

Revision B: Supporting Calculations



BDS | SCAFFOLD
DESIGN
SPECIALISTS

Drawn By: Matthew Bracken		
Date: 04/12/2023		
Calculations By: Brad Charles	Client: Connolly Scaffolding Ltd	Drawing Status: CONSTRUCTION
Date: 04/12/2023	Project: Ryland Building, Manchester	Drawing Ref: BDS - 10314 - 01
Checked By: Mike Brown	Drawing Title: High Street Elevation Access Scaffold	Revision: B 04/12/2023
Date: 04/12/2023		Pages: All

Components & Material Properties

Items listed below are for information purposes only, & are not necessarily used in this design.

All tubes used in this design are based on type 4, unless otherwise stated.

All couplers used in this design are based on class "B", unless otherwise stated.

NASC TG20:21 - Page 119 - Table 5.9Steel Tube (Type 4)

Area	=	5.57cm ²
Wall Thickness	=	4mm
Self Weight	=	4.37kg/m (0.043kN/m)
Diameter	=	48.3mm
Radius of Gyration	=	1.57cm
Plastic Modulus	=	7.87cm ³
Design Strength	=	235N/mm ²
Modulus of Elasticity	=	210000N/mm ²
Moment of Inertia	=	13.8cm ⁴
Moment Capacity	=	1.12kNm
Shear Capacity	=	29.1kN

NASC TG20:21 - Page 121 - Table 5.10

<u>Effective Length (L_E)</u>	<u>Slenderness ratio - λ</u>	<u>Safe axial load -P_c</u>
1.0m	63.50	58.60kN
1.1m	70.00	55.25kN
1.2m	76.50	51.90kN
1.3m	82.70	48.60kN
1.4m	88.90	45.30kN
1.5m	95.30	42.25kN
1.6m	101.70	39.20kN
1.7m	108.05	36.45kN
1.8m	114.40	33.70kN
1.9m	120.75	31.40kN
2.0m	127.10	29.10kN
2.1m	133.45	27.20kN
2.2m	139.80	25.30kN
2.3m	146.15	23.65kN
2.4m	152.50	22.00kN
2.5m	158.85	20.65kN
2.6m	165.20	19.30kN
2.7m	171.55	18.20kN
2.8m	177.90	17.10kN
2.9m	184.25	16.15kN
3.0m	190.60	15.20kN
3.1m	196.95	14.40kN
3.2m	203.30	13.60kN
3.3m	209.65	12.90kN
3.4m	216.00	12.20kN

<u>Effective Length (L_E)</u>	<u>Slenderness ratio - λ</u>	<u>Safe axial load -Pc</u>
3.5m	222.35	11.60kN
3.6m	228.70	11.00kN
3.7m	235.05	10.50kN
3.8m	241.40	10.00kN
3.9m	247.75	9.55kN
4.0m	254.10	9.10kN

NASC TG20:21 - Page 129 - Table 5.14

Effective lengths, L_E of standards in ledger braced tied independent scaffolds with 2m lifts with effective façade bracing

Vertical intervals betv Bay lengths

lines of ties	1.2m	1.5m	1.8m	2.0m	2.1m	2.4m	2.7m
2m with 2m 1st lift	2.5	2.5	2.5	2.5	2.55	2.75	2.9
2m with 2.7m 1st lift	2.7	2.7	2.7	2.7	2.7	2.9	3
4m	3.2	3.2	3.2	3.2	3.2	3.2	3.2
6m	4	4	4	4	4	4	4

NASC TG20:21 - Page 166 - Table C1

Aluminium Tube

Area	=	6.15cm ²
Wall Thickness	=	4.47mm
Self Weight	=	1.65kg/m
Diameter	=	48.3mm
Radius of Gyration	=	1.56cm
Plastic Modulus	=	8.61cm ³
Design Strength	=	255N/mm ²
Modulus of Elasticity	=	70000N/mm ²
Moment of Inertia	=	14.9cm ⁴
Moment Capacity	=	1.33kNm

