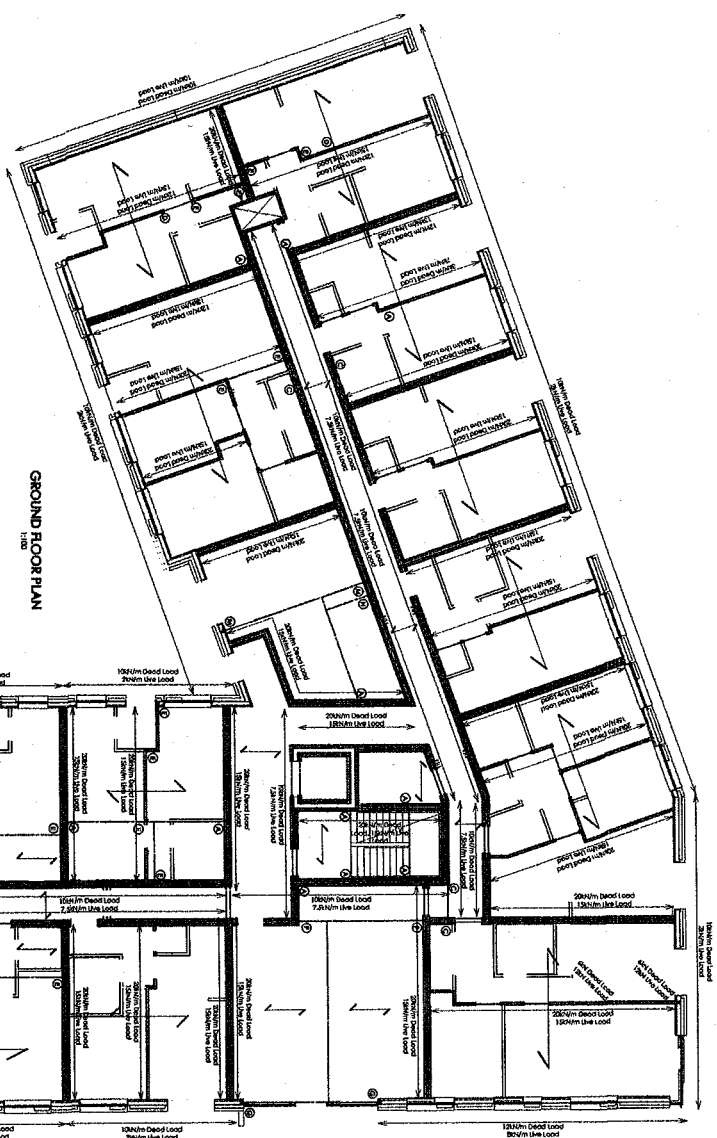
AS ABOVE PLUS

ADDITIONAL DEAD LOAD	1.00	KN/m ²			
ADDITIONAL IMPOSED	1.00	KN/m ²			



Point Load Key:	
A	36k Dead Load
B	72k Live Load
C	126k Dead Load
D	126k Live Load
E	126k Dead Load
F	126k Live Load
G	126k Dead Load
H	126k Live Load
I	126k Dead Load
J	126k Live Load
K	126k Dead Load
L	126k Live Load
M	126k Dead Load
N	126k Live Load

NOTE: LAYOUTS AND LOAD-BEARING WALLS TO BE AGREED WITH CLIENT.



TIMBER FRAME LOADS

GENERAL NOTES

1) All dimensions to be checked on site and not based on the drawings.

2) The drawing is to be used in conjunction with the contract documents and specifications. Any discrepancies are to be reported to the Architect/Engineer (A/E) immediately.

3) The Contractor shall be responsible for the temporary bracing or shoring of all temporary works and shall provide all structural bracing during construction.

4) If the Contractor considers that they do not have sufficient information to satisfy complete bracing or shoring, they shall contact the Engineer.

5) All temporary products to be braced in accordance with the Manufacturer's recommendation.

6) All works are to be carried out in accordance with the Building Regulations (as amended) and to the approval of Building Control.

7) For all setting out dimensions and details, the Contractor shall refer to the specification / instructions.

8) Using Approved Materials.

9) The Contractor must be aware of structural member sizes / weights and design site filling / bracing practices as outlined in the latest RLS guidance.

CDM 2015 DESIGNER RISK INFORMATION

1) In addition to the hazards/risks normally associated with the type of construction work described in the contract documents, the Contractor should be able to control using normal good practice and procedures.

2) The following unusual and extraordinary risks to health and safety:

- None

- Construction

3) It is assumed that all works will be carried out by a contractor competent under CDM 2015 working to an approved method statement.

4) Unless noted otherwise, we understand a CDM principal designer is already in place.

LINE & POINT LOAD NOTES

1) All loads are indicated with a 50/50 split for dead and live loads.

2) All loads are for timber frame only and exclude any masonry and ground floor loads.

3) Hatched walls indicate internal load-bearing walls.

ALP

alcock
lees
partnership

CONSULTING CIVIL & STRUCTURAL ENGINEERS

204-206, THE BRICKWORKERS, 204-206, THE BRICKWORKERS, 204-206, THE BRICKWORKERS

Frame-Tech

Project:
Greenwood Road,
Wymsham,
Dorset

Drawing title:
Line and Point Loads.

Scale: 1:100 & A1
Date: 08.03.23
Drawn by: B.C.
Checked by: O.J.
Design No: 10155/50



PHILIP WRIGHT
ASSOCIATES LTD

Contract

WYTHEWING

Contract No.

2500

Sheet No.

3

Rev.

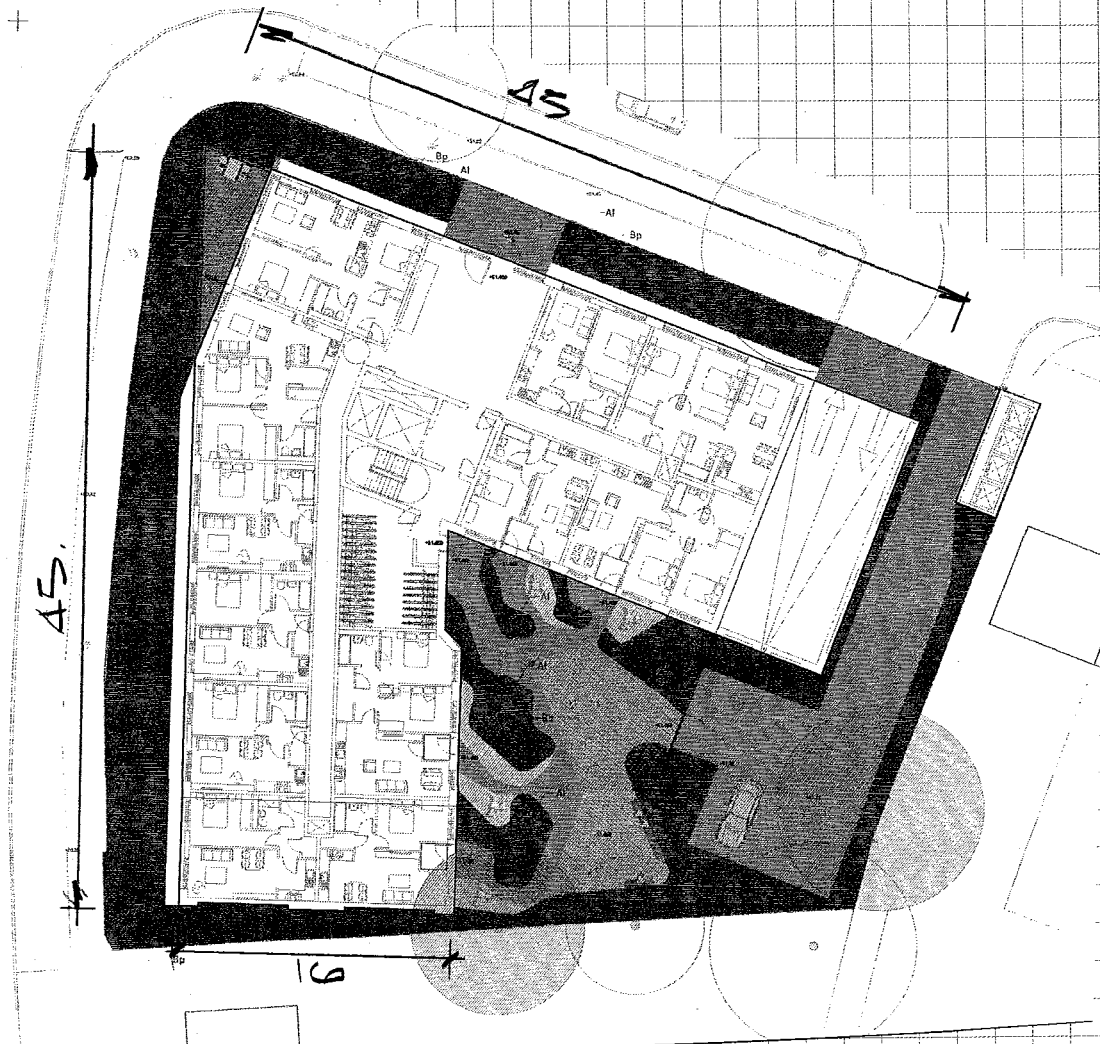
Date.

Consulting Structural Engineers

Part of Structure

WIND ANALYSIS

WIND ANALYSIS



GRID REF SJ8196 8776

SITE HT. , 51.45

BLD HT , 8.6~

Cf : 0.009

[illegible]

Consulting Structural Engineers

Part of Structure WIND ANALYSIS

DYNAMIC PRESSURE q . W : 0.74 k/m²
 N : 0.40
 E : 0.27
 S : 0.53.

$$P = 0.85 q C_p C_e A (1 + C_i)$$

$C_p \Rightarrow$ table 5c

WIND L-R $\longleftrightarrow$

$$B/D : 45/45 : 1 \quad D/H : 45/8.6 : 5.2 \quad C_p = 0.8$$

$$P : 0.85 \times 0.74 \times 0.8 \times 0.8 \times (1 + 0.009) A$$

$$: 0.41 A$$

$$A : 45 \times 8.6$$

$$\therefore \text{TOTAL WIND} : 0.41 \times 45 \times 8.6 = \underline{157.2 \text{ kN}}$$

WIND UP-DOWN $\downarrow$

$$C_p = \text{AS ABOVE } C_p = 0.8$$

$$P : 0.85 \times 0.53 + 0.8 \times 0.8 \times (1 + 0.009) A$$

$$: 0.29 A$$

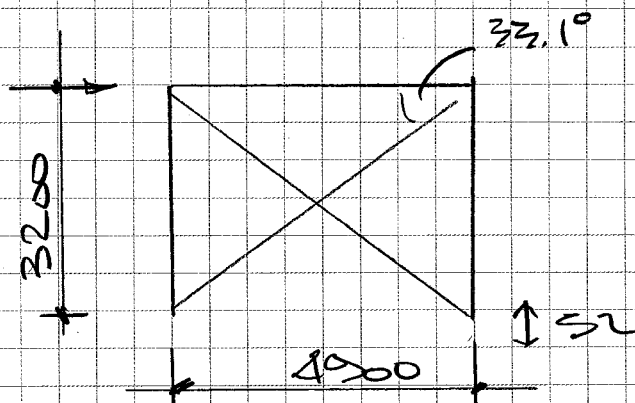
$$A : 45 \times 8.6$$

$$\text{TOTAL WIND} : 0.29 \times 45 \times 8.6 = \underline{113.6 \text{ kN}}$$

Consulting Structural Engineers

Part of Structure BRACING

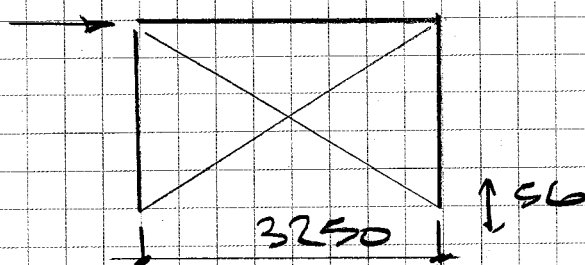
BRACE L/L C / B-C



$$H. 157.2 / \sim, 78.6 \text{ kN}$$

$$\text{FORCE IN BRACE, } 78.6 \times 1.4 / \cos 37.1, 132 \text{ kN}$$

BRACE L/L F / 1b-1c



$$H. 113.6 / \sim, 56.8$$

$$\text{FORCE IN BRACE, } 56.8 \times 1.4 / \cos 45, 113 \text{ kN}$$

120 x 10 FLAT Pt. 2500

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Bolton, Lancs, BL5 3YW
Tel: 01942 811532

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Date : 28 January 2023 / Ver. 2018.15
Checked :
Approved :

Strut and Tie (Element) BRACE

Classification and Properties (BS 5950: 2000)

Section (9.42 kg/m)	120x10 Flat 9.42 [S 275]	
Class = Fn(b/t,py)	12, 275	(Axial: Non-Slender) SemiComp
Effective Properties	Area=12 cm ² , Sxx=24(36) cm ³ , Syy=3 cm ³	

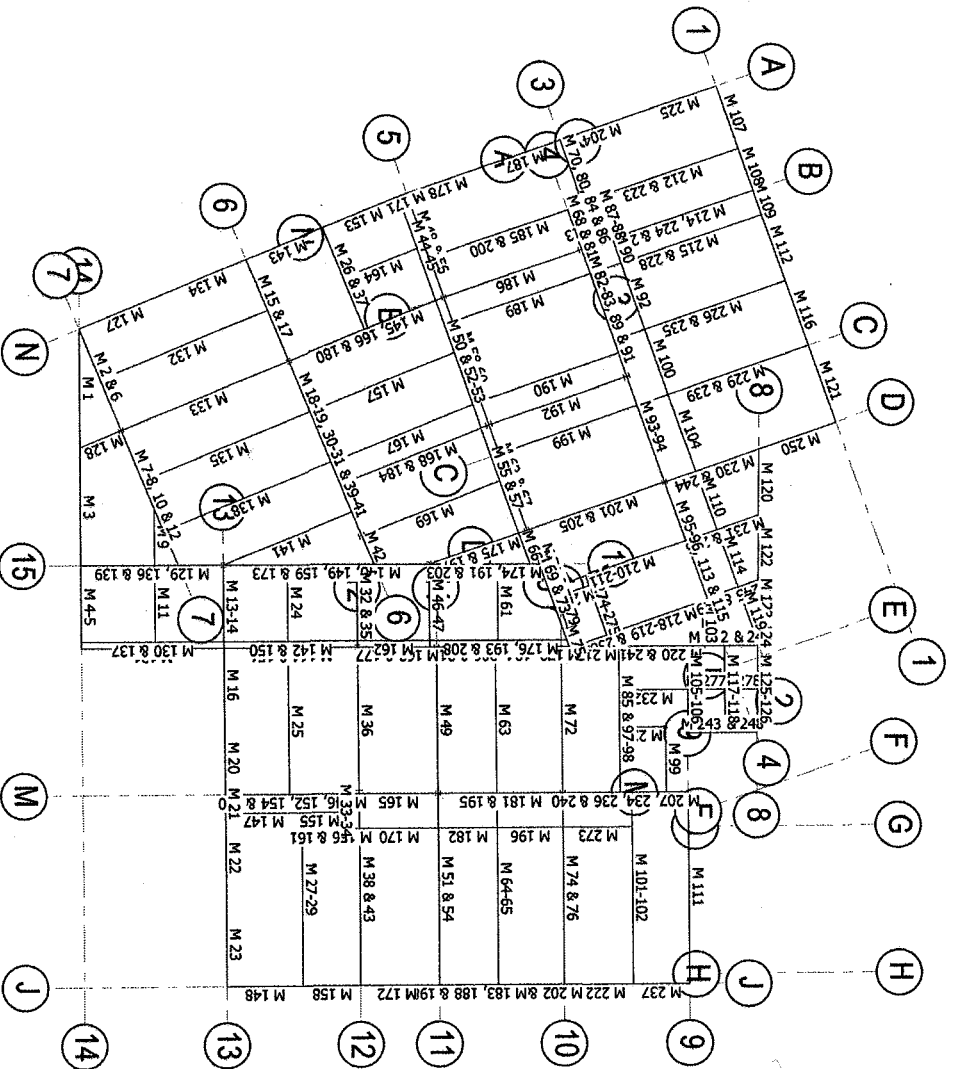
Axially Loaded Member in Tension : 3.4.3

Web Holes	2 No. 22 mm Holes	4.4 cm ²	
Ae = Fn(Ag,A.net,py,Us)	12,7.6,275,410	9.12 cm ²	
Tc = Ae.py	9.12x275/10 =	250.8 kN	
F (Tie)/Tc	132 / 250.8	0.526	OK

25554

Z

Y — X



Frame Geometry - (Roof Plan) - Plan View

Not to Scale

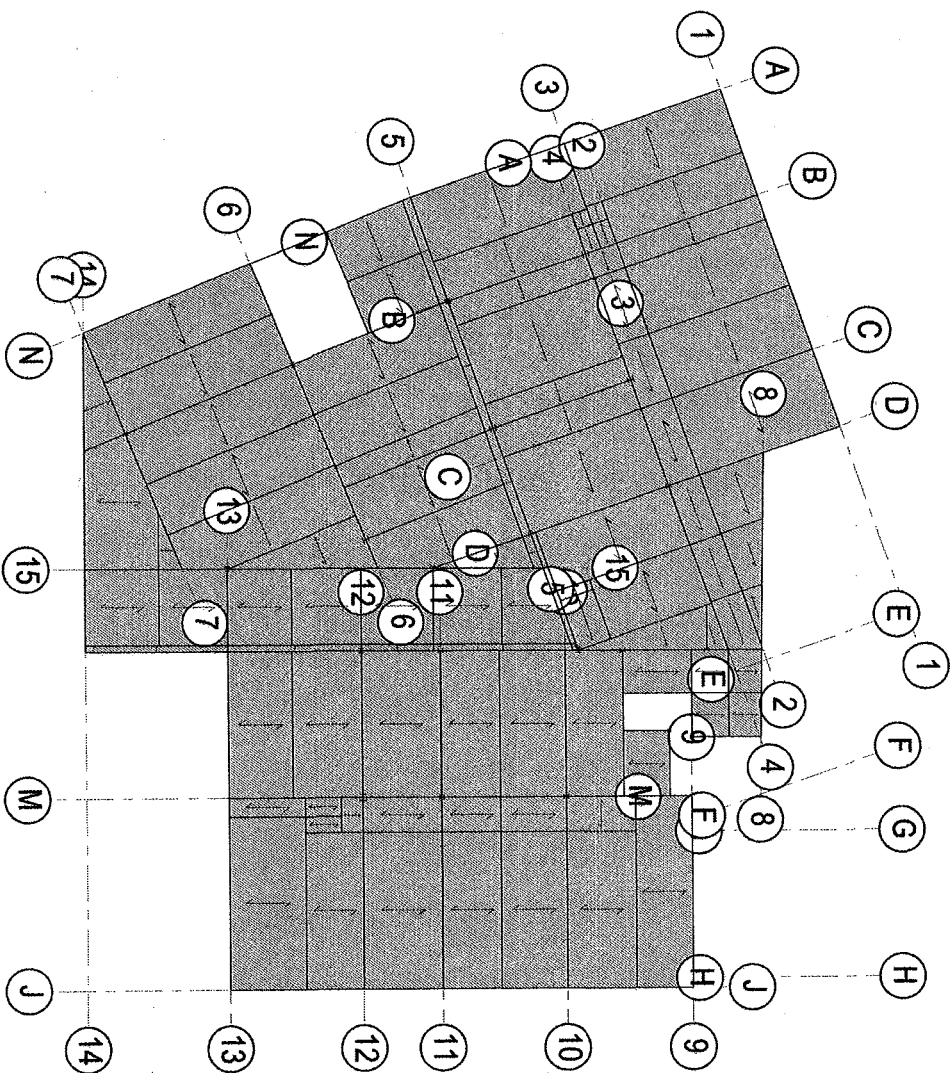
PHILIP WRIGHT ASSOCIATES SWellington St, Westhoughton, Bolton, Lancs, BL5 3YW

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Z

Y — X



Frame Geometry - (Roof Plan) - Plan View

Roof Deck

Not to Scale

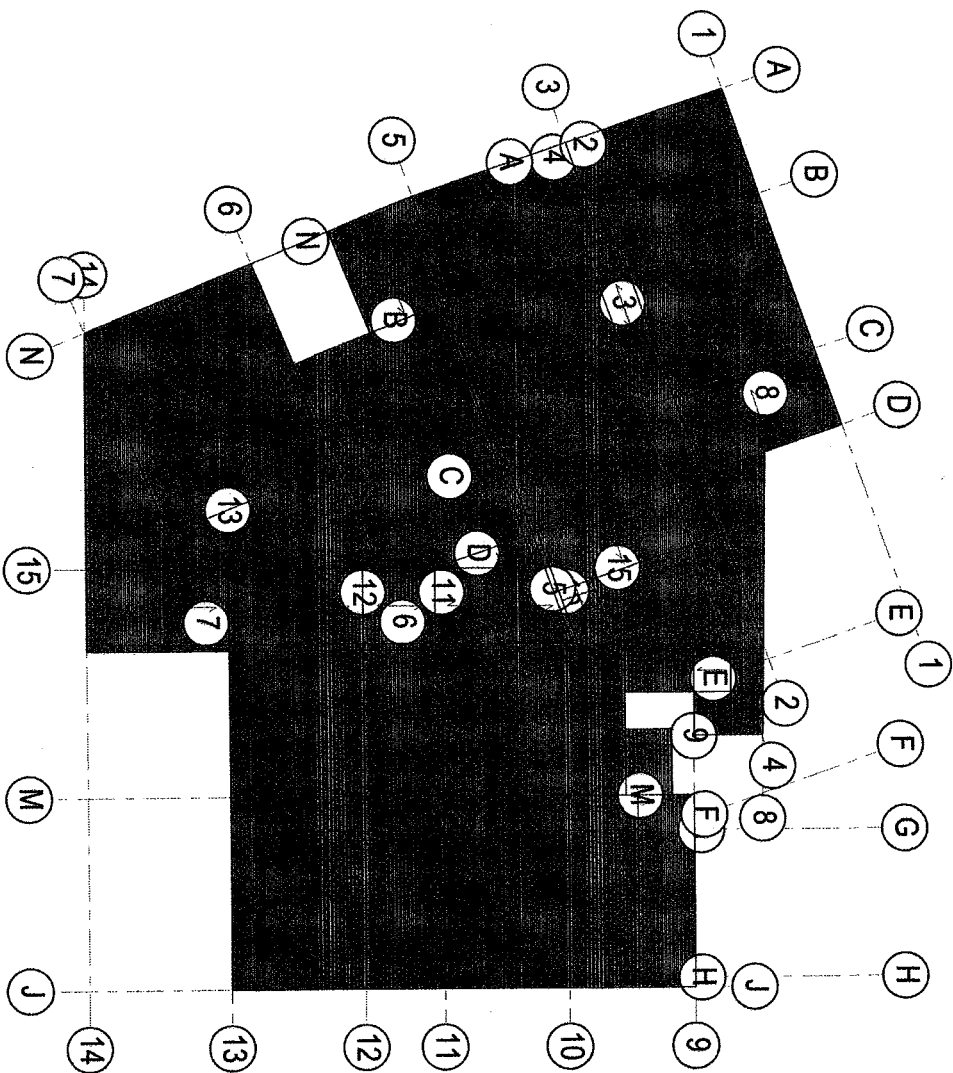
PHILIP WRIGHT ASSOCIATES Wellington St, Westhoughton, Bolton, Lancs, BL5 3YW

Ref: 2500, / , Date: 27/02/2024

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Z

Y — X



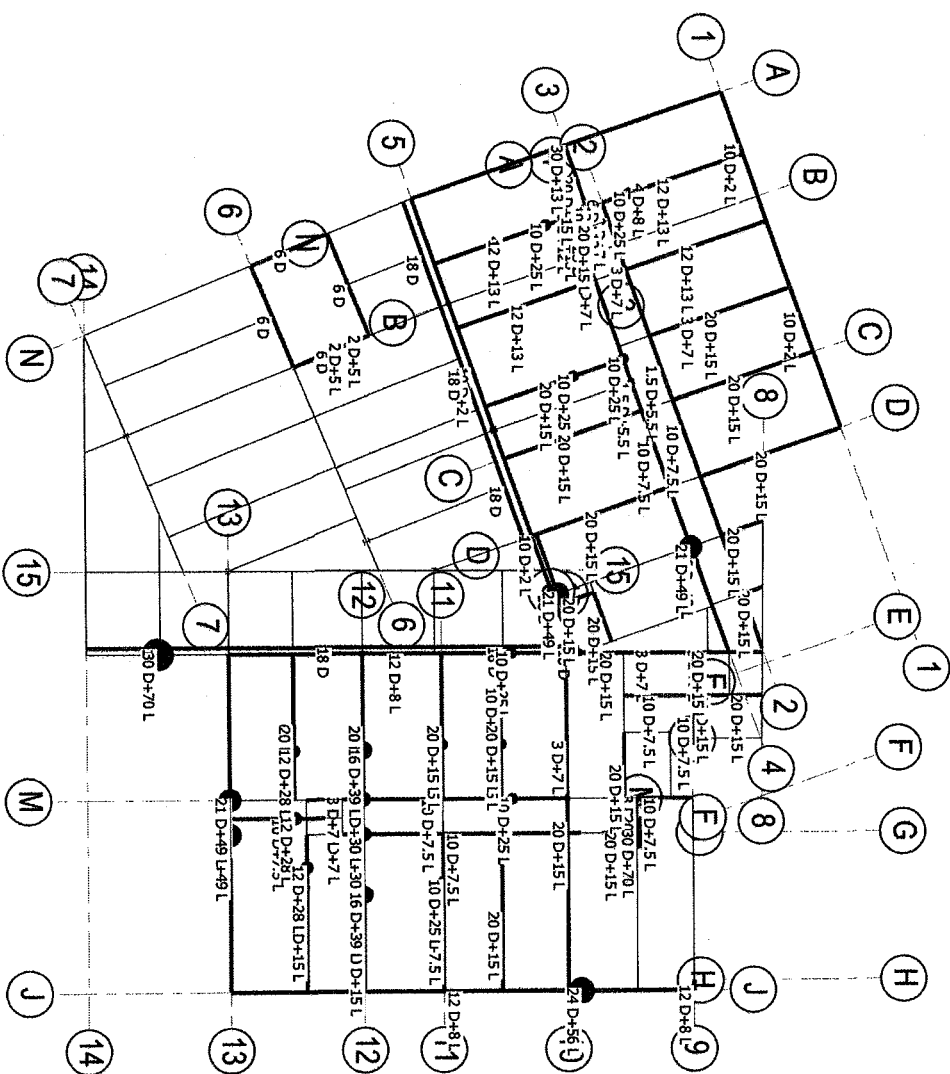
WOLLEDAWN

Frame Geometry - (Roof Plan) - Plan View

Not to Scale

25554

2

$$\frac{Y}{X}$$


Line boards.

Frame Geometry - (Roof Plan) - Plan View

Not to Scale

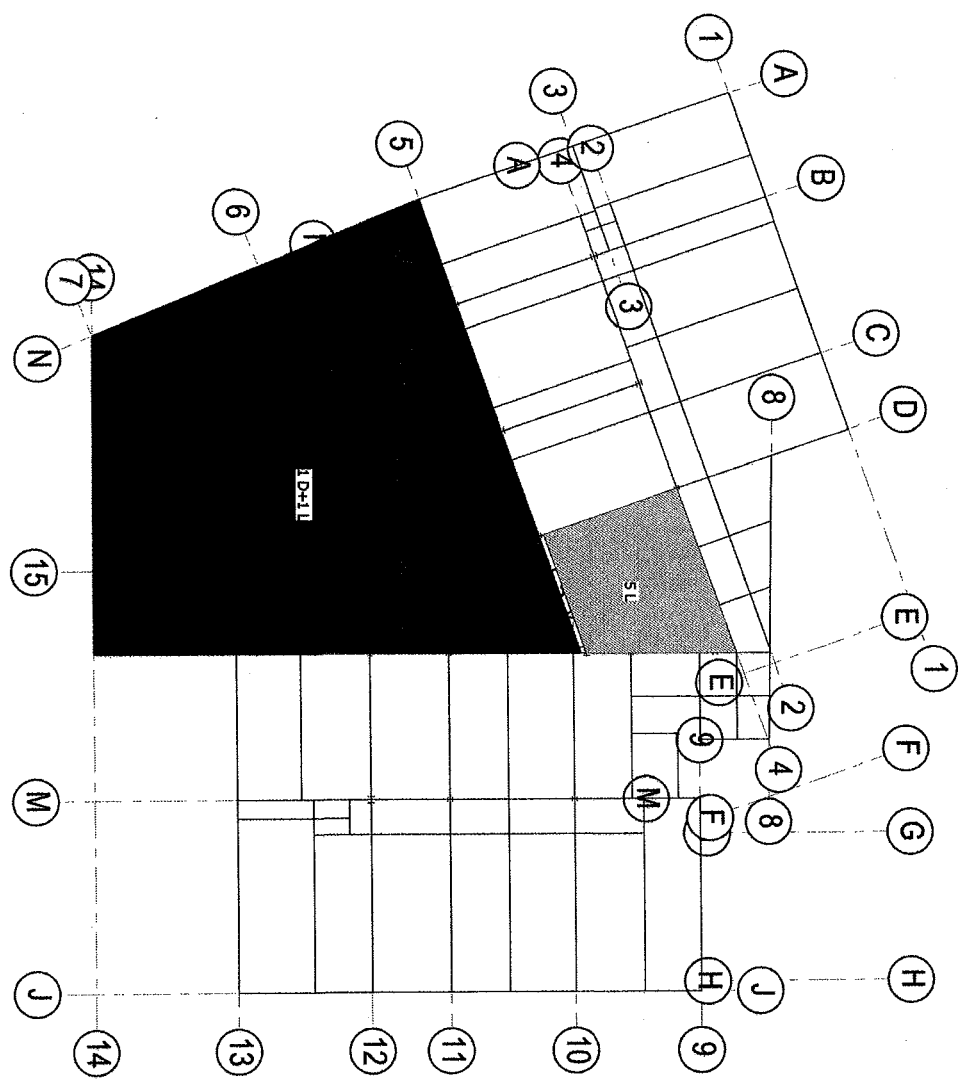
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Z

Y — X



Additional SOL loads

Frame Geometry - (Roof Plan) - Plan View

Not to Scale

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MasterFrame Data File Loading Cases and Load Combination

Load Group Labels

Load Group UT	Unity Load Factor (All Cases)
Load Group D0	Dead Load (Columns Self Weight)
Load Group D1	Super Imposed Dead Load
Load Group L1	Live Load
Load Group A1	Dead Load (Self Weight)
Load Group G1	Construction Load

Load Case 001 : Ultimate Limit State (Final Stage)

Load Combination + 1.00 UT + 1.40 D0 + 1.40 D1 + 1.60 L1 + 1.40 A1

Load Case 002 : Ultimate Limit State (Construction Stage)

Load Combination + 1.00 UT + 1.40 D0 + 1.40 A1 + 1.60 G1

Load Case 003 : Live Load (Serviceability)

Load Combination + 1.00 UT + 1.00 L1

Load Case 004 : Super Imposed Load (Serviceability)

Load Combination + 1.00 UT + 1.00 D1

Load Case 005 : Dead Load - Selfweight (Serviceability)

Load Combination + 1.00 UT + 1.00 D0 + 1.00 A1

Load Case 006 : Dead plus Live (Ultimate)

Load Combination + 1.00 UT + 1.40 D1 + 1.60 L1

Load Case 007 : Live Only (Serviceability)

Load Combination + 1.00 UT + 1.00 L1

Load Case 008 : Serviceability Limit State (Final Stage)

Load Combination + 1.00 UT + 1.00 D0 + 1.00 D1 + 1.00 L1 + 1.00 A1

The Nodal Co-ordinates

Node	X (m)	Y (m)	Z (m)	Node	X (m)	Y (m)	Z (m)
1	15.822	0.000	1.903	2	22.029	0.000	6.523
3	12.669	0.000	9.565	4	25.835	-0.300	16.231
5	32.545	-0.300	16.231	6	25.835	0.000	12.631
7	20.701	0.000	12.870	8	32.545	0.000	12.631
9	22.029	0.000	15.931	10	9.759	0.000	16.685
11	32.545	-0.300	21.934	12	15.614	0.000	18.728
13	25.833	-0.300	24.568	14	29.545	-0.300	26.683
15	25.835	0.000	22.534	16	7.551	0.000	23.011
17	29.833	-0.300	27.715	18	25.833	-0.300	28.415
19	13.406	0.000	25.054	20	18.254	0.000	26.746
21	11.198	3.200	0.000	22	16.602	3.200	0.006
23	22.029	3.200	0.000	24	25.536	3.200	0.000
25	25.835	3.200	0.000	26	13.510	3.200	0.951
27	15.822	3.200	1.903	28	9.604	3.200	3.824
29	18.134	3.200	2.854	30	19.404	3.200	3.376
31	22.029	3.200	3.376	32	25.536	3.200	3.376
33	20.447	3.200	3.805	34	22.029	3.200	4.457
35	22.029	3.200	6.523	36	25.536	3.200	6.523

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37	8.009	3.200	7.648	38	25.835	3.200	6.523
39	10.357	3.200	8.614	40	12.669	3.200	9.565
41	14.981	3.200	10.517	42	29.190	3.200	6.523
43	32.545	3.200	6.523	44	33.388	3.200	6.523
45	37.533	3.200	6.523	46	41.388	3.200	6.523
47	22.029	3.200	9.431	48	25.536	3.200	9.431
49	25.835	3.200	9.431	50	32.545	3.200	9.431
51	6.554	3.200	11.141	52	32.545	3.200	9.981
53	33.388	3.200	9.981	54	34.138	3.200	9.981
55	15.003	3.200	10.525	56	41.388	3.200	9.981
57	17.294	3.200	11.468	58	22.029	3.200	12.631
59	32.545	3.200	11.631	60	33.388	3.200	11.631
61	34.138	3.200	11.631	62	25.536	3.200	12.631
63	25.835	3.200	12.631	64	8.886	3.200	12.094
65	32.545	3.200	12.631	66	11.242	3.200	13.057
67	17.336	3.200	11.486	68	18.337	3.200	11.897
69	19.603	3.200	12.418	70	20.701	3.200	12.870
71	34.138	3.200	12.631	72	5.098	3.200	14.634
73	41.388	3.200	12.631	74	22.029	3.200	13.416
75	7.504	3.200	15.474	76	22.029	3.200	15.931
77	25.536	3.200	15.931	78	25.835	3.200	15.931
79	4.944	3.200	15.004	80	25.835	3.200	16.231
81	9.910	3.200	16.314	82	32.545	3.200	16.231
83	12.296	3.200	17.147	84	14.682	3.200	17.979
85	34.138	3.200	16.231	86	41.388	3.200	15.931
87	15.762	3.200	18.356	88	7.919	3.200	16.043
89	18.178	3.200	19.200	90	9.759	3.200	16.685
91	3.716	3.200	18.521	92	41.388	3.200	16.231
93	10.893	3.200	17.081	94	14.528	3.200	18.349
95	22.029	3.200	19.061	96	15.614	3.200	18.728
97	25.536	3.200	19.061	98	20.462	0.000	20.420
99	25.835	3.200	18.933	100	32.545	3.200	18.933
101	34.138	3.200	18.933	102	20.594	3.200	20.043
103	41.388	3.200	18.933	104	16.936	3.200	19.190
105	5.711	3.200	22.369	106	20.462	3.200	20.420
107	41.388	3.200	19.233	108	22.029	3.200	20.544
109	2.489	3.200	22.038	110	20.388	3.200	20.633
111	25.835	3.200	21.934	112	22.029	3.200	20.967
113	32.545	3.200	21.934	114	25.536	3.200	22.191
115	34.137	3.200	21.934	116	41.388	3.200	21.934
117	23.111	3.200	21.584	118	23.569	3.200	21.743
119	22.587	3.200	23.085	120	23.045	3.200	23.245
121	25.536	3.200	22.430	122	5.360	3.200	23.041
123	6.419	3.200	22.616	124	7.551	3.200	23.011
125	8.685	3.200	23.407	126	25.835	3.200	22.295
127	25.835	3.200	22.534	128	25.311	3.200	24.035
129	5.464	3.200	23.077	130	25.833	3.200	24.568
131	6.172	3.200	23.324	132	41.388	3.200	22.534
133	5.113	3.200	23.749	134	7.304	3.200	23.719
135	5.925	3.200	24.032	136	1.244	3.200	25.603
137	11.754	3.200	24.478	138	7.057	3.200	24.427
139	12.320	3.200	24.675	140	8.191	3.200	24.823
141	13.406	3.200	25.054	142	14.728	3.200	25.516
143	18.254	3.200	26.746	144	20.978	3.200	27.697
145	27.833	3.200	24.568	146	29.545	3.200	24.568
147	32.545	3.200	24.568	148	29.545	3.200	26.683
149	11.260	3.200	25.894	150	32.545	3.200	25.109
151	34.135	3.200	25.109	152	41.388	3.200	25.109
153	23.782	3.200	28.415	154	14.234	3.200	26.932
155	32.545	3.200	26.683	156	25.833	3.200	27.715
157	27.833	3.200	27.715	158	25.833	3.200	28.415
159	29.833	3.200	27.715	160	0.000	3.200	29.168

