

# Talking Reuse: Reusing Assets

# Welcome

Andy Yates - tERC

# Agenda

1. News
2. TBC.London
3. Reusing Building Services
4. TUMO, Armenia
5. Q+A

Please submit any questions  
via Slido: #3021166



# News

Andy Yates - tERC

# Talking Reuse: Reusing Assets

## Tipping Point East

Tipping Point East (TPE) is a circular construction hub based in Newham, East London.

TPE operates from a 20,000 m<sup>2</sup> industrial site in the Royal Docks, bringing together material reuse, low-carbon construction, training and cultural activity to support a just transition in the built environment.



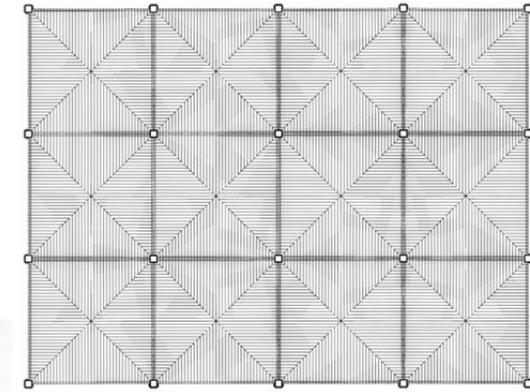
# Talking Reuse: Reusing Assets

## Arup's ReVault

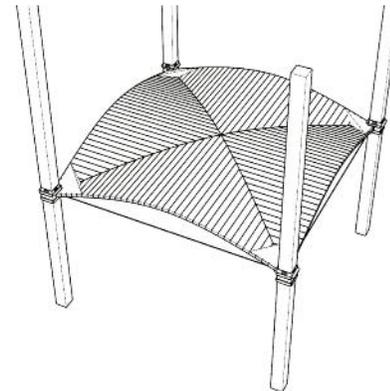
- **Quadripartite vault** form from remanufactured concrete elements
- **Reuse** of **linear** saw-cut RC blocks to form a tied shallow vault with an **800mm** rise
- RC blocks could range from **125-150mm thickness** depending on source slab thickness
- **400 mm width** of linear element
- Special edge pieces resolves the **column interface** and may be integrated with tie detail
- **Steel tie** to resolve thrust forces may be integrated with column connector



3D render of assembled ReVault bays



Series of ReVault bays on plan



Single bay of ReVault illustrating linear components



Linear components are prefabricated to form 8 'leaves' in a single bay

# Talking Reuse: Reusing Assets

## Arup's ReVault



# Talking Reuse: Reusing Assets

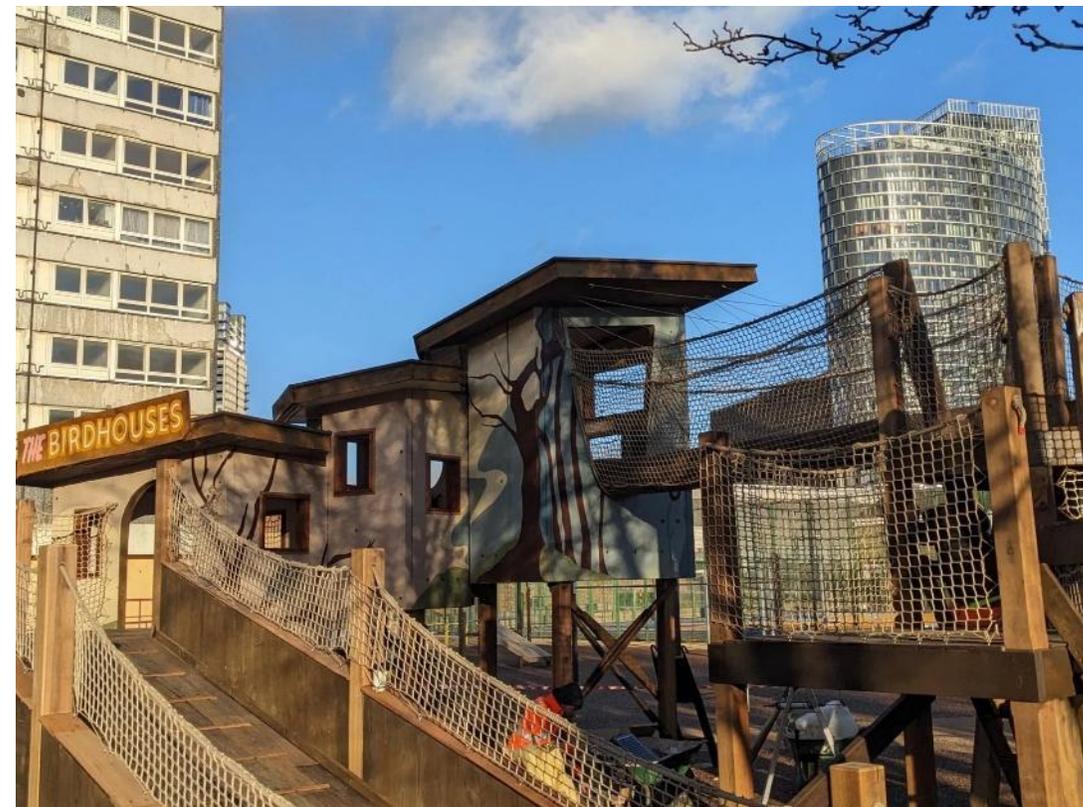
## Future Events



### Talking Reuse x NSQ: The Client's Perspective

29 April 2026, 18:00 - 20:00

Registration opening soon  
(Priority window for tERC members)



### Talking Reuse: Regenerative Design

4 June 2026, 18:00 - 20:00

Registration opening soon

# TBC.London

Tom Webster - Webb Yates

# WEBB YATES

TBC:London

Reusing Existing Assets

18.03.26

# 318 Oxford Street



# Two types of steel re-use at TBC:London

- 1930s steel from Oxford Street Donor Building
- Modern Steel from Cleveland Steelwork which has lost its provenance



# Design Guidance at the Time

- SCI Guide P427 Structural Steel Re-use
- Addendum to SCI Guide P427 Re-use of Pre-1970 Steelwork
- BS EN 10365, BS EN 10034, BS EN1090-2 Geometric Tolerances and deviations of Steelwork
- BS EN 1993-1-1 and BS EN 1993-1-8 Re-use of members with Holes

# Basic Member Acceptance

- No built-up members (unless welds are tested)
- No spliced members (individual lengths of a member can be cut)
- No significant loss due to corrosion
- No signs of fire exposure
- No evidence of Plasticity observed in the steel surface
- Members must meet geometric tolerance of BSEN1090-2



# Testing and Assurance

Steel is tested in batches according to section sizes

- Test for the following
- Yield Strength
- Ultimate Strength
- Elongation
- Impact Toughness
- Weldability

TBC.London tested 6 members per group.  
Minimum is 1 per group

.

