

DISRUPT
Delivering Innovative Steel ReUse Project

ASBP

The Alliance
for Sustainable
Building Products

DISRUPT Steel Reuse Project – Toolkit Launch Event

Wednesday 22nd March 2023, 18:00-20:00, London

@asbp_uk

Today's programme

18:00 **Welcome to the event**

- **Welcome from our event host and project partner: ISG** – Peter Kelly, Group Director of Sustainable Operations, ISG
- **Welcome from lead partner: ASBP** – Katherine Adams, Technical Director, ASBP
- **Welcome from the National Interdisciplinary Circular Economy Research (NICER) Programme** – Amy Peace, Innovation Lead – Circular Economy, Innovate UK

18:15 **Intro to DISRUPT** – Asselia Katenbayeva, Research Associate, ASBP

Today's programme

18:30 **Steel reuse case studies**

- **Short history of steel reuse and agricultural building case studies** – Roy Fishwick, Managing Director, Cleveland Steel and Jonny Hawkshaw – Director, Simple Works
- **Domestic refurbishment project** – Philippa Birch-Wood, Thrive Director, Chetwoods
- **Elephant & Castle redevelopment and Sloane Square House** – Sally Walsh, Senior Engineer, WSP

19:00 **Launch of toolkit** – Katherine Adams, Technical Director, ASBP

19:15 **Q&A**

19:30 **Drinks and networking**

20:00 **Close**

Thank you to our funders and supporters

- The project has received funding via Innovate UK's Circular Economy for SMEs competition, in collaboration with the NICER programme.
- The NICER programme is a four-year £30 million investment from UKRI consisting of one hub and five specialist research centres aiming to grow the circular economy community through a significant programme of outreach and collaboration.
- The project received support from the Interdisciplinary Centre for Circular Metal.



Who we are



**Not-for-profit, mission led,
membership organisation**

**“To accelerate the transformation
to a healthy, low carbon built
environment by championing the
use of demonstrably sustainable
building products”**

What we do

**Share learning through events, participate in
research projects, advocate product standards,
respond to policy consultations.**



Health and
well-being



Resource
efficiency



Whole life
carbon



Ethics and
transparency



Technical
performance

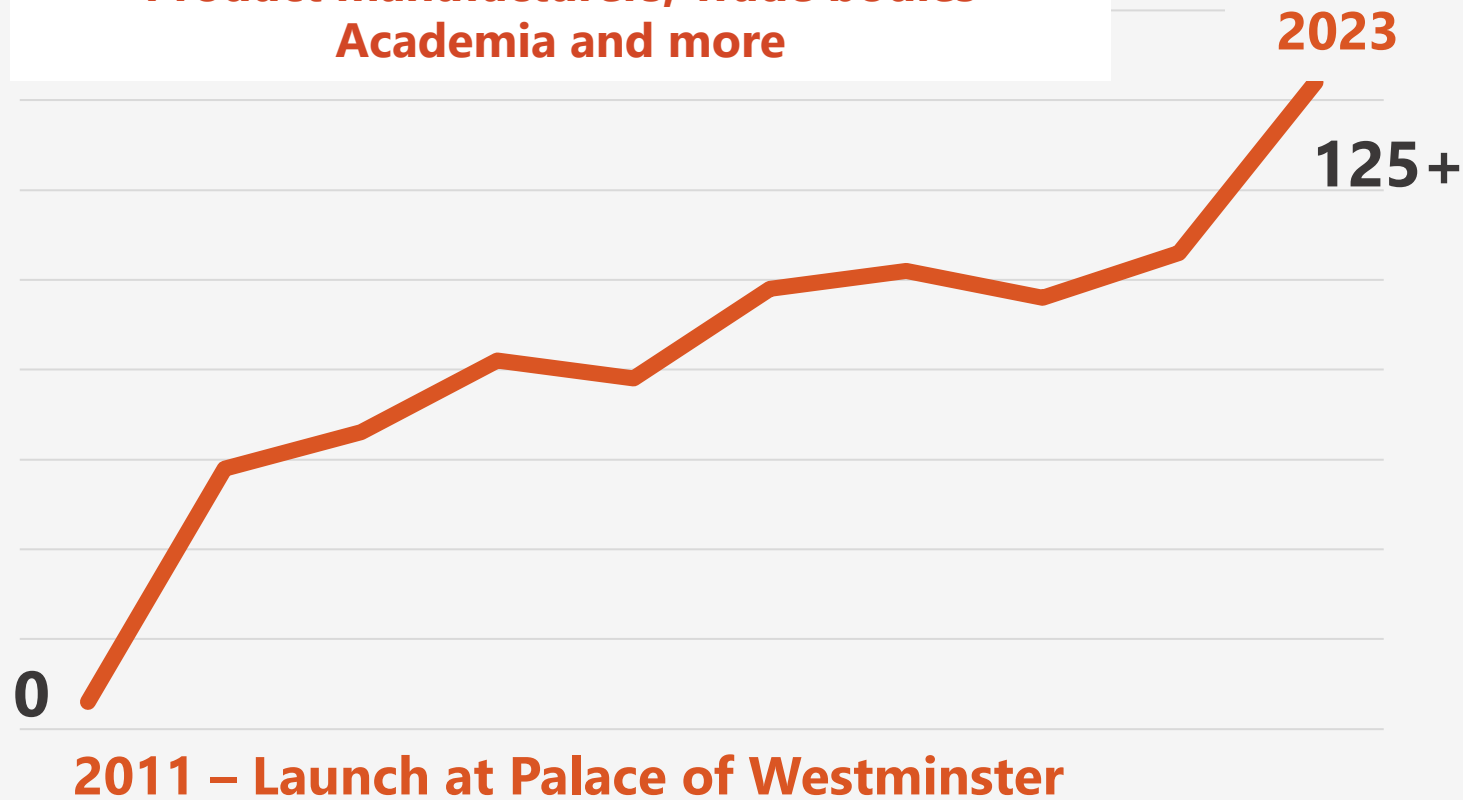


Social
value



Our Alliance – 130 members and counting...

Start-ups, SMEs and multi-national orgs
Architects, Specifiers, Contractors
Product manufacturers, Trade bodies
Academia and more



**In 2021 we donated 100 trees to
Caerphilly Woodlands Trust to
mark our 100th member milestone.**

Simon Corbey Katherine Adams Richard Broad Asselia Katenbayeva



BOARD



Flavie Lowres Debbie Mauger Larry Tate

Gary Newman Mark Lynn Jane Anderson



ASBP TEAM



Marcella Ucci Alex Sparrow Ben Humphries Jon Bootland

Activities



ASBP Awards



Paints & Finishes



Healthy Buildings



Mass Timber



Reducing Plastics



Natural Fibre Insulation



Embodied Carbon/EPD



Circular Economy/Reuse

'Reuse Now' campaign



ASBP has launched a new campaign to encourage greater reuse of building materials within the construction industry and accelerate the transition to a more resource efficient, circular economy.

- **Around 60 million tonnes of construction and demolition waste is created annually in the UK. Whilst much of this is recovered and recycled, only a small percentage is reused.**
- **Planned activities for the campaign include knowledge-sharing webinars, reuse case studies, freely available and topical briefing papers and factsheets, regular blogs and thought pieces.**
- **To reflect our diverse membership network and maximise impact, the campaign will focus on a wide range of materials and applications, and also technical solutions which can aid reuse.**

'Reuse Now' campaign



- 'Reuse Now' is supported by lead sponsor and long-standing ASBP patron member Cleveland Steel and Tubes, with additional support from circular economy experts Reusefully.
- ASBP has been working on the topic of material reuse for nearly 10 years, with past activities including the Re-Fab House feasibility study, research with University of Cambridge identifying the barriers to structural steel reuse, a Reuse Summit, and the DISRUPT project.
- **Sponsorship opportunities are available for organisations seeking to support the campaign in its aim of enabling a more resource efficient built environment. For more information, please contact Richard Broad, Projects & Communications Manager, ASBP – richard@asbp.org.uk.**

Why join our Alliance?

- **Demonstrate** your company is taking a leadership role in the transition to a sustainable built environment
- **Network** with leading experts, practitioners, specifiers and academics across our core themes
- **Promote** your products, technical innovations and projects to a wider audience, through our active social media channels and events
- **Access** the latest technical information, research and funding opportunities. We collaborate with Universities of Bath, Bangor, Brighton, Cambridge, UCL, Nottingham, Sheffield, Leeds and more
- **Be part of** a coherent voice; we actively influence policy, by meeting regularly with policy makers and responding to consultations in UK and Europe
- **Reach out** to our growing contact list via our popular monthly newsletter and social media channels
- **Attend** our regular events and webinars for FREE or discounted rates

<https://asbp.org.uk/join>

Get involved with the ASBP

Join as a member – Standard (from £165) or Patron (from £1,100 per year)

Sign up to our mailing list – <http://bit.ly/ASBPnewsletter>

Support our work – Sponsor our Awards, campaign or annual conference

Input into one of our specialist groups or projects – Reducing Plastics in Construction, Natural Fibre Insulation, Paints & Finishes.

