TMemo	File Note	Meeting	Telephone	Other
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AKSWard®
CONSTRUCTION CONSULTANTS

Project: Kneller Hall, Band Practice Hall

Project No: L211031

By	Date	Sheet	Circulate to	File	Action
SNH	2024.09.05	01		☐	

School Hall (Former Band Practice Hall) – Underpinning Works

The School Hall is a single storey brick masonry building (with double height internal space) and a tiled pitched roof. The roof is formed from timber roof trusses spanning north/south between the existing perimeter load bearing masonry walls. Two small rooms are located to the rear of the hall. There is a small basement used as a plant room beneath the south-west corner of the building.

Existing record drawing shows that movement has been an issue in this building for some time. A summary of repairs and condition reports is given below.

Date	Author & Report	Condition
1900	-	Construction of Band Practice Hall
1967	Service Departments Group M.P.B.W Cavalry Barracks, Record of Structural Condition drawing	Cracking to west gable noted. Drawing shows a proposal for the north-west corner of building to be underpinned to prevent further movement (note, SI works in 2023 proved that this was not in fact carried out). Assumed that cracks were repaired as part of the works.
1972	G. Alan Herbert Associates. Remedial Works drawing	Remedial works to new trusses with installation of new steel rod ties and concrete encased steel columns as buttresses to external masonry walls. Cracking to masonry walls is noted on drawings as 'all cracks to brickwork to be cut out and made good'.
2021	WSP, Site Visit Report	Significant cracking noted to internal masonry wall. Exterior walls noted as 'good condition'. Minor hairline cracking noted to concrete encased buttress columns.
2024	AKSWard, Site Visit	Previously repaired cracking to west gable has reopened. Cracking visible to north elevation at the corners of brick arches over windows and to spandrel panels at low level. Significant cracking noted to internal masonry wall.

The geotechnical report notes that the existing foundations are located on made ground comprising weak clay soils interspersed with gravel and brick/ concrete rubble material to a depth of 2-2.5m. The exception to this is the small basement in the south-west corner which appears to be founded on the stiffer River Terrace deposits. Cracking of the masonry walls is therefore, likely due to differential settlement caused by the masonry walls being founded on soils of varying stiffness. This is particularly apparent where the cracking to the west gable and internal masonry wall corresponds to these walls being partially founded at a deeper level for the basement.

As part of the refurbishment works to this building, AKS Ward initially proposed to install helical screw pile underpinning to the stabilize the existing masonry walls and prevent further vertical movement. This was considered to be the most suitable strategy at the time subject to additional further trial pit investigations to the existing foundations. These proposals were reviewed and accepted as part of the refurbishment plans by STAND Engineers acting as consultant for the Local Authority (London Borough of Richmond).

Unfortunately, once trial pit investigations were completed it was found that this method of underpinning would not be suitable. The existing strip footing to the masonry walls comprises poor quality, friable rubble concrete and therefore, could not be used in conjunction with the standard connection detail to the top of the screw pile. A system of traditional mass concrete underpinning has therefore, been proposed in its place with any loose concrete footing removed prior to the installation of the new underpins. These new underpins will extend the existing foundations onto firmer strata (river terrace deposits) to limit any further vertical movement. We are currently in conversation with the geotechnical engineer to confirm allowable underpin depths.

Whilst the method of underpinning has been revised, the base design principal remains unchanged. Mass concrete underpinning is a standard solution commonly employed to rectify distress caused to a building due to excessive movement of its foundation. This is the oldest and most traditional method of underpinning with substantial history in stabilising existing buildings and use with historic structures. By bypassing the weaker soils at the upper levels further settlement and hence cracking can be limited. This is an approach that AKS Ward has used on numerous buildings, including heritage buildings, to ensure that the long-term retention of these buildings. The underpinning works can be carried ahead of and separately to the refurbishment works to the interior of the building; and the construction of the adjacent independent extension building.

An outline sequence of works is proposed as follows:

1) Remedial works to existing masonry walls e.g. installation of stitch ties across cracking in external walls into cut slots within the existing masonry joints, making good of existing damaged brickwork, installation of RC elbow ties etc. New stitch ties will be detailed to allow for the formation of new builders-work openings through the gable wall once the underpinning is completed.

2) Internal propping to existing timber trusses. Temporary ties/ props installed to external buttress columns.

