

SLOUGH MULTIFUEL EXTENSION PROJECT

Planning Inspectorate Ref: EN010129

The Slough Multifuel Extension Order

Land at 342 Edinburgh Avenue, Slough Trading Estate, Slough

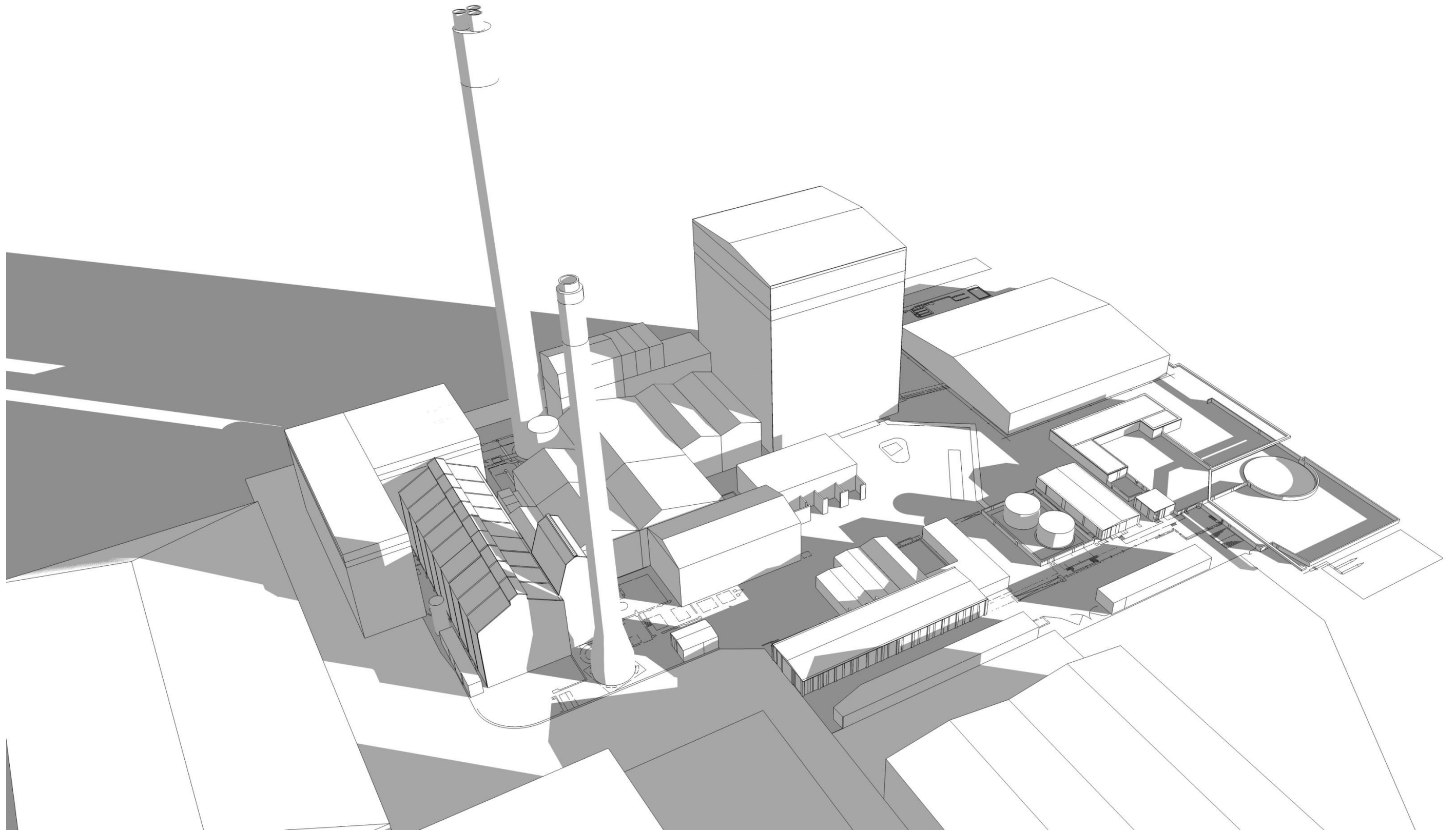
**Document Ref: 7.7.15 Condition 21 – Temporary Construction
Compound – Construction Site Layout Demolition Method Statement**

The Planning Act 2008



Applicant: SSE Slough Multifuel Limited

May 2023 – Deadline 5

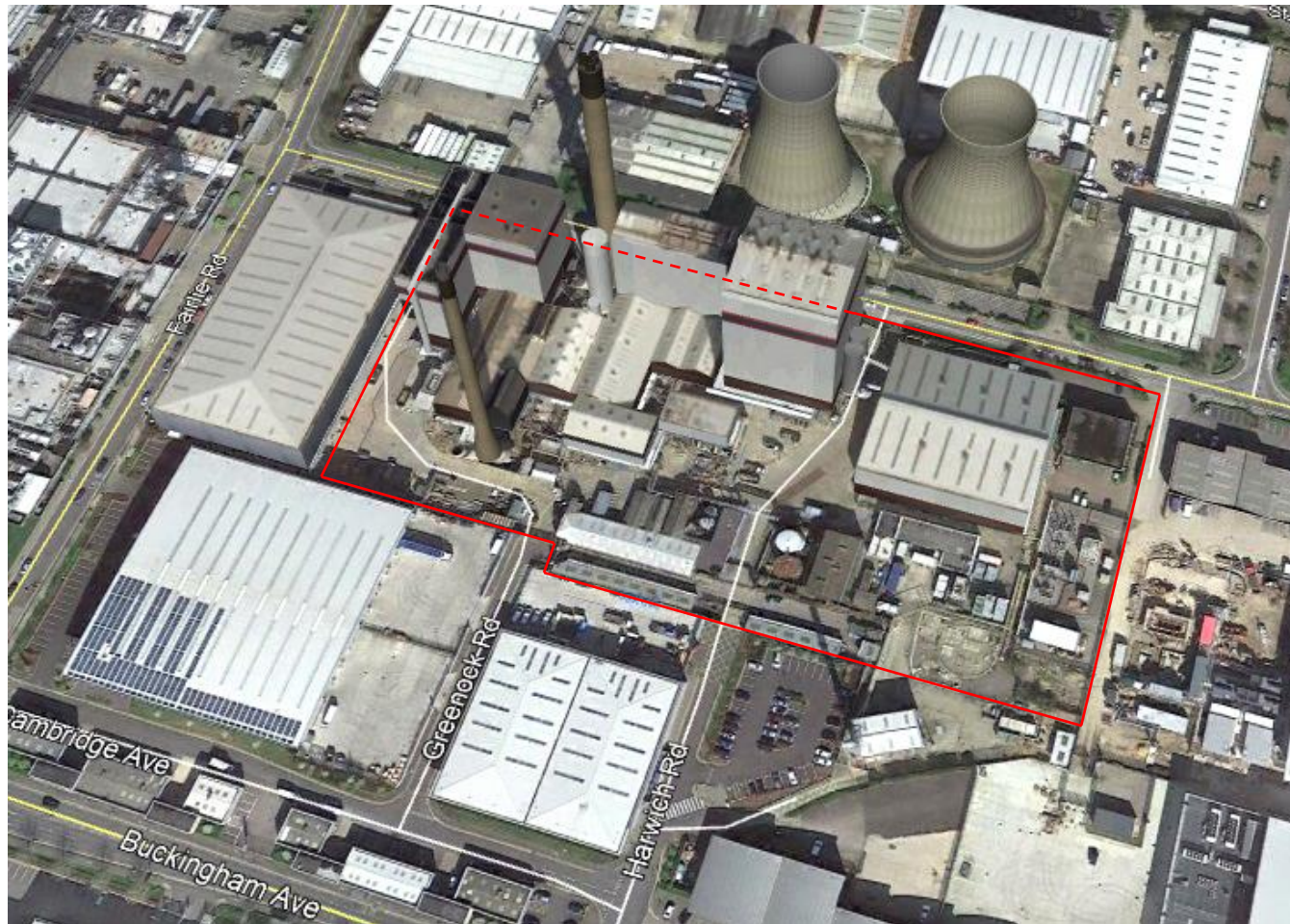


Overview

This document contains SSE's demolition proposals to cover the full works scope which has been developed to include:

- Specialist Services Contractor carrying out terminations, diversions and new supply design.
- Specialist Demolition Contractor to carry out:
 - Hazardous Materials Removal – including Asbestos and potential residue chemicals.
 - Deplanting of buildings to be demolished.
 - Selective Deplanting of structures scheduled for partial retention.
 - Demolition and partial demolition of buildings down to ground or basement slab level.
 - Break out of ground slabs and foundations.