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161	2.872	3.200	30.170	162	4.815	3.200	30.849
163	17.760	3.200	28.163	164	32.545	3.200	27.683
165	41.388	3.200	27.683	166	5.950	3.200	31.245
167	23.637	3.200	28.625	168	20.470	3.200	29.108
169	23.701	3.200	28.648	170	9.018	3.200	32.316
171	25.833	3.200	29.392	172	27.834	3.200	29.390
173	29.834	3.200	29.389	174	23.143	3.200	30.042
175	16.750	3.200	31.057	176	11.992	3.200	33.354
177	19.786	3.200	31.010	178	22.822	3.200	30.962
179	25.654	3.200	30.918	180	25.835	3.200	30.915
181	27.834	3.200	30.884	182	29.834	3.200	30.853
183	15.518	3.200	34.585				

Composite Section Properties

Composite Section Properties for the following members are used in the frame analysis in all but loading cases 2 to 5.
Members 2, 6-14, 18-19, 24-25, 27-32, 35-36, 38-41, 43, 46-47, 49, 51, 54, 61,
63-65, 70, 72, 74, 76, 80, 82-84, 86, 89, 91, 95-96, 101-103, 113, 115, 129,
132-133, 135-136, 138-141, 145-146, 149, 152, 154, 157, 159-160, 166-169, 173,
175, 180-181, 184-186, 189-190, 192, 195, 197, 199-201, 205, 207, 210-215,
218-219, 221, 223-224, 226-231, 234-236, 238-240, 244, 246 & 274-278

Member Properties

Members 1, 24, 99, 103, 114, 147, 217, 231-233, 243, 246, 248 & 274-278

M	...	254x146 UB 31 [S 275]		
A	39.67E-4	Ix 4414E-8	Iy 448.4E-8	J 8.55E-8
E	205.0E6	G 78.85E6		

Members 2, 6, 32, 35, 85 & 97-98

M	...	406x178 UB 54 [S 275]		
A	68.95E-4	Ix 18725E-8	Iy 1024E-8	J 23.12E-8
E	205.0E6	G 78.85E6		

Members 3-5, 9, 11, 26, 33-34, 37, 46-47, 61, 100, 104, 128, 141, 148, 155-156,
158, 161, 172, 174, 178, 186-187, 191-192, 203-204, 213, 218-219, 221-222,
225, 230, 237-238, 244 & 250

M	...	305x165 UB 40 [S 275]		
A	51.31E-4	Ix 8504E-8	Iy 766.0E-8	J 14.73E-8
E	205.0E6	G 78.85E6		

Members 7-8, 10, 12, 25, 36, 49, 63, 129, 136, 139 & 189

M	...	406x178 UB 54 [S 355]		
A	68.95E-4	Ix 18725E-8	Iy 1024E-8	J 23.12E-8
E	205.0E6	G 78.85E6		

Members 13-14

M	...	356x171 UB 45 [S 355]		
A	57.32E-4	Ix 12069E-8	Iy 814.0E-8	J 15.85E-8
E	205.0E6	G 78.85E6		

Members 15 & 17

M	...	356x171 UB 51 [S 355]		
A	64.9E-4	Ix 14139E-8	Iy 971.2E-8	J 23.81E-8
E	205.0E6	G 78.85E6		

Members 16, 20, 101-102, 214, 224, 227, 229 & 239

M	...	457x191 UB 67 [S 355]		
A	85.5E-4	Ix 29383E-8	Iy 1455E-8	J 37.14E-8
E	205.0E6	G 78.85E6		

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Members 18-19, 30-31 & 39-41

M	356x368 UC 202 [S 355]		
A 257.2E-4	Ix 66276E-8	Iy 23703E-8	J 557.5E-8
E 205.0E6	G 78.85E6		

Members 21-23

M	610x229 UB 113 [S 355]		
A 143.9E-4	Ix 87325E-8	Iy 3441E-8	J 111.3E-8
E 205.0E6	G 78.85E6		

Members 27-29, 38, 43, 51, 54, 64-65, 74, 76, 144, 151, 207, 234, 236 & 240

M	457x191 UB 98 [S 355]		
A 125.3E-4	Ix 45730E-8	Iy 2350E-8	J 121.3E-8
E 205.0E6	G 78.85E6		

Member 42

M	610x229 UB 140 [S 355]		
A 178.2E-4	Ix 111784E-8	Iy 4512E-8	J 216.4E-8
E 205.0E6	G 78.85E6		

Members 44-45, 140, 149, 159, 173, 176, 193 & 208

M	356x171 UB 67 [S 355]		
A 85.48E-4	Ix 19466E-8	Iy 1365E-8	J 55.68E-8
E 205.0E6	G 78.85E6		

Members 48, 56, 226 & 235

M	457x191 UB 82 [S 355]		
A 104.5E-4	Ix 37054E-8	Iy 1874E-8	J 69.21E-8
E 205.0E6	G 78.85E6		

Members 50, 52-53, 66, 215 & 228

M	406x178 UB 74 [S 355]		
A 94.5E-4	Ix 27313E-8	Iy 1548E-8	J 62.77E-8
E 205.0E6	G 78.85E6		

Members 55, 57 & 162

M	356x171 UB 57 [S 355]		
A 72.55E-4	Ix 16041E-8	Iy 1111E-8	J 33.38E-8
E 205.0E6	G 78.85E6		

Members 58-60, 71 & 77-79

M	457x191 UB 89 [S 355]		
A 113.8E-4	Ix 41018E-8	Iy 2092E-8	J 90.71E-8
E 205.0E6	G 78.85E6		

Members 62 & 67

M	406x178 UB 74 [S 275]		
A 94.5E-4	Ix 27313E-8	Iy 1548E-8	J 62.77E-8
E 205.0E6	G 78.85E6		

Members 68, 81, 110, 121, 125-126, 170, 182, 196 & 273

M	203x133 UB 25 [S 275]		
A 31.96E-4	Ix 2341E-8	Iy 308.5E-8	J 5.96E-8
E 205.0E6	G 78.85E6		

Members 69, 73, 75, 132-133, 135, 138, 145, 157, 164, 166-168, 180 & 184

M	356x171 UB 67 [S 275]		
A 85.48E-4	Ix 19466E-8	Iy 1365E-8	J 55.68E-8
E 205.0E6	G 78.85E6		

Members 70, 80, 84 & 86

M	457x191 UB 133 [S 355]		
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A 169.8E-4 E 205.0E6	Ix 63841E-8 G 78.85E6	Iy 3350E-8	J 292.4E-8	
Members 72, 111, 185, 200, 212 & 223				
M	406x178 UB 67 [S 355]			
A 85.54E-4 E 205.0E6	Ix 24334E-8 G 78.85E6	Iy 1368E-8	J 46.11E-8	
Members 82-83, 89 & 91				
M	533x210 UB 109 [S 355]			
A 138.9E-4 E 205.0E6	Ix 66829E-8 G 78.85E6	Iy 2950E-8	J 126.3E-8	
Members 87-88				
M	152x89 UB 16 [S 275]			
A 20.32E-4 E 205.0E6	Ix 835.2E-8 G 78.85E6	Iy 90.6E-8	J 3.56E-8	
Member 90				
M	127x76 UB 13 [S 275]			
A 16.51E-4 E 205.0E6	Ix 474.3E-8 G 78.85E6	Iy 56.6E-8	J 2.85E-8	
Member 92				
M	178x102 UB 19 [S 275]			
A 24.26E-4 E 205.0E6	Ix 1357E-8 G 78.85E6	Iy 137.6E-8	J 4.41E-8	
Members 93-94, 179, 194, 206 & 216				
M	533x210 UB 101 [S 355]			
A 128.7E-4 E 205.0E6	Ix 61526E-8 G 78.85E6	Iy 2699E-8	J 100.9E-8	
Members 95-96, 113, 115, 146, 152, 154, 160, 181 & 195				
M	533x210 UB 122 [S 355]			
A 155.4E-4 E 205.0E6	Ix 76050E-8 G 78.85E6	Iy 3395E-8	J 178.4E-8	
Members 105-106				
M	254x146 UB 37 [S 275]			
A 47.16E-4 E 205.0E6	Ix 5538E-8 G 78.85E6	Iy 571.5E-8	J 15.33E-8	
Members 107-109, 112, 116, 120 & 122				
M	203x102 UB 23 [S 275]			
A 29.39E-4 E 205.0E6	Ix 2106E-8 G 78.85E6	Iy 164.8E-8	J 7.02E-8	
Members 117-118, 260, 264 & 269				
M	203x203 UC 46 [S 275]			
A 58.73E-4 E 205.0E6	Ix 4571E-8 G 78.85E6	Iy 1551E-8	J 22.15E-8	
Members 119 & 123-124				
M	457x191 UB 67 [S 275]			
A 85.5E-4 E 205.0E6	Ix 29383E-8 G 78.85E6	Iy 1455E-8	J 37.14E-8	
Members 127, 134, 175, 197, 220 & 241				
M	356x171 UB 45 [S 275]			
A 57.32E-4 E 205.0E6	Ix 12069E-8 G 78.85E6	Iy 814.0E-8	J 15.85E-8	

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Members 130, 137, 142 & 150			
M	305x305 UC 118 [S 355]		
A 150.2E-4	Ix 27731E-8	Iy 9074E-8	J 161.0E-8
E 205.0E6	G 78.85E6		
Member 131			
M	457x191 UB 98 [S 275]		
A 125.3E-4	Ix 45730E-8	Iy 2350E-8	J 121.3E-8
E 205.0E6	G 78.85E6		
Members 143, 153 & 171			
M	305x127 UB 48 [S 275]		
A 61.23E-4	Ix 9577E-8	Iy 462.7E-8	J 31.78E-8
E 205.0E6	G 78.85E6		
Members 163, 165 & 177			
M	254x146 UB 31 [S 355]		
A 39.67E-4	Ix 4414E-8	Iy 448.4E-8	J 8.55E-8
E 205.0E6	G 78.85E6		
Member 169			
M	356x171 UB 51 [S 275]		
A 64.9E-4	Ix 14139E-8	Iy 971.2E-8	J 23.81E-8
E 205.0E6	G 78.85E6		
Members 183, 188, 198, 202 & 209			
M	533x312 UB 182 [S 275]		
A 231.1E-4	Ix 123222E-8	Iy 12667E-8	J 373.4E-8
E 205.0E6	G 78.85E6		
Members 190, 199, 201, 205 & 210-211			
M	406x178 UB 60 [S 355]		
A 76.51E-4	Ix 21599E-8	Iy 1206E-8	J 33.32E-8
E 205.0E6	G 78.85E6		
Members 242 & 247			
M	533x210 UB 82 [S 355]		
A 104.7E-4	Ix 47546E-8	Iy 2014E-8	J 51.52E-8
E 205.0E6	G 78.85E6		
Members 245 & 249			
M	203x133 UB 30 [S 275]		
A 38.21E-4	Ix 2897E-8	Iy 385.5E-8	J 10.3E-8
E 205.0E6	G 78.85E6		
Member 251			
M	88.9x6.3 CHS 12.8 [S 275]		
A 16.35E-4	Ix 140.2E-8	Iy 140.2E-8	J 280.5E-8
E 205.0E6	G 78.85E6		
Member 252			
M	203x203 UC 52 [S 275]		
A 66.28E-4	Ix 5262E-8	Iy 1781E-8	J 31.76E-8
E 205.0E6	G 78.85E6		
Members 253 & 261			
M	203x203 UC 60 [S 275]		
A 76.37E-4	Ix 6127E-8	Iy 2068E-8	J 47.23E-8
E 205.0E6	G 78.85E6		
Members 254-256 & 262			

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M	203x203 UC 71 [S 275]		
A 90.42E-4	Ix 7621E-8	Iy 2540E-8	J 80.25E-8
E 205.0E6	G 78.85E6		

Members 257 & 271

M	203x203 UC 60 [S 355]		
A 76.37E-4	Ix 6127E-8	Iy 2068E-8	J 47.23E-8
E 205.0E6	G 78.85E6		

Members 258, 263 & 270

M	254x254 UC 89 [S 275]		
A 113.3E-4	Ix 14275E-8	Iy 4864E-8	J 102.3E-8
E 205.0E6	G 78.85E6		

Member 259

M	305x305 UC 118 [S 275]		
A 150.2E-4	Ix 27731E-8	Iy 9074E-8	J 161.0E-8
E 205.0E6	G 78.85E6		

Members 265 & 268

M	152x152 UC 30 [S 275]		
A 38.26E-4	Ix 1749E-8	Iy 561.4E-8	J 10.52E-8
E 205.0E6	G 78.85E6		

Member 266

M	254x254 UC 89 [S 355]		
A 113.3E-4	Ix 14275E-8	Iy 4864E-8	J 102.3E-8
E 205.0E6	G 78.85E6		

Member 267

M	254x254 UC 107 [S 275]		
A 136.4E-4	Ix 17517E-8	Iy 5935E-8	J 172.4E-8
E 205.0E6	G 78.85E6		

Member 272

M	203x203 UC 52 [S 355]		
A 66.28E-4	Ix 5262E-8	Iy 1781E-8	J 31.76E-8
E 205.0E6	G 78.85E6		

Member Loading

Member Self Weight Density Load Included in Load Group D0, defined by Modulus of Elasticity

E kN/mm ²	Density kN/m ³
>= 200.00	77.01
>= 20.00	24.00
>= 2.00	10.00

Member 1 - MasterFrame Pro Loads

D1 TY2 -005.896	(kN)	A1 TY2 -008.855	(kN)
L1 TY2 -008.972	(kN)	G1 TY2 -001.923	(kN)
D1 PDLY -000.699 0.213 5.404	(kN,m,m)	D1 PTY2 -001.873 0.213 5.404	(kN,m,m)
L1 PDLY -000.699 0.213 5.404	(kN,m,m)	L1 PTY2 -001.873 0.213 5.404	(kN,m,m)
A1 D 077.010	(kN/m ³)		

Member 2 - MasterFrame Pro Loads

D1 TY2 -001.474	(kN)	A1 TY2 -002.214	(kN)
L1 TY2 -002.243	(kN)	G1 TY2 -000.481	(kN)
D1 PDLY -000.223 0.197 2.500	(kN,m,m)	D1 PTY2 -000.437 0.197 2.500	(kN,m,m)
L1 PDLY -000.223 0.197 2.500	(kN,m,m)	L1 PTY2 -000.437 0.197 2.500	(kN,m,m)
A1 D 077.010	(kN/m ³)		

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Member 3 - MasterFrame Pro Loads

D1 PTRY -002.550 0.000 2.801 -003.879	A1 PTRY -003.830 0.000 2.801 -005.826
D1 PTRY -003.879 2.801 5.427 -003.883	A1 PTRY -005.826 2.801 5.427 -005.831
L1 PTRY -003.881 0.000 2.801 -005.903	G1 PTRY -000.832 0.000 2.801 -001.265
L1 PTRY -005.903 2.801 5.427 -005.909	G1 PTRY -001.265 2.801 5.427 -001.266
D1 UDLY -001.355 (kN/m)	D1 TY2 -001.092 (kN)
L1 UDLY -001.355 (kN/m)	L1 TY2 -001.092 (kN)
A1 D 077.010 (kN/m ³)	

Member 4 - MasterFrame Pro Loads

D1 UDLY -005.567 (kN/m)	A1 UDLY -005.831 (kN/m)
L1 UDLY -007.593 (kN/m)	G1 UDLY -001.266 (kN/m)
A1 D 077.010 (kN/m ³)	

**Members 5, 14, 18-19, 30-31, 35, 39-41, 47, 84, 86, 129, 136, 152, 156, 197,
233, 243, 248, 251 & 274 - MasterFrame Pro Loads**

A1 D 077.010 (kN/m ³)

Member 6 - MasterFrame Pro Loads

D1 PTRY -001.179 0.000 2.500 -002.358	A1 PTRY -001.771 0.000 2.500 -003.542
L1 PTRY -001.794 0.000 2.500 -003.589	G1 PTRY -000.385 0.000 2.500 -000.769
D1 UDLY -000.588 (kN/m)	D1 TY2 -000.489 (kN)
L1 UDLY -000.588 (kN/m)	L1 TY2 -000.489 (kN)
A1 D 077.010 (kN/m ³)	

Member 7 - MasterFrame Pro Loads

D1 PTY2 -000.995 0.000 0.844 (kN,m,m)	A1 PTY2 -001.494 0.000 0.844 (kN,m,m)
D1 PTRY -002.358 0.844 2.500 -003.031	A1 PTRY -003.542 0.844 2.500 -004.551
L1 PTY2 -001.514 0.000 0.844 (kN,m,m)	G1 PTY2 -000.324 0.000 0.844 (kN,m,m)
L1 PTRY -003.589 0.844 2.500 -004.612	G1 PTRY -000.769 0.844 2.500 -000.988
D1 PTRY -000.412 0.000 2.000 -001.332	D1 PTRY -001.332 2.000 2.500 -001.201
L1 PTRY -000.412 0.000 2.000 -001.332	L1 PTRY -001.332 2.000 2.500 -001.201
A1 D 077.010 (kN/m ³)	

Member 8 - MasterFrame Pro Loads

D1 PTRY -003.031 0.000 1.373 -003.588	A1 PTRY -004.551 0.000 1.373 -005.388
L1 PTRY -004.612 0.000 1.373 -005.459	G1 PTRY -000.988 0.000 1.373 -001.170
D1 UDLY -001.476 (kN/m)	L1 UDLY -001.476 (kN/m)
A1 D 077.010 (kN/m ³)	

Member 9 - MasterFrame Pro Loads

D1 UDLY -005.641 (kN/m)	A1 UDLY -005.831 (kN/m)
L1 UDLY -007.667 (kN/m)	G1 UDLY -001.266 (kN/m)
D1 TY2 -001.631 (kN)	A1 TY2 -002.449 (kN)
L1 TY2 -002.481 (kN)	G1 TY2 -000.532 (kN)
D1 PDLY -000.222 0.284 2.625 (kN,m,m)	D1 PTY2 -000.430 0.284 2.625 (kN,m,m)
L1 PDLY -000.222 0.284 2.625 (kN,m,m)	L1 PTY2 -000.430 0.284 2.625 (kN,m,m)
A1 D 077.010 (kN/m ³)	

Member 10 - MasterFrame Pro Loads

D1 TY2 -000.257 (kN)	A1 TY2 -000.386 (kN)
L1 TY2 -000.392 (kN)	G1 TY2 -000.084 (kN)
D1 PDLY -000.104 0.307 1.128 (kN,m,m)	L1 PDLY -000.104 0.307 1.128 (kN,m,m)
A1 D 077.010 (kN/m ³)	

Member 11 - MasterFrame Pro Loads

D1 UDLY -010.754 (kN/m)	A1 UDLY -011.265 (kN/m)
L1 UDLY -014.668 (kN/m)	G1 UDLY -002.446 (kN/m)
A1 D 077.010 (kN/m ³)	

Member 12 - MasterFrame Pro Loads

D1 PTRY -000.456 0.000 1.711 -001.149	A1 PTRY -000.685 0.000 1.711 -001.725
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L1 PTRY -000.694 0.000 1.711 -001.748	G1 PTRY -000.149 0.000 1.711 -000.375
D1 UDLY -000.347 (kN/m)	L1 UDLY -000.347 (kN/m)
A1 D 077.010 (kN/m ³)	

Member 13 - MasterFrame Pro Loads

D1 UDLY -009.983 (kN/m)	A1 UDLY -010.457 (kN/m)
L1 UDLY -013.616 (kN/m)	G1 UDLY -002.271 (kN/m)
A1 D 077.010 (kN/m ³)	

Members 15, 17, 26, 37 & 143 - MasterFrame Pro Loads

D1 UDLY -006.000 (kN/m)	A1 D 077.010 (kN/m ³)
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Member 16 - MasterFrame Pro Loads

D1 UDLY -033.345 (kN/m)	A1 UDLY -005.023 (kN/m)
L1 UDLY -018.090 (kN/m)	G1 UDLY -001.091 (kN/m)
A1 D 077.010 (kN/m ³)	

Member 20 - MasterFrame Pro Loads

D1 UDLY -033.345 (kN/m)	A1 UDLY -005.023 (kN/m)
L1 UDLY -018.090 (kN/m)	G1 UDLY -001.091 (kN/m)
D1 PY -021.000 3.355 (kN,m)	L1 PY -049.000 3.355 (kN,m)
A1 D 077.010 (kN/m ³)	

Members 21 & 23 - MasterFrame Pro Loads

D1 UDLY -033.977 (kN/m)	A1 UDLY -005.973 (kN/m)
L1 UDLY -019.052 (kN/m)	G1 UDLY -001.297 (kN/m)
A1 D 077.010 (kN/m ³)	

Member 22 - MasterFrame Pro Loads

D1 UDLY -033.977 (kN/m)	A1 UDLY -005.973 (kN/m)
L1 UDLY -019.052 (kN/m)	G1 UDLY -001.297 (kN/m)
D1 PY -006.000 1.000 (kN,m)	L1 PY -012.000 1.000 (kN,m)
D1 PY -021.000 0.757 (kN,m)	L1 PY -049.000 0.757 (kN,m)
A1 D 077.010 (kN/m ³)	

Member 24 - MasterFrame Pro Loads

D1 UDLY -010.071 (kN/m)	A1 UDLY -010.549 (kN/m)
L1 UDLY -013.736 (kN/m)	G1 UDLY -002.291 (kN/m)
A1 D 077.010 (kN/m ³)	

Member 25 - MasterFrame Pro Loads

D1 UDLY -027.025 (kN/m)	A1 UDLY -010.549 (kN/m)
L1 UDLY -025.690 (kN/m)	G1 UDLY -002.291 (kN/m)
D1 PY -006.000 3.355 (kN,m)	L1 PY -012.000 3.355 (kN,m)
D1 PY -012.000 4.473 (kN,m)	L1 PY -028.000 4.473 (kN,m)
A1 D 077.010 (kN/m ³)	

Members 27-28 - MasterFrame Pro Loads

D1 UDLY -005.875 (kN/m)	A1 UDLY -008.823 (kN/m)
L1 UDLY -008.940 (kN/m)	G1 UDLY -001.916 (kN/m)
A1 D 077.010 (kN/m ³)	

Member 29 - MasterFrame Pro Loads

D1 UDLY -027.025 (kN/m)	A1 UDLY -010.550 (kN/m)
L1 UDLY -025.690 (kN/m)	G1 UDLY -002.291 (kN/m)
D1 PY -006.000 2.417 (kN,m)	L1 PY -012.000 2.417 (kN,m)
D1 PY -012.000 1.500 (kN,m)	L1 PY -028.000 1.500 (kN,m)
A1 D 077.010 (kN/m ³)	

Member 32 - MasterFrame Pro Loads

D1 UDLY -010.717 (kN/m)	A1 UDLY -011.225 (kN/m)
L1 UDLY -014.617 (kN/m)	G1 UDLY -002.438 (kN/m)

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A1 D 077.010 (kN/m³)

Member 33 - MasterFrame Pro Loads

D1 UDLY -003.048	(kN/m)	A1 UDLY -004.577	(kN/m)
L1 UDLY -004.638	(kN/m)	G1 UDLY -000.994	(kN/m)
D1 PY -003.000 0.000	(kN,m)	L1 PY -007.000 0.000	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 34 - MasterFrame Pro Loads

D1 UDLY -003.048	(kN/m)	A1 UDLY -004.577	(kN/m)
L1 UDLY -004.638	(kN/m)	G1 UDLY -000.994	(kN/m)
D1 PY -003.000 0.750	(kN,m)	L1 PY -007.000 0.750	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 36 - MasterFrame Pro Loads

D1 UDLY -027.820	(kN/m)	A1 UDLY -011.743	(kN/m)
L1 UDLY -026.900	(kN/m)	G1 UDLY -002.550	(kN/m)
D1 PY -016.000 4.473	(kN,m)	L1 PY -039.000 4.473	(kN,m)
D1 PY -015.000 6.710	(kN,m)	L1 PY -030.000 6.710	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 38 - MasterFrame Pro Loads

D1 UDLY -005.290	(kN/m)	A1 UDLY -007.944	(kN/m)
L1 UDLY -008.050	(kN/m)	G1 UDLY -001.725	(kN/m)
D1 PY -015.000 1.593	(kN,m)	L1 PY -030.000 1.593	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 42 - MasterFrame Pro Loads

D1 TY2 -000.065	(kN)	A1 TY2 -000.097	(kN)
L1 TY2 -000.099	(kN)	G1 TY2 -000.021	(kN)
D1 PTRY -000.011 0.215 1.192 -000.039		D1 PTRY -000.039 1.192 1.436 -000.026	
L1 PTRY -000.011 0.215 1.192 -000.039		L1 PTRY -000.039 1.192 1.436 -000.026	
A1 D 077.010	(kN/m ³)		

Member 43 - MasterFrame Pro Loads

D1 UDLY -007.188	(kN/m)	A1 UDLY -010.794	(kN/m)
L1 UDLY -010.938	(kN/m)	G1 UDLY -002.344	(kN/m)
D1 PDLY -080.000 3.250 7.250 (kN,m,m)		L1 PDLY -060.000 3.250 7.250 (kN,m,m)	
D1 PY -016.000 2.800	(kN,m)	L1 PY -039.000 2.800	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 44 - MasterFrame Pro Loads

D1 UDLY -018.669	(kN/m)	A1 UDLY -000.691	(kN/m)
L1 UDLY -000.909	(kN/m)	G1 UDLY -000.150	(kN/m)
D1 TY2 -000.195	(kN)	A1 TY2 -000.293	(kN)
L1 TY2 -000.296	(kN)	G1 TY2 -000.064	(kN)
D1 PDLY -000.085 0.473 2.549 (kN,m,m)		L1 PDLY -000.085 0.473 2.549 (kN,m,m)	
A1 D 077.010	(kN/m ³)		

Member 45 - MasterFrame Pro Loads

D1 TRY -001.168 0.000 2.528 (kN,m,m)		A1 TRY -001.754 0.000 2.528 (kN,m,m)	
L1 TRY -001.777 0.000 2.528 (kN,m,m)		G1 TRY -000.381 0.000 2.528 (kN,m,m)	
D1 UDLY -018.206	(kN/m)	L1 UDLY -000.206	(kN/m)
D1 TY2 -000.195	(kN)	A1 TY2 -000.292	(kN)
L1 TY2 -000.296	(kN)	G1 TY2 -000.064	(kN)
D1 PDLY -000.077 0.804 2.549 (kN,m,m)		L1 PDLY -000.077 0.804 2.549 (kN,m,m)	
A1 D 077.010	(kN/m ³)		

Member 46 - MasterFrame Pro Loads

D1 UDLY -010.601	(kN/m)	A1 UDLY -011.105	(kN/m)
L1 UDLY -014.459	(kN/m)	G1 UDLY -002.412	(kN/m)
A1 D 077.010	(kN/m ³)		

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Member 48 - MasterFrame Pro Loads

D1 TRY	-001.444	0.024	3.151	(kN,m,m)	A1 TRY	-002.169	0.024	3.151	(kN,m,m)
L1 TRY	-002.198	0.024	3.151	(kN,m,m)	G1 TRY	-000.471	0.024	3.151	(kN,m,m)
D1 UDLY	-010.200			(kN/m)	L1 UDLY	-002.200			(kN/m)
A1 D	077.010			(kN/m ³)					

Member 49 - MasterFrame Pro Loads

D1 UDLY	-027.247			(kN/m)	A1 UDLY	-010.883			(kN/m)
L1 UDLY	-026.028			(kN/m)	G1 UDLY	-002.363			(kN/m)
D1 PY	-003.000	3.710		(kN,m)	L1 PY	-007.000	3.710		(kN,m)
D1 PY	-010.000	4.210		(kN,m)	L1 PY	-025.000	4.210		(kN,m)
A1 D	077.010			(kN/m ³)					

Member 50 - MasterFrame Pro Loads

D1 TY2	-000.200			(kN)	A1 TY2	-000.300			(kN)
L1 TY2	-000.304			(kN)	G1 TY2	-000.065			(kN)
D1 PDLY	-000.091	0.412	2.527	(kN,m,m)	L1 PDLY	-000.091	0.412	2.527	(kN,m,m)
D1 UDLY	-018.658			(kN/m)	A1 UDLY	-000.691			(kN/m)
L1 UDLY	-000.898			(kN/m)	G1 UDLY	-000.150			(kN/m)
A1 D	077.010			(kN/m ³)					

Member 51 - MasterFrame Pro Loads

D1 UDLY	-007.247			(kN/m)	A1 UDLY	-010.883			(kN/m)
L1 UDLY	-011.028			(kN/m)	G1 UDLY	-002.363			(kN/m)
A1 D	077.010			(kN/m ³)					

Member 52 - MasterFrame Pro Loads

D1 TY2	-000.200			(kN)	A1 TY2	-000.300			(kN)
L1 TY2	-000.304			(kN)	G1 TY2	-000.065			(kN)
D1 PDLY	-000.097	0.364	2.527	(kN,m,m)	L1 PDLY	-000.097	0.364	2.527	(kN,m,m)
D1 UDLY	-018.460			(kN/m)	A1 UDLY	-000.691			(kN/m)
L1 UDLY	-000.700			(kN/m)	G1 UDLY	-000.150			(kN/m)
D1 PTRY	-000.188	0.000	2.022	-000.210	D1 PTRY	-000.210	2.022	2.527	-000.188
L1 PTRY	-000.188	0.000	2.022	-000.210	L1 PTRY	-000.210	2.022	2.527	-000.188
A1 D	077.010			(kN/m ³)					

Member 53 - MasterFrame Pro Loads

D1 TY2	-000.041			(kN)	A1 TY2	-000.062			(kN)
L1 TY2	-000.062			(kN)	G1 TY2	-000.013			(kN)
D1 PDLY	-000.014	0.314	1.144	(kN,m,m)	D1 PTY2	-000.012	0.314	1.144	(kN,m,m)
L1 PDLY	-000.014	0.314	1.144	(kN,m,m)	L1 PTY2	-000.012	0.314	1.144	(kN,m,m)
D1 TRY	-000.522	0.000	1.127	(kN,m,m)	A1 TRY	-000.785	0.000	1.127	(kN,m,m)
L1 TRY	-000.795	0.000	1.127	(kN,m,m)	G1 TRY	-000.170	0.000	1.127	(kN,m,m)
D1 UDLY	-018.201			(kN/m)	L1 UDLY	-000.201			(kN/m)
A1 D	077.010			(kN/m ³)					

Member 54 - MasterFrame Pro Loads

D1 UDLY	-017.247			(kN/m)	A1 UDLY	-010.883			(kN/m)
L1 UDLY	-018.528			(kN/m)	G1 UDLY	-002.363			(kN/m)
D1 PY	-010.000	2.200		(kN,m)	L1 PY	-025.000	2.200		(kN,m)
A1 D	077.010			(kN/m ³)					

Member 55 - MasterFrame Pro Loads

D1 UDLY	-018.655			(kN/m)	A1 UDLY	-000.691			(kN/m)
L1 UDLY	-000.895			(kN/m)	G1 UDLY	-000.150			(kN/m)
D1 TY2	-000.205			(kN)	A1 TY2	-000.308			(kN)
L1 TY2	-000.312			(kN)	G1 TY2	-000.067			(kN)
D1 PDLY	-000.087	0.362	2.559	(kN,m,m)	L1 PDLY	-000.087	0.362	2.559	(kN,m,m)
A1 D	077.010			(kN/m ³)					

Member 56 - MasterFrame Pro Loads

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D1 UDLY -010.666	(kN/m)	A1 UDLY -000.691	(kN/m)
L1 UDLY -002.906	(kN/m)	G1 UDLY -000.150	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 57 - MasterFrame Pro Loads

D1 UDLY -018.666	(kN/m)	A1 UDLY -000.691	(kN/m)
L1 UDLY -000.906	(kN/m)	G1 UDLY -000.150	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 58 - MasterFrame Pro Loads

D1 TRY -000.548 0.021 1.202	(kN,m,m)	A1 TRY -000.823 0.021 1.202	(kN,m,m)
L1 TRY -000.834 0.021 1.202	(kN,m,m)	G1 TRY -000.179 0.021 1.202	(kN,m,m)
D1 UDLY -010.196	(kN/m)	L1 UDLY -002.196	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 59 - MasterFrame Pro Loads

D1 UDLY -010.665	(kN/m)	A1 UDLY -000.691	(kN/m)
L1 UDLY -002.905	(kN/m)	G1 UDLY -000.150	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 60 - MasterFrame Pro Loads

D1 UDLY -010.660	(kN/m)	A1 UDLY -000.691	(kN/m)
L1 UDLY -002.900	(kN/m)	G1 UDLY -000.150	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 61 - MasterFrame Pro Loads

D1 UDLY -006.218	(kN/m)	A1 UDLY -005.406	(kN/m)
L1 UDLY -008.096	(kN/m)	G1 UDLY -001.174	(kN/m)
D1 PTRY -002.192 0.000 3.507	-003.599	A1 PTRY -003.292 0.000 3.507	-005.406
L1 PTRY -003.335 0.000 3.507	-005.477	G1 PTRY -000.715 0.000 3.507	-001.174
D1 TY2 -000.697	(kN)	L1 TY2 -000.697	(kN)
A1 D 077.010	(kN/m ³)		

Member 62 - MasterFrame Pro Loads

D1 TRY -000.640 0.017 1.400	(kN,m,m)	A1 TRY -000.961 0.017 1.400	(kN,m,m)
L1 TRY -000.974 0.017 1.400	(kN,m,m)	G1 TRY -000.209 0.017 1.400	(kN,m,m)
D1 UDLY -010.200	(kN/m)	L1 UDLY -002.200	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 63 - MasterFrame Pro Loads

D1 UDLY -026.559	(kN/m)	A1 UDLY -009.850	(kN/m)
L1 UDLY -024.980	(kN/m)	G1 UDLY -002.139	(kN/m)
D1 PY -010.000 4.210	(kN,m)	L1 PY -025.000 4.210	(kN,m)
D1 PY -010.000 1.710	(kN,m)	L1 PY -025.000 1.710	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 64 - MasterFrame Pro Loads