Register for one of our upcoming webinars - asbp.org.uk/upcomingevents

www.asbp.org.uk

Contact details

Katherine Adams (Technical)

katherine@asbp.org.uk

Richard Broad (Projects/membership)

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Simon Corbey (Membership/technical)

simon@asbp.org.uk

Asselia Katenbayeva (Research)

asselia@asbp.org.uk

Debbie Mauger (Social media)

debbie@asbp.org.uk

Flavie Lowres (Life cycle analysis)

kaye@asbp.org.uk

Welcome from the (NICER) Programme

Amy Peace

Innovation Lead – Circular Economy, Innovate UK

Intro to DISRUPT

Asselia Katenbayeva

Research Associate, ASBP



ASBP

The Alliance
for Sustainable
Building Products

DISRUPT project on Steel Reuse

22 March 2023

Dr Asselia Katenbayeva, Research Associate

@asbp_uk

**Steel is the
world's most
widely used
product but ...**



Steel production contributes 7% (2.6 billion tonnes) of CO₂ emissions worldwide

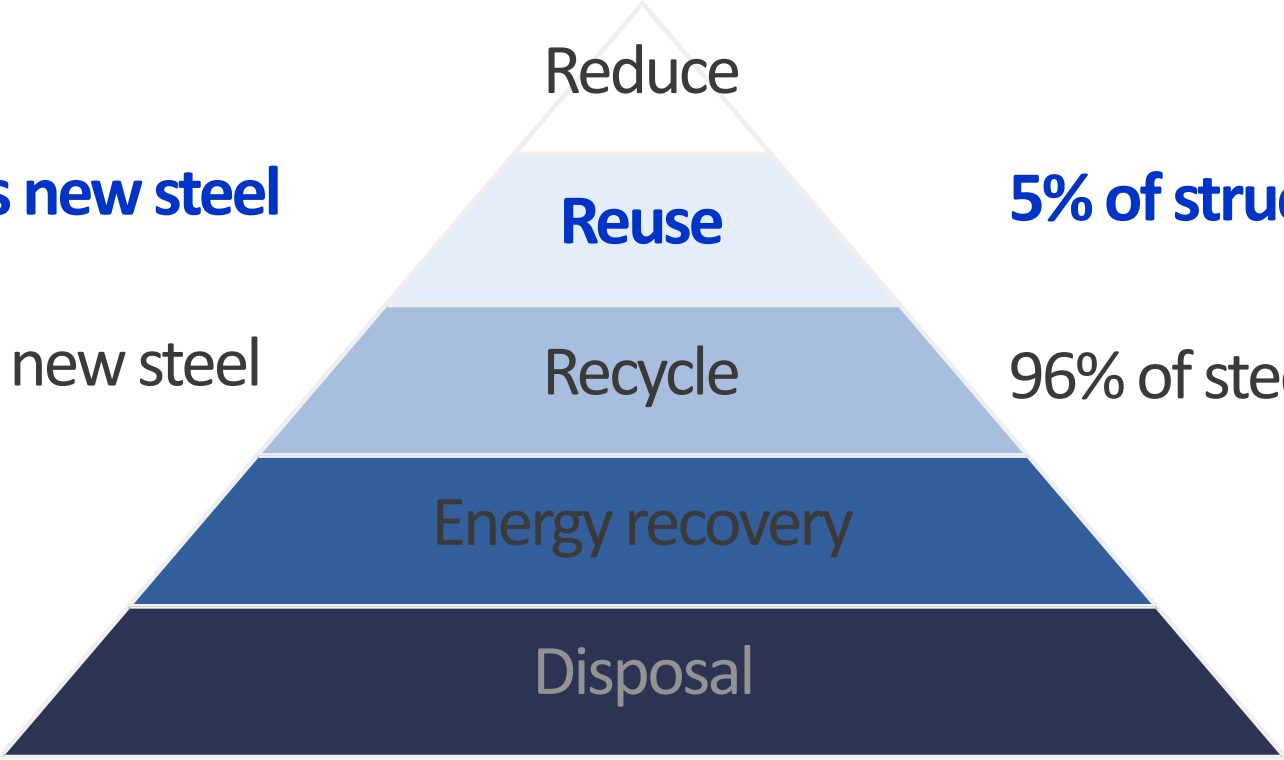
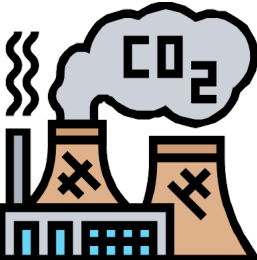


The construction industry produces a huge amount of waste, much downcycled (120 million tonnes)

Steel reuse involves the subsequent use of steel, either for its original purpose or for a similar purpose with some minor alterations

96% carbon savings vs new steel

80% carbon savings vs new steel



5% of structural steel is reused

96% of steel is recycled



DISRUPT Steel reuse project



Project aim: Develop a toolkit for businesses to enter the market of steel reuse

April 2022 - March 2023

Sponsor

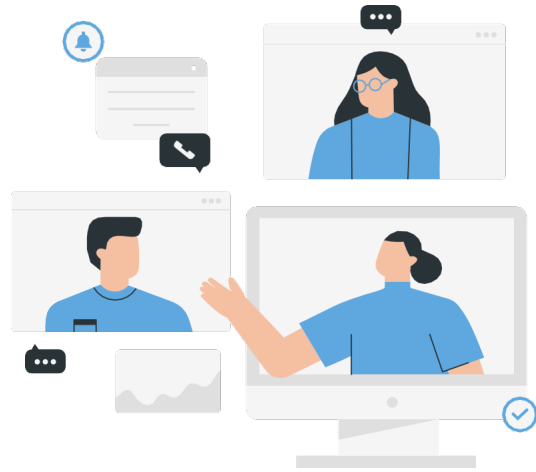


Partners



Supporter





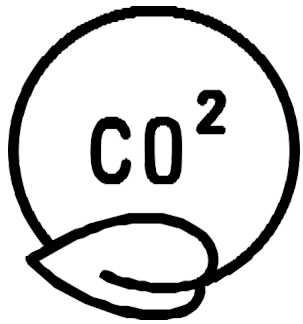
Literature review & mapping **supply chain models** for steel reuse

Interviews with stakeholders

Selected **11 case studies** of steel reuse

Developed the **toolkit** for market entrants of steel reuse

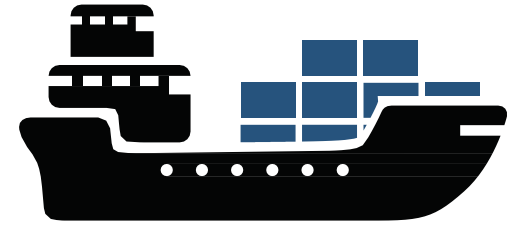
Why reuse steel?



Up to 96% carbon saving



Cost savings -
IF WELL MANAGED

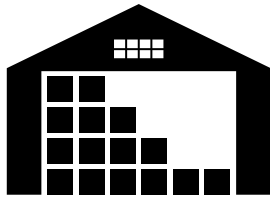


Local resource – scrap
Socioeconomic benefits –
all in UK

77% of scrap steel in the UK is exported

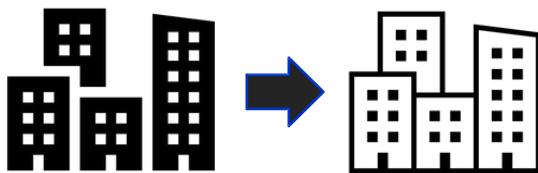
Steel reuse models

REUSE: STOCKHOLDERS DRIVEN



Stockholders purchase reclaimed steel from demolition contractors and then sell it in the open market

REUSE: CLIENT DRIVEN



Donor

Recipient

Clients recover steel from their demolished buildings for reuse within their new buildings

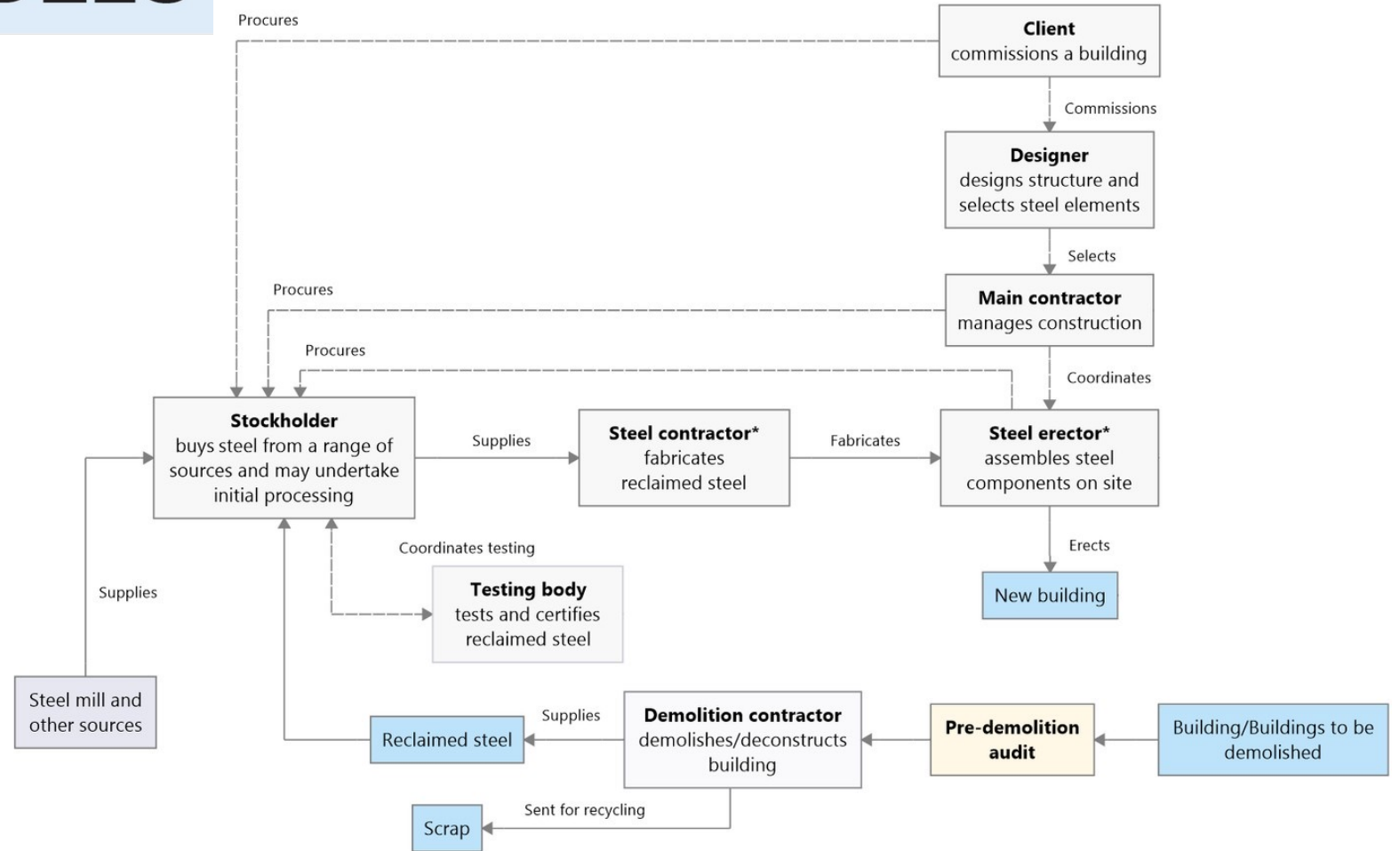
SUPPLY CHAIN MODELS

RECYCLING (BAU)

