cheshire SCAFFOLDS Ltd	Haigh Ave Whitehill Trading Estate Reddish Stockport SK4 1NU	Drawing No.	CSL-5954-CAS-1
		Date:	15-Jun-26
Provided By:	CSL - Paul Brogan	Signature	[redacted]
Drawing Title	Chimney Access Scaffold	Site:	Mindel House, Manchester

Materials/Properties

Standard steel scaffold tube in accordance with BS EN 39:2001.

All tube taken as galvanised or aluminium BS1139-1.2:1990, (as new, unless otherwise noted).

Fittings in accordance with BS EN 12811-1 characteristic strengths x F.O.S. 1.65

For erection/design guidance/permissible loads and stresses as translated from the above limit state codes see TG20:21 from the N.A.S.C.

For System Scaffolds see relevant Brochures/Data sheets

Properties Of Scaffold:

	Self Weight	Bending Moment	Shear
T4 - 48.3mm d steel tube	0.0437 kN/m	1.12 kN.m	29.1 kN
450 Apollo Beam	0.049 kN/m	15 kNm	13.2 kN
750 Apollo Beam	0.078 kN/m	40 kNm	37 kN
300 Ladder Beams	0.131 kN/m	11.7 kNm	18 kN
610 Steel Unit Beam	0.149 kN/m	27.7 kNm	20 kN
			Board Width
38mm Scaffold Boards	0.25 kN/m^2	0.475 kNm	0.225 m

		Safe Working Load	
Right Angle Coupler	1.2 kg	9.1 kN Slip	(Class B Fittings Only)
Putlog Coupler (Single)	0.77 kg	0.63 kN Slip	(1.26kN Slip Per Transom)
Sleeve Coupler	1 kg	3.6 kN Tension	
Swivel Coupler	1.03 kg	6.1 kN Slip	
Band & Plate	2 kg	6.1 kN Slip	
RSJ Coupler-(in Pairs)	3 kg	12.1 kN Slip	
Adj. Base/Forkhead	9 kg	30.0 kN Axial Compression	

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The following Codes of Practise and British Standards are used for the design and build of the scaffold detailed within this document:-

- All below to conform with Construction (Design And Management) Regulations 2015.
- BS EN 39:2001 Loose steel tubes for tube and coupler scaffolds - Technical delivery conditions.
- BS 1139-1-2:1990 Metal Scaffolding - Part 1: Tubes - Section 1.2 Specification for aluminium tube.
- BS 1139-2-2:2009 Metal Scaffolding - Part 2: Couplers - Section 2.2 Aluminium couplers and special couplers in steel - Requirements and test methods.
- BS 2482:2009 Specification for timber scaffold boards.
- BS EN 12811-1:2003 Temporary works equipment - Part 1: Scaffolds - Performance requirements and general design.
- BS EN 12812-1:2008 Falsework - Performance Requirements and General Design.
- BS EN 1991-1-1:2002 Eurocode 1: Actions on Structure - Part 1-1: General Actions - Densities, Self-weight, Imposed Loads for Building.
- BS EN 1991-1-3:2003 Eurocode 1: Actions on Structure - Part 1-3: General Actions - Snow Actions.
- BS EN 1991-1-4:2005 Eurocode 1: Actions on Structure - Part 1-4: General Actions - Wind Actions.
- BS EN 1993-1-1:2005 Eurocode 3: Design Of Steel Structures - Part 1-1: General rules and rules for buildings.
- TG20:21 Design Guide - Technical Guidance on the use of BS EN 12811-1.
- TG4:25 Anchorage Systems.
- SG4:22 Preventing Falls In Scaffolding.
- SG25:20 Access & Egress from Scaffolds, Via Ladders & Stair Towers
- CG6:20 Scaffold Design.

The following Common Scaffolding Terms Referred To Within This Document:-

- **Anchor** - an element that transfers forces between a scaffolding tie and a supporting structure. Can be temporary or permanent.
- **Base Plate** - a rigid plate under a standard, used to spread reaction
- **Bay** - space between two adjacent standards along face of a scaffold.
- **Bay Length** - distance between centres of two adjacent standards.
- **Coupler** - an element that connects two scaffold tubes together
- **Ledger** - a longitudinal scaffold tube (normally) parallel to a building face. Usually connected to adjacent standards using right angled couplers. Perpendicular to transoms.
- **Safe working moment** - is a characteristic moment of resistance divided by a factor of safety.
- **Scaffold tub**e - any tubular element of a scaffold: standard, ledger, transom etc..
- **Standard** - a vertical scaffold tube.
- **Swivel coupler** - a coupler for joining tubes at an angle (i.e. other than at a right angle).
- **Tie** - connects a scaffold to an anchor point.
- **Structural Transom** - a scaffold tube spanning between standards underneath ledgers and connecting outer standards to inner standards using right angled couplers.
- **Board Transom** - a scaffold tube spanning across ledgers and supporting scaffold boards forming a working platform. Perpendicular to scaffold boards, connected using putlog (“single”) couplers.
- **Working load** - a load that can be safely carried by a structural member.

