CALCULATIONS

For:

OLD BRIERLEY HALL - GARAGE

On Behalf of:

MR S ROBINSON

Project Reference:	21-066
Document Ref:	21066-MCE-XX-XX-CA-S-1001
Status	S0 - Initial Status
Revision:	P01
Date:	17/05/22

Ref.

Output

VERIFICATION RECORD

Calculation type	Original
Category of Checking	0
Design Process	N/A

REVISION RECORD

Rev	Status	Date	Originator	Checked	Approved
P01	S 0	17/05/22	AJH	LJH	AJH

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Project Title: OLD BRIERLEY HALL - GARAGE		Date 17/05/22
Subject **CONTENT**		By AJH / Chkd LJH

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SECTION	DESCRIPTION
1.0	INTRODUCTION
2.0	SKETCHES
3.0	NOTES
4.0	DESIGNER'S RISK ASSESSMENT
5.0	CALCULATIONS

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1.0 INTRODUCTION

MATRIX CONSULTING ENGINEERS	Document Reference: 21066-MCE-XX-XX-CA-S-1001	Project Reference: 21-066	
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Subject **DESIGN PARAMETERS**		By AJH	Chkd LJH

Site Information

Site Address:	Old Brierley Hall Common Road Brierley BARNSLEY	
Grid Reference:	SE 41244 10951	
Easting:	441244	
Northing:	410951	
Latitude	53.59352	
Longitude	-1.378339	
Elevation:	0	m
Proximiy to Sea	0	kM

Soils Information

GIR Report:	NONE PREPARED	
GDR Report:	NONE PREPARED	
Soil Density	18	kN/m^3
Allowable Pressure	100	kN/m^2
Cu	-	kN/m^2
ϕ	-	kN/m^3
Design Sulphate Class	-	
ACEC Class	-	

Superstructure Information

Fire Resistance:	0.5	Hrs
Concrete Grade:	35	N/mm^2
Concrete Cover:	-	mm
Steelwork Grade:	S355	N/mm^2
Steelwork Sub-grade	-	
Consequence Class	-	

EXTRACT FROM BS 8004 - CODE OF PRACTICE FOR FOUDATIONS

Table 1 — Presumed allowable bearing values under static loading (see **1.2.3** and **1.2.4**)

NOTE These values are for preliminary design purposes only, and may need alteration upwards or downwards. No addition has been made for the depth of embedment of the foundation (see **2.1.2.3.2** and **2.1.2.3.3**).

Category	Types of rocks and soils	Presumed allowable bearing value		Remarks
		kN/m^2 [a]	kgf/cm^2 [a] $tonf/ft^2$	
Rocks	Strong igneous and gneissic rocks in sound condition	10 000 4 000	100 40	These values are based on the assumption that the foundations are taken down to unweathered rock. For weak, weathered and broken rock, see **2.2.2.3.1.12**
	Strong limestones and strong sandstones	3 000	30	
	Schists and slates	2 000	20	
	Strong shales, strong mudstones and strong siltstones			
Non-cohesive soils	Dense gravel, or dense sand and gravel	> 600	> 6	Width of foundation not less than 1 m. Groundwater level assumed to be a depth not less than below the base of the foundation. For effect of relative density and groundwater level, see **2.2.2.3.2**
	Medium dense gravel, or medium dense sand and gravel	< 200 to 600	< 2 to 6	
	Loose gravel, or loose sand and gravel	< 200	< 2	
	Compact sand	> 300	> 3	
	Medium dense sand	100 to 300	1 to 3	
	Loose sand	< 100	< 1	
		Value depending on degree of looseness		
Cohesive soils	Very stiff boulder clays and hard clays	300 to 600	3 to 6	Group 3 is susceptible to long-term consolidation settlement (see **2.1.2.3.3**). For consistencies of clays, see Table 5
	Stiff clays	150 to 300	1.5 to 3	
	Firm clays	75 to 150	0.75 to 1.5	
	Soft clays and silts	<75	<0.75	
	Very soft clays and silts	Not applicable		
Peat and organic soils		Not applicable		See **2.2.2.3.4**
Made ground or fill		Not applicable		See **2.2.2.3.5**

[a] 107.25 kN/m^2 = 1.094 kgf/cm^2 = 1 $tonf/ft^2$.

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Subject **LOCATION PLANS**		By AJH	Chkd LJH

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FIGURE 1 - ARIEL PHOTOGRAPHY

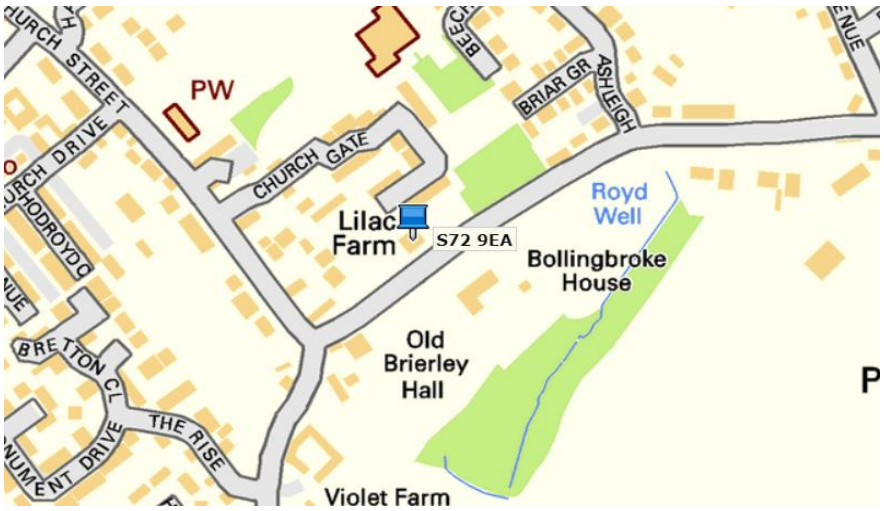


FIGURE 2 - OS BLOCK PLAN

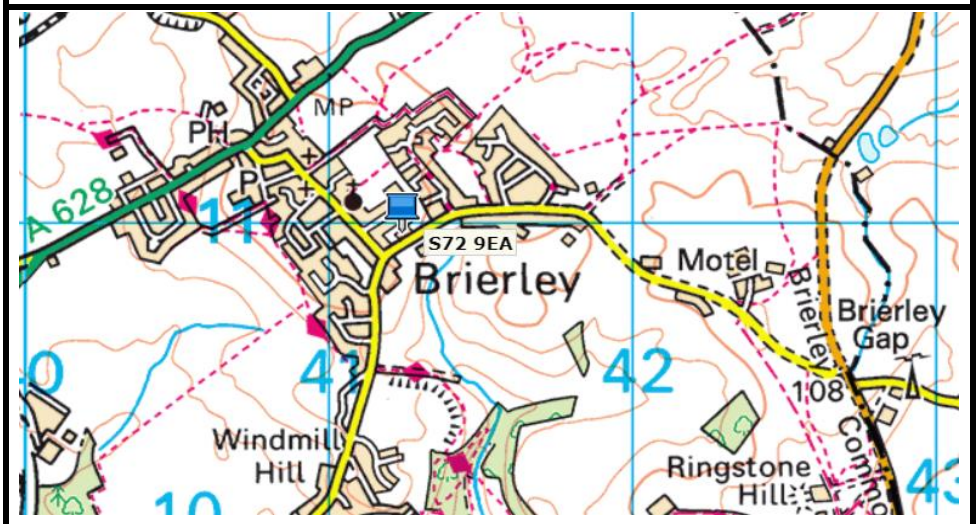
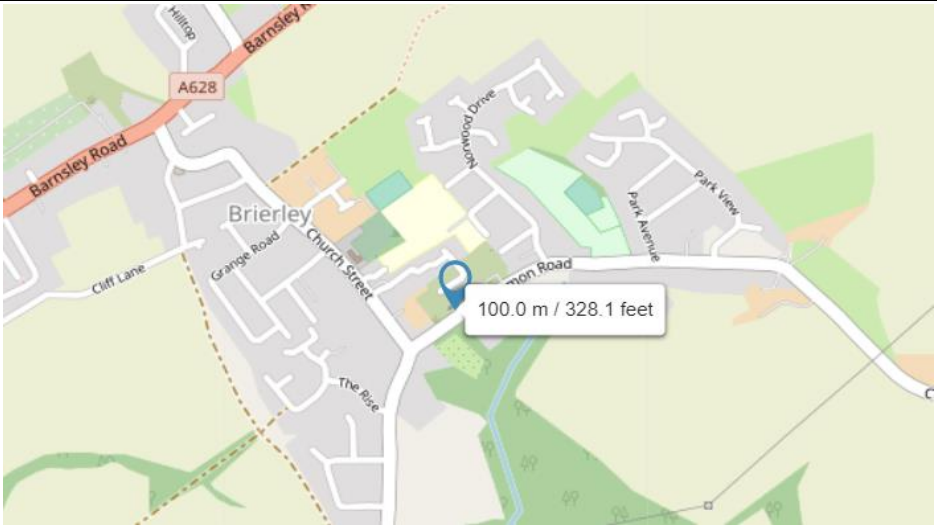
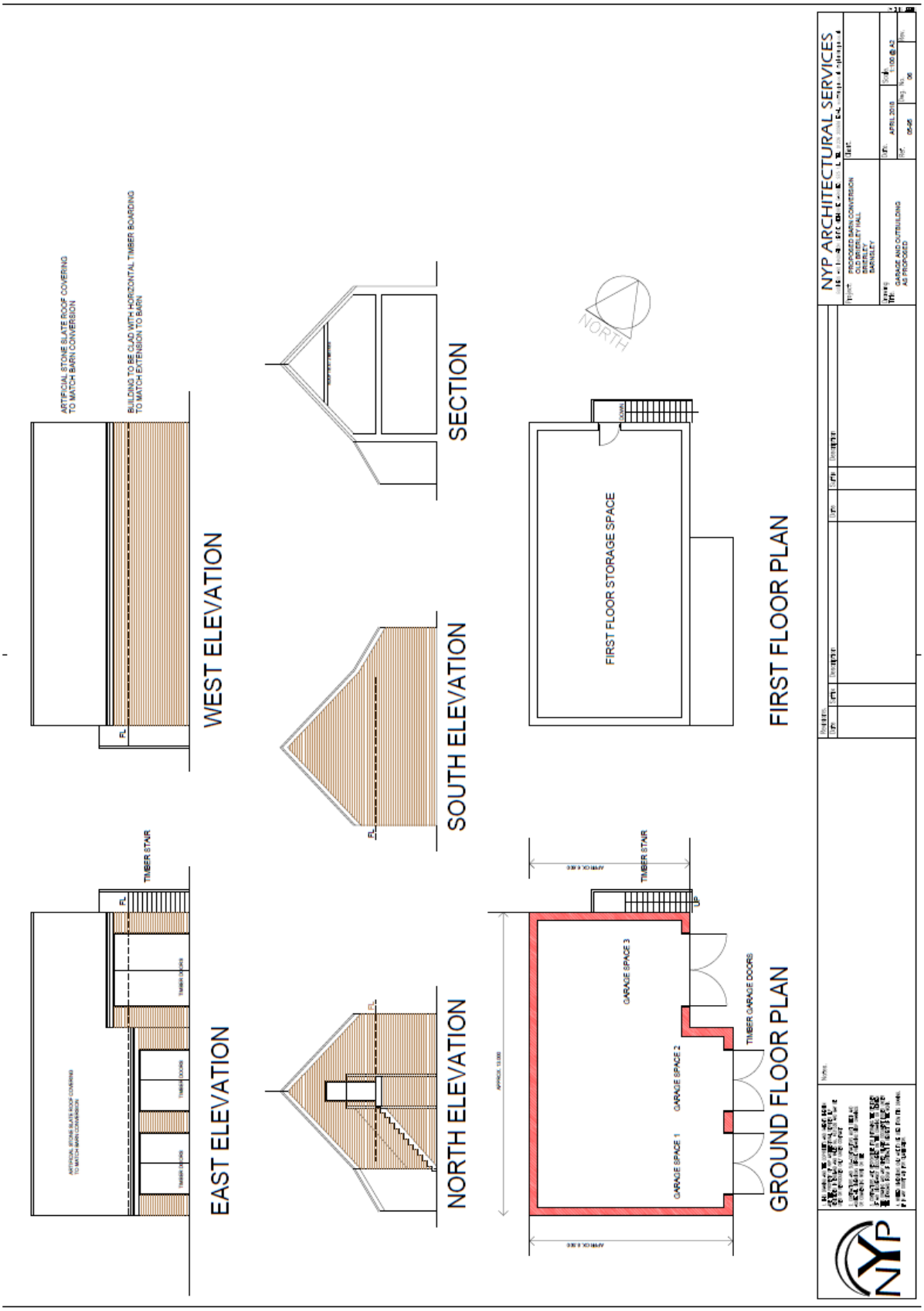


FIGURE 3 - OS LOCATION PLAN (SCALE1:2500)

Ref.		Output
	NOT USED	
	FIGURE 3 - DISTANCE TO SEA (GOOGLE MAPS)	
	NOT USED	
	FIGURE 4 - FRONT ELEVATION (GOOGLE STREET VIEW)	
		
	FIGURE 5 - SITE ELEVATION	

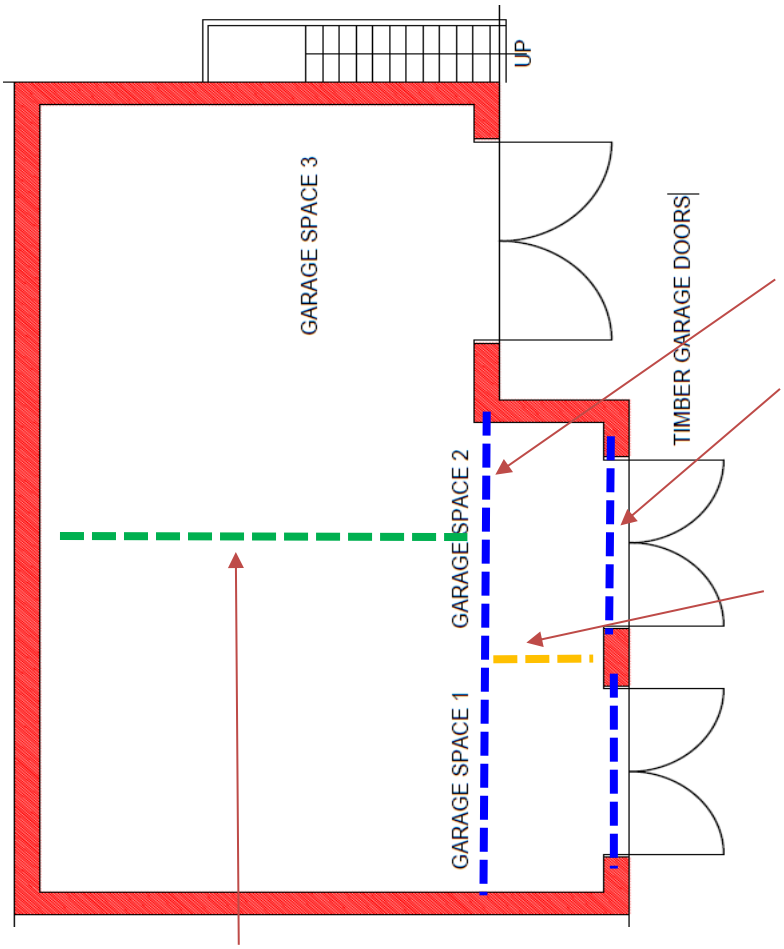
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Subject **ARCHITECTURAL INFORMATION**		By AJH	Chkd LJH