Slough Power Station is located in an urban semi-industrial and commercial trading estate. Parts of the station will remain live throughout the demolition contract, feeding power directly to nearby 3rd party businesses dependent on continuation of supply.



SSE's Tender Stage works specification has been developed on this basis, with the contractor provided with:

- Original construction drawings covering plant and structures.
- Opportunity to carry out unlimited site visits over the tendering period December 2017 to February 2018.

Only contractors with the highest level of expertise and safety culture in this specialist field will be selected for tendering following a rigorous prequalification exercise by SSE.

Contractor's tendered proposals will require to be prepared to a level sufficient to permit SSE's detailed appraisal, including review of:

- Works Sequence
- Works Methodology
- Protection Measures to avoid disruption to the live areas of the station.
- Coordinated Programme
- Demolition Team Resource – Management, Operatives, Plant

Following contract award the contractor will prepare a full schedule of detailed risk assessments and method statements covering all aspects of the works.

Only the safest practicable methods of demolition will be used based on comparative risk assessments. From experience this will typically follow a preference hierarchy of:

- Remote Demolition by Machine.
- Controlled Collapse of full or partial structures to permit materials processing at ground level.
- Crane Lifting or lowering plant and high level structures to permit materials processing at ground level.
- Piece Small Dismantling at height – comparatively high risk and used only where other options are not considered practicable.

Each working stage detailed method statement will describe:

- Safe System of Work
- Task specific Risk Assessments,
- COSHH Assessments
- Detailed Method Statements including 3-D modelling where appropriate

All works will be carried out in accordance with:

- BS6187:2011 Code of Practice for Full and Partial Demolition

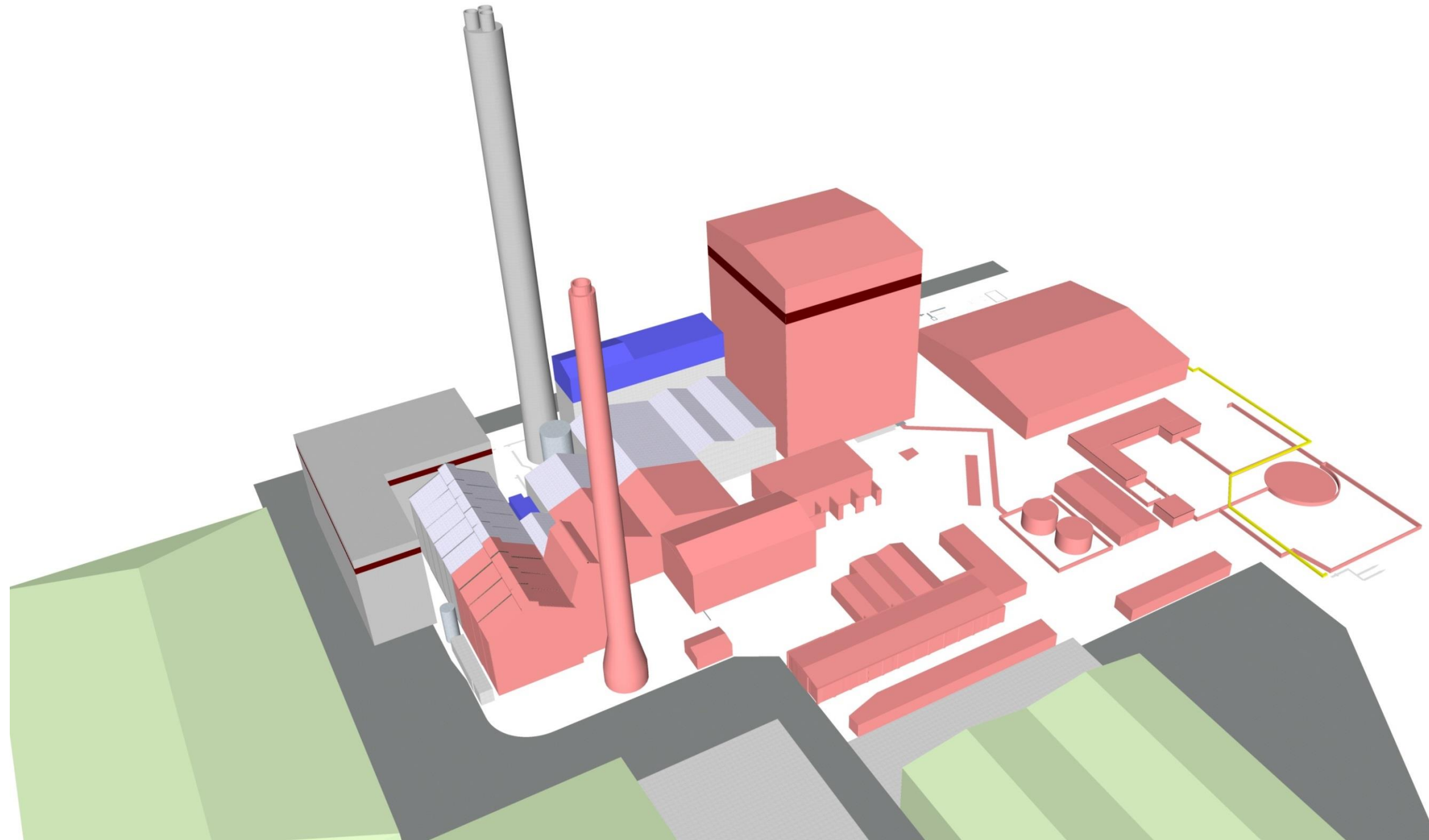
SSE has developed a detailed 3D model of the site and buildings to assist the contractor in sequencing, logistical planning and programming of the works. Such models are extremely effective in demonstrating the working space available/required, the potential interactions between different areas of work, location, proximity and impact of live services and adjacent stakeholders. SSE intends the successful contractor to use this model as a live working tool throughout the delivery of the project as part of our detailed planning process.

This method statement document highlights only the key project activities which SSE considers should adequately describe, for the purposes of the Planning Application, the principle demolition techniques and works sequencing.