D1 UDLY -006.559	(kN/m)	A1 UDLY -009.850	(kN/m)
L1 UDLY -009.980	(kN/m)	G1 UDLY -002.139	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 65 - MasterFrame Pro Loads

D1 UDLY -026.559	(kN/m)	A1 UDLY -009.850	(kN/m)
L1 UDLY -024.980	(kN/m)	G1 UDLY -002.139	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 66 - MasterFrame Pro Loads

D1 UDLY -000.656	(kN/m)	A1 UDLY -000.691	(kN/m)
L1 UDLY -000.896	(kN/m)	G1 UDLY -000.150	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 67 - MasterFrame Pro Loads

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D1 UDLY -010.662	(kN/m)	A1 UDLY -000.691	(kN/m)
L1 UDLY -002.902	(kN/m)	G1 UDLY -000.150	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 68 - MasterFrame Pro Loads

D1 PY -003.000 0.750	(kN,m)	L1 PY -007.000 0.750	(kN,m)
D1 PY -006.000 0.000	(kN,m)	L1 PY -012.000 0.000	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 69 - MasterFrame Pro Loads

D1 UDLY -018.450	(kN/m)	A1 UDLY -000.389	(kN/m)
L1 UDLY -000.586	(kN/m)	G1 UDLY -000.085	(kN/m)
D1 TRY -000.731 0.000 1.520	(kN,m,m)	A1 TRY -001.098 0.000 1.520	(kN,m,m)
L1 TRY -001.113 0.000 1.520	(kN,m,m)	G1 TRY -000.238 0.000 1.520	(kN,m,m)
A1 D 077.010	(kN/m ³)		

Member 70 - MasterFrame Pro Loads

D1 UDLY -020.000	(kN/m)	L1 UDLY -015.000	(kN/m)
D1 PY -010.000 3.042	(kN,m)	L1 PY -025.000 3.042	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 71 - MasterFrame Pro Loads

D1 UDLY -010.259	(kN/m)	A1 UDLY -000.390	(kN/m)
L1 UDLY -002.395	(kN/m)	G1 UDLY -000.085	(kN/m)
D1 PY -021.000 2.884	(kN,m)	L1 PY -049.000 2.884	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 72 - MasterFrame Pro Loads

D1 UDLY -026.481	(kN/m)	A1 UDLY -009.733	(kN/m)
L1 UDLY -024.861	(kN/m)	G1 UDLY -002.114	(kN/m)
D1 PY -003.000 4.210	(kN,m)	L1 PY -007.000 4.210	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 73 - MasterFrame Pro Loads

D1 UDLY -019.262	(kN/m)	A1 UDLY -000.390	(kN/m)
L1 UDLY -001.398	(kN/m)	G1 UDLY -000.085	(kN/m)
D1 PTRY -002.069 0.000 3.715	-003.398	A1 PTRY -003.108 0.000 3.715	-005.104
L1 PTRY -003.149 0.000 3.715	-005.171	G1 PTRY -000.675 0.000 3.715	-001.108
D1 TY2 -000.675	(kN)	L1 TY2 -000.675	(kN)
A1 D 077.010	(kN/m ³)		

Member 74 - MasterFrame Pro Loads

D1 UDLY -023.452	(kN/m)	A1 UDLY -005.184	(kN/m)
L1 UDLY -020.252	(kN/m)	G1 UDLY -001.126	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 75 - MasterFrame Pro Loads

D1 TY1 -000.018	(kN)	A1 TY1 -000.027	(kN)
L1 TY1 -000.027	(kN)	G1 TY1 -000.006	(kN)
D1 PTRY +000.000 0.164 0.195	-000.029	D1 PTRY -000.029 0.195 0.286	-000.029
D1 PTRY -000.029 0.286 0.316	+000.000	L1 PTRY +000.000 0.164 0.195	-000.029
L1 PTRY -000.029 0.195 0.286	-000.029	L1 PTRY -000.029 0.286 0.316	+000.000
D1 TRY -000.072 0.079 0.316	(kN,m,m)	A1 TRY -000.108 0.079 0.316	(kN,m,m)
L1 TRY -000.109 0.079 0.316	(kN,m,m)	G1 TRY -000.023 0.079 0.316	(kN,m,m)
D1 UDLY -036.000	(kN/m)	A1 D 077.010	(kN/m ³)

Member 76 - MasterFrame Pro Loads

D1 UDLY -027.103	(kN/m)	A1 UDLY -010.666	(kN/m)
L1 UDLY -025.807	(kN/m)	G1 UDLY -002.316	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 77 - MasterFrame Pro Loads

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D1 UDLY -010.259	(kN/m)	A1 UDLY -000.390	(kN/m)
L1 UDLY -002.395	(kN/m)	G1 UDLY -000.085	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 78 - MasterFrame Pro Loads

D1 TRY -000.530 0.000 2.005	(kN,m,m)	A1 TRY -000.797 0.000 2.005	(kN,m,m)
L1 TRY -000.807 0.000 2.005	(kN,m,m)	G1 TRY -000.173 0.000 2.005	(kN,m,m)
D1 UDLY -010.000	(kN/m)	L1 UDLY -002.000	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 79 - MasterFrame Pro Loads

D1 TRY -000.072 0.000 0.237	(kN,m,m)	A1 TRY -000.108 0.000 0.237	(kN,m,m)
L1 TRY -000.109 0.000 0.237	(kN,m,m)	G1 TRY -000.023 0.000 0.237	(kN,m,m)
D1 UDLY -010.000	(kN/m)	L1 UDLY -002.000	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 80 - MasterFrame Pro Loads

D1 PY -010.000 0.110	(kN,m)	L1 PY -025.000 0.110	(kN,m)
A1 D 077.010	(kN/m ³)		

Members 81, 83, 88, 91-92, 94, 104, 110, 113-115, 119, 154-155, 160-161, 165,

170, 181-182, 196, 232, 236 & 240 - MasterFrame Pro Loads			
D1 UDLY -010.000	(kN/m)	L1 UDLY -007.500	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 82 - MasterFrame Pro Loads

D1 UDLY -010.000	(kN/m)	L1 UDLY -007.500	(kN/m)
D1 PY -003.000 1.201	(kN,m)	L1 PY -007.000 1.201	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 85 - MasterFrame Pro Loads

D1 UDLY -006.648	(kN/m)	A1 UDLY -009.984	(kN/m)
L1 UDLY -010.116	(kN/m)	G1 UDLY -002.168	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 87 - MasterFrame Pro Loads

D1 UDLY -010.000	(kN/m)	L1 UDLY -007.500	(kN/m)
D1 PY -003.000 0.860	(kN,m)	L1 PY -007.000 0.860	(kN,m)
D1 PY -006.000 0.000	(kN,m)	L1 PY -012.000 0.000	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 89 - MasterFrame Pro Loads

D1 UDLY -010.000	(kN/m)	L1 UDLY -007.500	(kN/m)
D1 PY -010.000 0.600	(kN,m)	L1 PY -025.000 0.600	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 90 - MasterFrame Pro Loads

D1 UDLY -010.000	(kN/m)	L1 UDLY -007.500	(kN/m)
D1 PY -003.000 1.202	(kN,m)	L1 PY -007.000 1.202	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 93 - MasterFrame Pro Loads

D1 UDLY -010.000	(kN/m)	L1 UDLY -007.500	(kN/m)
D1 PY -001.500 0.125	(kN,m)	L1 PY -005.500 0.125	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 95 - MasterFrame Pro Loads

D1 UDLY -010.000	(kN/m)	L1 UDLY -007.500	(kN/m)
D1 PY -021.000 2.884	(kN,m)	L1 PY -049.000 2.884	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 96 - MasterFrame Pro Loads

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D1 UDLY -010.000	(kN/m)	L1 UDLY -007.500	(kN/m)
D1 PY -006.000 0.700	(kN,m)	L1 PY -012.000 0.700	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 97 - MasterFrame Pro Loads

D1 UDLY -003.029	(kN/m)	A1 UDLY -004.549	(kN/m)
L1 UDLY -004.609	(kN/m)	G1 UDLY -000.988	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 98 - MasterFrame Pro Loads

D1 UDLY -025.461	(kN/m)	A1 UDLY -008.201	(kN/m)
L1 UDLY -023.310	(kN/m)	G1 UDLY -001.781	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 99 - MasterFrame Pro Loads

D1 UDLY -002.432	(kN/m)	A1 UDLY -003.652	(kN/m)
L1 UDLY -003.701	(kN/m)	G1 UDLY -000.793	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 100 - MasterFrame Pro Loads

D1 UDLY -010.000	(kN/m)	L1 UDLY -007.500	(kN/m)
D1 PY -001.500 1.575	(kN,m)	L1 PY -005.500 1.575	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 101 - MasterFrame Pro Loads

D1 UDLY -022.960	(kN/m)	A1 UDLY -004.446	(kN/m)
L1 UDLY -019.505	(kN/m)	G1 UDLY -000.965	(kN/m)
D1 PY -003.000 0.000	(kN,m)	L1 PY -007.000 0.000	(kN,m)
D1 PY -030.000 1.591	(kN,m)	L1 PY -070.000 1.591	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 102 - MasterFrame Pro Loads

D1 UDLY -006.611	(kN/m)	A1 UDLY -009.928	(kN/m)
L1 UDLY -010.060	(kN/m)	G1 UDLY -002.155	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 103 - MasterFrame Pro Loads

D1 TY1 -000.845	(kN)	A1 TY1 -001.268	(kN)
L1 TY1 -001.285	(kN)	G1 TY1 -000.275	(kN)
L1 PDLY -000.671 0.000 1.913	(kN,m,m)	L1 PTY1 -001.409 0.000 1.913	(kN,m,m)
D1 TY2 -000.753	(kN)	A1 TY2 -001.131	(kN)
L1 TY2 -001.146	(kN)	G1 TY2 -000.245	(kN)
L1 PDLY -000.495 0.303 2.051	(kN,m,m)	L1 PTY2 -001.013 0.303 2.051	(kN,m,m)
A1 D 077.010	(kN/m ³)		

Member 105 - MasterFrame Pro Loads

D1 UDLY -005.546	(kN/m)	A1 UDLY -008.329	(kN/m)
L1 UDLY -008.439	(kN/m)	G1 UDLY -001.808	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 106 - MasterFrame Pro Loads

D1 UDLY -011.925	(kN/m)	A1 UDLY -002.891	(kN/m)
L1 UDLY -010.429	(kN/m)	G1 UDLY -000.628	(kN/m)
A1 D 077.010	(kN/m ³)		

Members 107-109, 112, 116 & 121 - MasterFrame Pro Loads

D1 UDLY -010.000	(kN/m)	L1 UDLY -002.000	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 111 - MasterFrame Pro Loads

D1 UDLY -002.960	(kN/m)	A1 UDLY -004.446	(kN/m)
L1 UDLY -004.505	(kN/m)	G1 UDLY -000.965	(kN/m)

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D1 PDLY -005.401 8.393 8.844 (kN,m,m) L1 PDLY -003.601 8.393 8.844 (kN,m,m)
A1 D 077.010 (kN/m³)

Member 117 - MasterFrame Pro Loads

D1 PTRY -001.752 0.000 2.000 -001.718 A1 PTRY -002.631 0.000 2.000 -002.580
L1 PTRY -002.666 0.000 2.000 -002.614 G1 PTRY -000.571 0.000 2.000 -000.560
D1 UDLY -001.927 (kN/m) A1 UDLY -002.894 (kN/m)
L1 UDLY -002.932 (kN/m) G1 UDLY -000.628 (kN/m)
A1 D 077.010 (kN/m³)

Member 118 - MasterFrame Pro Loads

D1 PTRY -001.718 0.000 2.000 -001.684 A1 PTRY -002.580 0.000 2.000 -002.529
L1 PTRY -002.614 0.000 2.000 -002.562 G1 PTRY -000.560 0.000 2.000 -000.549
D1 UDLY -001.925 (kN/m) A1 UDLY -002.891 (kN/m)
L1 UDLY -002.929 (kN/m) G1 UDLY -000.628 (kN/m)
A1 D 077.010 (kN/m³)

Member 120 - MasterFrame Pro Loads

D1 TY2 -001.713 (kN) A1 TY2 -002.573 (kN)
L1 TY2 -002.607 (kN) G1 TY2 -000.559 (kN)
D1 PY -000.004 3.036 (kN,m) L1 PY -000.003 3.036 (kN,m)
A1 D 077.010 (kN/m³)

Member 122 - MasterFrame Pro Loads

D1 TY2 -001.707 (kN) A1 TY2 -002.564 (kN)
L1 TY2 -002.598 (kN) G1 TY2 -000.557 (kN)
A1 D 077.010 (kN/m³)

Member 123 - MasterFrame Pro Loads

D1 TY2 -001.491 (kN) A1 TY2 -002.239 (kN)
L1 TY2 -002.269 (kN) G1 TY2 -000.486 (kN)
A1 D 077.010 (kN/m³)

Member 124 - MasterFrame Pro Loads

D1 UDLY -001.119 (kN/m) A1 UDLY -001.681 (kN/m)
L1 UDLY -001.704 (kN/m) G1 UDLY -000.365 (kN/m)
A1 D 077.010 (kN/m³)

Member 125 - MasterFrame Pro Loads

D1 PTRY -001.751 0.000 2.000 -001.717 A1 PTRY -002.630 0.000 2.000 -002.579
L1 PTRY -002.665 0.000 2.000 -002.614 G1 PTRY -000.571 0.000 2.000 -000.560
A1 D 077.010 (kN/m³)

Member 126 - MasterFrame Pro Loads

D1 PTRY -001.717 0.000 2.000 -001.684 A1 PTRY -002.579 0.000 2.000 -002.528
L1 PTRY -002.614 0.000 2.000 -002.562 G1 PTRY -000.560 0.000 2.000 -000.549
A1 D 077.010 (kN/m³)

Member 127 - MasterFrame Pro Loads

D1 UDLY -004.177 (kN/m) A1 UDLY -004.351 (kN/m)
L1 UDLY -005.689 (kN/m) G1 UDLY -000.945 (kN/m)
A1 D 077.010 (kN/m³)

Member 128 - MasterFrame Pro Loads

D1 TY1 -000.995 (kN) A1 TY1 -001.494 (kN)
L1 TY1 -001.514 (kN) G1 TY1 -000.324 (kN)
D1 PDLY -000.105 0.000 1.875 (kN,m,m) D1 PTY1 -000.370 0.000 1.875 (kN,m,m)
L1 PDLY -000.105 0.000 1.875 (kN,m,m) L1 PTY1 -000.370 0.000 1.875 (kN,m,m)
A1 D 077.010 (kN/m³)

Member 130 - MasterFrame Pro Loads

D1 UDLY -018.495 (kN/m) A1 UDLY -000.515 (kN/m)

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L1 UDLY -000.674	(kN/m)	G1 UDLY -000.112	(kN/m)
A1 D 077.010	(kN/m³)		

Member 131 - MasterFrame Pro Loads

D1 UDLY -000.492	(kN/m)	A1 UDLY -000.515	(kN/m)
L1 UDLY -000.671	(kN/m)	G1 UDLY -000.112	(kN/m)
D1 PY -030.000 3.261	(kN,m)	L1 PY -070.000 3.261	(kN,m)
A1 D 077.010	(kN/m³)		

Member 132 - MasterFrame Pro Loads

D1 UDLY -005.422	(kN/m)	A1 UDLY -004.318	(kN/m)
L1 UDLY -006.922	(kN/m)	G1 UDLY -000.938	(kN/m)
D1 PTRY -002.875 0.000 8.286 -002.920		A1 PTRY -004.318 0.000 8.286 -004.385	
L1 PTRY -004.375 0.000 8.286 -004.443		G1 PTRY -000.937 0.000 8.286 -000.952	
A1 D 077.010	(kN/m³)		

Member 133 - MasterFrame Pro Loads

D1 UDLY -008.274	(kN/m)	A1 UDLY -008.636	(kN/m)
L1 UDLY -011.275	(kN/m)	G1 UDLY -001.876	(kN/m)
A1 D 077.010	(kN/m³)		

Member 134 - MasterFrame Pro Loads

D1 UDLY -004.231	(kN/m)	A1 UDLY -004.385	(kN/m)
L1 UDLY -005.754	(kN/m)	G1 UDLY -000.952	(kN/m)
A1 D 077.010	(kN/m³)		

Member 135 - MasterFrame Pro Loads

D1 UDLY -008.251	(kN/m)	A1 UDLY -008.636	(kN/m)
L1 UDLY -011.253	(kN/m)	G1 UDLY -001.876	(kN/m)
A1 D 077.010	(kN/m³)		

Member 137 - MasterFrame Pro Loads

D1 UDLY -018.496	(kN/m)	A1 UDLY -000.515	(kN/m)
L1 UDLY -000.675	(kN/m)	G1 UDLY -000.112	(kN/m)
A1 D 077.010	(kN/m³)		

Member 138 - MasterFrame Pro Loads

D1 UDLY -005.329	(kN/m)	A1 UDLY -004.318	(kN/m)
L1 UDLY -006.830	(kN/m)	G1 UDLY -000.938	(kN/m)
D1 PTRY -001.968 0.000 1.911 -002.872		A1 PTRY -002.955 0.000 1.911 -004.313	
D1 PDLY -018.309 1.911 8.286 (kN,m,m)		A1 PDLY -027.496 1.911 8.286 (kN,m,m)	
L1 PTRY -002.994 0.000 1.911 -004.370		G1 PTRY -000.642 0.000 1.911 -000.937	
L1 PDLY -027.861 1.911 8.286 (kN,m,m)		G1 PDLY -005.970 1.911 8.286 (kN,m,m)	
A1 D 077.010	(kN/m³)		

Member 139 - MasterFrame Pro Loads

D1 PTRY -001.820 0.000 2.066 -002.656		A1 PTRY -002.733 0.000 2.066 -003.989	
L1 PTRY -002.769 0.000 2.066 -004.042		G1 PTRY -000.593 0.000 2.066 -000.866	
D1 UDLY -000.883	(kN/m)	D1 TY2 -000.249	(kN)
L1 UDLY -000.883	(kN/m)	L1 TY2 -000.249	(kN)
A1 D 077.010	(kN/m³)		

Member 140 - MasterFrame Pro Loads

D1 TY2 -001.712	(kN)	A1 TY2 -002.571	(kN)
L1 TY2 -002.605	(kN)	G1 TY2 -000.558	(kN)
D1 PDLY -000.237 0.143 2.909 (kN,m,m)		D1 PTY2 -000.557 0.143 2.909 (kN,m,m)	
L1 PDLY -000.237 0.143 2.909 (kN,m,m)		L1 PTY2 -000.557 0.143 2.909 (kN,m,m)	
A1 D 077.010	(kN/m³)		

Member 141 - MasterFrame Pro Loads

D1 UDLY -004.147	(kN/m)	A1 UDLY -004.313	(kN/m)
L1 UDLY -005.645	(kN/m)	G1 UDLY -000.937	(kN/m)

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D1 TY2 -009.615	(kN)	A1 TY2 -014.440	(kN)
L1 TY2 -014.632	(kN)	G1 TY2 -003.135	(kN)
D1 PDLY -000.997 0.133 6.375	(kN,m,m)	D1 PTY2 -003.173 0.133 6.375	(kN,m,m)
L1 PDLY -000.997 0.133 6.375	(kN,m,m)	L1 PTY2 -003.173 0.133 6.375	(kN,m,m)
A1 D 077.010	(kN/m³)		

Member 142 - MasterFrame Pro Loads

D1 UDLY -018.498	(kN/m)	A1 UDLY -000.515	(kN/m)
L1 UDLY -000.677	(kN/m)	G1 UDLY -000.112	(kN/m)
A1 D 077.010	(kN/m³)		

Member 144 - MasterFrame Pro Loads

D1 UDLY -012.497	(kN/m)	A1 UDLY -000.515	(kN/m)
L1 UDLY -008.676	(kN/m)	G1 UDLY -000.112	(kN/m)
A1 D 077.010	(kN/m³)		

Member 145 - MasterFrame Pro Loads

D1 UDLY -010.192	(kN/m)	A1 UDLY -004.358	(kN/m)
L1 UDLY -005.706	(kN/m)	G1 UDLY -000.946	(kN/m)
D1 PY -002.000 3.473	(kN,m)	L1 PY -005.000 3.473	(kN,m)
D1 PY -002.000 2.515	(kN,m)	L1 PY -005.000 2.515	(kN,m)
A1 D 077.010	(kN/m³)		

Member 146 - MasterFrame Pro Loads

D1 PY -006.000 0.100	(kN,m)	L1 PY -012.000 0.100	(kN,m)
A1 D 077.010	(kN/m³)		

Member 147 - MasterFrame Pro Loads

D1 UDLY -010.000	(kN/m)	L1 UDLY -007.500	(kN/m)
D1 PY -012.000 2.958	(kN,m)	L1 PY -028.000 2.958	(kN,m)
A1 D 077.010	(kN/m³)		

Members 148, 158, 172, 183, 188, 198, 202, 222 & 237 - MasterFrame Pro Loads

D1 UDLY -012.000	(kN/m)	L1 UDLY -008.000	(kN/m)
A1 D 077.010	(kN/m³)		

Member 149 - MasterFrame Pro Loads

D1 PTRY -001.177 0.000 3.200 -002.472		A1 PTRY -001.768 0.000 3.200 -003.712	
L1 PTRY -001.791 0.000 3.200 -003.762		G1 PTRY -000.384 0.000 3.200 -000.806	
D1 UDLY -000.619	(kN/m)	D1 TY2 -000.683	(kN)
L1 UDLY -000.619	(kN/m)	L1 TY2 -000.683	(kN)
A1 D 077.010	(kN/m³)		

Members 150 & 162 - MasterFrame Pro Loads

D1 UDLY -018.494	(kN/m)	A1 UDLY -000.515	(kN/m)
L1 UDLY -000.673	(kN/m)	G1 UDLY -000.112	(kN/m)
A1 D 077.010	(kN/m³)		

Members 151 & 163 - MasterFrame Pro Loads

D1 UDLY -012.492	(kN/m)	A1 UDLY -000.515	(kN/m)
L1 UDLY -008.671	(kN/m)	G1 UDLY -000.112	(kN/m)
A1 D 077.010	(kN/m³)		

Member 153 - MasterFrame Pro Loads

D1 PTRY -002.897 0.000 3.651 -002.926		A1 PTRY -004.351 0.000 3.651 -004.394	
D1 PTY1 -000.195 3.651 3.784 (kN,m,m)		A1 PTY1 -000.293 3.651 3.784 (kN,m,m)	
L1 PTRY -004.409 0.000 3.651 -004.452		G1 PTRY -000.945 0.000 3.651 -000.954	
L1 PTY1 -000.296 3.651 3.784 (kN,m,m)		G1 PTY1 -000.064 3.651 3.784 (kN,m,m)	
D1 UDLY -001.270	(kN/m)	L1 UDLY -001.270	(kN/m)
A1 D 077.010	(kN/m³)		

Member 157 - MasterFrame Pro Loads

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D1 UDLY -005.421	(kN/m)	A1 UDLY -004.358	(kN/m)
L1 UDLY -006.935	(kN/m)	G1 UDLY -000.946	(kN/m)
D1 TRY -020.558 0.000 7.015	(kN,m,m)	A1 TRY -030.874 0.000 7.015	(kN,m,m)
L1 TRY -031.284 0.000 7.015	(kN,m,m)	G1 TRY -006.704 0.000 7.015	(kN,m,m)
A1 D 077.010	(kN/m ³)		

Member 159 - MasterFrame Pro Loads

D1 PTRY -002.472 0.000 0.785 -002.790		A1 PTRY -003.712 0.000 0.785 -004.189	
L1 PTRY -003.762 0.000 0.785 -004.245		G1 PTRY -000.806 0.000 0.785 -000.910	
D1 UDLY -001.171	(kN/m)	L1 UDLY -001.171	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 164 - MasterFrame Pro Loads

D1 TRY -010.492 0.000 3.518 (kN,m,m)		A1 TRY -015.757 0.000 3.518 (kN,m,m)	
L1 TRY -015.967 0.000 3.518 (kN,m,m)		G1 TRY -003.421 0.000 3.518 (kN,m,m)	
D1 UDLY -002.579	(kN/m)	L1 UDLY -002.579	(kN/m)
D1 PTRY -002.897 0.000 3.651 -002.926		A1 PTRY -004.351 0.000 3.651 -004.394	
L1 PTRY -004.409 0.000 3.651 -004.452		G1 PTRY -000.945 0.000 3.651 -000.954	
A1 D 077.010	(kN/m ³)		

Member 166 - MasterFrame Pro Loads

D1 TRY -010.010 0.000 3.380 (kN,m,m)		A1 TRY -015.032 0.000 3.380 (kN,m,m)	
L1 TRY -015.232 0.000 3.380 (kN,m,m)		G1 TRY -003.264 0.000 3.380 (kN,m,m)	
D1 UDLY -005.500	(kN/m)	L1 UDLY -007.027	(kN/m)
A1 UDLY -004.396	(kN/m)	G1 UDLY -000.954	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 167 - MasterFrame Pro Loads

D1 UDLY -004.727	(kN/m)	A1 UDLY -004.358	(kN/m)
L1 UDLY -006.241	(kN/m)	G1 UDLY -000.946	(kN/m)
D1 PTRY -001.244 0.000 6.953 -001.314		A1 PTRY -001.868 0.000 6.953 -001.973	
D1 PTY1 -000.041 6.953 7.015 (kN,m,m)		A1 PTY1 -000.062 6.953 7.015 (kN,m,m)	
L1 PTRY -001.893 0.000 6.953 -002.000		G1 PTRY -000.406 0.000 6.953 -000.429	
L1 PTY1 -000.062 6.953 7.015 (kN,m,m)		G1 PTY1 -000.013 6.953 7.015 (kN,m,m)	
A1 D 077.010	(kN/m ³)		

Member 168 - MasterFrame Pro Loads

D1 PTRY -001.244 0.000 6.953 -001.314		A1 PTRY -001.868 0.000 6.953 -001.973	
L1 PTRY -001.893 0.000 6.953 -002.000		G1 PTRY -000.406 0.000 6.953 -000.428	
D1 UDLY -001.824	(kN/m)	L1 UDLY -001.824	(kN/m)
D1 TRY -020.237 0.000 6.814 (kN,m,m)		A1 TRY -030.391 0.000 6.814 (kN,m,m)	
L1 TRY -030.795 0.000 6.814 (kN,m,m)		G1 TRY -006.599 0.000 6.814 (kN,m,m)	
A1 D 077.010	(kN/m ³)		

Member 169 - MasterFrame Pro Loads

D1 UDLY -005.138	(kN/m)	A1 UDLY -004.415	(kN/m)
L1 UDLY -006.672	(kN/m)	G1 UDLY -000.959	(kN/m)
D1 PTY2 -000.065 0.000 0.078 (kN,m,m)		A1 PTY2 -000.097 0.000 0.078 (kN,m,m)	
D1 PTRY -001.651 0.078 2.455 -002.722		A1 PTRY -002.480 0.078 2.455 -004.088	
D1 PTRY -002.722 2.455 6.814 -002.940		A1 PTRY -004.088 2.455 6.814 -004.415	
L1 PTY2 -000.099 0.000 0.078 (kN,m,m)		G1 PTY2 -000.021 0.000 0.078 (kN,m,m)	
L1 PTRY -002.513 0.078 2.455 -004.142		G1 PTRY -000.538 0.078 2.455 -000.888	
L1 PTRY -004.142 2.455 6.814 -004.474		G1 PTRY -000.888 2.455 6.814 -000.959	
D1 TY2 -001.450	(kN)	L1 TY2 -001.450	(kN)
A1 D 077.010	(kN/m ³)		

Member 171 - MasterFrame Pro Loads

D1 TY1 -000.005	(kN)	A1 TY1 -000.008	(kN)
L1 TY1 -000.008	(kN)	G1 TY1 -000.002	(kN)
D1 PTRY +000.000 0.000 0.080 -000.030		D1 PTRY -000.030 0.080 0.321 -000.030	
D1 PTRY -000.030 0.321 0.401 +000.000		L1 PTRY +000.000 0.000 0.080 -000.030	
L1 PTRY -000.030 0.080 0.321 -000.030		L1 PTRY -000.030 0.321 0.401 +000.000	

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A1 D 077.010 (kN/m³)

Member 173 - MasterFrame Pro Loads

D1 PTRY -001.560 0.000 2.515 -002.572	A1 PTRY -002.344 0.000 2.515 -003.863
L1 PTRY -002.375 0.000 2.515 -003.915	G1 PTRY -000.509 0.000 2.515 -000.839
D1 UDLY -000.774 (kN/m)	D1 TY2 -000.407 (kN)
L1 UDLY -000.774 (kN/m)	L1 TY2 -000.407 (kN)
A1 D 077.010 (kN/m ³)	

Member 174 - MasterFrame Pro Loads

D1 TY2 -001.752 (kN)	A1 TY2 -002.632 (kN)
L1 TY2 -002.667 (kN)	G1 TY2 -000.571 (kN)
D1 PDLY -000.265 0.230 3.130 (kN,m,m)	D1 PTY2 -000.541 0.230 3.130 (kN,m,m)
L1 PDLY -000.265 0.230 3.130 (kN,m,m)	L1 PTY2 -000.541 0.230 3.130 (kN,m,m)
A1 D 077.010 (kN/m ³)	

Member 175 - MasterFrame Pro Loads

D1 PTRY -002.725 0.000 4.355 -002.943	A1 PTRY -004.092 0.000 4.355 -004.419
L1 PTRY -004.146 0.000 4.355 -004.478	G1 PTRY -000.888 0.000 4.355 -000.960
D1 UDLY -001.259 (kN/m)	L1 UDLY -001.259 (kN/m)
D1 TY2 -003.805 (kN)	A1 TY2 -005.715 (kN)
L1 TY2 -005.791 (kN)	G1 TY2 -001.241 (kN)
D1 PDLY -000.472 0.217 4.355 (kN,m,m)	D1 PTY2 -001.182 0.217 4.355 (kN,m,m)
L1 PDLY -000.472 0.217 4.355 (kN,m,m)	L1 PTY2 -001.182 0.217 4.355 (kN,m,m)
A1 D 077.010 (kN/m ³)	

Members 176 & 193 - MasterFrame Pro Loads

D1 UDLY -018.497 (kN/m)	A1 UDLY -000.515 (kN/m)
L1 UDLY -000.676 (kN/m)	G1 UDLY -000.112 (kN/m)
A1 D 077.010 (kN/m ³)	

Member 177 - MasterFrame Pro Loads

D1 UDLY -012.343 (kN/m)	A1 UDLY -000.515 (kN/m)
L1 UDLY -008.522 (kN/m)	G1 UDLY -000.112 (kN/m)
D1 TY1 -000.045 (kN)	L1 TY1 -000.045 (kN)
A1 D 077.010 (kN/m ³)	

Members 178 & 187 - MasterFrame Pro Loads

D1 UDLY -033.624 (kN/m)	A1 UDLY -005.443 (kN/m)
L1 UDLY -018.515 (kN/m)	G1 UDLY -001.182 (kN/m)
A1 D 077.010 (kN/m ³)	

Member 179 - MasterFrame Pro Loads

D1 UDLY -012.498 (kN/m)	A1 UDLY -000.515 (kN/m)
L1 UDLY -008.677 (kN/m)	G1 UDLY -000.112 (kN/m)
A1 D 077.010 (kN/m ³)	

Member 180 - MasterFrame Pro Loads

D1 TY2 -000.005 (kN)	A1 TY2 -000.007 (kN)
L1 TY2 -000.007 (kN)	G1 TY2 -000.002 (kN)
D1 PTRY +000.000 0.137 0.190 -000.013	D1 PTRY -000.013 0.190 0.348 -000.013
D1 PTRY -000.013 0.348 0.401 +000.000	L1 PTRY +000.000 0.137 0.190 -000.013
L1 PTRY -000.013 0.190 0.348 -000.013	L1 PTRY -000.013 0.348 0.401 +000.000
D1 TY1 -000.005 (kN)	A1 TY1 -000.007 (kN)
L1 TY1 -000.007 (kN)	G1 TY1 -000.002 (kN)
D1 PY -000.001 0.052 (kN,m)	L1 PY -000.001 0.052 (kN,m)
A1 D 077.010 (kN/m ³)	

Member 184 - MasterFrame Pro Loads

D1 UDLY -000.020 (kN/m)	A1 UDLY -000.030 (kN/m)
L1 UDLY -000.030 (kN/m)	G1 UDLY -000.007 (kN/m)
A1 D 077.010 (kN/m ³)	

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Member 185 - MasterFrame Pro Loads

D1 UDLY -017.865	(kN/m)	A1 UDLY -008.808	(kN/m)
L1 UDLY -021.925	(kN/m)	G1 UDLY -001.913	(kN/m)
D1 PY -004.000 3.350	(kN,m)	L1 PY -008.000 3.350	(kN,m)
D1 PY -010.000 5.400	(kN,m)	L1 PY -025.000 5.400	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 186 - MasterFrame Pro Loads

D1 UDLY -003.623	(kN/m)	A1 UDLY -005.440	(kN/m)
L1 UDLY -005.513	(kN/m)	G1 UDLY -001.182	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 189 - MasterFrame Pro Loads

D1 UDLY -017.809	(kN/m)	A1 UDLY -008.724	(kN/m)
L1 UDLY -021.840	(kN/m)	G1 UDLY -001.895	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 190 - MasterFrame Pro Loads

D1 UDLY -025.750	(kN/m)	A1 UDLY -008.635	(kN/m)
L1 UDLY -023.750	(kN/m)	G1 UDLY -001.875	(kN/m)
D1 PY -010.000 4.257	(kN,m)	L1 PY -025.000 4.257	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 191 - MasterFrame Pro Loads

D1 PTRY -001.120 0.000 1.482 -001.650		A1 PTRY -001.682 0.000 1.482 -002.478	
L1 PTRY -001.704 0.000 1.482 -002.511		G1 PTRY -000.365 0.000 1.482 -000.538	
D1 UDLY -000.544	(kN/m)	D1 TY2 -000.114	(kN)
L1 UDLY -000.544	(kN/m)	L1 TY2 -000.114	(kN)
A1 D 077.010	(kN/m ³)		

Member 192 - MasterFrame Pro Loads

D1 UDLY -002.933	(kN/m)	A1 UDLY -004.404	(kN/m)
L1 UDLY -004.463	(kN/m)	G1 UDLY -000.956	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 194 - MasterFrame Pro Loads

D1 UDLY -012.497	(kN/m)	A1 UDLY -000.515	(kN/m)
L1 UDLY -008.676	(kN/m)	G1 UDLY -000.112	(kN/m)
D1 PY -010.000 0.500	(kN,m)	L1 PY -025.000 0.500	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 195 - MasterFrame Pro Loads

D1 UDLY -010.000	(kN/m)	L1 UDLY -007.500	(kN/m)
D1 PY -010.000 0.500	(kN,m)	L1 PY -025.000 0.500	(kN,m)
A1 D 077.010	(kN/m ³)		

Member 199 - MasterFrame Pro Loads

D1 UDLY -025.905	(kN/m)	A1 UDLY -008.868	(kN/m)
L1 UDLY -023.986	(kN/m)	G1 UDLY -001.926	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 200 - MasterFrame Pro Loads

D1 UDLY -016.487	(kN/m)	A1 UDLY -006.738	(kN/m)
L1 UDLY -019.828	(kN/m)	G1 UDLY -001.463	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 201 - MasterFrame Pro Loads

D1 UDLY -034.295	(kN/m)	A1 UDLY -006.451	(kN/m)
L1 UDLY -023.536	(kN/m)	G1 UDLY -001.401	(kN/m)
A1 D 077.010	(kN/m ³)		

