conisbee | Consulting Structural Engineers
Consulting Civil Engineers

London
1–5 Offord Street
London N1 1DH
Telephone 020 7700 6666

design@conisbee.co.uk
www.conisbee.co.uk

THE POWER HALL: CORNICE & COPINGS – REPAIR METHODOLOGY

1.0 ASSESSMENT

1.1 Conisbee carried out a detailed inspection of the Power Hall cornice and copings in early 2019 at the request of The Science Museum Group with the aim of evaluating their condition and structural integrity coupled with the provision of outline repair recommendations. Our initial inspection was carried out from ground level with the aid of binoculars.

1.2 The Power Hall and Gantry were scaffolded and enclosed in 2019 as part of the Power Hall repair project. Following a pause in the progress of this project we completed a supplementary inspection of the Power Hall from the scaffold in early 2020.

1.3 Our observations and recommendations are detailed in our *Structural Appraisal and Feasibility Report* which may be summarised as follows:

- Sandstone or gritstone coping stones cap the parapets of the Power Hall walls on all elevations, with further stone detailing provided at sills, carriage stones and bollards. Some of the coping stones have been replaced with modern concrete equivalents.

- Profiled stones also form the upper part of the cornice at the south and east elevations, with profiled white glazed bricks forming the lower portion.

- The stonework has suffered from a poor preventative maintenance regime over a substantial period of time, almost certainly pre-dating its ownership by the Science Museum Group. Despite this the coping stones generally remain in good condition with only isolated instances of material loss. Where this has occurred, mechanical damage or an inherent weakness in the individual stone is the most likely cause. Joints have been pointed with cementitious mortar which in most locations has cracked and failed.

- Misalignment is present between the coping stones at the north-west corner of the Power Hall where the parapet leans inwards. The brickwork and copings in this area may have been locally reconstructed, possibly following impact damage.

- The profiled stones forming the projecting cornice on the south and east elevations are in relatively poor condition. General erosion is widespread and localised spalling and material loss has also occurred.

- Sills and other isolated stone features have been subjected to minor surface erosion and abrasion but due to their substantial nature and lack of detailing remain in reasonable condition overall.

1.4 Sampling and testing of mortar has subsequently been undertaken to understand its composition, aid our subsequent structural analysis, and inform repair specifications.

2.0 RECOMMENDED ACTIONS & REPAIRS

2.1 Essential repair of localised defects to the high level cornice and coping stonework of the Power Hall has been identified following our detailed inspection and assessment (see Conisbee drawings 180426-CON-PH-XX-DR-S-3100 to S-3105).

- Typical repairs to locally defective areas of the cornice stonework at the east and south elevations are specified on Conisbee drawing 180426-CON-PH-XX-DR-S-4120 which entail the careful removal of locally defective stone and the insertion of matching stone set in lime mortar secured in place with hidden stainless steel dowels resin anchored into the existing stonework. These repairs have been developed on the basis of a minimally invasive approach which retains as much of the original fabric as possible.

- To expose any defects that may be hidden behind the substantial historic build up of dirt and organic matter and thus clarify the full extent of necessary repairs it is proposed to clean and descale the stonework prior to a supplementary close up inspection. To assess the suitability of the cleaning method and to select the most appropriate technique it is proposed to clean a small trial area of the stonework by hand using a stiff nylon bristle brush and warm water: a very low impact manual technique that will cause negligible harm to the existing fabric. It is not proposed to use steam-based cleaning techniques such as Doff or Therma-Tech at this stage. The proposed trial area measures approximately 2m long and is located at the south (Liverpool Road) elevation. The effectiveness of the cleaning trial will be assessed once complete and if it is deemed acceptable will be adopted for the remaining areas of stonework following the approval of MCC. If the cleaning trial is not considered acceptable owing to its ineffectiveness in achieving its intended purpose or the harm it might cause to the existing fabric an alternative approach will be proposed for consideration.

- Parts of the above ground drainage system are in poor condition and wall dampness is evident in various areas. These defects will be addressed by renewal and upgrading of the entire system.

- In line with best conservation practice for a Grade II listed heritage asset such as this our approach will be one of minimal intervention. Where intrusive repairs are deemed necessary to maintain durability and structural performance they will be as sympathetic, transparent and honest as possible so as to allow the story of the Power Hall and its relationship to the Gantry and the wider site to be clearly read.

- All specified remedial work will be developed in conjunction with the Science Museum Group and MCC's Conservation Officers recognising the listed status of this significant structure.

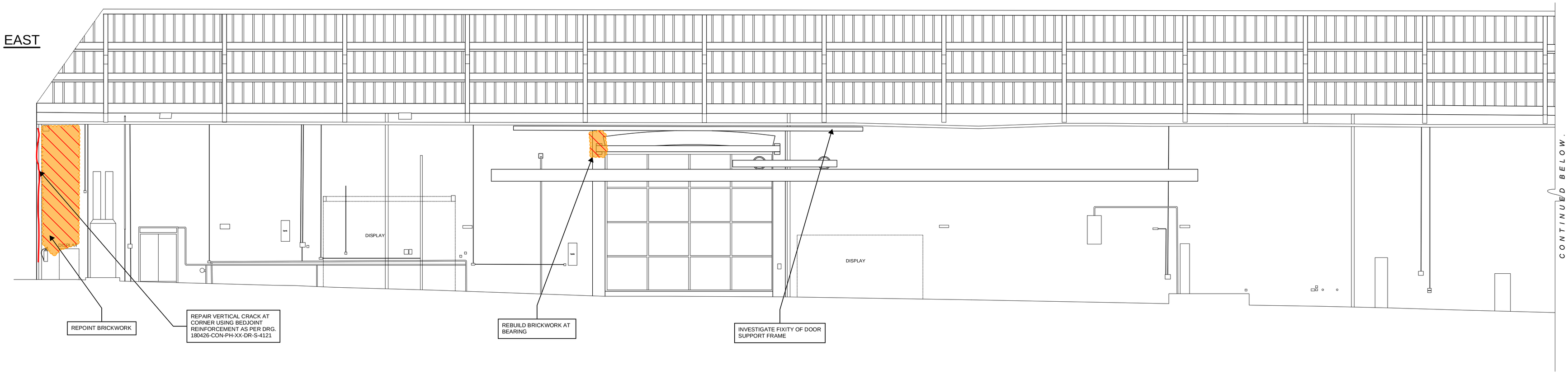
- Following the implementation of essential repairs an appropriate program of protection and routine maintenance will be developed and implemented to mitigate further deterioration.