# Defect Identification



Defect: Fabrication Hole

Defect: Web Damage

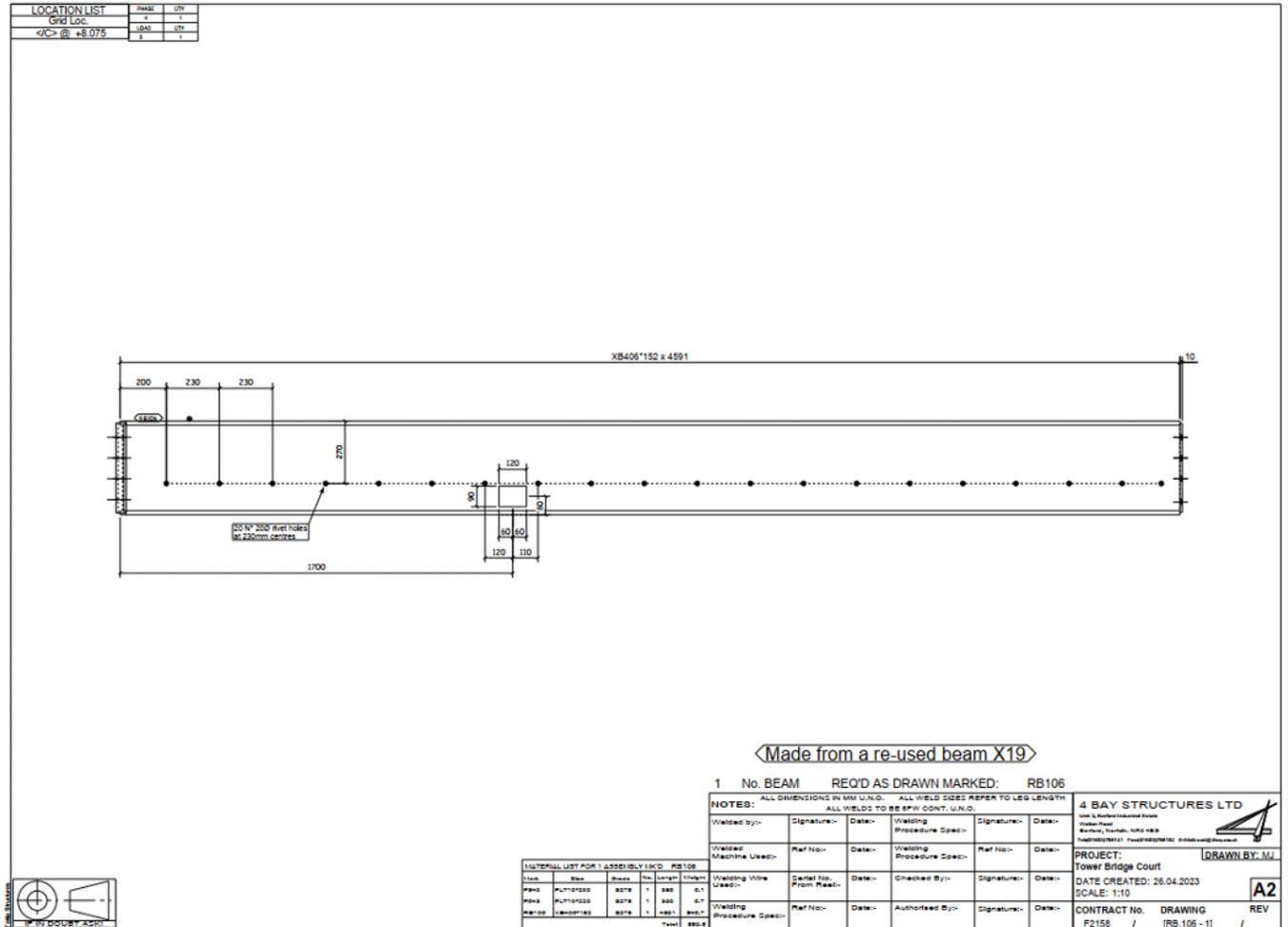


Defect: In Service  
Penetration

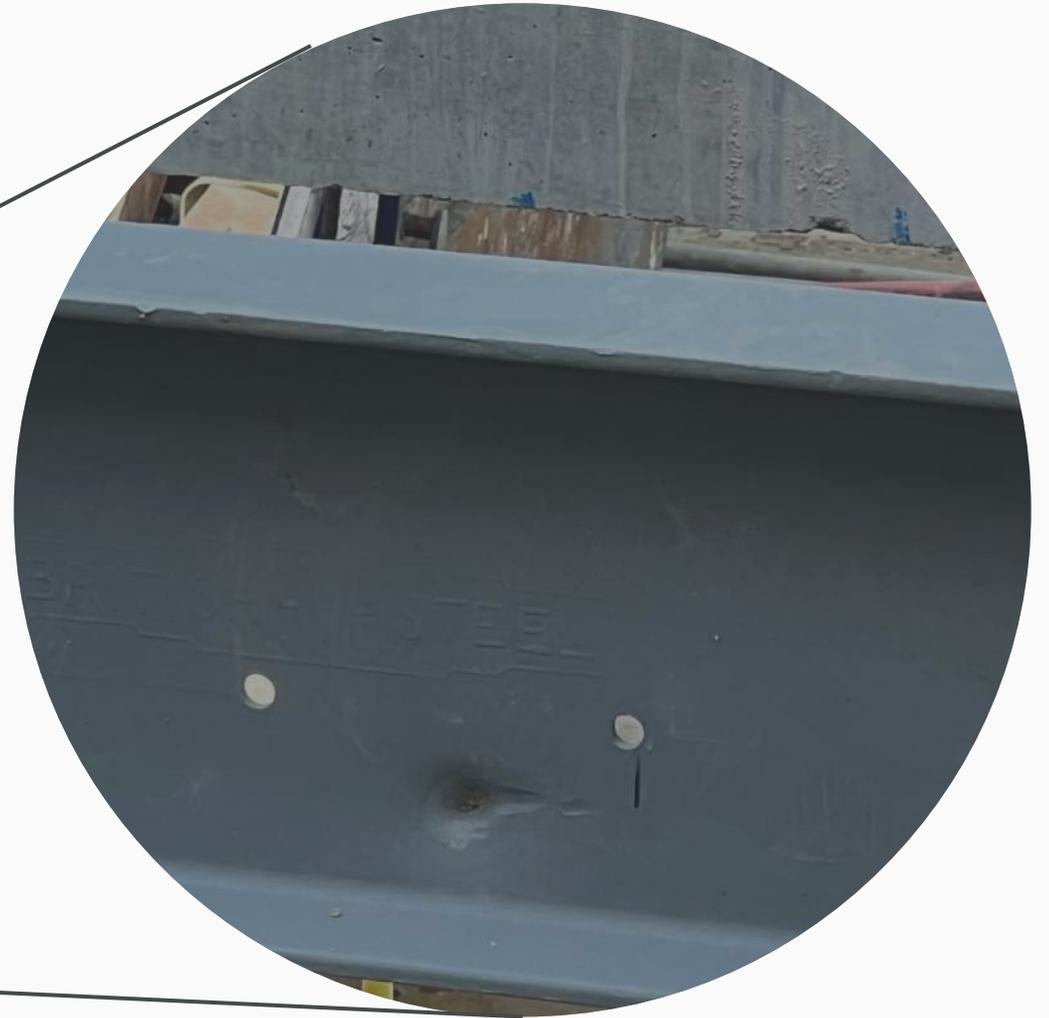
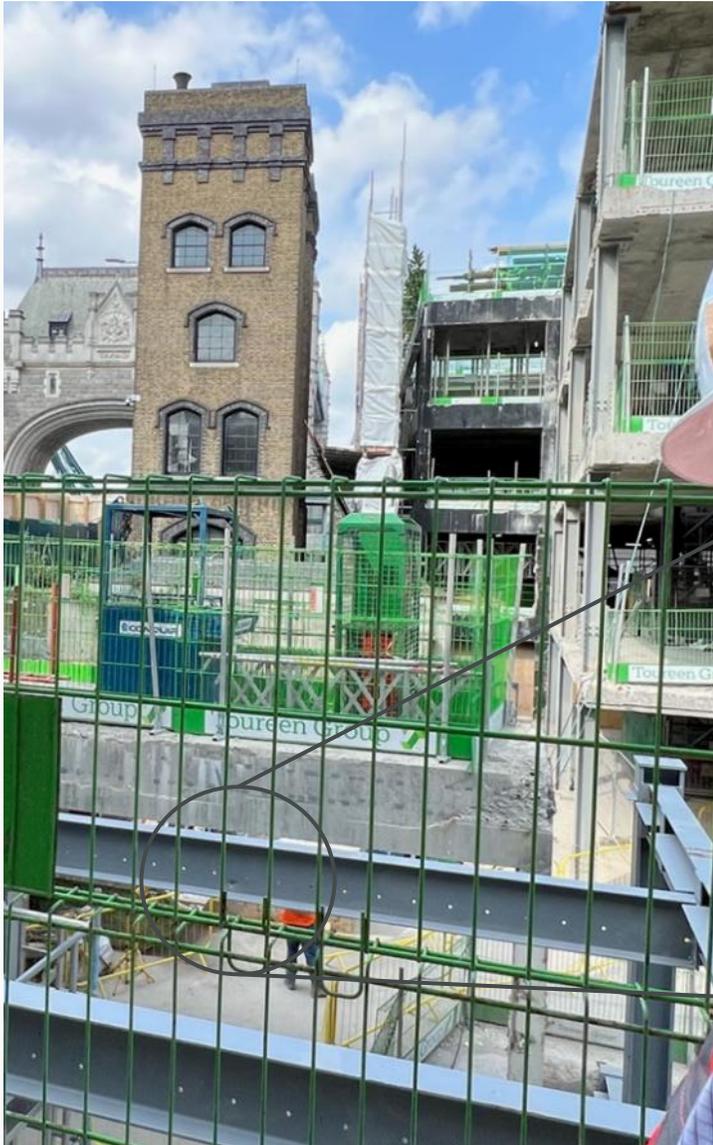
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# Documentation and Refabrication



# Install



WEBB YATES

One of the questions I get asked most about TBC:London by Engineers is how did we satisfy the requirements of EN1090-2 to determine the execution class with pre 1970s steelwork?

BS EN1090-2 Asks for the following to be documented for structural steel

- Properties and grades
- Geometrical Tolerances
- Identification and Traceability (*Provenance*)

We took the view that we would use reasonable skill and care to understand the following about the steelwork

- Assess the steelwork to all available guidance at the time
- Test the steelwork to understand its properties
- Do more tests than required to understand variation in properties
- Use the most conservative values from the tests
- Advise the client and contractor that the steelwork would not meet current standards for manufacture

# Execution of steel structures and aluminium structures. Reuse of structural steel

PD CEN/TS 1090-201:2024

Published August 2024

This document gives complimentary provisions to EN 1090-2 for the use of reclaimed structural components for the execution of steel structures to EXC1, EXC2 and EXC3 for quasi-static loading not subject to fatigue loading.

# Flow Chart for the choice of testing protocol;

Reclaimed structural components have known provenance?