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Designers Risk Assessment:-

Hazards	Control Measures	Respsonsible
Capability of the ground / existing structure to carry the loads imposed by the scaffolding structure.	Client to ensure that all foundations can adequately support the loads detailed within this calculation document, such as external ground, roofs and/or internal slab structures.	CLIENT
	Maximum Leg Loads provided within Design Calculations.	CSL
Inclement Weather Conditions	Scaffolding not to be used in periods of inclement weather.	ALL
	Weather forecasts should be monitored to aid planning of scaffold operations and its use.	ALL
	Scaffolding that is in progress should always be left in a safe and secure state with appropriate signage and/or tags.	CSL
Capability of the existing structure to carry the loads imposed by the scaffold ties & / or tie failure.	All anchors / ties detailed within this document (& relevant design drawing), are based on correct installation in line with manufacturer's guidelines.	CSL
	Client to ensure that the existing structure can suitably withstand imposed loads from ties, as this exceeds matters beyond CSL remit.	CLIENT
	Prior to installation of any ties into structure, CSL will carry out prelim tie test in line with TG4 current edition, to ascertain suitability of structure to withstand scaffold ties.	CSL
	Client to ensure no 3rd party interference with any scaffold ties, at any time.	CLIENT
Design Platform Load & Overloading	Client responsible to ensure that the plaform load and service load detailed within this document, are suitable for their works, and that adequate control measures are in place to prevent risk of overloading of scaffold to prevent risk of scaffold collapse.	CLIENT
	CSL to provide, complete and fit CSL Scaff Tag detailing scaffold load capability, at access point of scaffold.	CSL
Falls From Height	All scaffolds relating to this document, to be built with handrails in line with SG4 current edition, with handrails conforming to the Work At Height Regulations 2005 to all working platform levels & detailed within TG20 current edition.	CSL
Falling Materials	Client and all scaffold users must ensure suitable measures are taken to prevent materials from falling to public area.	CLIENT
	Where applicable, all materials and tools to be tethered with brickguards / debris netting used as added safety measure.	ALL
	Where material storage and access is required on scaffold platforms, brickguards or similar material fall prevention system to be be fitted, to prevent risk of falling materials.	CSL
	Client to induct all operatives to access scaffold on safe storage of materials on scaffold, and to ensure that 3rd parties do not remove such safety materials to aid own works.	CLIENT
Unauthorised Adaptions To Scaffold	No alterations or adaptions to be carried out to the scaffold, via 3rd parties, other than authorised CSL scaffold operatives.	CLIENT
	Any possible required alterations and / or adaptions to be authorised via CSL management and conducted by CSL operatives.	ALL
Uplift Of Scaffold Boards	All compliant scaffold boards shorter than 2.13m are to be suitably tied down to scaffold frame with proprietry board clamps. In addition a Risk Assessment for the tying down of all scaffold boards should be conducted, in line with TG12 current edition.	CSL

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Main Independent Access Scaffold

LIVE LOAD - MAIN WORKING PLATFORM LOADINGS

MAIN SCAFFOLD DECK	2 kN/m2	INSIDE SCAFFOLD DECK	0.75 kN/m2

LIVE LOAD - SERVICE PLATFORM LOADINGS (OPTIONAL)

MAIN SCAFFOLD DECK	0 kN/m2	INSIDE SCAFFOLD DECK	0 kN/m2

Scaffold Max Transom Spacing	1.2 m	No. Scaffold Lifts	3 No.
Scaffold Max Inside Ledger Bays	1.8 m	No. Lift Of Boards	1 No.
Scaffold Max Outside Ledger Bays	1.8 m	Base Lift Double Boarded	No
Scaffold Board Width	4 No. =	0.225 x 4	0.97 m Wide
Inside Boards No.	1 No. =	0.225 x 1	0.26 m Wide
Max Lift Heights	2 m High	Outside Leg - No. Toe Board Per Lift	1 No.
Maximum Base Lift Height	2 m High	Inside Leg - No. Toe Board Per Lift	0 No.
Maximum Tie Pattern - Horizontal	3.6 m	Vertical 4 m	Z = 6.0 m High

Additional Bay Detail

INSIDE LEGS PER BAY		OUTSIDE LEGS PER BAY	
No.of Inside Guardrails	0 No.	No.of Outside Guardrails	5 No.
Max No. Ledger Brace / Bay	1 No.	Max No. Ledger Brace / Bay	0 No.
Max No. Face Brace / Bay	0 No.	Max No. Face Brace / Bay	1 No.