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Member 203 - MasterFrame Pro Loads

D1 TY1 -000.032	(kN)	A1 TY1 -000.048	(kN)
L1 TY1 -000.049	(kN)	G1 TY1 -000.010	(kN)
D1 PTRY +000.000 0.000 0.084 -000.076		D1 PTRY -000.076 0.084 0.280 -000.002	
L1 PTRY +000.000 0.000 0.084 -000.076		L1 PTRY -000.076 0.084 0.280 -000.002	
A1 D 077.010	(kN/m³)		

Members 204 & 225 - MasterFrame Pro Loads

D1 UDLY -033.498	(kN/m)	A1 UDLY -005.253	(kN/m)
L1 UDLY -018.323	(kN/m)	G1 UDLY -001.141	(kN/m)
A1 D 077.010	(kN/m³)		

Member 205 - MasterFrame Pro Loads

D1 UDLY -027.612	(kN/m)	A1 UDLY -011.432	(kN/m)
L1 UDLY -033.800	(kN/m)	G1 UDLY -002.483	(kN/m)
A1 D 077.010	(kN/m³)		

Member 206 - MasterFrame Pro Loads

D1 TRY -000.106 0.000 0.257 (kN,m,m)		A1 TRY -000.159 0.000 0.257 (kN,m,m)	
L1 TRY -000.161 0.000 0.257 (kN,m,m)		G1 TRY -000.035 0.000 0.257 (kN,m,m)	
D1 TY1 -000.051	(kN)	L1 TY1 -000.051	(kN)
D1 UDLY -012.000	(kN/m)	L1 UDLY -008.000	(kN/m)
A1 D 077.010	(kN/m³)		

Member 207 - MasterFrame Pro Loads

D1 UDLY -001.829	(kN/m)	A1 UDLY -002.747	(kN/m)
L1 UDLY -002.784	(kN/m)	G1 UDLY -000.597	(kN/m)
A1 D 077.010	(kN/m³)		

Member 208 - MasterFrame Pro Loads

D1 TY1 -000.010	(kN)	A1 TY1 -000.015	(kN)
L1 TY1 -000.016	(kN)	G1 TY1 -000.003	(kN)
D1 TY2 -000.010	(kN)	A1 TY2 -000.015	(kN)
L1 TY2 -000.016	(kN)	G1 TY2 -000.003	(kN)
A1 D 077.010	(kN/m³)		

Member 209 - MasterFrame Pro Loads

D1 UDLY -012.000	(kN/m)	L1 UDLY -008.000	(kN/m)
D1 PY -024.000 0.600	(kN,m)	L1 PY -056.000 0.600	(kN,m)
A1 D 077.010	(kN/m³)		

Member 210 - MasterFrame Pro Loads

D1 UDLY -003.874	(kN/m)	A1 UDLY -005.819	(kN/m)
L1 UDLY -014.487	(kN/m)	G1 UDLY -001.264	(kN/m)
A1 D 077.010	(kN/m³)		

Member 211 - MasterFrame Pro Loads

D1 UDLY -006.634	(kN/m)	A1 UDLY -009.964	(kN/m)
L1 UDLY -024.658	(kN/m)	G1 UDLY -002.164	(kN/m)
A1 D 077.010	(kN/m³)		

Member 212 - MasterFrame Pro Loads

D1 UDLY -016.487	(kN/m)	A1 UDLY -006.738	(kN/m)
L1 UDLY -019.828	(kN/m)	G1 UDLY -001.464	(kN/m)
A1 D 077.010	(kN/m³)		

Member 213 - MasterFrame Pro Loads

D1 UDLY -022.241	(kN/m)	A1 UDLY -003.365	(kN/m)
L1 UDLY -018.410	(kN/m)	G1 UDLY -000.730	(kN/m)
A1 D 077.010	(kN/m³)		

Members 214 & 224 - MasterFrame Pro Loads

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D1 UDLY -002.760	(kN/m)	A1 UDLY -004.145	(kN/m)
L1 UDLY -004.200	(kN/m)	G1 UDLY -000.900	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 215 - MasterFrame Pro Loads

D1 UDLY -005.120	(kN/m)	A1 UDLY -007.688	(kN/m)
L1 UDLY -007.791	(kN/m)	G1 UDLY -001.670	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 216 - MasterFrame Pro Loads

D1 TY1 -000.010	(kN)	A1 TY1 -000.015	(kN)
L1 TY1 -000.016	(kN)	G1 TY1 -000.003	(kN)
D1 UDLY -012.000	(kN/m)	L1 UDLY -008.000	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 217 - MasterFrame Pro Loads

D1 TY2 -000.739	(kN)	A1 TY2 -001.109	(kN)
L1 TY2 -001.124	(kN)	G1 TY2 -000.241	(kN)
D1 PY -000.004 2.034	(kN,m)	L1 PY -000.003 2.034	(kN,m)
L1 PDLY -000.595 0.256 2.034	(kN,m,m)	L1 PTY2 -000.978 0.256 2.034	(kN,m,m)
D1 UDLY -020.000	(kN/m)	L1 UDLY -015.000	(kN/m)
A1 D 077.010	(kN/m ³)		

Member 218 - MasterFrame Pro Loads

D1 TY2 -000.507	(kN)	A1 TY2 -000.762	(kN)
L1 TY2 -000.772	(kN)	G1 TY2 -000.165	(kN)
L1 PDLY -001.179 0.242 1.590	(kN,m,m)	D1 UDLY -002.760	(kN/m)
A1 UDLY -004.145	(kN/m)	L1 UDLY -010.190	(kN/m)
G1 UDLY -000.900	(kN/m)	A1 D 077.010	(kN/m ³)

Member 219 - MasterFrame Pro Loads

D1 PTRY -000.638 0.000 3.963 -002.227		A1 PTRY -000.958 0.000 3.963 -003.345	
D1 PTY1 -000.753 3.963 4.639 (kN,m,m)		A1 PTY1 -001.131 3.963 4.639 (kN,m,m)	
L1 PTRY -000.971 0.000 3.963 -003.389		G1 PTRY -000.208 0.000 3.963 -000.726	
L1 PTY1 -001.146 3.963 4.639 (kN,m,m)		G1 PTY1 -000.245 3.963 4.639 (kN,m,m)	
D1 PDLY -000.024 1.533 3.302 (kN,m,m)		D1 PTY1 -000.038 1.533 3.302 (kN,m,m)	
L1 PDLY -000.018 1.533 3.302 (kN,m,m)		L1 PTY1 -000.028 1.533 3.302 (kN,m,m)	
D1 PDLY -000.072 0.331 1.533 (kN,m,m)		L1 PDLY -000.054 0.331 1.533 (kN,m,m)	
L1 PTRY -001.643 0.000 3.711 -004.118		L1 PTRY -004.118 3.711 4.639 -002.894	
D1 PY -000.009 1.533 (kN,m)		L1 PY -000.020 1.533 (kN,m)	
D1 UDLY -003.317 (kN/m)		A1 UDLY -004.982 (kN/m)	
L1 UDLY -012.418 (kN/m)		G1 UDLY -001.082 (kN/m)	
A1 D 077.010 (kN/m ³)			

Member 220 - MasterFrame Pro Loads

D1 PTRY -000.726 0.000 3.147 -001.852		A1 PTRY -001.090 0.000 3.147 -002.782	
L1 PTRY -001.105 0.000 3.147 -002.819		G1 PTRY -000.237 0.000 3.147 -000.604	
D1 PDLY -037.458 1.273 3.147 (kN,m,m)		L1 PDLY -028.093 1.273 3.147 (kN,m,m)	
D1 PDLY -025.415 0.000 1.273 (kN,m,m)		L1 PDLY -019.061 0.000 1.273 (kN,m,m)	
L1 UDLY -001.994 (kN/m)		L1 TY2 -002.940 (kN)	
D1 PY -002.994 1.273 (kN,m)		L1 PY -006.986 1.273 (kN,m)	
A1 D 077.010 (kN/m ³)			

Member 221 - MasterFrame Pro Loads

D1 UDLY -022.367 (kN/m)		A1 UDLY -003.555 (kN/m)	
L1 UDLY -018.602 (kN/m)		G1 UDLY -000.772 (kN/m)	
A1 D 077.010 (kN/m ³)			

Member 223 - MasterFrame Pro Loads

D1 UDLY -017.865 (kN/m)		A1 UDLY -008.808 (kN/m)	
L1 UDLY -021.925 (kN/m)		G1 UDLY -001.913 (kN/m)	
D1 PY -004.000 2.215 (kN,m)		L1 PY -008.000 2.215 (kN,m)	

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D1 PY -010.000 1.300 (kN,m)	L1 PY -025.000 1.300 (kN,m)
A1 D 077.010 (kN/m³)	

Member 226 - MasterFrame Pro Loads

D1 UDLY -007.361 (kN/m)	A1 UDLY -011.053 (kN/m)
L1 UDLY -011.201 (kN/m)	G1 UDLY -002.400 (kN/m)
A1 D 077.010 (kN/m³)	

Member 227 - MasterFrame Pro Loads

D1 UDLY -003.749 (kN/m)	A1 UDLY -005.630 (kN/m)
L1 UDLY -005.705 (kN/m)	G1 UDLY -001.223 (kN/m)
A1 D 077.010 (kN/m³)	

Member 228 - MasterFrame Pro Loads

D1 UDLY -017.119 (kN/m)	A1 UDLY -007.688 (kN/m)
L1 UDLY -020.790 (kN/m)	G1 UDLY -001.670 (kN/m)
A1 D 077.010 (kN/m³)	

Member 229 - MasterFrame Pro Loads

D1 UDLY -007.918 (kN/m)	A1 UDLY -011.890 (kN/m)
L1 UDLY -012.049 (kN/m)	G1 UDLY -002.582 (kN/m)
A1 D 077.010 (kN/m³)	

Member 230 - MasterFrame Pro Loads

D1 UDLY -007.596 (kN/m)	A1 UDLY -011.407 (kN/m)
L1 UDLY -011.559 (kN/m)	G1 UDLY -002.477 (kN/m)
A1 D 077.010 (kN/m³)	

Member 231 - MasterFrame Pro Loads

D1 UDLY -006.573 (kN/m)	A1 UDLY -009.871 (kN/m)
L1 UDLY -010.002 (kN/m)	G1 UDLY -002.144 (kN/m)
A1 D 077.010 (kN/m³)	

Member 234 - MasterFrame Pro Loads

D1 UDLY -011.829 (kN/m)	A1 UDLY -002.747 (kN/m)
L1 UDLY -010.283 (kN/m)	G1 UDLY -000.596 (kN/m)
A1 D 077.010 (kN/m³)	

Member 235 - MasterFrame Pro Loads

D1 UDLY -027.360 (kN/m)	A1 UDLY -011.053 (kN/m)
L1 UDLY -026.200 (kN/m)	G1 UDLY -002.400 (kN/m)
D1 PY -003.000 2.267 (kN,m)	L1 PY -007.000 2.267 (kN,m)
A1 D 077.010 (kN/m³)	

Member 238 - MasterFrame Pro Loads

D1 PTRY -002.499 0.000 0.246 -002.598	A1 PTRY -003.753 0.000 0.246 -003.901
L1 PTRY -003.802 0.000 0.246 -003.953	G1 PTRY -000.815 0.000 0.246 -000.847
L1 UDLY -017.927 (kN/m)	D1 UDLY -003.317 (kN/m)
A1 UDLY -004.982 (kN/m)	G1 UDLY -001.082 (kN/m)
A1 D 077.010 (kN/m³)	

Member 239 - MasterFrame Pro Loads

D1 UDLY -027.918 (kN/m)	A1 UDLY -011.890 (kN/m)
L1 UDLY -027.049 (kN/m)	G1 UDLY -002.582 (kN/m)
A1 D 077.010 (kN/m³)	

Member 241 - MasterFrame Pro Loads

D1 PTRY -001.852 0.000 0.700 -002.103	A1 PTRY -002.782 0.000 0.700 -003.158
L1 PTRY -002.819 0.000 0.700 -003.200	G1 PTRY -000.604 0.000 0.700 -000.686
D1 PY -000.004 0.000 (kN,m)	L1 PY -000.003 0.000 (kN,m)
L1 UDLY -019.489 (kN/m)	D1 UDLY -020.000 (kN/m)
D1 PY -003.000 0.493 (kN,m)	L1 PY -007.000 0.493 (kN,m)

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A1 D 077.010 (kN/m³)

Member 242 - MasterFrame Pro Loads

D1 PTY2 -000.845 0.000 0.716 (kN,m,m)	A1 PTY2 -001.268 0.000 0.716 (kN,m,m)
D1 PTRY -002.359 0.716 0.977 -002.452	A1 PTRY -003.543 0.716 0.977 -003.683
L1 PTY2 -001.285 0.000 0.716 (kN,m,m)	G1 PTY2 -000.275 0.000 0.716 (kN,m,m)
L1 PTRY -003.590 0.716 0.977 -003.732	G1 PTRY -000.769 0.716 0.977 -000.800
L1 UDLY -015.982 (kN/m)	L1 TY2 -002.240 (kN)
D1 UDLY -020.000 (kN/m)	A1 D 077.010 (kN/m ³)

Member 244 - MasterFrame Pro Loads

D1 UDLY -024.295 (kN/m)	A1 UDLY -006.450 (kN/m)
L1 UDLY -021.536 (kN/m)	G1 UDLY -001.401 (kN/m)
D1 TRY -008.393 0.000 2.020 (kN,m,m)	A1 TRY -012.605 0.000 2.020 (kN,m,m)
L1 TRY -012.772 0.000 2.020 (kN,m,m)	G1 TRY -002.737 0.000 2.020 (kN,m,m)
D1 PDLY -000.033 0.000 1.745 (kN,m,m)	D1 PTY1 -000.102 0.000 1.745 (kN,m,m)
L1 PDLY -000.025 0.000 1.745 (kN,m,m)	L1 PTY1 -000.076 0.000 1.745 (kN,m,m)
A1 D 077.010 (kN/m ³)	

Member 245 - MasterFrame Pro Loads

D1 UDLY -003.256 (kN/m)	A1 UDLY -004.890 (kN/m)
L1 UDLY -004.955 (kN/m)	G1 UDLY -001.062 (kN/m)
D1 PTRY -002.675 0.000 1.438 -003.253	A1 PTRY -004.017 0.000 1.438 -004.886
D1 PTRY -003.253 1.438 1.500 -003.058	A1 PTRY -004.886 1.438 1.500 -004.593
L1 PTRY -004.071 0.000 1.438 -004.951	G1 PTRY -000.872 0.000 1.438 -001.061
L1 PTRY -004.951 1.438 1.500 -004.654	G1 PTRY -001.061 1.438 1.500 -000.997
A1 D 077.010 (kN/m ³)	

Member 246 - MasterFrame Pro Loads

D1 TRY -004.877 0.000 0.975 (kN,m,m)	A1 TRY -007.324 0.000 0.975 (kN,m,m)
L1 TRY -007.422 0.000 0.975 (kN,m,m)	G1 TRY -001.590 0.000 0.975 (kN,m,m)
D1 UDLY -023.214 (kN/m)	A1 UDLY -004.923 (kN/m)
L1 UDLY -019.941 (kN/m)	G1 UDLY -001.069 (kN/m)
A1 D 077.010 (kN/m ³)	

Member 247 - MasterFrame Pro Loads

D1 PTRY -002.525 0.000 1.523 -003.071	A1 PTRY -003.792 0.000 1.523 -004.612
L1 PTRY -003.842 0.000 1.523 -004.673	G1 PTRY -000.823 0.000 1.523 -001.001
D1 UDLY -020.000 (kN/m)	L1 UDLY -015.000 (kN/m)
A1 D 077.010 (kN/m ³)	

Member 249 - MasterFrame Pro Loads

D1 UDLY -023.267 (kN/m)	A1 UDLY -004.906 (kN/m)
L1 UDLY -019.972 (kN/m)	G1 UDLY -001.065 (kN/m)
D1 TY1 -001.491 (kN)	A1 TY1 -002.239 (kN)
L1 TY1 -002.269 (kN)	G1 TY1 -000.486 (kN)
A1 D 077.010 (kN/m ³)	

Member 250 - MasterFrame Pro Loads

D1 UDLY -024.295 (kN/m)	A1 UDLY -006.450 (kN/m)
L1 UDLY -021.536 (kN/m)	G1 UDLY -001.401 (kN/m)
A1 D 077.010 (kN/m ³)	

Members 252-272 - MasterFrame Pro Loads

D0 D 077.010 (kN/m³)

Member 273 - MasterFrame Pro Loads

D1 UDLY -001.829 (kN/m)	A1 UDLY -002.747 (kN/m)
L1 UDLY -002.783 (kN/m)	G1 UDLY -000.596 (kN/m)
D1 PDLY -031.744 1.587 3.174 (kN,m,m)	L1 PDLY -023.808 1.587 3.174 (kN,m,m)
D1 PDLY -006.000 0.000 0.600 (kN,m,m)	L1 PDLY -004.500 0.000 0.600 (kN,m,m)
A1 D 077.010 (kN/m ³)	

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Members 275 & 277-278 - MasterFrame Pro Loads

D1 UDLY -020.000	(kN/m)	L1 UDLY -015.000	(kN/m)
A1 D 077.010	(kN/m³)		

Member 276 - MasterFrame Pro Loads

D1 UDLY -023.317	(kN/m)	A1 UDLY -004.982	(kN/m)
L1 UDLY -027.252	(kN/m)	G1 UDLY -001.082	(kN/m)
A1 D 077.010	(kN/m³)		

Member Orientation

- Member 252 B +067.64
- Members 253, 257, 259-260 & 266 B +180.00
- Member 254 B +157.63
- Members 255-256, 262 & 265 B +090.00
- Member 258 B +067.63
- Members 261, 263, 267 & 270-271 B +070.76
- Members 264 & 269 B +090.01
- Member 268 B -089.99
- Member 272 B +070.73

Member End Releases

Symbols	End 1 torsion-minor-major	End 2 torsion-minor-major	O Released	® Fixed			
1	®®® ®®®	2	®®® ®®®	4	®®® ®®®	5	®®® ®®®
6	®®® ®®®	7	®®® ®®®	9	®®® ®®®	11	®®® ®®®
12	®®® ®®®	13	®®® ®®®	14	®®® ®®®	15	®®® ®®®
17	®®® ®®®	18	®®® ®®®	20	®®® ®®®	22	®®® ®®®
23	®®® ®®®	24	®®® ®®®	25	®®® ®®®	26	®®® ®®®
27	®®® ®®®	29	®®® ®®®	32	®®® ®®®	33	®®® ®®®
34	®®® ®®®	35	®®® ®®®	36	®®® ®®®	37	®®® ®®®
38	®®® ®®®	41	®®® ®®®	42	®®® ®®®	43	®®® ®®®
44	®®® ®®®	45	®®® ®®®	46	®®® ®®®	47	®®® ®®®
48	®®® ®®®	49	®®® ®®®	50	®®® ®®®	51	®®® ®®®
53	®®® ®®®	54	®®® ®®®	55	®®® ®®®	56	®®® ®®®
57	®®® ®®®	58	®®® ®®®	61	®®® ®®®	62	®®® ®®®
63	®®® ®®®	64	®®® ®®®	65	®®® ®®®	66	®®® ®®®
67	®®® ®®®	68	®®® ®®®	69	®®® ®®®	70	®®® ®®®
71	®®® ®®®	72	®®® ®®®	73	®®® ®®®	74	®®® ®®®
75	®®® ®®®	76	®®® ®®®	79	®®® ®®®	81	®®® ®®®
82	®®® ®®®	85	®®® ®®®	86	®®® ®®®	87	®®® ®®®
88	®®® ®®®	90	®®® ®®®	91	®®® ®®®	92	®®® ®®®
93	®®® ®®®	94	®®® ®®®	95	®®® ®®®	98	®®® ®®®
99	®®® ®®®	100	®®® ®®®	101	®®® ®®®	102	®®® ®®®
103	®®® ®®®	104	®®® ®®®	105	®®® ®®®	106	®®® ®®®
108	®®® ®®®	109	®®® ®®®	110	®®® ®®®	112	®®® ®®®
114	®®® ®®®	115	®®® ®®®	116	®®® ®®®	117	®®® ®®®
118	®®® ®®®	119	®®® ®®®	121	®®® ®®®	122	®®® ®®®
123	®®® ®®®	124	®®® ®®®	127	®®® ®®®	128	®®® ®®®
129	®®® ®®®	130	®®® ®®®	131	®®® ®®®	132	®®® ®®®
133	®®® ®®®	135	®®® ®®®	137	®®® ®®®	138	®®® ®®®
139	®®® ®®®	140	®®® ®®®	141	®®® ®®®	142	®®® ®®®

PHILIP WRIGHT ASSOCIATES

25554

Wellington St
Westhoughton,
Bolton, Lanes, BL5 3YW
Tel: 01942 811532

Job Ref : 2500
Sheet : /
Made by : PW
Date : 27 February 2024 / Ver. 2022.07.14
Checked :
Approved :

143	000	000	144	000	000	145	000	000	146	000	000
147	000	000	148	000	000	150	000	000	151	000	000
153	000	000	155	000	000	156	000	000	157	000	000
158	000	000	160	000	000	161	000	000	162	000	000
163	000	000	164	000	000	165	000	000	167	000	000
168	000	000	169	000	000	170	000	000	171	000	000
172	000	000	173	000	000	174	000	000	175	000	000
176	000	000	177	000	000	178	000	000	179	000	000
180	000	000	181	000	000	182	000	000	184	000	000
185	000	000	186	000	000	189	000	000	190	000	000
192	000	000	195	000	000	196	000	000	197	000	000
198	000	000	199	000	000	200	000	000	201	000	000
203	000	000	204	000	000	205	000	000	207	000	000
208	000	000	209	000	000	210	000	000	211	000	000
212	000	000	213	000	000	214	000	000	215	000	000
217	000	000	218	000	000	220	000	000	221	000	000
223	000	000	225	000	000	226	000	000	227	000	000
228	000	000	229	000	000	230	000	000	231	000	000
232	000	000	233	000	000	235	000	000	237	000	000
238	000	000	239	000	000	240	000	000	241	000	000
242	000	000	243	000	000	244	000	000	245	000	000
246	000	000	247	000	000	248	000	000	249	000	000
250	000	000	251	000	000	273	000	000	274	000	000
275	000	000	276	000	000	277	000	000	278	000	000

Nodal Loading and Support Conditions

NODES 21-23, 25, 28, 37-38, 42-46, 51, 56, 72-73, 79, 91-92, 103, 109, 116, 136, 152, 160-162, 164-166, 170, 175-178, 180 & 182-183

UT Rs 1 1 1 0 0 0 (Pinned)

NODES 1-3, 6-10 & 15-16

UT Rs 1 1 1 1 1 1 (Fixed)

NODES 12, 19-20 & 98

UT Rs 1 1 1 0 0 0 (Pinned)

NODES 4-5, 11, 13-14 & 17-18

UT Rs 1 1 1 0 1 0

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Nodal Deflections Ultimate (001 : Ultimate Limit State (Final Stage))

Node	Nodal Displacements (mm)				Nodal Rotations (Degrees) (about axis)			
	$\delta X \rightarrow$	$\delta Y \uparrow$	$\delta Z \nearrow$	δXYZ	$\phi X \rightarrow$	$\phi Y \uparrow$	$\phi Z \nearrow$	ϕXYZ
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.24	0.00	-0.18	0.30
42	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.11
45	0.00	0.00	0.00	0.00	0.16	0.00	-0.07	0.17
51	0.00	0.00	0.00	0.00	0.01	0.00	-0.19	0.19
64	0.00	-31.66	0.00	31.66	0.01	0.00	-0.37	0.37
80	0.00	-1.89	-0.15	1.89	0.00	0.00	0.00	0.00
82	0.00	-2.42	0.00	2.42	0.00	0.00	0.00	0.00
91	0.00	0.00	0.00	0.00	0.62	0.00	0.05	0.62
92	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.62
103	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.62
111	-0.05	-8.56	-0.20	8.56	-0.62	-0.02	0.00	0.62
113	-0.02	-3.07	0.00	3.07	0.00	0.00	0.00	0.00
116	0.00	0.00	0.00	0.00	0.02	0.00	0.62	0.62
118	-0.31	-28.18	-0.07	28.18	-0.16	0.00	0.20	0.25
119	-0.22	-40.74	-0.07	40.74	0.31	0.00	0.07	0.32
120	-0.23	-46.74	-0.05	46.74	0.73	0.00	-0.44	0.85
128	-0.19	-55.17	-0.16	55.17	1.59	0.00	0.87	1.81
130	0.00	-1.12	-0.13	1.13	0.00	0.00	0.00	0.00
136	0.00	0.00	0.00	0.00	0.66	0.00	-0.02	0.66
148	0.00	-0.10	0.01	0.11	0.00	0.00	0.00	0.00
155	0.00	-8.99	0.00	8.99	-0.47	0.00	-0.51	0.69
156	0.00	-8.30	-0.05	8.30	-0.44	0.00	0.02	0.44
158	0.00	-1.98	-0.03	1.98	0.00	0.00	0.00	0.00
159	0.00	-0.70	0.00	0.70	0.00	0.00	0.00	0.00
181	0.00	-18.13	-0.02	18.13	-0.82	0.00	0.01	0.82
182	0.00	0.00	0.00	0.00	-0.80	0.00	0.81	1.14

Member Forces Ultimate (001 : Ultimate Limit State (Final Stage))

Mem ber No.	Node End1 End2	Axial Force (kN)	Torque Moment (kN.m)	Shear Force (kN)		Bending Moment (kN.m)		Maximum Moment (kN.m @ m)		Maximum Deflection (mm @ m)
				x-x	y-y	x-x	y-y	x-x	y-y	
1	21	0.00C	0.01	15.63	0.00	-0.01	0.00	31.14		10.26
	22	0.00C	-0.01	-29.40	0.00	0.00	0.00	@ 3.096		@ 2.815
2	21	0.03T	-0.01	104.86	0.00	0.00	0.00	250.76	0.00	5.48
	26	0.03T	0.01	92.27	0.00	250.76	0.00	@ 2.500	@ 0.000	@ 2.500
3	22	0.00C	-0.01	66.97	0.00	-0.04	0.00	98.90		17.32
	23	0.00C	0.01	-75.33	0.00	-0.03	0.00	@ 2.801		@ 2.713
4	23	0.00C	-0.01	65.32	0.12	0.00	0.00	74.44	0.43	6.62
	24	0.00C	0.01	-35.20	0.12	52.83	0.43	@ 2.280	@ 3.507	@ 1.999

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Member Forces Ultimate (001 : Ultimate Limit State (Final Stage))

Mem ber No.	Node End1 End2	Axial Force (kN)	Torque Moment (kN.m)	Shear Force (kN)		Bending Moment (kN.m)		Maximum Moment (kN.m @ m)		Maximum Deflection (mm @ m)
				x-x	y-y	x-x	y-y	x-x	y-y	
5	24	0.01T	-0.01	-177.20	-1.44	52.88	0.43	74.44	0.43	6.62
	25	0.01T	0.01	-177.36	-1.44	0.00	0.00	@ 2.280	@ 3.507	@ 1.999
6	26	0.03T	0.00	-85.01	0.00	250.76	0.00	250.76	0.00	5.48
	27	0.03T	0.00	-119.00	0.00	0.00	0.00	@ 2.500	@ 0.000	@ 2.500
7	27	0.01T	0.00	224.14	0.00	0.00	0.00	519.08	-0.01	24.19
	29	0.01T	0.00	182.75	0.00	518.20	0.00	@ 2.769	@ 4.977	@ 3.364
8	29	0.01T	0.02	6.39	0.00	518.20	0.00	519.08	-0.01	24.19
	30	0.01T	-0.02	-27.68	0.00	504.11	0.00	@ 2.769	@ 4.977	@ 3.364
9	30	0.02T	-0.01	41.82	0.00	0.00	0.00	28.73	0.00	0.44
	31	0.02T	0.01	-45.64	0.00	0.00	0.00	@ 1.340	@ 0.000	@ 1.313
10	30	0.01C	0.00	-69.49	-0.01	504.12	0.00	519.08	-0.01	24.19
	33	0.01C	0.00	-72.17	-0.01	424.58	-0.01	@ 2.769	@ 4.977	@ 3.364
11	31	0.01T	0.00	96.19	0.00	0.00	0.00	84.34	0.00	2.01
	32	0.01T	0.00	-96.19	0.00	0.00	0.00	@ 1.754	@ 0.000	@ 1.754
12	33	0.01C	0.01	-243.12	0.01	424.60	-0.01	519.08	-0.01	24.19
	34	0.01C	-0.01	-254.33	0.01	0.00	0.00	@ 2.769	@ 4.977	@ 3.364
13	35	0.11C	0.00	118.64	0.14	0.00	0.00	137.94	0.47	2.96
	36	0.11C	0.00	-60.31	0.14	102.30	0.47	@ 2.315	@ 3.507	@ 1.999
14	36	0.14T	0.00	-342.35	-1.59	102.15	0.47	137.94	0.47	2.96
	38	0.14T	0.00	-342.53	-1.59	0.00	0.00	@ 2.315	@ 3.507	@ 1.999
15	37	69.36T	-0.01	111.06	0.00	0.00	0.00	252.66	0.00	18.97
	39	69.36T	0.01	87.96	0.00	252.66	0.00	@ 2.539	@ 0.000	@ 2.514
16	38	0.00C	0.00	105.16	0.00	-0.02	0.00	66.13		0.95
	42	0.00C	0.00	-175.25	0.00	-117.59	0.00	@ 1.241		@ 1.409
17	39	69.36T	-0.01	-89.69	0.00	252.66	0.00	252.66	0.00	18.97
	40	69.36T	0.01	-112.44	0.00	0.00	0.00	@ 2.539	@ 0.000	@ 2.514
18	40	69.79T	0.01	422.47	-0.01	0.00	0.00	1256.67	-0.19	30.85
	41	69.79T	-0.01	415.54	-0.01	1047.63	-0.03	@ 5.001	@ 7.498	@ 4.381
19	41	69.79T	0.23	239.99	-0.03	1047.64	-0.03	1256.67	-0.19	30.85
	55	69.79T	-0.23	239.92	-0.03	1053.27	-0.03	@ 5.001	@ 7.498	@ 4.381
20	42	0.00C	0.00	175.26	0.00	-117.59	0.00	66.15		0.95
	43	0.00C	0.00	-212.96	0.00	0.00	0.00	@ 2.101		@ 1.932
21	43	0.00C	0.00	37.07	0.00	0.00	0.00	7.81		0.00
	44	0.00C	0.00	-37.12	0.00	-0.02	0.00	@ 0.422		@ 0.000

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Member Forces Ultimate (001 : Ultimate Limit State (Final Stage))

Mem ber No.	Node End1 End2	Axial Force (kN)	Torque Moment (kN.m)	Shear Force (kN)		Bending Moment (kN.m)		Maximum Moment (kN.m @ m)		Maximum Deflection (mm @ m)
				x-x	y-y	x-x	y-y	x-x	y-y	
22	44	0.00C	0.00	291.37	0.00	0.00	0.00	247.47		2.51
	45	0.00C	0.00	-208.66	0.00	0.00	0.00	@ 1.770		@ 1.986
23	45	0.00C	0.00	169.55	0.00	0.00	0.00	163.41		1.41
	46	0.00C	0.00	-169.55	0.00	0.00	0.00	@ 1.928		@ 1.928
24	47	0.46T	0.01	89.92	0.00	0.00	0.00	78.84	0.00	2.89
	48	0.46T	-0.01	-89.92	0.00	0.00	0.00	@ 1.754	@ 0.000	@ 1.754
25	49	0.02C	0.00	351.22	0.00	0.00	0.00	647.01	0.00	25.11
	50	0.02C	0.00	-371.75	0.00	0.00	0.00	@ 3.425	@ 0.000	@ 3.355
26	51	0.31T	0.01	62.40	0.00	0.00	0.00	128.73	0.00	16.67
	64	0.31T	-0.01	39.84	0.00	128.79	0.00	@ 2.519	@ 0.000	@ 2.519
27	52	0.03C	-0.03	516.57	0.00	0.00	0.00	1119.17	0.00	37.68
	53	0.03C	0.03	486.01	0.00	422.79	0.00	@ 4.011	@ 0.000	@ 4.388
28	53	0.03C	-0.03	365.72	0.00	422.76	0.00	1119.17	0.00	37.68
	54	0.03C	0.03	338.55	0.00	686.86	0.00	@ 4.011	@ 0.000	@ 4.388
29	54	0.03C	-0.03	317.11	0.00	686.86	0.00	1119.17	0.00	37.68
	56	0.03C	0.03	-461.28	0.00	0.00	0.00	@ 4.011	@ 0.000	@ 4.388
30	55	69.79T	0.03	85.55	-0.02	1053.26	-0.03	1256.67	-0.19	30.85
	57	69.79T	-0.03	78.68	-0.02	1256.68	-0.08	@ 5.001	@ 7.498	@ 4.381
31	57	69.79T	-0.75	-96.59	0.01	1256.67	-0.08	1256.67	-0.19	30.85
	67	69.79T	0.75	-96.72	0.01	1252.21	-0.08	@ 5.001	@ 7.498	@ 4.381
32	58	3.88C	-0.02	117.76	0.10	0.00	0.00	126.40	0.34	1.95
	62	3.88C	0.02	-74.62	0.10	75.64	0.34	@ 2.140	@ 3.507	@ 1.964
33	59	0.00C	-0.01	40.57	0.00	0.00	0.00	14.60	0.00	0.20
	60	0.00C	0.01	9.44	0.00	14.59	0.00	@ 0.843	@ 0.000	@ 0.809
34	60	0.00C	-0.01	-12.47	0.00	14.60	0.00	14.60	0.00	0.20
	61	0.00C	0.01	-41.86	0.00	0.00	0.00	@ 0.843	@ 0.000	@ 0.809
35	62	3.66C	-0.02	-253.94	-1.14	75.78	0.34	126.40	0.34	1.95
	63	3.66C	0.02	-254.16	-1.14	0.00	0.00	@ 2.140	@ 3.507	@ 1.964
36	63	3.68C	0.00	360.99	0.00	0.00	0.00	656.98	0.00	25.75
	65	3.68C	0.00	-458.25	0.00	0.00	0.00	@ 3.666	@ 0.000	@ 3.390
37	64	0.31T	-0.01	-39.18	0.00	128.73	0.00	128.73	0.00	16.67
	66	0.31T	0.01	-61.97	0.00	0.00	0.00	@ 2.519	@ 0.000	@ 2.519
38	65	3.60C	-0.03	402.75	0.00	0.00	0.00	949.06	0.00	33.76
	71	3.60C	0.03	281.56	0.00	600.14	0.00	@ 4.394	@ 0.000	@ 4.417