NASC TG20:21 - Page 167 - Table C.2

<u>Effective Length (L_E)</u>	<u>Slenderness ratio - λ</u>	<u>Safe axial load -Pc</u>
1.0m	64.2	48.90kN
1.2m	77	36.60kN
1.4m	89.9	27.90kN
1.6m	102.7	21.80kN
1.8m	115.5	17.50kN
2.0m	128.4	14.40kN
2.2m	141.2	12.00kN
2.4m	154	10.10kN
2.6m	166.9	8.70kN
2.8m	179.7	7.50kN

NASC TG20:21 - Page 135 - Table 5.15**Couplers**

Right Angle Coupler (Double) Class "A"	SWL =	6.10kN	Slip
Right Angle Coupler (Double) Class "B"	SWL =	9.10kN	Slip
Band & plate (Double) coupler	SWL =	6.10kN	Slip
Right Angle Coupler (Double) Self Weight	SW =	1.25kg	
Swivel Coupler Class "A"	SWL =	6.10kN	Slip
Swivel Coupler Class "B"	SWL =	9.10kN	Slip
Swivel Coupler Self Weight	SW =	1.33kg	
Sleeve Coupler Class "A"	SWL =	3.60kN	Tension
Adjustable Screw Jack (200mm extension)	SWL =	35.00kN	Compression
Girder Coupler (must be used in pairs)	SWL =	10.00kN	"X" Axis
	SWL =	30.00kN	"Y" Axis
	SWL =	12.50kN	"Z" Axis
Girder Coupler Self Weight (each)	SW =	1.50kg	

Timber Scaffold Boards

Self Weight	=	25kg/m ²
Width	=	225mm
Thickness	=	38mm
Section Modulus	=	47.5cm ³
Moment Capacity	=	0.48kNm

300mm Ladder Beams* (Steel) Laced at 1m c/c

Self Weight	=	0.30kN	(laced & braced)
Moment Capacity	=	10.40kNm	
Shear Capacity	=	18.00kN	

*For further information refer to manufacturer

RMD Superslim Soldiers

Moment Capacity	=	38.0kNm
Shear Capacity	=	75.0kN

*For further information refer to manufacturer

450mm Apollo Beams* (Aluminium) Laced at 1m c/c

Self Weight	=	0.14kN	(laced & braced)
Moment Capacity	=	15.70kNm	
Shear Capacity	=	13.90kN	

*For further information refer to manufacturer

750mm Apollo Beams* (Aluminium) Laced at 1m c/c

Self Weight	=	0.28kN	(laced & braced)
Moment Capacity	=	42.90kNm	
Shear Capacity	=	45.50kN	

*For further information refer to manufacturer

1300mm Apollo Beams* (Aluminium) Laced at 1m c/c

Self Weight	=	Varies TBC	(laced & braced)
Moment Capacity	=	98.52kNm	
Shear Capacity	=	44.25kN	

*For further information refer to manufacturer

1500mm Apollo Beams* (Aluminium) Laced at 1m c/c

Self Weight	=	Varies TBC (laced & braced)
Moment Capacity	=	255.00kNm
Shear Capacity	=	60.00kN

*For further information refer to manufacturer

1300mm Asterix Beams* (Aluminium)

Self Weight	=	Varies TBC (laced & braced)
Moment Capacity	=	102.20kNm Laced at 1m c/c
Moment Capacity	=	77.70kNm Laced at 1.5m c/c
Shear Capacity	=	42.10kN (Top & Bottom chords connected)
Shear Capacity	=	32.60kN (Bottom chord connected)

*For further information refer to manufacturer

450mm Layher Beams* (Aluminium) Laced at 1m c/c

Self Weight	=	0.14kN (laced & braced)
Moment Capacity	=	13.94kNm
Shear Capacity	=	12.32kN

*For further information refer to manufacturer

450mm Layher Beams* (Aluminium) Laced at 1.5m c/c

Self Weight	=	0.14kN (laced & braced)
Moment Capacity	=	8.06kNm
Shear Capacity	=	12.32kN