REUSE: STOCKHOLDERS DRIVEN

REUSE: CLIENT DRIVEN

REUSE: HYBRID MODEL



* Steel contractor and Steel erector are commonly the same entity



Steel reuse case studies

Entopia building

Holbein Gardens

55 Great Suffolk Street

Meridian Water project

Brent Cross Town Primary Substation

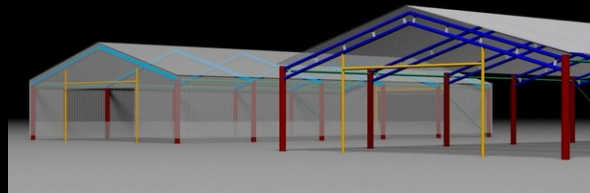
Elephant & Castle Town centre redevelopment

Sloane Square House

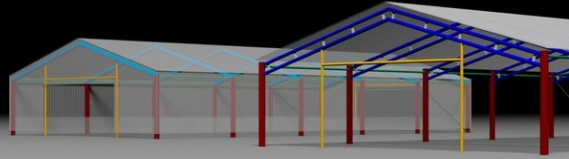
Agricultural buildings

Domestic extension projects

Subsea drilling out of the wind farms



Case studies



Result	Size	Amount of steel reused	Carbon savings	Implications on project budget	Implications on timelines
9 successful 2 unsuccessful	154 - 70,000 sq m	353 tonnes	660 tonnes	5 cost savings 2 cost neutral 2 slightly more expensive	No



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Building Products

Thank you

Dr Asselia Katenbayeva, Research Associate

Asselia@asbp.org.uk

@asbp_uk

Steel reuse case studies



Short history of steel reuse

Roy Fishwick

Managing Director, Cleveland Steel and Tubes Ltd

Steel reuse agricultural building case studies

Jonny Hawkshaw

Director & Co-founder, Simple Works

DISRUPT - Steel Reuse

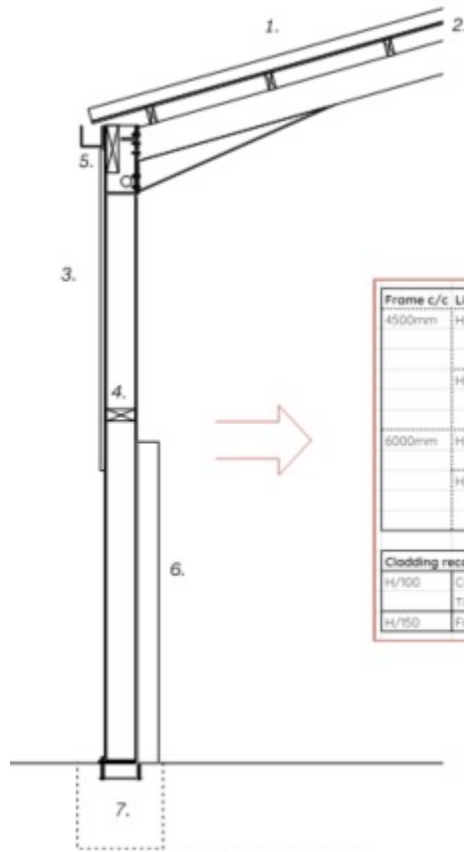
Steel Tube Portal Frames



Traditional vs non-traditional



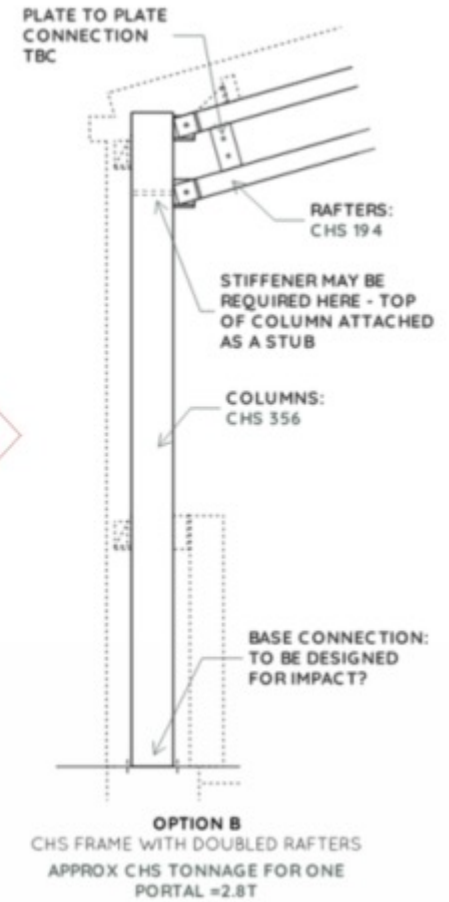
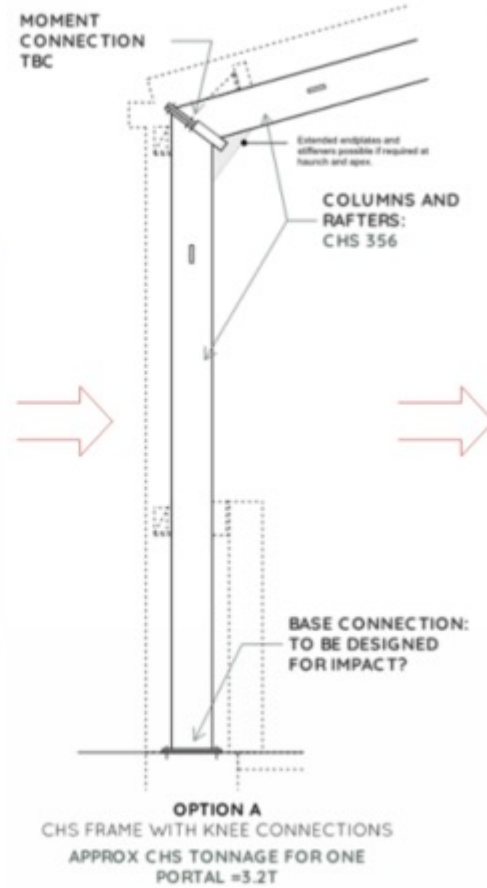
Traditional vs non-traditional



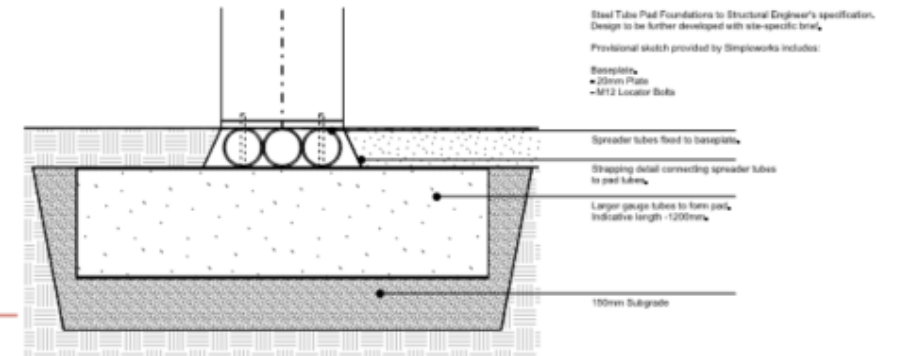
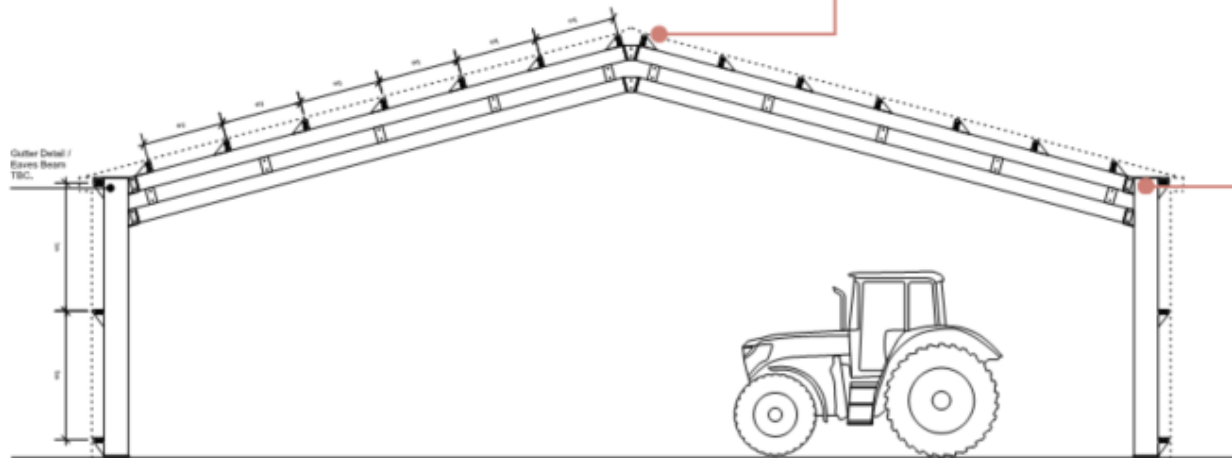
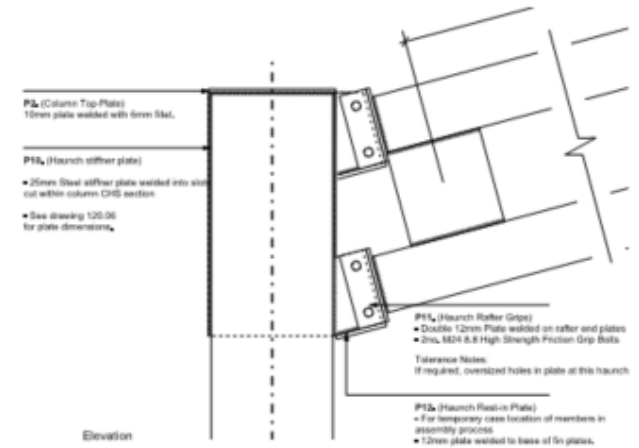
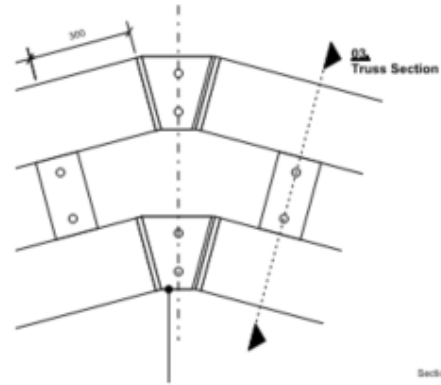
UC OR UC FRAME WITH HAUNCHED CONNECTIONS
TONNAGE FOR ONE PORTAL ~1.5 - 2 T

Frame c/c	Limit	Col CHS	Rafter CHS	Gable CHS	Bracing CHS	Bays	Total kg
4500mm	H/150	355x8	219x5	139x8.0	88.9x5	8	12,578
		325x12	193x5.3	139x8.0	88.9x5	8	14,788
	H/100	275x25	168x8	139x8.0	88.9x5	8	19,246
		355x6.0	219x5	139x8.0	88.9x5	8	11,490
6000mm	H/150	325x8	193x5.3	139x8.0	88.9x5	8	12,825
		275x12.5	168x8	139x8.0	88.9x5	8	14,599
	H/100	355x12.5	219x8	139x8.0	88.9x5	6	14,927
		325x16	193x10	139x8.0	88.9x5	6	16,321
H/750	355x8	219x8	139x8.0	88.9x5	6	13,151	
	325x10	193x10	139x8.0	88.9x5	6	14,297	
		275x20	168x12	139x8.0	88.9x5	6	16,832

Cladding recommendations	
H/100	Corrugated metal sheeting Timber boarding
H/150	Fibre cement sheeting



All in the detail



Fabrication photos



Steel reuse domestic refurbishment project

Philippa Birch-Wood

Thrive Director, Chetwoods

Who am I?