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2.0 SKETCHES

MATRIX CONSULTING ENGINEERS	Document Reference: 21066-MCE-XX-XX-CA-S-1001	Project Reference: 21-066	
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Subject GENERAL ARRANGEMENT ON EXRACT FROM ARCHITECTURAL DRAWING		By AJH	Chkd LJH



BEAM A - BEAM 5 AND 6 OUTER LEAF
305x305x97kg/m UC
[SEE SHEET S12]

200x100x4.0 RHS
WITH 300x8 PLATE
[SEE SHEET S11]

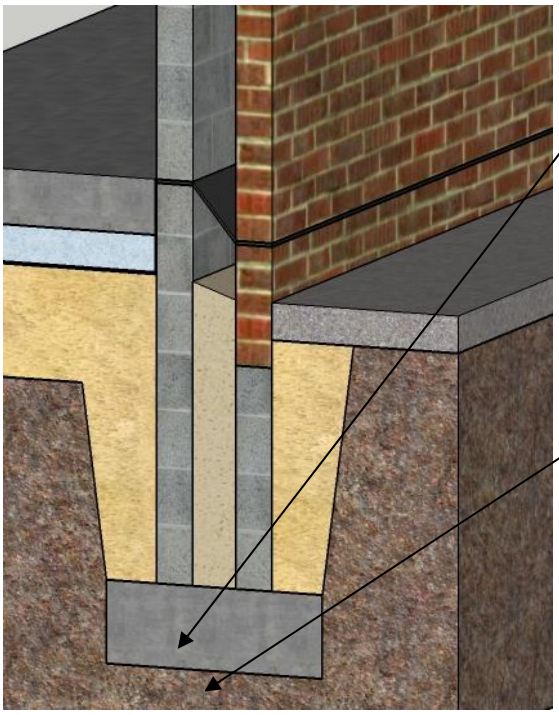
PITCHED ROOF RAFTERS TO BE
145x44 C24 JOISTS @ 400 C/C
WITH 18mm THK PLYWOOD
DIAPHRAGM, JOISTS DOUBLED
UP TO TRIM WINDOWS

DENOTES DIRECTION OF SPAN
OF ATTIC ROOF TRUSSES

NOTE:

IF ANY PROPOSED OR EXISTING SPAN CONFIGURATIONS ARE NOT AS ASSUMED, CEASE WORK AND REPORT FINDINGS TO THE ENGINEER
ASSUMED SPAN INDICATED TO BE CONFIRMED ON SITE:
ALL BEAMS TO BE SAT ON 440x215xWALL THICKNESS PADSTONE OR EQUIVALENT AREA.
BEARING AREA ON WALL BELOW. CONCRETE TO BE MIN CHARCTERISTIC STRENGTH OF 20N/mm².

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Subject FOUNDATION DETAIL		By AJH	Chkd LJH

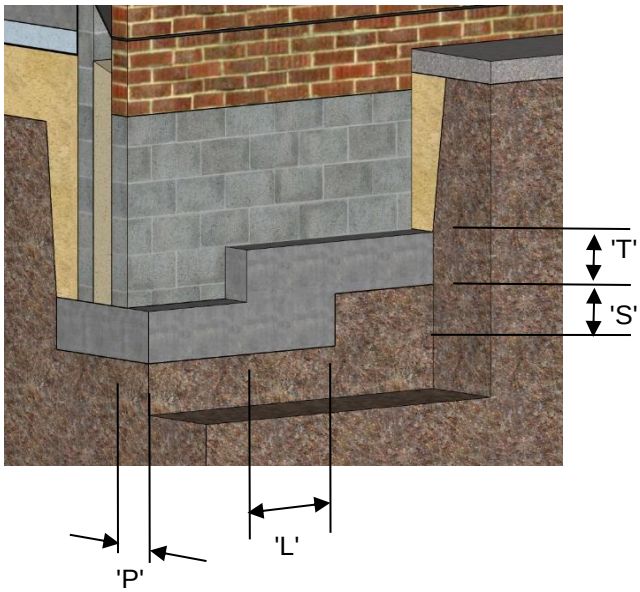


NEW FOUNDATIONS TO BE A MINIMUM OF:

WIDTH:	**0.600**	m
THICKNESS:	**0.225**	m
DEPTHS:		
ROCK:	**0.45**	m
SANDS AND GRAVELS:	**0.75**	m
LOW SHRINKAGE CLAYS:	**0.75**	m
MEDIUM SHRINKAGE CLAYS	**0.90**	m
HIGH SHRINKAGE CLAYS:	**1.10**	m

FOUNDING MATERIAL TO BE FIRM, UNIFORM, NATURAL GROUND WITH ALLOWABALE BEARING NO LESS THAN 100 kN/m2 ANY UNSUITABLE GROUND TO BE REMOVED AND REPLACED WITH ST1 CONCRETE.

TYPICAL FOUNDATION DETAIL WITH GROUND BEARING FLOOR SLAB

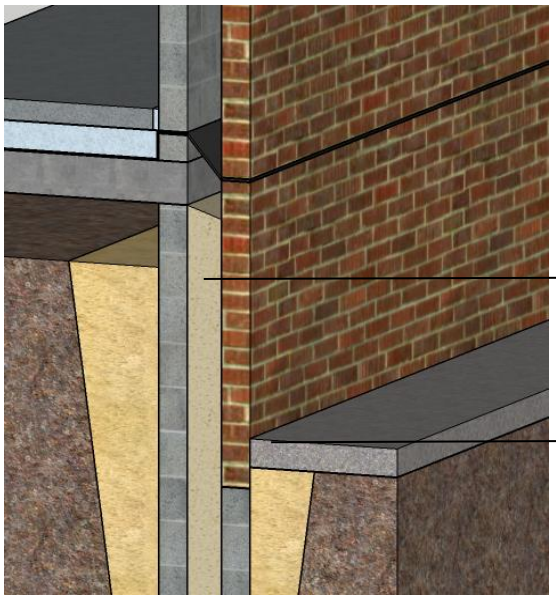


NOTES:

'S' - SHOULD NOT BE GREATER THAN 'T'
'L' - SHOULD BE GREATER THAN 2'T' OF MIN 300mm OR 1000mm FOR TRENCH FOUNDATIONS
'P' - GREATER THAN 'T' & NOT LESS THAN 150mm

MINIMUM FOUNDATION DIMENSIONS

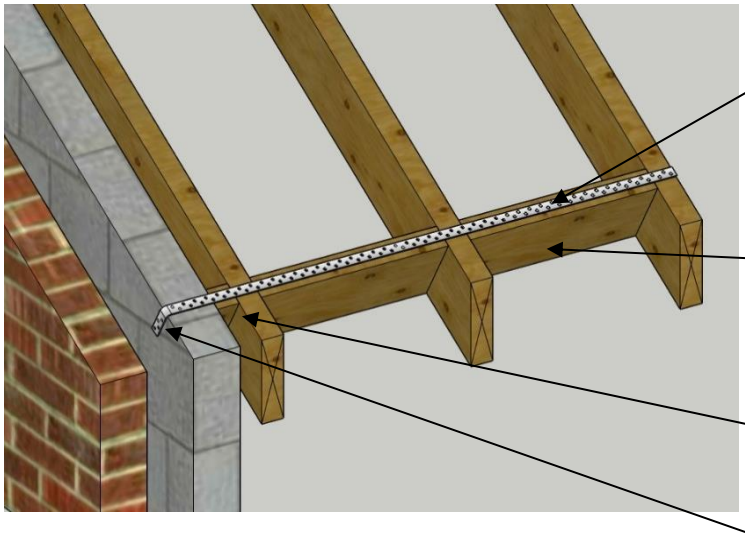
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RETAINED HEIGHT NOT TO BE GREATER THAN 4 X WALL THICKNESS OR 1000 mm WHICHEVER IS THE LEAST.

MAXIMUM RETAINING CONDITIONS FOR CAVITY WALLS

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Subject LATERAL RESTRAINT DETAILS		By AJH	Chkd LJH



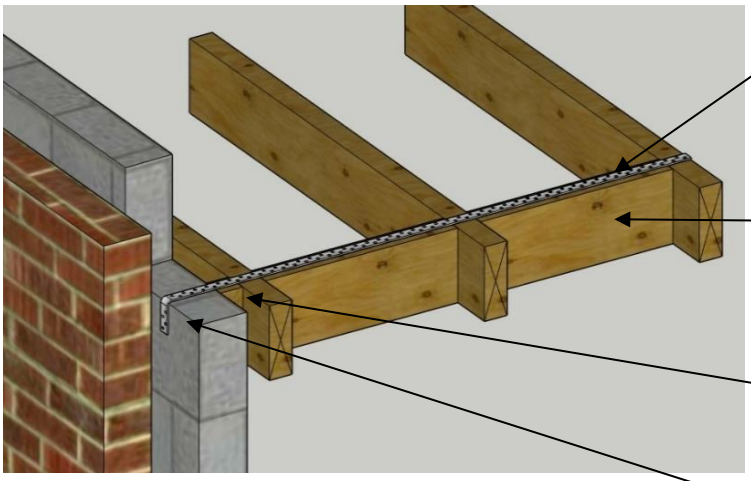
STRAP FIXED TO SOLID NOGGINS WITH A MINIMUM OF FOUR FIXINGS OF WHICH AT LEAST ONE IS TO BE IN THE THIRD JOIST OR IN A NOGGING BEYOND THE THIRD JOIST.

NOGGINS TO BE PROVIDED AND SET HORIZONTAL UNLESS THE STRAP HAS A TWIST TO LINE IT UP WITH THE ROOF SLOPE.

PACKING PIECE BETWEEN INNER LEAF AND FIRST RAFTER/JOIST.

STRAP BEDDED UNDER A CUT BLOCK & TURNED 100min DOWN TIGHT AGAINST WALL.

LATERAL RESTAINT TO PITHCED ROOF TRUSS/RAFTER



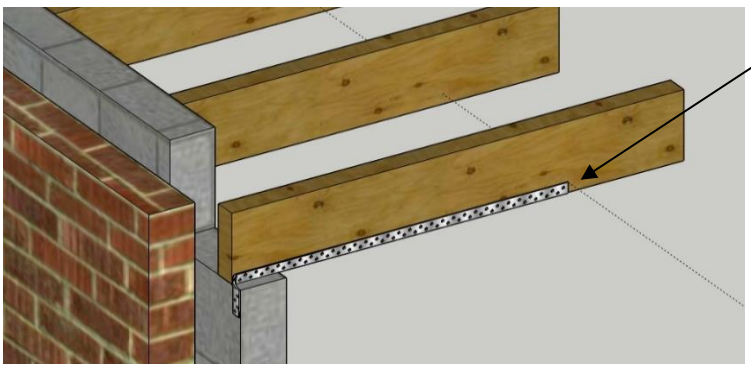
STRAP FIXED TO SOLID NOGGINS WITH A MINIMUM OF FOUR FIXINGS OF WHICH AT LEAST ONE IS TO BE IN THE THIRD JOIST OR IN A NOGGING BEYOND THE THIRD JOIST.

NOGGINS TO BE PROVIDED AND SET HORIZONTAL UNLESS THE STRAP HAS A TWIST TO LINE IT UP WITH THE ROOF SLOPE.

PACKING PIECE BETWEEN INNER LEAF AND FIRST RAFTER/JOIST.

STRAP BEDDED UNDER A CUT BLOCK & TURNED 100min DOWN TIGHT AGAINST WALL.

LATERAL RESTAINT TO FLOOR JOIST/ROOF RAFTER OR JOIST - SPAN RUNNING PARRALLEL TO WALL *

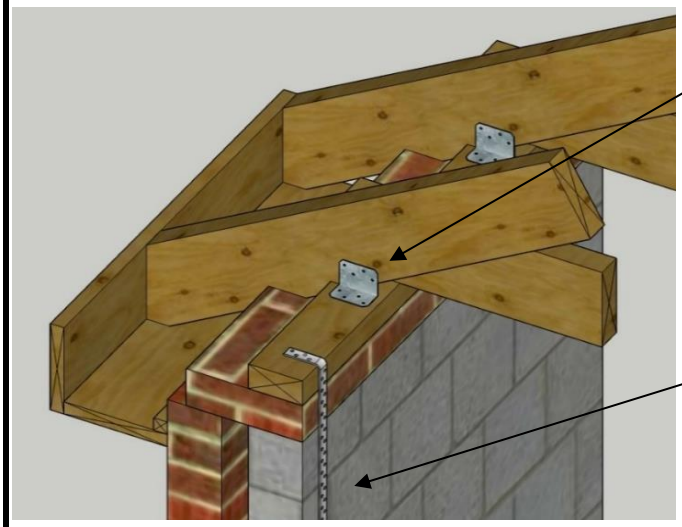


'L' STRAP TWISTED THROUGH 90° WITH LEADING EDGE ALIGNED. STRAP TO BE TURNED DOWN A MINIMUM OF 100mm AND BE TIGHT AGAINST THE FACE OF THE WALLING INNER LEAF.

*** [NOTE: TO BE APPLIED AT SOLID OR CAVITY EXTERNAL WALLS AND INTERNAL LOAD BEARING WALLS]**

LATERAL RESTAINT TO FLOOR JOIST/ROOF RAFTER OR JOIST SPAN RUNNING PERPENDICULAR TO WALL *

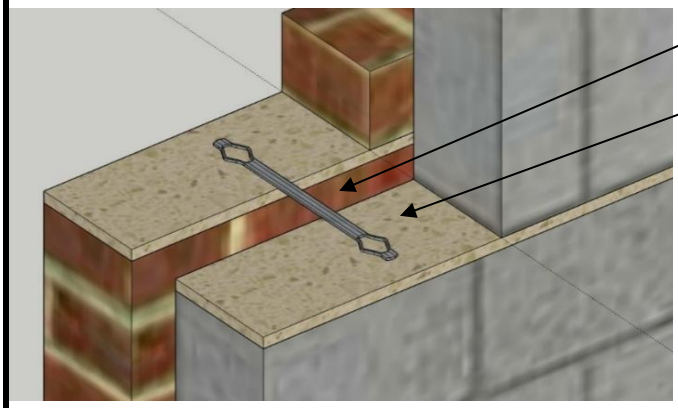
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Subject HOLDING DOWN AND WALL TIE DETAILS		By AJH	Chkd LJH



EACH RAFTER/JOIST ANCHORED TO WALLPLATE WITH FRAMING ANCHOR, CLIP OR NAIL.