Ledger Bay Details	2> Bays	Single Bay
Ledger Braced	Yes	No
	Yes	

Transom Span For Calcs = Simply Supported
No. Transoms Between Ledger Spans = 1

Check the board spans for the design load, plus self weight of the boards.

Live Load 2 kN/m2 Dead Load 0.25 kN/m2 TOTAL 2.25 kN/m2

Maximum calculated bending moment, based upon board supports fixed at maximum 1.2 m centres

$$\frac{W * L^2}{8} = \frac{2.25\ 0.225 \times 1.2\ 1.2}{8} = 0.091 \text{ kN.m}$$

Permissible **0.475 kN.m** **Therefore** **Ok**

Check the Transom Board bearers, at maximum span of 0.968 Maximum calulcated bending moment moment.

Maximum calculated bending moment, based upon board supports fixed at maximum 1.2 m Centres

			Trans c/c		Width		
Live Load	2	x	1.2	x	0.968	=	2.323 kN
Dead Load	Tube		W Transom				
	0.968	x	0.0437			=	0.043
	Boards		Trans c/c		Board w		+
	0.9	x	1.2	x	0.25	=	0.27
					Total Dead Load		0.313 kN
					Total Design Load		2.636 kN

Transom Bending Moment = TG20:21 - Section 5.11.1 Simply Supported Span

Main Transom Between Standards W L

0.125 x 2.64 x 0.968 = **0.319 kNm**

Permissible **1.12 kN.m** **Therefore** **Ok**

Inside Cantilever Transom W L **ONLY IF APPLICABLE**

0.5 x 0.28 x 0.26 = **0.037 kNm**

Permissible **1.12 kN.m** **Therefore** **Ok**

Point load on outside ledger, from transom (No Outer Boards) **TG20:21 Section 5.12.1 Function & Load Of Ledgers**

Loads per transom at 1.8 m max ledger span

0.172 x 1.8 x 1.32 = **0.408 kNm**

Permissible **1.12 kN.m** **Therefore** **Ok**

Point load on Inside ledger, from transom **TG20:21 Section 5.12.1 Function & Load Of Ledgers**

Loads per transom at 1.8 m max ledger span Inc inside live & dead load

0.172 x 1.8 x 1.60 = **0.495 kNm**

Permissible **1.12 kN.m** **Therefore** **Ok**

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Drawing Title	**Chimney Access Scaffold**	Site:	**Mindel House, Manchester**

Main Independent Access Scaffold

LIVE LOAD - MAIN WORKING PLATFORM LOADINGS

MAIN SCAFFOLD DECK	**2**	kN/m2	INSIDE SCAFFOLD DECK	**0.75**	kN/m2

LIVE LOAD - SERVICE PLATFORM LOADINGS (OPTIONAL)

MAIN SCAFFOLD DECK	**0**	kN/m2	INSIDE SCAFFOLD DECK	**0**	kN/m2

Scaffold Max Tansom Spacing	1.2	m		No. Scaffold Lifts			**3**	No.
Scaffold Max Inside Ledger Bays	**1.8**	m		No. Lift Of Boards			**1**	No.
Scaffold Max Outside Ledger Bays	**1.8**	m						
Scaffold Board Width	**4**	No.	=	0.225	x	4	0.968	m Wide
Inside Boards No.	**1**	No.	=	0.225	x	1	0.26	m Wide
Max Lift Heights	**2**	m		Out Leg - No. Toe Board Per Lif			1	No.
Maximum Base Lift Height	**2**	m		In Leg - No. Toe Board Per Lift			0	No.
Max Scaffold Top Lift Height	**6**	m High		Vertical Tie Distance =			4	m

Additional Bay Detail

INSIDE LEGS PER BAY			OUTSIDE LEGS PER BAY		
No.of Inside Guardrails	0	No.	No.of Outside Guardrails	5	No.
Max No. Ledger Brace / Bay	1	No.	Max No. Ledger Brace / Bay	0	No.
Max No. Face Brace / Bay	0	No.	Max No. Face Brace / Bay	1	No.