*For further information refer to manufacturer

450mm Layher Beams* (Aluminium) Laced at 2m c/c

Self Weight	=	0.14kN (laced & braced)
Moment Capacity	=	5.14kNm
Shear Capacity	=	12.32kN

*For further information refer to manufacturer

780mm Dessa Beams* (Aluminium) Laced at 1m c/c. (6no. bolts 3 each side of spigot)

Self Weight	=	0.28kN (laced & braced)
Moment Capacity	=	38.84kNm
Shear Capacity	=	23.71kN

*For further information refer to manufacturer

Relevant Design Standards/guidance (only a selection of the below standards are applicable for this design)

BS EN 39	:2001	Specification for steel scaffold tube.
BS EN 74-1	:2005	Couplers, spigot pins & baseplates for use in falsework & scaffolds.
BS EN 12811-1	:2003	Temporary works equipment: Scaffolds - Performance requirements & general design.☐
BS EN 12812-1	:2008	Falsework: Performance requirements & general design.
BS EN 1139-1-2	:1990	Metal scaffolding - part 1: Tubes - Specification for aluminium tube.
BS EN 1139-2-2	:2009	Metal scaffolding - part 2: Couplers - Specification for aluminium couplers.
BS EN 1991-1-1	:2002	Eurocode 1: Actions on structures - Densities, self-weight & imposed loads.
BS EN 1991-1-3	:2003	Eurocode 1: Actions on structures - Snow loads.
BS EN 1991-1-4	:2005	Eurocode 1: Actions on structures - Wind loads.
BS EN 1991-2	:2003	Eurocode 1: Actions on structures - Part2: Traffic load and bridges
BS EN 13374	:2013	Temporary edge protection systems - Product specification, test methods.
BS 5975	:2019	Code of practise for temporary work procedures & the p design of false work.
BS 2482	:2009	Specification for timber scaffold boards.
TG3:19		Erection, use & dismantling of temporary rubbish chutes on scaffold.
TG4:19		Anchorage systems.
TG9:18		Guide to the design & construction of temporary roofs & buildings.
TG12:17		Tying down of scaffold boards.
TG13:16		Non-standard boarded platforms.
TG16:21		Anchoring to the ground.
TG20:21		Technical guidance on the use of BS EN 12811-1.
SG4:15		Preventing falls in scaffolding.
SG5:18		Overhead power sources.
SG25:20		Access & egress from scaffolds.
SG27:09		Temporary edge protection on open steelwork.
SG28:17		Safe system of work for scaffolding associated with timber frame building construction.
SG29:17		Internal edge protection on scaffold platforms.
SG32:17		Provision of extended & telescopic transoms & board brackets.
SG34:17		Guidance on protection of the public

Job Description: High Street Elevation Access Scaffold

Safe Working Loads: Independent with 1no. Lift at: 2 kN/m²
 Independent with 1no. Lift at: 1 kN/m²
 All inside decks at: 0.75 kN/m²

Item: Independent

Max Bay Length: 2.50m
 Max Bay Width: 1.00m (3 decks)
 Max Transom Centres: N/A
 Max Standard Load: Refer to DWG's

Item: Loading Bay

Max Bay Length: N/A
 Max Bay Width: N/A
 Max Transom Centres: N/A
 Max Standard Load: N/A

Item: Birdcage

Max Bay Length: N/A
 Max Bay Width: N/A
 Max Transom Centres: N/A
 Max Standard Load: N/A

Item: Buttress

Max Bay Length: N/A
 Max Bay Width: N/A
 Max Transom Centres: N/A
 Max Standard Load: N/A

Item: Ties (Tension)

Max Tie Load: 4.28kN
 Preliminary Test: 8.56kN
 Proof Test: 5.35kN

Item: Ties (Shear)

Max Tie Load: N/A
 Preliminary Test: N/A
 Proof Test: N/A

Additional Comments (if required)

- System scaffold to be built in accordance with manufacturers guidelines & recommendations