STRAP TO HAVE A STRAIGHT LENGTH OF AT LEAST 1m AND BE EITHER SCREWED TO FACE OF MASONRY, OR HAVE A TAIL BUILT INTO A MASONRY BED JOINT. IF SCREWS ARE USED A MINIMUM OF FOUR SCREWS IS NECESSARY AT LEAST ONE OF WHICH IS TO BE LOCATED WITHIN 150mm OF THE BOTTOM END OF THE STRAP.

HOLDING DOWN STRAP TO PITCHED OR FLAT ROOF

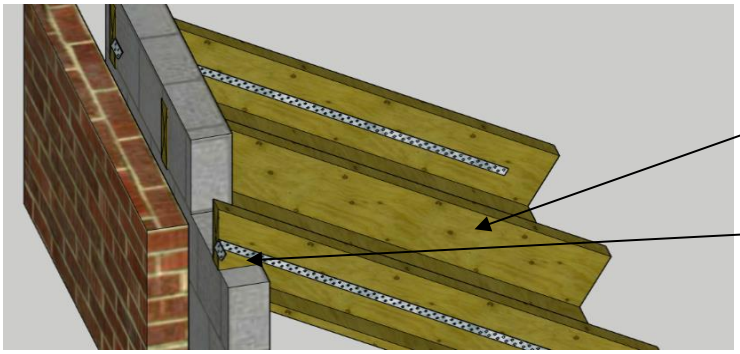


TIES TO BE TYPE 2 TO PD 6697:2010

MINIMUM EMBEDDMENT INTO BOTH LEAFS TO BE 50mm WITH AN ANGLE TO INSIDE FACE OF LEAFS TO BE BETWEEN 65^{O} & 90^{O}.

NOTE:
DENSITY AND LAYOUT OF WALL TIES TO BE IN ACCORDANCE WITH APPROVED DOC-UMENT 'A' AND PD 6697:2010 AND THE NATIONAL ANNEX TO BS EN 1996.

CAVITY WALL TIES



'L' STRAP TWISTED THROUGH 90° WITH LEADING EDGE ALIGNED. STRAP TO BE TURNED DOWN A MINIMUM OF 100mm AND BE TIGHT AGAINST THE FACE OF THE WALLING INNER LEAF.

EACH RAFTER TO BE NOTCHED 1/3 DEPTH OVER

LATERAL RESTAINT TO ROOF RAFTER OR JOIST SPAN RUNNING PERPENDICULAR TO WALL *

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Subject EXTRACT FROM BRE DIGEST 380 - DAMP PROOF COURSES		By AJH	Chkd LJH

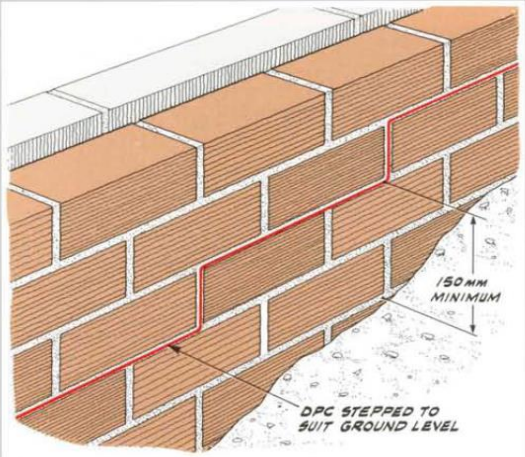


Fig 2 Position of DPC above ground level

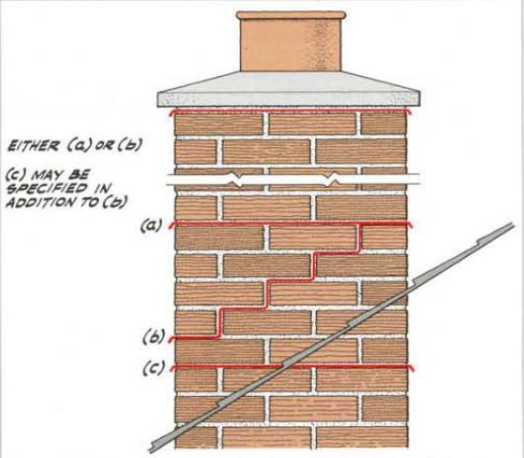


Fig 4 DPC in a masonry chimney where it penetrates the roof

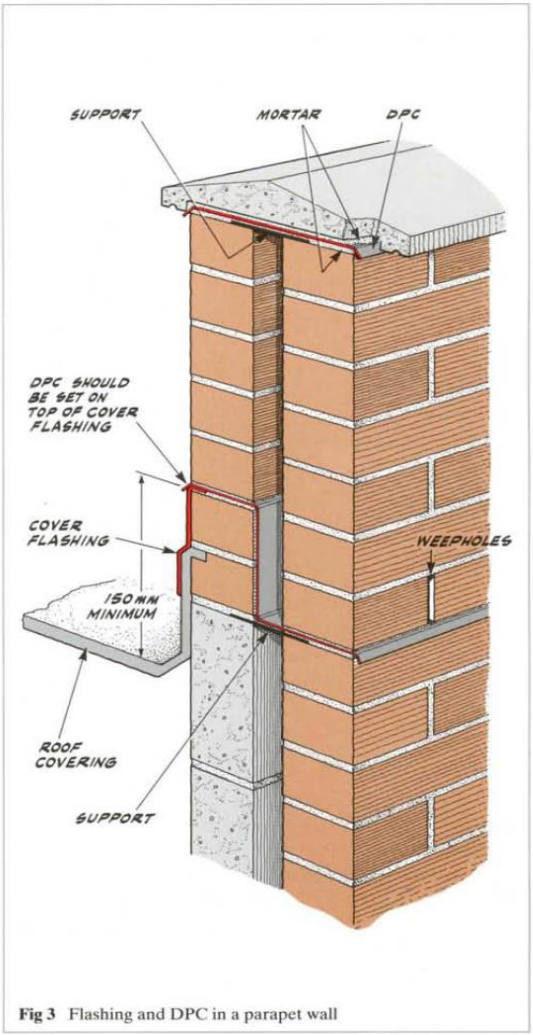


Fig 3 Flashing and DPC in a parapet wall

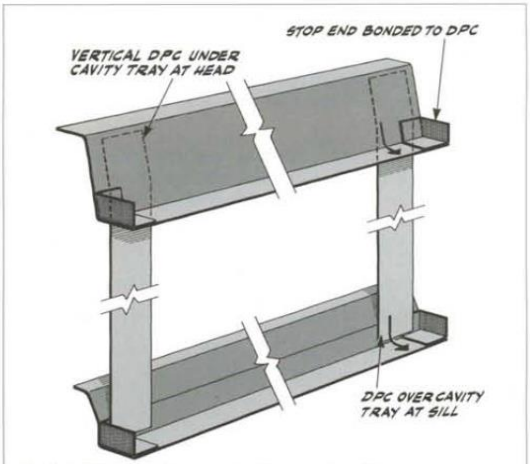


Fig 5 DPCs around an opening in a cavity wall

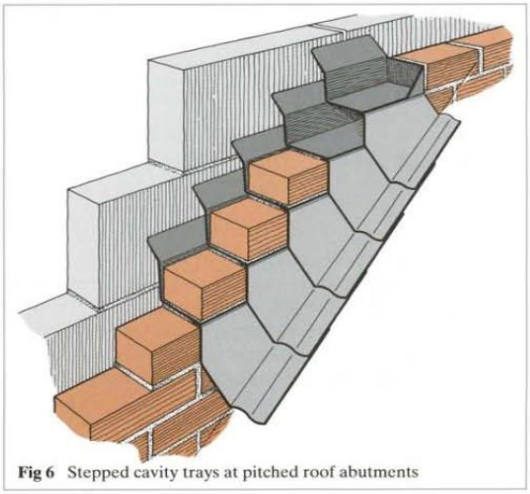
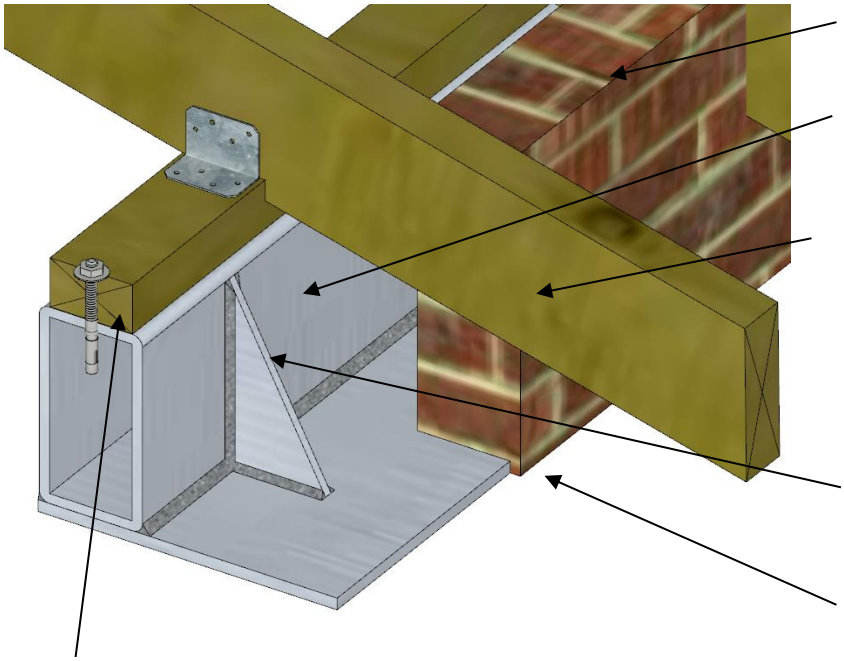


Fig 6 Stepped cavity trays at pitched roof abutments

[NOTE : ALL DPC'S TO BE INSTALLED IN A SANDWICH OF MORTAR. THAT IS WITH THE DPC TO BE LAID ON A MORTAR BED AND THE COURSE OF MASONRY ABOVE IT ALSO LAID ON A MORTAR BED]

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Subject ECCENTRICALLY LOAD BEAM DETAIL		By AJH	Chkd LJH



EXTERNAL LEAF

200x100x4.0 RHS SUPPORT BEAM WITH 300x8 PLATE WELDED TO UNDERSIDE WITH 6mm CFWs

145x44mm C24 JOISTS @ 400 mm c/c SECURED TO WALL PLATE USING SIMPSON STRONG-TIE REINFORCED ANGLE BRACKET SECURED THROUGH ALL TIMBER FACING HOLES. 2No PER JOIST.

250x100x8mm GUSSETS AT 900mm CENTRES WITH CAVITY DRAINS IN PERP ENDS BETWEEN.

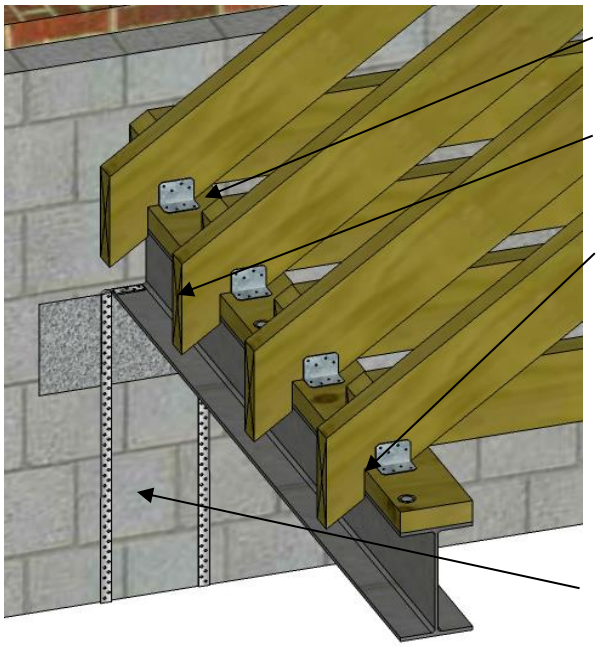
PISTOL CUT MASONRY OVER ENDGE OF PLATE

100x50 WALL PLATE SECURED TO DOOR SUPPORT BEAM USING M16 HOLLO BOLTS AT 400mm C/C

[NOTE: STEELWORK FINISH TO ARCHITECTURAL INFORMATION]

ECCENTRICALLY LOADED BEAM DETAIL

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Subject WALL PLATE DETAILS		By AJH	Chkd LJH



EACH RAFTER TO BE NOTCHED 1/3 DEPTH OVER THE WALL PLATE .

ALL JOISTS AND/OR RAFTERS TO BE ANCHORED TO THE WALL PLATE OR TO TIMBER PURLIN WITH FRAMING ANCHORS, CLIPS OR NAILS.

50mm WIDE THICK WALLPLATE ATTACHED TO THE STEEL PURLIN BY M16 BOLTS @ 450mm C/C STAGGERED

STEEL & TIMBER PURLINS TO BE SECURED TO WALL WITH 2No.30x5 MS STRAPS @ EACH SUPP-ORT STRAPS TO HAVE A STRAIGHT LENGTH OF AT LEAST 1.2m AND BE EITHER SCREWED TO FACE OF MASONRY, OR HAVE A TAIL BUILT INTO A MASONRY BED JOINT. IF SCREWS ARE USED A MINIMUM OF 8No SCREWS ARE NECESSARY AT LEAST 1No IS TO BE LOCATED WITHIN 150mm OF THE BOTTOM END OF THE STRAP.