GENERAL NOTES

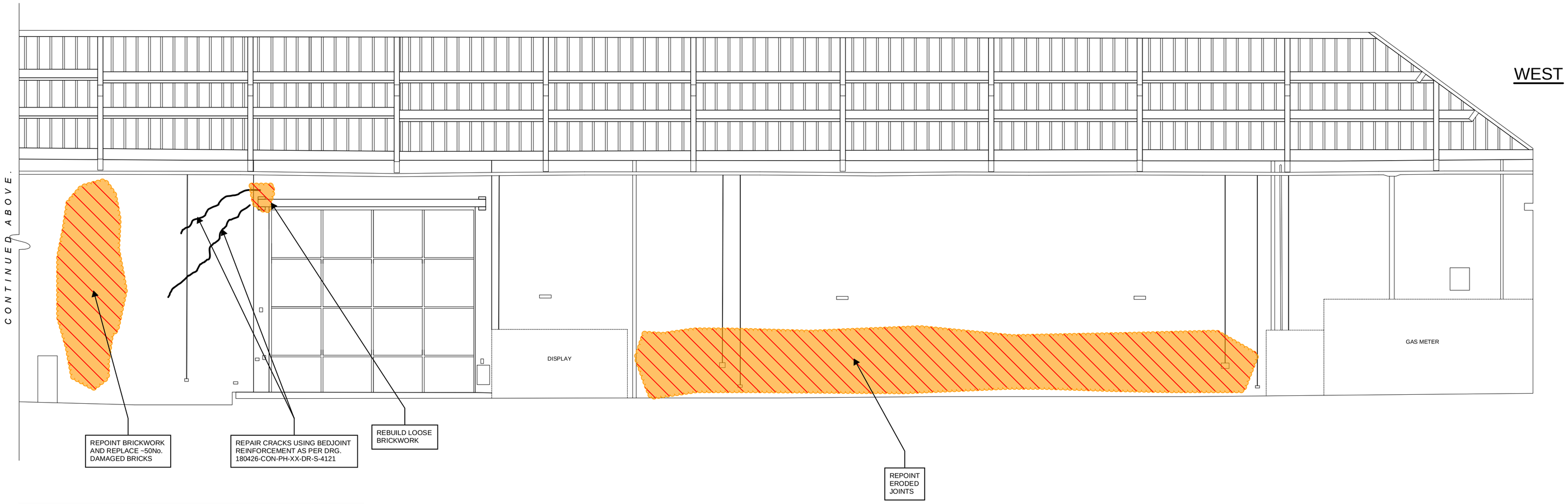
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALIST DRAWINGS AND SPECIFICATIONS

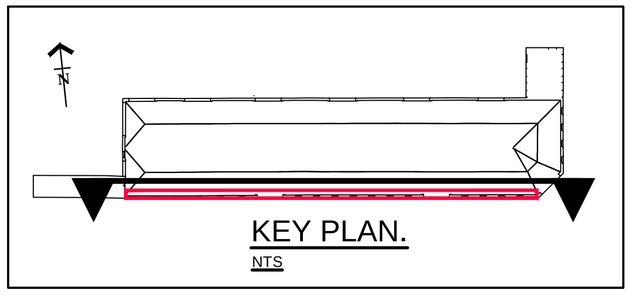
2. DO NOT SCALE FROM THIS DRAWING IN EITHER PAPER OR DIGITAL FORM. USE WRITTEN DIMENSIONS ONLY.

EAST



WEST





NOT FOR CONSTRUCTION

Rev	Date	Description	Drawn	Check
P1	06.12.19	STAGE 3 ISSUE	PM	SW

conisbee | Consulting Structural Engineers Consulting Civil Engineers
London • Cambridge • Norwich
1-5 Offord St London N1 1DH
Telephone 020 7700 6666
www.conisbee.co.uk

Drawing Status
PRELIMINARY

Project
Science & Industry Museum
Manchester

Title
Power Hall Repairs
South Elevation (Internal)