INSIDE STANDARD

Item	Length (m)	Weight (kg)	*	no.	Total Weight(kg)
Standard	4.00m	18.84kg	*	14.5	273.18kg
Ledger	2.50m	8.53kg	*	30	255.90kg
Transom	1.00m	4.03kg	*	17	34.26kg
Hop up Bracket	0.70m	4.91kg	*	13	63.83kg
Decks	2.50m	17.59kg	*	36.5	642.04kg
Bracing	2.50m	11.23kg	*	0	0.00kg
Base Collar	N/A	2.09kg	*	1	2.09kg
Base Jack	N/A	4.29kg	*	1	4.29kg
Toe Board	2.50m	5.34kg	*	13	69.42kg
Hand Rail	2.50m	8.53kg	*	26	221.78kg
				Total	1566.78kg

Total Dead Load

$$1566.78\text{kg} \times 0.00981 = 15.37\text{kN}$$

Total Live Load

2.50m	*	0.50m	=	1.25m
1.25m	*	2.00kN/m ²	=	2.50kN
2.50m	*	0.50m	=	1.25m
1.25m	*	1.00kN/m ²	=	1.25kN

2.50m	*	0.70m	=	1.75m
1.75m	*	0.75kN/m ²	=	1.31kN

Total Leg Load

$$15.37\text{kN} + 1.25\text{kN} + 1.31\text{kN} = 17.93\text{kN}$$

No. Support Stds/Puncheons	1	
Axial Load	Effective Length (Le)	Safe Axial Load (Pc)
17.93kN	2.0 m	26.10kN

Result

PASSES**Ground Bearing Pressure (GBP)**

		Sole Pad Arrangements		
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	Y	0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Tredda Plate		0.210	0.210	0.0441
Other				0

Imposed Load:	17.93 kN
GBP:	88.56 kN/m ²

OUTSIDE STANDARD

Item	Length (m)	Weight (kg)	*	no.	Total Weight(kg)
Standard	4.00m	18.84kg	*	7.5	141.30kg
Ledger	2.50m	8.53kg	*	16	136.48kg
Transom	1.00m	4.03kg	*	17	34.26kg
Hop up Bracket	0.70m	4.91kg	*	0	0.00kg
Decks	2.50m	17.59kg	*	19.5	343.01kg
Bracing	2.50m	11.23kg	*	16	89.84kg
Base Collar	N/A	2.09kg	*	1	2.09kg
Base Jack	N/A	4.29kg	*	1	4.29kg
Toe Board	2.50m	5.34kg	*	13	69.42kg
Hand Rail	2.50m	8.53kg	*	26	221.78kg
				Total	1042.46kg

Total Dead Load

$$1042.46\text{kg} \times 0.00981 = 10.23\text{kN}$$

Total Live Load

$$2.50\text{m} \times 0.50\text{m} = 1.25\text{m}^2$$

$$1.25\text{m}^2 \times 2.00\text{kN/m}^2 = 2.50\text{kN}$$

$$1.25\text{m}^2 \times 1.00\text{kN/m}^2 = 1.25\text{kN}$$

Consider Imposed Load From Protection Fan

Bay Width (m)	*	Bay Length (m)	*	(	SWL (kN/m ²)	+	Bds DL (kN/m ²)	)	+	Tube Dead Load(kN)	
1.5	*	2.5	*	(	0.75	+	0.25	)	+	0.45	
											= 4.20kN

Total Leg Load

$$10.23\text{kN} + 2.50\text{kN} + 1.25\text{kN} + 4.20\text{kN} = 18.18\text{kN}$$

No. Support Stds/Puncheons 1

Axial Load Effective Length (Le) Safe Axial Load (Pc)