TYPICAL WALL PLATE DETAIL

Ref.		Output

3.0 NOTES

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Project Title: OLD BRIERLEY HALL - GARAGE		Date 17/05/22	
Subject GENERAL NOTES RELATING TO THE SKETCHES AND DRAWINGS		By AJH	Chkd LJH

1	DO NOT SCALE FROM THE SKETCHES OR DAWINGS.
2	THESE SKETCHED ARE TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEERING, ARCHITECTURAL AND SPECIALIST SUPPLIER DRAWINGS, SPECIFICATION OF WORKS, DESIGN RISK ASSESSMENTS AND METHOD STATEMENTS.
3	THE PRINCIPAL DIMENSIONS AND LEVELS FOR SETTING OUT ARE INDICATED. THE CONTRACTOR IS TO TAKE ACCURATE SITE MEASUREMENTS TO VERIFY PRINCIPAL SETTING OUT DIMENSIONS AND LEVELS PRIOR TO THE EXECUTION OF ANY WORK. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE. ALL LEVELS IN METRES ABOVE OS DATUM UNLESS NOTED OTHERWISE.
4	ALL WORK IS TO BE CARRIED OUT TO THE APPROVAL OF THE CLIENT, ENGINEER AND BUILDING CONTROL AND TO BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE BUILDING REGULATIONS APPROVED DOCUMENTS AND PLANNING PERMISSION WHERE APPROPRIATE. ALL WORKMANSHIP AND MATERIALS TO BE IN ACCORDANCE WITH THE LATEST EDITION OF THE RELEVANT BRITISH STANDARDS, CODES OF PRACTICE OR EUROCODES AND THE AGREED PROJECT SPECIFICATION.
5	THE CONTRACTOR IS TO ENSURE COMPATIBILITY AND GOOD FIT BETWEEN NEW AND EXISTING CONSTRUCTION THROUGHOUT, TAKING SITE DIMENSIONS AS NECESSARY PRIOR TO COMMENCEMENT OF ANY WORK. THE CONTRACTOR IS TO MAINTAIN STABILITY OF ALL WALLS, FLOORS, COLUMNS, TRUSSES AND OTHER STRUCTURAL AND NON-STRUCTURAL ELEMENTS AND TO DESIGN, DETAIL, SUPPLY AND FIX ALL TEMPORARY SUPPORTS TO MAINTAIN VERTICAL AND HORIZONTAL STABILITY OF THE STRUCTURE AND ADJACENT STRUCTURES FOR THE DURATION OF THE WORKS.
6	ALL PROPRIETARY PRODUCT DETAILS ARE INDICATIVE. FOR CONSTRUCTION DETAILS SEE SPECIALIST SUPPLIERS INFORMATION. ALTERNATIVE PROPRIETARY PRODUCTS MAY BE PROPOSED BUT SHOULD BE IN ALL RESPECTS EQUAL TO THE PRODUCT DETAILED AND WILL BE SUBJECT TO THE APPROVAL OF THE ENGINEER AND BUILDING CONTROL. ALL PROPRIETARY PRODUCTS ARE TO BE INSTALLED STRICTLY IN ACCORDANCE WITH THE MANUFACTURERS WRITTEN INSTRUCTIONS.
7	IF ANY PROPOSED OR EXISTING SPAN CONFIGURATIONS ARE NOT AS ASSUMED, CEASE WORK AND REPORT FINDINGS TO THE ENGINEER

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	Suitability: S0 - Initial Status	Sheet No. N2	Rev P01
Project Title: OLD BRIERLEY HALL - GARAGE		Date 17/05/22	
Subject FOUNDATION NOTES		By AJH	Chkd LJH

1 ALL WORK TO BE IN ACCORDANCE WITH PD 6694, BS EN 1997 - EUROCODE 7, THE NATIONAL ANNEX AND AS AGREED ON SITE WITH BUILDING CONTROL.

2 ALL FOUNDATIONS TO BE CAST ON FIRM NATURAL GROUND WITH AN ALLOWABLE BEARING RESISTANCE OF AT LEAST 100 kN/m2 AND AT SUCH A DEPTH AS NOT TO SURCHARGE ANY ADJACENT WALLS, DRAINS OR SEWERS. ANY DEEPENED EXCAVATION OR UNSUITABLE GROUND TO BE REMOVED IS TO BE REPLACED WITH ST1 MASS CONCRETE AS AGREED WITH THE ENGINEER AND BUILDING CONTROL

3 FOR CLAYS AND OTHER SHRINKABLE SOILS, UNDERTAKE ATTERBERG LIMIT TESTS TO ASCERTAIN THE VOLUME CHANGE POTENTIAL OF THE SOIL AND ASSESS ITS SENSTIVITY TO CHANGES IN MOISTURE CONTENT AND SHRINKABILITY. THE MINIMUM FOUNDATION DEPTHS IN CLAY AND OTHER SHRINKABLE SOILS SHOULD BE AS FOLLOWS:
0.75 m ON LOW SHRINKAGE SOILS.
0.90 m ON MEDIUM SHRINKAGE SOILS.
1.00 m ON HIGH SHRINKAGE SOILS.

4 MINIMUM FOUNDATION WIDTHS TO BE IN ACCORDANCE WITH APPROVED DOCUMENT A - TABLE 10, DEPENDING ON TYPE AND CONDITION OF THE PREVAILING GROUND.

5 IN THE PROXIMITY OF TREES IN CLAYS AND OTHER SHRINKABLE SOILS, UNDERTAKE ATTERBERG LIMIT TESTS TO ASCERTAIN THE VOLUME CHANGE POTENTIAL OF THE SOIL AND ASSESS ITS SENSTIVITY TO CHANGES IN MOISTURE CONTENT AND SHRINKABILITY, SO AS TO CONFIRM THE ASSUMPTIONS MADE IN THESE CALCULATIONS. REPORT FINDINGS TO THE ENGINEER TO ENABLE FOUNDATION DEPTHS AND DETAILS TO BE CONFIRMED.

6 ALL FOUNDATIONS TO BE POSITIONS CENTRALLY UNDER WALLS OR COLUMNS U.N.O. FOR DETAILS ON GAS MEMBRANES, DPC'S AND DPM'S SEE ARCHITECTURAL INFORMATION.

7 EXCAVATIONS TO BE KEPT DRY AT ALL TIMES. BACKFILL ABOVE FOUNDATIONS TO BE TYPE 1 SUB-BASE OR CLEAN INTERT HARDCORE COMPACTED IN LAYERS NOT EXCEEDING 150mm AND BENCHED INTO THE EXCAVATION SIDES AS NECESSARY.

8 CONCRETE GRADE IS TO BE AS FOLLOWS:
- C35/45
- MAX. FREE WATER/CEMENT RATIO TO BE 0.35
- MIN. CEMENT CONTENT TO BE 380 kg/m^3
- DESIGN CLASS TO BE DS-1
- AGGRESSIVE CHEMICAL CLASS TO BE AC-1.

MATRIX CONSULTING ENGINEERS	Document Reference: 21066-MCE-XX-XX-CA-S-1001	Project Reference: 21-066	
	Suitability: S0 - Initial Status	Sheet No. N3	Rev P01
Project Title: OLD BRIERLEY HALL - GARAGE		Date 17/05/22	
Subject STEELWORK NOTES		By AJH	Chkd LJH

1 STEEL WORK TO BE IN ACCORDANCE WITH PD 6695, BS EN 1993 - EUROCODE 3 AND THE NATIONAL ANNEX.

2 ALL STEELWORK CONNECTIONS TO BE DESIGNED AND DETAILED BY A SPECIALIST SUPPLIER TO LOADS THAT CAN BE INFERRED FROM THE CONTRACT INFORMATION. STEELWORK FRAMES TO PROVIDE VERTICAL SUPPORT AND ENSURE LATERAL STABILITY TO THE CROSS-WALL CONSTRUCTION AS NECESSARY.

3 STEEL HOLLOW SECTIONS TO BE 'HOT FINISHED' STEEL GRADE S355 J2H TO BS EN 10210. PLATE AND ALL OTHER SECTIONS TO BE 'HOT ROLLED' STEEL GRADE S355 J2G3 TO BS EN 10025 U.N.O. DO NOT USE SECTIONS THAT ARE HEAVILY PITTED OR CORRODED. MAKE CUTS AND HOLES NEATLY AND ACCURATELY, REMOVING ALL BURRS, SHARP EDGES AND DROSS.

4 WELDS TO BE MIN 6mm C.F.W.'S IN ACCORDANCE WITH BS EN 1011-1 TO FORM FULLY FUSED JOINTS WITH MECHANICAL PROPERTIES NOT LESS THAN THOSE OF THE PARENT METAL U.N.O. ALL NON-PRELOADED BOLTS TO BE GALVANISED MIN 16mm DIA GRADE 8.8 TO BS EN 15048 AND BS EN ISO 898-1 U.N.O.

5 ONE COAT OF HIGH BUILD ALKYD ZINC PHOSPHATE MODIFIED PRIMER APPLIED TO ALL SURFACES FREE FROM RUNS AND SAGS TO THE MANUFACTURERS WRITTEN INSTRUCTIONS. TWO COATS TO BE APPLIED TO COLUMN BASES AND TO STEEL LOCATED IN CAVITY WALLS. PRIMER TO BE TOUCHED UP ON SITE AS NECESSARY. 19mm PLASTERBOARD AND SKIM TO ALL INTERNAL STEELWORK. FOR PROTECTION TO EXTERNAL STEELWORK, SEE ARCHITECTURAL INFORMATION.

6 POSITION SUPPORTING MEMBERS ACCURATLEY USING STEEL PACKS OF ADEQUATE AREA AND NON-SHRINK GROUT AS NECESSARY TO ACHIEVE TRUE LINE AND LEVEL. DRY PACK MORTAR TO NEW BEAMS SUPPORTING EXISTING FLOORS AND WALLS AS NECESSARY TO ENSURE FULL LOAD TRANSFER.

7 BEARING TO BE A MINIMUM 150mm WHERE BEAM IS PARRALLEL TO THE SUPPORTING WALL AND THE MINIMUM OF THE WALL THICKNESS WHERE PERPENDICULAR TO THE SUPPORTING WALL. PADSTONES TO BE MASS CONCRETE OF STRENGTH NOT LESS THAN 25N/mm^2.

8 ALL HOLLOW SECTIONS TO BE FULLY WELDED AND SEALED AGAINST WATER INGRESS. UNLESS ADVISED OTHERWISE, HOLES FOR BOLT FIXINGS ARE NOT PERMITTED.

9 THE STEELWORK MANUACTURING DIMENSIONS SHOWN ARE SPECIFIED FOR A MEAN TMPERATURE OF 12^{O}C.

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Project Title: OLD BRIERLEY HALL - GARAGE		Date 17/05/22	
Subject TIMBER NOTES		By AJH	Chkd LJH

1 ALL WORK TO BE IN ACCORDANCE WITH PD 6693, BS EN 1995 - EUROCODE 5 AND THE NATIONAL ANNEX.

2 RAFTERS AND JOISTS TO BE DOUBLED UP AS TRIMMING TO PENETRATIONS, WINDOWS AND THE LIKE.

3 ALL TRUSSED RAFTER ROOFS TO BE DESIGNED AND BRACED IN ACCORDANCE BS EN 14250 AND PD 6693 BY A SPECIALIST SUPPLIER TO SUSTAIN LOADS THAT CAN BE INFERRED FROM THE CONTRACT INFORMATION. TRUSSED RAFTER ROOFS TO PROVIDE LATERAL STABILITY TO THE CROSS-WALL CONSTRUCTION, DISTRIBUTING LATERAL LOADS INTO THE BUTTRESSING WALLS USING LATERAL RESTRAINT STRAPS AS NECESSARY, IN ACCORDANCE WITH APPROVED DOCUMENT ‘A’ AND PD 6693.

4 ALL TIMBERWORK SHALL BE A MINIMUM C24 AND COMPLY WITH BS EN 1995-1, BE IN ACCORDANCE WITH APPROVED DOCUMENT 'A' AND BE GOOD, SOUND AND FREE FROM INSECT ATTACK, FUNGI, SPLITS, SHAKES OR EXCESSIVE KNOTS. MINIMUM BEARING TO ALL TIMBER MEMBER TO BE 90 mm U.N.O.

5 NEW FLOORS TO HAVE 19mm THK BOARDING WITH STRUTS AT:
i) CENTRE SPAN FOR JOIST SPANS 2.5m-4.5m
ii) THIRD POINTS OF SPAN FOR JOIST SPANS >4.5m.
FLOOR JOISTS SUPPORTING PARTITION WALLS PARALLEL TO THE SPAN AND BATHS TO BE 'DOUBLED-UP'.

6 30mm x 5mm GALVANISED MILD STEEL LATERAL RESTRAINT STRAPS WITH 50mm WIDE NOGGINS AND FIRST JOIST OR RAFTER PARRALEL TO INTERNAL OR EXTERNAL WALLS TO BE PLACED ABUTTING MASONRY TO ENSURE FULL LATERAL LOAD TRANSFER. STRAPS IN ACCORDANCE WITH APPROVED DOCUMENT 'A' AS FOLLOWS:
i) FLOORS: 2m C/C UP TO 2 STOREYS AND AT 1.25m C/C THEREAFTER, MIN 3No. JOIST.
ii) CEILINGS: 2m C/C ABOUT CENTRELINE OF JOISTS, MIN 3No. JOIST.
iii) RAFTERS: 2m C/C AT GABLES ABOUT CENTRELINE OF RAFTERS, MIN 3No. RAFTER.

7 30mm x 5mm GALVANISED MILD STEEL HOLDING DOWN STRAPS TO ROOFS IN ACCORDANCE WITH APPROVED DOCUMENT 'A' AT 2m C/C.

8 BEARING TO BE A MINIMUM 150mm WHERE BEAM IS PARRALLEL TO THE SUPPORTING WALL AND THE MINIMUM OF THE WALL THICKNESS WHERE PERPENDICULAR TO THE SUPPORTING WALL. PADSTONES TO BE MASS CONCRETE OF STRENGTH NOT LESS THAN 25N/mm².

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Project Title: OLD BRIERLEY HALL - GARAGE		Date 17/05/22	
Subject MASONRY NOTES		By AJH	Chkd LJH

1 ALL WORK TO BE IN ACCORDANCE WITH PD 6697, BS EN 1996 - EUROCODE 6 AND THE NATIONAL ANNEX.

2 ALL NEW EXTERNAL MASONRY WALLS TO BE COMPRISED OF: 100mm MANUFACTURED STONE/100mm SQUARE DRESSED NATURAL STONE/100mm THICK FACING BRICKWORK (AS DETAILED IN ARCHITECTURAL INFORMATION), 100mm CONTINUOUS CAVITY WITH LEAN-MIX CONCRETE BELOW DPC LEVEL, 100mm THICK 7N/mm2 BLOCKWORK WITH 215X105mm AIR-GRATE VENTS TO THE VOID OF THE SUSPENDED GROUND FLOOR AT 1800mm CTS. ALL NEW INTERNAL MASONRY WALLS TO BE 100mm THICK 7N/mm2 BLOCKWORK U.N.O. ALL MASONRY WALLS TO COMPLY WITH BS EN 771.

3 MORTAR TO BE DESIGNATION (II) - 1: 3 TO 4 IN ACCORDANCE WITH BS EN 1996-1 WITH MIN STRENGTH CLASS M6 TO BS EN 998-1 AND CEM 1 CEMENT. WALLS TIES TO CAVITY WALLS TO BE TYPE 2 STAINLESS STEEL TO PD 6697. TIES TO 450 mm C/C VERTICALLY AND 750 mm C/C HORIZONTALLY, STAGGERED. ALL TIES TO BE PLACED 225 mm FROM REVEALS AT 300 mm C/C VERTICALLY AND 225 mm FROM HEADS AT 300 mm C/C HORIZONTALLY WITH 50mm MIN OF EMBEDDMENT.

4 NEW WALLS TO BE TIED TO EXISTING BY EITHER BLOCK BONDING, TOOTH BONDING OR BY USING SIMPSON STRONG-TIE STAINLESS STEEL CROCODILE PLUS WALL CONNECTOR SYSTEM INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS WRITTEN INSTRUCTIONS AND THE BBA AGREMENT CERTIFICATE NO.85/1571.

5 CAVITIES TO BE CONTINUOUS AT JUNCTIONS. HORIZONTAL DPC'S TO ALL WALLS TO BE A MIN OF 150mm ABOVE EXTERNAL GROUND LEVEL, SANDWICHED BETWEEN BEDS OF MORTAR AND LAPPED INTO DPM'S AND INSULATED DPC's TO ALL REVEALS. ALL IN ACCORDANCE WITH BS 8215:1991 - CODE OF PRACTICE FOR DESIGN AND INSTALLATION OF DAMP-PROOF COURSES IN MASONRY CONSTRUCTION.