Slip On The Platform Couplers

Outside Ledger Load =	2.17 kN	***Permissible For Ledger Coupler (kN)***	=	**9.1**
Therefore	**Ok**	**CHECK FITTING(S) Required**	=	**0**
Inside Ledger Load =	2.35 kN	***Permissible For Ledger Coupler (kN)***	=	**9.1**
Therefore	**Ok**	**CHECK FITTING(S) Required**	=	**0**

IF STRUCTURAL TRANSOM PLACED BELOW LEDGER - THIS FITTING ACTS AS ONE No. CHECK FITTING

Does Table 5.14 Apply For Effective Lengths L_E	**Yes**	Inside Standard	Outside Standard
Additional Loads Onto Standards - Imposed At Lift =	**0**	**0** kN	**0** kN

Axial Effective Length - Table 5.14 - L_E Standards In Ledger Braced Tied Independent Scaffolds With 2.0m Lifts with Effective Façade Bracing

Bay Length =	1.8 m	Vertical m Between Ties =	4 m
Effective Standard Length L_E =	3.2 m	**Max Permissible Leg Load**	**13.6 kN**

Maximum Leg Loads Down Node Point

	INSIDE LEG		OUTSIDE LEG			INSIDE LEG		OUTSIDE LEG	
Tube/Fitts	0.944	kN.	1.139	kN.	H/Rails	0.000	kN.	0.454	kN.
Boards	0.101	kN.	0.304	kN.	Live Load	2.093	kN.	1.742	kN.
Addn.Load	**0**	kN.	**0**	kN.					
	MAX LEG LOAD - DEAD LOAD ONLY					**MAX LEG LOAD INC LIVE LOAD**			
	1.0	kN.	1.9	kN.		3.1	kN.	3.6	kN.

Inside Standards		Outside Standards	
Single Standards OK	**0**	**Single Standards OK**	**0**

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FLOOR JOIST SPREADER BEAM SUPPORT

ANALYSIS FOR SINGLE 300mm STEEL LADDER BEAM

Uniformly Distributed Load At Beam Level Span = **2.29** m

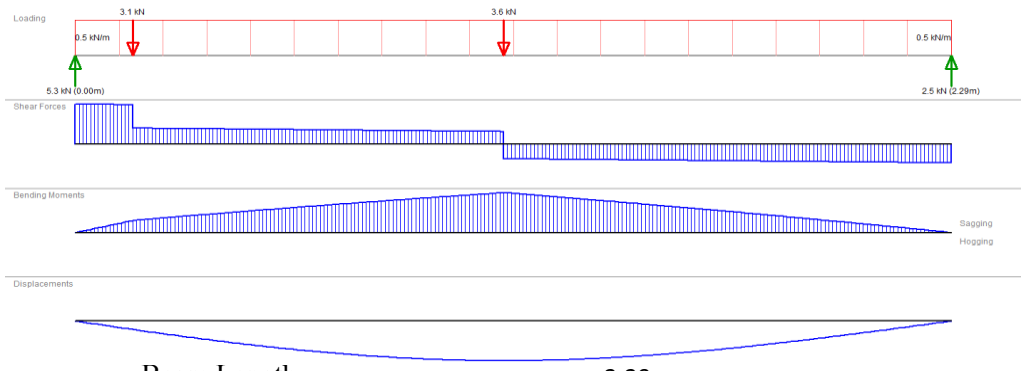
Board Width 4 Inside Boards = 1 BEAM SW = **0.470** kN/m

Total Linear metre Load Applied Onto Inside Beam = **0.47 kN/m**

Point Loads Imposed From Standards Onto Beams

	Leg 1	Leg 2
Imposed Load (kN)	3.1	3.6
Distance (m)	0.15	1.12

Beam Analysis below



Beam Length	=	2.29	m
Second Moment of Area	=	2600	cm^4
Elastic Modulus	=	210000	N/mm^2

APPLIED LOADING

Point Loads

3.1 kN at 0.15 m

3.6 kN at 1.12 m

Distributed Loads

0.47 kN/m @ 0 m --> 0.47 kN/m @ 2.29 m

REACTIONS (+ve Upward)

5.28 kN @ 0 m No upward reaction –therefore no uplift to scaffold

2.5 kN @ 2.29 m

RESULTS SUMMARY

Max. Reaction	=	5.28 kN @	0 m	
Max. Sag Bending Moment	=	2.61 kN.m @	1.12 m - Permissible =	**11.7 kN - OK**
Max. Shear Force	=	5.28 kN @	0 m - Permissible =	**18 kN - OK**
Max. Downward Displacement	=	0.22 mm @	1.12 m	

ALL RESULTS WITHIN SINGLE BEAM LIMITS

Check Fitting Loads Onto Supporting Standard At End Beam Location = 5.28 kN

End Reaction To Leg (s) = 3.6 Permissible Slip Load To Fitting = 9.1 kN

2 x Fittings On Beam & 2 x Transom = **4** x fittings fixed at each leg = 36.4 kN

Therefore **0** Check Fitting(s) Required Fixed Directly Under Beam Node Point