> Thrive Director, running a Sustainable Design Consultancy at Chetwoods Architects

> UKGBC Regional Rep for Birmingham and the West Midlands

> A homeowner, concerned about the Climate and Biodiversity Emergency



1960s build



2 storey



3 bed



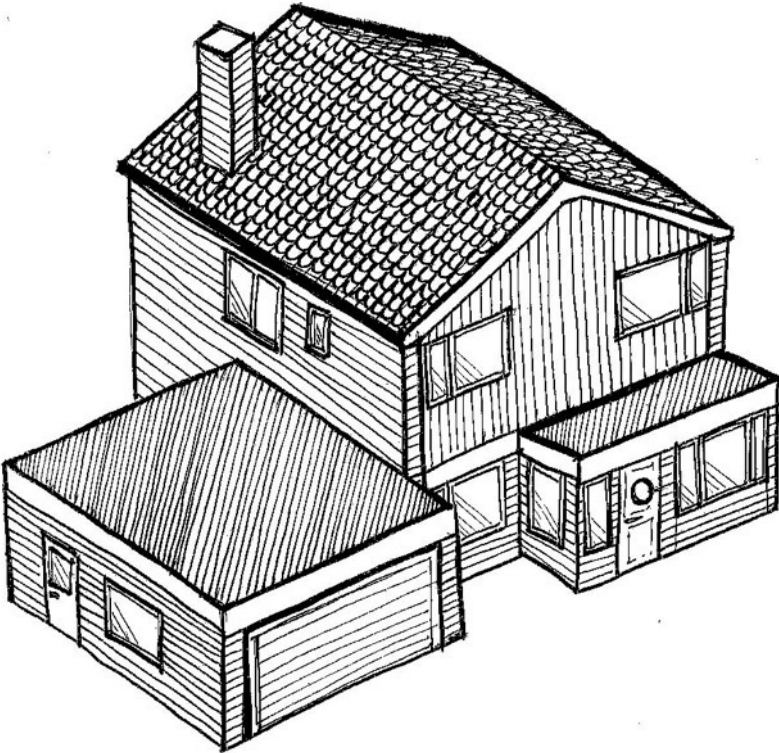
154 m²



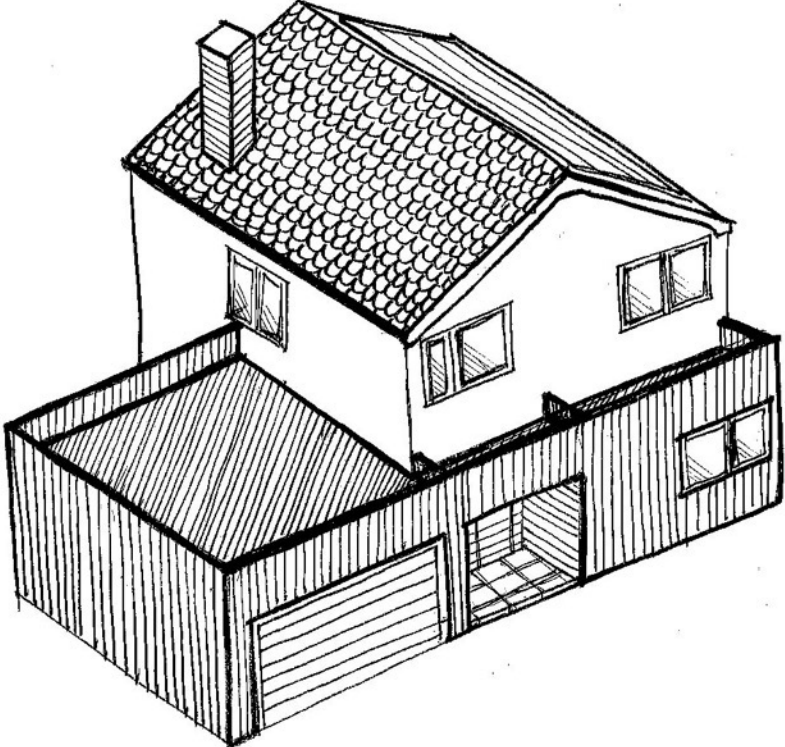
Completion
2023



The context

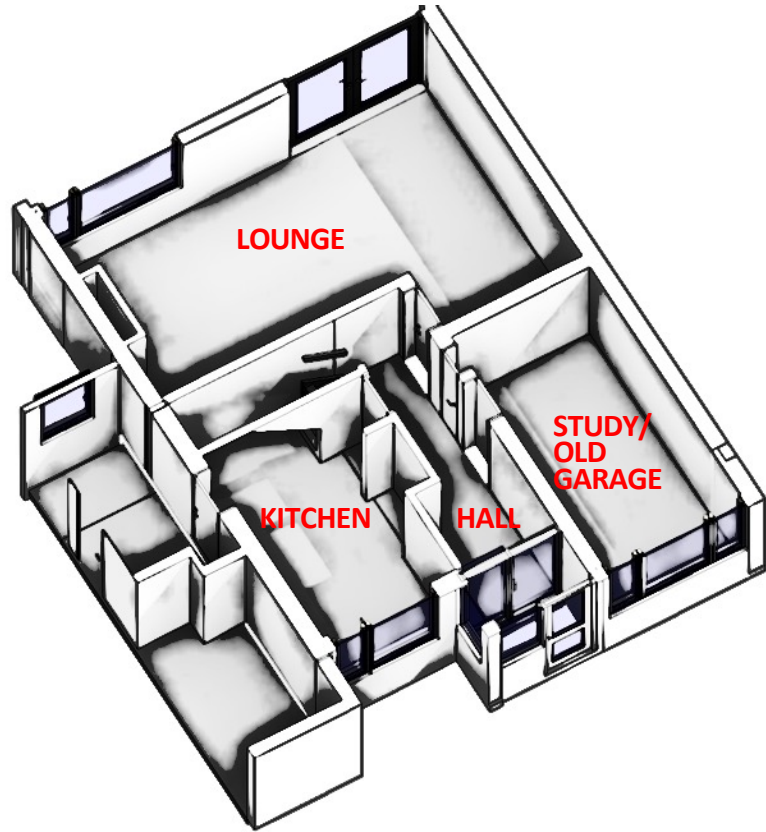


Before

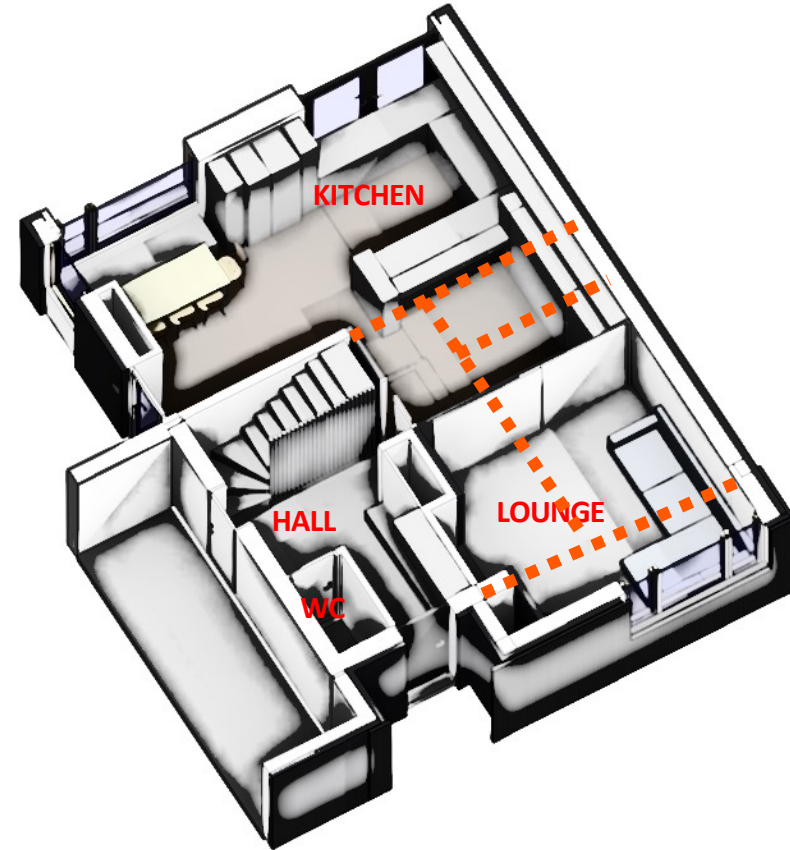


After

Why we needed steel...