Yes

No

The material is Type 1 (post 1970) structural steel

Yes

No

Original Inspection documents  
available & specific to the  
reclaimed components

Yes

No

Protocol A

Protocol B

Protocol C

Protocol D

The provenance should be considered as known when at least the geographical location, building year and former function of the components is known

# Testing Protocol – Type 1 Structural Steelwork

## Protocol A

Strength, elongation impact toughness  
etc declared based on specific test results  
in original documentation according to  
EN 10204

## Protocol B

The member of the test unit with the  
lowest hardness value should be taken as  
representative and tested with destructive  
techniques

# Testing Protocol - Type 2 Structural Steelwork

## Protocol C

The following members of the test unit to be submitted for tensile testing

- A) Member with the lowest hardness value
- B) The member with the highest hardness value
- C) And one randomly selected member

## Protocol D

All reclaimed structural components shall be submitted to destructive testing

# Reuse of Building Services

Elisa Sartori - Webb Yates



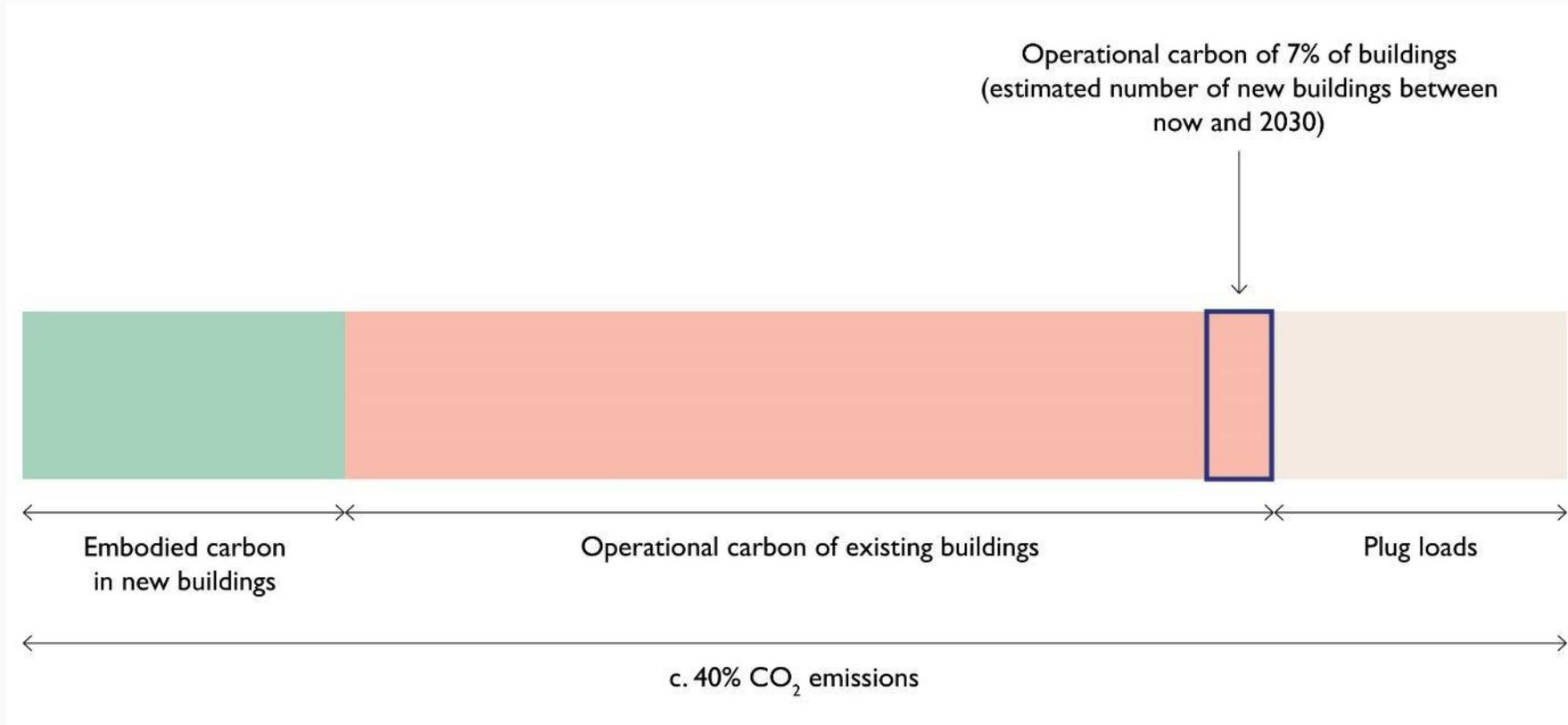
# WEBB YATES

## tERC: Talking Reuse Reuse of Building Services

Reflections from retrofit projects

Elisa Sartori - 18.03.2026

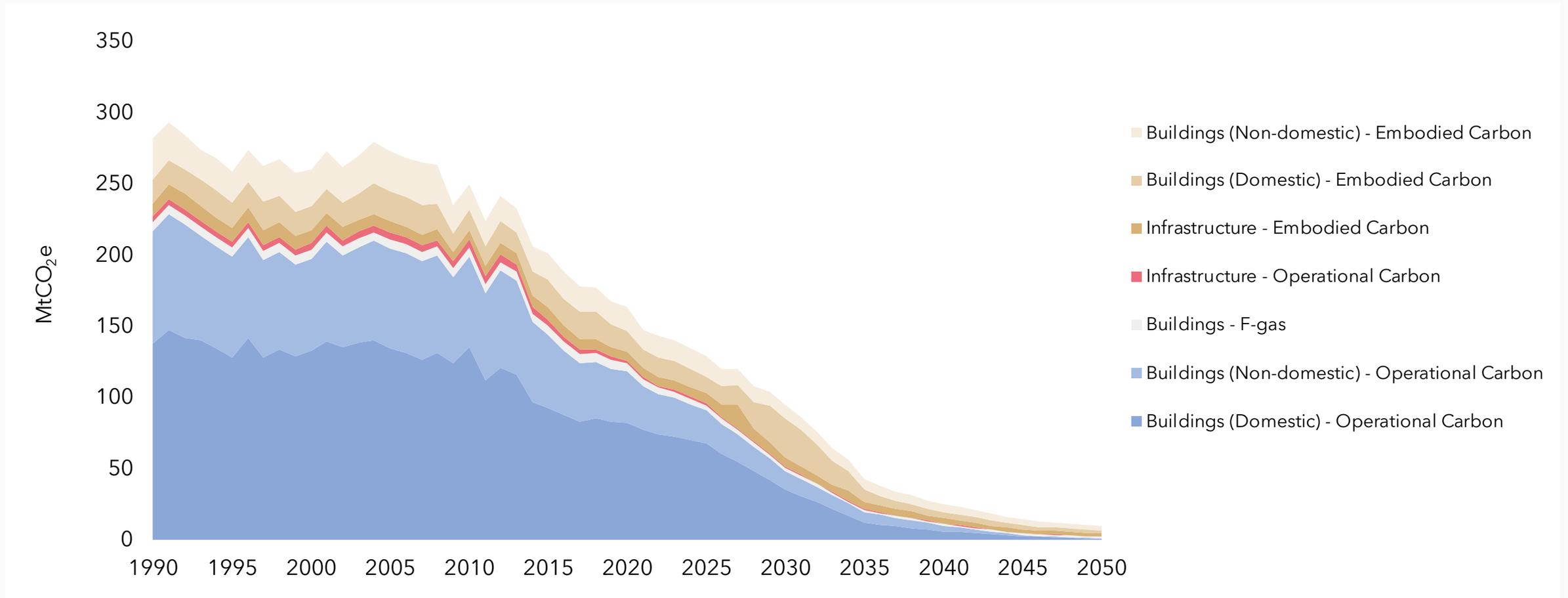
# Carbon emissions in the built environment



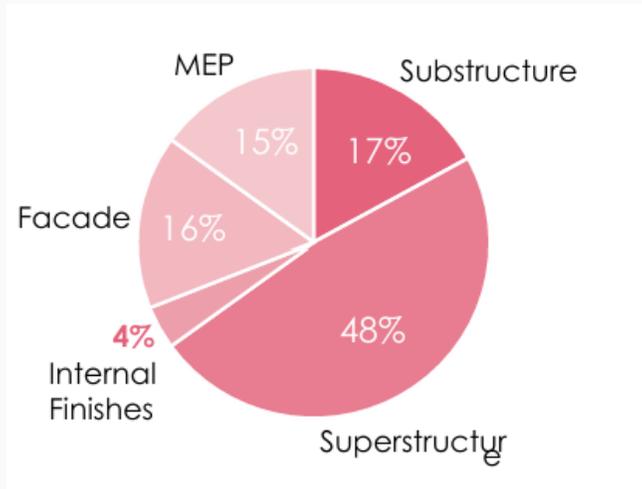
Embodied vs operational carbon  
new-build vs retrofit