3) Sequential 'hit-miss' underpinning on to the existing band practice hall building and stabilisation of existing masonry walls.

Given the condition of the existing masonry walls we would like to undertake repairs to these external walls ahead of the underpinning and as soon as possible to prevent any further deterioration. The three-year period between the production of the WSP report which listed the condition as 'good' and today has evidenced significant movement and we would like to address this as a priority item.

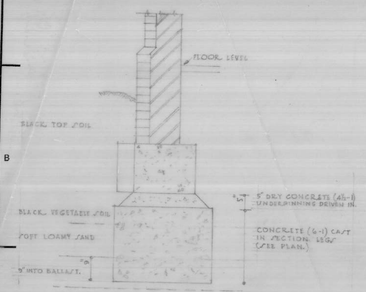
Appendix 01: Site Photographs

Figure 1: Cracking to West Gable Masonry Wall. Note previous brick repairs

Figure 2: Cracking to North Elevation Masonry Wall above and Below Window

Figure 3: Cracking to Internal Masonry Wall

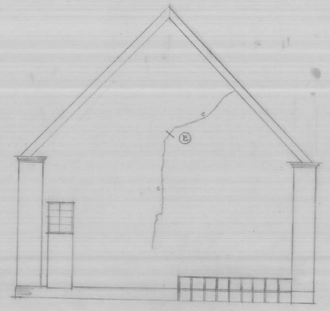
Appendix 02: Historic Drawings



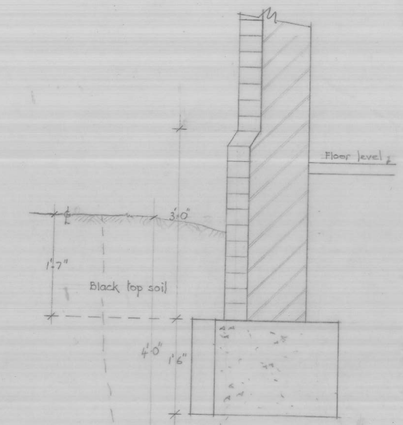
SECTION "A-A" PROPOSED.

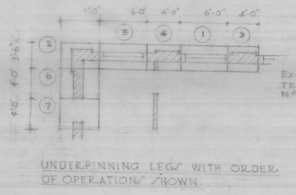
SCALE ⅛" to 1'-0"

NORTH ELEVATION

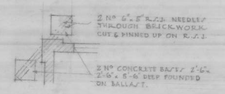


WEST ELEVATION





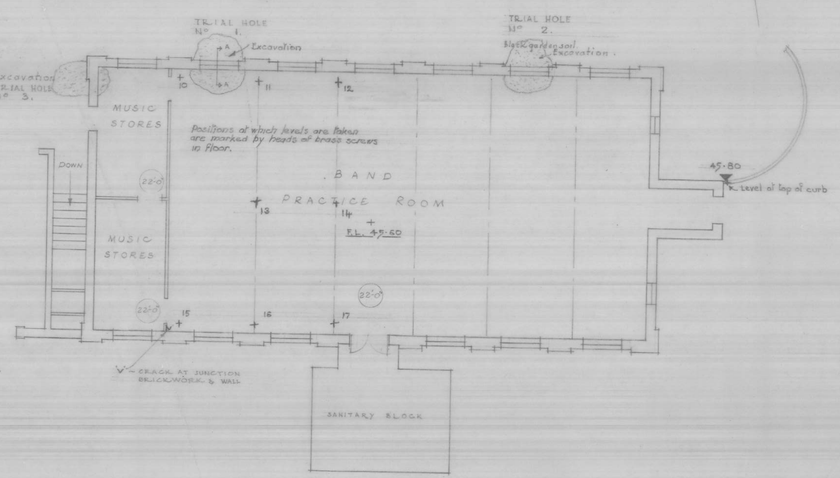
UNDERPINNING LEGS WITH ORDER OF OPERATION SHOWN.



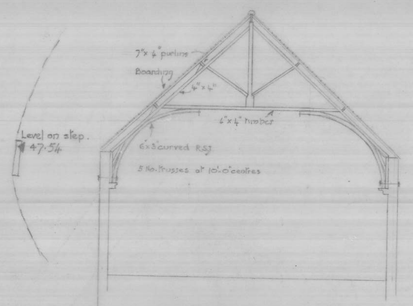
CORNER NEEDLE SUPPORT

PART PLANS N.W. CORNER.