18.18kN 2.0 m 26.10kN

Result

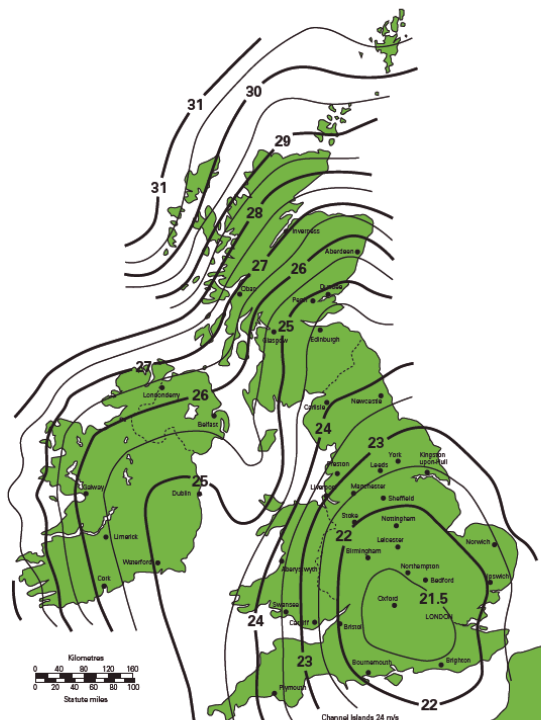
PASSES**Ground Bearing Pressure (GBP)**

		Sole Pad Arrangements		
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	Y	0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Tredda Plate		0.210	0.210	0.0441
Other				0

Imposed Load: 18.18 kN

GBP: 89.76 kN/m²

Consider Wind Loads On Scaffold

Figure E.1 – Wind speed, V_{map} (m/s)Table E1: Combined exposure factor, C_c

Height $Z - h_{eff}$ (m)	Site in country or adjacent to sea				Site in town, more than 2 km from the edge of the town		
	Closest distance to the shoreline (km)				Distance to shoreline (km)		
	≤ 0.1	2	10	≥ 100	≥ 2	10	≥ 100
≤ 2	1.90	1.60	1.50	1.40	1.07	1.01	0.94
3	2.15	1.84	1.73	1.62	1.32	1.25	1.17
4	2.31	2.03	1.90	1.78	1.54	1.44	1.35
5	2.43	2.18	2.05	1.90	1.72	1.62	1.50
10	2.82	2.65	2.50	2.32	2.33	2.20	2.04
15	3.07	3.02	2.85	2.67	2.81	2.65	2.48
20	3.20	3.05	2.98	2.78	2.90	2.83	2.64
30	3.42	3.43	3.27	3.04	3.40	3.24	3.01
50	3.68	3.68	3.62	3.39	3.68	3.62	3.39
100	3.98	3.98	3.98	3.80	3.98	3.98	3.80

Notes: (1) Interpolation may be used in this table
(2) Based on Figure NA.7 and Figure NA.8 in the NA to BS EN 1991-1-4

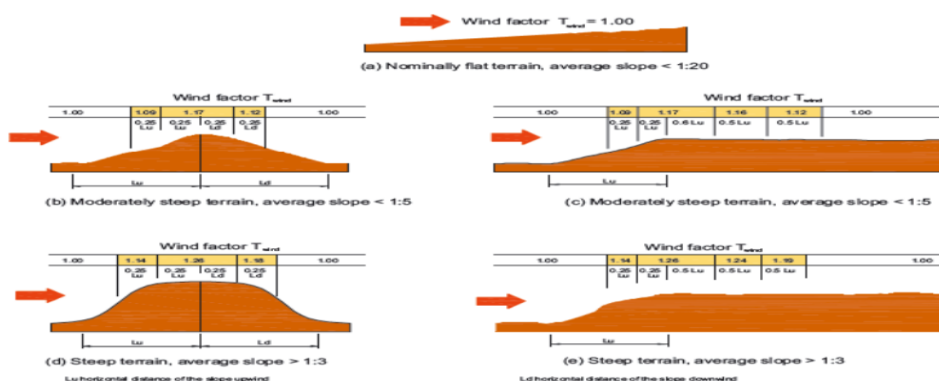
Figure E.2 – Topography factor, T_{wind} 

Figure E.3 – Displacement height

Table NA.1 Directional factor c_{dir}

Direction	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°
c_{dir}	0,78	0,73	0,73	0,74	0,73	0,80	0,85	0,93	1,00	0,99	0,91	0,82

NOTE 1 Interpolation may be used within Table NA.1.

NOTE 2 The directions are defined by angles from due North in a clockwise direction.

NOTE 3 Where the wind loading on a building is assessed only for orthogonal load cases, the maximum value of the factor for the directions that lie $\pm 45^\circ$ either side of the normal to the face of the building is to be used.