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				x-x	y-y	x-x	y-y	x-x	y-y	
39	67	69.79T	-0.02	-206.01	-0.03	1252.16	-0.08	1256.67	-0.19	30.85
	68	69.79T	0.02	-209.01	-0.03	1027.65	-0.11	@ 5.001	@ 7.498	@ 4.381
40	68	69.71T	-0.04	-345.35	-0.06	1027.63	-0.11	1256.67	-0.19	30.85
	69	69.71T	0.04	-349.14	-0.06	552.14	-0.19	@ 5.001	@ 7.498	@ 4.381
41	69	69.71T	0.00	-463.45	0.16	552.15	-0.19	1256.67	-0.19	30.85
	70	69.71T	0.00	-466.74	0.16	0.00	0.00	@ 5.001	@ 7.498	@ 4.381
42	70	4.46C	0.39	112.28	0.00	-159.01	0.00		0.00	0.09
	74	4.46C	-0.39	109.04	0.00	0.00	0.00	@ 0.000	@ 0.000	@ 0.602
43	71	3.61C	-0.03	186.25	0.00	600.13	0.00	949.06	0.00	33.76
	73	3.61C	0.03	-425.74	0.00	0.00	0.00	@ 4.394	@ 0.000	@ 4.417
44	72	6.15C	0.08	115.30	0.00	0.00	0.00	196.93	0.00	12.01
	75	6.15C	-0.08	38.75	0.00	196.87	0.00	@ 2.549	@ 0.000	@ 2.549
45	75	6.15C	0.09	-39.25	0.00	196.93	0.00	196.93	0.00	12.01
	81	6.15C	-0.09	-115.72	0.00	0.00	0.00	@ 2.549	@ 0.000	@ 2.549
46	76	0.55C	0.04	117.21	-0.02	0.00	0.00	127.03	-0.06	3.57
	77	0.55C	-0.04	-72.45	-0.02	78.50	-0.06	@ 2.175	@ 3.507	@ 1.964
47	77	0.63C	0.04	-262.69	0.21	78.39	-0.06	127.03	-0.06	3.57
	78	0.63C	-0.04	-262.86	0.21	0.00	0.00	@ 2.175	@ 3.507	@ 1.964
48	79	50.89C	0.12	171.40	0.00	0.00	0.00	432.73		12.77
	88	50.89C	-0.12	103.18	0.00	432.72	0.00	@ 3.151		@ 2.701
49	80	0.42C	0.00	348.31	0.00	0.00	0.00	633.40	0.00	24.58
	82	0.42C	0.00	-363.70	0.00	0.00	0.00	@ 3.635	@ 0.000	@ 3.355
50	81	4.30C	-0.02	203.60	0.00	0.00	0.00	418.88	0.00	28.32
	83	4.30C	0.02	127.49	0.00	418.86	0.00	@ 2.527	@ 0.000	@ 3.088
51	82	0.43C	0.00	372.38	0.00	0.00	0.00	848.43	0.00	27.31
	85	0.43C	0.00	301.67	0.00	537.02	0.00	@ 3.961	@ 0.000	@ 4.331
52	83	4.30C	0.00	-24.90	0.00	418.88	0.00	418.88	0.00	28.32
	84	4.30C	0.00	-101.04	0.00	260.33	0.00	@ 2.527	@ 0.000	@ 3.088
53	84	4.30C	-0.01	-210.56	0.00	260.40	0.00	418.88	0.00	28.32
	87	4.30C	0.01	-244.67	0.00	0.00	0.00	@ 2.527	@ 0.000	@ 3.088
54	85	0.43C	0.00	218.66	0.00	537.02	0.00	848.43	0.00	27.31
	92	0.43C	0.00	-345.58	0.00	0.00	0.00	@ 3.961	@ 0.000	@ 4.331
55	87	2.73C	-0.05	147.75	0.00	0.00	0.00	280.85	0.01	20.25
	89	2.73C	0.05	71.30	0.00	280.81	0.01	@ 2.559	@ 2.532	@ 2.558

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Member Forces Ultimate (001 : Ultimate Limit State (Final Stage))

Mem ber No.	Node End1 End2	Axial Force (kN)	Torque Moment (kN.m)	Shear Force (kN)		Bending Moment (kN.m)		Maximum Moment (kN.m @ m)		Maximum Deflection (mm @ m)
				x-x	y-y	x-x	y-y	x-x	y-y	
56	88	50.89C	0.10	-200.96	0.00	432.73	0.00	432.73		12.77
	90	50.89C	-0.10	-243.20	0.00	0.00	0.00	@ 3.151		@ 2.701
57	89	2.73C	-0.04	-72.23	0.00	280.85	0.01	280.85	0.01	20.25
	102	2.73C	0.04	-147.29	0.00	0.00	0.00	@ 2.559	@ 2.532	@ 2.558
58	90	52.57C	0.01	306.45	-0.01	0.00	0.00	382.91	0.01	19.97
	93	52.57C	-0.01	280.35	-0.01	352.57	-0.01	@ 2.857	@ 5.013	@ 3.088
59	93	52.57C	0.00	36.35	0.00	352.56	-0.01	382.91	0.01	19.97
	94	52.57C	0.00	-47.47	0.00	331.16	0.01	@ 2.857	@ 5.013	@ 3.088
60	94	52.57C	-0.01	-358.50	-0.01	331.17	0.01	382.91	0.01	19.97
	96	52.57C	0.01	-383.52	-0.01	-95.51	0.00	@ 2.857	@ 5.013	@ 3.088
61	95	0.04C	0.00	80.63	0.00	0.00	0.00	73.17	0.00	1.74
	97	0.04C	0.00	-86.20	0.00	0.00	0.00	@ 1.772	@ 0.000	@ 1.772
62	96	5.49T	0.00	269.47	0.00	0.00	0.00	356.16	0.00	14.54
	104	5.49T	0.00	239.32	0.00	356.16	0.00	@ 1.400	@ 0.000	@ 2.334
63	99	0.93C	0.01	367.96	0.00	0.00	0.00	629.89	0.00	24.86
	100	0.93C	-0.01	-355.24	0.00	0.00	0.00	@ 3.425	@ 0.000	@ 3.355
64	100	0.91C	0.01	394.28	0.00	0.00	0.00	929.27	0.00	30.39
	101	0.91C	-0.01	330.08	0.00	577.10	0.00	@ 4.348	@ 0.000	@ 4.421
65	101	0.91C	0.01	254.96	0.00	577.10	0.00	929.27	0.00	30.39
	103	0.91C	-0.01	-414.16	0.00	0.00	0.00	@ 4.348	@ 0.000	@ 4.421
66	102	1.33C	0.16	3.30	0.00	0.00	0.00	1.25	0.00	0.00
	108	1.33C	-0.16	-3.30	0.00	0.00	0.00	@ 0.745	@ 0.000	@ 0.000
67	104	5.49T	0.00	-55.10	0.00	356.16	0.00	356.16	0.00	14.54
	106	5.49T	0.00	-135.61	0.00	0.00	0.00	@ 1.400	@ 0.000	@ 2.334
68	105	0.01T	-0.02	62.12	0.00	0.00	0.00	25.92	0.00	1.90
	123	0.01T	0.02	18.86	0.00	25.79	0.00	@ 0.750	@ 0.000	@ 0.954
69	106	5.83T	0.07	151.86	-0.10	0.00	0.00	218.98	-0.17	16.44
	112	5.83T	-0.07	100.67	-0.10	209.37	-0.17	@ 2.310	@ 1.659	@ 2.617
70	109	0.01C	-0.96	469.61	0.00	0.00	0.00	1179.34	0.00	12.05
	122	0.01C	0.96	251.88	0.00	1179.38	0.00	@ 3.042	@ 0.000	@ 2.673
71	110	1.68C	0.27	279.79	0.06	0.00	0.00	723.94	-1.12	25.69
	117	1.68C	-0.27	114.40	0.06	723.92	0.18	@ 2.884	@ 5.453	@ 2.928
72	111	6.27T	-0.06	312.38	0.00	0.00	0.00	533.83	0.00	17.42
	113	6.27T	0.06	-316.31	0.00	0.00	0.00	@ 3.423	@ 0.000	@ 3.355

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Member Forces Ultimate (001 : Ultimate Limit State (Final Stage))

Member No.	Node End1 End2	Axial Force (kN)	Torque Moment (kN.m)	Shear Force (kN)		Bending Moment (kN.m)		Maximum Moment (kN.m @ m)		Maximum Deflection (mm @ m)
				x-x	y-y	x-x	y-y	x-x	y-y	
73	112	4.59T	0.10	29.01	0.04	209.31	-0.17	218.98	-0.17	16.44
	114	4.59T	-0.10	-147.25	0.04	0.00	0.00	@ 2.310	@ 1.659	@ 2.617
74	113	6.20T	0.00	466.47	0.00	0.00	0.00	994.29	0.00	32.66
	115	6.20T	0.00	348.91	0.00	649.04	0.00	@ 4.275	@ 0.000	@ 4.420
75	114	6.28T	-0.09	8.37	0.00	0.00	0.00	0.66		0.00
	126	6.28T	0.09	-8.39	0.00	0.00	0.00	@ 0.156		@ 0.000
76	115	6.20T	0.00	256.82	0.00	649.03	0.00	994.29	0.00	32.66
	116	6.20T	0.00	-435.83	0.00	0.00	0.00	@ 4.275	@ 0.000	@ 4.420
77	117	1.68C	0.33	-136.44	-0.31	723.94	0.18	723.94	-1.12	25.69
	118	1.68C	-0.33	-146.11	-0.31	655.50	0.03	@ 2.884	@ 5.453	@ 2.928
78	118	1.68C	0.26	-212.61	-0.55	655.56	0.03	723.94	-1.12	25.69
	121	1.68C	-0.26	-254.16	-0.55	169.10	-1.12	@ 2.884	@ 5.453	@ 2.928
79	121	4.75C	0.26	-532.23	3.55	169.10	-1.12	723.94	-1.12	25.69
	127	4.75C	-0.26	-538.47	3.55	0.00	0.00	@ 2.884	@ 5.453	@ 2.928
80	122	0.01C	-0.64	-140.09	0.01	1179.34	0.00	1179.34	0.00	12.05
	129	0.01C	0.64	-194.30	0.01	1163.92	0.00	@ 3.042	@ 0.000	@ 2.673
81	123	0.01T	-0.03	-5.84	0.00	25.92	0.00	25.92	0.00	1.90
	124	0.01T	0.03	-37.41	0.00	0.00	0.00	@ 0.750	@ 0.000	@ 0.954
82	124	0.02T	0.02	719.75	-0.01	0.00	0.00	1127.61	0.01	14.96
	125	0.02T	-0.02	671.31	-0.01	844.92	-0.01	@ 4.452	@ 4.452	@ 3.184
83	125	0.01T	0.00	131.68	0.01	844.88	-0.01	1127.61	0.01	14.96
	137	0.01T	0.00	42.31	0.01	1127.62	0.01	@ 4.452	@ 4.452	@ 3.184
84	129	0.03C	-1.00	-564.97	0.00	1163.90	0.00	1179.34	0.00	12.05
	131	0.03C	1.00	-566.34	0.00	739.66	0.00	@ 3.042	@ 0.000	@ 2.673
85	130	0.02C	0.00	173.36	-0.02	0.00	0.00	328.80	-0.05	40.34
	145	0.02C	0.00	92.93	-0.02	266.29	-0.05	@ 3.922	@ 2.000	@ 3.438
86	131	0.03C	-0.93	-616.02	0.00	739.57	0.00	1179.34	0.00	12.05
	134	0.03C	0.93	-618.21	0.00	0.00	0.00	@ 3.042	@ 0.000	@ 2.673
87	133	0.00T	0.00	78.11	0.00	0.00	0.00	33.74		7.71
	135	0.00T	0.00	12.56	0.00	33.74	0.00	@ 0.860		@ 1.004
88	135	0.00T	0.00	-12.41	0.00	33.71	0.00	33.74		7.71
	138	0.00T	0.00	-43.84	0.00	0.00	0.00	@ 0.860		@ 1.004
89	137	0.01T	-0.02	-370.76	-0.01	1127.61	0.01	1127.61	0.01	14.96
	139	0.01T	0.02	-441.25	-0.01	900.24	0.00	@ 4.452	@ 4.452	@ 3.184

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Member Forces Ultimate (001 : Ultimate Limit State (Final Stage))

Mem ber No.	Node End1 End2	Axial Force (kN)	Torque Moment (kN.m)	Shear Force (kN)		Bending Moment (kN.m)		Maximum Moment (kN.m @ m)		Maximum Deflection (mm @ m)
				x-x	y-y	x-x	y-y	x-x	y-y	
90	138	0.01C	0.00	15.73	0.00	0.00	0.00	4.72	0.00	0.73
	140	0.01C	0.00	-31.13	0.00	0.00	0.00	@ 0.595	@ 0.000	@ 0.607
91	139	0.01T	0.00	-766.90	0.00	900.23	0.00	1127.61	0.01	14.96
	141	0.01T	0.00	-798.53	0.00	0.00	0.00	@ 4.452	@ 4.452	@ 3.184
92	140	0.01C	0.00	42.68	0.00	0.00	0.00	34.67	0.00	13.71
	149	0.01C	0.00	-42.68	0.00	0.00	0.00	@ 1.625	@ 0.000	@ 1.625
93	141	0.02T	0.02	602.93	0.01	0.00	0.00	803.34	0.01	13.96
	142	0.02T	-0.02	553.69	0.01	803.36	0.01	@ 1.400	@ 1.400	@ 2.334
94	142	0.02T	-0.01	-163.94	0.00	803.34	0.01	803.34	0.01	13.96
	143	0.02T	0.01	-266.23	0.00	0.00	0.00	@ 1.400	@ 1.400	@ 2.334
95	143	0.08T	0.03	507.74	0.00	0.00	0.00	1349.31	0.47	29.59
	144	0.08T	-0.03	320.11	0.00	1349.36	0.01	@ 2.884	@ 5.769	@ 3.948
96	144	0.07T	-0.02	-51.74	-0.09	1349.31	0.01	1349.31	0.47	29.59
	167	0.07T	0.02	-157.31	-0.09	1035.31	-0.24	@ 2.884	@ 5.769	@ 3.948
97	145	0.02C	0.00	51.35	0.01	266.26	-0.05	328.80	-0.05	40.34
	146	0.02C	0.00	19.30	0.01	326.72	-0.03	@ 3.922	@ 2.000	@ 3.438
98	146	0.02C	0.00	18.84	0.01	326.72	-0.03	328.80	-0.05	40.34
	147	0.02C	0.00	-236.66	0.01	0.00	0.00	@ 3.922	@ 2.000	@ 3.438
99	148	0.00C	0.02	22.30	0.00	0.00	0.00	16.73	0.00	1.73
	155	0.00C	-0.02	-22.30	0.00	0.00	0.00	@ 1.500	@ 0.000	@ 1.500
100	149	0.01C	-0.01	47.27	0.00	0.00	0.00	41.52	0.00	2.36
	154	0.01C	0.01	-47.27	0.00	0.00	0.00	@ 1.575	@ 0.000	@ 1.575
101	150	0.01C	0.00	429.79	0.00	0.00	0.00	625.97	0.00	28.49
	151	0.01C	0.00	148.26	0.00	569.91	0.00	@ 3.259	@ 0.000	@ 4.202
102	151	0.01C	0.00	67.11	0.00	569.92	0.00	625.97	0.00	28.49
	152	0.01C	0.00	-224.26	0.00	0.00	0.00	@ 3.259	@ 0.000	@ 4.202
103	153	0.05T	-0.10	8.20	0.00	0.00	0.00	4.16	0.00	0.20
	158	0.05T	0.10	-7.91	0.00	0.00	0.00	@ 1.003	@ 0.000	@ 1.026
104	154	0.01C	0.02	49.59	0.00	0.00	0.00	46.30	0.00	3.86
	163	0.01C	-0.02	-49.59	0.00	0.00	0.00	@ 1.867	@ 0.000	@ 1.867
105	156	0.01C	-0.02	111.86	0.00	0.00	0.00	156.89		20.52
	157	0.01C	0.02	44.99	0.00	156.85	0.00	@ 2.000	@	2.000
106	157	0.01C	-0.02	-40.51	0.00	156.89	0.00	156.89		20.52
	159	0.01C	0.02	-116.38	0.00	0.00	0.00	@ 2.000	@	2.000

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				x-x	y-y	x-x	y-y	x-x	y-y	
107	160	0.00C	0.00	26.63	0.00	0.00	0.00	20.24		4.52
	161	0.00C	0.00	-26.65	0.00	-0.02	0.00	@ 1.521		@ 1.521
108	161	0.00C	0.00	18.03	0.00	0.00	0.00	9.27		0.95
	162	0.00C	0.00	-18.03	0.00	-0.01	0.00	@ 1.029		@ 1.029
109	162	0.00C	0.00	10.49	0.00	0.00	0.00	3.14		0.11
	166	0.00C	0.00	-10.56	0.00	-0.04	0.00	@ 0.601		@ 0.601
110	163	0.01C	0.02	37.80	0.00	0.00	0.00	27.13	0.00	4.85
	168	0.01C	-0.02	-37.80	0.00	0.00	0.00	@ 1.435	@ 0.000	@ 1.435
111	164	0.00C	0.00	82.16	0.00	-0.18	0.00	182.25		29.80
	165	0.00C	0.00	-94.76	0.00	0.00	0.00	@ 4.467		@ 4.467
112	166	0.00C	0.00	28.46	0.00	0.00	0.00	23.12		5.89
	170	0.00C	0.00	-28.47	0.00	-0.01	0.00	@ 1.625		@ 1.625
113	167	0.07T	-0.01	-240.92	10.59	1035.32	-0.24	1349.31	0.47	29.59
	169	0.07T	0.01	-242.78	10.59	1019.05	0.47	@ 2.884	@ 5.769	@ 3.948
114	168	0.01C	0.01	37.42	0.00	0.00	0.00	26.49	0.00	2.44
	174	0.01C	-0.01	-37.42	0.00	0.00	0.00	@ 1.416	@ 0.000	@ 1.416
115	169	0.03T	0.02	-419.92	-0.21	1019.09	0.47	1349.31	0.47	29.59
	171	0.03T	-0.02	-482.43	-0.21	0.00	0.00	@ 2.884	@ 5.769	@ 3.948
116	170	0.00C	0.00	27.58	0.00	0.00	0.00	21.71		5.20
	176	0.00C	0.00	-27.60	0.00	-0.04	0.00	@ 1.575		@ 1.575
117	171	0.01C	0.00	86.22	0.01	0.00	0.00	127.61	0.03	19.75
	172	0.01C	0.00	41.47	0.01	127.62	0.03	@ 2.000	@ 1.979	@ 2.000
118	172	0.01C	0.01	-41.60	-0.01	127.61	0.03	127.61	0.03	19.75
	173	0.01C	-0.01	-85.93	-0.01	0.00	0.00	@ 2.000	@ 1.979	@ 2.000
119	174	0.01C	0.00	35.80	0.00	0.00	0.00	23.80		0.29
	179	0.01C	0.00	-35.80	0.00	0.00	0.00	@ 1.330		@ 1.330
120	175	0.00C	0.00	3.87	0.00	0.00	0.00	4.31		0.94
	177	0.00C	0.00	-7.28	0.00	-0.02	0.00	@ 1.735		@ 1.580
121	176	0.00C	0.00	32.76	0.00	0.00	0.00	30.59		9.26
	183	0.00C	0.00	-32.77	0.00	-0.01	0.00	@ 1.867		@ 1.867
122	177	0.00C	0.00	3.86	0.00	0.00	0.00	4.31		0.94
	178	0.00C	0.00	-7.24	0.00	0.00	0.00	@ 1.731		@ 1.579
123	178	0.00C	0.00	6.88	0.00	0.00	0.00	9.00	0.00	0.14
	179	0.00C	0.00	-4.59	0.00	7.42	0.00	@ 2.124	@ 0.000	@ 1.643

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Mem ber No.	Node End1 End2	Axial Force (kN)	Torque Moment (kN.m)	Shear Force (kN)		Bending Moment (kN.m)		Maximum Moment (kN.m @ m)		Maximum Deflection (mm @ m)
				x-x	y-y	x-x	y-y	x-x	y-y	
124	179	0.00C	0.00	-40.38	0.00	7.42	0.00	9.00	0.00	0.14
	180	0.00C	0.00	-41.75	0.00	0.00	0.00	@ 2.124	@ 0.000	@ 1.643
125	180	0.00C	0.00	40.86	0.01	-0.32	0.00	60.06	0.01	18.13
	181	0.00C	0.00	19.58	0.01	60.06	0.01	@ 2.000	@ 1.959	@ 2.000
126	181	0.00C	0.00	-19.57	-0.01	60.06	0.01	60.06	0.01	18.13
	182	0.00C	0.00	-40.45	-0.01	-0.03	0.00	@ 2.000	@ 1.959	@ 2.000
127	21	0.00C	0.00	-44.87	0.00	0.00	0.00	-46.47		3.36
	28	0.00C	0.00	44.87	0.00	0.00	0.00	@ 2.072		@ 2.072
128	22	0.28T	-0.04	-5.45	0.00	0.00	0.00	-2.22	0.00	0.05
	27	0.28T	0.04	3.02	0.00	0.00	0.00	@ 0.876	@ 0.000	@ 0.983
129	23	1.73T	0.03	156.43	0.00	0.00	0.00	536.55	-0.01	18.68
	31	1.73T	-0.03	153.92	0.00	523.92	-0.01	@ 4.457	@ 3.343	@ 3.452
130	24	1.56C	0.06	142.00	-0.01	0.00	0.00	312.37	-0.02	21.92
	32	1.56C	-0.06	43.03	-0.01	312.36	-0.02	@ 3.376	@ 3.343	@ 3.275
131	25	0.00C	0.00	89.51	0.00	-0.01	0.00	271.50		10.46
	38	0.00C	0.00	-89.49	0.00	0.00	0.00	@ 3.261		@ 3.261
132	26	0.00C	0.00	-177.28	0.00	0.00	0.00	-367.57	0.00	20.57
	39	0.00C	0.00	177.65	0.00	0.00	0.00	@ 4.186	@ 0.000	@ 4.186
133	27	0.28T	0.00	-176.64	0.00	0.00	0.00	-365.89	0.00	20.48
	40	0.28T	0.00	176.64	0.00	0.00	0.00	@ 4.143	@ 0.000	@ 4.143
134	28	0.00C	0.00	-45.34	0.00	0.00	0.00	-46.95		3.39
	37	0.00C	0.00	45.34	0.00	0.01	0.00	@ 2.071		@ 2.071
135	29	0.00T	0.00	-176.36	0.00	0.00	0.00	-365.31	0.00	20.44
	41	0.00T	0.00	176.36	0.00	0.00	0.00	@ 4.143	@ 0.000	@ 4.143
136	31	1.73T	0.03	12.09	0.01	523.91	-0.01	536.55	-0.01	18.68
	34	1.73T	-0.03	11.29	0.01	536.54	0.00	@ 4.457	@ 3.343	@ 3.452
137	32	1.56C	0.06	-53.15	0.01	312.37	-0.02	312.37	-0.02	21.92
	36	1.56C	-0.06	-145.40	0.01	0.00	0.00	@ 3.376	@ 3.343	@ 3.275
138	33	0.01T	0.02	-170.95	0.00	0.00	0.00	-362.28	0.00	20.26
	57	0.01T	-0.02	175.30	0.00	0.00	0.00	@ 4.187	@ 0.000	@ 4.187
139	34	1.72T	0.03	-243.04	0.00	536.55	0.00	536.55	-0.01	18.68
	35	1.72T	-0.03	-278.25	0.00	0.00	0.00	@ 4.457	@ 3.343	@ 3.452
140	35	2.07T	-0.04	119.26	0.06	0.00	0.00	339.72	1.63	26.65
	47	2.07T	0.04	104.04	0.06	330.62	0.18	@ 4.129	@ 6.894	@ 4.558

PHILIP WRIGHT ASSOCIATES

25554

Wellington St
Westhoughton,
Bolton, Lancs, BL5 3YW
Tel: 01942 811532

Job Ref : 2500
Sheet : /
Made by : PW
Date : 27 February 2024 / Ver. 2022.07.14
Checked :
Approved :

Member Forces Ultimate (001 : Ultimate Limit State (Final Stage))

Mem ber No.	Node End1 End2	Axial Force (kN)	Torque Moment (kN.m)	Shear Force (kN)		Bending Moment (kN.m)		Maximum Moment (kN.m @ m)		Maximum Deflection (mm @ m)
				x-x	y-y	x-x	y-y	x-x	y-y	
141	35	0.23C	-0.02	-91.91	0.00	0.00	0.00	-164.84	0.00	11.07
	69	0.23C	0.02	114.30	0.00	0.00	0.00	@ 3.387	@ 0.000	@ 3.254
142	36	3.28C	-0.09	136.65	-0.24	0.00	0.00	273.43	-0.70	16.84
	48	3.28C	0.09	51.36	-0.24	273.42	-0.70	@ 2.909	@ 2.909	@ 3.037
143	37	0.00C	0.00	-17.15	0.00	0.00	0.00	-16.22		1.23
	51	0.00C	0.00	17.14	0.00	-0.01	0.00	@ 1.892		@ 1.892
144	38	22.67C	-0.02	286.13	-0.01	0.00	0.00	690.76	-0.02	24.20
	49	22.67C	0.02	188.84	-0.01	690.76	-0.02	@ 2.909	@ 2.880	@ 3.005
145	40	0.28T	0.00	-190.67	0.06	0.00	0.00	-486.03	-0.64	28.30
	66	0.28T	0.00	-54.30	0.06	-486.05	0.23	@ 3.773	@ 7.291	@ 3.952
146	43	0.01T	0.00	472.68	0.00	0.00	0.00	1327.66	-0.02	14.13
	50	0.01T	0.00	440.21	0.00	1290.24	-0.01	@ 3.458	@ 3.453	@ 3.118
147	44	0.00C	0.02	54.61	0.00	0.00	0.00	56.43	0.00	7.93
	53	0.00C	-0.02	-98.39	0.00	0.00	0.00	@ 2.082	@ 0.000	@ 1.800
148	46	0.00C	0.00	52.14	0.00	0.00	0.00	45.08		3.22
	56	0.00C	0.00	-52.14	0.00	0.00	0.00	@ 1.729		@ 1.729
149	47	2.07T	-0.04	14.12	-0.40	330.61	0.18	339.72	1.63	26.65
	58	2.07T	0.04	-31.48	-0.40	310.48	-1.10	@ 4.129	@ 6.894	@ 4.558
150	48	3.28C	-0.09	-38.56	0.22	273.43	-0.70	273.43	-0.70	16.84
	62	3.28C	0.09	-132.34	0.22	0.00	0.00	@ 2.909	@ 2.909	@ 3.037
151	49	22.67C	-0.02	-162.38	0.01	690.76	-0.02	690.76	-0.02	24.20
	63	22.67C	0.02	-269.36	0.01	0.00	0.00	@ 2.909	@ 2.880	@ 3.005
152	50	0.01T	0.00	68.46	-0.02	1290.24	-0.01	1327.66	-0.02	14.13
	52	0.01T	0.00	67.54	-0.02	1327.63	-0.02	@ 3.458	@ 3.453	@ 3.118
153	51	0.00C	0.00	-41.13	0.00	0.00	0.00	-38.97		2.96
	72	0.00C	0.00	40.06	0.00	-0.08	0.00	@ 1.912		@ 1.912
154	52	0.01T	0.00	-449.03	0.01	1327.66	-0.02	1327.66	-0.02	14.13
	59	0.01T	0.00	-494.69	0.01	549.09	-0.01	@ 3.458	@ 3.453	@ 3.118
155	53	0.00C	0.00	21.91	0.00	0.00	0.00	9.04	0.00	0.15
	60	0.00C	0.00	-21.91	0.00	0.00	0.00	@ 0.825	@ 0.000	@ 0.825
156	54	0.00C	0.00	21.43	0.00	0.00	0.00	34.61	0.00	1.18
	61	0.00C	0.00	20.52	0.00	34.61	0.00	@ 1.650	@ 0.000	@ 1.436
157	55	0.00C	-0.02	-153.57	0.00	0.00	0.00	-274.61	0.00	11.94
	83	0.00C	0.02	152.39	0.00	0.00	0.00	@ 3.577	@ 0.000	@ 3.577

PHILIP WRIGHT ASSOCIATES

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Member Forces Ultimate (001 : Ultimate Limit State (Final Stage))

Mem ber No.	Node End1 End2	Axial Force (kN)	Torque Moment (kN.m)	Shear Force (kN)		Bending Moment (kN.m)		Maximum Moment (kN.m @ m)		Maximum Deflection (mm @ m)
				x-x	y-y	x-x	y-y	x-x	y-y	
158	56	0.00C	0.00	39.96	0.00	-0.03	0.00	26.46		1.11
	73	0.00C	0.00	-39.94	0.00	0.00	0.00	@ 1.325		@ 1.325
159	58	2.17T	-0.04	-149.24	3.48	310.50	-1.10	339.72	1.63	26.65
	74	2.17T	0.04	-164.98	3.48	187.25	1.63	@ 4.129	@ 6.894	@ 4.558
160	59	0.01T	0.00	-535.26	0.01	549.10	-0.01	1327.66	-0.02	14.13
	65	0.01T	0.00	-562.93	0.01	0.00	0.00	@ 3.458	@ 3.453	@ 3.118
161	61	0.00C	0.00	-21.33	0.00	34.61	0.00	34.61	0.00	1.18
	71	0.00C	0.00	-47.89	0.00	0.00	0.00	@ 1.650	@ 0.000	@ 1.436
162	62	4.52C	0.05	46.98	0.00	0.00	0.00	38.76	0.00	1.34
	77	4.52C	-0.05	-46.98	0.00	0.00	0.00	@ 1.650	@ 0.000	@ 1.650
163	63	21.54C	0.00	80.41	0.05	0.00	0.00	99.45	0.17	14.93
	78	21.54C	0.00	-26.87	0.05	88.34	0.17	@ 2.475	@ 3.300	@ 1.914
164	64	0.00C	-0.06	-79.02	0.00	-0.02	0.00	-72.18	0.00	2.51
	75	0.00C	0.06	78.00	0.00	0.00	0.00	@ 1.826	@ 0.000	@ 1.826
165	65	0.00C	0.00	47.57	0.00	0.00	0.00	42.81	0.00	6.39
	82	0.00C	0.00	-47.57	0.00	0.00	0.00	@ 1.800	@ 0.000	@ 1.800
166	66	0.28T	0.00	7.67	-0.25	-486.03	0.23	-486.03	-0.64	28.30
	81	0.28T	0.00	158.64	-0.25	-191.45	-0.64	@ 3.773	@ 7.291	@ 3.952
167	67	0.00T	-0.06	-109.27	0.00	0.00	0.00	-192.05	0.00	8.60
	84	0.00T	0.06	109.52	0.00	0.00	0.00	@ 3.545	@ 0.000	@ 3.545
168	68	0.03C	-0.02	-136.33	-0.09	0.00	0.00	-296.72	-0.59	14.90
	87	0.03C	0.02	81.07	-0.09	-189.61	-0.59	@ 4.346	@ 6.953	@ 3.839
169	70	0.00T	-0.04	-133.97	0.00	0.00	0.00	-239.85	0.00	12.08
	89	0.00T	0.04	143.53	0.00	0.00	0.00	@ 3.481	@ 0.000	@ 3.407
170	71	0.00C	0.00	47.42	0.00	0.00	0.00	42.68	0.00	12.00
	85	0.00C	0.00	-47.42	0.00	0.00	0.00	@ 1.800	@ 0.000	@ 1.800
171	72	0.00C	0.00	-0.17	0.00	0.00	0.00	-0.02		0.00
	79	0.00C	0.00	0.16	0.00	0.00	0.00	@ 0.177		@ 0.000
172	73	0.00C	0.00	49.76	0.00	-0.03	0.00	41.03		2.67
	86	0.00C	0.00	-49.74	0.00	0.00	0.00	@ 1.650		@ 1.650
173	74	0.47T	0.11	-55.95	-0.65	187.61	1.63	339.72	1.63	26.65
	76	0.47T	-0.11	-96.18	-0.65	0.00	0.00	@ 4.129	@ 6.894	@ 4.558
174	76	0.11C	0.01	43.04	0.09	0.00	0.00	118.44	0.47	14.82
	95	0.11C	-0.01	28.49	0.09	118.44	0.28	@ 3.130	@ 4.611	@ 2.664

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Mem ber No.	Node End1 End2	Axial Force (kN)	Torque Moment (kN.m)	Shear Force (kN)		Bending Moment (kN.m)		Maximum Moment (kN.m @ m)		Maximum Deflection (mm @ m)
				x-x	y-y	x-x	y-y	x-x	y-y	
175	76	0.58T	0.00	-73.24	-0.12	0.00	0.00	-112.42	-0.51	3.71
	102	0.58T	0.00	46.72	-0.12	-79.16	-0.51	@ 2.887	@ 4.354	@ 2.509
176	77	4.29C	-0.06	143.26	0.08	0.00	0.00	308.21	0.37	31.38
	97	4.29C	0.06	53.68	0.08	308.21	0.25	@ 3.130	@ 6.260	@ 3.255
177	78	21.75C	0.00	-289.73	-0.58	88.39	0.17	99.45	0.17	14.93
	80	21.75C	0.00	-299.48	-0.58	0.00	0.00	@ 2.475	@ 3.300	@ 1.914
178	79	0.00C	0.00	-158.10	0.00	0.12	0.00	-147.14		12.20
	91	0.00C	0.00	158.04	0.00	0.00	0.00	@ 1.862		@ 1.862
179	80	21.75C	0.00	350.72	-0.16	0.00	0.00	825.25	1.87	23.47
	99	21.75C	0.00	260.25	-0.16	825.26	-0.44	@ 2.702	@ 5.703	@ 3.069
180	81	0.37T	-0.02	477.96	1.61	-191.55	-0.64	-486.03	-0.64	28.30
	90	0.37T	0.02	478.39	1.61	0.00	0.00	@ 3.773	@ 7.291	@ 3.952
181	82	0.00C	0.00	497.07	0.01	0.00	0.00	1241.84	0.03	10.31
	100	0.00C	0.00	422.30	0.01	1241.84	0.03	@ 2.702	@ 2.702	@ 2.824
182	85	0.00C	0.00	35.58	0.00	0.00	0.00	24.03	0.00	3.81
	101	0.00C	0.00	-35.58	0.00	0.00	0.00	@ 1.351	@ 0.000	@ 1.351
183	86	0.00C	0.00	-49.74	0.00	0.00	0.00	19.96		0.07
	92	0.00C	0.00	-59.37	0.00	-16.37	0.00	@ 1.813		@ 1.759
184	87	0.04T	-0.01	473.49	1.48	-189.64	-0.59	-296.72	-0.59	14.90
	96	0.04T	0.01	473.91	1.48	0.00	0.00	@ 4.346	@ 6.953	@ 3.839
185	88	0.00T	0.01	-304.14	0.00	0.00	0.00	-618.23	-0.01	27.04
	105	0.00T	-0.01	259.68	0.00	-259.64	-0.01	@ 3.908	@ 6.630	@ 3.769
186	90	0.23T	0.00	-73.91	0.00	0.00	0.00	-123.80	0.00	9.23
	124	0.23T	0.00	73.91	0.00	0.00	0.00	@ 3.350	@ 0.000	@ 3.350
187	91	0.00C	0.00	-157.81	0.00	0.00	0.00	-146.72		12.15
	109	0.00C	0.00	158.33	0.00	0.96	0.00	@ 1.862		@ 1.862
188	92	0.00C	0.00	48.29	0.00	-16.37	0.00	19.96		0.07
	103	0.00C	0.00	-38.41	0.00	-3.02	0.00	@ 1.813		@ 1.759
189	93	0.01T	-0.01	-244.00	0.00	0.00	0.00	-408.71	0.00	16.72
	125	0.01T	0.01	244.00	0.00	0.00	0.00	@ 3.350	@ 0.000	@ 3.350
190	94	0.01C	0.01	-311.03	0.00	0.00	0.00	-556.19	0.00	20.69
	139	0.01C	-0.01	325.65	0.00	0.00	0.00	@ 3.555	@ 0.000	@ 3.350
191	95	0.11C	0.01	-52.14	0.13	118.44	0.28	118.44	0.47	14.82
	108	0.11C	-0.01	-67.91	0.13	30.13	0.47	@ 3.130	@ 4.611	@ 2.664