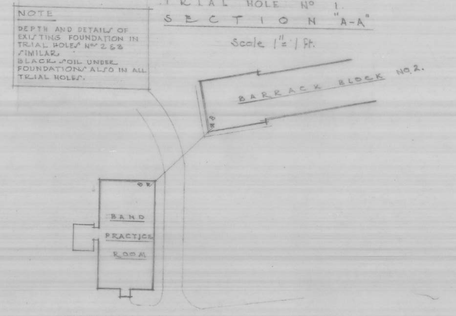
SCALE ½" to 1'-0"



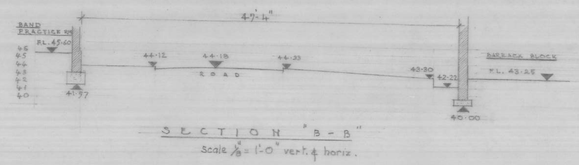
PLAN



SECTION

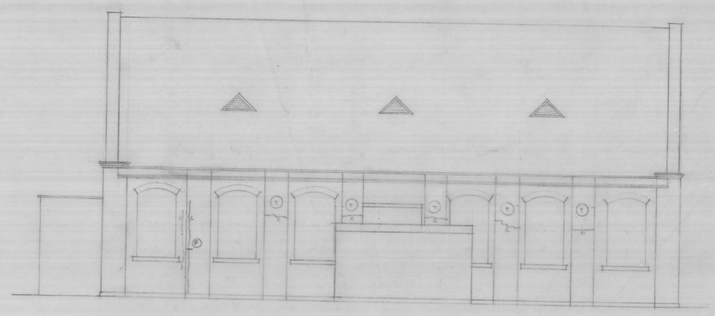


SITE PLAN Scale 1/500



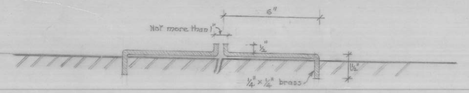
SECTION "B-B"

Scale ⅛" = 1'-0" vert. & horiz.



SOUTH ELEVATION

EAST ELEVATION



BRACKETS FOR CRACK MEASUREMENT.

Scale ½ F.S.

SCALE ⅛" = 1 FOOT

NOTES

RECORDS OF READINGS

CRACK GAUGES

	DATE	16-2-67	11-4-67	31-4-67	28-4-67
A		17·57mm	17·58	17·40	·676
B		18·55mm	18·14	18·64	·726
C		17·28mm	17·45	17·65	·623
D		14·90mm	15·00	14·73	·584
E		16·43mm	15·95	16·00	·621
F		17·28mm	17·58	17·55	·599

PLUMB LINES

	DATE	16-2-67	11-4-67						
		TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM	TOP	BOTTOM
1		2·14	2·44	2·11"	2·14"	2-11/16	2 7/16		
2	GABLE - B. HOUSE	3·26	3·56	3·22	3·34"	3·25	3 5/16		
3	LEFT GABLE, ENT.	3·12	4·62			3 1/4	3 5/8		
4	RIGHT GABLE ENT.	3·02	4·24			2 7/8	4 1/8		

LEVELS

	DATE	16-2-67	27-4-67
10		45·455	
11		45·56	
12		45·59	45·59
13		45·62	45·62
14		45·59	45·58
15		45·57	45·50
16		45·505	45·56
17		45·640	45·64