1 ALL WORK TO BE IN ACCORDANCE WITH PD 6687, BS EN 1992 - EUROCODE 2 AND THE NATIONAL ANNEX.

2 GROUND BEARING FLOOR SLABS TO COMPRISE: 150 mm THICK CONCRETE SLAB WITH 1 NO. LAYER OF A393 MESH PLACED 40mm FROM SURFACE, 1200G VISQUEEN DPM TAPED AND LAPPED ONTO DPC'S AND MIN 150mm EITHER FINES BLINDED TYPE 1 SUB-BASE IN ACCORDANCE WITH THE DMRB OR FINES BLINDED CLEAN INERT WELL COMPACTED HARDCORE PLACED IN EQUAL LAYERS NOT EXCEEDING 150mm.

3 ALL SLABS TO BE CAST ON FIRM NATURAL GROUND WITH AN ALLOWABLE BEARING RESISTANCE OF AT LEAST 50kN/m2 AND AT SUCH A DEPTH AS NOT TO SURCHARGE ANY ADJACENT WALLS, DRAINS OR SEWERS. ANY DEEPENED FORMATIONS, EXCAVATIONS OR UNSUITABLE GROUND TO BE REMOVED AND REPLACED WITH TYPE 1 SUB-BASE OR CLEAN INERT WELL COMPACTED HARDCORE AS AGREED WITH THE ENGINEER AND BUILDING CONTROL. FORMATIONS TO BE KEPT DRY AT ALL TIMES.

4 CONCRETE GRADE IS TO BE AS FOLLOWS:
- C35/45
- MAX. FREE WATER/CEMENT RATIO TO BE 0.35
- MIN. CEMENT CONTENT TO BE 325 kg/m^3
- DESIGN CLASS TO BE DS-1
- AGGRESSIVE CHEMICAL CLASS TO BE AC-1.
- COURSE AGGREGATE TO BE MAX 20 MM NATURAL OR CRUSHED GRAVEL MAIN AGGREGATE (MAXIMUM WATER ABSORPTION 3%).

5 SURFACE TO BE TROWELLED SMOOTH WITH DISCS AND POLISHED WITH BLADES. SQUARE EDGED STEEL SHUTTERS TO BE USED THROUGHOUT. MESH NOT SCHEDULED, CONTRACTOR TO ALLOW FOR MINIMUM LAPS OF 500mm. 600mm LONG ANTICRACK BARS TO BE PROVIDED TO THE MESH AT ALL INTERNAL CORNERS AND AT OPENINGS IN THE SLAB.

6 FLOOR SLAB SHALL BE CONSTRUCTED TO COMPLY WITH CONCRETE SOCIETY TECHNICAL REPORT 34 FOURTH EDITION 2013 (TR34: 2013). WEARING SURFACE IS TO HAVE A MINIMUM ABRASION RESISTANCE OF AR3 TO BS 8204. THE FLOOR SLAB IS TO BE FINISHED LEVEL AS FOLLOWS: -

i +/- 3 MM IN ANY LENGTH RELATIVE TO A STRAIGHT EDGE 3 M LONG.
ii +/- 5 MM ACROSS ANY PANEL 4.5 M WIDE.
iii +/- 2 MM BETWEEN ADJACENT EDGES OVER A DISTANCE OF 300 MM LONG.
iv +/- 5 MM OVER THE SPECIFIED LEVEL OF THE FLOOR SLAB.

Ref.		Output

4.0 DESIGNER'S RISK ASSESSMENT

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Subject: DESIGNER'S RISK ASSESSMENT		By AJH	Chkd LJH

LOCATION	HAZARD	Probability	Severity	Risk	Available Control Measures	Residual Risk	Action by	Procedure	Output
General	Being struck by moving plant or materials.	High	Medium	High	Exclude pedestrians from the vicinity of the works. Barriers / fences to be erected accordingly. Adopt suitable traffic management system.	Low	Contractor	Contractor to implement suitable scheme	
General	Members of the general public, the client and others coming in to conflict with construction work.	High	Medium	High	Secure site, net scaffolding, use rubbish chutes, exclude pedestrians from the vicinity of the works, adopt suitable vehicle and pedestrian traffic management systems.	Low	Contractor	Contractor to implement suitable scheme	
General	Exposure to building dust	Medium	High	High	Prevent dust by using wet cutting and vacuum extraction on tools; use a vacuum cleaner rather than sweeping; use a suitable, well-fitting mask.	Medium	Contractor	Contractor to implement suitable scheme	
General	Contact with protected/ priority species of fauna and flora.	Medium	High	High	Be vigilant and take precautions as necessary to avoid affecting protected/ priority species of fauna and flora.	Medium	Contractor	Contractor to implement suitable scheme	
General	Hot works	Medium	High	High	Suitably trained staff to undertake any hot works required and suitable protection methods put in place	Medium	Contractor	Contractor to implement suitable scheme	
General	Hazardous substances	High	Low	Medium	Suitable PPE to be worn including protective gloves. Masks to prevent inhaling of hazardous chemicals. Washing facilities to be present on-site	Low	Contractor	Contractor to implement suitable scheme	
General	Contact with hazardous animal waste.	Medium	Medium	Medium	Suitable PPE to be worn including protective gloves. Masks to prevent inhaling of hazardous substances. Washing facilities to be present on-site	Medium	Contractor	Contractor to implement suitable scheme	
General	Contact with discarded needles and sharp objects	Medium	High	High	Suitable PPE to be worn including protective gloves to prevent injury from contaminated objects. Washing facilities to be present on-site	Medium	Contractor	Contractor to implement suitable scheme	

General	Contact with services.	Medium	High	High	Carry out survey to establish position of live services, protect and divert if necessary.	Medium	Contractor	Contractor to implement suitable scheme	
Installation of super structure	Temporary instability	Medium	Medium	Medium	Adopt any special sequencing identified in the contract documents. Should no special sequencing be identified, adopt conventional good building practice.	Medium	Contractor	Contractor to implement suitable scheme	
Installation of super structure	Lifting heavy pre-fabricated elements.	Medium	High	High	Temporary works design to be undertaken for mobile lifting equipment or cranes, including the preparation of lifting plans.	High	Contractor	Contractor to implement suitable scheme	
Installation of super structure	Affecting buried and overhead services	Medium	High	High	Temporary works design to be undertaken for mobile lifting equipment or cranes, including the preparation of lifting plans, to ensure that no buried or overhead services are effected. Utilise buried services information and position lifting equipment or cranes appropriately to avoid loading services.	High	Contractor	Contractor to implement suitable scheme	
Installation of super structure	Instability during lifting	Medium	High	High	Provide temporary haul roads and pads at outrigger positions that have been designed to suit the prevailing ground conditions.	High	Contractor	Contractor to implement suitable scheme	
Installation of super structure	Working at height	Medium	High	High	Suitable access scaffolding/protection to be adopted.	Medium	Contractor	Contractor to implement suitable scheme	
Installation of super structure	Instability of installed structural elements	Medium	High	High	Before completion of the works take precautions to ensure that structural elements remain stable in the temporary condition. Temporarily secure elements that can be dislodged, such as steel and concrete beams and provide appropriately designed and coordinated temporary works, such as crash decks or the like.	High	Contractor	Contractor to implement suitable scheme	

Installation of substructure and super structure	Hot works	Medium	High	High	Suitably trained staff to undertake any hot works required and suitable protection methods put in place	Medium	Contractor	Contractor to implement suitable scheme	
Foundation and drainage works	Contact with services.	Medium	High	High	Carry out survey to establish position of live services, protect and divert if necessary.	Medium	Contractor	Contractor to implement suitable scheme	
Foundation and drainage works	Falling into open excavation.	High	Medium	High	Provide barriers / fences to be erected accordingly. Place warning signs in prominent positions	Low	Contractor	Contractor to implement suitable scheme	
Foundation and drainage works	Collapse of excavation.	High	Medium	High	Provide suitably designed and coordinated temporary excavation support or batter back excavation sides as necessary.	Low	Contractor	Contractor to implement suitable scheme	
Foundation and drainage works	Collapse of excavation.	High	Medium	High	Do not position or move plant or store materials, including excavation arisings, adjacent to open excavations such that the means of ensuring the excavation stability is affected.	Low	Contractor	Contractor to implement suitable scheme	
Foundation and drainage works	Objects and material falling into excavations	High	Medium	High	Do not store materials adjacent to or above an open exaction which can be dislodged and fall into the excavation.	Low	Contractor	Contractor to implement suitable scheme	
Foundation and drainage works	Unsafe excavations.	High	Medium	High	Excavations to be inspected in accordance with Regulation 22 and 24 by a competent person.	Low	Contractor	Contractor to implement suitable scheme	
Foundation and drainage works	Affecting buried services	Medium	High	High	Utilise buried services information and position access scaffolds to avoid loading services. Provide spreader plates to ensure load applied to the surrounding ground are within the allowable bearing pressure.	Medium	Designer/ Contractor	Contractor to implement suitable scheme	
Foundation and drainage works	Electrocution by live electrical cables	Medium	High	High	All works to be supervised by appropriately experienced and qualified competent technical staff. Suitable protective measures to be implemented including encapsulation of the electrical equipment during the works. Consult buried services information.	Medium	Contractor	Suitable Scheme to be implemented.	

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Foundation and drainage works	Undermining existing structures	Medium	High	High	Carry out trial pits to ascertain nature and condition of the existing structural foundations if not identified in the contract drawings. Report the findings to the designers. Implement appropriately designed and coordinated temporary works scheme.	Medium	Contractor	Contractor to implement suitable scheme	

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5.0 CALCULATIONS

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Subject DEAD LOADS		By AJH	Chkd LJH

Ref.

GENERAL CHARACTERISTIC DEAD LOADS

Brickwork	Blue	24 kN/m^3
	Engineering	22 kN/m^3
	Fletton	18 kN/m^2
	London Stock	19 kN/m^3
	Sand Lime	21 kN/m^3
Blockwork	Lightweight	10 kN/m^3
	Normal	20 kN/m^3
Glazing	Single	0.3 kN/m^2
	Double	0.52 kN/m^2
Insulation		0.1 kN/m^3
Partitions	Plastered Brick	2.6 kN/m^2
	Medium dense plastered blockwork	2 kN/m^2
	Timber studwork	0.35 kN/m^2
Plaster	Gypsum Plaster Board and Skim	0.15 kN/m^2
	Lath and Plaster	0.25 kN/m^2
Roof Tiles	Clay - Plain	0.77 kN/m^2
	Clay - Pantile	0.42 kN/m^2
	Concrete	0.51 kN/m^2
	Slate	0.3 kN/m^2
Timberwork	Softwood C14	2.84 kN/m^3
	Softwood C16	3.04 kN/m^3
	Softwood C18	3.14 kN/m^3
	Softwood C22	3.34 kN/m^3
	Softwood C24	3.43 kN/m^3
	Softwood C27	3.63 kN/m^3
	Softwood C30	3.73 kN/m^3
	Softwood C35	3.92 kN/m^3
	Softwood C40	4.12 kN/m^3
	Hardwood D30	5.20 kN/m^3
	Hardwood D35	5.49 kN/m^3
	Hardwood D40	5.79 kN/m^3
	Hardwood D50	6.38 kN/m^3
	Hardwood D60	6.87 kN/m^3
	Hardwood D70	8.83 kN/m^3
	Chipboard	7.00 kN/m^3
	Plywood	7.00 kN/m^3
Beam and Block Flooring		3.96 kN/m2
Precast concrete plank (150mm thick plank)		2.40 kN/m2
Screed		22.00 kN/m3
Bi-fold doors	(2.5kg/mm/m2)	0.50 kN/m2
Partitions		1.00 kN/m2

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Subject DEAD LOADS		By AJH	Chkd LJH

SPECIFIC CHARACTERISTIC DEAD LOADS

Timber First Floor	L (m)	H (m)	t (m)	kN/m^2	kN/m^3	No	
170x47 Joists @450C/C	1.000	0.170	0.047	0.00	3.43	2.50	0.069 kN/m^2
22mm Chipboard	1.000	1.000	0.022	0.00	7.00	1.00	0.154 kN/m^2
Insulation	1.000	1.000	0.170	0.00	0.10	1.00	0.017 kN/m^2
Plasterboard	1.000	1.000	0.000	0.15	0.00	1.00	0.150 kN/m^2
-	0.000	0.000	0.000	0.00	0.00	1.00	0.000 kN/m^2
-	0.000	0.000	0.000	0.00	0.00	1.00	0.000 kN/m^2
Total							**0.390 kN/m^2**

Roof (Flat - Slope)	L (m)	H (m)	t (m)	kN/m^2	kN/m^3	No	
Plain clay tiles	1.000	1.000	0.000	0.77	0.00	1.00	0.770 kN/m^2
38x19 battons @ 200 c/c	1.000	0.038	0.019	0.00	3.43	5.00	0.012 kN/m^2
Sarking felt + insultation	1.000	1.000	0.150	0.00	0.10	1.00	0.015 kN/m^2
195x50 rafters @ 400 c/c	1.000	0.195	0.050	0.00	3.43	2.50	0.084 kN/m^2
Plasterboard	1.000	1.000	0.000	0.150	0.000	1.00	0.150 kN/m^3
-	0.000	0.000	0.000	0.00	0.00	1.00	0.000 kN/m^2
Total							**1.031 kN/m^2**

External Walls	L (m)	H (m)	t (m)	kN/m^2	kN/m^3	No	
Facing bricks	1.000	1.000	0.100	0.00	21.00	1.00	2.100 kN/m^2
Insulation	1.000	1.000	0.150	0.00	0.10	1.00	0.015 kN/m^2
Internal blockwork	1.000	1.000	0.100	0.00	20.00	1.00	2.000 kN/m^2
Plasterboard	1.000	1.000	0.000	0.15	0.00	1.00	0.150 kN/m^2
-	0.000	0.000	0.000	0.00	0.00	1.00	0.000 kN/m^2
-	0.000	0.000	0.000	0.00	0.00	1.00	0.000 kN/m^2
Total							**4.265 kN/m^2**

Roof (Truss - Plan)	L (m)	H (m)	t (m)	kN/m^2	kN/m^3	No	
Plain clay tiles	1.200	1.000	0.000	0.77	0.00	1.00	0.924 kN/m^2
38x19 battons @ 200 c/c	1.200	0.038	0.019	0.00	3.43	5.00	0.015 kN/m^2
Sarking felt + insultation	1.200	1.000	0.150	0.00	0.10	1.00	0.018 kN/m^2
Trusses @ 400 c/c	3.600	0.174	0.050	0.00	3.43	2.50	0.269 kN/m^2
Plasterboard	1.000	1.000	0.000	0.150	0.000	1.00	0.150 kN/m^2
-	0.000	0.000	0.000	0.00	0.00	1.00	0.000 kN/m^2
Total							**1.375 kN/m^2**