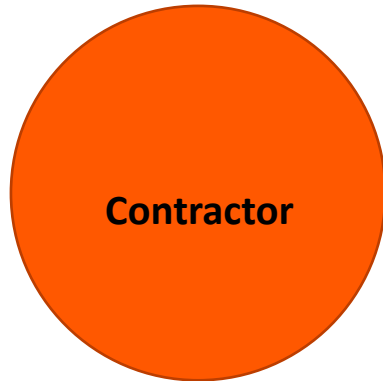


Before

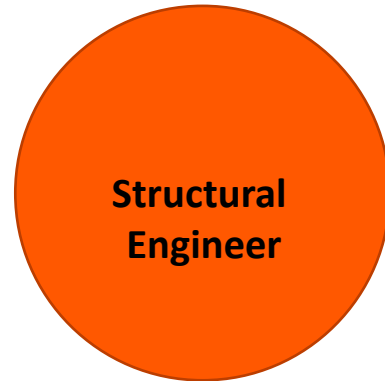


After

Enabling Steel Reuse



Fine, but won't take measurements. Their steel suppliers typically do this



Resistant/ Risk Adverse
Needed convincing, saying "Steel is recycled anyway." Concerned about provenance of steel.

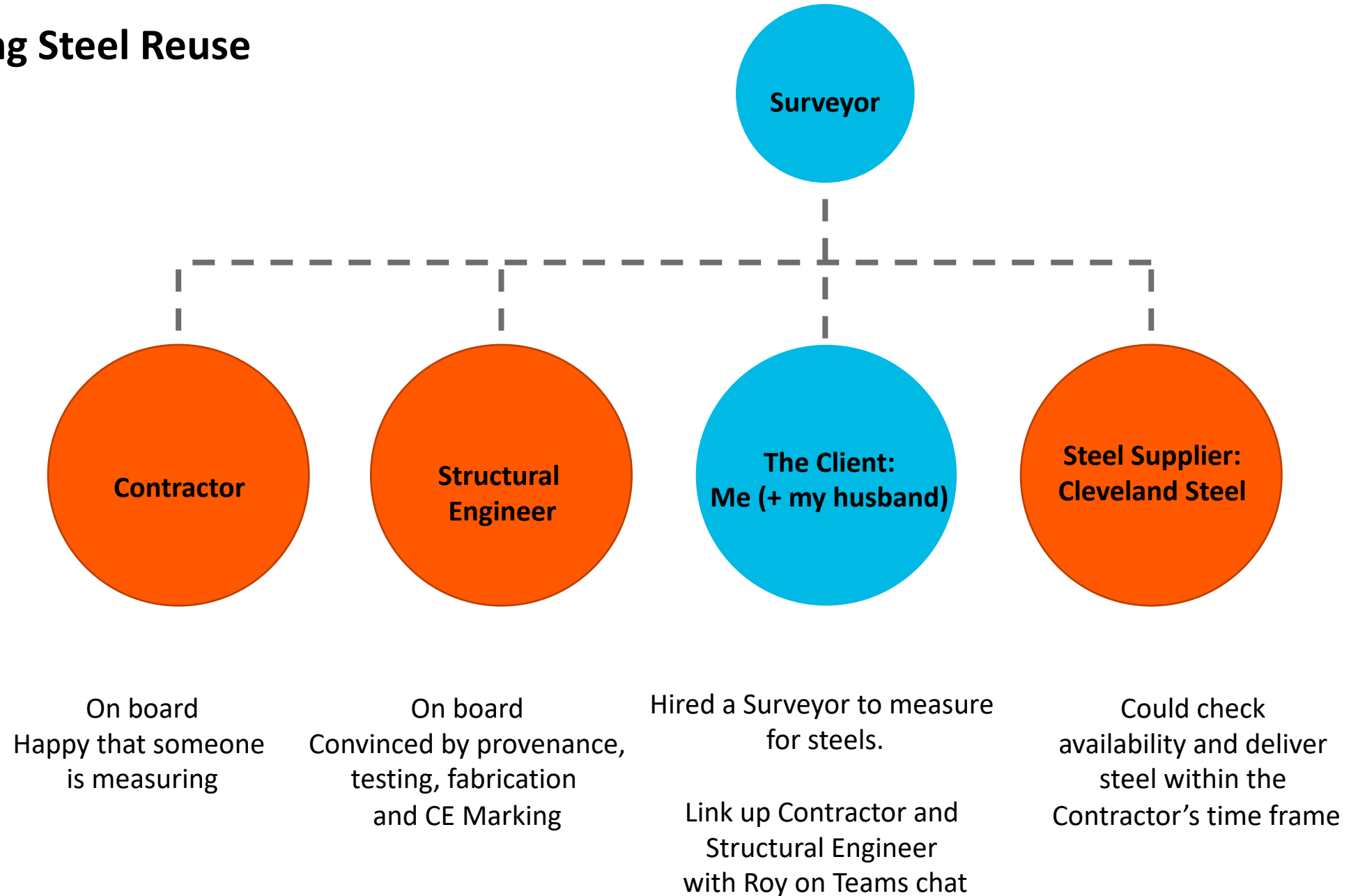


Desperately wanting to make this happen



Would need Measurements to ensure availability and for fabrication

Enabling Steel Reuse



The result

1.45 Tonnes of Steel reused

2 x lengths of 203 x 203 x 71 –
temporary façade retention American embassy

203 x 203 x 86 -
temporary façade retention American embassy
plus a scrap offcut butt welded together

203 x 133 x 25 -
Pinewood Studios – rail and track system for a
movie project



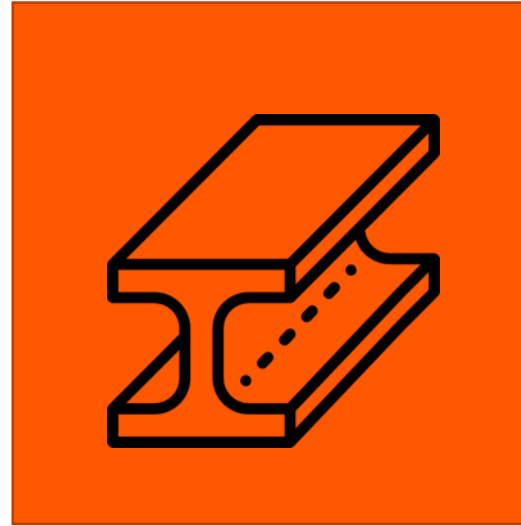
The stats



New Steel
1.45 T

Cost: £2200 +VAT + Delivery
(£1250/tonne + painting)

Lead Time: At the time 5 weeks+



Our Steel
1.45 T

Cost: £1300 + VAT + Delivery
(£850/tonne + fabrication)

+£400 for a surveyor and
£90 for structural engineer time

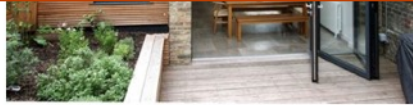
CO2 emissions: 3 Tonnes saved

Lead Time: 4 days

¹Carbon savings were calculated based on the LCA of reclaimed steel by Cleveland Steel and Tubes.
This includes inbound transport impact to the stockholder's yard and excludes outbound transport impact to the construction site.
²Based on the costs when the project was in the design stage

- Glass House Extension
- Wooden House Extensions
- Modern House Extensions
- Small House Extension
- Brick House Extensions
- Front House Extension
- Roof Extensions On House

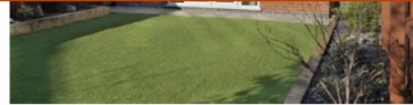
Just imagine the tonnes of CO2 saved...



House extensions for every budget: 2...
www.realhomes.com



Case Study - A side return kitchen ex...
www.myhomeextension.co.uk



5 Single Storey House Extension Idea...
thearchdigest.com



2019 House Extension Costs & Prices | How ...
wisetradesmen.com



House Exte
www.ultrafra



Real home: a ta...
www.pinterest.co....



If every time there was a house renovation or extension project procuring reused steel was the default (where it is required).



House Extensions, Atherton | Glazed Hous...
www.bellavista.org.uk



Small house extensions, House extension ...
www.pinterest.co.uk



Award Winning L...
www.pinterest.com



Double storey extensions: a...
www.realhomes.com



Home Extensions Shrewsbury | Bespo...
www.matthewsandpeart.co.uk

Elephant & Castle redevelopment and Sloane Square House

Sally Walsh

Senior Engineer, WSP

STEEL REUSE AT WSP

Sally Walsh Senior Structural Engineer

- 1 Circular Economy Goals
- 2 WSP Steel Reuse Tool
- 3 Elephant & Castle Town Centre
- 4 Sloane Square House



1 CIRCULAR ECONOMY GOALS



Apply the **embodied carbon hierarchy** of design and set a project embodied carbon target



Apply the **circular economy hierarchy** and set a target for % of material reuse



Challenge the typical design process to **maximise the potential for reuse**



Collaborate and engage with suppliers, fabricators, and contractors early



Encourage auditing of assets and **reused material databases** to establish availability



Delivering Net Zero

WSP commit to halving the carbon footprint of our designs and advice by 2030

2

WSP STEEL REUSE TOOL

Steel Frame Design



Parameter Limits Agreed



Reclaimed Sections Database



Steel Reuse Tool V4.2

Inputs

ProjectShortName:

Excel Inputs:

Schedules Folder:

Database Type: **Cleveland Steel**

\\uk.wspgroup.com\ce

Select Results Folder:

Geometric Constraints | Splicing Options

Assumed capacity of reclaimed steel []:

Assumed unusable end length per member [mm]:

Include columns

Include framing

Geometric parameters included in schedules

Allowable Depth Increase [mm]:

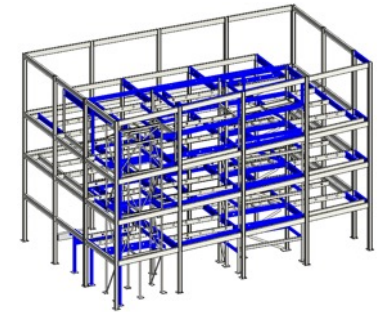
Allowable Width Increase [mm]:

Allowable Width Reduction [mm]:

Allowable Weight Factor []:

RUN MATCHING TOOL

For help or suggestions please contact Tom.Mclean@wsp.com



X Tonnes of **Steel Reused**

X Tonnes of **Carbon Saved**

3

ELEPHANT & CASTLE TOWN CENTRE

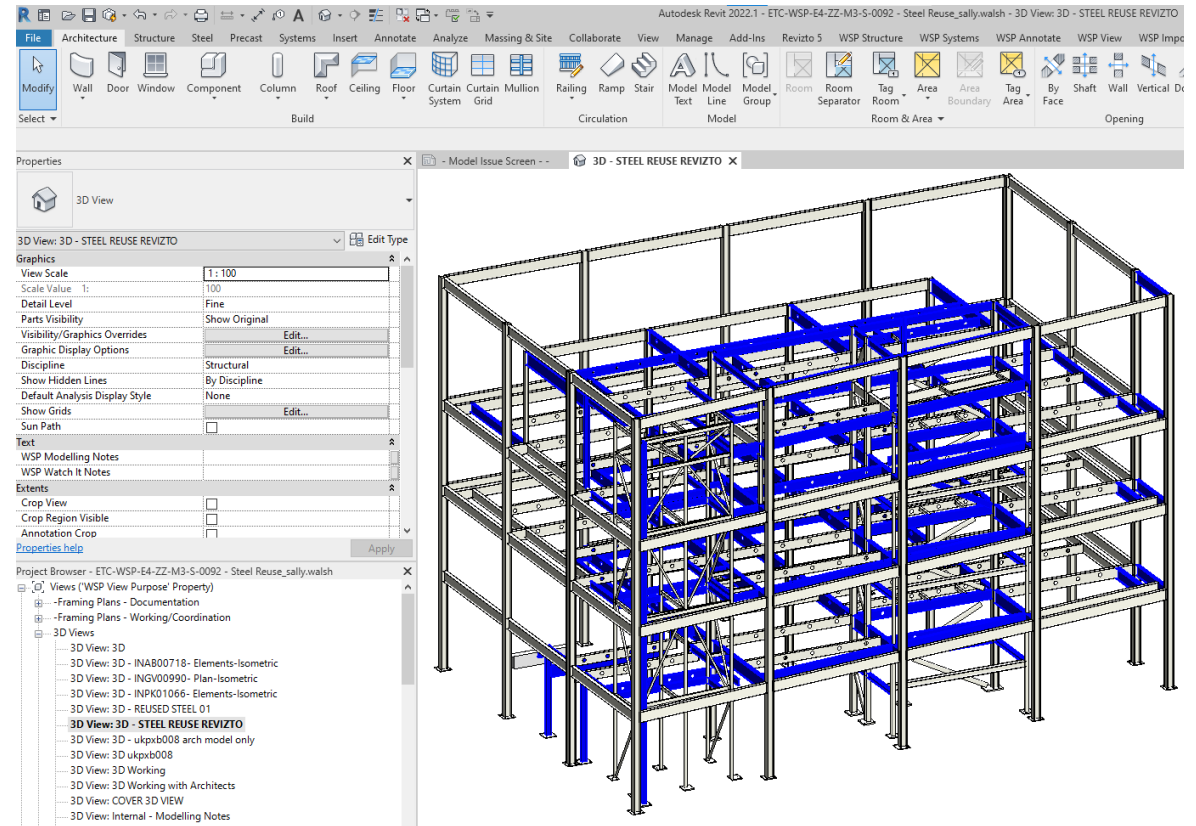
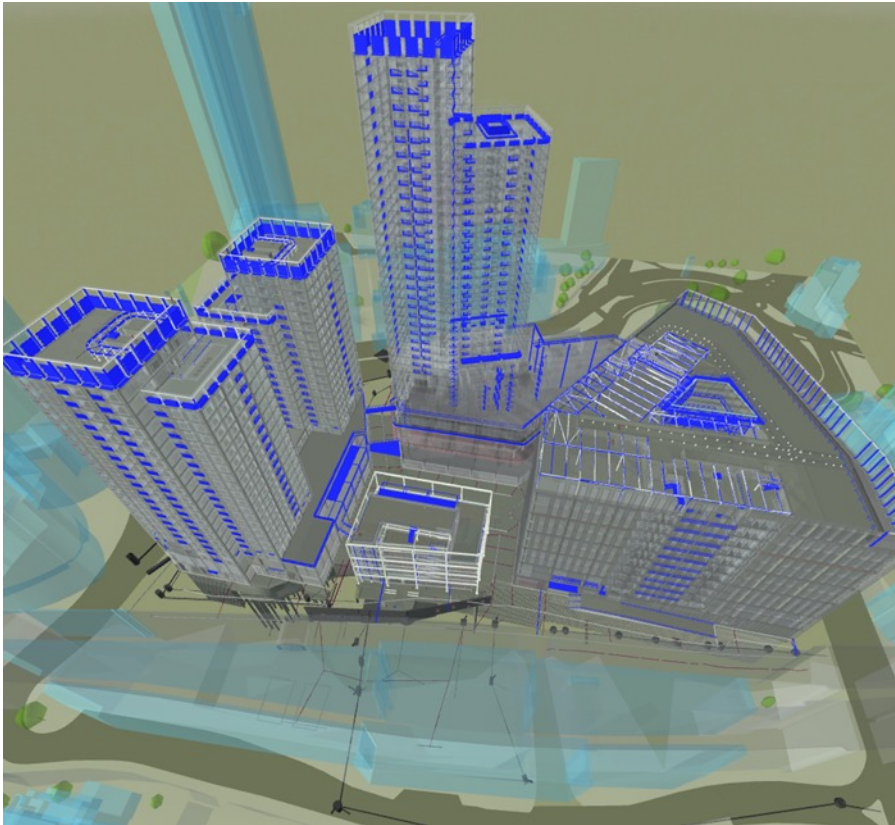