# UKGBC Trajectory Data

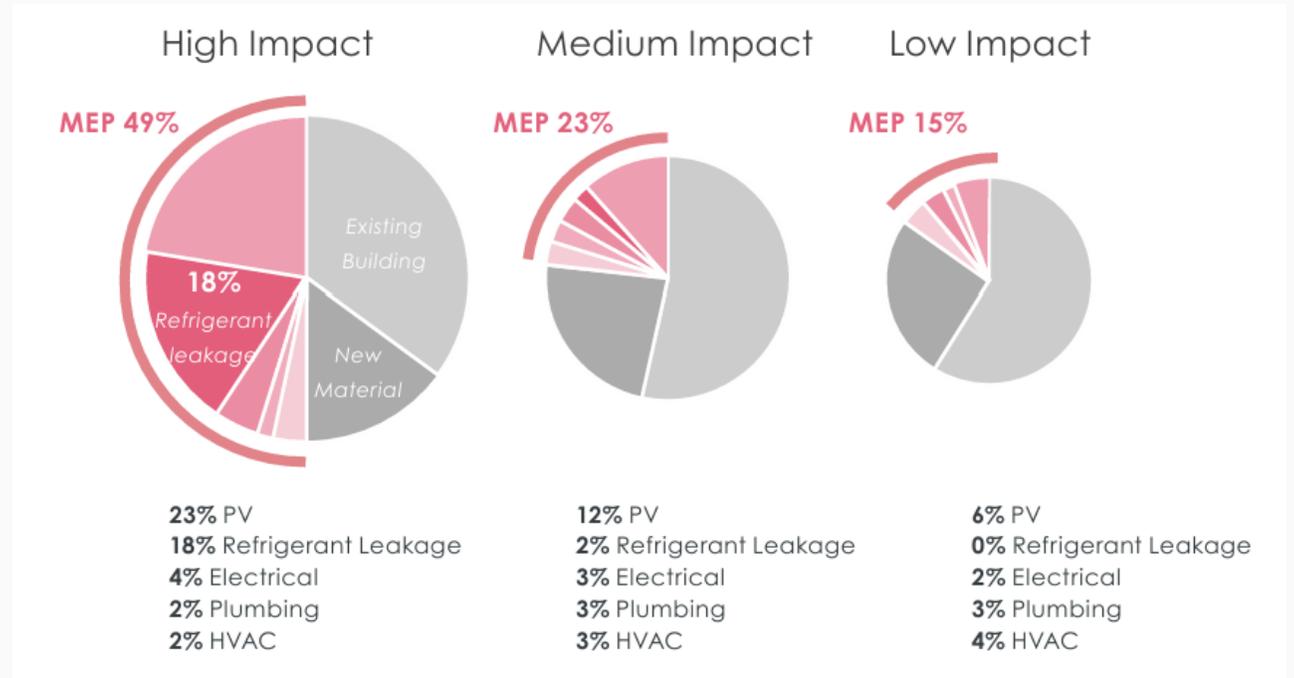
Historic (1990-2018) built environment emissions (MtCO<sub>2</sub>e), alongside projected emissions from the built environment (2018 through to 2050)



# Embodied Carbon in Building Services



Office - New Building



Office - Retrofit

Source: LETI - Embodied Carbon Primer

WEBB YATES

# MEP Service Lifespan

Service	Indicative Lifespan
Boiler	25-30 years
Heat Pump	15-20 years
Fan/AHU	15-20 years
Ductwork	40+ years
Pumps	10-20 years

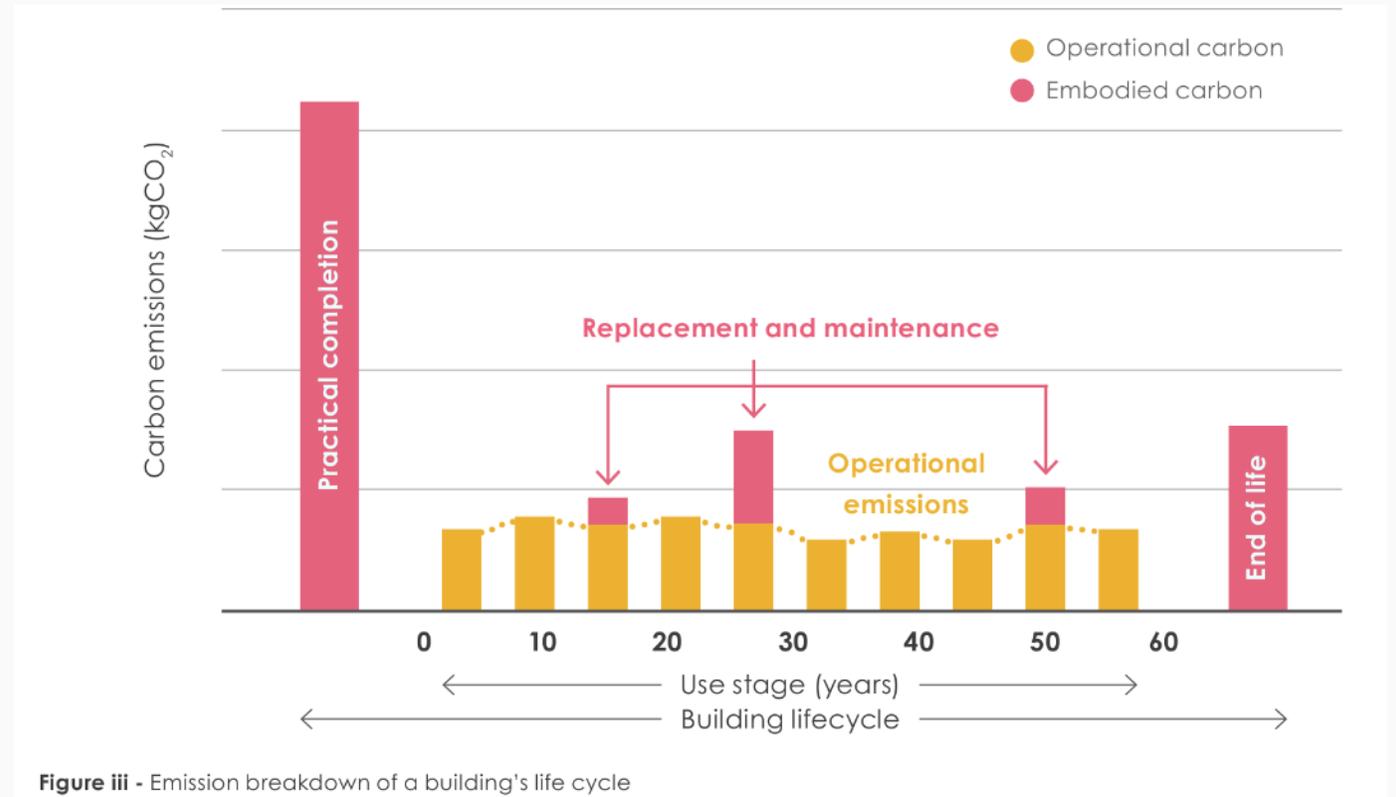
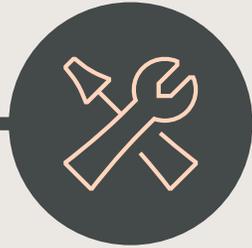


Figure iii - Emission breakdown of a building's life cycle

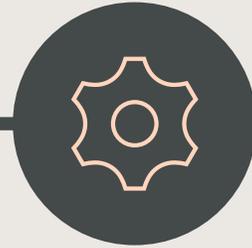
# Cat A Offices Paradox



Cat A installation



Tenant fit-out



Strip-out



Landfill

# Wharf Road



Northumbria University



112



110





Capacity?

Condition?

Compliance?

Controls?



Northumbria University

# Northumbria University



# Church House



# Church House



# Church House



# Science Museum Main Shop



# Lessons Learnt - Existing Services Reuse Process

01

Survey

02

Validation

03

Decision

04

Adaptation

05

Risk Management

06

Maintenance

# Key Challenges



Skill set



Replace rather than repair mentality



Knowledge and collaboration across industry



Easier and quicker to design and install new rather than reuse



Risk Management / Warranties



Costs



Design for efficiency rather than WLC approach



Programme pressure

Are we replacing systems too early?