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				x-x	y-y	x-x	y-y	x-x	y-y	
192	96	0.02C	0.02	-60.19	0.00	0.00	0.00	-100.82	0.00	7.75
	141	0.02C	-0.02	60.19	0.00	0.00	0.00	@ 3.350	@ 0.000	@ 3.350
193	97	4.29C	-0.06	-32.52	0.04	308.21	0.25	308.21	0.37	31.38
	114	4.29C	0.06	-122.10	0.04	66.24	0.37	@ 3.130	@ 6.260	@ 3.255
194	99	21.75C	0.00	-107.71	0.77	825.25	-0.44	825.25	1.87	23.47
	111	21.75C	0.00	-262.21	0.77	216.07	1.87	@ 2.702	@ 5.703	@ 3.069
195	100	0.00C	0.00	-327.22	-0.01	1241.84	0.03	1241.84	0.03	10.31
	113	0.00C	0.00	-464.28	-0.01	0.00	0.00	@ 2.702	@ 2.702	@ 2.824
196	101	0.00C	0.00	-39.54	0.00	0.00	0.00	-29.67	0.00	5.80
	115	0.00C	0.00	39.54	0.00	0.00	0.00	@ 1.501	@ 0.000	@ 1.501
197	102	0.58T	0.00	197.30	1.28	-78.96	-0.51	-112.42	-0.51	3.71
	106	0.58T	0.00	197.55	1.28	0.00	0.00	@ 2.887	@ 4.354	@ 2.509
198	103	0.00C	0.00	14.85	0.00	-3.01	0.00	19.96		0.07
	107	0.00C	0.00	5.23	0.00	0.00	0.00	@ 1.813		@ 1.759
199	104	0.00C	0.00	-294.42	0.00	0.00	0.00	-493.18	0.00	17.99
	142	0.00C	0.00	294.42	0.00	0.00	0.00	@ 3.350	@ 0.000	@ 3.350
200	105	0.00T	0.02	321.80	0.01	-259.67	-0.01	-618.23	-0.01	27.04
	129	0.00T	-0.02	370.67	0.01	0.00	0.00	@ 3.908	@ 6.630	@ 3.769
201	106	0.50T	0.00	-634.38	1.62	0.00	0.00	-646.50	0.37	23.23
	110	0.50T	0.00	-612.84	1.62	-140.62	0.37	@ 3.269	@ 0.225	@ 3.333
202	107	0.00C	0.00	5.23	0.00	0.00	0.00	-102.98		0.23
	116	0.00C	0.00	-81.47	0.00	-102.98	0.00	@ 2.701		@ 2.053
203	108	0.54C	0.06	-71.20	-1.12	30.28	0.47	118.44	0.47	14.82
	112	0.54C	-0.06	-71.66	-1.12	0.00	0.00	@ 3.130	@ 4.611	@ 2.664
204	109	0.00C	0.00	-158.82	0.00	0.00	0.00	-149.92		12.77
	136	0.00C	0.00	158.82	0.00	0.00	0.00	@ 1.888		@ 1.888
205	110	0.57T	0.00	-333.04	-0.06	-140.35	0.37	-646.50	0.37	23.23
	143	0.57T	0.00	376.39	-0.06	0.00	0.00	@ 3.269	@ 0.225	@ 3.333
206	111	21.75C	0.00	-574.60	-5.50	216.13	1.87	825.25	1.87	23.47
	126	21.75C	0.00	-586.56	-5.50	6.51	-0.11	@ 2.702	@ 5.703	@ 3.069
207	113	0.01T	0.18	375.34	0.01	0.00	0.00	998.26	0.02	16.45
	147	0.01T	-0.18	343.17	0.01	946.28	0.02	@ 3.174	@ 2.608	@ 2.915
208	114	4.89C	0.00	-277.73	-1.55	66.42	0.37	308.21	0.37	31.38
	121	4.89C	0.00	-278.07	-1.55	0.00	0.00	@ 3.130	@ 6.260	@ 3.255

PHILIP WRIGHT ASSOCIATES

25554

Wellington St
Westhoughton,
Bolton, Lancs, BL5 3YW
Tel: 01942 811532

Job Ref : 2500
Sheet : /
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Date : 27 February 2024 / Ver. 2022.07.14
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Member Forces Ultimate (001 : Ultimate Limit State (Final Stage))

Mem ber No.	Node End1 End2	Axial Force (kN)	Torque Moment (kN.m)	Shear Force (kN)		Bending Moment (kN.m)		Maximum Moment (kN.m @ m)		Maximum Deflection (mm @ m)
				x-x	y-y	x-x	y-y	x-x	y-y	
209	116	0.00C	0.00	181.27	0.00	-102.98	0.00	-102.98		0.23
	132	0.00C	0.00	38.81	0.00	0.00	0.00	@ 2.701		@ 2.053
210	117	0.38C	0.01	-250.83	0.00	0.00	0.00	-405.87		15.67
	119	0.38C	-0.01	-191.09	0.00	-351.33	0.00	@ 2.909		@ 3.153
211	119	0.58C	0.02	-83.20	0.00	-351.39	0.00	-405.87		15.67
	144	0.58C	-0.02	227.06	0.00	0.00	0.00	@ 2.909		@ 3.153
212	122	0.01T	-0.04	-391.98	0.00	0.00	0.00	-639.48		28.24
	133	0.01T	0.04	-343.11	0.00	-275.66	0.00	@ 3.372		@ 3.726
213	123	0.00C	0.12	-24.70	0.00	0.00	0.00	-4.63		0.00
	131	0.00C	-0.12	24.70	0.00	0.00	0.00	@ 0.375		@ 0.000
214	124	0.24T	-0.03	-699.48	-0.01	0.00	0.00	-565.16	-0.01	24.96
	134	0.24T	0.03	-686.50	-0.01	-519.75	-0.01	@ 1.500	@ 0.720	@ 3.813
215	125	0.02T	-0.04	-295.63	0.00	0.00	0.00	-629.23		29.37
	140	0.02T	0.04	-248.51	0.00	-408.10	0.00	@ 4.017		@ 4.153
216	126	19.68C	-0.03	594.94	-0.42	-6.43	0.11	825.25	1.87	23.47
	127	19.68C	0.03	602.41	-0.42	136.65	0.01	@ 2.702	@ 5.703	@ 3.069
217	127	28.95T	0.00	-55.65	0.00	0.00	0.00	-28.89	0.00	1.38
	130	28.95T	0.00	57.90	0.00	0.00	0.00	@ 1.017	@ 0.000	@ 1.017
218	127	10.82T	-0.01	-186.23	0.00	0.00	0.00	-296.73	-0.01	70.74
	128	10.82T	0.01	-139.16	0.00	-259.72	0.00	@ 2.924	@ 6.055	@ 3.272
219	128	10.78T	0.00	-54.52	0.00	-259.66	0.00	-296.73	-0.01	70.74
	153	10.78T	0.00	154.99	0.00	-41.78	-0.01	@ 2.924	@ 6.055	@ 3.272
220	130	28.92T	0.00	154.61	0.00	0.00	0.00	175.14		11.16
	156	28.92T	0.00	-65.00	0.00	144.44	0.00	@ 2.179		@ 1.971
221	131	0.00C	0.04	-24.98	0.00	0.00	0.00	-4.68	0.00	0.00
	135	0.00C	-0.04	24.98	0.00	0.00	0.00	@ 0.375	@ 0.000	@ 0.000
222	132	0.00C	0.00	38.81	0.00	0.00	0.00	24.98		0.99
	152	0.00C	0.00	-38.81	0.00	0.00	0.00	@ 1.287		@ 1.287
223	133	0.01T	-0.02	-264.99	0.00	-275.66	0.00	-639.48		28.24
	161	0.01T	0.02	306.27	0.00	0.00	0.00	@ 3.372		@ 3.726
224	134	0.24T	0.03	-68.29	0.01	-518.82	-0.01	-565.16	-0.01	24.96
	138	0.24T	-0.03	-55.31	0.01	-565.16	0.00	@ 1.500	@ 0.720	@ 3.813
225	136	0.00C	0.00	-158.82	0.00	0.00	0.00	-149.92		12.77
	160	0.00C	0.00	158.82	0.00	0.00	0.00	@ 1.888		@ 1.888

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PHILIP WRIGHT ASSOCIATES

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Member Forces Ultimate (001 : Ultimate Limit State (Final Stage))

Mem ber No.	Node End1 End2	Axial Force (kN)	Torque Moment (kN.m)	Shear Force (kN)		Bending Moment (kN.m)		Maximum Moment (kN.m @ m)		Maximum Deflection (mm @ m)
				x-x	y-y	x-x	y-y	x-x	y-y	
226	137	0.02C	-0.01	-413.07	0.00	0.00	0.00	-902.71		30.78
	149	0.02C	0.01	-345.83	0.00	-569.17	0.00	@ 3.999		@ 4.137
227	138	0.24T	-0.01	4.26	0.00	-565.16	0.00	-565.16	-0.01	24.96
	162	0.24T	0.01	161.92	0.00	0.00	0.00	@ 1.500	@ 0.720	@ 3.813
228	140	0.02T	-0.04	-174.71	0.00	-408.10	0.00	-629.23		29.37
	166	0.02T	0.04	294.70	0.00	0.00	0.00	@ 4.017		@ 4.153
229	142	0.01C	-0.02	-423.21	0.00	0.00	0.00	-904.80	0.00	36.76
	154	0.01C	0.02	-351.31	0.00	-580.92	0.00	@ 4.017	@ 0.000	@ 4.153
230	143	0.58T	-0.01	-215.81	0.00	0.00	0.00	-290.70	0.00	10.69
	163	0.58T	0.01	-147.33	0.00	-272.36	0.00	@ 2.120	@ 0.000	@ 2.250
231	144	0.67C	-0.02	-144.79	0.00	0.00	0.00	-173.28	0.00	6.02
	168	0.67C	0.02	-85.61	0.00	-172.81	0.00	@ 1.584	@ 0.000	@ 1.753
232	145	0.04T	-0.03	41.58	0.00	0.00	0.00	32.71	0.00	3.73
	157	0.04T	0.03	-41.58	0.00	0.00	0.00	@ 1.573	@ 0.000	@ 1.573
233	146	0.01C	0.00	0.45	0.00	0.00	0.00	0.24	0.00	0.01
	148	0.01C	0.00	-0.45	0.00	0.00	0.00	@ 1.036	@ 0.000	@ 1.057
234	147	0.00T	0.18	106.52	-0.02	946.27	0.02	998.26	0.02	16.45
	150	0.00T	-0.18	85.87	-0.02	998.25	0.01	@ 3.174	@ 2.608	@ 2.915
235	149	0.02C	-0.01	-255.88	0.00	-569.18	0.00	-902.71		30.78
	170	0.02C	0.01	418.11	0.00	0.00	0.00	@ 3.999		@ 4.137
236	150	0.00T	0.18	-343.92	0.00	998.26	0.01	998.26	0.02	16.45
	155	0.00T	-0.18	-386.98	0.00	422.93	0.00	@ 3.174	@ 2.608	@ 2.915
237	152	0.00C	0.00	38.81	0.00	0.00	0.00	24.98		0.99
	165	0.00C	0.00	-38.81	0.00	0.00	0.00	@ 1.287		@ 1.287
238	153	10.79T	-0.03	163.18	0.04	-41.88	-0.01	-296.73	-0.01	70.74
	169	10.79T	0.03	176.96	0.04	0.00	0.00	@ 2.924	@ 6.055	@ 3.272
239	154	0.01C	-0.04	-254.45	0.00	-580.89	0.00	-904.80	0.00	36.76
	176	0.01C	0.04	425.26	0.00	0.00	0.00	@ 4.017	@ 0.000	@ 4.153
240	155	0.00T	0.18	-409.28	0.00	422.95	0.00	998.26	0.02	16.45
	164	0.00T	-0.18	-436.63	0.00	0.00	0.00	@ 3.174	@ 2.608	@ 2.915
241	156	28.92T	0.01	-176.86	0.00	144.47	0.00	175.14		11.16
	158	28.92T	-0.01	-242.35	0.00	0.00	0.00	@ 2.179		@ 1.971
242	158	28.95T	0.07	430.73	0.03	0.00	0.00	390.51	0.03	2.14
	171	28.95T	-0.07	364.98	0.03	390.49	0.03	@ 0.977	@ 0.967	@ 1.181

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Member Forces Ultimate (001 : Ultimate Limit State (Final Stage))

Mem ber No.	Node End1 End2	Axial Force (kN)	Torque Moment (kN.m)	Shear Force (kN)		Bending Moment (kN.m)		Maximum Moment (kN.m @ m)		Maximum Deflection (mm @ m)
				x-x	y-y	x-x	y-y	x-x	y-y	
243	159	0.01T	-0.03	40.76	0.00	0.00	0.00	67.64	0.01	6.14
	173	0.01T	0.03	40.04	0.00	67.63	0.01	@ 1.674	@ 1.657	@ 1.607
244	163	0.58T	-0.01	-59.94	0.00	-272.36	0.00	-290.70	0.00	10.69
	175	0.58T	0.01	229.52	0.00	0.00	0.00	@ 2.120	@ 0.000	@ 2.250
245	167	10.67T	0.01	-83.79	0.00	0.00	0.00	-84.27	0.00	8.04
	174	10.67T	-0.01	-27.70	0.00	-84.25	0.00	@ 1.500	@ 0.000	@ 1.293
246	168	0.67C	-0.02	-10.39	0.00	-172.81	0.00	-173.28	0.00	6.02
	177	0.67C	0.02	163.48	0.00	0.00	0.00	@ 1.584	@ 0.000	@ 1.753
247	171	29.17T	0.32	-203.67	-0.02	390.51	0.03	390.51	0.03	2.14
	180	29.17T	-0.32	-309.90	-0.02	0.00	0.00	@ 0.977	@ 0.967	@ 1.181
248	173	0.02T	-0.03	-45.88	0.00	67.64	0.01	67.64	0.01	6.14
	182	0.02T	0.03	-46.51	0.00	0.00	0.00	@ 1.674	@ 1.657	@ 1.607
249	174	10.67T	0.00	45.51	0.00	-84.27	0.00	-84.27	0.00	8.04
	178	10.67T	0.00	124.38	0.00	0.00	0.00	@ 1.500	@ 0.000	@ 1.293
250	175	0.00C	-0.01	-145.82	0.00	0.00	0.00	-136.20		11.36
	183	0.00C	0.01	145.82	0.00	0.00	0.00	@ 1.868		@ 1.868
251	96	34.72C	0.00	0.45	0.00	0.00	0.00	0.68	0.00	9.08
	98	35.28C	0.00	-0.45	0.00	0.00	0.00	@ 2.965	@ 0.000	@ 3.025
252	1	525.08C	0.00	0.00	0.02	0.00	-0.02	0.00		0.00
	27	522.79C	0.00	0.00	0.02	0.00	0.04	@ 0.000		@ 0.000
253	2	610.69C	0.00	-0.04	0.00	0.05	-0.01			0.00
	35	608.06C	0.00	-0.04	0.00	-0.09	0.00			@ 0.000
254	3	905.34C	0.00	-0.37	0.01	1.20	-0.01			0.05
	40	902.22C	0.00	-0.37	0.01	0.00	0.02			@ 1.344
255	4	1001.93C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	80	998.51C	0.00	0.00	0.00	0.00	0.00	@ 0.000	@ 0.000	@ 0.000
256	5	1284.14C	0.00	0.00	0.00	0.00	0.00		0.00	0.00
	82	1280.72C	0.00	0.00	0.00	0.00	0.00	@ 0.000	@ 0.000	@ 0.000
257	6	967.57C	0.00	-0.03	-0.01	0.10	0.06			0.01
	63	964.93C	0.00	-0.03	-0.01	0.02	0.02			@ 1.472
258	7	716.89C	0.00	-0.18	74.17	0.16	-78.38			6.10
	70	712.99C	0.00	-0.18	74.17	-0.40	158.97			@ 2.144
259	8	1476.69C	0.00	-0.06	-0.01	0.21	0.01			0.00
	65	1471.51C	0.00	-0.06	-0.01	0.00	-0.03			@ 0.000

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Member Forces Ultimate (001 : Ultimate Limit State (Final Stage))

Mem ber No.	Node End1 End2	Axial Force (kN)	Torque Moment (kN.m)	Shear Force (kN)		Bending Moment (kN.m)		Maximum Moment (kN.m @ m)		Maximum Deflection (mm @ m)
				x-x	y-y	x-x	y-y	x-x	y-y	
260	9	331.70C	0.00	-0.11	0.03	0.24	-0.04			0.01
	76	329.67C	0.00	-0.11	0.03	-0.10	0.04			@ 1.120
261	10	1104.59C	0.00	0.05	0.06	-0.05	-0.16			0.02
	90	1101.95C	0.00	0.05	0.06	0.09	0.02			@ 1.312
262	11	1625.81C	0.00	-0.02	0.05	0.00	0.00			0.03
	113	1622.39C	0.00	-0.02	0.05	-0.06	0.18			@ 2.030
263	12	1173.02C	0.00	-0.01	-29.84	0.00	0.00			6.29
	96	1169.11C	0.00	-0.01	-29.84	-0.02	-95.49			@ 1.856
264	13	388.08C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	130	385.87C	0.00	0.00	0.00	0.00	0.00	@ 0.000	@ 0.000	@ 0.000
265	14	24.20C	0.00	-0.01	0.00	0.00	0.00		0.00	0.00
	148	22.75C	0.00	-0.01	0.00	-0.02	0.00	@ 0.000	@ 0.000	@ 0.000
266	15	1386.69C	0.01	0.70	63.76	-2.25	-67.62			5.22
	127	1382.78C	-0.01	0.70	63.76	0.00	136.42			@ 2.144
267	16	1535.26C	0.00	-0.02	-0.01	0.01	0.01			0.00
	124	1530.55C	0.00	-0.02	-0.01	-0.05	-0.03			@ 0.000
268	17	158.59C	0.00	0.01	0.01	0.00	0.00			0.02
	159	157.14C	0.00	0.01	0.01	0.02	0.03			@ 2.030
269	18	683.20C	0.00	-0.03	0.02	0.00	0.00			0.02
	158	680.99C	0.00	-0.03	0.02	-0.10	0.06			@ 2.030
270	19	1465.56C	0.00	-0.01	-0.01	0.00	0.00			0.00
	141	1461.65C	0.00	-0.01	-0.01	-0.02	-0.02			@ 0.000
271	20	1368.81C	0.00	-0.01	0.00	0.00	0.00			0.00
	143	1366.17C	0.00	-0.01	0.00	-0.03	-0.01			@ 0.000
272	98	1121.68C	0.00	-0.02	0.00	0.00	0.00			0.00
	106	1119.39C	0.00	-0.02	0.00	-0.07	0.01			@ 0.000
273	115	0.00C	0.00	-52.55	0.00	0.00	0.00	-52.12	0.00	10.88
	151	0.00C	0.00	81.15	0.00	0.00	0.00	@ 1.891	@ 0.000	@ 1.655
274	119	0.00T	-0.06	107.89	-0.20	0.00	0.00	68.32	-0.10	6.66
	120	0.00T	0.06	107.68	-0.20	52.22	-0.10	@ 1.276	@ 0.484	@ 1.396
275	120	0.00T	-0.06	41.18	0.04	52.15	-0.10	68.32	-0.10	6.66
	128	0.00T	0.06	-84.64	0.04	0.00	0.00	@ 1.276	@ 0.484	@ 1.396
276	118	0.24C	0.07	-66.50	0.00	0.00	0.00	-26.44	0.00	0.77
	120	0.24C	-0.07	66.50	0.00	0.00	0.00	@ 0.795	@ 0.000	@ 0.795

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Member Forces Ultimate (001 : Ultimate Limit State (Final Stage))

Mem ber No.	Node End1 End2	Axial Force (kN)	Torque Moment (kN.m)	Shear Force (kN)		Bending Moment (kN.m)		Maximum Moment (kN.m @ m)		Maximum Deflection (mm @ m)
				x-x	y-y	x-x	y-y	x-x	y-y	
277	157	0.04T	0.01	43.92	0.00	0.00	0.00	18.40	0.00	0.59
	172	0.04T	-0.01	-43.92	0.00	0.00	0.00	@ 0.838	@ 0.000	@ 0.838
278	172	0.01T	0.00	39.15	0.00	0.00	0.00	14.62	0.00	0.38
	181	0.01T	0.00	-39.15	0.00	0.00	0.00	@ 0.747	@ 0.000	@ 0.747

Support Reactions (001 : Ultimate Limit State (Final Stage))

Node	Directional Reactions (kN)			Moment Reactions (kN.m) (about axis)		
	Rx→(kN)	Ry↑(kN)	Rz↗(kN)	Mx→(kN.m)	My↑(kN.m)	Mz↗(kN.m)
1	0.020	525.080	0.000	0.000	0.000	-0.022
2	-0.042	610.693	0.000	-0.011	0.000	0.045
3	-0.343	905.337	-0.152	-0.469	0.000	1.106
6	-0.026	967.567	0.011	0.056	0.000	0.102
7	68.657	716.895	28.066	29.679	0.000	-72.545
8	-0.065	1476.693	0.013	0.014	0.000	0.207
9	-0.106	331.701	-0.026	-0.038	0.000	0.241
10	0.039	1104.587	0.062	0.105	0.000	-0.134
12	-28.171	1173.023	-9.838	0.000	0.000	0.000
15	0.703	1386.689	-63.761	-67.620	0.000	-2.255
16	0.000	1535.256	-0.023	-0.016	0.000	0.000
19	0.000	1465.558	0.000	0.000	0.000	0.000
21	-0.028	165.363	-0.012	0.000	0.000	0.000
23	0.000	297.079	-1.604	0.000	0.000	0.000
28	0.000	90.204	0.000	0.000	0.000	0.000
42	0.000	350.510	0.000	0.000	0.000	0.000
43	0.000	722.707	0.000	0.000	0.000	0.000
46	0.000	221.696	0.000	0.000	0.000	0.000
51	-0.285	120.666	-0.116	0.000	0.000	0.000
91	0.000	315.853	0.000	0.000	0.000	0.000
92	-0.430	453.240	0.000	0.000	0.000	0.000
116	6.201	698.566	0.000	0.000	0.000	0.000
170	0.000	474.149	-0.018	0.000	0.000	0.000
183	0.000	178.584	0.000	0.000	0.000	0.000
Total	0.020	32888.100	0.024	-38.300	0.000	-73.255

Support Reactions (008 : Serviceability Limit State (Final Stage))

Node	Directional Reactions (kN)			Moment Reactions (kN.m) (about axis)		
	Rx→(kN)	Ry↑(kN)	Rz↗(kN)	Mx→(kN.m)	My↑(kN.m)	Mz↗(kN.m)
1	0.014	355.422	0.000	0.000	0.000	-0.015
2	-0.028	413.947	0.000	0.000	0.000	0.031
3	-0.232	615.326	-0.103	-0.318	0.000	0.750
6	-0.018	657.692	0.000	0.038	0.000	0.069
7	46.572	486.066	19.038	20.132	0.000	-49.209
8	-0.044	989.838	0.000	0.000	0.000	0.140
9	-0.072	225.265	-0.018	-0.026	0.000	0.164
10	0.026	753.105	0.042	0.072	0.000	-0.091

PHILIP WRIGHT ASSOCIATES

25554

Wellington St

Westhoughton,

Bolton, Lancs, BL5 3YW

Tel: 01942 811532

Job Ref : 2500

Sheet : /

Made by : PW

Date : 27 February 2024 / Ver. 2022.07.14

Checked :

Approved :

Support Reactions (008 : Serviceability Limit State (Final Stage))

Node	Directional Reactions (kN)			Moment Reactions (kN.m) (about axis)		
	Rx→(kN)	Ry↑(kN)	Rz↗(kN)	Mx→(kN.m)	My↑(kN.m)	Mz↗(kN.m)
12	-19.084	800.122	-6.664	0.000	0.000	0.000
15	0.484	936.939	-42.809	-45.399	0.000	-1.537
16	0.000	1029.641	-0.015	-0.010	0.000	0.000
19	0.000	987.168	0.000	0.000	0.000	0.000
21	-0.019	111.966	0.000	0.000	0.000	0.000
23	0.000	201.309	-1.090	0.000	0.000	0.000
28	0.000	61.045	0.000	0.000	0.000	0.000
42	0.000	239.527	0.000	0.000	0.000	0.000
43	0.000	484.079	0.000	0.000	0.000	0.000
46	0.000	151.132	0.000	0.000	0.000	0.000
51	-0.194	83.149	-0.079	0.000	0.000	0.000
91	0.000	215.767	0.000	0.000	0.000	0.000
92	-0.292	306.001	0.000	0.000	0.000	0.000
116	4.230	468.247	0.000	0.000	0.000	0.000
170	0.000	321.374	-0.012	0.000	0.000	0.000
183	0.000	121.279	0.000	0.000	0.000	0.000
Total	0.014	22229.620	0.015	-25.513	0.000	-49.699

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Composite Design Brief Summary

Brief No.	Title	Unity	Pass	Shear final	Shear const.	Mom. final	Mom. const.	Buckling final	Buckling const.	Shear conn.	Transv. shr.	P.L. final	P.L. const.	Steel str.	Conc. str.	Max. defl.	Nat. freq.	Dim. chk.
1	Member CgBL2ld 7 @ Level GROUND	0.747	True	0.152	0.056	0.106	0.062	N.A.	N.A.	0.571	0.747	0.106	0.062	0.095	0.049	0.010	0.083	0.745
2	Member CgBL2ld 8 @ Level GROUND	0.943	True	0.320	0.118	0.257	0.182	N.A.	N.A.	N.A.	0.943	0.257	0.182	0.271	0.111	0.053	0.180	0.745
3	Member CgBL2ld 12 @ Level GROUND	0.884	True	0.361	0.133	0.336	0.268	N.A.	N.A.	0.496	0.780	0.343	0.268	0.376	0.134	0.094	0.218	0.884
4	Member CgBL2ld 14 @ Level GROUND	0.951	True	0.563	0.097	0.951	0.288	N.A.	N.A.	0.511	0.780	0.951	0.288	0.885	0.467	0.486	0.630	0.697
5	Member CgBL2ld 22 @ Level GROUND	0.99	True	0.694	0.108	0.985	0.320	N.A.	N.A.	0.562	0.780	0.990	0.320	0.907	0.469	0.513	0.640	0.697
6	Member CgBL2ld 26 @ Level GROUND	0.89	True	0.551	0.100	0.890	0.297	N.A.	N.A.	N.A.	0.854	0.890	0.297	0.872	0.455	0.437	0.626	0.697
7	Member CgBL2ld 222 @ Level GROUND	0.78	True	0.287	0.106	0.237	0.158	N.A.	N.A.	0.533	0.780	0.287	0.158	0.235	0.096	0.046	0.168	0.745
8	Member CgBL2ld 32 @ Level GROUND	0.934	True	0.557	0.091	0.926	0.270	N.A.	N.A.	0.511	0.780	0.934	0.270	0.858	0.457	0.476	0.622	0.697
9	Member CgBL2ld 37 @ Level GROUND	0.78	True	0.412	0.078	0.663	0.211	N.A.	N.A.	0.511	0.780	0.669	0.211	0.595	0.348	0.335	0.534	0.633
10	Member CgBL2ld 249 @ Level GROUND	0.884	True	0.033	0.010	0.021	0.012	N.A.	N.A.	0.594	0.759	0.032	0.012	0.020	0.010	0.001	0.027	0.884
11	Member CgBL2ld 72 @ Level GROUND	0.78	True	0.326	0.122	0.554	0.414	N.A.	N.A.	0.435	0.780	0.554	0.414	0.621	0.189	0.574	0.593	0.633
12	Member CgBL2ld 73 @ Level GROUND	0.78	True	0.324	0.122	0.552	0.413	N.A.	N.A.	0.435	0.780	0.552	0.413	0.618	0.188	0.572	0.592	0.633
13	Member CgBL2ld 74 @ Level GROUND	0.904	True	0.323	0.122	0.663	0.413	N.A.	N.A.	0.904	0.526	0.663	0.413	0.617	0.188	0.572	0.592	0.600
14	Member CgBL2ld 75 @ Level GROUND	0.722	True	0.321	0.121	0.569	0.410	N.A.	N.A.	0.511	0.722	0.569	0.410	0.612	0.186	0.568	0.589	0.600
15	Member CgBL2ld 77 @ Level GROUND	0.855	True	0.381	0.142	0.445	0.358	N.A.	N.A.	N.A.	0.855	0.445	0.358	0.515	0.151	0.344	0.437	0.745
16	Member CgBL2ld 87 @ Level GROUND	0.78	True	0.281	0.106	0.438	0.310	N.A.	N.A.	0.511	0.780	0.438	0.310	0.467	0.156	0.320	0.449	0.633
17	Member CgBL2ld 91 @ Level GROUND	0.603	True	0.148	0.002	0.307	0.005	0.603	N.A.	N.A.	N.A.	0.307	0.005	0.231	N.A.	0.106	0.363	N.A.
18	Member CgBL2ld 90 @ Level GROUND	0.956	True	0.201	0.076	0.315	0.220	N.A.	N.A.	0.416	0.956	0.315	0.220	0.332	0.127	0.219	0.377	0.633
19	Member CgBL2ld 211 @ Level GROUND	0.78	True	0.331	0.124	0.471	0.364	N.A.	N.A.	0.406	0.780	0.471	0.364	0.540	0.158	0.346	0.456	0.661
20	Member CgBL2ld 102 @ Level GROUND	0.908	True	0.246	0.112	0.334	0.329	N.A.	N.A.	N.A.	0.908	0.334	0.329	0.404	0.102	0.351	0.406	0.745
21	Member CgBL2ld 103 @ Level GROUND	0.908	True	0.370	0.081	0.611	0.240	N.A.	N.A.	0.438	0.908	0.611	0.240	0.579	0.312	0.322	0.510	0.697
22	Member CgBL2ld 104 @ Level GROUND	0.924	True	0.476	0.078	0.773	0.210	N.A.	N.A.	0.451	0.924	0.781	0.210	0.688	0.436	0.363	0.568	0.633
23	Member CgBL2ld 212 @ Level GROUND	0.856	True	0.200	0.092	0.277	0.270	N.A.	N.A.	N.A.	0.856	0.277	0.270	0.331	0.090	0.289	0.371	0.745
24	Member CgBL2ld 105 @ Level GROUND	0.849	True	0.431	0.080	0.674	0.215	N.A.	N.A.	0.468	0.849	0.674	0.215	0.615	0.357	0.338	0.548	0.633
25	Member CgBL2ld 113 @ Level GROUND	0.745	True	0.082	0.008	0.022	0.003	N.A.	N.A.	0.626	0.681	0.082	0.008	0.016	0.021	N.A.	0.002	0.745
26	Member CgBL2ld 116 @ Level GROUND	0.745	True	0.083	0.008	0.023	0.003	N.A.	N.A.	0.626	0.681	0.083	0.008	0.016	0.022	N.A.	0.002	0.745
27	Member CgBL2ld 257 @ Level GROUND	0.884	True	0.267	0.029	0.150	0.027	N.A.	N.A.	0.553	0.512	0.150	0.027	0.116	0.104	0.005	0.059	0.884
28	Member CgBL2ld 258 @ Level GROUND	0.884	True	0.176	0.001	0.100	0.001	N.A.	N.A.	0.665	0.738	0.100	0.001	0.077	0.071	0.004	0.054	0.884
29	Member CgBL2ld 259 @ Level GROUND	0.884	True	0.157	0.001	0.080	0.001	N.A.	N.A.	0.593	0.738	0.080	0.001	0.062	0.060	0.003	0.043	0.884
30	Member CgBL2ld 2 @ Level GROUND	0.99	True	0.223	0.089	0.540	0.328	N.A.	N.A.	0.589	0.990	0.540	0.328	0.511	0.225	0.124	0.297	0.697
31	Member CgBL2ld 6 @ Level GROUND	0.886	True	0.385	0.146	0.868	0.524	N.A.	N.A.	0.449	0.766	0.886	0.524	0.816	0.448	0.555	0.628	0.697
32	Member CgBL2ld 9 @ Level GROUND	0.784	True	0.654	0.149	0.313	0.172	N.A.	N.A.	0.636	0.780	0.653	0.172	0.285	0.165	0.065	0.234	0.784
33	Member CgBL2ld 5 @ Level GROUND	0.794	True	0.201	0.063	0.794	0.271	0.640	N.A.	N.A.	N.A.	0.794	0.271	0.604	N.A.	0.239	0.668	N.A.
34	Member CgBL2ld 13 @ Level GROUND	0.959	True	0.365	0.142	0.705	0.355	N.A.	0.355	0.959	0.780	0.705	0.355	0.565	0.363	0.645	0.712	0.633

PHILIP WRIGHT ASSOCIATES Wellington St, Westhoughton, Bolton, BL5 3YW

Ref : 2500, / , Date : 27/02/2024

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Composite Design Brief Summary

Brief No.	Title	Unity	Pass	Shear	Shear const.	Mom. final	Mom. const.	Buckling	Buckling const.	Shear conn.	Transv. shr.	P.L.	P.L. const.	Steel str.	Conc. str.	Max. defl.	Nat. freq.	Dim. chk.
				final				final				final						
35	Member CpBL21d 246 @ Level GROUND	0.752	True	0.208	0.054	0.752	0.229	0.592	0.171	N.A.	N.A.	0.752	0.229	0.569	N.A.	0.229	0.648	N.A.
36	Member CpBL21d 15 @ Level GROUND	0.923	True	0.469	0.080	0.923	0.253	N.A.	N.A.	0.558	0.893	0.923	0.253	0.803	0.519	0.653	0.760	0.633
37	Member CpBL21d 223 @ Level GROUND	0.697	True	0.497	0.112	0.267	0.139	N.A.	N.A.	0.578	0.534	0.496	0.139	0.256	0.120	0.040	0.187	0.697
38	Member CpBL21d 23 @ Level GROUND	0.903	True	0.386	0.081	0.790	0.258	N.A.	N.A.	N.A.	0.903	0.790	0.258	0.698	0.479	0.571	0.703	0.633
39	Member CpBL21d 25 @ Level GROUND	0.875	True	0.875	0.189	0.407	0.232	N.A.	N.A.	0.578	0.780	0.875	0.232	0.405	0.175	0.082	0.255	0.745
40	Member CpBL21d 27 @ Level GROUND	0.78	True	0.338	0.082	0.698	0.260	N.A.	N.A.	0.665	0.780	0.698	0.260	0.620	0.337	0.529	0.660	0.633
41	Member CpBL21d 33 @ Level GROUND	0.78	True	0.376	0.075	0.746	0.237	N.A.	N.A.	0.573	0.780	0.746	0.237	0.669	0.386	0.563	0.711	0.633
42	Member CpBL21d 34 @ Level GROUND	0.366	True	0.325	0.009	0.366	0.018	0.268	0.012	N.A.	N.A.	0.366	0.018	0.274	N.A.	0.031	0.189	N.A.
43	Member CpBL21d 18 @ Level GROUND	0.983	True	0.406	0.054	0.872	0.145	N.A.	0.144	0.408	0.983	0.872	0.145	0.694	0.883	0.178	0.396	0.633
44	Member CpBL21d 40 @ Level GROUND	0.803	True	0.423	0.080	0.803	0.255	N.A.	N.A.	0.593	0.780	0.803	0.255	0.716	0.412	0.605	0.737	0.633
45	Member CpBL21d 39 @ Level GROUND	0.948	True	0.616	0.102	0.853	0.201	N.A.	0.250	0.936	0.948	0.853	0.201	0.676	0.475	0.256	0.483	0.760
46	Member CpBL21d 235 @ Level GROUND	0.891	True	0.503	0.092	0.891	0.169	0.867	0.157	N.A.	N.A.	0.891	0.169	0.681	N.A.	0.198	0.544	N.A.
47	Member CpBL21d 45 @ Level GROUND	0.902	True	0.355	0.061	0.902	0.212	N.A.	0.241	0.437	0.880	0.902	0.212	0.749	0.728	0.446	0.620	0.600
48	Member CpBL21d 46 @ Level GROUND	0.818	True	0.524	0.099	0.712	0.343	N.A.	N.A.	0.818	0.780	0.757	0.343	0.677	0.280	0.616	0.674	0.633
49	Member CpBL21d 68 @ Level GROUND	0.949	True	0.421	0.160	0.875	0.545	N.A.	0.670	0.874	0.949	0.875	0.545	0.831	0.328	0.494	0.569	0.697
50	Member CpBL21d 76 @ Level GROUND	0.924	True	0.169	0.053	0.477	0.234	N.A.	0.311	0.577	0.924	0.496	0.234	0.358	0.178	0.449	0.548	0.600
51	Member CpBL21d 189 @ Level GROUND	0.979	True	0.877	0.225	0.870	0.410	N.A.	N.A.	N.A.	0.979	0.870	0.410	0.831	0.455	0.534	0.707	0.633
52	Member CpBL21d 80 @ Level GROUND	0.927	True	0.393	0.063	0.927	0.203	N.A.	0.201	0.807	0.812	0.927	0.203	0.723	0.612	0.242	0.458	0.600
53	Member CpBL21d 210 @ Level GROUND	0.971	True	0.869	0.240	0.498	0.304	N.A.	N.A.	0.493	0.971	0.868	0.304	0.510	0.206	0.342	0.516	0.633
54	Member CpBL21d 232 @ Level GROUND	0.784	True	0.487	0.132	0.296	0.173	N.A.	N.A.	0.543	0.651	0.486	0.173	0.297	0.125	0.083	0.257	0.784
55	Member CpBL21d 98 @ Level GROUND	0.795	True	0.347	0.056	0.795	0.191	N.A.	0.145	0.613	0.779	0.795	0.191	0.663	0.503	0.175	0.399	0.760
56	Member CpBL21d 101 @ Level GROUND	0.935	True	0.483	0.079	0.788	0.237	N.A.	N.A.	N.A.	0.935	0.788	0.237	0.695	0.477	0.457	0.619	0.633
57	Member CpBL21d 107 @ Level GROUND	0.928	True	0.928	0.153	0.884	0.284	N.A.	N.A.	0.534	0.780	0.896	0.284	0.796	0.436	0.448	0.597	0.633
58	Member CpBL21d 118 @ Level GROUND	0.967	True	0.396	0.072	0.949	0.237	N.A.	0.222	N.A.	0.967	0.949	0.237	0.776	0.800	0.254	0.483	0.760
59	Member CpBL21d 108 @ Level GROUND	0.929	True	0.367	0.087	0.596	0.226	N.A.	N.A.	N.A.	0.929	0.596	0.226	0.528	0.359	0.275	0.438	0.633
60	Member CpBL21d 112 @ Level GROUND	0.901	True	0.511	0.080	0.810	0.244	N.A.	N.A.	0.445	0.901	0.810	0.244	0.717	0.478	0.479	0.635	0.633
61	Member CpBL21d 114 @ Level GROUND	0.905	True	0.852	0.142	0.760	0.240	N.A.	N.A.	0.900	0.781	0.905	0.240	0.622	0.416	0.443	0.614	0.633
62	Member CpBL21d 115 @ Level GROUND	0.988	True	0.354	0.072	0.704	0.234	N.A.	N.A.	0.473	0.988	0.704	0.234	0.637	0.395	0.516	0.669	0.633
63	Member CpBL21d 110 @ Level GROUND	0.912	True	0.620	0.151	0.876	0.390	N.A.	N.A.	N.A.	0.912	0.876	0.390	0.886	0.435	0.449	0.549	0.745
64	Member CpBL21d 120 @ Level GROUND	0.843	True	0.431	0.089	0.843	0.272	N.A.	N.A.	0.599	0.780	0.843	0.272	0.759	0.420	0.580	0.714	0.633
65	Member CpBL21d 121 @ Level GROUND	0.991	True	0.518	0.112	0.991	0.361	N.A.	N.A.	0.599	0.534	0.991	0.361	0.935	0.449	0.722	0.793	0.633
66	Member CpBL21d 122 @ Level GROUND	0.883	True	0.764	0.158	0.860	0.314	N.A.	N.A.	0.504	0.534	0.883	0.314	0.838	0.390	0.216	0.421	0.745
67	Member CpBL21d 233 @ Level GROUND	0.884	True	0.657	0.126	0.760	0.253	N.A.	N.A.	0.545	0.534	0.760	0.253	0.724	0.371	0.127	0.314	0.884
68	Member CpBL21d 129 @ Level GROUND	0.975	True	0.570	0.096	0.975	0.153	N.A.	N.A.	N.A.	N.A.	0.975	0.153	0.739	N.A.	0.115	0.413	N.A.