372 tonnes
Total Designed Steel

26% Reclaimed Steel

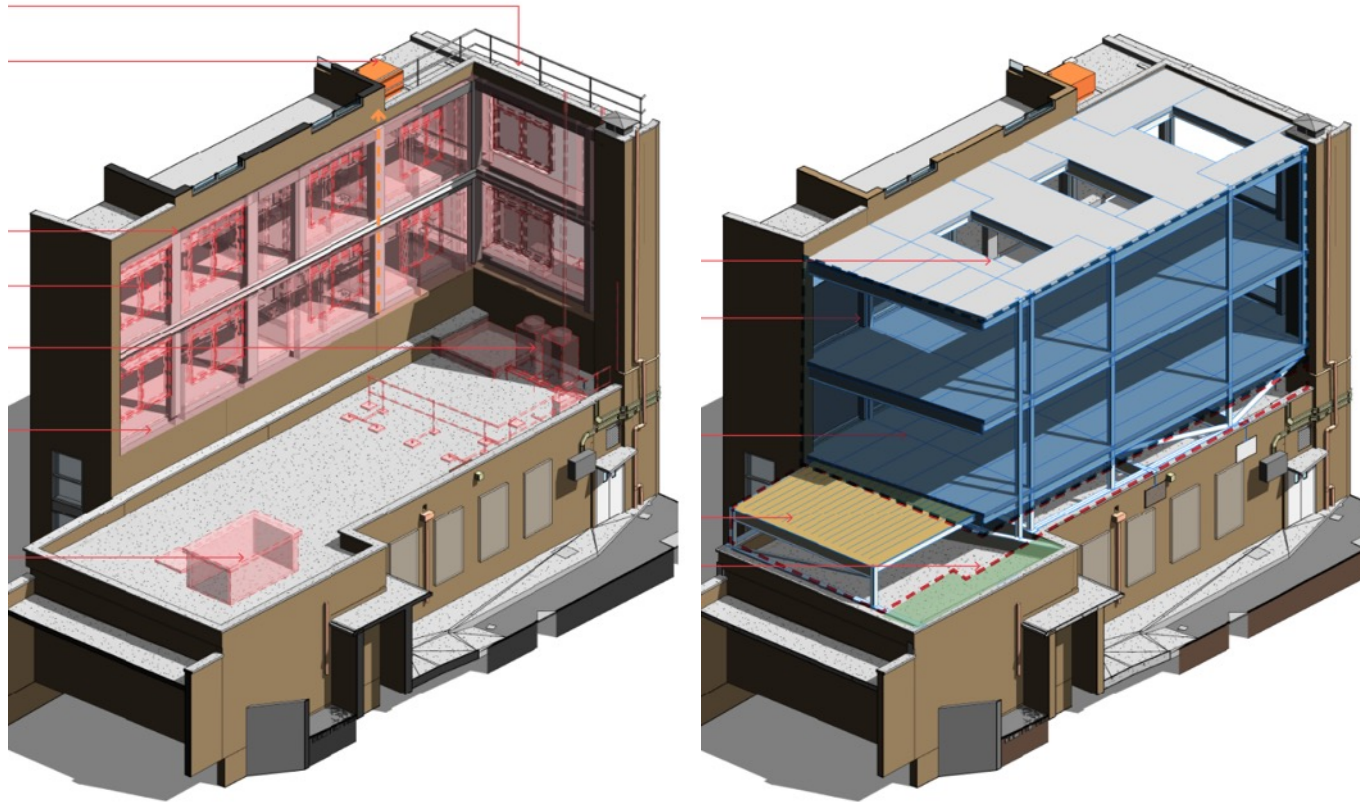
160 tonnes CO₂e
Saved

ELEPHANT & CASTLE TOWN CENTRE



4

SLOANE SQUARE HOUSE



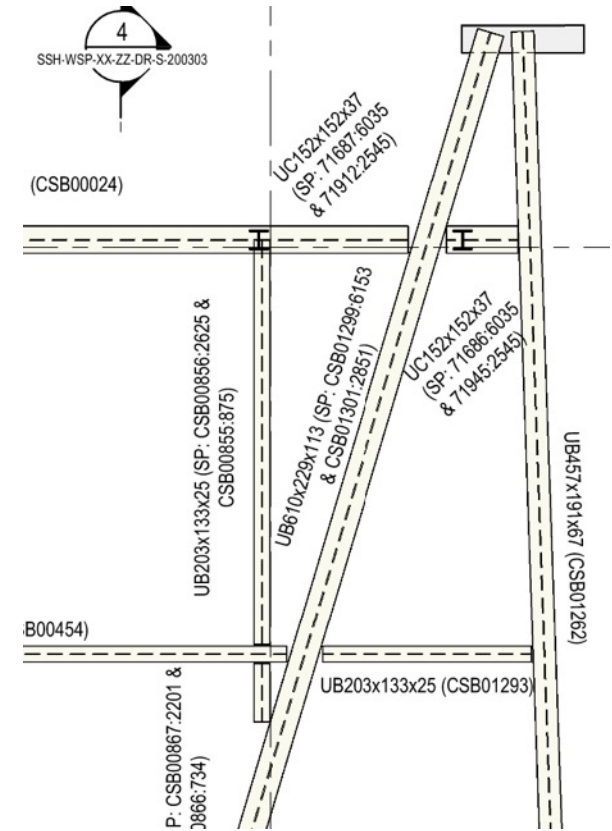
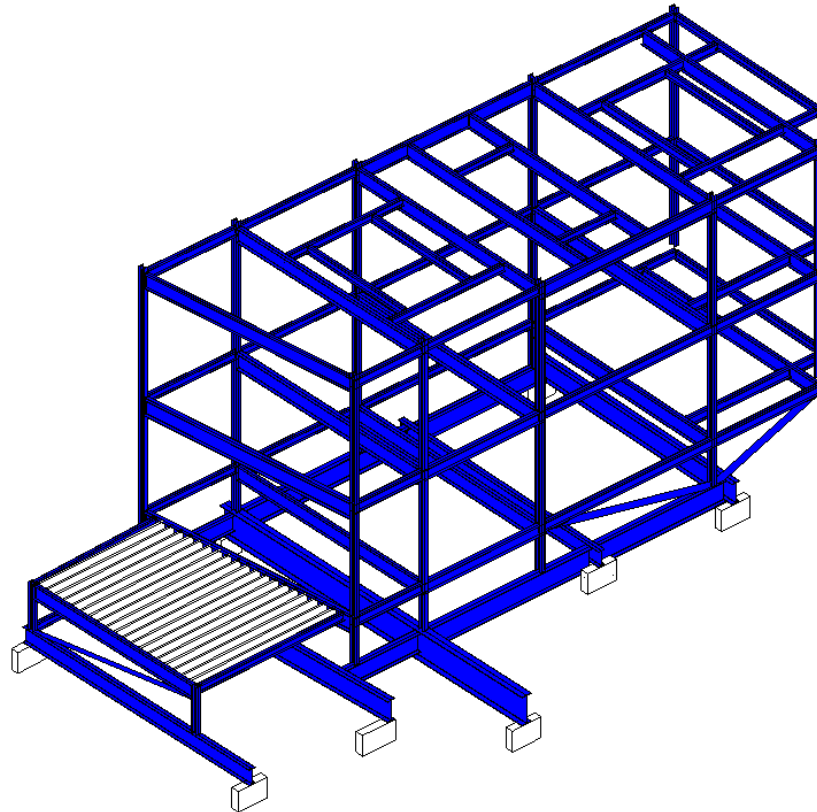
21 tonnes
Total Designed Steel

100% Reclaimed Steel

35 tonnes CO₂e saved

4

SLOANE SQUARE HOUSE



Thank You

sally.walsh@wsp.com

tom.mclean@wsp.com



wsp.com



Launch of steel reuse toolkit


Katherine Adams

Technical Director, ASBP

The toolkit

What is in the toolkit?

- + Business considerations for steel reuse
- + Stakeholder checklists
- + Steel reuse scenario mapping
- + Supply chain models
- + Guidance and policy notes
- + Literature review
- + Case studies

 Download the full toolkit

<https://asbp.org.uk/toolkit/disrupt-steel-reuse>

Business considerations for reuse

DISRUPT - Delivering Innovative Steel ReUse Project

CONSIDERATIONS FOR STEEL REUSE

A set of business considerations has been developed for major supply chain stakeholders involved in steel reuse, ranging from demolition contractors to clients. These considerations cover technical, supply chain, economic, and carbon savings, as well as other benefits.



Demolition Contractor



Stockholder



Steel Contractor (Fabricator)



Steelwork Erector



Main Contractor



Cost Consultant and Project Manager

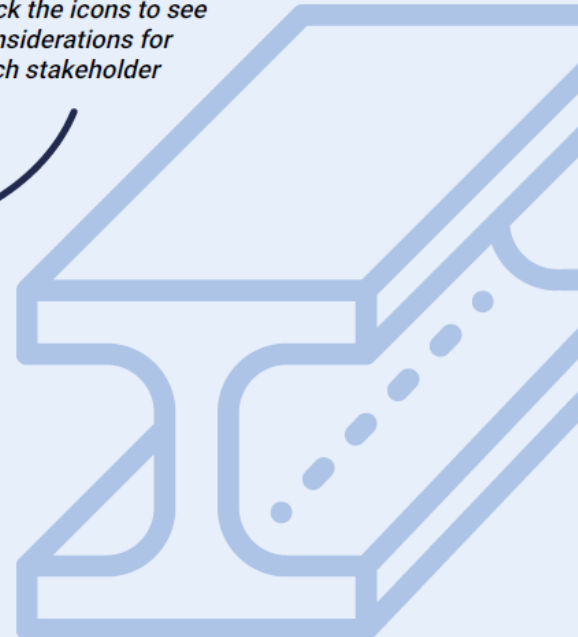


Designer



Client

Click the icons to see considerations for each stakeholder



Business considerations for reuse



Demolition Contractor



TECHNICAL

Pre-demolition audits (to ascertain which structural steel maybe suitable for reuse, the quantities, its condition and potential age)

Specifications/requirements from clients (to recover a certain amount of steel, in certain conditions and/or specific steel elements)

Demolition approach to recover steel sections

Ability to use existing demolition equipment to reclaim steel or utilise different equipment

Health and safety considerations (careful demolition/deconstruction may possess more injury risks)



SUPPLY CHAIN

Time constraints (it may take more time than usual although not necessarily as depends on the type of structure, the complexity of connections, composite materials and other factors)

Storage on site (might need to store large quantities of reclaimed steel on site)

Transportation of reclaimed steel elements

Demand for reclaimed steel (versus demand for scrap steel)



ECONOMIC

Potential cost increase in case of delays to the demolition programme (although not necessarily as this depends on the complexity of the project)

Payment for reclaimed steel (versus payment sent for recycling, and agreeing on the payment rate)

Potential increased labour costs (not necessarily as depends on the complexity of the project)

Potential increased machinery/equipment cost (not necessarily as depends on the complexity of the project)

Cash flow (versus quick payment for steel scrap sent for recycling)



CARBON & OTHER

Competitive advantage (knowledge and experience of steel reuse could provide competitive advantage)

Carbon savings and environmental benefits

Stakeholder checklists

DISRUPT - Delivering Innovative Steel ReUse Project

STEEL REUSE CHECKLIST



TECHNICAL CONSIDERATIONS

Specify steel reuse and set contractual requirements

Conduct pre-demolition audits to identify which structural steel can potentially be reused, their condition, and quantities and potential age

Determine a demolition approach to recover steel sections, and consider health and safety implications

Assess the ability of using existing equipment for steel reuse

Conduct the processing of reclaimed steel, including removing existing fittings, fixing holes, removing coatings and paints, etc.

Manage testing, certification, and quality assurance of the reclaimed steel, following the SCI P427 protocol

Record and keep material information (such as drawings from the demolished/refurbished building, age of the structure, original certificates, grade and material properties of steel sections, records of inspection and tests conducted, etc.)

Consider any warranty and insurance issues

Inspect and fabricate reclaimed steel sections

Consider the aesthetics of the steel structure, particularly if it will be exposed in a building, taking into account that reclaimed steel might have surface imperfections such as marks and holes from its previous use

Ensure that required holes are marked clearly to avoid inadvertent use of the wrong holes during assembly on site if reclaimed steel has spare holes and attachments

Design the steelwork based on available reclaimed steel sections. Consider design efficiency. Allow for design iterations. Consider tolerances in design.

Assess embodied carbon savings from steel reuse

Ensure that new buildings are designed to be suitable for future reuse.

	Demolition Contractor	Stockholder	Steel Contractor (Fabricator)	Steelwork Erector	Main Contractor	Cost Consultant/ Project Manager	Designer	Client
Specify steel reuse and set contractual requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Conduct pre-demolition audits to identify which structural steel can potentially be reused, their condition, and quantities and potential age	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Determine a demolition approach to recover steel sections, and consider health and safety implications	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Assess the ability of using existing equipment for steel reuse	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conduct the processing of reclaimed steel, including removing existing fittings, fixing holes, removing coatings and paints, etc.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manage testing, certification, and quality assurance of the reclaimed steel, following the SCI P427 protocol	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Record and keep material information (such as drawings from the demolished/refurbished building, age of the structure, original certificates, grade and material properties of steel sections, records of inspection and tests conducted, etc.)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Consider any warranty and insurance issues	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Inspect and fabricate reclaimed steel sections	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Consider the aesthetics of the steel structure, particularly if it will be exposed in a building, taking into account that reclaimed steel might have surface imperfections such as marks and holes from its previous use	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Ensure that required holes are marked clearly to avoid inadvertent use of the wrong holes during assembly on site if reclaimed steel has spare holes and attachments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Design the steelwork based on available reclaimed steel sections. Consider design efficiency. Allow for design iterations. Consider tolerances in design.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Assess embodied carbon savings from steel reuse	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Ensure that new buildings are designed to be suitable for future reuse.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Stakeholder checklists

DISRUPT - Delivering Innovative Steel ReUse Project

STEEL REUSE CHECKLIST



SUPPLY CHAIN CONSIDERATIONS

- Consider the availability of reclaimed steel sections
- Consider the procurement route of reclaimed steel e.g. who will buy and own the steel
- Consider lead times for business processes such as recovering steel from demolished buildings, fabrication, initial processing, testing, designing, procurement, etc.
- Evaluate the possibility of project delays and mitigate these risks
- Ensure sufficient space for storage of reclaimed steel
- Consider transportation issues of reclaimed steel to and from the project site, in case of space constraints (e.g in central London projects)



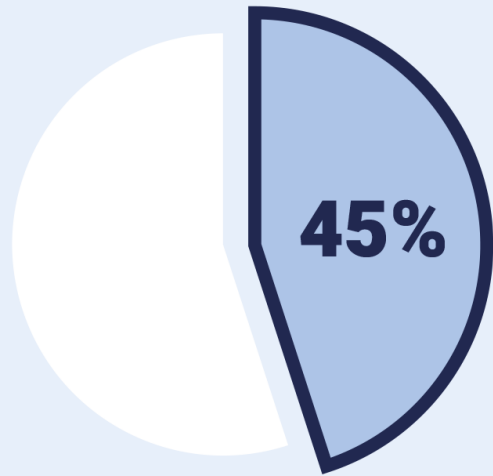
ECONOMIC CONSIDERATIONS

- Determine payment agreement for reclaimed steel
- Evaluate any potential increase in labour and equipment costs
- Assess potential cost increase in case of project delays
- Determine material costs/savings related to reclaimed steel
- Consider cost of testing and certification for reclaimed steel
- Evaluate potential increased design costs, including additional design fees in case of design iterations and more coordination and planning required