DIMENSIONS

	DATE		DATE	
BY EXCAVATION	25	35'-0"	34-10⅞"	35'-0"
NEAT TRUSS	2	36'-0⅛"	35'-2⅝"	36'-0⅛"
	22			

LEGEND

CRACKS SHOWN THUS — CRACK GAUGES W.C. WALL TIES WITH FLANGED (CIRCULAR) PLATE

AMDT. LETTER	AMENDMENT	ZONE	INITIAL & DATE

KNELLER HALL
BAND PRACTICE ROOM
RECORD OF
STRUCTURAL
CONDITION

DRAWING NUMBER AS1/1
JOB No. 67005
SET OF 1
AMDT. A B C

Planned
Drn/Tcd V.W.
Checked
Scale ⅛" to 1'-0"
Date 23-1-67

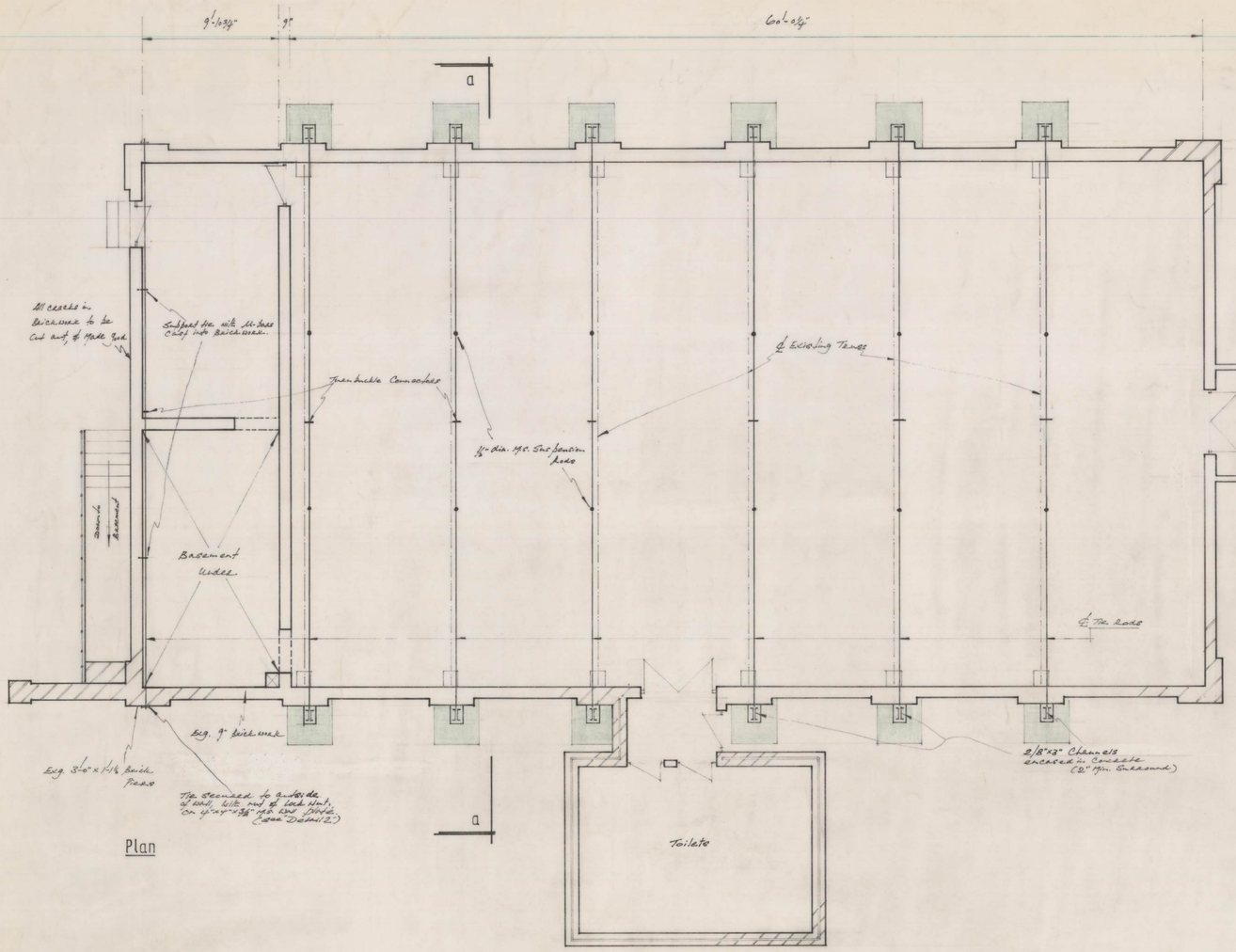
DIRECTORATE OF WORKS (LONDON)