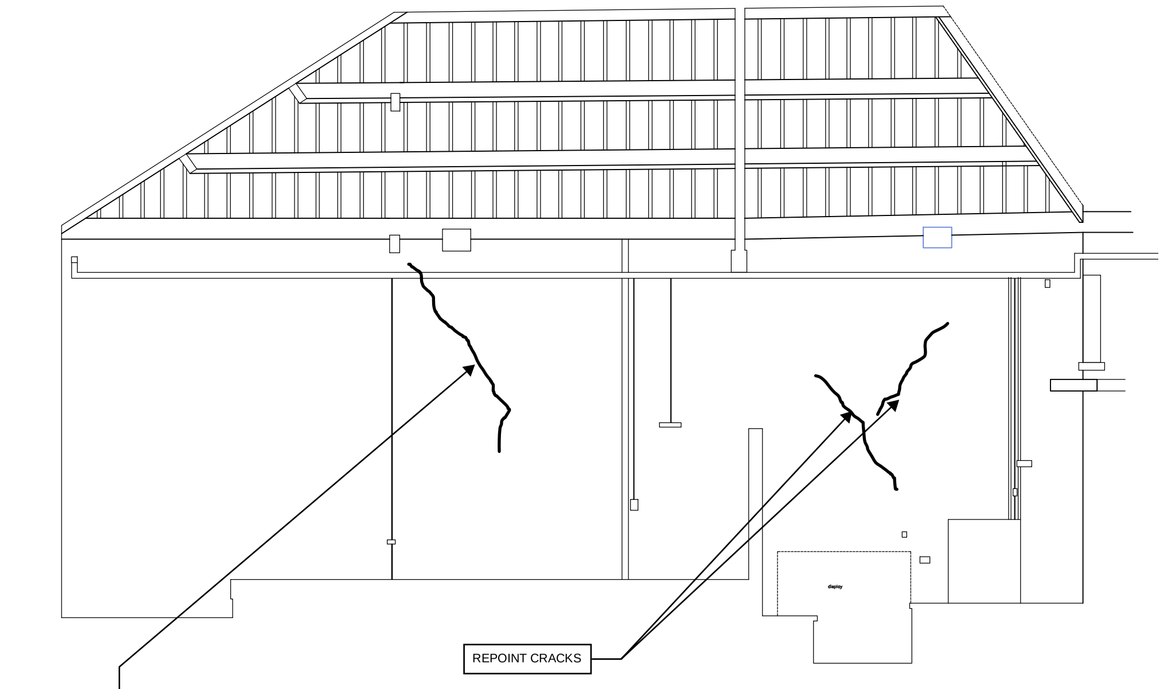
Drawing No
180426-CON-PH-XX-DR-S-3100

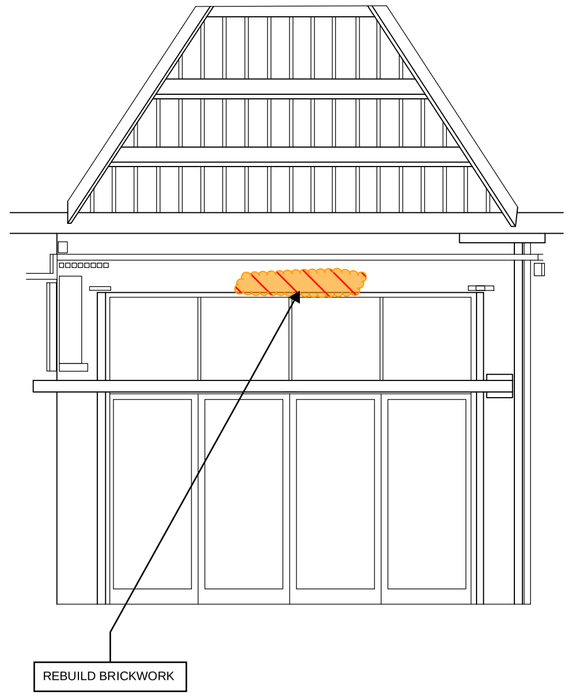
Date Dec 2019
Scale 1:75@A1
Drawn PM
Engineer SW
Project No **180426**
Revision **P1**

GENERAL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALIST DRAWINGS AND SPECIFICATIONS

2. DO NOT SCALE FROM THIS DRAWING IN EITHER PAPER OR DIGITAL FORM. USE WRITTEN DIMENSIONS ONLY.

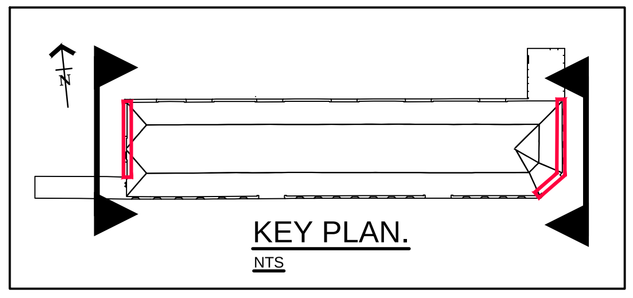




EAST ELEVATION
SCALE 1:75



WEST ELEVATION
SCALE 1:75



KEY PLAN.
NTS

NOT FOR CONSTRUCTION

Rev	Date	Description	Drawn	Check
P1	06.12.19	STAGE 3 ISSUE	PM	SW

conisbee | Consulting Structural Engineers Consulting Civil Engineers
London • Cambridge • Norwich
1-5 Offord St London N1 1DH
Telephone 020 7700 6666
www.conisbee.co.uk

Drawing Status
PRELIMINARY

Project
Science & Industry Museum.
Manchester.

Title
Power Hall Repairs
East and West Elevations (Internal)

Drawing No
180426-CON-PH-XX-DR-S-3101

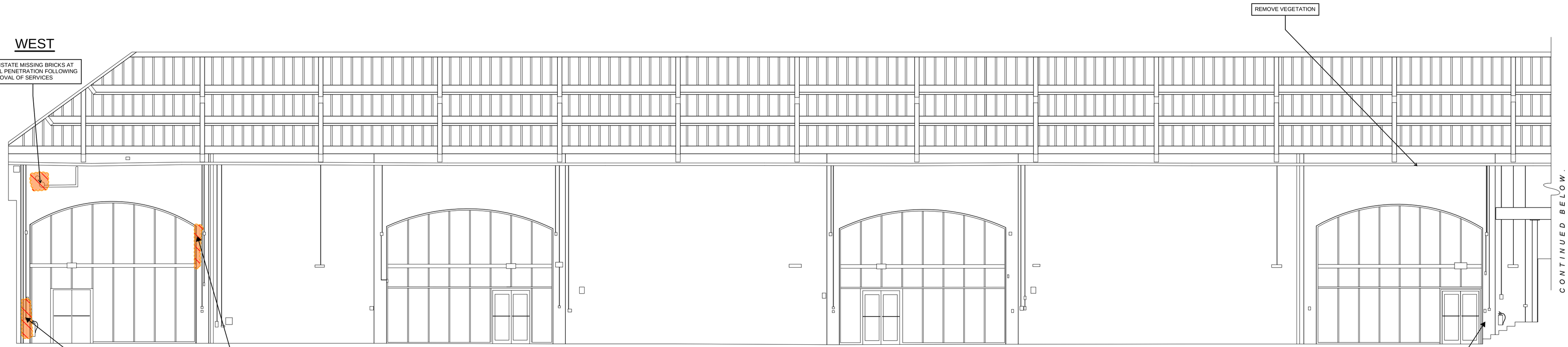
Date Dec 2019
Scale 1:75@A1
Drawn PM
Engineer SW
Project No **180426**
Revision **P1**