Site As-Existing

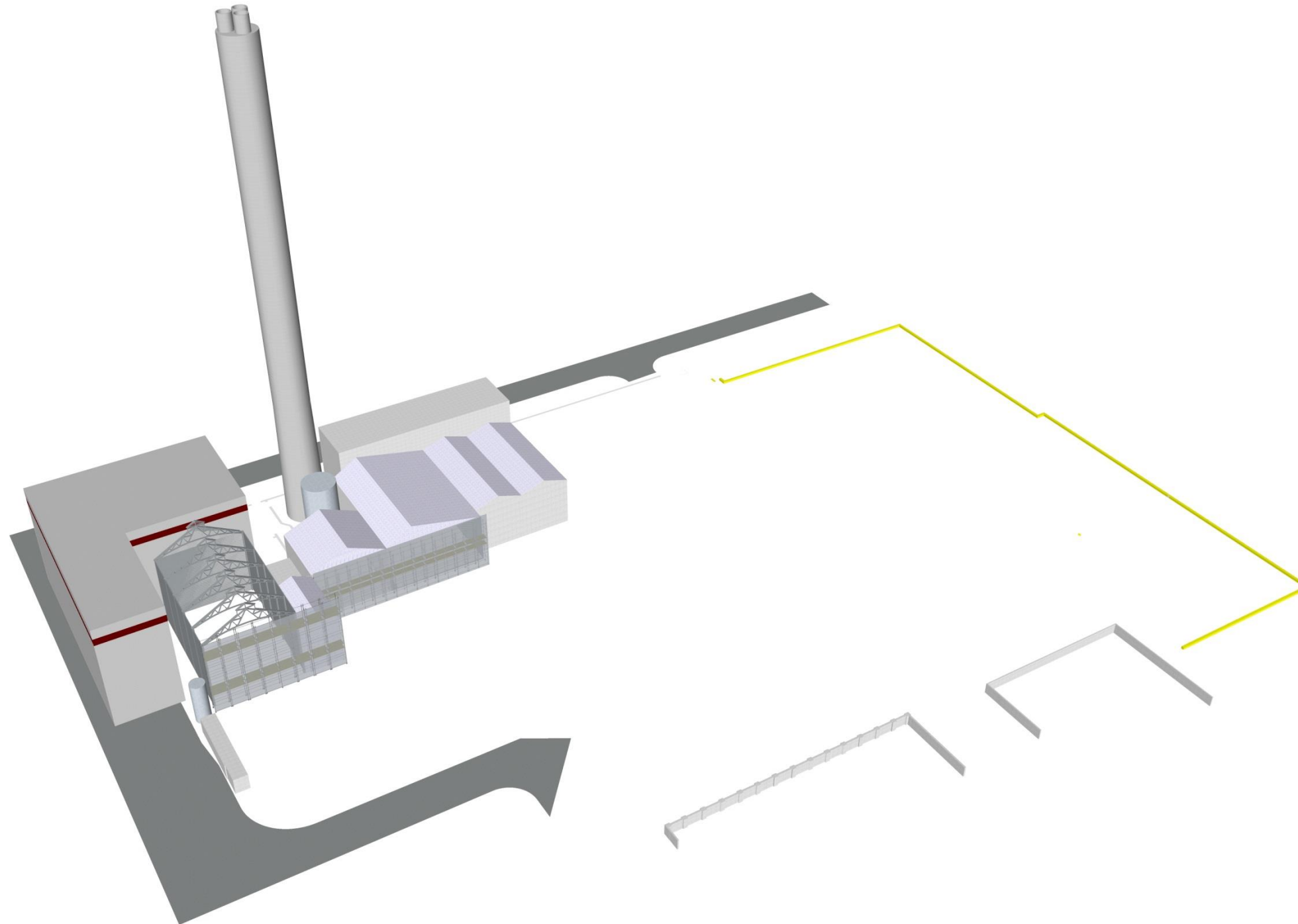
The images below shows perspective views of the 3-D block model of the overall site with the various buildings and areas shaded appropriate to the specified work scope:

- Pink Demolish and remove ground slab
- Blue Deplant
- Grey Remain
- Green Buildings in 3rd Party Ownership



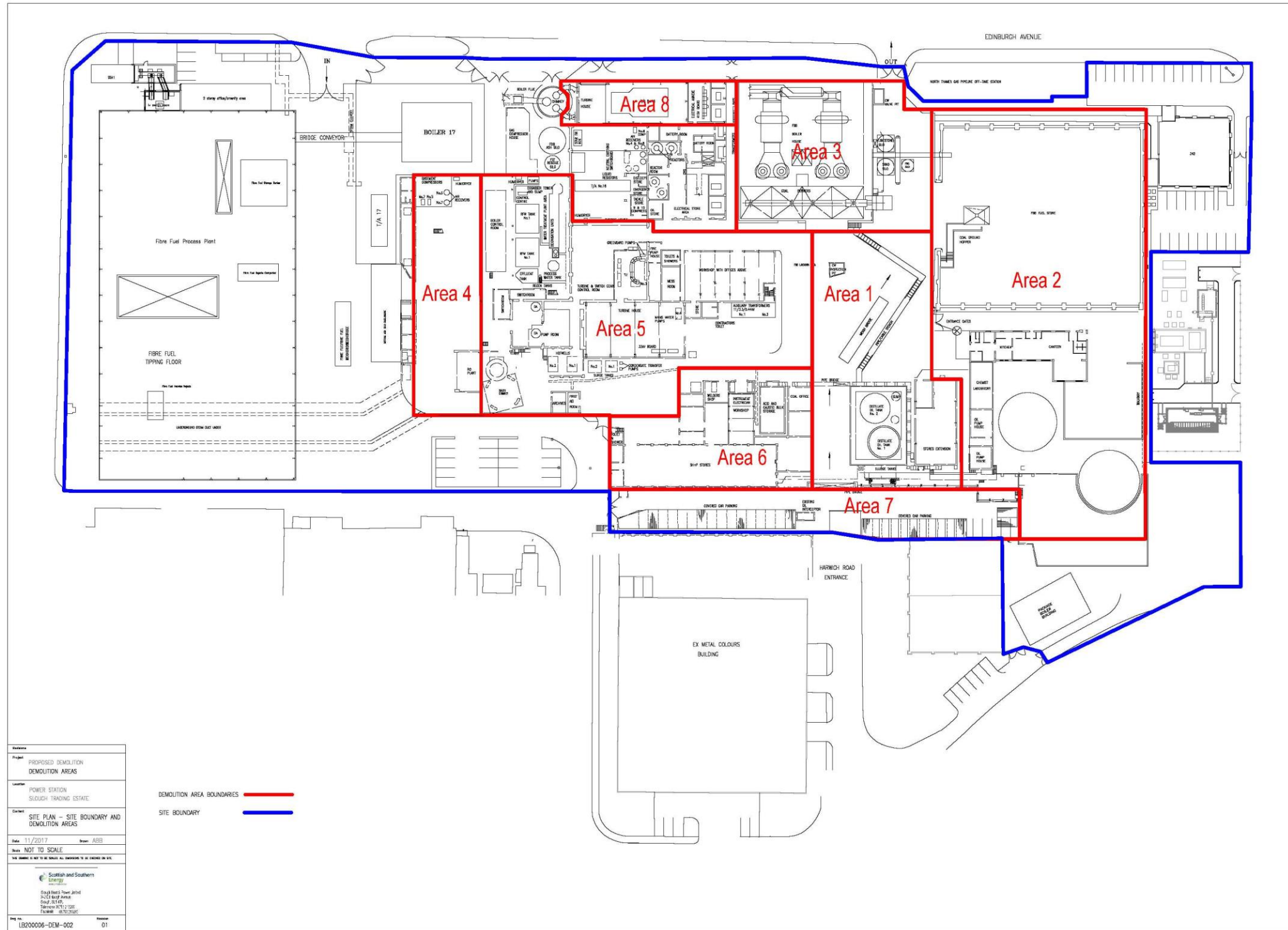
Site End State

The images below shows perspective views of the 3-D block model of the overall site with the various demolition and deplanting activities completed.