Approved

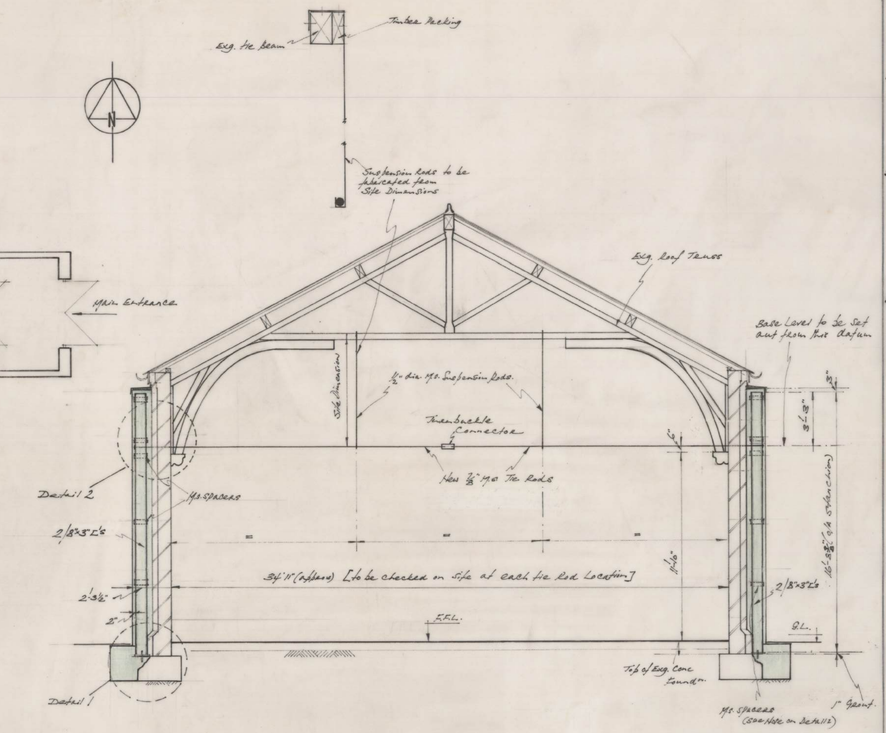
SUPERINTENDING SERVICE DEPARTMENTS M.P.B.W. HOUNSLOW MANAGER GROUP BARRACKS LONDON