GENERAL NOTES

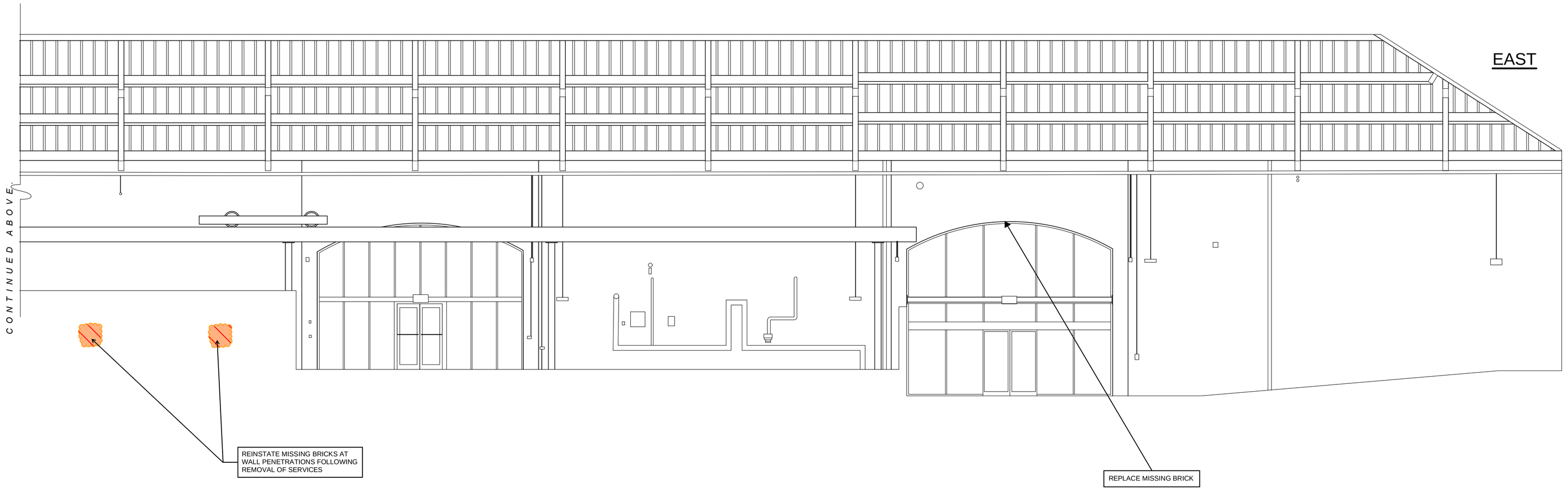
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALIST DRAWINGS AND SPECIFICATIONS

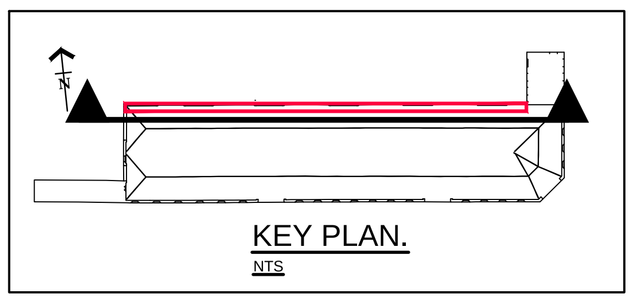
2. DO NOT SCALE FROM THIS DRAWING IN EITHER PAPER OR DIGITAL FORM. USE WRITTEN DIMENSIONS ONLY.

WEST



EAST





KEY PLAN.
NTS

NOT FOR CONSTRUCTION

Rev	Date	Description	Drawn	Check
P2	18.08.21	REPAIRS ADDED	KC	KC
P1	06.12.19	STAGE 3 ISSUE	PM	SW

conisbee | Consulting Structural Engineers Consulting Civil Engineers
London • Cambridge • Norwich
1-5 Offord St London N1 1DH
Telephone 020 7700 6666
www.conisbee.co.uk

Drawing Status
PRELIMINARY

Project
Science & Industry Museum.
Manchester.

Title
Power Hall Repairs
North Elevation (Internal)