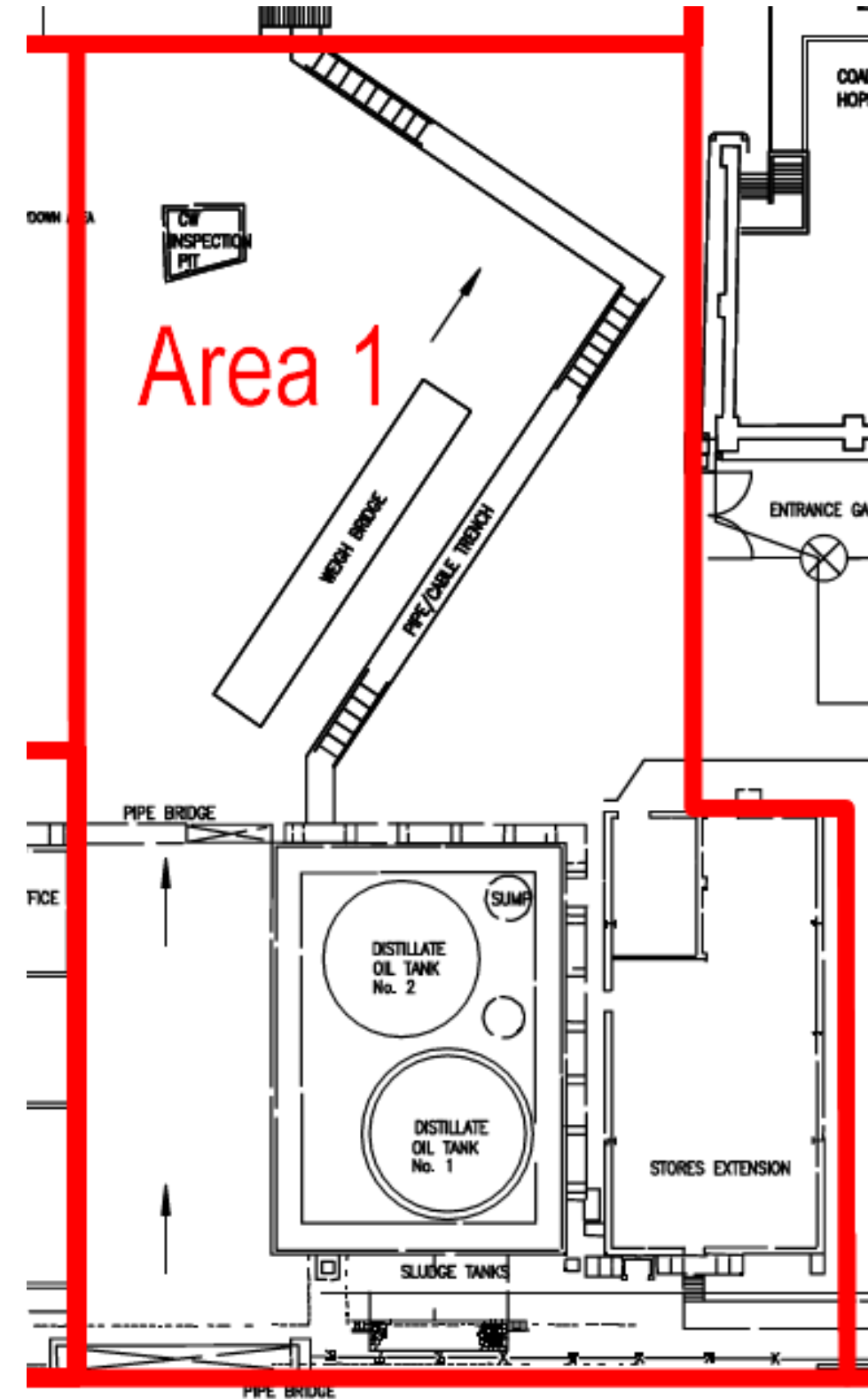
Project Works

The site has been divided into defined areas for building reference purposes.



Works Summary – Area 1

1. Existing Services
 - *Underground HV Cable*
 - *Cooling Water Pipework feeding other areas*
2. Services Diversions
 - *To be completed in this area before commencement of demolition*
3. Fuel Oil Storage Tanks
 - *Remove Pipe Bridge*
 - *Tanks empty – check if “Decommissioned by Others” means they are clean*
 - *Break down Bund Wall to slab level*
 - *Tanks steel – require*
 - *Leave tank bases intact*
4. Stores Extension Building
 - *Small steel framed industrial building*
 - *Steel wall cladding with low level brick dado wall*
 - *Steel roof cladding*
 - *Demolish to slab level - require*
5. Weigh Bridge
 - *Use during works*
 - *Demolish at end, break out substructure and infill*
6. Services Trench
 - *Remove concrete covers*
 - *Remove services and decontaminate residual product*
 - *Refill to slab level*
7. Cooling Water Valve Pit
 - *Remove concrete covers*
 - *Remove services and decontaminate residual product*
 - *Refill to slab level*



Works Summary – Area 2

8. Existing Services

- *Underground HV Cable*
- *Other Underground Services*

9. Services Diversions

- *To be completed in this area before commencement of demolition*

10. FBB Fuel Store including Associated Conveyor System

- *Demolish Steel Portal Frame*
- *Break out Coal Hopper*
- *Remove Conveyor across to FBB building*

11. Canteen Building / Chemist Lab

- *Small traditional build structure*
- *Brickwork and Concrete*
- *Demolish to slab level*