NOTE 4 Conservatively, c_{dir} may be taken as 1,0 for all directions.

Consider Wind Loads On Scaffold**TG20:21 - 5.15. 1.3 Scaffolds Clad With Sheeting****Windward**

$$F_c = q_p * C_{fT} * H_c * L_c * K_s \text{ kN}$$

q_p	*	C_{fT}	*	H_c	*	L_c	*	K_s	Result
0.61kN/m ²	*	1.3	*	2.0m	*	3.6m	*	1.35	=
									7.71kN
Max Tie Load (windward):		7.71kN				<	18.20kN		PASSES

Coupler Capacities

Coupler Type Used - Class A: 6.1kN

Coupler Type Used - Class B: **Y** 9.1kN

Node loads in accordance with TG20:21, 5.9.2

No. of Primary Connections: **2**No. of Supplementary Connections: **0**Strength of Connection: **18.20kN****Leeward**

$$F_{tc} = q_p * C_s * C_{fT} * H_c * L_c * K_s \text{ kN}$$

q_p	*	C_s	*	C_{fT}	*	H_c	*	L_c	*
0.61kN/m ²	*	0.25	*	1.3	*	4.0m	*	4.0m	*
*									*
K_s	=	Result							
1.35	=	4.28kN							

Max Tie Load (leeward):	4.28kN	<	9.10kN	PASSES
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Preliminary Load Test: 8.56kN

Proof Test Load: 5.35kN

Coupler Capacities

Coupler Type Used - Class A: 6.1kN

Coupler Type Used - Class B: **Y** 9.1kN

Node loads in accordance with TG20:21, 5.9.2

No. of Primary Connections: **1**No. of Supplementary Connections: **0**Strength of Connection: **9.10kN**



Alternative
tying systems

Apollo Scaffold Screw System

For most masonry substrates
Introduced into the UK by Apollo
in 1999 as a stocked product



Developers of the range of Apollo scaffolding ties

Designer, purchaser and installer benefits

Often offering higher tensile loads than expected. In place anchors quite often provide tensile performances greater than the traditional M16 insert usually due to the simplicity of the setting procedure. Expect performances of between 8-20+ kN into the range of suitable materials.

Can be used with tube and fittings as well as lightweight systems such as layer, cuploc and kwikstage. Small hole diameter of 14 mm that can be rapidly drilled using battery drills.

Ideal for fixing blind across a cavity where our training programme can show you how to achieve a correct setting 100% of the time: this means consistency in performance. An ideal system for being fixed across a cavity that is being constructed.

Correctly installed fixings can be achieved and visually recognised with every fix. Visual setting guide to enhance the quality and consistency of the installation.

Suitable for contracts that require the smallest possible area of tubing to be in contact with the structure. This can be achieved by using the Apollo internal Scaffold hook.

Can accept small short term shear loads that will return the screw to its original shape.

In applications where the screw will protrude over 120 mm from the wall additional consideration is recommended for the use of the Apollo external hook.



All screws are measured by their entire shank length. The amount of protrusion will be the shank length less the length of the selected plug plus 5 mm. All screws have a 23 mm diameter eye that allows the use of an Apollo scaffold hook or other proprietary connections. To install only a 14 mm drill bit is required, unless you are fixing blind across a cavity: for advice on this application contact technical services at Apollo.

Type	Drill bit Diameter mm	Shaft Protrusion using the stated plug lengths mm	
		70	100
ASS 12 X 90	14	15	na
ASS 12 X 120	14	45	15
ASS 12 X 160	14	85	55
ASS 12 X 190	14	115	85
ASS 12 X 230	14	155	125
ASS 12 X 300	14	225	195
ASS 12 X 350	14	275	245
ASS 12 x 400	14	325	295
ASS 12 x 450	14	375	345
ASS 12 x 500	14	425	395
ASS 12 x 550	14	475	445