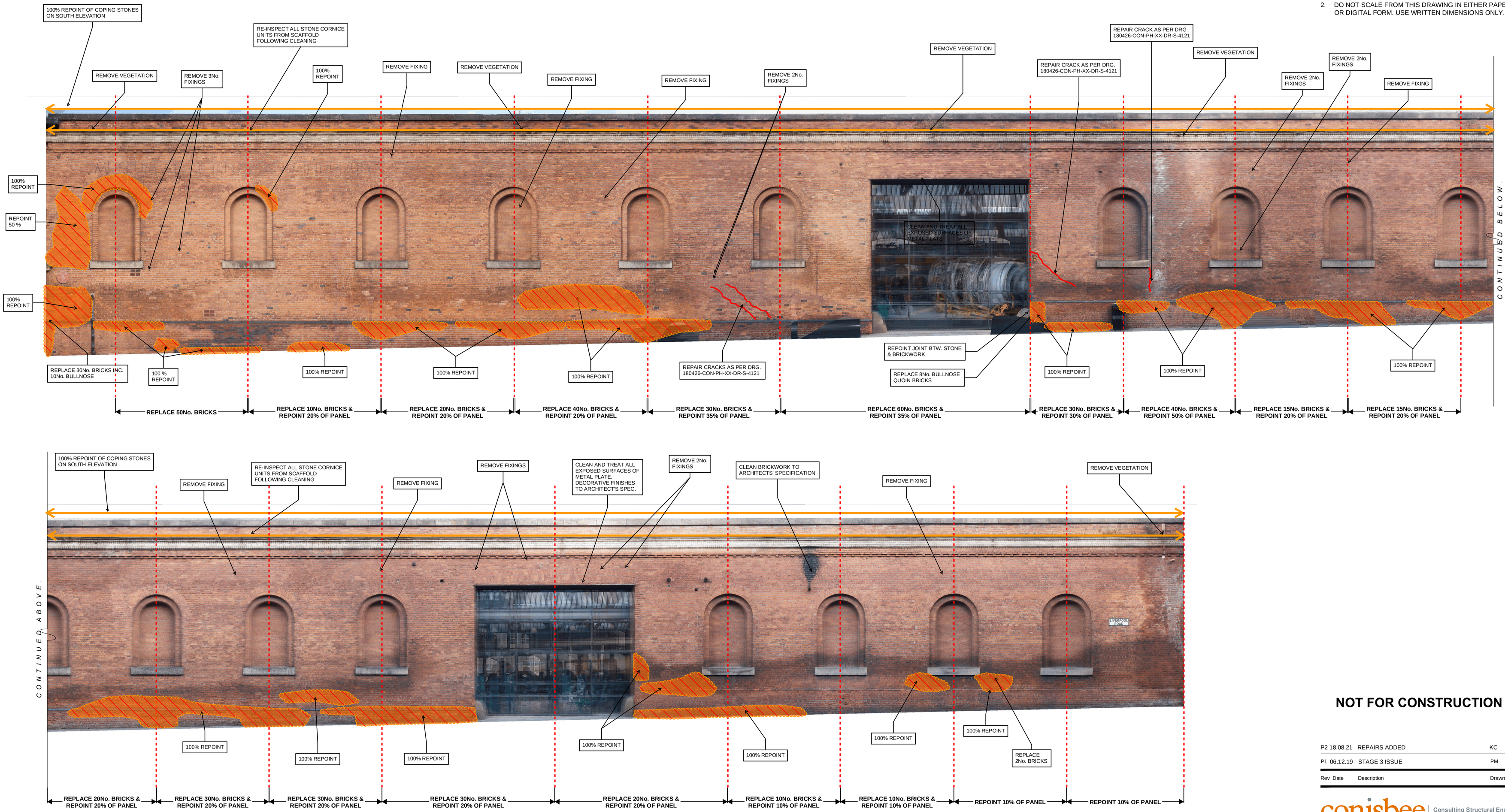
Drawing No
180426-CON-PH-XX-DR-S-3102

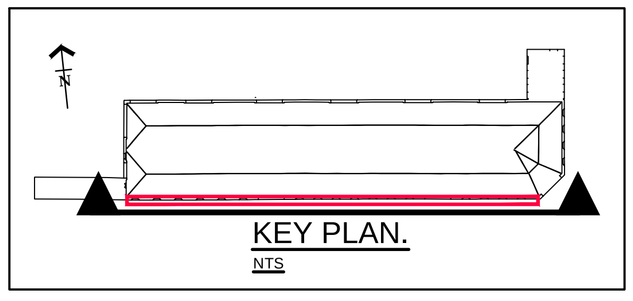
Date Dec 2019
Scale 1:75@A1
Drawn PM
Engineer SW
Project No **180426**
Revision **P2**

GENERAL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALIST DRAWINGS AND SPECIFICATIONS

2. DO NOT SCALE FROM THIS DRAWING IN EITHER PAPER OR DIGITAL FORM. USE WRITTEN DIMENSIONS ONLY.





NOT FOR CONSTRUCTION

Rev	Date	Description	Drawn	Check
P2	18.08.21	REPAIRS ADDED	KC	KC
P1	06.12.19	STAGE 3 ISSUE	PM	SW

conisbee | Consulting Structural Engineers, Consulting Civil Engineers
London • Cambridge • Norwich
1-5 Offord St London N1 1DH
Telephone 020 7700 6666
www.conisbee.co.uk

Drawing Status
PRELIMINARY

Project
Science & Industry Museum.
Manchester

Title
Power Hall Repairs
South Elevation (External)

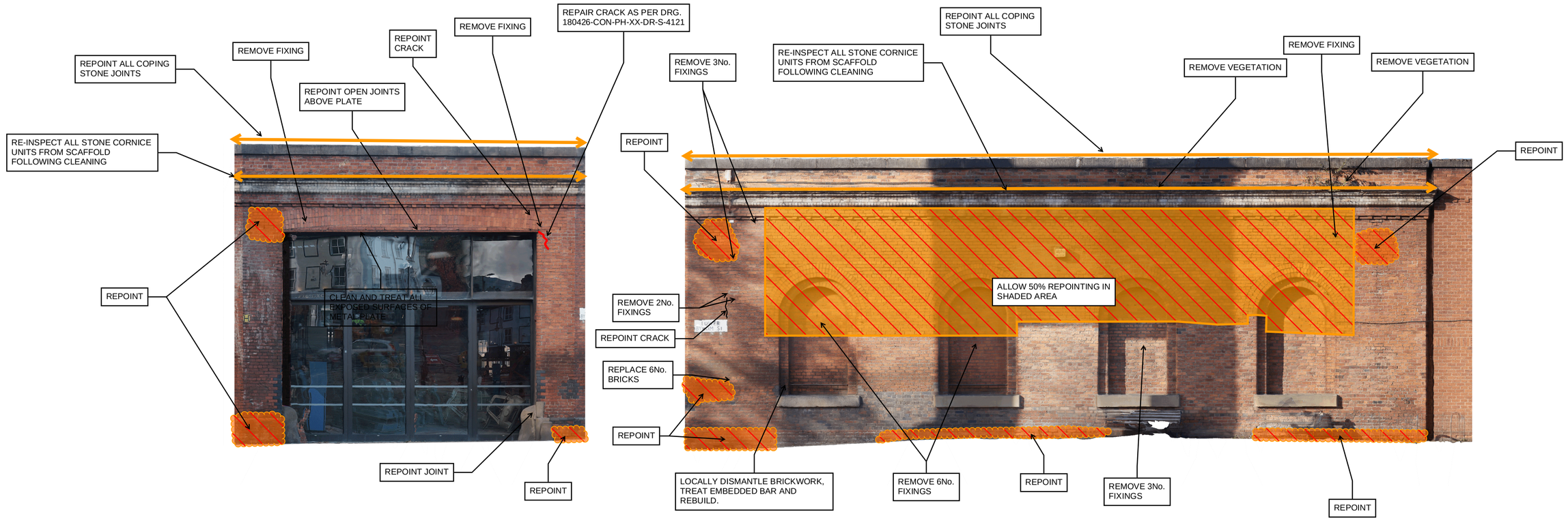
Drawing No
180426-CON-PH-XX-DR-S-3103

Date Dec 2019
Scale 1:75@A1
Drawn SW
Engineer SW
Project No **180426**
Revision **P2**