12. 2No Oil Pump Houses

- *Decontaminate*
- *Demolish to slab level*

13. Oil Storage Tank Slab No.3, bund walls and any upstands

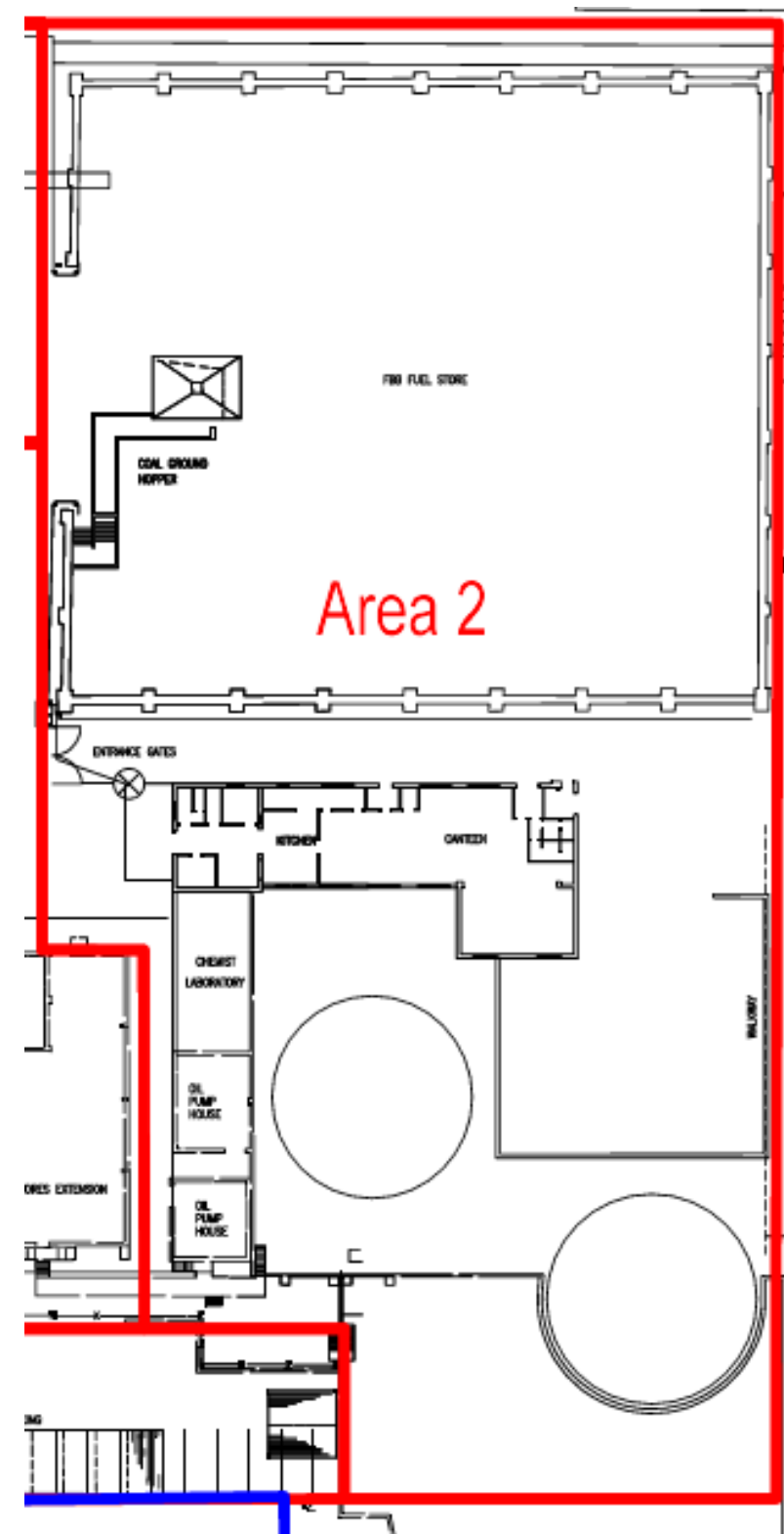
- *Break out and remove*

14. Contractors Compound

- *Breakout compound wall*
- *Remove remaining cabins*

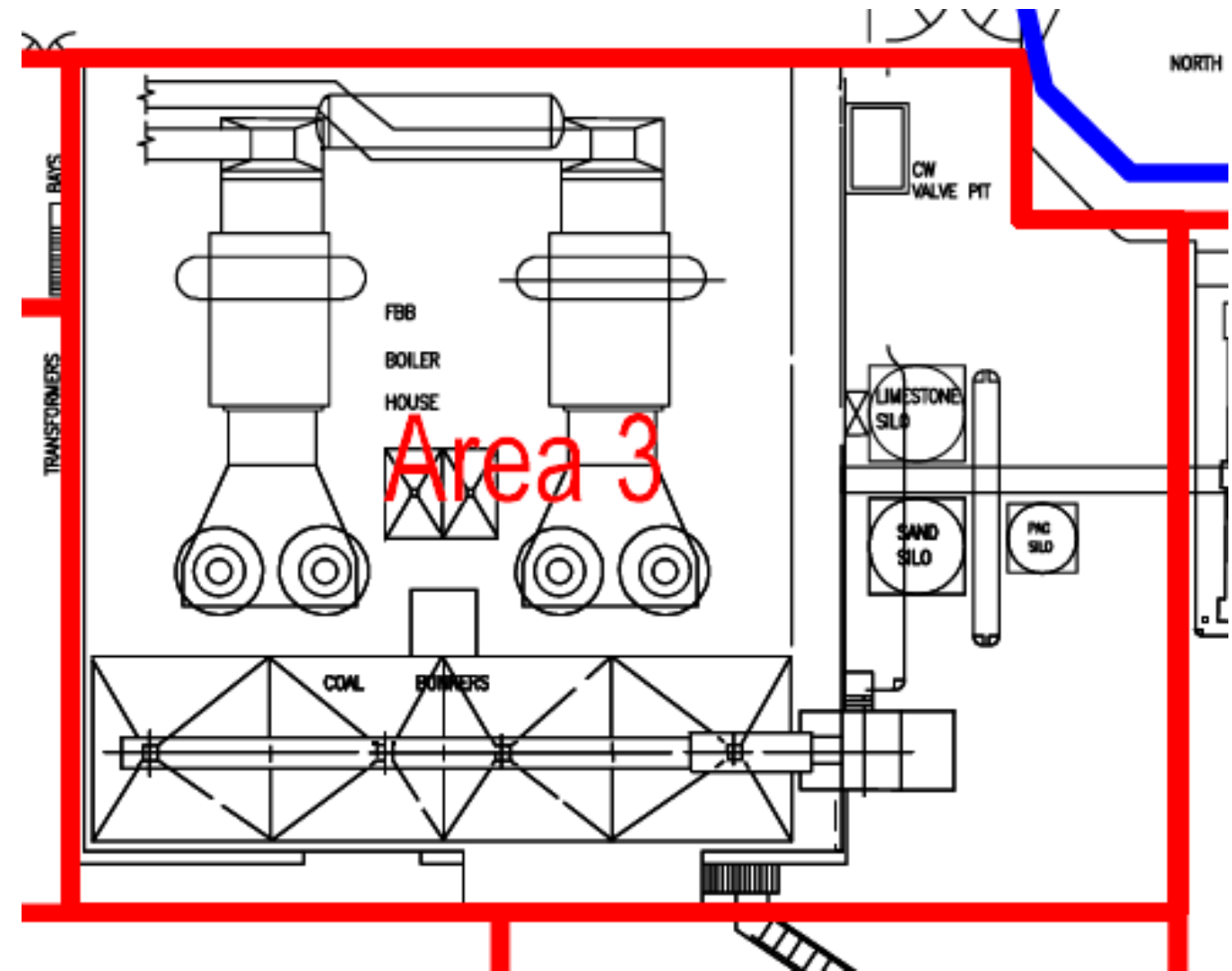
15. Oil Storage Tank Slab No.4

- *Breakout and backfill void*



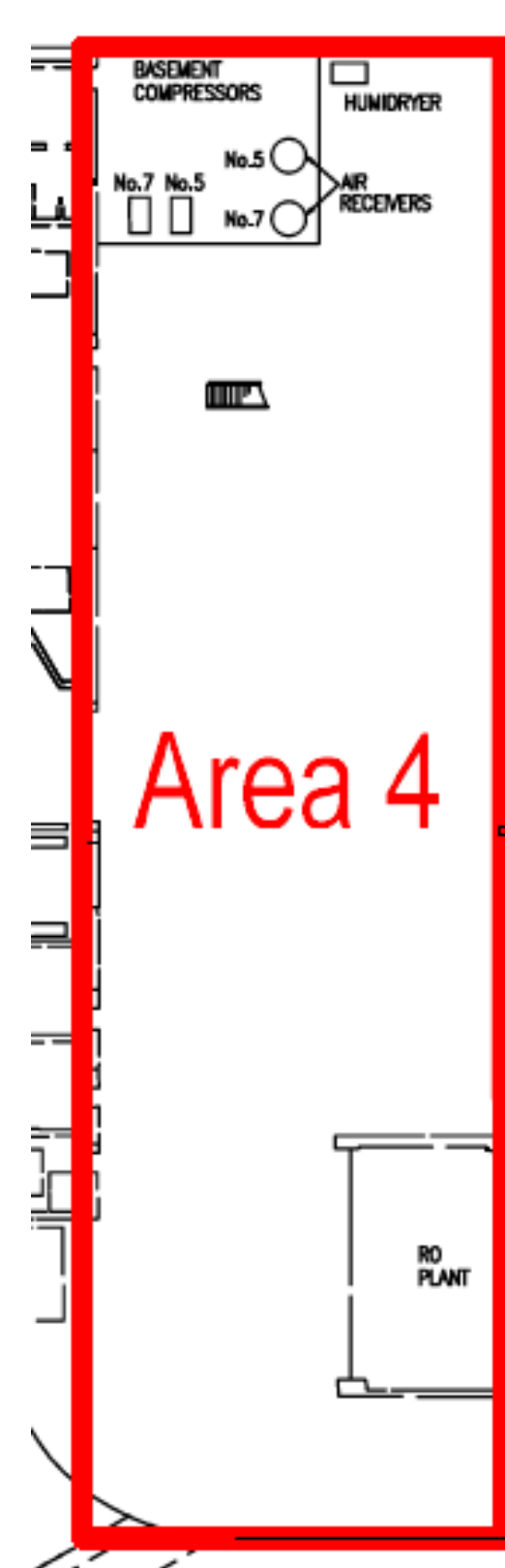
Works Summary – Area 3

16. Existing Services
 - Power Transformers located to the West of the FBB
 - Gas Compound to the North East Corner
17. Services Diversions
 - To be completed in this area before commencement of demolition
18. FBBH
 - Lower and Remove Top Hung Boilers
 - De-Plant remaining items, coal bunkers etc.
 - Dismantle Steel Frame
19. Limestone Sand and PAC Silos
 - Piece Small Dismantling
 - Controlled Collapse
20. High Level Duct Work, Platforms and Stairs from FBB to Bag House
 - Dismantle Using Luffing Tower Crane
 - Brought down with FBB Structure level by level.



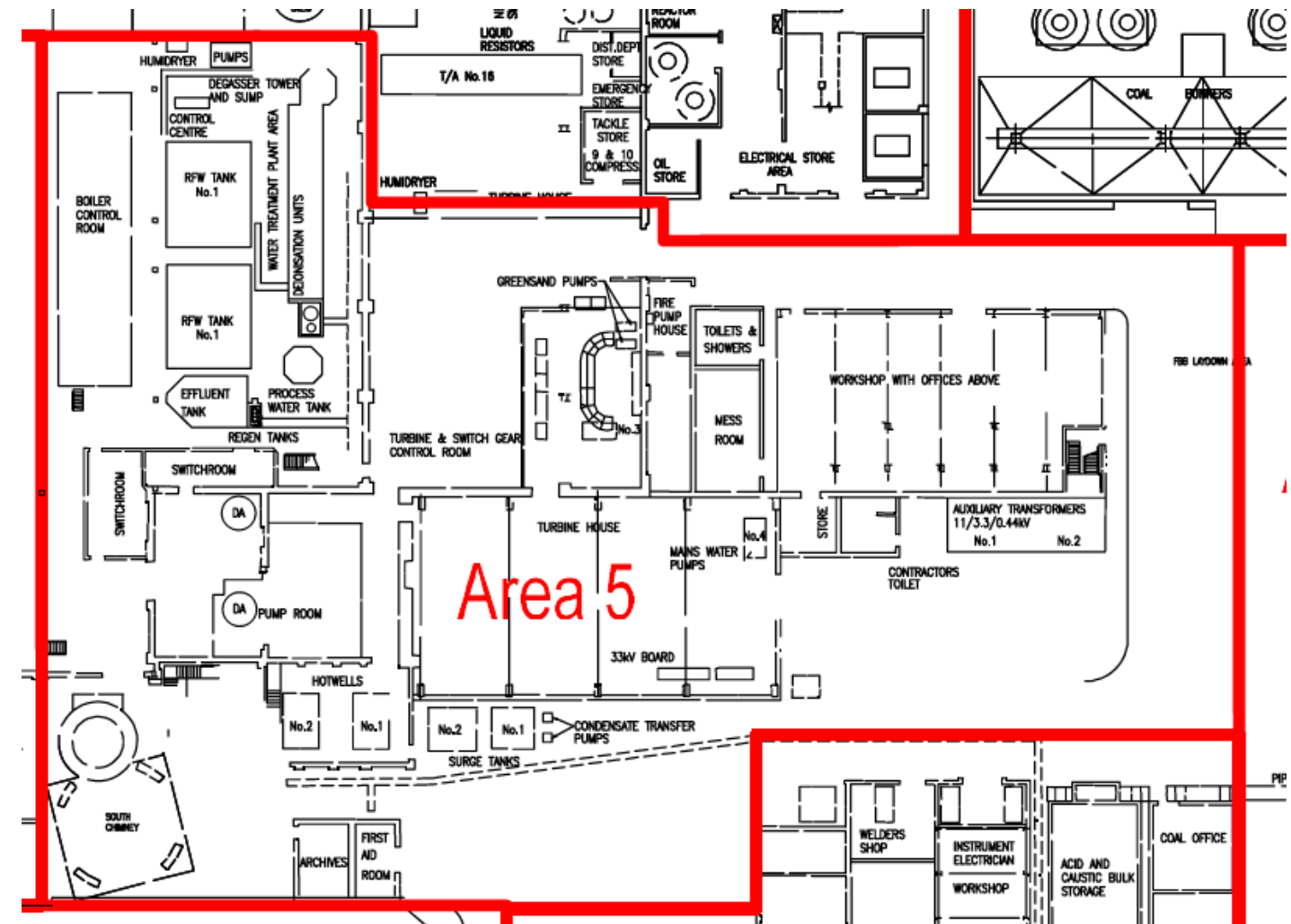
Works Summary – Area 4 – Former Boiler House 15, 16 and Waste Heat Boiler (WHB)