# TUMO, Armenia

Florence Browning - Webb Yates

# WEBB YATES

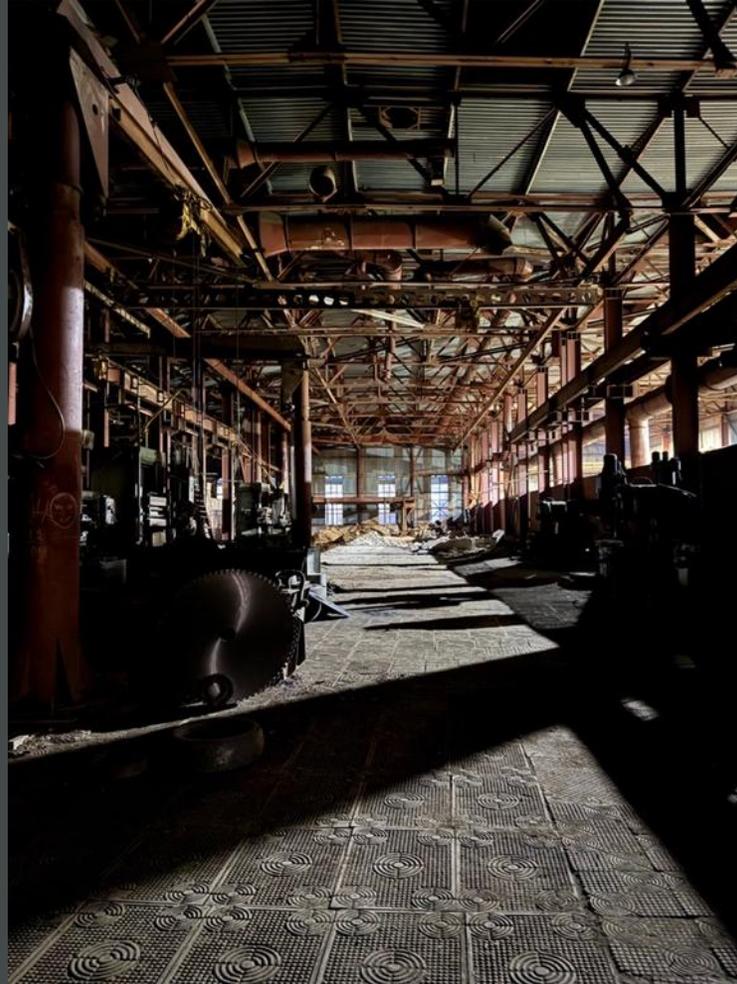


tERC: Talking Reuse –  
Reusing Assets

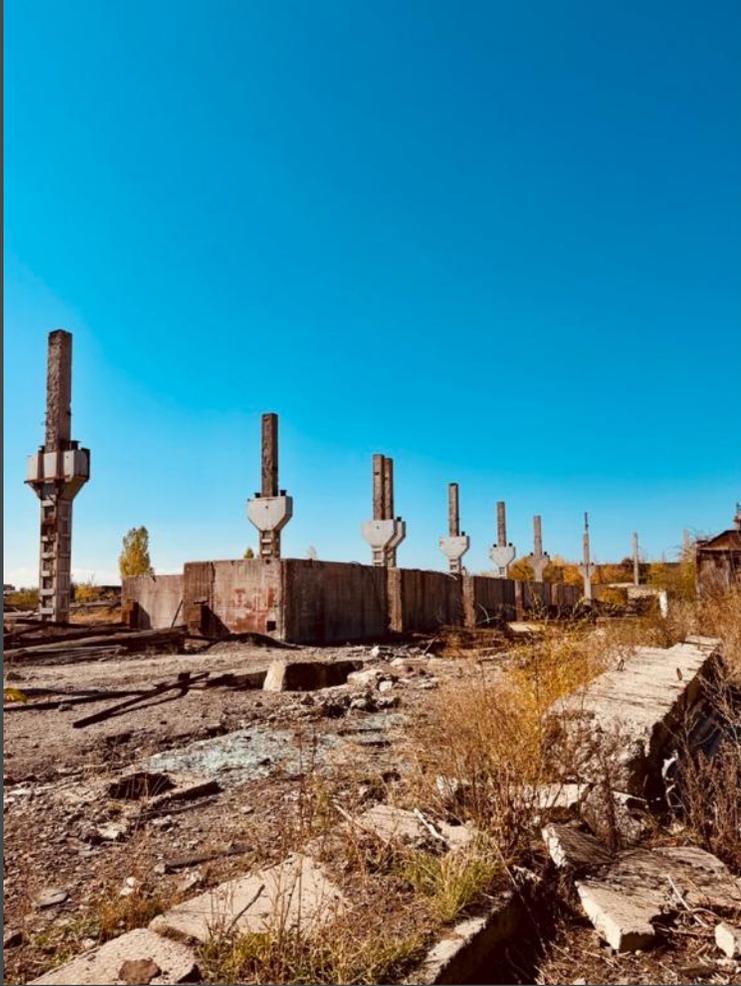
TUMO - Armenia

18.03.2026

# Disused Factory Buildings



# Dismantled into Sellable Components



# Materials Testing – NDT & Destructive



Non Destructive Testing

Destructive Testing

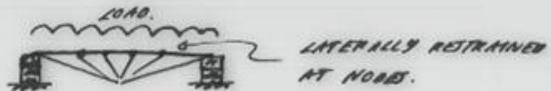


Site Investigation

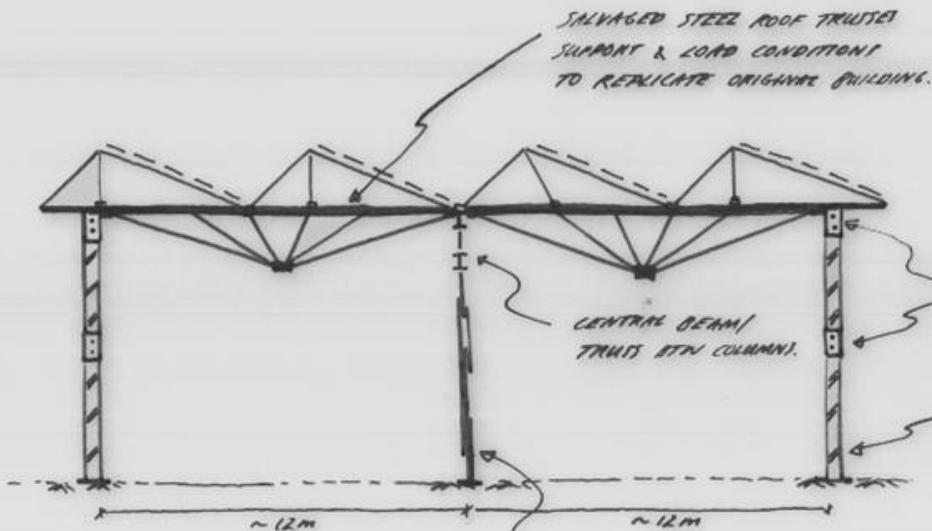


KEY CONSIDERATIONS - TRUSS RE-USE:

- STEELWORK / STRUCTURE TO BE DISMANTLED CAREFULLY AS TO NOT DAMAGE TRUSS ELEMENTS.
- CONNECTIONS TO BE UNBOLTED
- NO CUTTING OF WEIBED ELEMENTS.
- TRUSSES TO BE VISUALLY INSPECTED FOR DEFECTS
  - WARPING / DAMAGE TO ELEMENTS
  - SIGNIFICANT CORROSION / SURFACE DAMAGE / SECTION LOS.
  - CUTTING OF HOLE THROUGH ELEMENTS.
- TRUSSES OF SUITABLE CONDITION TO BE LOAD TESTED
  - 1N<sup>2</sup> PER TYPE & JOINCE.
  - SIMPLY SUPPORTED WITH LOAD UNIFORMLY DISTRIBUTED.



- ALL SALVAGED STEEL TO BE THOROUGHLY CLEANED TO MEET SUITABLE SURFACE PREPARATION FOR RE PRIMING AND PAINTING FOR CORROSION PROTECTION REINSTATEMENT.
- ALL EXISTING BOLTS TO BE INSPECTED & REPLACED TO MATCH EXISTING.
- ANY ELEMENT TO BE WELDED TO RE MATERIAL TESTED TO CONFIRM
  - STEEL GRADE
  - CHEMICAL COMPOSITION (CEV).



A - TRUSS OPTION - HALF SPAN.

SALVAGED STEEL ROOF TRUSSES  
SUPPORT & LOAD CONDITIONS  
TO REPLICATE ORIGINAL BUILDING.

LIGHT WEIGHT SALVAGED  
STEEL FRAME TO FORM  
ROOF LIGHT & SUPPORT  
BY PANELS.

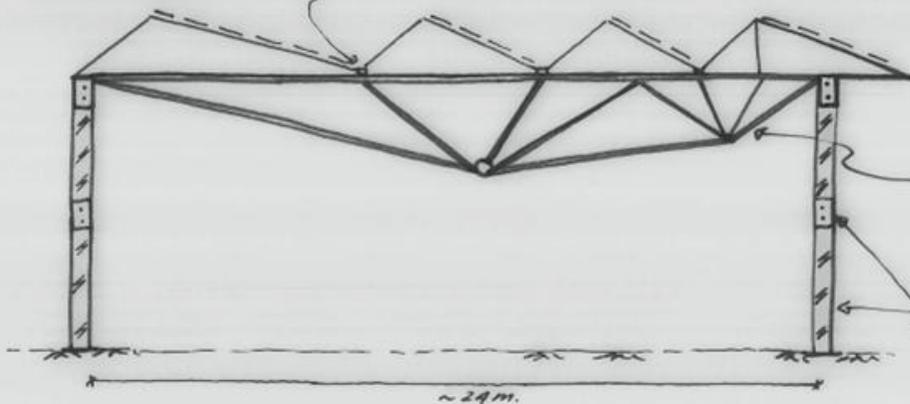
CENTRAL BEAM/  
TRUSS BTW COLUMNS.

PT BASALT STONE  
INTERMEDIATE THE  
BEAMS TO FACADE.

PT BASALT STONE  
EXTERNAL COLUMNS.  
THRU INFILL

CENTRAL COLUMNS  
SALVAGED STEEL FORMED  
FROM MULTIPLE SECTIONS  
SPLICED TOGETHER.

ROOF FRAME LOADS  
TO BE CONCENTRATED  
AT TRUSS NODES.



B - TRUSS OPTION - FULL SPAN

LIGHTWEIGHT SALVAGED  
STEEL FRAME ROOF  
OVER SAIL TO FORM CANOPY.  
ROTATE 90° TO SUIT N-S?