Average tensile values when using the ASSS, Apollo scaffold screw system

Substrate	kN	Details of performances into the following materials are available from our technical services team;	
Concrete C15	12.5	Mortar joints Sandstone Concrete block Softwood	Slotted brick Perforated brick Engineering brick Timberstrand
Concrete C25	19.5		
Solid Brick	15		
Granite	19.5		

10 kN = 1 tonne

Shear and compressive performances and installation method statements are available on request

E: sales@apollofix.co.uk

Alternative Tying Systems

Tel: 01527 521061 / 63999

TABLE 2 – Capacity of Standards					
Buckling Length (m)	1.0	1.5	2.0	2.5	3.0
Allowable Compression Load (kN)	60.0	39.5	26.1	18.0	13.1
Allowable Tension Load (kN)	54.0*				

Standard Capacity: 26.1kN > 18.18kN therefore **Passes**

TABLE 3 – Capacity of Base Jacks / Swivel Base Jacks / U-Heads						
Length of Thread Visible (m)	0.1	0.2	0.3	0.4	0.5	0.6
Allowable Compression Load* (kN)	60.0	50.0	40.0	32.5	22.5	15.0

Screw Jack Capacity: 32.5kN > 18.18kN therefore **Passes**

TABLE 7 – Capacity of Decks					
Type	Steel, 0.30m Wide	Steel, 0.20m Wide	Aluminium, 0.30m Wide	Aluminium, 0.60m Wide	Aluminium / Timber, 0.60m Wide
Length (m)	kN/m ²	kN/m ²	kN/m ²	kN/m ²	kN/m ²
3.0	6.0	6.0	3.0	2.0	2.0
2.5	6.0	6.0	3.0	4.5	4.5
2.0	6.0	6.0	3.0	-	4.5
1.5	6.0	6.0	-	-	4.5
1.3	6.0	6.0	-	-	-
1.0	6.0	6.0	-	-	-
0.7	6.0	6.0	-	-	-

Deck Capacity: 6kN/m² > 2kN/m² therefore **Passes**

TABLE 4 – Capacity of Single Transoms and Ledgers; Tubular Support					
Transom Length (m)	allow. q (kN/m)	Deck Length (m)	allow. p ⁺ central transom (kN/m ²)	allow. p ⁺ perimeter transom (kN/m ²)	allow. P (kN)
0.7	24.4	3.0	7.9	16.0	7.4
		2.5	9.5	19.3	
		2.0	12.0	24.2	
		1.5	16.0	32.3	
1.0	13.5	3.0	4.3	8.8	6.1
		2.5	5.2	10.6	
		2.0	6.5	13.3	
		1.5	8.8	17.8	

UDL (Independent)

$$2.5\text{m} * (2\text{kN/m}^2 + 0.5\text{kN/m}^2) + 0.45\text{kN/m} = \mathbf{6.7\text{kN/m}}$$

Transom Capacity: 13.5kN/m > **6.7kN/m** therefore **Passes**

Project:	Ryland Building, Manchester		
Drawing Number:	BDS -	10314 -	01
Item:	High Street Elevation Access Scaffold		
Revision (if applicable):	B	04/12/2023	
Category of Check (1, 2, or 3):	2		

Description of Temporary Works:

High Street Elevation Access Scaffold

I certify for and on behalf of BDS Ltd, that in my opinion, the erection proposals and proposed temporary works details, specified in the schedule attached hereto relating to the construction of the above contract, are satisfactory for the proper discharge of responsibilities for the safe temporary works design elements of the works, and for their safe execution and removal (if applicable) in accordance with the drawings and specification, and without detriment to the related permanent Works.

Schedule of Drawings and Other Documents:

10314 - 01 Plan A-A Elevation B-B Section C-C

Supporting Calculations: Page 1 to 14
 Check Certificate: Page 15 of Calculations Document

Drawn By: Matthew Bracken
 Company: Buckley Design Solutions

Signature: *M. Bracken*

Drawing Status:
CONSTRUCTION

Calculations By: Brad Charles
 Company: Buckley Design Solutions

Signature: *[Signature]*

Checked By: Mike Brown
 Company: Buckley Design Solutions

Signature: *[Signature]*

Date:
 04/12/2023