21. Existing Services
 - Power, Data and Water Supplies to the control room
22. Services Diversions
 - To be completed in this area before commencement of demolition
23. BH15,16 building
 - Remove roof sheeting full length of building
 - Remove Structure to the point indicated
 - De-plant and dismantle remaining steelwork and apparatus.
 - Sub-Basement to be deplaned and decontaminated
 - Break out roof of underground void leading to south stack. Clear void of equipment, clean contamination and backfill with clean crushed concrete.
 - Remove temporary weathering scaffold to south elevation



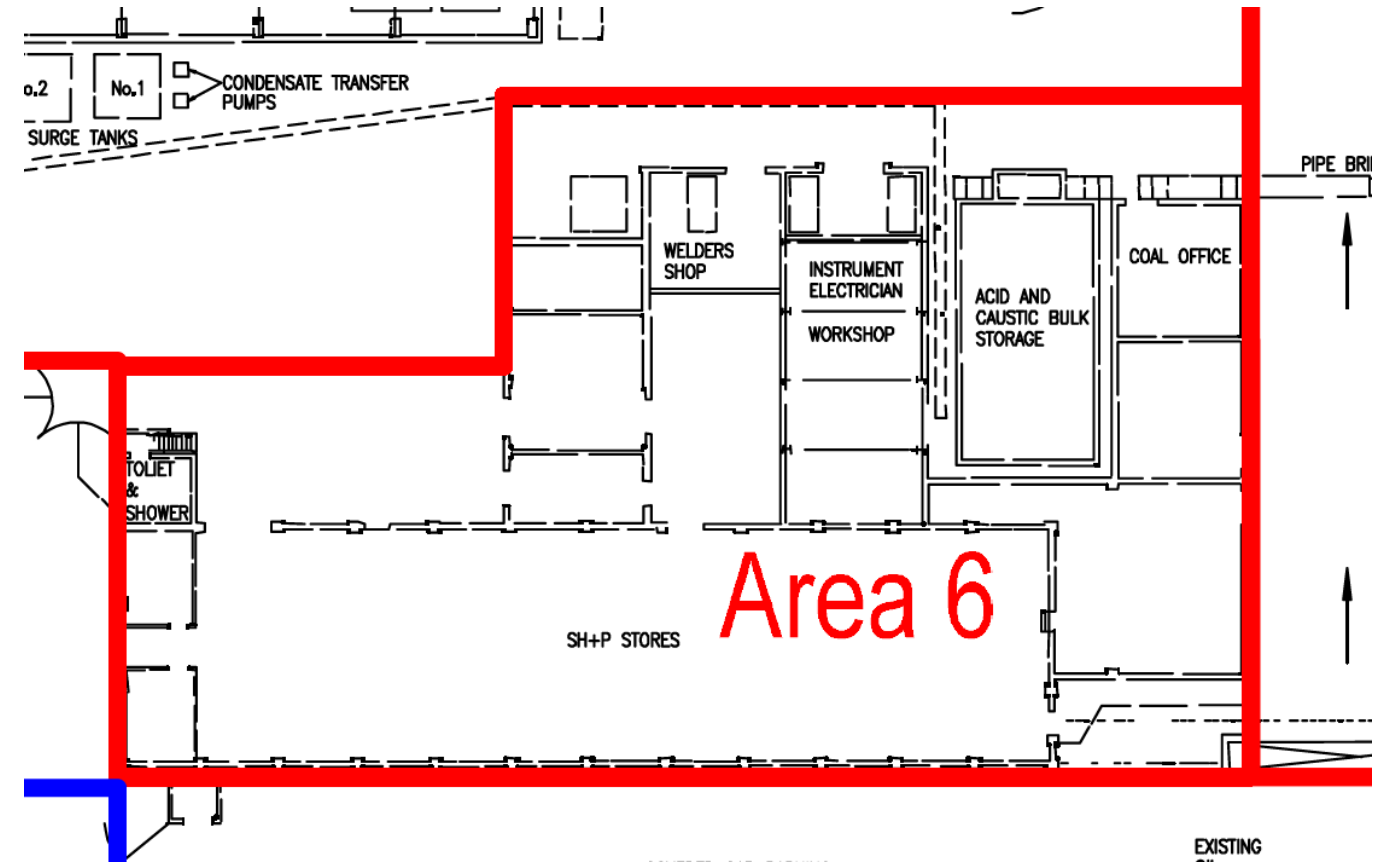
Works Summary – Area 5

24. Existing Services
 - Power, Data will remain live to control building
 - Water supply will remain live to control building
25. Services Diversions
 - To be completed in this area before commencement of demolition
26. Workshop Building with offices above including walkway
27. 2 Aux Transformers located to the south
28. External Stores, Archive and First Aid Room
29. Turbine House T/A14
30. Pump Room Hot Wells and Surge Tanks
31. South Stack
32. Roof of underground void leading from area 4
33. De-Plant of Switch Rooms
34. Water Treatment Plant, associated water tanks
35. Redundant Coal Bunkers
36. Turbine Control Room (First Floor)
37. South Section of Turbine House T/A12



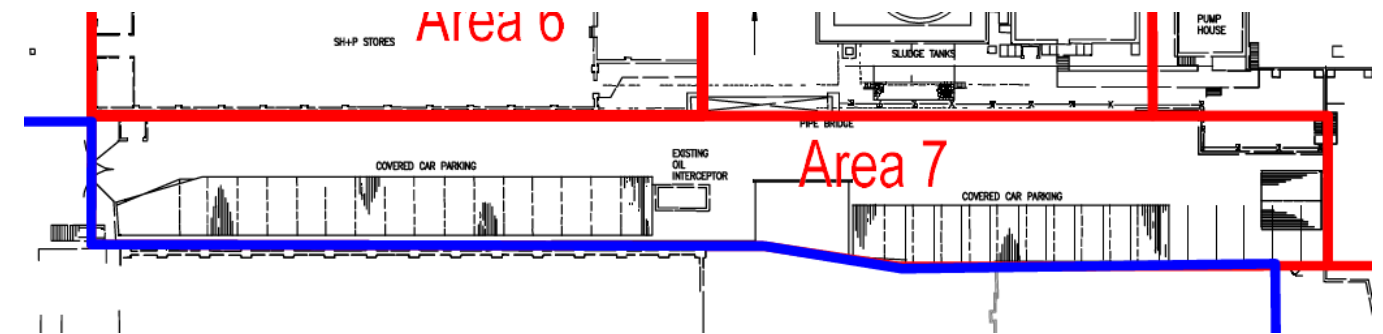
Works Summary – Area 6 – Traditional Machine Demolition