GENERAL NOTES

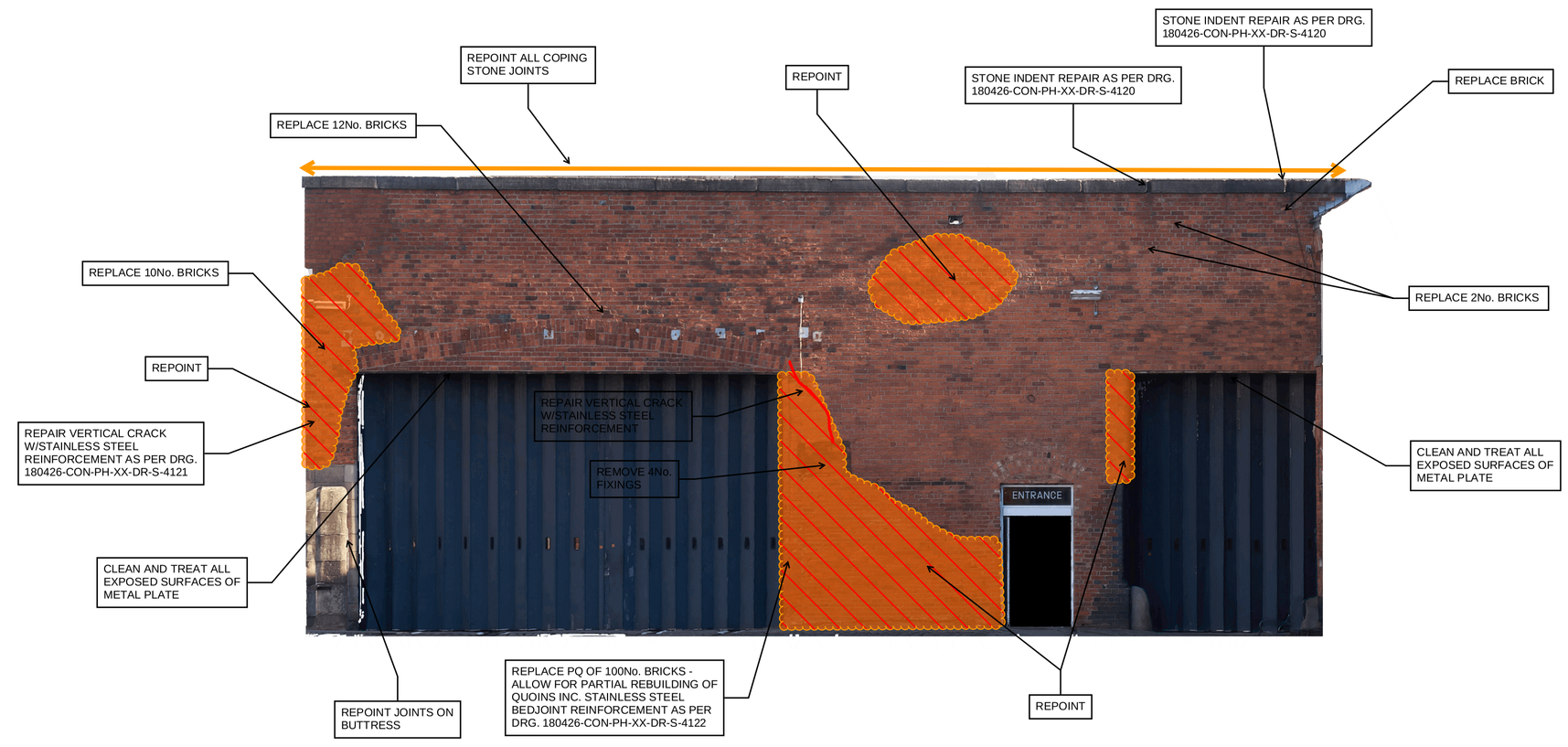
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALIST DRAWINGS AND SPECIFICATIONS

2. DO NOT SCALE FROM THIS DRAWING IN EITHER PAPER OR DIGITAL FORM. USE WRITTEN DIMENSIONS ONLY.



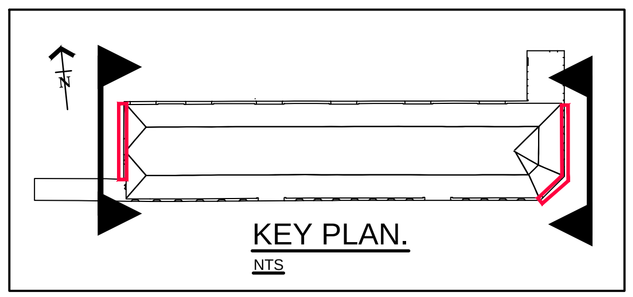
EAST ELEVATION

SCALE 1:75



WEST ELEVATION

SCALE 1:75



NOT FOR CONSTRUCTION

Rev	Date	Description	Drawn	Check
P2	18.08.21	REPAIRS ADDED	KC	KC
P1	06.12.19	STAGE 3 ISSUE	PM	SW

conisbee | Consulting Structural Engineers Consulting Civil Engineers

London • Cambridge • Norwich

1-5 Offord St London N1 1DH
Telephone 020 7700 6666
www.conisbee.co.uk

Drawing Status
PRELIMINARY

Project
Science & Industry Museum.
Manchester

Title
Power Hall Repairs
East & West Elevations (External)