B12/034

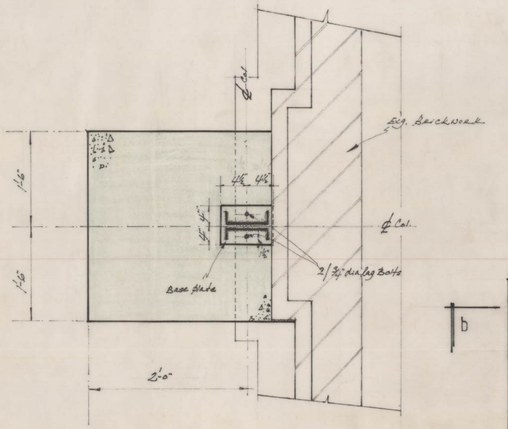
019913



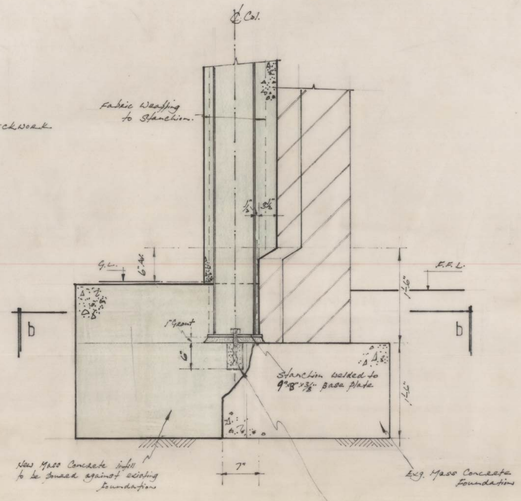
Plan



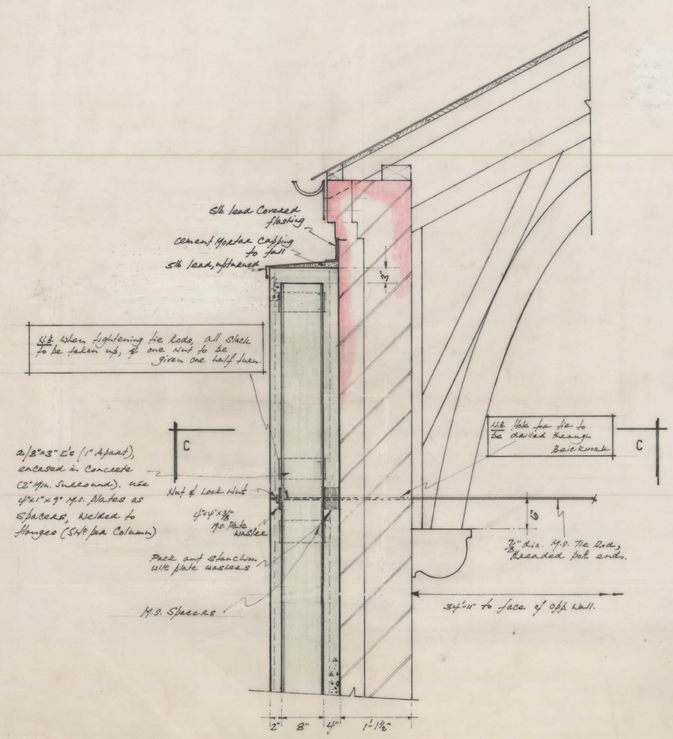
Section a-a



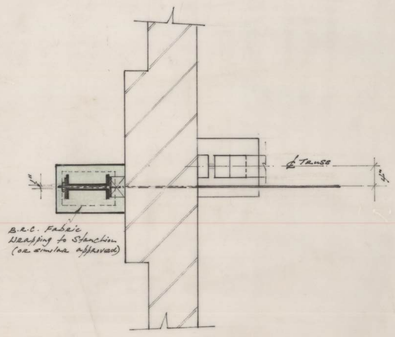
Section b-b



Detail 1



Detail 2



Section c c

NOTES

1. This drawing to be read in conjunction with other relevant drawings, together with the Spec.
2. The Contractor is to be responsible for the accuracy of all dimensions, & for the correct Setting out of the Works on Site.
3. All Concrete work to be in accordance with C.P.114. Concrete to Stanchion Bases & Column Casings to be 21 Mpa/m² @ 28 Days Fabric Wrapping to Stanchions to be B.R.C. Fabric Ref. No D49 (or similar approved)
4. All Cutting away of existing work shall be Carried out with Care. Exposure of Settlement or other Cracks shall be reported to the Supervising Officer for the advice of the Structural Engineer.
5. Excavation. All dimensions are minimum. Where ground conditions require, extra depth to be made up in 1:12 Weak Mix Concrete. Extent of Work to be decided on Site by the Structural Engineer at time of Excavation.
8. Steelwork to conform to the relevant British Standards. All steel to be free from Rust, Grease, or other extraneous matter.
9. All Cracks in Brickwork to be Cut out & made good

AMENDMENTS

JOB
Royal Military School of Music
Kneller Hall
Whitton, Middx.

CLIENT
A.F. Madden, (Structural Engineer), Dept. of the Environment, St. Christopher's House, Southwark St, S.E.1.

TITLE
Remedial Works to the Old Band Practice Hall.

G. ALAN HERBERT ASSOCIATES.
ARCHITECTS: CIVIL & STRUCTURAL ENGINEERS.
189, VICTORIA STREET,
WESTMINSTER,
S.W.1 01-834-6288/9