- 38. Existing Services N/A
- 39. Services Diversions
 - *To be completed in this area before commencement of demolition*
- 40. Slough Heat and Power Stores
- 41. Auxiliary Stores
- 42. Workshops and Offices
- 43. Acid and Caustic Bulk Storage Tanks Including Bunds and Pipework
- 44. Weighbridge office building



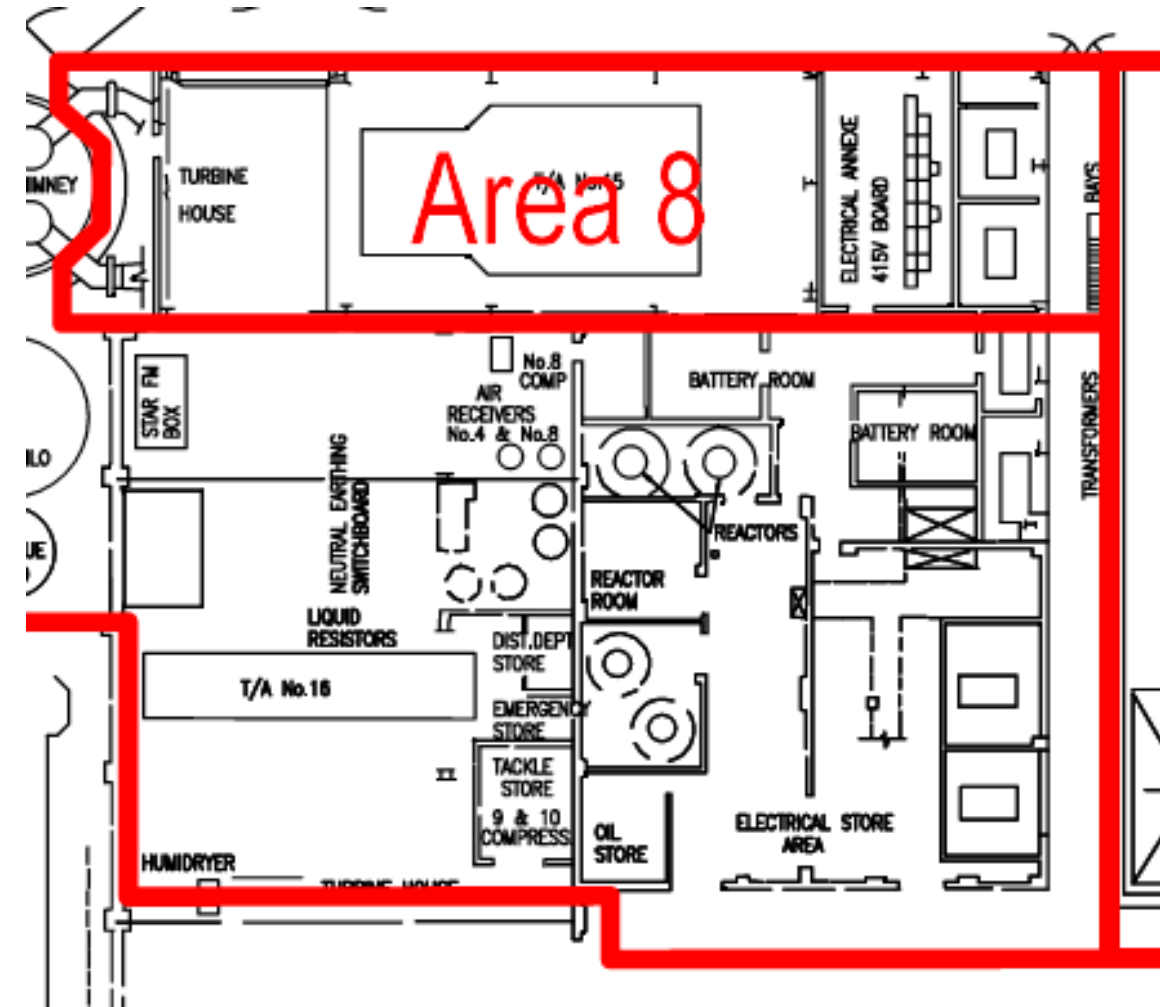
Works Summary – Area 7 – Traditional Machine Demolition

45. Existing Services N/A
46. Services Diversions
 - *To be completed in this area before commencement of demolition*
47. Car Parking Canopies along Southern Site Boundary
48. Chemical Waste Stores
49. Open Front Shed
50. Oil Interceptor

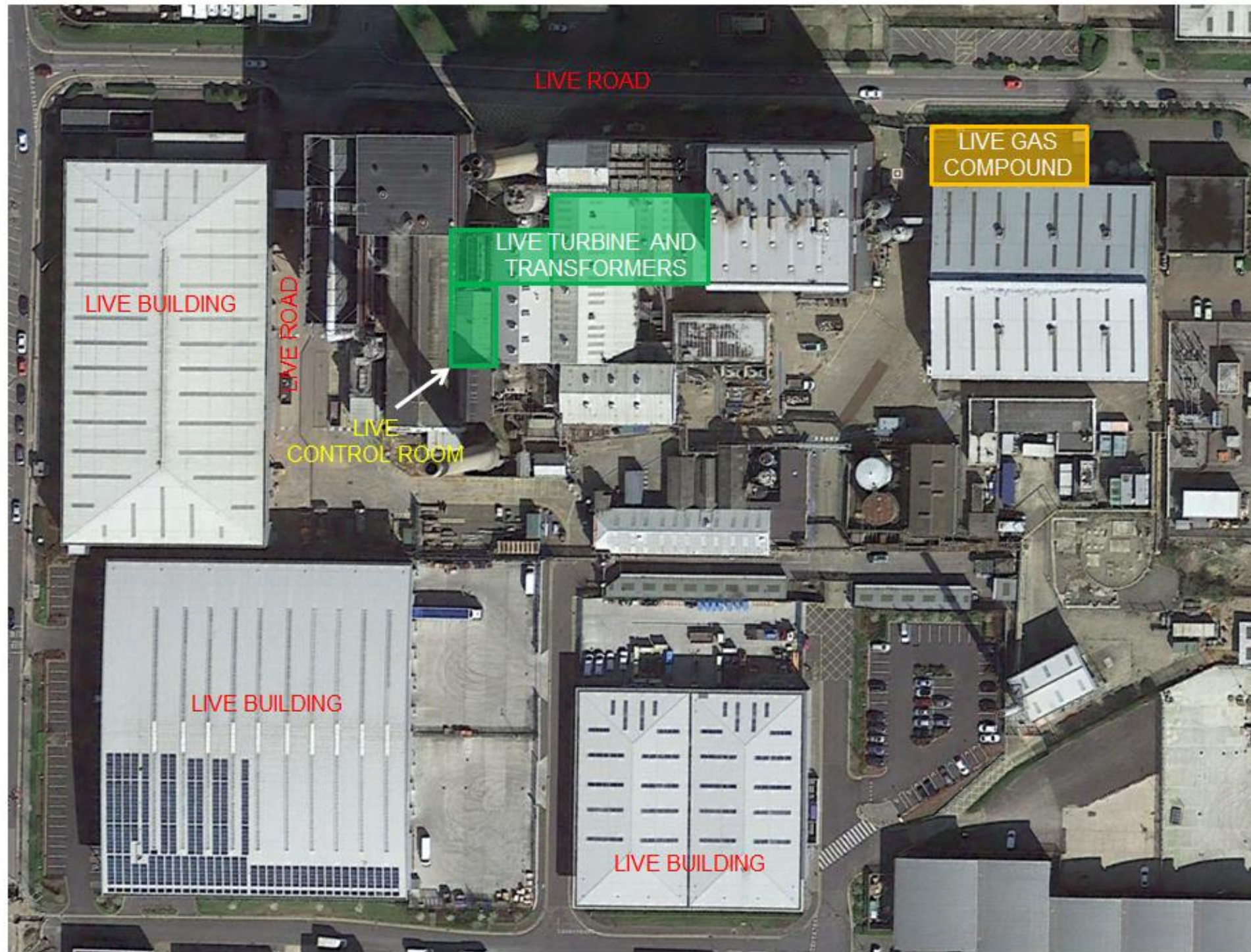


Works Summary – Area 8

51. Existing Services
 - Many Residual Services Within Building
52. Services Diversions
 - To be completed in this area before commencement of demolition
53. FBB Bag Filter Units and Associated Ductwork / Control Systems
54. ID Fans located in ductwork to north stack
55. Ductwork leading in to the north stack
56. Possible removal of cladding panels
57. T/A15 Turbine and associated equipment.