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Composite Design Brief Summary

Brief No.	Title	Unity	Pass	Shear final	Shear const.	Mom. final	Mom. const.	Buckling final	Buckling const.	Shear conn.	Transv. shr.	P.L. final	P.L. const.	Steel str.	Conc. str.	Max. defl.	Nat. freq.	Dim. chk.
69	Member CgBL21d 266 @ Level GROUND	0.884	True	0.433	0.027	0.308	0.029	N.A.	0.025	0.545	0.738	0.433	0.029	0.276	0.179	0.034	0.166	0.884

Steel Design Brief Summary

Brief No.	Type	Title	Portion	Case	Unity	Pass	Local	Shear	LT buckling	Deflection
1	Axial+Mom.	Member SBL21d 41	0 to 0.86	001	0.990	Pass	0.990	0.387	0.983	0.901
2	Axial+Mom.	Member SBL21d 41	0.86 to 2.058	001	0.990	Pass	0.990	0.387	0.983	0.901
3	Axial+Mom.	Member SBL21d 42	0 to 1.202	001	0.194	Pass	0.042	0.371	0.219	0.147
4	Axial+Mom.	Member SBL21d 44	0 to 3.25	001	0.710	Pass	0.542	0.303	0.785	0.710
5	Axial+Mom.	Member SBL21d 51	0 to 1.202	001	0.049	Pass	0.049	0.058	0.052	0.023
6	Axial+Mom.	Member SBL21d 69	0 to 3.785	001	0.084	Pass	0.083	0.037	0.091	0.084
7	Axial+Mom.	Member Cpl21d 129	0 to 1.5	001	0.950	Pass	0.950	0.570	0.947	0.790
8	Axial+Mom.	Member Cpl21d 129	1.5 to 2.475	001	0.950	Pass	0.950	0.570	0.947	0.790
9	Axial+Mom.	Member SCI21d 160	0 to 3.2	001	0.744	Pass	0.553	0.000	0.744	0.000
10	Axial+Mom.	Member SCI21d 163	0 to 3.2	001	0.809	Pass	0.809	0.000	0.800	0.000
11	Axial+Mom.	Member SCI21d 168	0 to 3.2	001	0.775	Pass	0.355	0.000	0.775	0.000
12	Axial+Mom.	Member SCI21d 157	0 to 3.2	001	0.839	Pass	0.785	0.000	0.839	0.002
13	Axial+Mom.	Member SBL21d 20	0 to 3.042	001	0.555	Pass	0.314	0.147	0.555	0.373
14	Beam	Member SBL21d 100	0 to 3.302	001	0.015	Pass	0.015	0.045		0.005
15	Beam	Member SBL21d 29	0 to 6.202	001	0.786	Pass	0.551	0.381		0.786
16	Beam	Member SBL21d 79	0 to 6.109	001	0.962	Pass	0.897	0.260		0.962
17	Axial+Mom.	Member SBL21d 218	0 to 3.6	001	0.803	Pass	0.570	0.932	0.803	0.709
18	Axial+Mom.	Member SBL21d 96	0 to 6.499	001	0.840	Pass	0.518	0.395	0.666	0.840
19	Axial+Mom.	Member SBL21d 78	0 to 6.109	001	0.690	Pass	0.166	0.175	0.414	0.690
20	Axial+Mom.	Member SBL21d 71	0 to 6.523	001	0.888	Pass	0.459	0.106	0.888	0.377
21	Axial+Mom.	Member SBL21d 70	0 to 6.523	001	0.841	Pass	0.214	0.186	0.470	0.841
22	Axial+Mom.	Member SBL21d 10	0 to 3.355	001	0.225	Pass	0.225	0.213	0.141	0.070
23	Axial+Mom.	Member SBL21d 11	0 to 0.843	001	0.007	Pass	0.007	0.027	0.007	
24	Axial+Mom.		0 to 0.843	001	0.000	Pass				
25	Beam	Member SBL21d 1	0 to 5.404	001	0.463	Pass	0.288	0.118		0.463
26	Beam	Member SBL21d 3	0 to 5.427	001	0.777	Pass	0.577	0.251		0.777
27	Beam	Member SBL21d 71	0 to 6.523	001	0.889	Pass	0.459	0.106		0.377
28	Beam	Member SBL21d 10	0 to 3.355	001	0.225	Pass	0.225	0.213		0.070
29	Beam	Member SBL21d 11	0 to 0.843	001	0.007	Pass	0.007	0.027		
30	Beam	Member SBL21d 66	0 to 4.143	001	0.218	Pass	0.218	0.111		0.197
31	Beam	Member SBL21d 16	0 to 5.097	001	0.589	Pass	0.458	0.164		0.589
32	Beam	Member SBL21d 24	0 to 6.198	001	0.944	Pass	0.786	0.293		0.944
33	Beam	Member SBL21d 206	0 to 5.118	001	0.982	Pass	0.783	0.239		0.982
34	Beam	Member SBL21d 17	0 to 5.1	001	0.666	Pass	0.666	0.251		0.608

PHILIP WRIGHT ASSOCIATES Wellington St, Westhoughton,, Bolton, Lancs, BL5 3YW

Ref: 2500, / , Date : 27/02/2024

25554

Steel Design Brief Summary

Brief No.	Type	Title	Portion	Case	Unity	Pass	Local	Shear	LT buckling	Deflection
35	Beam	Member SBL2id 206	0 to 5.118	001	0.982	Pass	0.783	0.239		0.982
36	Beam	Member SBL2id 207	0 to 5.135	001	0.863	Pass	0.863	0.416		0.693
37	Simple Col.	Member SCI2id 143	0 to 3.2	001	0.855	Pass	0.855			
38	Simple Col.	Member SCI2id 144	0 to 3.2	001	0.665	Pass	0.665			
39	Simple Col.	Member SCI2id 151	0 to 3.2	001	0.807	Pass	0.807			
40	Simple Col.	Member SCI2id 154	0 to 3.2	001	0.510	Pass	0.510			
41	Axial+Mom.	Member SBL2id 50	0 to 8.844	001	0.824	Pass	0.381	0.123	0.410	0.824
42	Axial+Mom.	Member SBL2id 196	0 to 3.736	001	0.795	Pass	0.795	0.485	0.839	0.739
43	Axial+Mom.	Member SBL2id 200	0 to 3.25	001	0.671	Pass	0.359	0.157	0.671	0.456
44	Axial+Mom.	Member SBL2id 201	0 to 3.15	001	0.613	Pass	0.337	0.152	0.613	0.414
45	Simple Col.	Member SCI2id 213	0 to 3.2	001	0.760	Pass	0.760			
46	Simple Col.	Member SCI2id 149	0 to 3.2	001	0.842	Pass	0.842			
47	Simple Col.	Member SCI2id 214	0 to 3.2	001	0.913	Pass	0.913			
48	Simple Col.	Member SCI2id 215	0 to 3.2	001	0.848	Pass	0.848			
49	Beam	Member SBL2id 206	0 to 5.118	001	0.982	Pass	0.783	0.239		0.982
50	Beam	Member SBL2id 218	0 to 3.6	001	0.851	Pass	0.750	0.932		0.851
51	Axial+Mom.	Member SBL2id 29	0 to 6.202	001	0.786	Pass	0.304	0.381	0.547	0.786
52	Axial+Mom.	Member SBL2id 191	0 to 3.036	001	0.116	Pass	0.067	0.040	0.116	0.076
53	Axial+Mom.	Member SBL2id 192	0 to 3.036	001	0.116	Pass	0.067	0.040	0.116	0.076
54	Axial+Mom.	Member SBL2id 4	0 to 3.806	001	0.429	Pass	0.198	0.590	0.464	0.429
55	Axial+Mom.	Member SBL2id 199	0 to 2.058	001	0.164	Pass	0.144	0.100	0.164	0.116
56	Axial+Mom.	Member SBL2id 54	0 to 3.735	001	0.738	Pass	0.432	0.171	0.738	0.623
57	Axial+Mom.	Member SBL2id 193	0 to 3.013	001	0.022	Pass	0.000	0.066	0.022	0.011
58	Axial+Mom.	Member SBL2id 82	0 to 3.458	001	0.328	Pass	0.263	0.174	0.328	0.227
59	Axial+Mom.	Member SBL2id 202	0 to 2.65	001	0.158	Pass	0.154	0.133	0.158	0.102
60	Axial+Mom.	Member SBL2id 94	0 to 3.3	001	0.284	Pass	0.239	0.166	0.284	0.197
61	Axial+Mom.	Member SBL2id 88	0 to 3.725	001	0.859	Pass	0.859	0.526	0.907	0.805
62	Axial+Mom.	Member SBL2id 89	0 to 3.776	001	0.875	Pass	0.875	0.529	0.924	0.832
63	Axial+Mom.	Member SBL2id 119	0 to 2.574	001	0.147	Pass	0.146	0.129	0.147	0.094
64	Axial+Mom.	Member SBL2id 204	0 to 2.574	001	0.147	Pass	0.146	0.129	0.147	0.094
65	Axial+Mom.	Member SBL2id 198	0 to 2.5	001	0.453	Pass	0.286	0.399	0.453	0.207
66	Axial+Mom.	Member SBL2id 228	0 to 2.832	001	0.233	Pass	0.060	0.150	0.261	0.209
67	Axial+Mom.	Member SBL2id 190	0 to 2.659	001	0.056	Pass	0.003	0.056	0.063	0.027
68	Axial+Mom.	Member SBL2id 252	0 to 3.847	001	0.782	Pass	0.677	0.597	0.882	0.700

PHILIP WRIGHT ASSOCIATES

Wellington St, Westhoughton,, Bolton, Lancs, BL5 3YW

Ref : 2500, / , Date : 27/02/2024

25554

Steel Design Brief Summary

Brief No.	Type	Title	Portion	Case	Unity	Pass	Local	Shear	LT buckling	Deflection
69	Axial+Mom.	Member SBL21d 234	0 to 2.87	001	0.410	Pass	0.146	0.198	0.407	0.410
70	Axial+Mom.	Member SBL21d 35	0 to 5.374	001	0.763	Pass	0.435	0.278	0.703	0.763
71	Axial+Mom.	Member SBL21d 29	0 to 6.202	001	0.786	Pass	0.304	0.381	0.547	0.786
72	Axial+Mom.	Member SBL21d 221	0 to 5.036	001	0.717	Pass	0.487	0.239	0.638	0.717
73	Axial+Mom.	Member SBL21d 245	0 to 3.651	001	0.206	Pass	0.047	0.145	0.233	0.168
74	Beam	Member CpbL21d 246	0 to 5.065	001	0.813	Pass	0.752	0.208		0.813
75	Beam	Member CpbL21d 5	0 to 5.039	001	0.924	Pass	0.794	0.201		0.924
76	Axial+Mom.	Member SBL21d 193	0 to 3.013	001	0.022	Pass	0.000	0.066	0.022	0.011
77	Axial+Mom.	Member SBL21d 248	0 to 3	001	0.147	Pass	0.024	0.090	0.165	0.141
78	Axial+Mom.	Member SBL21d 251	0 to 4	001	0.918	Pass	0.719	0.214	0.870	0.918
79	Axial+Mom.	Member SBL21d 253	0 to 3.147	001	0.287	Pass	0.092	0.167	0.322	0.287
80	Axial+Mom.	Member SBL21d 254	0 to 2.115	001	0.002	Pass	0.000	0.002	0.002	
81	Axial+Mom.	Member SBL21d 256	0 to 3.138	001	0.540	Pass	0.392	0.187	0.605	0.476
82	Axial+Mom.	Member SBL21d 261	0 to 4	001	1.000	Pass	0.871	0.357	0.947	1.000
83	Axial+Mom.	Member SBL21d 252	0 to 3.847	001	0.782	Pass	0.677	0.597	0.882	0.700
84	Axial+Mom.	Member SBL21d 265	0 to 3.174	001	0.832	Pass	0.538	0.425	0.749	0.832
85	Axial+Mom.	Member SBL21d 265	0 to 3.174	001	0.832	Pass	0.538	0.425	0.749	0.832
86	Axial+Mom.	Member SBL21d 93	0 to 3.6	001	0.809	Pass	0.363	0.248	0.640	0.809
87	Axial+Mom.	Member SBL21d 97	0 to 6.303	001	0.899	Pass	0.843	0.502	0.812	0.899
88	Axial+Mom.	Member SBL21d 81	0 to 3.458	001	0.757	Pass	0.272	0.395	0.757	0.550
89	Axial+Mom.	Member SBL21d 243	0 to 4.145	001	0.219	Pass	0.219	0.209	0.237	0.147
90	Axial+Mom.	Member SBL21d 242	0 to 3.855	001	0.144	Pass	0.144	0.121	0.157	0.090
91	Beam	Member SBL21d 207	0 to 5.135	001	0.863	Pass	0.863	0.416		0.693

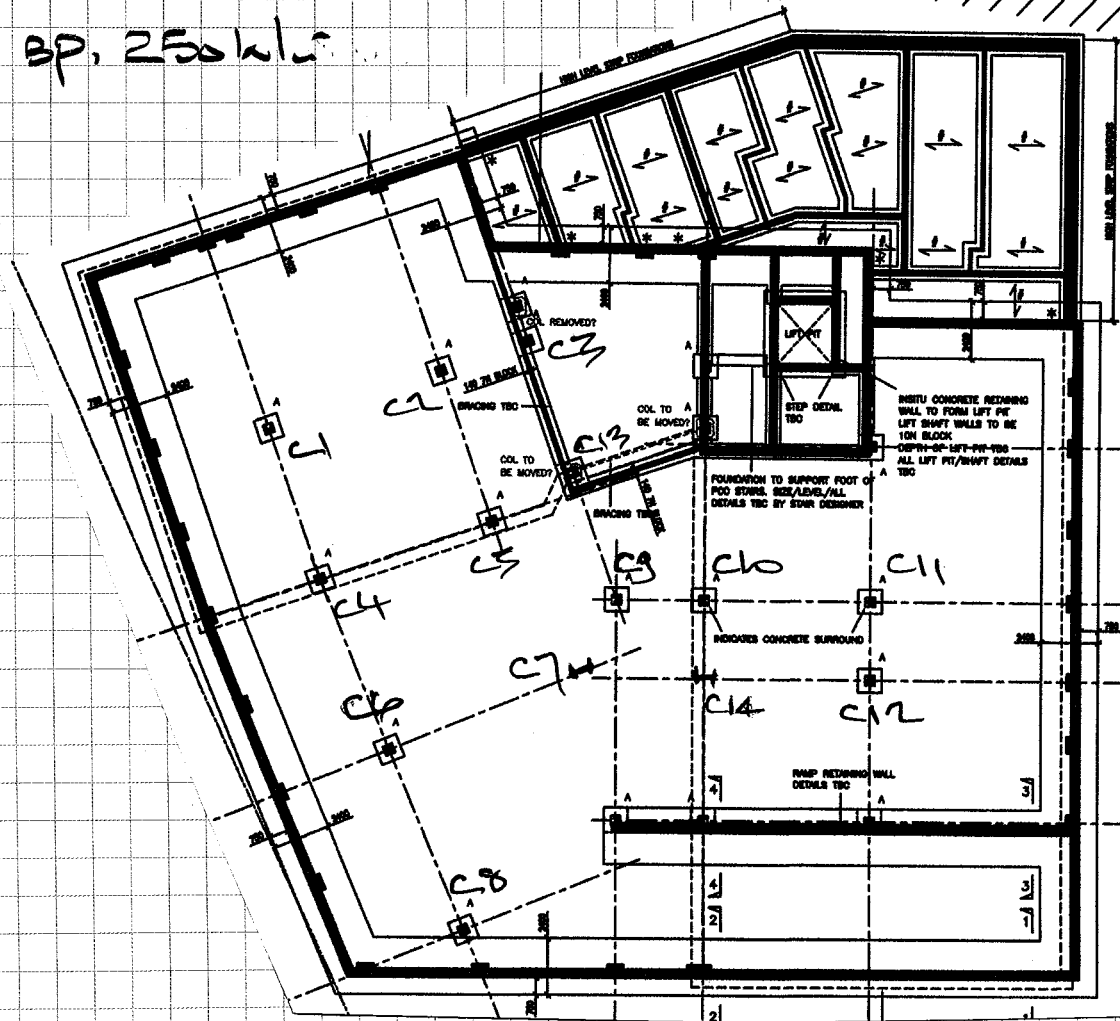
Consulting Structural Engineers

Part of Structure

FOUNDATIONS

PAD FOUNDATIONS

ALLOW BP, 250 kN/m²



COL LOADS

COL R/C

↓

→

↘

C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14

1025
1040
804
835
649
493
356
219
634
910
1068
661
627

94
21
47
27

33
7
20
10
10



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Part of Structure

FOUNDATIONS.

Allow OVERBURDEN $6 \times 1.2 = 8$

WT TANK, 24×0.2

$\cdot 5$

WT WALLS, 18×0.15

$\cdot 3$

$\frac{5}{3}$
 16 kN

$\therefore$ DESIGN BP, $250 - 16 = 234 \text{ kN}$

SIZE	AREA	MAX ALLOW LOAD (kN)
$1.0 \times 1.0 \times 0.4$	1.0	234
$1.2 \times 1.2 \times 0.5$	1.44	337
$1.3 \times 1.3 \times 0.6$	1.69	396
$1.4 \times 1.4 \times 0.6$	1.96	459
$1.5 \times 1.5 \times 0.7$	2.25	527
$1.6 \times 1.6 \times 0.7$	2.56	599
$1.7 \times 1.7 \times 0.8$	2.89	676
$1.8 \times 1.8 \times 0.8$	3.24	759
$1.9 \times 1.9 \times 0.9$	3.61	845
$2.0 \times 2.0 \times 0.9$	4.0	936
$2.1 \times 2.1 \times 1.0$	4.41	1032
$2.2 \times 2.2 \times 1.0$	4.84	1133



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ASSOCIATES LTD

Contract

WYTHEN CHANG

Contract No.

2500

Sheet No.

67

Rev.

Date.

Nov 21

Consulting Structural Engineers

Part of Structure FOUNDATIONS

FOUNDATIONS SIZE

C1	-	2.2	x	2.2	x	1.0
C3						
C4	-	1.9	x	1.9	x	0.9
C6	-	1.7	x	1.7	x	0.8
C8	-	1.3	x	1.3	x	0.6
C9	-	1.0	x	1.0	x	0.5
C10	-	1.7	x	1.7	x	0.8
C11	-	2.0	x	2.0	x	0.9
C12	-	2.2	x	2.2	x	1.0
C14	-	1.7	x	1.7	x	0.8

C2.

↓ 1040 → 94 → 33

$$2500 \times 2500 \times 600$$

C5

↓ 835 → 21 → 7

$$2000 \times 2000 \times 600$$

C7

↓ 493 → 47 → 20

$$1800 \times 1800 \times 600$$

C13

↓ 661 → 27 → 10

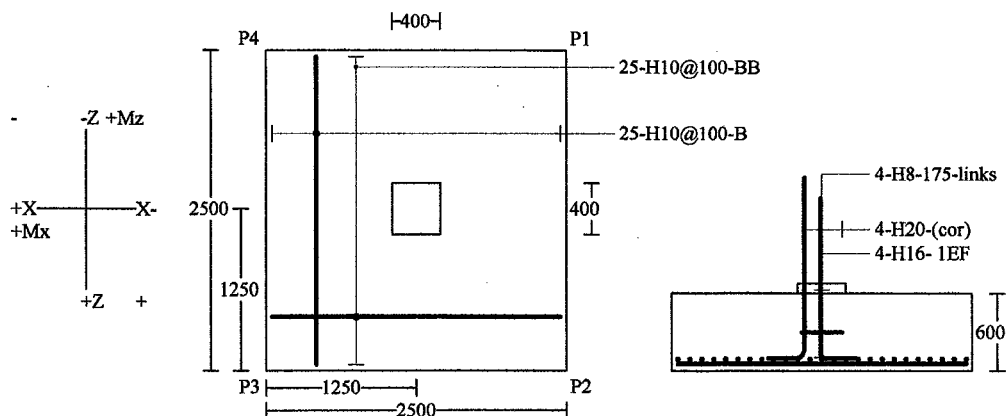
$$1900 \times 1900 \times 600$$

PHILIP WRIGHT ASSOCIATES

25554

Wellington St
Westhoughton,
Bolton, Lancs, BL5 3YW
Tel: 01942 811532

Job Ref : 2500
Sheet : / 68
Made by : PW
Date : 12 December 2022 / Ver. 2022.07.14
Checked :
Approved :

Pad @ COL C2**Basic Properties**

Design to BS 8110: 1997
Fy, Fcu, Covers T, B, S 500 N/mm², 30 N/mm², 50 mm, 50 mm, 50 mm
Gross: Area, Areal, Z zz, Z xx 6.25, 0.16, 2.604, 2.604
Conc Den, Surcharge, LFsrv, LFult, SWP 23.4, 0.0, 1.0, 1.0, 250

Z-Z Axis Section Capacities

Mu conc = Fn(Z, Beff, X, K1, Fcu) 518, 2500, 28, 0.4, 30 442 kN.m
vc = Fn(AS, bv, d, Fcu) 1963, 2500, 545, 30 0.33 N/mm²

X-X Axis Section Capacities

X/d = Fn(AS, Fy, K1, Beff, Fcu, γm) 1963, 500, 0.4, 2500, 30, 0.87 0.05
Mu conc = Fn(Z, Beff, X, K1, Fcu) 508, 2500, 28, 0.4, 30 434 kN.m
vc = Fn(AS, bv, d, Fcu) 1963, 2500, 535, 30 0.33 N/mm²

Critical Serviceability : 2 : Dead plus Live**Pressure**

Pmax = Fn(Pa, Pzz, Pxx, p1-4) 180.4, ±34.3, ±0.0, 214.8, 214.8, 146.1, 146.1 214.8 kN/m² OK
Check for up-lift Le 2500 >= 2500 Be 2500 >= 2500 OK

FOS Overturning

FOS OT zz = Mzz Rest / Mzz ot 1410 / 89 15.77 > 1.5 OK

FOS Sliding

FOS Sliding = 0.30 • F / Fv (0.30 x 1128) / 94 3.60 > 1.5 OK

Combined Axial & Horizontal loads

F/Pv + Fv/Pv < 1 (BS 8004: 2.3.2.4.7) 1127.8 / 1562.5 + 94.0 / 338.3 = 0.72 + 0.28 1.00 OK

Critical Ultimate : 1 : Dead plus Live**Pressure**

Pmax = Fn(Pa, Pzz, Pxx, p1-4) 247.0, ±48.1, ±0.0, 295.1, 295.1, 198.9, 198.9 295.1 kN/m² (ULS)
Check for up-lift Le 2500 >= 2500 Be 2500 >= 2500 (ULS)

FOS Overturning

FOS OT zz = Mzz Rest / Mzz ot 1930 / 125 15.42 > 1.0 OK

PHILIP WRIGHT ASSOCIATES

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FOS Sliding

FOS Sliding = $0.30 \cdot F / F_v$ (0.30 x 1544) / 132 3.52 > 1.0 OK

Moments and Shears

Static load reduction $w = (\text{Sur} + \text{Den} \cdot D) \cdot L_F$
(0.0 + 23.4 x 0.6) x 1.00 14.0kN/m²

Moments at Column Face

X-X Moment Lower M - $w \cdot l_a^2 \cdot B / 2$	340.4 - 14 · 2500 · 1050 ² / 2	321.0 kN.m	OK
X-X Moment Upper M - $w \cdot L_a^2 \cdot B / 2$	340.4 - 14 · 2500 · 1050 ² / 2	321.0 kN.m	OK
Z-Z Moment Left M - $w \cdot L_a^2 \cdot B / 2$	292.7 - 14 · 2500 · 1050 ² / 2	273.4 kN.m	OK
Z-Z Moment Right M - $w \cdot l_a^2 \cdot B / 2$	388.1 - 14 · 2500 · 1050 ² / 2	368.7 kN.m	OK

Shear at d and 2d from Column Face

Checking $\leq 2v_c$ at d & $\leq v_c$ at 2d from column face

X-X lower $V_d, V_{2d}, l_{a_d}, l_{a_{2d}}, d, b, w$	318, 0, 515, -20, 535, 2500, 14	0.22, 0.00 N/mm ²	OK
X-X upper $V_d, V_{2d}, l_{a_d}, l_{a_{2d}}, d, b, w$	318, 0, 515, -20, 535, 2500, 14	0.22, 0.00 N/mm ²	OK
Z-Z left $V_d, V_{2d}, l_{a_d}, l_{a_{2d}}, d, b, w$	263.4, 0, 505, -40, 545, 2500, 14	0.18, 0.00 N/mm ²	OK
Z-Z right $V_d, V_{2d}, l_{a_d}, l_{a_{2d}}, d, b, w$	360.3, 0, 505, -40, 545, 2500, 14	0.25, 0.00 N/mm ²	OK

Punching Shear

Sub Zone Loads $F_0 = 1007.9 + F_1 = 16.7 + F_2 = 16.7 + F_3 = 11.7 + F_4 = 11.7$
 $+ F_{12} = 140.8 + F_{23} = 119.7 + F_{34} = 98.7 + F_{41} = 119.7$ 1543.8 kN
 Sub Zone Error = $F_{res} / \Sigma(F_0 - F_{41})$ (1 - 1543.75 / 1543.75) · 100 0.000% OK

Zone Locations

P₄-----P₁
 | F₄ | F₄₁ | F₁ |
 |-----|
 | F₃₄ | F₀ | F₁₂ | F₀ is bound by Punching Perimeter
 |-----| @ 1.5 d from column face.
 | F₃ | F₂₃ | F₂ |
 P₃-----P₂

$v_c \text{ ave} = (v_c \text{ zz} + v_c \text{ xx}) / 2$ (0.33, 0.332) / 2 0.331 N/mm²

Zone 1 Full punching '[]' F_{net}	$v_{net} = F_{net} / \text{Per} / d \cdot V_{mod} = 505 / 8080 / 540 \cdot 1.16$	0.134 N/mm ²	OK
Zone 2 Left side free '[]' F_{net}	$v_{net} = F_{net} / \text{Per} / d \cdot V_{mod} = 414 / 6540 / 540 \cdot 1.12$	0.131 N/mm ²	OK
Zone 3 Right side free '[]' F_{net}	$v_{net} = F_{net} / \text{Per} / d \cdot V_{mod} = 371 / 6540 / 540 \cdot 1.15$	0.121 N/mm ²	OK
Zone 4 Top side free '[]' F_{net}	$v_{net} = F_{net} / \text{Per} / d \cdot V_{mod} = 392 / 6540 / 540 \cdot 1.16$	0.129 N/mm ²	OK
Zone 5 Btm side free '[]' F_{net}	$v_{net} = F_{net} / \text{Per} / d \cdot V_{mod} = 392 / 6540 / 540 \cdot 1.16$	0.129 N/mm ²	OK
Zone 6 Left & Btm sides free '[]' F_{net}	$v_{net} = F_{net} / \text{Per} / d \cdot V_{mod} = 290 / 4520 / 540 \cdot 1.08$	0.128 N/mm ²	OK
Zone 7 Left & Top sides free '[]' F_{net}	$v_{net} = F_{net} / \text{Per} / d \cdot V_{mod} = 290 / 4520 / 540 \cdot 1.08$	0.128 N/mm ²	OK
Zone 8 Right & Top sides free '[]' F_{net}	$v_{net} = F_{net} / \text{Per} / d \cdot V_{mod} = 243 / 4520 / 540 \cdot 1.19$	0.119 N/mm ²	OK
Zone 9 Right & Btm sides free '[]' F_{net}	$v_{net} = F_{net} / \text{Per} / d \cdot V_{mod} = 243 / 4520 / 540 \cdot 1.19$	0.119 N/mm ²	OK

Critical Zone

Full punching '[]' F_{net} $F_{res} = (F_0) - (\text{Area}_{ext} \cdot w_{conc})$
 1543.8 - 1007.9 - 2.2 · 14 505.4 kN

$v_{net} = F_{net} / \text{Perim} / d \cdot V_{mod}$ 505.4 / 8080 / 540 · 1.157 0.134 N/mm² OK

Punching shear at Column Head

$v_{max} = \text{Min}(5, 0.8 \cdot p F_{cu})$ min(5, 0.8 x Sqr(30) 4.38 N/mm²

Column Head F_{net} $F_{res} = (F_{col}) - (\text{Area}_{ext} \cdot w_{conc})$
 1543.8 - 1007.9 - 6.1 · 14 1418.7 kN

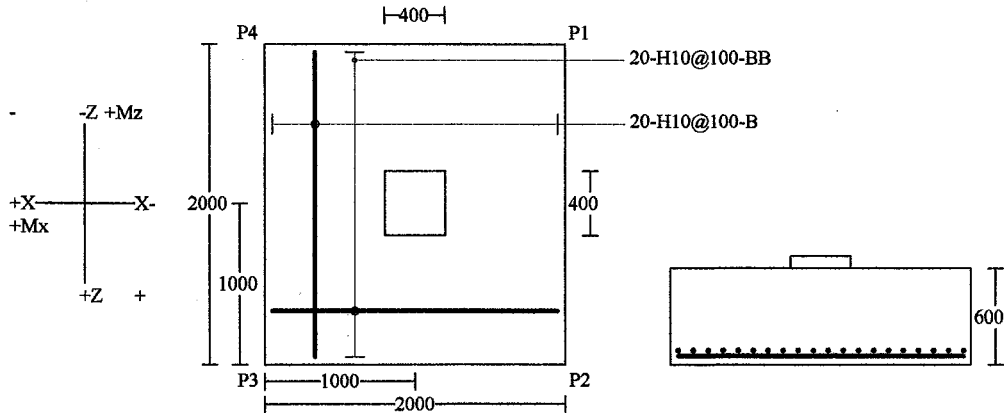
$v_{net} = F_{net} / \text{Perim} / d \cdot V_{mod}$ 1418.7 / 1600 / 540 · 1.000 1.642 N/mm² OK

PHILIP WRIGHT ASSOCIATES

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Wellington St
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Tel: 01942 811532

Job Ref : 2500
Sheet : / 70
Made by : PW
Date : 12 December 2022 / Ver. 2022.07.14
Checked :
Approved :

Pad @ COL C5**Basic Properties**

Design to BS 8110: 1997
Fy, Fcu, Covers T, B, S 500 N/mm², 30 N/mm², 50 mm, 50 mm, 50 mm
Gross: Area, Area1, Z zz, Z xx 4.0, 0.16, 1.333, 1.333
Conc Den, Surcharge, LFsrv, LFult, SWP 23.4, 0.0, 1.0, 1.0, 250

Z-Z Axis Section Capacities

Mu conc = Fn(Z, Beff, X, K1, Fcu) 518, 2000, 28, 0.4, 30 354 kN.m
vc = Fn(AS, bv, d, Fcu) 1571, 2000, 545, 30 0.33 N/mm²