Ceiling	L (m)	H (m)	t (m)	kN/m^2	kN/m^3	No	
150x47 Joists @400C/C	1.000	0.150	0.040	0.000	3.430	2.500	0.051 kN/m^2
22mm Chipboard	1.000	1.000	0.022	0.000	7.000	1.000	0.154 kN/m^2
Insulation	1.000	1.000	0.170	0.000	0.100	1.000	0.017 kN/m^2
Plasterboard	1.000	1.000	0.000	0.150	0.000	1.000	0.150 kN/m^2
Total							**0.372 kN/m^2**

PCC Plank Floor	L (m)	H (m)	t (m)	kN/m^2	kN/m^3	No	
Plank	1.000	1.000	0.000	3.000	0.000	1.000	3.000 kN/m^2
75mm screed	1.000	1.000	0.075	0.000	20.000	1.000	1.500 kN/m^2
Plaster	1.000	1.000	0.000	0.200	0.000	1.000	0.200 kN/m^2
Suspended Ceiling	0.100	0.050	0.000	3.430	0.000	5.000	0.086 kN/m^2
Total							**4.786 kN/m^2**

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IMPOSED FLOOR LOADS

BS 6399 : Part 1 : 1996

Table 1. Minimum imposed floor loads

Type of activity/occupancy for part of the building or structure	Examples of specific use		Uniformity distributed load kN/m^2	Concentrated load kN
A Domestic and residential activities (Also see category C)	All usages within self-contained dwelling units Communal areas (including kitchens) in blocks of flats with limited use (See note 1) (For communal areas in other blocks of flats, see C3 and below)		1.5	1.4
	Bedrooms and dormitories except those in hotels and motels		1.5	1.8
	Bedrooms in hotels and motels Hospital wards Toilet areas		2.0	1.8
	Billiard rooms		2.0	2.7
	Communal kitchens except in flats covered by note 1		3.0	4.5
	Balconies	Single dwelling units and communal areas in blocks of flats with limited use (See note 1)	1.5	1.4
		Guest houses, residential clubs and communal areas in blocks of flats except as covered by note 1	Same as rooms to which they give access but with a minimum of 3.0	1.5/m run concentrated at the outer edge
		Hotels and motels	Same as rooms to which they give access but with a minimum of 4.0	1.5/m run concentrated at the outer edge
B Offices and work areas not covered elsewhere	Operating theatres, X-ray rooms, utility rooms		2.0	4.5
	Work rooms (light industrial) without storage		2.5	1.8
	Offices for general use		2.5	2.7
	Banking halls		3.0	2.7
	Kitchens, laundries, laboratories		3.0	4.5
	Rooms with mainframe computers or similar equipment		3.5	4.5
	Machinery halls, circulation spaces therein		4.0	4.5
	Projection rooms		5.0	To be determined for specific use
	Factories, workshops and similar buildings (general industrial)		5.0	4.5
	Foundries		20.0	To be determined for specific use
	Catwalks		—	1.0 at 1 m centres
	Balconies		Same as rooms to which they give access but with a minimum of 4.0	1.5/m run concentrated at the outer edge
	Fly galleries		4.5 kN/m run distributed uniformly over width	—
	Ladders		—	1.5 rung load

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Subject IMPOSED LOADS		By AJH	Chkd LJH

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IMPOSED ROOF LOADS

BS 6399-3:1988 Section 1

s_b Basic snow load (on the ground);

s_d Snow load on roof;

s_0 Site snow load (on the ground);

α Angle of pitch of roof measured from the horizontal;

β Equivalent slope for a curved roof;

δ Angle between the horizontal and a tangent to a curved roof at the eaves;

μ_i Snow load shape coefficient, suffix i = 1, 2, etc. to distinguish between shape coefficients at different locations.

4 Minimum imposed roof loads

4.1 General

In 4.2 and 4.3 "access" means access in addition to that necessary for cleaning and repair and "no access" means access for cleaning and repair only.

The effects of deflection under concentrated loads need only be considered when such deflection would adversely affect the finishes.

All roof slopes are measured from the horizontal and all loads should be applied vertically.

4.2 Minimum imposed load on roof with access

Where access is provided to a roof allowance should be made for an imposed load equal to or greater than that which produces the worst load effect from one of the following:

a) the uniformly distributed snow load; or

b) the redistributed snow load; or

c) a uniformly distributed load of 1.5 kN/m^2 measured on plan; or

d) a concentrated load of 1.8 kN.

Where the roof is to have access for specific usages the imposed loads for c) and d) above should be replaced by the appropriate imposed floor load as recommended in 5.1 of BS 6399-1:1996, including any reduction as appropriate as recommended in 6.3 of BS 6399-1:1996.

4.3 Minimum imposed load on roof with no access

4.3.1 *General.* Where no access is provided to a roof (other than that necessary for cleaning and maintenance), allowance should be made for an imposed load equal to or greater than that which produces the worst load effect from one of the following:

a) the uniformly distributed snow load; or

b) the redistributed snow load; or

c) a uniformly distributed load of 0.6 kN/m^2 measured on plan for roof slopes of 30° or less; or a uniformly distributed load of 0.6 [(60 − α)/30] kN/m^2 measured on plan for roof slopes (α) greater than 30° and less than 60°; or zero load for roof slopes equal to or greater than 60°; or

d) a concentrated load of 0.9 kN.

These loads assume that spreader boards will be used while any cleaning or maintenance work is in progress on fragile roofs. The recommendations of this clause may also be used where a ladder is permanently fixed to allow access to a roof for cleaning and maintenance only.

4.3.2 *Small buildings.* This subclause is an optional alternative to 4.3.1, which means that the detailed calculations using snow load shape coefficients do not have to be carried out. It applies to any building, where no access is provided to the roof (other than that necessary for cleaning and maintenance), which has:

a) a roof area no larger than 200 m^2 in plan; or

b) a width no greater than 10 m and a pitched roof with no parapet;

provided that there are no other buildings within 1.5 m of its perimeter, and provided that the roof configuration also meets one of the following conditions:

1) the roof has no abrupt changes of height greater than 1 m, at which drifting could occur;

2) the area of a lower part of the roof, on which a drift could form, is not greater than 35 m^2.

For the purpose of this subclause the roof area is defined as the total covered area, in plan, of the entire building structure. Also, chimneys and dormers whose vertical elevation area, against which a drift could form, is less than 1 m^2 can be ignored as an abrupt change of height.

Providing the above conditions are met, an allowance should be made for an imposed load equal to or greater than that which produces the worst load effect from one of the following:

i) a uniformly distributed load of 1.25 times the site snow load s_0 (see 6.2); or

ii) a uniformly distributed load of 0.75 kN/m^2; or

iii) a concentrated load of 0.9 kN.

For roof slopes (α) larger than 30° and less than 60° the values given by i) and ii) may be reduced by multiplying by [(60 − α)/30]. For roof slopes larger than 60° the minimum uniformly distributed load requirement is zero.

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Angle of Roof, α: 35.00 °

Imposed UDL roof load: 0.50 kN/m^2

Imposed Concentrated roof load: 0.90 kN

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Subject UNIFORM SNOW LOAD - BARN		By AJH	Chkd LJH

GEOMETRIC AND GENERAL PROPERTIES

	Overall Roof Area, A:	140.0	m^2
	Are there any other buildings closer than 1.5m, Yes/No:	No	
	Does the roof have abrupt changes of height greater than 1m, Yes/No:	No	
	Does the building have a width greater than 10m, Yes/No:	Yes	
	Does the building have a pitched roof, Yes/No:	Yes	
	Does the roof have a parapet, Yes/No:	No	
	Is the lower area of roof greater than $35m^2$, Yes/No:	No	
	Angle of Pitch of Roof, α^o:	45.0	^{o}
	Is access allowed to the roof, Yes/No:	No	
BS 6399	Imposed Concentrated Load associated with Roof Usage, P_q:	0.00	kN
Pt 1	Imposed UDL associated with Roof Usage, w_q:	0.00	kN/m^2
	Roof type, Pitched/Monopitched	Pitched	
Cl 6 &	Basic Snow Load s_b:	0.71	kN/m^2
Fig 1	Altitude of the Site, A:	0.00	m

NOTE - IMPOSED LOADS ARE NOT ASSOCIATED WITH SMALL BUILDINGS

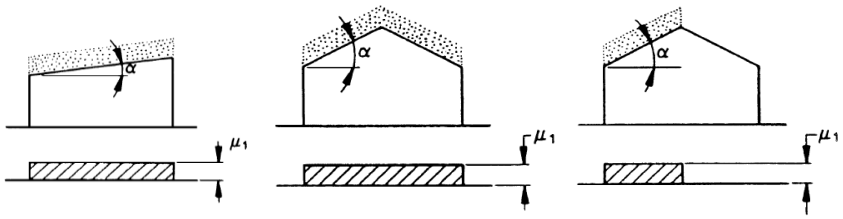
UNIFORM SNOW LOAD INTENSITIES

Cls 6	Site Snow Load, $s_o = s_b + s_{alt}((A - 100/100)$:	0.71	kN/m^2
Fig 2 & 3	Snow Shape Coefficients - Uniform Load, $\mu_{1(Case\ 1)}$:	0.40	
Fig 2 & 3	Snow Shape Coefficients - Asymmetric Load, $\mu_{1(Case\ 2)}$:	0.60	
Fig 2 & 3	Case 1 - Uniform Snow Load Intensity on the Roof, $s_d = \mu_{i(Case\ 1)}.s_o$:	0.28	kN/m^2
Fig 2 & 3	Case 2 - Asymmetric Snow Load Intensity on the Roof, $s_d = \mu_{i(Case\ 2)}.s_o$:	0.43	kN/m^2
	Uniform Load Intensity on the Roof Based on $0.6kN/m^2$:	0.30	kN/m^2

MINIMUM IMPOSED LOAD ON ROOF WITH NO ACCESS

NOTE - CHECK FOR THE EFFECTS OF REDISTRIBUTED SNOW

Minimum Concentrated Load, p_k:	0.90	kN
Uniform Load Intensity on the Roof,:	0.30	kN/m^2
Asymmetric Load Intensity on the Roof:	0.43	kN/m^2



Monopitch | **Duo-Pitch Case 1** | **Duo-Pitch Case2**

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Subject FOUNDATION - DESIGN		By AJH	Chkd LJH

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LOADING

Description	Width (m)	Length (m)	Load kN/m^2	Ecc, e_x (m)	Ecc, e_y (m)	Load kN	$M_{A,x}$ kNm	$M_{A,y}$ kNm
Dead Load								
D-ROOF	1	3.35	1.320	0.1	0	4.4	0.4	0.0
D-FLOOR	1	3.35	0.5	0.1	0	1.7	0.2	0.0
D-I-LEAF	1	4.1	2.2	0.1	0	9.0	0.9	0.0
D-O-LEAF	1	4.1	2.2	-0.1	0	9.0	-0.9	0.0
-	0	0	0	0	0	0.0	0.0	0.0
-	0	0	0	0	0	0.0	0.0	0.0
-	0	0	0	0	0	0.0	0.0	0.0
FOUNDATION	0.600	1.000	5.4	0	0	3.2	0.0	0.0
Totals						**27.4**	**0.6**	**0.0**
Live Load								
I-ROOF	1	3.35	0.6	0.1	0	2.0	0.2	0.0
I-FLOOR	1	3.35	1.5	0.1	0	5.0	0.5	0.0
-	0	0	0	0	0	0.0	0.0	0.0
-	0	0	0	0	0	0.0	0.0	0.0
-	0	0	0	0	0	0.0	0.0	0.0
-	0	0	0	0	0	0.0	0.0	0.0
Totals						**7.0**	**0.7**	**0.0**

FOUNDATION DESIGN

Allowable Bearing Pressure,	**100**	kN/m^2
Foundation - Width, B (Direction e_x):	**0.600**	m
Foundation - Length, L (Diection of e_y):	**1.000**	m
Foundation - Depth Thickness, d:	**0.225**	m
Supported element - Width, b (Direction e_x):	**0.300**	m
Supported element - Length width, l (Diection of e_y):	**1.000**	m
Total Foundation Load, F_v =	**34.4**	kN
Total Foundation Moment about centroid, $M_{a,x}$ =	**1.3**	kNm
Load Eccentricity, $e_x = M_{a,x}/F_v$ =	**0.038**	m
Section Modulus, $Z_x = L.B^2/6$	**0.060**	m^3
Total Foundation Moment about centroid, $M_{a,y}$ =	**0.000**	kNm
Load Eccentricity, $e_y = M_{a,y}/F_v$ =	**0.000**	m
Section Modulus, $Z_y = B.L^2/6$	**0.100**	m^3
Area; A = L.B:	**0.600**	m^2
Applied Bearing Pressure Corner 1, $F_v/A + M_{a,x}/Z_x + M_{b,y}/Z_y$':	**79.2**	kN/m^2
Applied Bearing Pressure Corner 2, $F_v/A + M_{a,x}/Z_x - M_{b,y}/Z_y$':	**79.2**	kN/m^2
Applied Bearing Pressure Corner 3, $F_v/A - M_{a,x}/Z_x + M_{b,y}/Z_y$':	**35.5**	kN/m^2
Applied Bearing Pressure Corner 4, $F_v/A - M_{a,x}/Z_x - M_{b,y}/Z_y$':	**35.5**	kN/m^2

PASS - ALLOWABLE BEARING PRESSURE >= MAXIMUM APPLIED BEARING PRESSURE

NOTE - AS d >= L/2-ey-l/2 NO REINFORCEMENT IS REQUIRED

NOTE - AS d >= B/2-ex-b/2 NO REINFORCEMENT IS REQUIRED

PASS - RESULTANT ECCENTRICITY, ex LAYS WITHIN MIDDLE THIRD

PASS - RESULTANT ECCENTRICITY, ey LAYS WITHIN MIDDLE THIRD

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Project Title: OLD BRIERLEY HALL - GARAGE		Date 17/05/22	
Subject BEAM A - BEAM 5 AND 6 OUTER LEAF		By AJH	Chkd LJH

GENERAL INFORMATION

Beam Length, L: 7.370 m Support Condition: Simple

COMMENTS

VERTICAL CHARACTERTISTIC LOADS

Action	Loaded Area			Load Intensity		Dimensions		Partial Factors	
	b (m)	h/w (m)	t (m)	kN/m^3	kN/m^2	a (m)	L (m)	ULS	SLS
Uniformally Vertical Distributed Actions									
D-ROOF	1.00	4.50	0.00	0.00	1.35	0.00	7.370	1.40	1.00
D-FLOOR	1.00	4.50	0.00	0.00	0.50	0.00	7.370	1.40	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	7.370	1.40	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	7.370	1.40	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	7.370	1.40	1.00
I-ROOF	1.00	4.50	0.00	0.00	0.60	0.00	7.370	1.60	1.00
I-FLOOR	1.00	4.50	0.00	0.00	1.50	0.00	7.370	1.60	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	7.370	1.60	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	7.370	1.60	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	7.370	1.60	1.00
Concentrated Vertical Actions									
-	0.00	0.00	0.00	0.00	0.00	0.00	7.370	1.60	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	7.370	1.60	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	7.370	1.40	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	7.370	1.60	0.00
Triangular Distributed Vertical Actions									
-	Min. Intensity (kN)			Max Intensity (kN)			L (m)	ULS	SLS
-	0.00			0.00			7.370	1.40	0.00
-	0.00			0.00			7.370	1.60	0.00