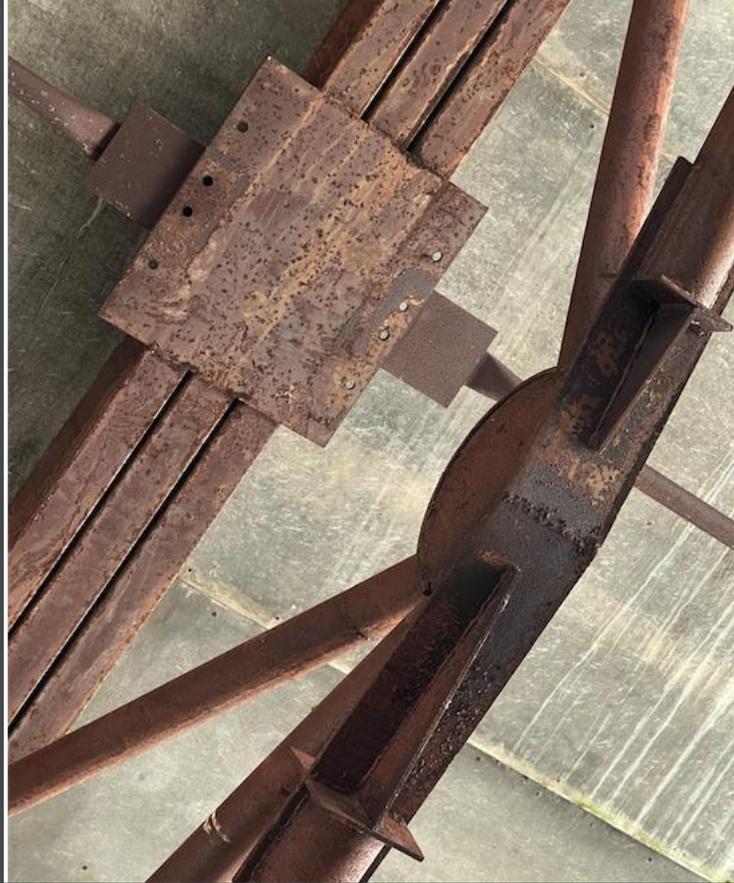
SALVAGED STEEL ROOF TRUSSES  
SUPPORT & LOAD CONDITIONS  
TO REPLICATE ORIGINAL SOURCE  
BUILDING.

PT BASALT STONE EXTERNAL  
COLUMNS & BEAMS.

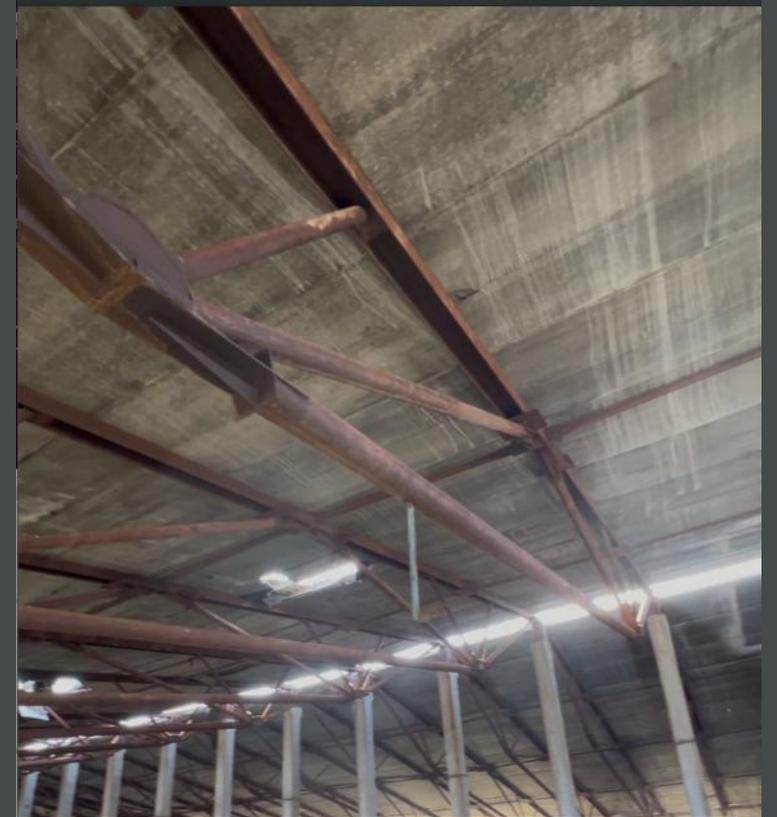
# Selection and Load Testing of Truss Assemblies



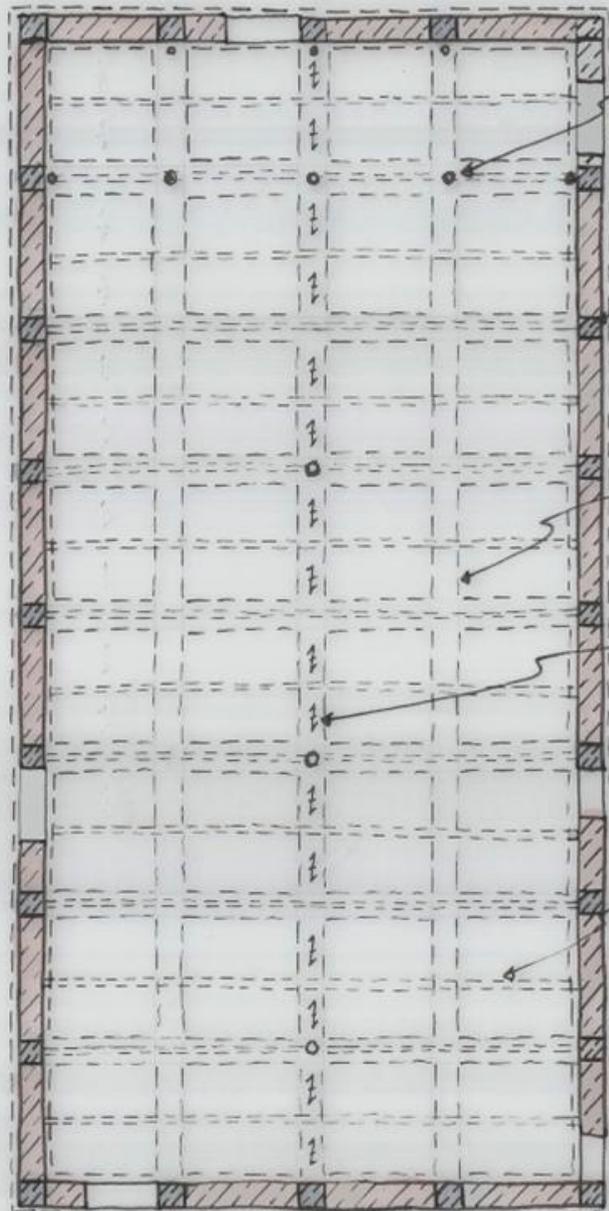
Disassembly



Visual Inspection



Existing Arrangement



GROUND FLOOR PLAN

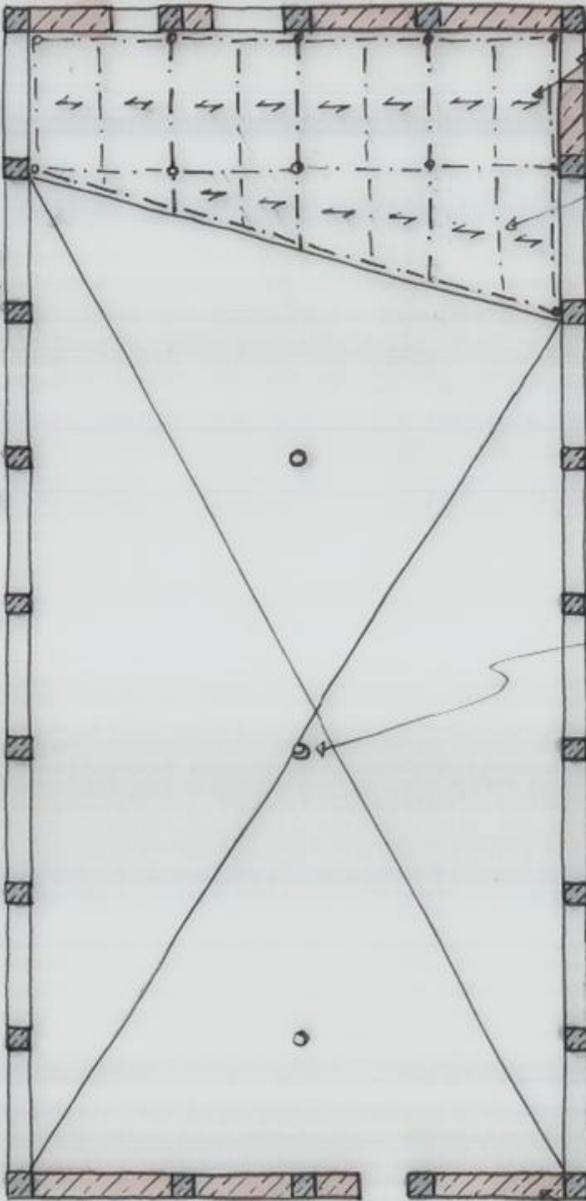
SALVAGED  
STEEL COLUMN.

POST TENSION  
BASALT STONE  
COLUMNS  
TIED INTO  
FOUNDATION

REINFORCED  
STRIP FOOTINGS  
UNDER.