X-X Axis Section Capacities

X/d = Fn(AS, Fy, K1, Beff, Fcu, γ_m) 1571, 500, 0.4, 2000, 30, 0.87 0.05
Mu conc = Fn(Z, Beff, X, K1, Fcu) 508, 2000, 28, 0.4, 30 347 kN.m
vc = Fn(AS, bv, d, Fcu) 1571, 2000, 535, 30 0.33 N/mm²

Critical Serviceability : 2 : Dead plus Live**Pressure**

Pmax = Fn(Pa, Pzz, Pxx, p1-4) 222.8, ±14.7, ±0.0, 237.5, 237.5, 208.1, 208.1 237.5 kN/m² OK
Check for up-lift Le 2000 >= 2000 Be 2000 >= 2000 OK

FOS Overturning

FOS OT zz = Mzz Rest / Mzz ot 891 / 20 45.47 > 1.5 OK

FOS Sliding

FOS Sliding = 0.30 • F / Fv (0.30 x 891) / 21 12.73 > 1.5 OK

Combined Axial & Horizontal loads

F/P_v + Fv/P_h < 1 (BS 8004: 2.3.2.4.7) 891.2 / 1000.0 + 21.0 / 267.3 = 0.89 + 0.08 0.97 OK

Critical Ultimate : 1 : Dead plus Live**Pressure**

Pmax = Fn(Pa, Pzz, Pxx, p1-4) 306.3, ±20.6, ±0.0, 326.9, 326.9, 285.7, 285.7 326.9 kN/m² (ULS)
Check for up-lift Le 2000 >= 2000 Be 2000 >= 2000 (ULS)

FOS Overturning

FOS OT zz = Mzz Rest / Mzz ot 1225 / 27 44.65 > 1.0 OK

PHILIP WRIGHT ASSOCIATES

25554

Wellington St
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Bolton, Lancs, BL5 3YW
Tel: 01942 811532

Job Ref : 2500
Sheet : / 71
Made by : PW
Date : 12 December 2022 / Ver. 2022.07.14
Checked :
Approved :

FOS Sliding

FOS Sliding = $0.30 \cdot F / F_v$ (0.30 x 1225) / 29 12.50 > 1.0 OK

Moments and Shears

Static load reduction $w = (\text{Sur} + \text{Den} \cdot D) \cdot L_F$
(0.0 + 23.4 x 0.6) x 1.00 14.0kN/m²

Moments at Column Face

X-X Moment Lower M - $w \cdot l_a^2 \cdot B / 2$	196 - 14 • 2000 • 800 ² / 2	187.0 kN.m	OK
X-X Moment Upper M - $w \cdot L_a^2 \cdot B / 2$	196 - 14 • 2000 • 800 ² / 2	187.0 kN.m	OK
Z-Z Moment Left M - $w \cdot L_a^2 \cdot B / 2$	186.4 - 14 • 2000 • 800 ² / 2	177.4 kN.m	OK
Z-Z Moment Right M - $w \cdot l_a^2 \cdot B / 2$	205.7 - 14 • 2000 • 800 ² / 2	196.7 kN.m	OK

Shear at d and 2d from Column Face

Checking $\leq 2v_c$ at d & $\leq v_c$ at 2d from column face

X-X lower $V_d, V_{2d}, l_{a_d}, l_{a_{2d}}, d, b, w$	162.3, 0, 265, -270, 535, 2000, 14	0.14, 0.01 N/mm ²	OK
X-X upper $V_d, V_{2d}, l_{a_d}, l_{a_{2d}}, d, b, w$	162.3, 0, 265, -270, 535, 2000, 14	0.14, 0.01 N/mm ²	OK
Z-Z left $V_d, V_{2d}, l_{a_d}, l_{a_{2d}}, d, b, w$	147.1, 0, 255, -290, 545, 2000, 14	0.13, 0.01 N/mm ²	OK
Z-Z right $V_d, V_{2d}, l_{a_d}, l_{a_{2d}}, d, b, w$	165.4, 0, 255, -290, 545, 2000, 14	0.15, 0.01 N/mm ²	OK

Punching Shear

Sub Zone Loads $F_0 = 1225.2 + F_1 = 0 + F_2 = 0 + F_3 = 0 + F_4 = 0$
+ $F_{12} = 0 + F_{23} = 0 + F_{34} = 0 + F_{41} = 0$ 1225.2 kN
Sub Zone Error = $F_{res} / \Sigma(F_0 - F_{41})$ (1 - 1225.16 / 1225.16) • 100 0.000% OK

Zone Locations

P_4 ----- P_1
| F_4 | F_{41} | F_1 |
|-----|
| F_{34} | F_0 | F_{12} | F_0 is bound by Punching Perimeter
|-----| @ 1.5 d from column face.
| F_3 | F_{23} | F_2 |
 P_3 ----- P_2

Projections from Column face

2 opposite Projections are less than 1.5 d =>

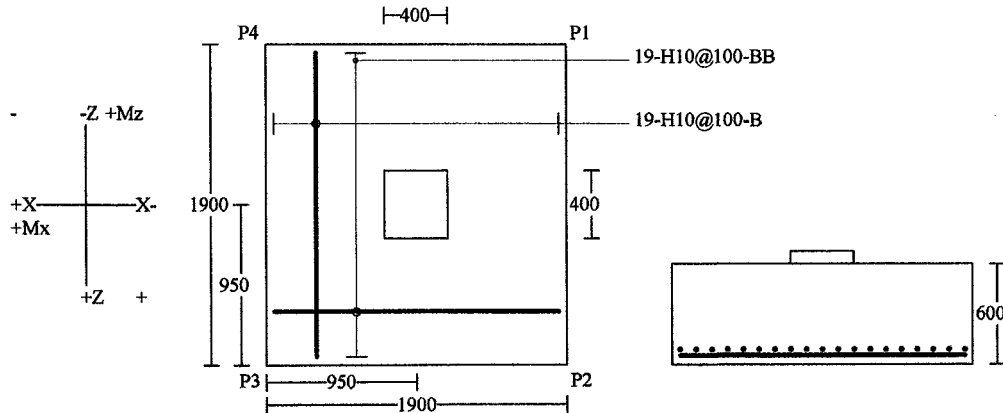
Not Applicable

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Pad @ COL C13**Basic Properties**

Design to BS 8110: 1997
Fy, Fcu, Covers T, B, S 500 N/mm², 30 N/mm², 50 mm, 50 mm, 50 mm
Gross: Area, Areal, Z zz, Z xx 3.61, 0.16, 1.143, 1.143
Conc Den, Surcharge, LFsrv, LFult, SWP 23.4, 0.0, 1.0, 1.0, 250

Z-Z Axis Section Capacities

Mu conc = Fn(Z, Beff, X, K1, Fcu) 518, 1900, 28, 0.4, 30 336 kN.m
vc = Fn(AS, bv, d, Fcu) 1492, 1900, 545, 30 0.33 N/mm²

X-X Axis Section Capacities

X/d = Fn(AS, Fy, K1, Beff, Fcu, γ_m) 1492, 500, 0.4, 1900, 30, 0.87 0.05
Mu conc = Fn(Z, Beff, X, K1, Fcu) 508, 1900, 28, 0.4, 30 330 kN.m
vc = Fn(AS, bv, d, Fcu) 1492, 1900, 535, 30 0.33 N/mm²

Critical Serviceability : 2 : Dead plus Live**Pressure**

Pmax = Fn(Pa, Pzz, Pxx, p1-4) 197.1, ±22.9, ±0.0, 220.1, 220.1, 174.2, 174.2 220.1 kN/m² OK
Check for up-lift Le 1900 >= 1900 Be 1900 >= 1900 OK

FOS Overturning

FOS OT zz = Mzz Rest / Mzz ot 676 / 26 25.81 > 1.5 OK

FOS Sliding

FOS Sliding = 0.30 • F / Fv (0.30 x 712) / 27 7.91 > 1.5 OK

Combined Axial & Horizontal loads

F/P_v + Fv/P_h < 1 (BS 8004: 2.3.2.4.7) 711.7 / 902.5 + 27.0 / 213.5 = 0.79 + 0.13 0.92 OK

Critical Ultimate : 1 : Dead plus Live**Pressure**

Pmax = Fn(Pa, Pzz, Pxx, p1-4) 270.4, ±32.1, ±0.0, 302.5, 302.5, 238.3, 238.3 302.5 kN/m² (ULS)
Check for up-lift Le 1900 >= 1900 Be 1900 >= 1900 (ULS)

FOS Overturning

FOS OT zz = Mzz Rest / Mzz ot 927 / 37 25.28 > 1.0 OK

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FOS Sliding

FOS Sliding = $0.30 \cdot F / F_v$ (0.30 x 976) / 38 7.75 > 1.0 OK

Moments and Shears

Static load reduction $w = (\text{Sur} + \text{Den} \cdot D) \cdot L_F$
(0.0 + 23.4 x 0.6) x 1.00 14.0kN/m²

Moments at Column Face

X-X Moment Lower M - $w \cdot l_a^2 \cdot B / 2$	144.5 - 14 • 1900 • 750 ² / 2	137.0 kN.m	OK
X-X Moment Upper M - $w \cdot L_a^2 \cdot B / 2$	144.5 - 14 • 1900 • 750 ² / 2	137.0 kN.m	OK
Z-Z Moment Left M - $w \cdot l_a^2 \cdot B / 2$	131.9 - 14 • 1900 • 750 ² / 2	124.3 kN.m	OK
Z-Z Moment Right M - $w \cdot l_a^2 \cdot B / 2$	157.1 - 14 • 1900 • 750 ² / 2	149.6 kN.m	OK

Shear at d and 2d from Column Face

Checking $\leq 2v_c$ at d & $\leq v_c$ at 2d from column face

X-X lower $V_d, V_{2d}, l_{a_d}, l_{a_{2d}}, d, b, w$	110.5, 0, 215, -320, 535, 1900, 14	0.10, 0.01 N/mm ²	OK
X-X upper $V_d, V_{2d}, l_{a_d}, l_{a_{2d}}, d, b, w$	110.5, 0, 215, -320, 535, 1900, 14	0.10, 0.01 N/mm ²	OK
Z-Z left $V_d, V_{2d}, l_{a_d}, l_{a_{2d}}, d, b, w$	94.2, 0, 205, -340, 545, 1900, 14	0.09, 0.01 N/mm ²	OK
Z-Z right $V_d, V_{2d}, l_{a_d}, l_{a_{2d}}, d, b, w$	116.5, 0, 205, -340, 545, 1900, 14	0.11, 0.01 N/mm ²	OK

Punching Shear

Sub Zone Loads $F_0 = 976.1 + F_1 = 0 + F_2 = 0 + F_3 = 0 + F_4 = 0$
+ $F_{12} = 0 + F_{23} = 0 + F_{34} = 0 + F_{41} = 0$ 976.1 kN

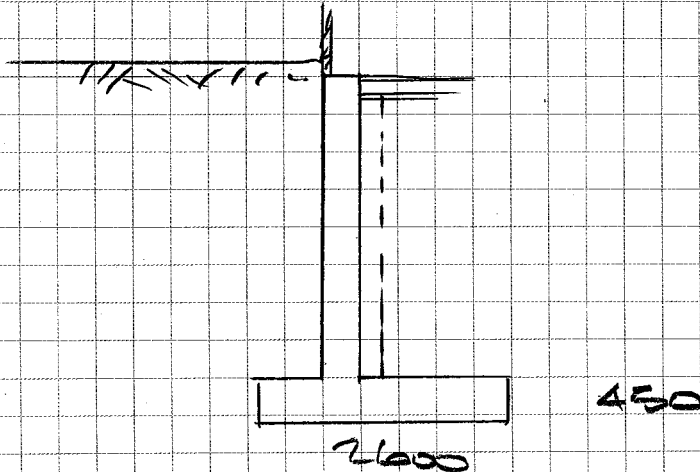
Sub Zone Error = $F_{res} / \sum(F_0 - F_{41})$ (1 - 976.084 / 976.084) • 100 0.000% OK

Zone Locations

$P_4 \text{-----} P_1$
| F_4 | F_{41} | F_1 |
|-----|
| F_{34} | F_0 | F_{12} | F_0 is bound by Punching Perimeter
|-----| @ 1.5 d from column face.
| F_3 | F_{23} | F_2 |
 $P_3 \text{-----} P_2$

Projections from Column face 2 opposite Projections are less than 1.5 d => Not Applicable

PERIMETER RETAINING WALL



STEM

350 TL +116 - 200

BASE

001 FROM BEAMS

• $440 / 0.0712$ 145 121

LONGITUDINAL MM, $145 \times 3.1^2 / 10$ 139 1.5, 209

STEM, 145×3.112 225 1.5, 337

BASE 2600 x 450

B1131 MESH T + B

+ H12 + 200 LONGITUDINAL RF.

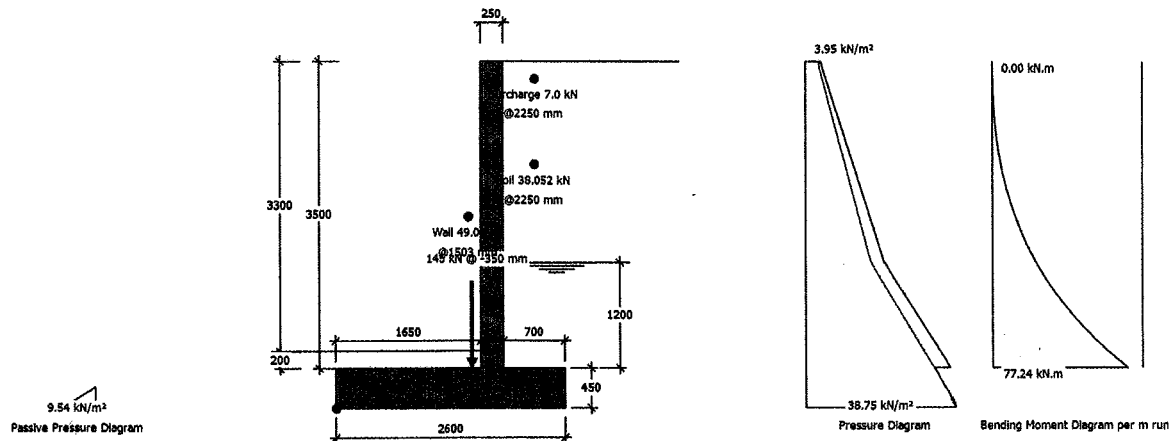
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MasterKey : Retaining Wall Design to BS 8002 : 1994 and BS 8110 : 1997
PERIMETER RETAINING
Reinforced Concrete Retaining Wall with Reinforced Base

**Summary of Design Data****Notes**

Material Densities (kN/m³)

Concrete grade

Concrete covers (mm)

Reinforcement design

Surcharge and Water Table

Unplanned excavation depth

† The Engineer must satisfy him/herself to the reinforcement detailing requirements of the relevant codes of practice

All dimensions are in mm and all forces are per metre run

Dry Soil 18.00, Saturated Soil 20.80, Submerged Soil 10.80, Concrete 24.00

fcu 30 N/mm², Permissible tensile stress 0.250 N/mm²

Wall inner cover 30 mm, Wall outer cover 30 mm, Base cover 50 mm

fy 500 N/mm² designed to BS 8110: 1997

Surcharge 10.00 kN/m², Water table level 1200 mm

Front of wall 395 mm

Additional Loads

Vertical Line Load

† Dimensions

145 kN/m @ X -350 mm and Y 3500 mm - Load type Live

Ties, line loads and partial loads are measured from the inner top edge of the wall

Soil Properties

Bearing pressure

Back Soil Friction and Cohesion

Base Friction and Cohesion

Front Soil Friction and Cohesion

Permissible service pressure @ front 200.00 kN/m², @ back 200.00 kN/m²

 $\alpha = \text{Atn}(\tan(30)/1.2) = 25.69^\circ$ $\delta = \text{Atn}(0.75 \times \tan(\text{Atn}(\tan(30)/1.2))) = 19.84^\circ$ $\phi = \text{Atn}(\tan(30)/1.2) = 25.69^\circ$ **Loading Cases**G_{Soil}- Soil Self Weight, G_{Wall}- Wall & Base Self Weight, F_{VHeel}- Vertical Loads over Heel,P_a- Active Earth Pressure, P_{surcharge}- Earth pressure from surcharge, P_p- Passive Earth PressureCase 1: Geotechnical Design 1.00 G_{Soil}+1.00 G_{Wall}+1.00 F_{VHeel}+1.00 P_a+1.00 P_{surcharge}+1.00 P_pCase 2: Structural Ultimate Design 1.40 G_{Soil}+1.40 G_{Wall}+1.60 F_{VHeel}+1.00 P_a+1.00 P_{surcharge}+1.00 P_p**Geotechnical Design****Wall Stability - Virtual Back Pressure**

Case 1 Overturning/Stabilising 92.220/399.896

0.231 OK

Wall Sliding - Virtual Back PressureF_x/(R_{xFriction}+ R_{xPassive}) 69.400/(86.289+1.222)

0.793 OK

Soil Pressure

Virtual Back (No uplift)

Max(94.810/200, 89.137/200) kN/m²

0.474 OK

Wall Back (No uplift)

Max(109.555/200, 74.393/200) kN/m²

0.548 OK

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Structural Design**Wall Design (Inner Steel)**

Critical Section	Critical @ 0 mm from base, Case 2		
Steel Provided (Cover)	Main H16@200 (30 mm) Dist. H12@175 (46 mm)	1005 mm ²	OK
Compression Steel Provided (Cover)	Main H12@200 (30 mm) Dist. H12@175 (42 mm)	565 mm ²	
Leverarm $z=fn(d,b,As,fy,Fcu)$	212 mm, 1000 mm, 1005 mm ² , 500 N/mm ² , 30.0 N/mm ²	196 mm	
$Mr=fn(above,As',d',x,x/d)$	565 mm ² , 36 mm, 36 mm, 0.17	85.6 kN.m	
Moment Capacity Check (M/Mr)	M 77.2 kN.m, Mr 85.6 kN.m	0.903	OK
Shear Capacity Check	F 62.5 kN, vc 0.614 N/mm ² , Fvr 130.1 kN	0.48	OK

Base Top Steel Design

Steel Provided (Cover)	Main H10@100 (50 mm) Dist. H12@175 (60 mm)	785 mm ²	OK
Compression Steel Provided (Cover)	Main H12@100 (50 mm) Dist. H12@175 (62 mm)	1131 mm ²	
Leverarm $z=fn(d,b,As,fy,Fcu)$	395 mm, 1000 mm, 785 mm ² , 500 N/mm ² , 30 N/mm ²	375 mm	
$Mr=fn(above,As',d',x,x/d)$	1131 mm ² , 56 mm, 28 mm, 0.07	128.2 kN.m	
Moment Capacity Check (M/Mr)	M 0.0 kN.m, Mr 128.2 kN.m	0.000	OK
Shear Capacity Check	F 0.0 kN, vc 0.393 N/mm ² , Fvr 155.3 kN	0.00	OK

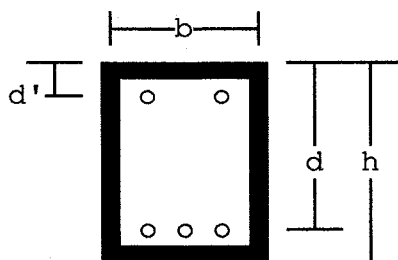
Base Bottom Steel Design

Steel Provided (Cover)	Main H12@100 (50 mm) Dist. H12@175 (62 mm)	1131 mm ²	OK
Compression Steel Provided (Cover)	Main H10@100 (50 mm) Dist. H12@175 (60 mm)	785 mm ²	
Leverarm $z=fn(d,b,As,fy,Fcu)$	394 mm, 1000 mm, 1131 mm ² , 500 N/mm ² , 30 N/mm ²	374 mm	
$Mr=fn(above,As',d',x,x/d)$	785 mm ² , 55 mm, 41 mm, 0.10	184.1 kN.m	
Moment Capacity Check (M/Mr)	M 134.0 kN.m, Mr 184.1 kN.m	0.728	OK
Shear Capacity Check	F 172.3 kN, vc 0.445 N/mm ² , Fvr 175.2 kN	0.98	OK

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Location: RET WALL BASE

Design to BS8110(1997) with partial safety factor for steel $\gamma_s=1.15$



Rectangular beam/slab section

Calculations for reinforcement are in accordance with BS 8110.

Normal-weight concrete only.

Moment before redistribution	M _{before} =209 kNm
Shear force due to ultimate loads	V=337 kN
Axial load due to ultimate loads	N=0 kN
Length of beam/slab	len=1.5 m
Overall depth of concrete section	h=450 mm
Breadth of concrete section	b=2600 mm
Cover to all reinforcement	cover=40 mm
Eff. depth of concrete section	d=385 mm
Depth to compression steel	d'=60 mm
BM at section after redistrib.	M=209 kNm
Characteristic concrete strength	f _{cu} =35 N/mm ²
Characteristic strength of links	f _{yv} =500 N/mm ²
Char. strength of longitud. bars	f _y =500 N/mm ²
Bar is deformed round	Type=2
Diameter of tension bars	dia=12 mm
Diameter of links	dial=12 mm
Section is at a support.	

Main reinforcement

Moment redistribution	$\text{percnt} = 100 \cdot \text{ABS}((M_{\text{before}} - M) / M_{\text{before}})$ $= 100 \cdot \text{ABS}((209 - 209) / 209)$ $= 0 \%$
Betab ratio in Clause 3.4.4.3	betab = M / M _{before} = 209 / 209 = 1
Limiting factor for comp steel	K' = 0.156
Compute	$K = M \cdot 10^6 / (b \cdot d^2 \cdot f_{cu})$ $= 209 \cdot 10^6 / (2600 \cdot 385^2 \cdot 35)$ $= 0.015495$
As K does not exceed K', compression reinforcement is not required and lever arm	$z = d \cdot (0.5 + \text{SQR}(0.25 - K / 0.9))$ $= 385 \cdot (0.5 + \text{SQR}(0.25 - 0.015495 / 0.9))$ $= 378.25 \text{ mm}$
Limit lever arm to	z = 0.95 · d = 0.95 · 385 = 365.75 mm
Depth to neutral axis	$x = (d - z) / 0.45 = (385 - 365.75) / 0.45$ $= 42.778 \text{ mm}$
Area of tension reinforcement	$A_s = M \cdot 10^6 / (f_y / \gamma_s \cdot z)$ $= 209 \cdot 10^6 / (500 / 1.15 \cdot 365.75)$ $= 1314.3 \text{ mm}^2$
Minimum area of reinforcement	$A_{smin} = 0.13 \cdot b \cdot h / 100 = 0.13 \cdot 2600 \cdot 450 / 100$ $= 1521 \text{ mm}^2$ from Table 3.25
Increase reinforcement to minimum	As = A _{smin} = 1521 mm ²
Number of tension bars required	$n_{\text{bart}} = \text{INT}(A_s / (\text{PI} \cdot \text{dia}^2 / 4)) + 1$ $= \text{INT}(1521 / (3.1416 \cdot 12^2 / 4)) + 1$ $= 14$

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Section under design is a slab. Clear distance limit ref 3.12.11.2.7.

Assuming section under design is part of a continuous slab:

Clear distance between bars $\text{clear} = b/n_{\text{bart}} - \text{dia} = 2600/14 - 12$
 $= 173.71 \text{ mm}$

Effective-depth limit $\text{pclear} = 3*d = 3*385 = 1155 \text{ mm}$

Reduce to limit of 750mm $\text{pclear} = 750 \text{ mm}$

Reinforcement percentage is less than 0.3%.

Clear distance within permissible (173 mm $\leq$ 750 mm).

Area of tension steel provided $\text{Asprov} = n_{\text{bart}} * \text{PI} * \text{dia}^2/4$
 $= 14 * 3.1416 * 12^2/4$
 $= 1583.4 \text{ mm}^2$

Bond coefficient $\text{beta} = \text{TABLE 3.28 for Type}=2, \text{column}=1$
 $= 0.5$

Ultimate anchorage bond stress $\text{fbu} = \text{beta} * \text{SQR}(\text{fcu}) = 0.5 * \text{SQR}(35)$
 $= 2.958 \text{ N/mm}^2$

Force in one fully-stressed bar $\text{Fs} = \text{fy}/\gamma_{\text{mas}} * \text{PI} * \text{dia}^2/4$
 $= 500/1.15 * 3.1416 * 12^2/4$
 $= 49173 \text{ N}$

Based on bars at full stress:

Anchor length and tension lap $l = \text{Fs}/(\text{PI} * \text{dia} * \text{fbu})$
 $= 49173/(3.1416 * 12 * 2.958)$
 $= 440.95 \text{ mm}$

TENSION

REINFORCEMENT

SUMMARY

Characteristic strength	500 N/mm ²
Diameter of bars	12 mm
Number of bars	14
Area required	1521 mm ²
Area provided	1583.4 mm ²
See BS 8110 (Anchorage & tension lap	450 mm
: Part 1 : (1.4 * tension lap	640 mm
Cl.3.12.8.13 (2.0 * tension lap	910 mm

Shear reinforcement

Breadth of section for shear $\text{bv} = b = 2600 \text{ mm}$
Design shear stress $\text{v} = V*1000/(\text{bv}*d) = 337*1000/(2600*385)$
 $= 0.33666 \text{ N/mm}^2$

Number of longitudinal bars in accordance with Clause 3.4.5.4.

No. of long. bars eff. for shear $n_{\text{bars}} = 14$

Area of tens. steel prov. for shear $\text{Aspros} = n_{\text{bars}} * \text{PI} * \text{dia}^2/4$
 $= 14 * 3.1416 * 12^2/4$
 $= 1583.4 \text{ mm}^2$

Percentage provided $\text{percnt} = 100 * \text{Aspros}/(\text{bv}*d)$
 $= 100 * 1583.4/(2600*385)$
 $= 0.15818 \%$

Assuming that no shearing reinforcement is specifically required

As eff. depth does not exceed 1985 mm, depth-factor $\text{f00d} = (400/d)^{.25}$
 $= (400/385)^{.25}$
 $= 1.0096$

Then from formula in Note 2 below Table 3.8, with $\text{pcnt} = 100 * \text{As}/(\text{bv}*d)$,

Design shear stress in concrete $\text{vc} = 0.79 * \text{pcnt}^{(1/3)} * \text{f00d}/1.25$
 $= 0.79 * 0.15818^{(1/3)} * 1.0096/1.25$
 $= 0.34508 \text{ N/mm}^2$

As characteristic concrete strength exceeds 25 N/mm²
therefore increase vc according to footnote in Table 3.8.

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Modified design shear stress Office: 1070 3
$$vc = vc * (fcu/25)^{(1/3)}$$
$$= 0.34508 * (35/25)^{(1/3)}$$
$$= 0.38603 \text{ N/mm}^2$$

As design shear stress of 0.33666 N/mm² does not exceed critical shear stress of 0.38603 N/mm² , no shear reinforcement is required.

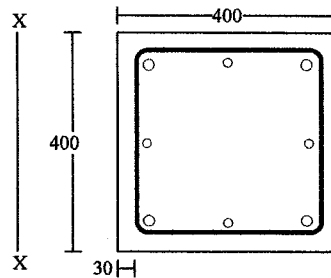
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Job Ref : 2500
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Column @ COL C2 Level 1

Grade C30

Corners : 4-H20

Internal xx: 2-H16 1 EF

Internal yy: 2-H16 1 EF

Links : H8 x 150 c/c

Basic Data

Design to BS 8110: 1997
Grades F_y , F_{yv} , F_{cu} 500 N/mm², 500 N/mm², 30 N/mm²
Column Geometry H, D, B 7700 mm, 400 mm, 400 mm

Bi-Axial, Slender, UnBraced, Column Design
Critical Case : 1 : Dead plus Live
Part 1 of 2 with Mxx Nominal considered

X-X Moments

Applied Moments (M_{x1} , M_{x2})	0.0 kN.m, 0.0 kN.m	
$K = K_{min} > (N_{uz} - N) / (N_{uz} - N_{bal}) < 1$	$1.00 > (3029 - 900) / (3029 - 1076) < 1$	1.00
$a_u = \beta_a \cdot K \cdot h$	0.241, 1.000, 400	96.3 mm
$M_{add} = N \cdot a_u$	900 x 96.3	86.6 kN.m
$M_i = \text{fn}(M_{x1}, M_{x2})$	0.0 kN.m, 0.0 kN.m	0.0 kN.m
$M_2 + M_{add}$, M nom	86.6 kN.m, 18.0 kN.m	
Design Moment		86.6 kN.m

Y-Y Moments

Applied Moments (M_{y1} , M_{y2})	0.0 kN.m, 0.0 kN.m	
$K = K_{min} > (N_{uz} - N) / (N_{uz} - N_{bal}) < 1$	$1.00 > (3029 - 900) / (3029 - 1076) < 1$	1.00
$a_u = \beta_a \cdot K \cdot h$	0.241, 1.000, 400	96.3 mm
$M_{add} = N \cdot a_u$	900 x 96.3	86.6 kN.m
$M_i = \text{fn}(M_{y1}, M_{y2})$	0.0 kN.m, 0.0 kN.m	0.0 kN.m
$M_2 + M_{add}$, M nom	86.6, 0.0 kN.m	
Design Moment		86.6 kN.m

Resultant Design Moment

$M = \text{sqr}(M_x^2 + M_y^2)$	$\text{sqr}(86.6^2 + 86.6^2)$	122.5 kN.m
$\theta = \text{atn}(M_y / M_x)$	$\text{atn}(86.6 / 86.6)$	45.0 deg

Moment Capacity

Design Data X/h, h, b, X, A_c , Ybar	0.505, 566 mm, 400 mm, 285.44 mm, 65994 mm ² , 171.3 mm	
Bar group1:M1 fn(bars,d, $\epsilon\%$, σ ,la,F)	1 x 20, 497.8, -0.260, -435, -215.0, -136.7	29.4 kNm
Bar group2:M2 fn(bars,d, $\epsilon\%$, σ ,la,F)	2 x 20, 282.8, 0.003, 6, 0.0, 4.0	0.0 kNm
Bar group3:M3 fn(bars,d, $\epsilon\%$, σ ,la,F)	2 x 16, 391.7, -0.130, -261, -108.9, -104.8	11.4 kNm
Bar group4:M4 fn(bars,d, $\epsilon\%$, σ ,la,F)	1 x 20, 67.9, 0.267, 435, 215.0, 136.7	29.4 kNm
Bar group5:M5 fn(bars,d, $\epsilon\%$, σ ,la,F)	2 x 16, 173.9, 0.137, 273, 108.9, 109.9	12.0 kNm
Concrete $F_c = (A_c \cdot 45 \cdot f_{cu})$	65994 x 0.45 x 30	890.9 kN
F Equilibrium $\sum (F_t) + F_c - F_{app} = 0$	-137 + 4 - 105 + 137 + 110 + 891 - 900.0	0.0 kN
Concrete $M_c = F_c \cdot (H/2 - Ybar)$	890.9 x (566 / 2 - 171.3)	99.4 kNm
$M_u = M_c + (M_1 + \dots + M_5)$	99.4 + (29.4 + 0.0 + 11.4 + 29.4 + 12.0)	181.5 kNm
Max Moment/ M_u	122.5 / 181.5	0.675

OK

OK

PHILIP WRIGHT ASSOCIATES

25554

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Job Ref : 2500
Sheet : / 81
Made by : PW
Date : 12 December 2022 / Ver. 2022.07.14
Checked :
Approved :

X-X Shear Checks

M/N, 0.6h 96.3 mm, 240 mm Nominal links

Y-Y Shear Checks

App. Shear V_y , v , v_{max} 0 kN, 0 N/mm², 4.38 N/mm² 0 OK
M/N, 0.6b 96.3 mm, 240 mm Nominal links

Bi-Axial , Slender, UnBraced, Column Design
Critical Case : 1 : Dead plus Live
Part 2 of 2: with Myy Nominal considered

X-X Moments

Applied Moments (M_{x1} , M_{x2}) 0.0 kN.m, 0.0 kN.m
 $K = K_{min} > (N_{uz} - N) / (N_{uz} - N_{bal}) < 1$ $1.00 > (3029 - 900) / (3029 - 1076) < 1$ 1.00
 $a_u = \beta_a \cdot K \cdot h$ 0.241, 1.000, 400 96.3 mm
 $M_{add} = N \cdot a_u$ 900 x 96.3 86.6 kN.m
 $M_i = f_n(M_{x1}, M_{x2})$ 0.0 kN.m, 0.0 kN.m 0.0 kN.m
 $M_2 + M_{add}$, M nom 86.6 kN.m, 0.0 kN.m
 Design Moment 86.6 kN.m

Y-Y Moments

Applied Moments (M_{y1} , M_{y2}) 0.0 kN.m, 0.0 kN.m
 $K = K_{min} > (N_{uz} - N) / (N_{uz} - N_{bal}) < 1$ $1.00 > (3029 - 900) / (3029 - 1076) < 1$ 1.00
 $a_u = \beta_a \cdot K \cdot h$ 0.241, 1.000, 400 96.3 mm
 $M_{add} = N \cdot a_u$ 900 x 96.3 86.6 kN.m
 $M_i = f_n(M_{y1}, M_{y2})$ 0.0 kN.m, 0.0 kN.m 0.0 kN.m
 $M_2 + M_{add}$, M nom 86.6, 18.0 kN.m
 Design Moment 86.6 kN.m

Resultant Design Moment

$M = \sqrt{M_x^2 + M_y^2}$ $\sqrt{86.6^2 + 86.6^2}$ 122.5 kN.m
 $\theta = \arctan(M_y / M_x)$ $\arctan(86.6 / 86.6)$ 45.0 deg

Moment Capacity

Design Data X/h , h , b , X , A_c , Y_{bar} 0.505, 566 mm, 400 mm, 285.44 mm, 65994 mm², 171.3 mm
 Bar group1:M1 $f_n(\text{bars}, d, \epsilon\%, \sigma, \text{la}, F)$ 1 x 20, 497.8, -0.260, -435, -215.0, -136.7 29.4 kNm
 Bar group2:M2 $f_n(\text{bars}, d, \epsilon\%, \sigma, \text{la}, F)$ 2 x 20, 282.8, 0.003, 6, 0.0, 4.0 0.0 kNm
 Bar group3:M3 $f_n(\text{bars}, d, \epsilon\%, \sigma, \text{la}, F)$ 2 x 16, 391.7, -0.130, -261, -108.9, -104.8 11.4 kNm
 Bar group4:M4 $f_n(\text{bars}, d, \epsilon\%, \sigma, \text{la}, F)$ 1 x 20, 67.9, 0.267, 435, 215.0, 136.7 29.4 kNm
 Bar group5:M5 $f_n(\text{bars}, d, \epsilon\%, \sigma, \text{la}, F)$ 2 x 16, 173.9, 0.137, 273, 108.9, 109.9 12.0 kNm
 Concrete $F_c = (A_c \cdot 45 \cdot f_{cu})$ 65994 x 0.45 x 30 890.9 kN
 F Equilibrium $\sum (F_i) + F_c - F_{app} = 0$ -137 + 4 - 105 + 137 + 110 + 891 - 900.0 0.0 kN OK
 Concrete $M_c = F_c \cdot (H/2 - Y_{bar})$ 890.9 x (566 / 2 - 171.3) 99.4 kNm
 $\mu = M_c + (M_1 + \dots + M_5)$ 99.4 + (29.4 + 0.0 + 11.4 + 29.4 + 12.0) 181.5 kNm
 Max Moment/ μ 122.5 / 181.5 0.675 OK

X-X Shear Checks

M/N, 0.6h 96.3 mm, 240 mm Nominal links

Y-Y Shear Checks

App. Shear V_y , v , v_{max} 0 kN, 0 N/mm², 4.38 N/mm² 0 OK
 M/N, 0.6b 96.3 mm, 240 mm Nominal links