VERTICAL DESIGN VALUES OF ACTION EFFECTS

Action	Serviceiability Limit State							Ultimate Limit State				
Uniformally Vertical Distributed Actions												
Action	w kN/m	W kN	M_a kNm	M_b kNm	M_c kNm	R_a kN	R_a kN	M_a kNm	M_b kNm	M_c kNm	R_a kN	R_b kN
D-ROOF	6.08	44.77	0.00	41.25	0.00	22.39	22.39	0.00	57.75	0.00	31.34	31.34
D-FLOOR	2.25	16.58	0.00	15.28	0.00	8.29	8.29	0.00	21.39	0.00	11.61	11.61
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I-ROOF	2.70	19.90	0.00	18.33	0.00	9.95	9.95	0.00	29.33	0.00	15.92	15.92
I-FLOOR	6.75	49.75	0.00	45.83	0.00	24.87	24.87	0.00	73.33	0.00	39.80	39.80
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		131.00	**0.00**	**120.69**	**0.00**	**65.50**	**65.50**	**0.00**	**181.79**	**0.00**	**98.67**	**98.67**
Triangular Distributed Vertical Actions												
-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Concentrated Vertical Actions												
Action	Load kN	-	M_a kNm	M_b kNm	M_c kNm	R_a kN	R_b kN	M_a kNm	M_b kNm	M_c kNm	R_a kN	R_b kN
-	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

COMBINED DESIGN VALUE OF ACTIONS

Action	Serviceiability Limit State							Ultimate Limit State				
-	Load kN	-	M_a kNm	M_b kNm	M_c kNm	R_a kN	R_a kN	M_a kNm	M_b kNm	M_c kNm	R_a kN	R_b kN
-	**131.00**		**0.00**	**120.69**	**0.00**	**65.50**	**65.50**	**0.00**	**181.79**	**0.00**	**98.67**	**98.67**

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Project Title: OLD BRIERLEY HALL - GARAGE		Date 17/05/22	
Subject BEAM A - BEAM 5 AND 6 OUTER LEAF		By AJH	Chkd LJH

Ref.		Output	
	SECTION PROPERTIES		
	Beam Length, L:	7470	mm
	Section Type	UC	
	Member Designation	305x305x97	kg/m
	Steel Grade:	S355	
	Cross Section Class	Semi-compact	
	WARNING - SECTION IS SEMI-COMPACT, RESULTS MAY BE INVALID		
	DESIGN LOAD EFFECTS AT UITIMATE LIMIT STATE		
	Design Maximum Bending Moment in Major Axis, M_{ax}:	181.79	kNm
	Design Maximum Bending Moment in Minor Axis, M_{ay}:	0.00	kNm
	Design Shear Force at Supports, $V_{a:}$	98.67	kN
	BENDING MOMENT RESISTANCE CHECK		
	Effective Length to be adopted, L_e:	1.4L+2D	
	Mode of Moment Resistance, M_{bx} or M_{cx}:	Mbx	
	Actual Effective Length, L_e:	11.454	m

λ	λ /x	v	λ_{LT}	P_E	λ_{L0}	ν_{LT}	ϕ_{LT}	p_b
148.9	7.758	0.707	0.416	355.8	30.18	0.416	355.8	163

	Buckling Resistance Moment, M_{bx}:	259.2	kNm	
B' Book	Plastic Resistance Moment, M_{cx}:	N/A	kNm	
B' Book	Elastic Resistance Moment, py.Zy:	170.0	kNm	
	$\frac{M_{ax}}{Mbx} + \frac{M_{ay}}{py.Zy} =$	0.70		
	PASS - Design Bending Moment <= Bending Moment Resistance			
	VERTICAL DEFLECTION CHECK AT SLS			
	Deflection limit, :	360		
B' Book	Total Uniformally Distributed Load, $W_{a,u}$:	131.0	kN	
	Total Triangular Distributed Load, $W_{a,t}$:	0.0	kN	
	Point Load, $P_{a,1}$:	0.0	kN	
	Distance from Support, a_1:	0	mm	
	Point Load, $P_{a,2}$:	0.0	kN	
	Distance from Support, a_2:	0	mm	
	Allowable deflection:	20.8	mm	
	Actual deflection:	15.6	mm	
	Actual Second Moment of Area, I_{Act}:	22,200.0	cm^4	
	Total Second Moment of Area Required, I_{Req}:	16,715.0	cm^4	
	PASS - Required Second Moment of Area <= Actual Second Moment of A	0.75	U/F	
	PADSTONE DESIGN			
- Tbl 2	Characteristic Compressive Strength of Masonry, f_k :	5	N/mm^2	
- Tbl 4	Partial Safety Factor For Material Strength, γ_m :	3.1		
- Fig 5	Bearing Factor, (1.25, 1.5 or 2) :	1.25		
- Fig 5	Width of Wall, t :	100	mm	
	Actual padstone length, $L_{pad,actual}$:	400	mm	
	Required padstone length, $L_{pad,req'd}$:	489	mm	
	FAIL - Required Padstone Length > Actual Padstone Length			

MATRIX CONSULTING ENGINEERS	Document Reference: 21066-MCE-XX-XX-CA-S-1001	Project Reference: 21-066	
	Suitability: S0 - Initial Status	Sheet No. B2	Rev P01
Project Title: OLD BRIERLEY HALL - GARAGE		Date 17/05/22	
Subject BEAM D - TIMBER BEAM		By AJH	Chkd LJH

GENERAL INFORMATION

Beam Length, L: 2.000 m Support Condition

CHARACTERTISTIC LOADS

Action	Loaded Area			Load Intensity		Dimensions	
	b (m)	h/w (m)	t (m)	kN/m^3	kN/m^2	a (m)	L (m)
Uniformally Distributed Actions							
D-ROOF	1.10	0.40	0.00	0.00	1.35	0.00	2.000
-	0.00	0.00	0.00	0.00	0.00	0.00	2.000
-	0.00	0.00	0.00	0.00	0.00	0.00	2.000
-	0.00	0.00	0.00	0.00	0.00	0.00	2.000
-	0.00	0.00	0.00	0.00	0.00	0.00	2.000
I-ROOF	1.10	0.40	0.00	0.00	0.60	0.00	2.000
-	0.00	0.00	0.00	0.00	0.00	0.00	2.000
-	0.00	0.00	0.00	0.00	0.00	0.00	2.000
-	0.00	0.00	0.00	0.00	0.00	0.00	2.000
-	0.00	0.00	0.00	0.00	0.00	0.00	2.000
Concentrated Actions							
-	0.00	0.00	0.00	0.00	0.00	0.00	2.000
-	0.00	0.00	0.00	0.00	0.00	0.00	2.000
-	0.00	0.00	0.00	0.00	0.00	0.00	2.000
-	0.00	0.00	0.00	0.00	0.00	0.00	2.000

Triangular Distributed Actions			
-	**Min. Intensity (kN)**	**Max Intensity (kN)**	L (m)
-	0.00	0.00	2.000
-	0.00	0.00	2.000

DESIGN VALUES OF ACTION EFFECTS

Action **Serviceiability Limit State**

Uniformally Distributed Actions

Action	w kN/m	W kN	M_a kNm	M_b kNm	M_c kNm	R_a kN	R_a kN
D-ROOF	0.59	1.19	0.00	0.30	0.00	0.59	0.59
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I-ROOF	0.26	0.53	0.00	0.13	0.00	0.26	0.26
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		1.72	**0.00**	**0.43**	**0.00**	**0.86**	**0.86**

Triangular Distributed Actions

-	-	0.00	0.00	0.00	0.00	0.00	0.00
-	-	0.00	0.00	0.00	0.00	0.00	0.00
		0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Concentrated Actions

Action	Load kN	-	M_a kNm	M_b kNm	M_c kNm	R_a kN	R_b kN
-	0.00	-	0.00	0.00	0.00	0.00	0.00
-	0.00	-	0.00	0.00	0.00	0.00	0.00
-	0.00	-	0.00	0.00	0.00	0.00	0.00
-	0.00	-	0.00	0.00	0.00	0.00	0.00
	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

COMBINED DESIGN VALUE OF ACTIONS

Action **Serviceiability Limit State**

-	Load kN	-	M_a kNm	M_b kNm	M_c kNm	R_a kN	R_a kN
-	**1.72**		**0.00**	**0.43**	**0.00**	**0.86**	**0.86**

COMMENTS

MATRIX CONSULTING ENGINEERS	Document Reference: 21066-MCE-XX-XX-CA-S-1001	Project Reference: 21-066	
	Suitability: S0 - Initial Status	Sheet No. B2	Rev P01
Project Title: OLD BRIERLEY HALL - GARAGE		Date 17/05/22	
Subject BEAM D - TIMBER BEAM		By AJH	Chkd LJH

Ref.		Output	
	DIMENSIONAL PARAMETRES		
Cl 2.10.3	Effective Span of Beam, l:	2200	mm
	Regularised timber size:	145x44	
	Number of members acting compositely:	1	No
	Effective Depth of Beam, d:	145	mm
	Effective Width of Beam, b:	44	mm
	Effective Depth at Notched End, h_e:	145	mm
	Effective Width of Bearing, w_b:	44	mm
Cl 2.10.4	Effective Length of Notched End, a:	0	mm
Tbl 19	Permissible Depth to Breadth Ratio, b/d:	5	
	Is the member a floor joist, Yes/No:	No	
	LOADING PARAMETRES		
	Applied Major Axis Bending Moment, M_{ax}:	0.43	kNm
	Applied Minor Axis Bending Moment, M_{ay}:	0.00	kNm
	Maximum Support Reaction, $R_{a,max}$:	0.86	kN
	GRADE STRESSES AND MODULI		
Cl 1.6.4	Service Class: 1, 2 or 3	1	
	Strength Class, C14 - D70	C24	
Tbl 8	Permissible Bending Stress Parallel to Grain:	7.50	N/mm^2
Tbl 8	Permissible Compressive Stress Perpendicular to Grain:	1.90	N/mm^2
Tbl 8	Permissible Shear Stress Parrallel to Grain:	0.71	N/mm^2
Tbl 8	Modulus of Elasticity, E:	7200	N/mm^2
	MODIFICATION FACTORS		
Tbl 17	Duration of Load, K_3:	1.25	
Tbl 18	Bearing Stress, K_4:	1.10	
Cl 2.10.4	Shear at Notched Ends, K_5 (Assume Bottom Notch):	1.00	
Cl 2.10.5	Structural Form, K_6:	1.00	
Cl 2.10.6	Total Depth Of Beam, K_7:	1.00	
Cl 2.9	Load Sharing System, K_8:	1.10	
Tbl 20	Trimmer Joist and Lintels, K_9:	1.00	
	FLEXURE - RESULTS		
	Section Modulus, $Z_x = b.d^2/6$:	154183	mm^3
	Section Modulus, $Z_y = d.b^2/6$:	46786.7	mm^3
	Applied Bending Stress, $\sigma = M_{ax}/Z_x + M_{ay}/Z_y$:	2.78	N/mm^2
	Permissible Bending Stress.$K_2.K_3.K_6.K_7.K_8$:	10.31	N/mm^2
	PASS - Applied Bending Stress > Permissible Bending Stress	0.27	U/F
	SHEAR - RESULTS		
	Applied Shear, $R_{a.max}$:	0.86	kN
	Shear Area, $A_s = h_e.b$:	6380	mm^2
	Applied Shear Stress, $v = R_{a,max}/A_s$	0.13	N/mm^2
	Permissible Shear Stress.$K_2.K_3.K_5.K_8$:	0.98	N/mm^2
	PASS - Applied Shear Stress > Permissible Shear Stress	0.14	U/F

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Project Title: OLD BRIERLEY HALL - GARAGE		Date 17/05/22
Subject BEAM D - TIMBER BEAM		By AJH / Chkd LJH

	BEARING - RESULTS		
	Bearing Area, $A_b = b.w_b$:	**1936**	mm^2
	Applied Bearing Stress, $q_b = V_a/A_b$:	**0.44**	N/mm^2
	Permissible Compressive Stress.$K_2.K_3.K_4.K_8$:	**2.87**	N/mm^2
	PASS - Applied Bearing Stress > Permissible Bearing Stress	**0.15**	U/F
	VERTICAL DEFLECTION CHECK AT SLS		
Cl 2.10.7	Deflection limit, Span/:	**300**	
	Configuration: Simply Supported (S), Built-in (B), Propped cantilever (P):	**S**	
	Total Uniformally Distributed Load, $W_{a,u}$:	**1.72**	kN
	Total Triangular Distributed Load, $W_{a,t}$:	**0.00**	kN
	Point Load, $P_{1,a}$:	**0**	kN
	Distance from Support, a_1:	**0**	mm
	Point Load, $P_{2,a}$:	**0**	kN
	Distance from Support, a_2:	**0**	mm
	Allowable deflection:	**7.3**	mm
	Actual Deflection:	**3.0**	mm
	Actual Second Moment of Area, I_{Act}:	**1118**	cm^4
	Total Second Moment of Area Required, I_{req}:	**451**	cm^4
	PASS - Required Second Moment of Area <= Actual Second Moment of A	**0.40**	U/F
	DIMENSIONAL CONSTRAINTS - RESULTS		
	Actual Depth of Beam, d :	**145**	mm
	Permissible Depth of Beam :	**220**	mm
	PASS - Actual Beam Depth < Max. Permissible Beam Depth		

MATRIX CONSULTING ENGINEERS	Document Reference: 21066-MCE-XX-XX-CA-S-1001	Project Reference: 21-066	
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Project Title: OLD BRIERLEY HALL - GARAGE		Date 17/05/22	
Subject BEAM C - ECCENTRICALY LOADED BEAM		By AJH	Chkd LJH

GENERAL INFORMATION

Beam Length, L: 2.650 m Support Condition: Simple

COMMENTS

VERTICAL CHARACTERTISTIC LOADS

Action	Loaded Area			Load Intensity		Dimensions		Partial Factors	
	b (m)	h/w (m)	t (m)	kN/m^3	kN/m^2	a (m)	L (m)	ULS	SLS
Uniformally Vertical Distributed Actions									
RAFTER	1.00	1.00	0.00	0.00	2.15	0.00	2.650	1.40	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	2.650	1.40	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	2.650	1.40	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	2.650	1.40	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	2.650	1.40	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	2.650	1.60	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	2.650	1.60	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	2.650	1.60	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	2.650	1.60	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	2.650	1.60	1.00
Concentrated Vertical Actions									
-	0.00	0.00	0.00	0.00	0.00	0.00	2.650	1.60	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	2.650	1.60	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	2.650	1.40	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	2.650	1.60	0.00
Triangular Distributed Vertical Actions									
-	Min. Intensity (kN)			Max Intensity (kN)			L (m)	ULS	SLS
-	0.00			0.00			2.650	1.40	0.00
-	0.00			0.00			2.650	1.60	0.00