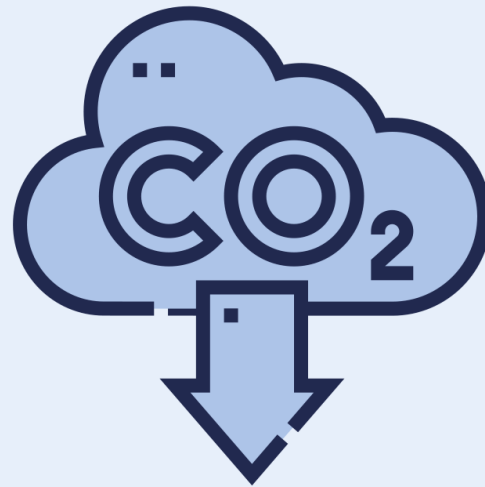
	Demolition Contractor	Stockholder	Steel Contractor (Fabricator)	Steelwork Erector	Main Contractor	Cost Consultant/ Project Manager	Designer	Client
Consider the availability of reclaimed steel sections	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Consider the procurement route of reclaimed steel e.g. who will buy and own the steel	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Consider lead times for business processes such as recovering steel from demolished buildings, fabrication, initial processing, testing, designing, procurement, etc.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Evaluate the possibility of project delays and mitigate these risks	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Ensure sufficient space for storage of reclaimed steel	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Consider transportation issues of reclaimed steel to and from the project site, in case of space constraints (e.g in central London projects)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Determine payment agreement for reclaimed steel	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Evaluate any potential increase in labour and equipment costs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Assess potential cost increase in case of project delays	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Determine material costs/savings related to reclaimed steel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Consider cost of testing and certification for reclaimed steel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Evaluate potential increased design costs, including additional design fees in case of design iterations and more coordination and planning required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Scenario mapping

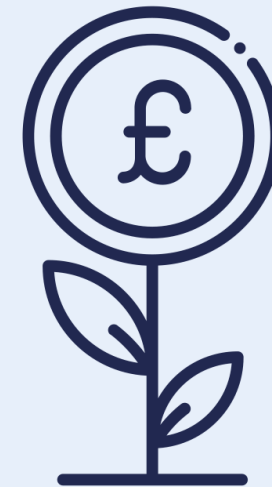
By 2050...



45% of all structural steel* in construction is being reused



Steel reuse could save 250,000+ tonnes of embodied carbon per year



Construction projects could save £40m annually by using reused steel

Scenario mapping

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STEEL REUSE SCENARIO MAPPING

Four scenarios have been developed for structural steel reuse. These scenarios include one current scenario for 2023, and three future scenarios for 2030, 2040, and 2050. Each scenario includes the annual availability of structural steel for reuse, as well as the carbon and socioeconomic impact of steel reuse. Please note that scenarios focus specifically on *columns and beams as the main structural elements currently reused.

Scenario	2023 (current)	2030	2040	2050
Description	This current scenario includes beams and columns reused at a 5% rate.	In this scenario, 15% of beams and columns are reused	In this scenario, 30% of beams and columns are reused	In this scenario, structural steel reuse is a widespread practice and 45% of beams and columns are reused
Annual availability of structural steel for reuse, tonnes	313,038 ¹	338,081 ²	338,081 ³	331,319 ⁴
Reused structural steel, tonnes	15,652	50,712	101,424	149,094
Embodied carbon savings due to steel reuse, tonnes per year⁵	26,499	85,856	171,711	252,416
Annual costs savings from steel reuse to construction projects⁶	£4,226,013	£13,692,282	£27,384,564	£40,255,309

Supply chain models

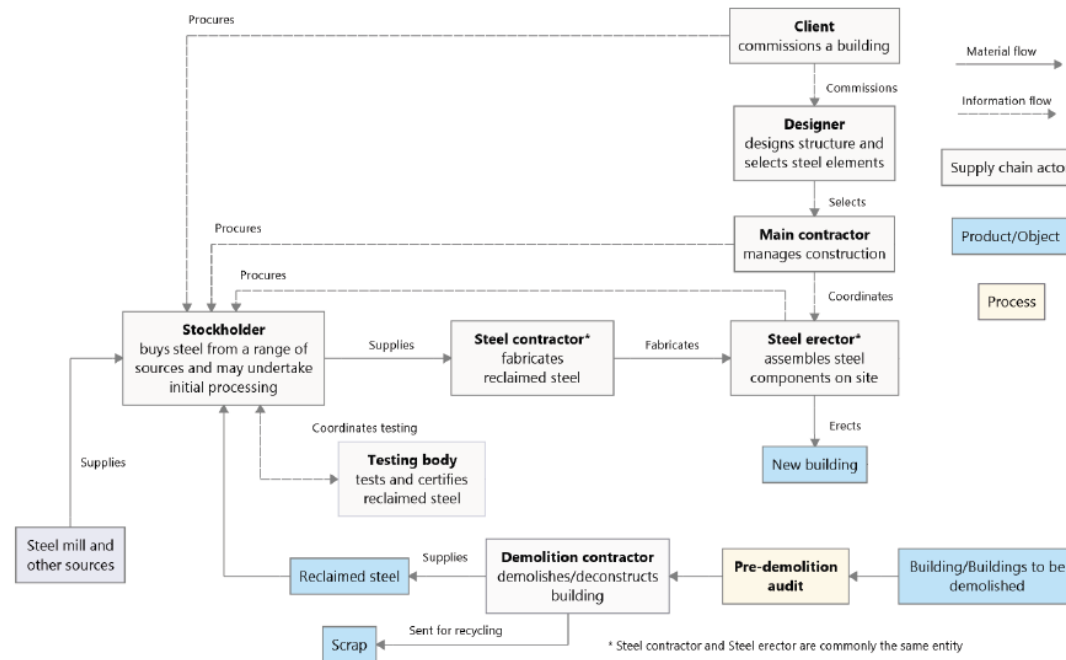
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Download the full toolkit and view case studies at asbp.org.uk/toolkit/disrupt-steel-reuse

SUPPLY CHAIN MODELS

REUSE: STOCKHOLDERS DRIVEN

Stockholders purchase reclaimed steel from demolition contractors and then sell it in the open market. Stockholders perform the initial processing of reclaimed steel, such as sandblasting to remove paintings and coatings. Reclaimed steel is tested and certified, the complexity of which might depend on the amount of information available on the reclaimed elements (e.g. material properties, steel grade, previous testing). Certified steel is then supplied for fabrication and assembly on site as usual. Certified steel is then supplied for fabrication and assembly on site as usual.



Guidance and policy notes

— Guidance and policy notes

Short guidance and policy notes.

↓ Policy note – Policy considerations for steel reuse

↓ Guidance note – Sourcing reclaimed steel

↓ Guidance note – Technical considerations for steel reuse

↓ Guidance note – How and when to source reclaimed steel

+ Literature review

+ Case studies

Case studies



55 Great Suffolk Street

Southwark, London



Brent Cross Town Primary
Substation

Brent Cross, London



Elephant & Castle Town centre
redevelopment

Southwark, London



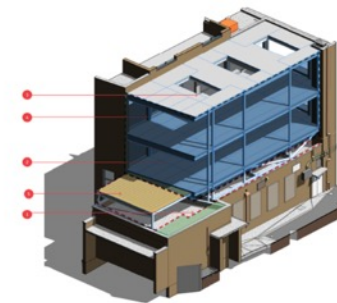
Holbein Gardens (DISRUPT)

Sloane Square, London



Meridian Water

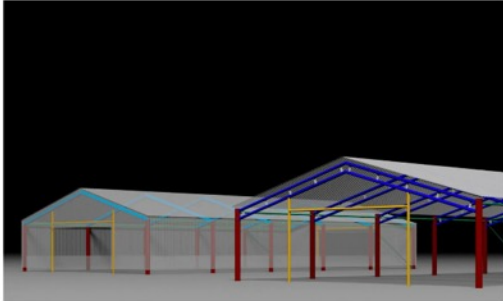
Enfield, London



Sloane Square House

Sloane Square, London

Case studies



Steel reuse agricultural buildings

North Yorkshire



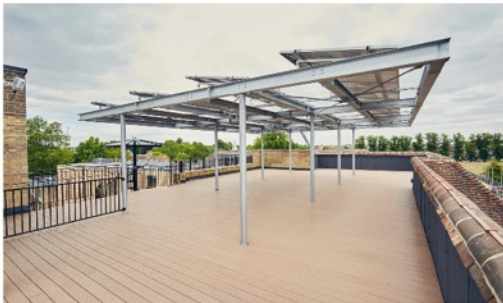
Steel reuse domestic refurbishment project

Lichfield, West Midlands



Steel reuse for offshore wind farm

Wick, Scotland



The Entopia Building (DISRUPT)

Cambridge



Unsuccessful steel reuse case study

London

What's next?



DISRUPT 2 – Start May 2023 for 18 months

Partners: National Federation of Demolition Contractors (NFDC) and Cleveland Steel and Tubes

Funding from **Innovate UK** to:

- **Deep dive with demolition contractors**
- **Reuse platform**
- **Procurement analysis**
- **Demolition guidance/toolkits**
- **Structural steel and non-structural steel products**
- **Wide stakeholder engagement**

Also..

Embedding Traceability in Manufacturing Construction Steel (E-TRACS) to Aid Reuse

- Innovate UK Funding – Feasibility Study
- Partners: Dynatics Solutions Ltd, University of Hertfordshire , Leeds Beckett University
- Start June for 6 months
- Researching construction steel products suitable for tracing/tracking & identify suitable trace/track system technologies for construction steel



The Alliance
for Sustainable
Building Products

Thank you

22nd March 2023

Dr Katherine Adams, Technical Director

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www.asbp.org.uk

[@asbp_uk](https://twitter.com/asbp_uk)

Q&A

Any questions?

Thank you

Drinks and networking until 8pm

Download the free toolkit at:

asbp.org.uk/toolkit/disrupt-steel-reuse

Please consider joining ASBP