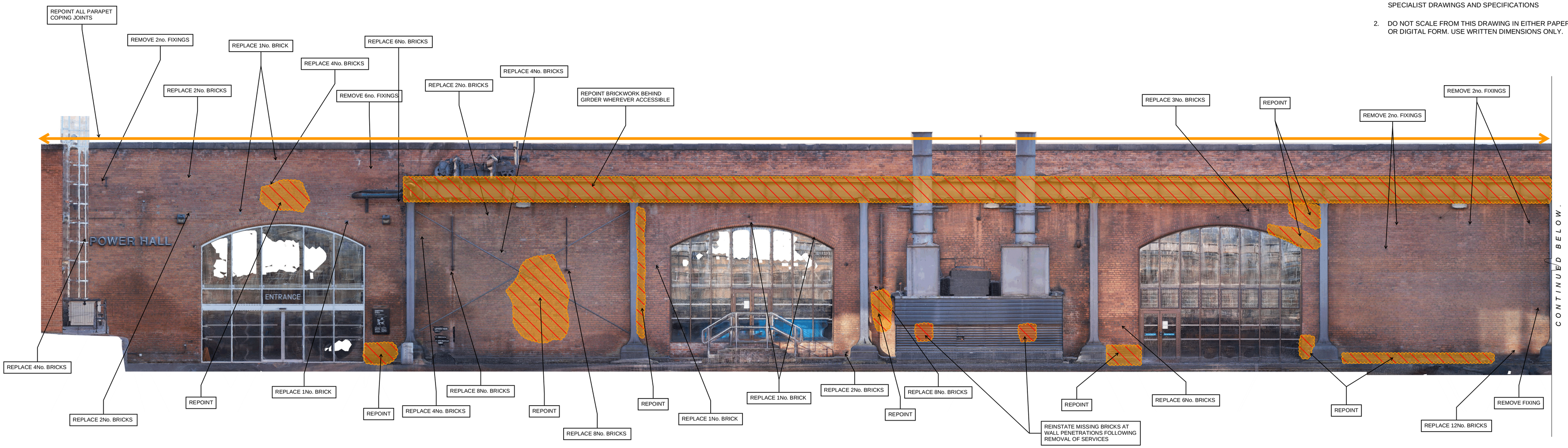
Drawing No
180426-CON-PH-XX-DR-S-3104

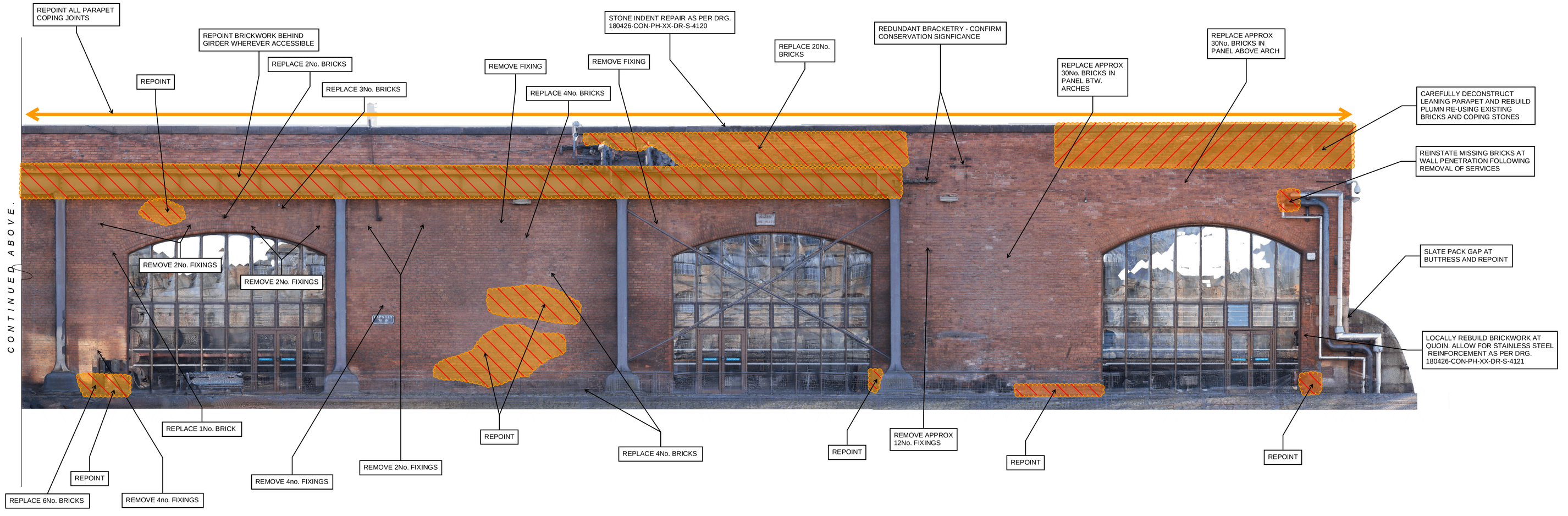
Date Dec 2019
Scale 1:75@A1
Drawn SW
Engineer SW
Project No **180426**
Revision **P2**

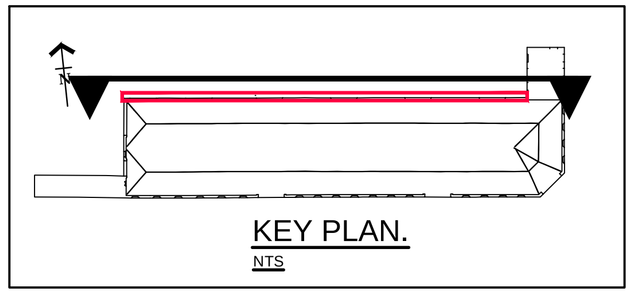
GENERAL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALIST DRAWINGS AND SPECIFICATIONS

2. DO NOT SCALE FROM THIS DRAWING IN EITHER PAPER OR DIGITAL FORM. USE WRITTEN DIMENSIONS ONLY.







NOT FOR CONSTRUCTION

Rev	Date	Description	Drawn	Check
P2	18.08.21	REPAIRS ADDED	KC	KC
P1	06.12.19	STAGE 3 ISSUE	PM	SW

conisbee | Consulting Structural Engineers Consulting Civil Engineers
London • Cambridge • Norwich
1-5 Offord St London N1 1DH
Telephone 020 7700 6666
www.conisbee.co.uk