SOLID STONE  
SUSPENDED  
GROUND  
FLOOR SLAB.

THERMAL  
WALL  
LABYRINTH  
UNDER.



MEZZANINE PLAN

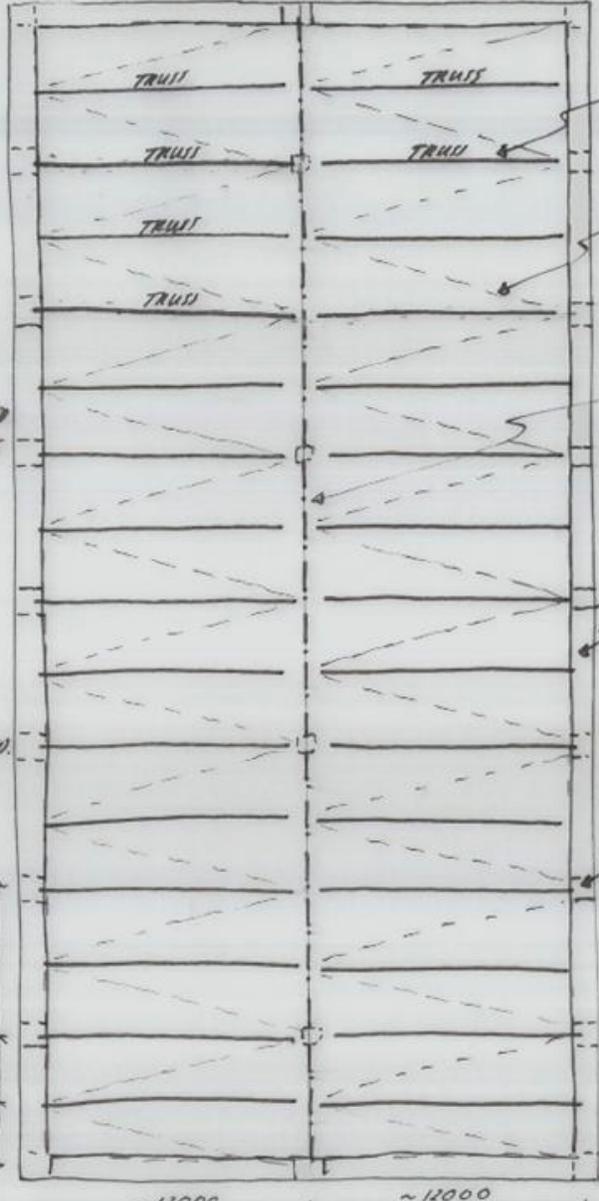
SOLID STONE  
FLOOR SLABS

SALVAGED  
STEEL BEAMS.

POST TENSIONED  
BASALT STONE  
COLUMNS.

SALVAGED  
STEEL COLUMN  
FORMED OF  
MULTIPLE  
WELDED SECTIONS.

THUFF WALL.



ROOF TRUSS PLAN

RECLAIMED  
STEEL TRUSS

ROOF BAKE

SALVAGED  
STEEL BEAM  
OR TRUSS

POST TENSION  
STONE BEAM  
UNDER.

STONE  
COLUMN  
UNDER.