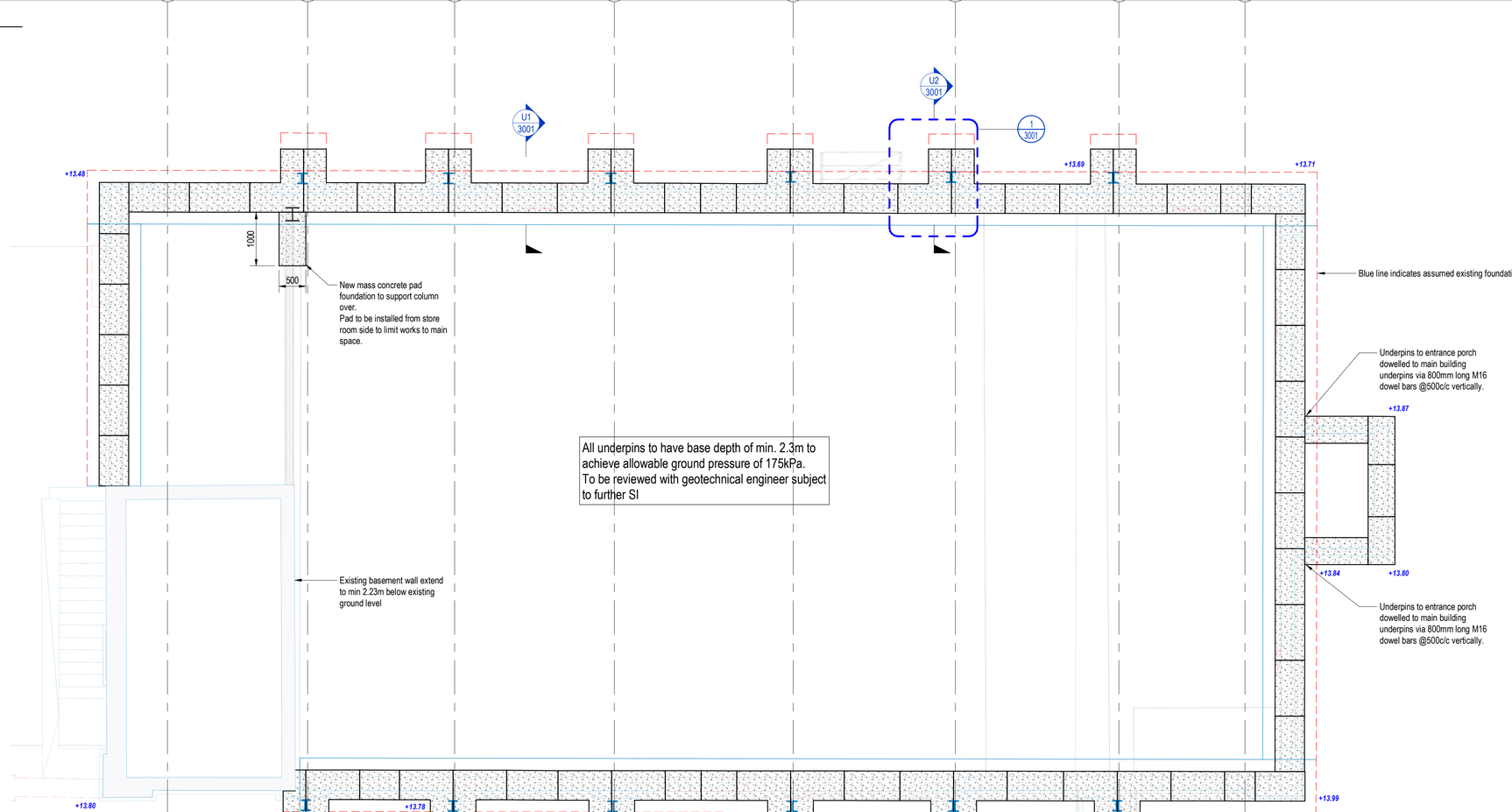
SCALES ½" 1'-3" & 3" to 1'-0"

JOB NO. 2476 | DRG NO. XD1/1

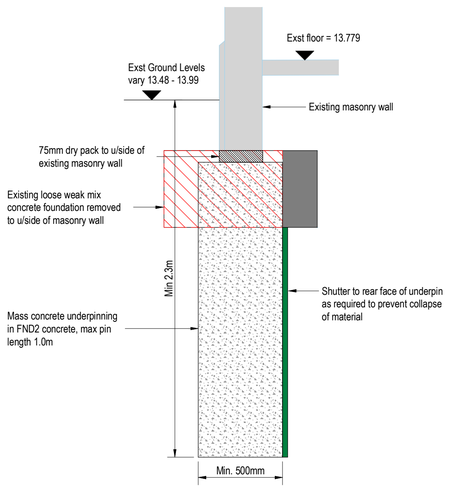
DRN. D.R.A. | DATE Oct 1972

019927 22/12/72
PROP. No. 224932

Appendix 03: Proposed Structural Underpinning

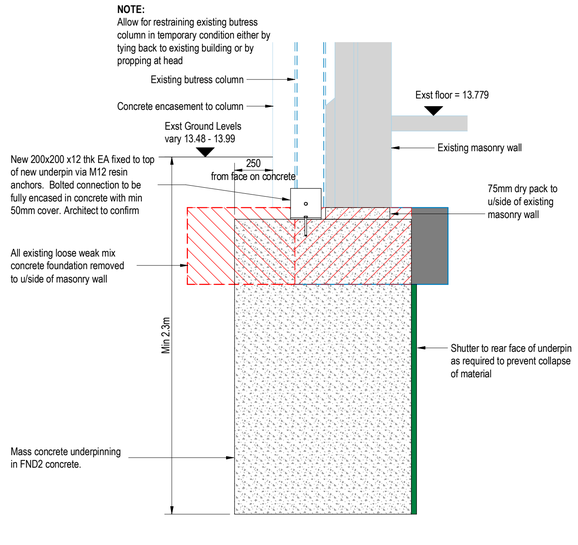


Underpinning Plan
(1 : 50)