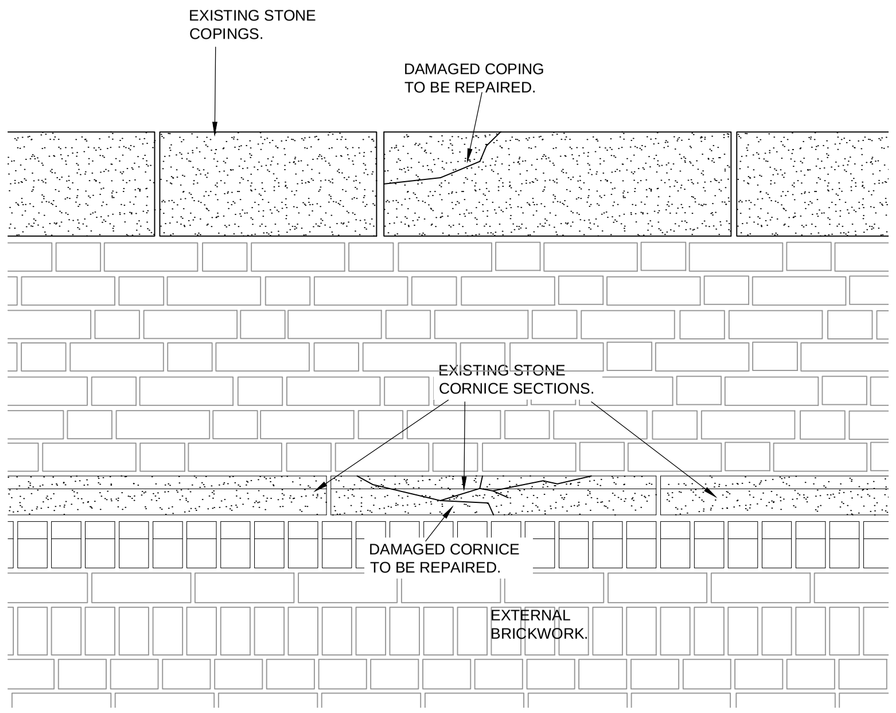
Drawing Status
PRELIMINARY

Project
Science & Industry Museum.
Manchester

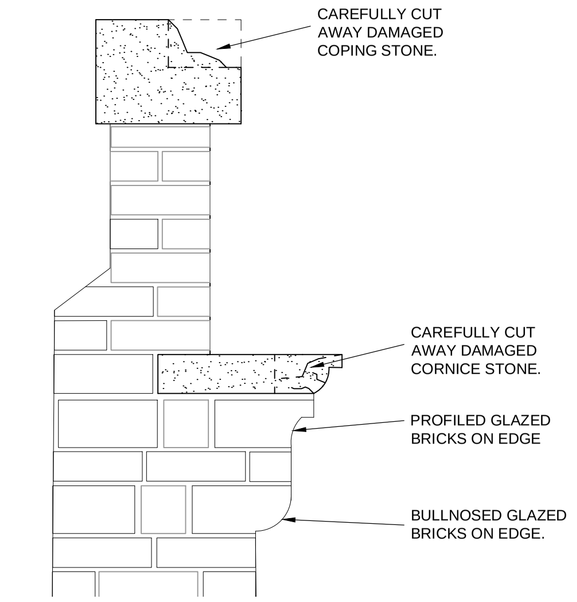
Title
Power Hall Repairs
North Elevation (External)

Drawing No
180426-CON-PH-XX-DR-S-3105

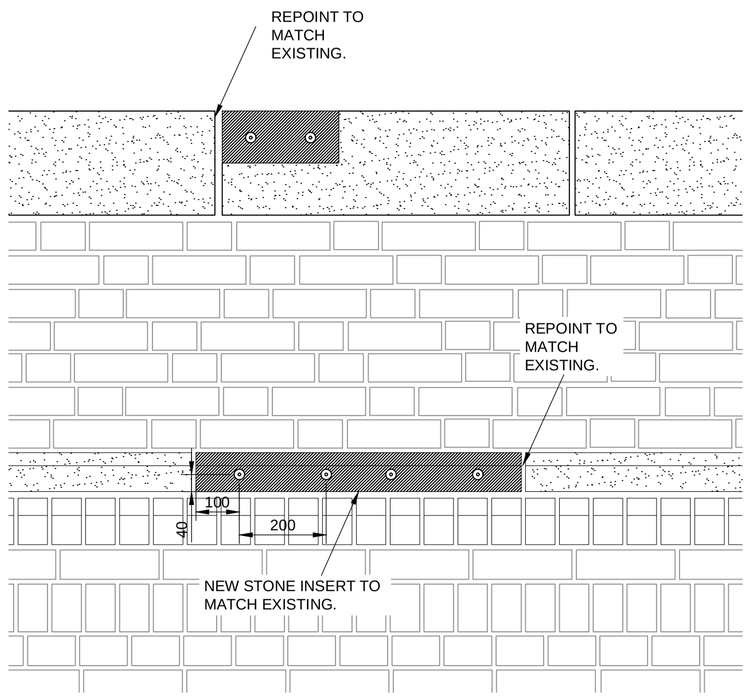
Date Dec 2019
Scale 1:75@A1
Drawn SW
Engineer SW
Project No **180426**
Revision **P2**



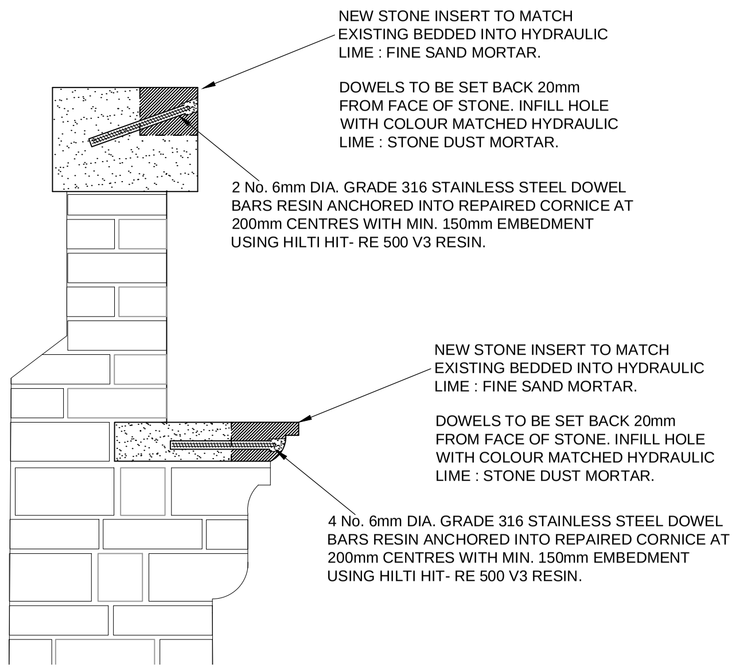
TYPICAL DAMAGED CORNICE & COPING.
SCALE 1:10



SECTION THRO' DAMAGED CORNICE & COPING
SCALE 1:10



TYPICAL REPAIRED CORNICE & COPING.
SCALE 1:10



SECTION THRO' REPAIRED CORNICE & COPING.
SCALE 1:10

GENERAL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALIST DRAWINGS AND SPECIFICATIONS
2. DO NOT SCALE FROM THIS DRAWING IN EITHER PAPER OR DIGITAL FORM. USE WRITTEN DIMENSIONS ONLY.

STRUCTURAL REPAIR NOTES

1. REFER TO SECTION C41 OF CONISBEE'S SPECIFICATION FOR DETAILED STONE REPAIR REQUIREMENTS.
2. TYPICAL REPAIR DETAILS ONLY ARE SHOWN. LOCATIONS AND EXTENT OF REPAIR ARE TO BE AGREED WITH THE SE/CA BEFORE ANY WORK IS UNDERTAKEN.
3. STONE CORNICES ARE PRESENT TO SOUTH AND EAST ELEVATIONS ONLY. COPING STONES ARE PRESENT AT ALL ELEVATIONS.

NOT FOR CONSTRUCTION

Rev	Date	Description	Drawn	Check
P1	11.12.19	Stage 3 Issue	SW	KC

conisbee | Consulting Structural Engineers
Consulting Civil Engineers
London • Cambridge • Norwich
1-5 Offord St London N1 1DH
Telephone 020 7700 6666
www.conisbee.co.uk

Drawing Status
PRELIMINARY

Project
SCIENCE & INDUSTRY MUSEUM
MANCHESTER

Title
POWER HALL REPAIRS
TYPICAL STONE REPAIRS

Drawing No
180426-CON-PH-XX-DR-S-4120

Date DEC 2019
Scale 1:10@A1
Drawn SW
Engineer SW
Project No **180426**
Revision **P1**