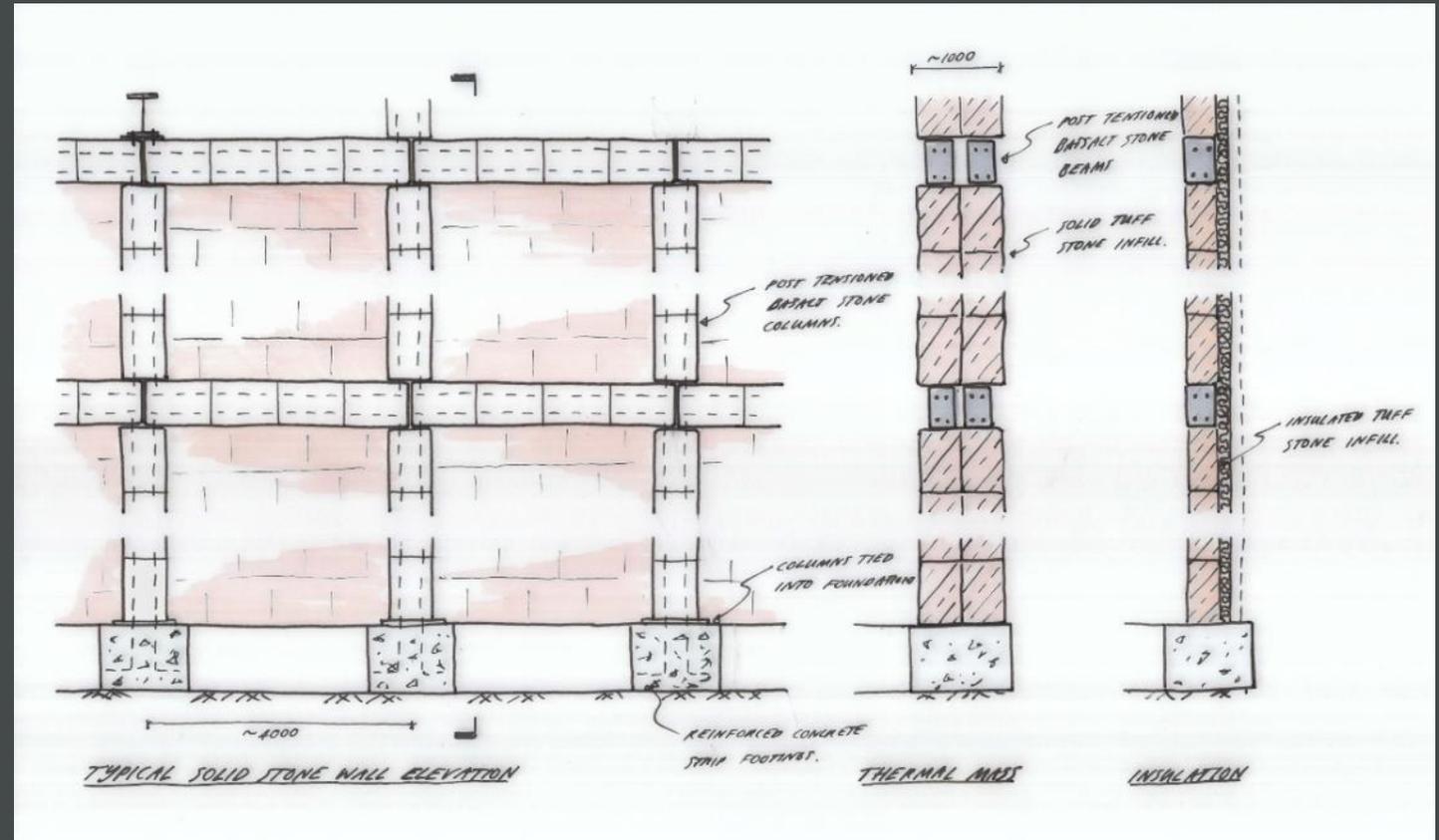
WEBB YATES

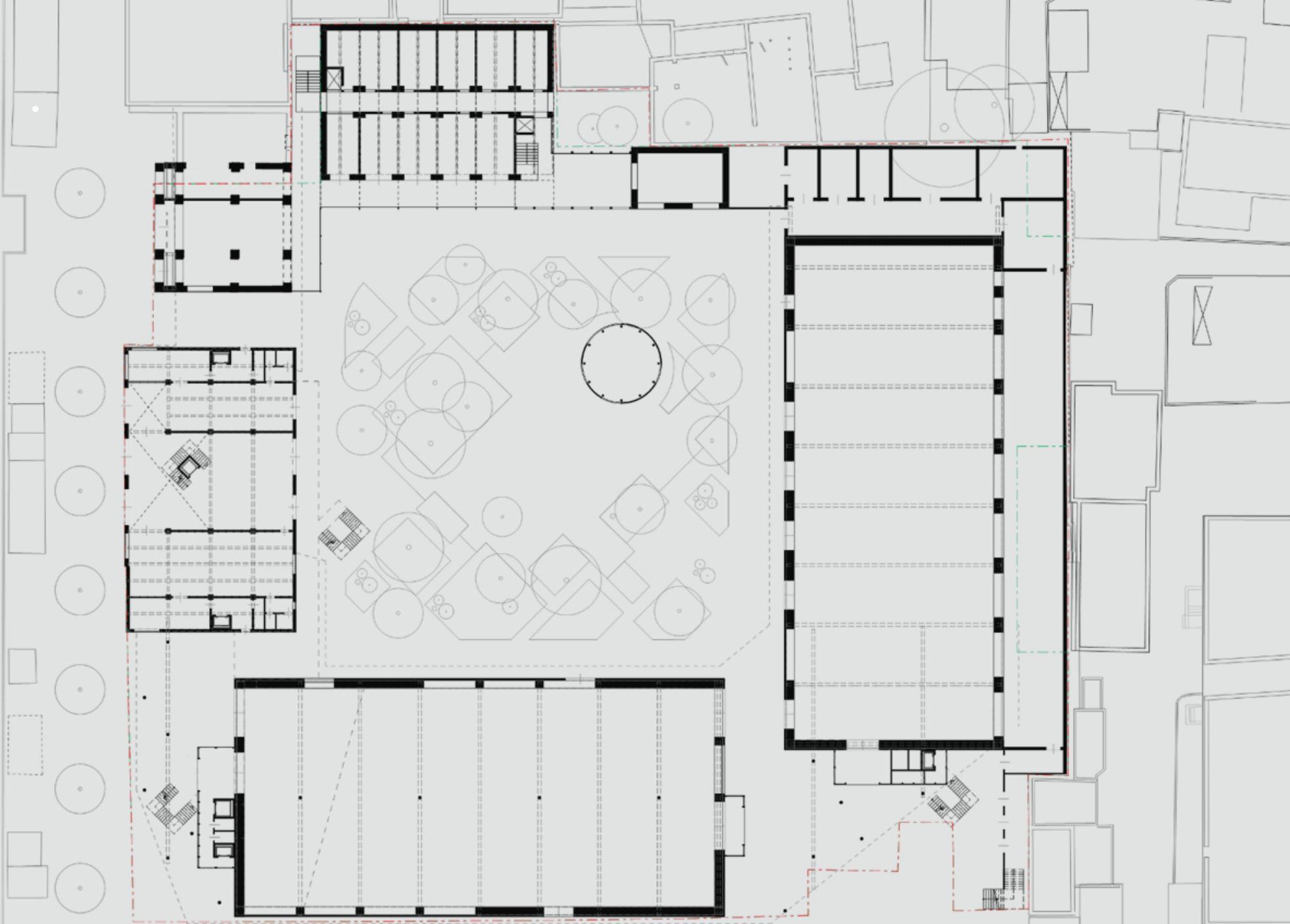
# Design Considerations – Seismic Loads

## 4.1 Structure scope

This protocol has been prepared on the basis that reclaimed steel can be used in Consequence class 1, 2 or 3 structures (see Table B1 of BS EN 1990). Use of reclaimed steelwork in Consequence class 3 structures places additional requirements on the testing regime to determine material characteristics.

Reclaimed steel should not be used in structures subject to fatigue, or in plastically analysed structures which rely on the formation of plastic hinges. Similarly, the use of reclaimed steel in structures subject to seismic loading is excluded, unless the steel plays no part in resisting the seismic action, for example as a pin-ended floor beam.





REV	DATE	DESCRIPTION	NAME
P01	27.10.2025	Stage 2 Interim Issue	BW
P02	28.11.2025	Stage 2 Issue	BW

Mooradian Studio



Gyumri Market

Proposed Ground Floor Site Plan

019	MRKT	MS	CD	ZZ	01	DR	A	2003	P02
Project No	Project Code	Phase	System	Level	Room	Area	Level	Year	Revision

1:200	841 x 594	27.10.2025	28.11.2025	BW	AM
Scale	Size (A x B mm)	Date	Revision	Author	Checker

Concept Design ±0.00 = 1516.74 AOD

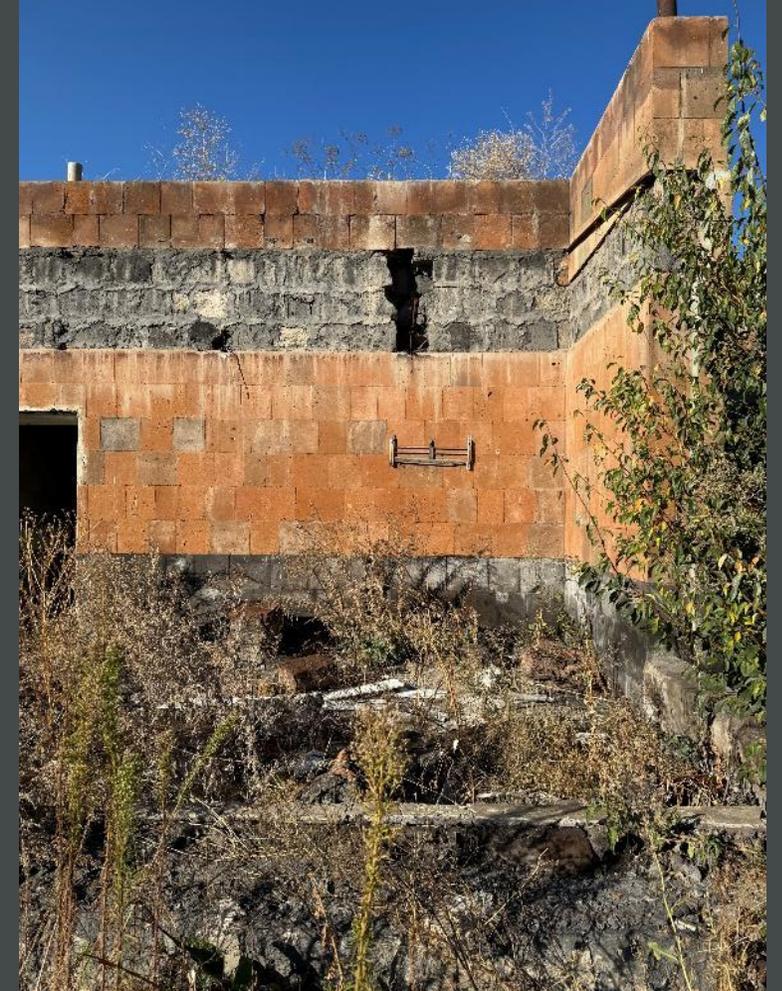
Client:  
TUMD Center for Creative Technologies  
18 Haldipash 82, Yerevan 0098, Armenia

Architect:  
Mooradian Studio  
3rd Floor, 22-27 The Oval, London E2 9DT, UK

Local authority:  
TUMD Center for Creative Technologies

WEBB YATES

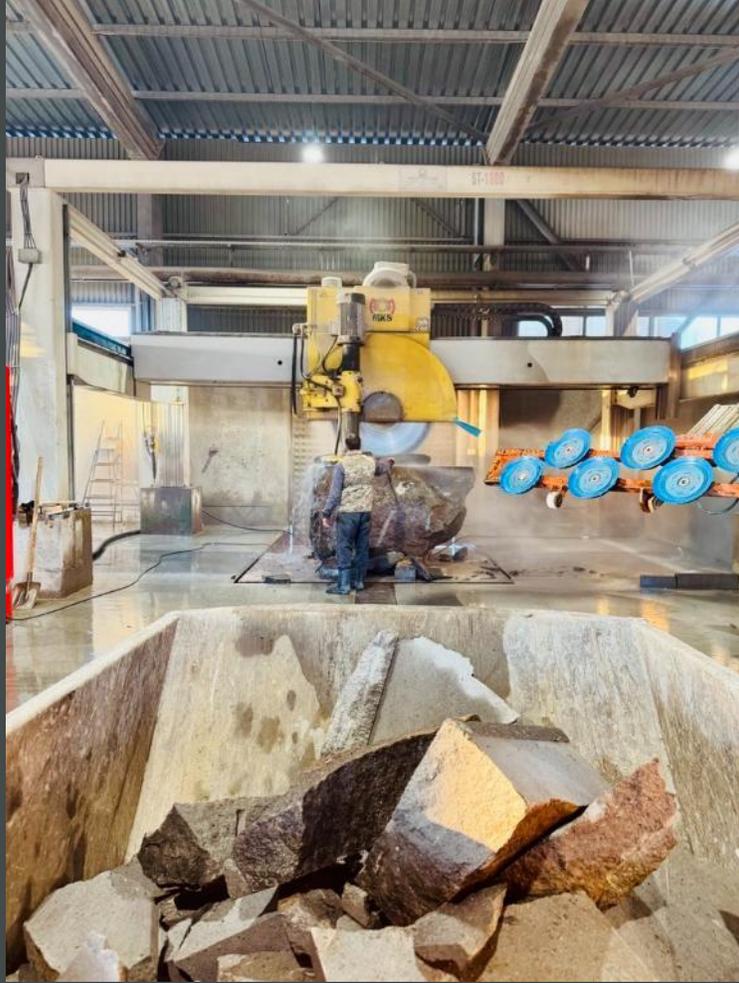
# Reuse of Existing Stone on Site



# Local Stone Sourcing



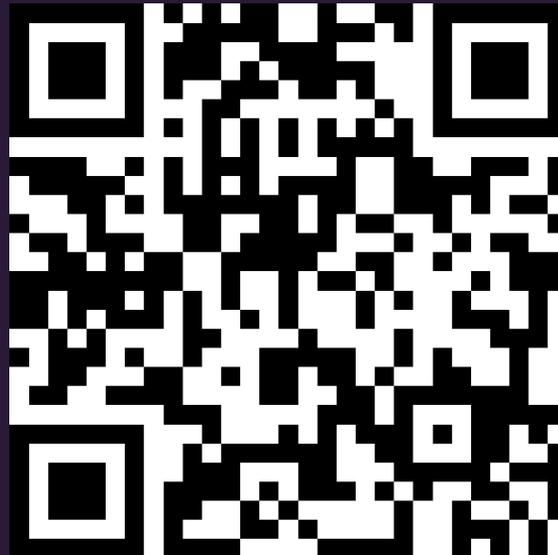
# Stone Processing



# Armenian Culture



Q+A



Thank you



THE  
ENGINEERS  
REUSE  
COLLECTIVE