VERTICAL DESIGN VALUES OF ACTION EFFECTS

Action	Serviceiability Limit State							Ultimate Limit State				
Uniformally Distributed Actions												
Action	w kN/m	W kN	M_a kNm	M_b kNm	M_c kNm	R_a kN	R_a kN	M_a kNm	M_b kNm	M_c kNm	R_a kN	R_b kN
RAFTER	2.15	5.68	0.00	1.88	0.00	2.84	2.84	0.00	2.64	0.00	3.98	3.98
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		5.68	**0.00**	**1.88**	**0.00**	**2.84**	**2.84**	**0.00**	**2.64**	**0.00**	**3.98**	**3.98**
Triangular Distributed Actions												
-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Concentrated Actions												
Action	Load kN	-	M_a kNm	M_b kNm	M_c kNm	R_a kN	R_b kN	M_a kNm	M_b kNm	M_c kNm	R_a kN	R_b kN
-	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

COMBINED DESIGN VALUE OF ACTIONS

Action	Serviceiability Limit State							Ultimate Limit State				
-	Load kN	-	M_a kNm	M_b kNm	M_c kNm	R_a kN	R_a kN	M_a kNm	M_b kNm	M_c kNm	R_a kN	R_b kN
-	**5.68**		**0.00**	**1.88**	**0.00**	**2.84**	**2.84**	**0.00**	**2.64**	**0.00**	**3.98**	**3.98**

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	Suitability: S0 - Initial Status	Sheet No. BX	Rev P01
Project Title: OLD BRIERLEY HALL - GARAGE		Date 17/05/22	
Subject BEAM C - ECCENTRICALY LOADED BEAM		By AJH	Chkd LJH

Ref.		Output	
	SECTION PROPERTIES		
	Beam Length, L:	2750	mm
	Section Type	RHS	
	Member Designation	200x100x4.0	mm
	Steel Grade:	S355	
	Cross Section Class	Plastic	
	DESIGN LOAD EFFECTS AT UITIMATE LIMIT STATE		
	Design Maximum Bending Moment in Major Axis, M_{ax}:	2.64	kNm
	Design Maximum Bending Moment in Minor Axis, M_{ay}:	0	kNm
	Design Shear Force at Supports, $V_{a:}$	3.98	kN
	BENDING MOMENT RESISTANCE CHECK		
	Effective Length to be adopted, L_e:	1.4L+2D	
	Mode of Moment Resistance, M_{bx} or M_{cx}:	Mcx	
	Actual Effective Length, L_e:	4.217	m

λ	λ /x	v	λ_{LT}	P_E	λ_{L0}	ν_{LT}	ϕ_{LT}	p_b
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

	Buckling Resistance Moment, M_{bx}:	N/A	kNm	
B' Book	Plastic Resistance Moment, M_{cx}:	52.0	kNm	
B' Book	Plastic Resistance Moment, Mcy:	24.1	kNm	
	$\frac{M_{ax}}{Mcx} + \frac{M_{ay}}{Mcy} =$	0.05		
	PASS - Design Bending Moment < Bending Moment Resistance			
	VERTICAL DEFLECTION CHECK AT SLS			
	Deflection limit, :	500		
B' Book	Total Uniformally Distributed Load, $W_{a,u}$:	5.7	kN	
	Total Triangular Distributed Load, $W_{a,t}$:	0.0	kN	
	Point Load, $P_{a,1}$:	0.0	kN	
	Distance from Support, a_1:	0	mm	
	Point Load, $P_{a,2}$:	0.0	kN	
	Distance from Support, a_2:	0	mm	
	Allowable deflection:	5.5	mm	
	Actual deflection:	0.6	mm	
	Actual Second Moment of Area, I_{Act}:	1,220.0	cm^4	
	Total Second Moment of Area Required, I_{req}:	136.5	cm^4	
	PASS - Required Second Moment of Area <= Actual Second Moment of A	0.11	U/F	
	PADSTONE DESIGN			
- Tbl 2	Characteristic Compressive Strength of Masonry, f_k :	5	N/mm^2	
- Tbl 4	Partial Safety Factor For Material Strength, γ_m :	3.1		
- Fig 5	Bearing Factor, (1.25, 1.5 or 2) :	1.25		
- Fig 5	Width of Wall, t :	100	mm	
	Actual padstone length, $L_{pad,actual}$:	400	mm	
	Required padstone length, $L_{pad,req'd}$:	20	mm	
	PASS - Required Padstone Length < Actual Padstone Length			

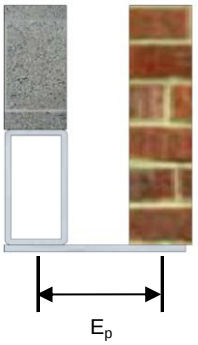
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Project Title: OLD BRIERLEY HALL - GARAGE		Date 17/05/22	
Subject BEAM C - ECCENTRICALY LOADED BEAM		By AJH	Chkd LJH

TORSION DESIGN LOAD EFFECTS

Beam Length, L: 2.650 m

CHARACTERTISTIC LOADS

Action	Loaded Area			Load Intensity		Dimensions		Partial Factors	
	b (m)	h/w (m)	t (m)	kN/m^3	kN/m^2	Ep (m)	L (m)	ULS	SLS
Uniformally Distributed Actions									
-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	1.40	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	1.40	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	1.40	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	1.40	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	1.40	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	1.60	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	1.60	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	1.60	1.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	1.60	1.00
Concentrated Actions									
-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	1.40	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	1.40	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	1.40	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	1.60	0.00
Triangular Distributed Actions									
-	**Min. Intensity (kN)**			**Max Int (kN)**		ep (m)	L (m)	ULS	SLS
-	0.00			0.00		1.00	0.000	1.40	0.00
-	0.00			0.00		1.00	0.000	1.60	0.00



TYPICAL SECTION

TORSION EFFECTS

Action	Service Limit State			Ultimate Limit State		
Uniform Distributed Actions						
Action	w kN/m	T_a kNm/m	T_a kNm	w kN/m	T_a kNm/m	T_a kNm
-	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Triangular Distributed Actions						
-	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Concentrated Actions						
-	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00
-	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Action	w kN/m	T_a kNm/m	T_a kNm	w kN/m	T_a kNm/m	T_a kNm
TOTALS	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

MATRIX CONSULTING ENGINEERS	Document Reference: 21066-MCE-XX-XX-CA-S-1001	Project Reference: 21-066	
	Suitability: S0 - Initial Status	Sheet No. BX	Rev P01
Project Title: OLD BRIERLEY HALL - GARAGE		Date 17/05/22	
Subject BEAM C - ECCENTRICALY LOADED BEAM		By AJH	Chkd LJH

TORSION CHECK DESIGN LOAD EFFECTS SUMMARY

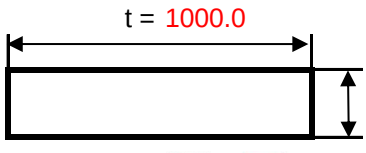
Beam Span, L:	**2650**	mm
Maximum ULS Shear Force, F_{vy}:	**4.0**	kN
Maximum Bending Moment, M_x:	**2.6**	kNm
Total ULS Applied Torque, T_q:	**0.0**	kNm
Deflection Limit, k_δ:	**500**	
Absolute Limit on Deflection, δ_{lim_abs}:	**5.5**	mm
Maximum deflection due to unfactored SLS Loading, δ_{y_max}:	**0.6**	mm
Total SLS Applied Torque, T_q:	**0.0**	kNm
Member Type:	**RHS**	
Member	**200x100x4.0**	mm

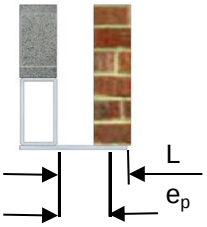
BI-FOLD DOOR PLATE DESIGN LOAD EFFECTS

Total applied SLS Line Load, $W_{p,SLS}$:	**0.0**	kN/m
Total applied ULS Line Load, $W_{p,ULS}$:	**0.0**	kN/m

MATRIX CONSULTING ENGINEERS	Document Reference: 21066-MCE-XX-XX-CA-S-1001	Project Reference: 21-066	
	Suitability: S0 - Initial Status	Sheet No. BX	Rev P01
Project Title: OLD BRIERLEY HALL - GARAGE		Date 17/05/22	
Subject BI-FOLD DOOR PLATE DESIGN		By AJH	Chkd LJH

Ref.		Output
	SECTION PROPERTIES	
	Project of Flat, L:	200 mm
	Depth of the flat, d:	8.0 mm
	Length of Flat, t :	1000 mm
Tbl 13	Dimensional Factor, n :	1.00
	Effective Length to be adopted, L_e:	2.0L
	Steel Grade, p_y:	355 N/mm^2
	Breadth of supporting element, b:	100 mm
	Eccentricity of point load, e_p:	150 mm
	Weld Length, d:	1000 mm
	Weld size, s:	6 mm
Tbl 8	Permissible Deflection Limit, l/180 - l/500 :	100
	DESIGN LOAD EFFECTS AT UITIMATE LIMIT STATE	
	Total applied SLS Line Load, $W_{p,SLS}$:	0.00 kN/m
	Total applied ULS Line Load, $W_{p,ULS}$:	0.00 kN/m
	FLEXURE - RESULTS	
	As a flat, no local bucking only global assume Class 3, Semi-compact	
	Plastic Modulus of Flat, $S_x = t.d^2/4$:	16.00 cm^3
	Effective Plastic Modulus of Flat, $S_{x,eff} = t.d^2/4$:	16.00 cm^3
	Elastic Modulus of Flat, $Z_x = t.d^2/6$:	10.67 cm^3
	Actual Effective Length, L_e:	400 mm
	Ratio, βw ; Z_x / S_x:	0.7
	Equivalent Slenderness, $\lambda_{LT}=2.8.(\beta_w.L_e.d/t^2)^1/_2$:	0
Tbl 16	Bending Strength, p_b :	345 N/mm^2
	Buckling Moment Capacity, $M_b = Z_{xx}.p_b$:	3.68 kNm
	Ratio, βw ; $S_{x,eff} / S_x$:	1.0
	Equivalent Slenderness, $\lambda_{LT}=2.8.(\beta_w.L_e.d/t^2)^1/_2$:	0
Tbl 16	Bending Strength, p_b :	345 N/mm^2
	Buckling Moment Capacity, $M_b = S_{x,eff}.p_b$:	5.52 kNm
	Design bending moment applied to plate, $M_a = W_{p,ULS}.e_p$:	0.00 kNm
	PASS - Bending Moment Capacity > Applied Bending Moment	
	DEFLECTION - RESULTS	
	Permissible Deflection, δ = L/ 100	2.00 mm
	Required Second Moment of Area, $I_{req} = W_{P,SLS}.L^3/3.E.\delta$:	0.00 cm^4
	Actual Second Moment of Area, $I_{Act} = t.d^3/12$:	4.27 cm^4
	PASS - Actual Second Moment of Area > Required Second Moment of Area	
	SHEAR - RESULTS	
	Applied Shear Force, $V_{a,ULS}$:	0.00 kN
	Shear Area of Flat, $A_v = 0.9.t.d$:	7200 mm^2
Tbl 6	Design Strength, p_y :	355 N/mm^2
	Shear Capacity, $P_v = 0.6.p_y.A_v$:	1534 kN
	PASS - Shear Capacity > Applied Shear Force	



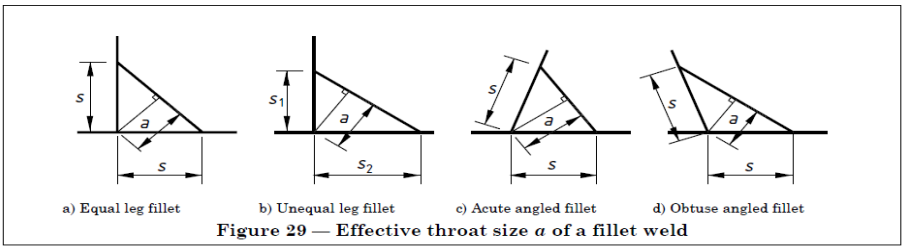


TYPICAL SECTIONS

WELD DESIGN

	Weld throat thickness, a:	**4.2** mm
Tbl 36	Weld Design Strength for Grade S355 Steel:	**0.215** N/mm^2
	Area of Weld, A = d.a :	**4200** mm^2
	Force Applied to weld, Fw = $W_{p,ULS}.(e_p+b)/b$	**0.00** kN
Tbl 6	Design Strength of weld:	**0.000** N/mm^2

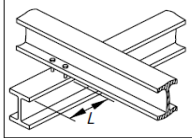
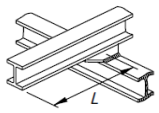
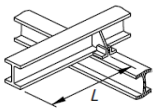
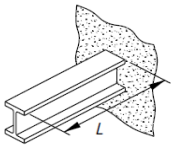
PASS - Weld Design Strength > Load Applied to Weld

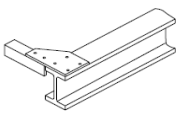
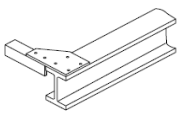
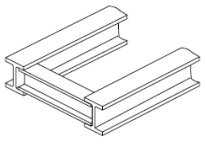
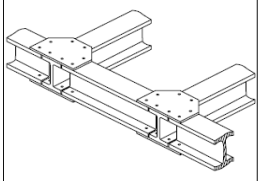


a) Equal leg fillet b) Unequal leg fillet c) Acute angled fillet d) Obtuse angled fillet

Figure 29 — Effective throat size *a* of a fillet weld

Table 14 — Effective length L_E for cantilevers without intermediate restraint

Restraint conditions		Loading conditions	
At support	At tip	Normal	Destabilizing
a) Continuous, with lateral restraint to top flange 	1) Free	3.0*L*	7.5*L*
	2) Lateral restraint to top flange	2.7*L*	7.5*L*
	3) Torsional restraint	2.4*L*	4.5*L*
	4) Lateral and torsional restraint	2.1*L*	3.6*L*
b) Continuous, with partial torsional restraint 	1) Free	2.0*L*	5.0*L*
	2) Lateral restraint to top flange	1.8*L*	5.0*L*
	3) Torsional restraint	1.6*L*	3.0*L*
	4) Lateral and torsional restraint	1.4*L*	2.4*L*
c) Continuous, with lateral and torsional restraint 	1) Free	1.0*L*	2.5*L*
	2) Lateral restraint to top flange	0.9*L*	2.5*L*
	3) Torsional restraint	0.8*L*	1.5*L*
	4) Lateral and torsional restraint	0.7*L*	1.2*L*
d) Restrained laterally, torsionally and against rotation on plan 	1) Free	0.8*L*	1.4*L*
	2) Lateral restraint to top flange	0.7*L*	1.4*L*
	3) Torsional restraint	0.6*L*	0.6*L*
	4) Lateral and torsional restraint	0.5*L*	0.5*L*

Tip restraint conditions			
1) Free  (not braced on plan)	2) Lateral restraint to top flange  (braced on plan in at least one bay)	3) Torsional restraint  (not braced on plan)	4) Lateral and torsional restraint  (braced on plan in at least one bay)

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