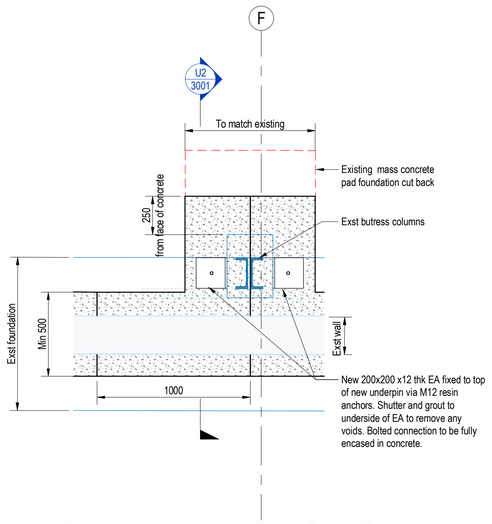
Section U1
(1 : 20)

(TYPICAL WALL UNDERPINNING)



Section U2
(1 : 20)

(TYPICAL BUTRESS COLUMN UNDERPINNING)



L-Shaped Column Underpinning Detail (Plan)
(1 : 20)

UNDERPINNING NOTES

1. Exact extent of underpinning to be determined once level of existing foundation is known.

2. Excavation of any section should not proceed until 24 hours after completion of any adjoining section.

3. Dry packing - Mass Concrete shall be stopped 75mm below underside of existing wall. The final packing shall be carried out with a semi-dry fine concrete comprising one park Rapid Hardening Portland Cement to three parts of aggregate (10mm max. and well graded down to fine sand).

4. Sections of underpinning are to be excavated in sequence. Sections of same number may be excavated simultaneously.

5. Mass concrete to be FND2 grade thoroughly compacted.

6. The underside of existing foundations to be underpinned shall be thoroughly cleaned to remove all loose materials, earth, etc. before underpinning.

7. Contractor to protect all drainage, water supply etc. and check for damage etc.

GENERAL NOTES

1. This drawing is to be read in conjunction with all Engineer's, Architect's or relevant drawings and specifications.
2. All dimensions and levels are to be checked on site by the contractor prior to preparing any working drawings or commencing on site.
3. The contractor must ensure and will be held responsible for the overall stability of the building/structure/excavation at all stages of the work.
4. All work by the contractor must be carried out in such a way that all requirements under the 'Health and Safety at Work Act' are satisfied.
5. All work is to be carried out in compliance with the requirements of the relevant statutory authorities and regulations.
6. Refer to General Notes Drawing KNE-AKSW-XX-XX-DR-S-0000

IDENTIFIES RISKS DURING THE CONSTRUCTION PROCESS ON THE DRAWINGS:

NOTE: The list below and notes on the drawing identify risks which are deemed to be unusual, abnormal, residual or unexpected to a competent contractor carrying out the works. These notes relate to risks which we have been unable to design out.

1. Underpinning assumed to be completed ahead of construction new foundations. Underpinning to be carried out in short lengths (<1.0m) with sequence to be determined by Conctractor.
2. External butress columns to be restrained at head prior to underpinning. Contractor to satisfy themselves of lateral stability ahead of underpinning works to existing pad foundations.
3. Lateral restraints to pilecaps provided by ground floor slab.

DRAWING LEGEND

+13.99 Denotes existing ground levels

Rev.	Amendment	Drn	Chkd	Date
P01	STAGE 4 ISSUE	EK	SH	23.08.24

Drg. Status **STAGE 4** Suitability **S3**

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□ Hitchin
□ Oxford
□ Southampton
□ Birmingham

Client **DUKE EDUCATION GROUP Ltd**

Project **KNELLER HALL SCHOOL HALL (Former Band Practice Hall)**

Title **Underpinning Plan and Details**

Reviewed Scheme Date

Reviewed Final Date

Scales at A1 Project No. **L221004**

Project Ref.	Originator	Zone	Level	Type	Role	Drg No.	Rev.
KNE	AKSW	02	F1	DR	S	3001	P01