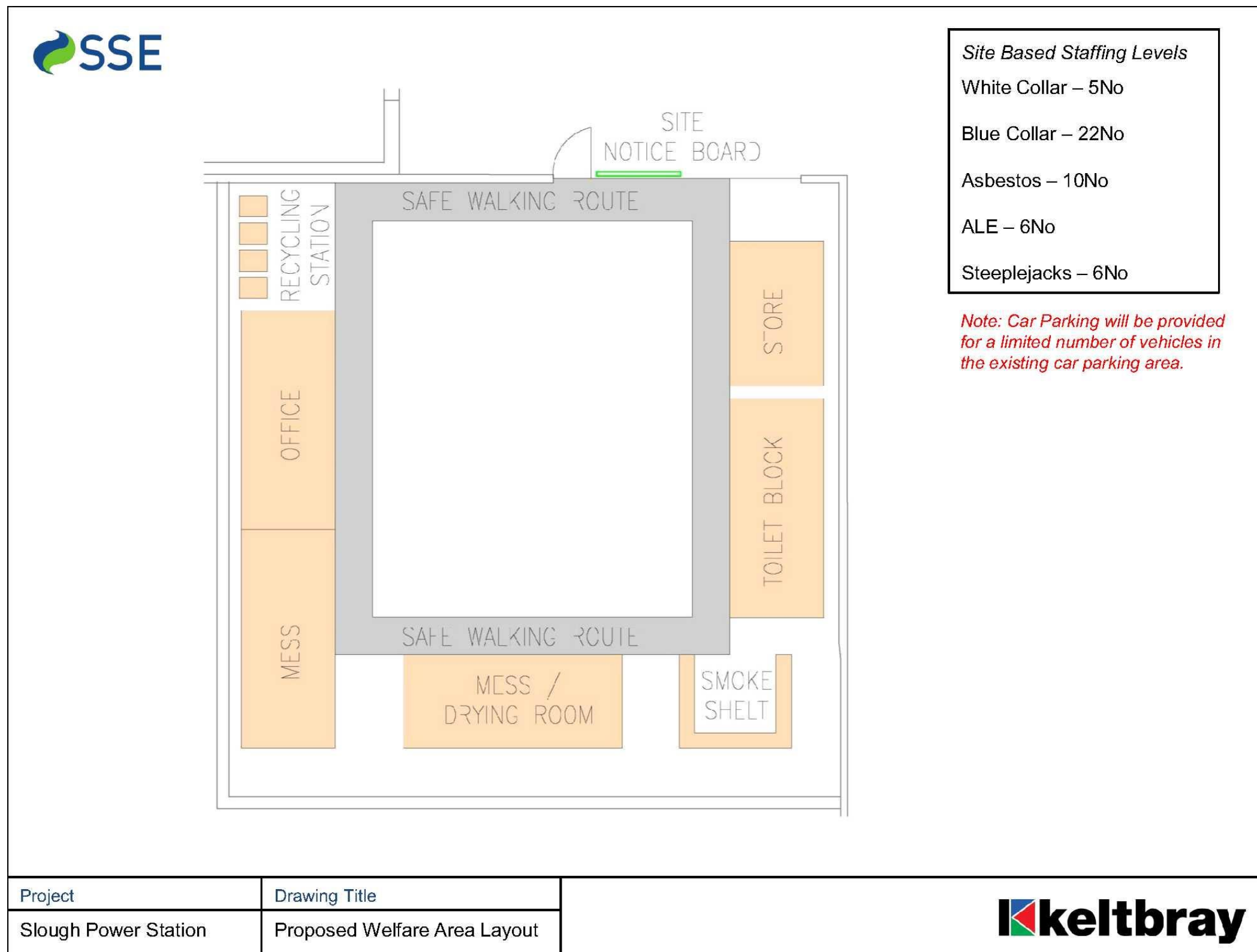


The proposed methodology has been selected taking account of the constraints shown in the image below.

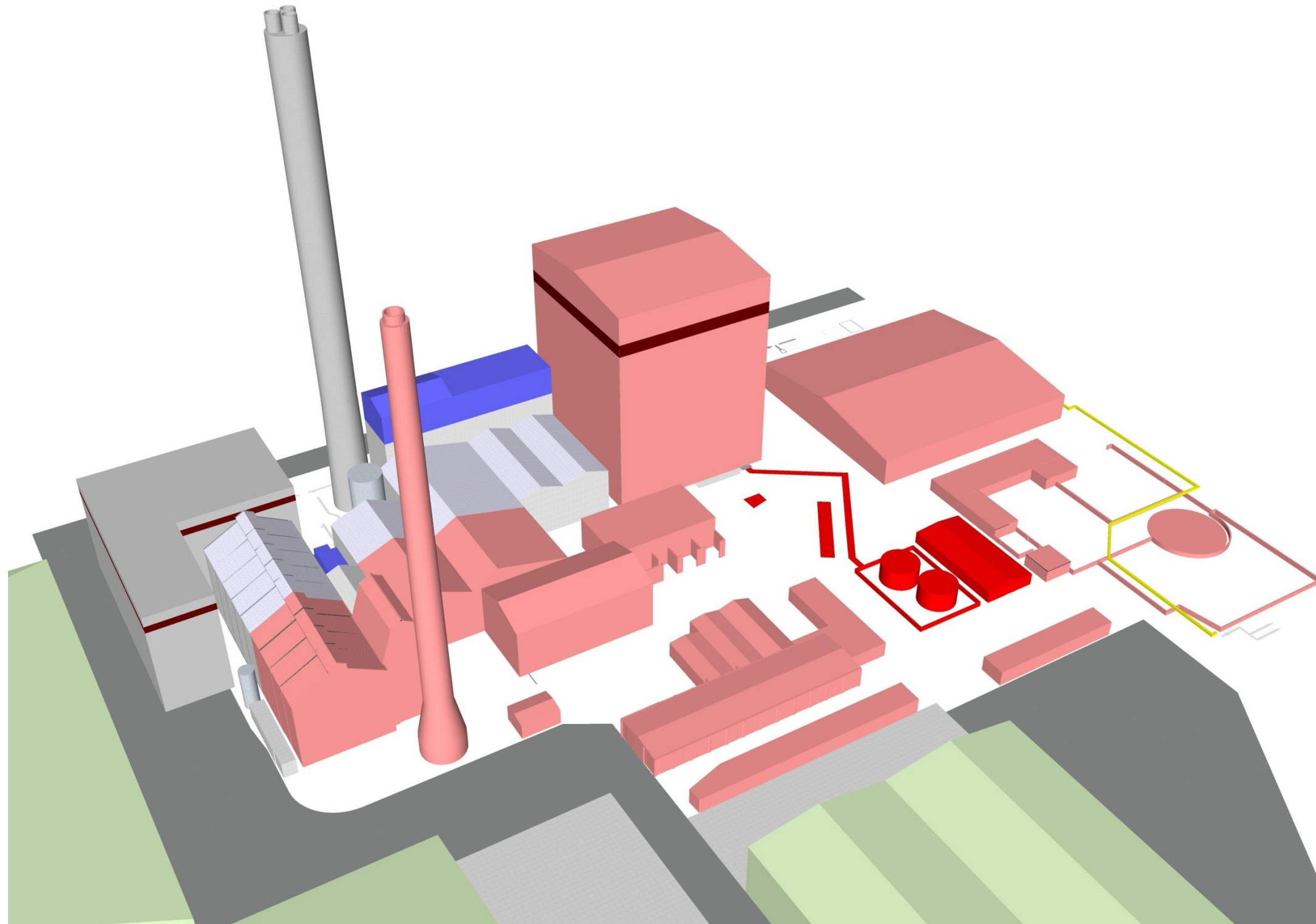


Aerial View of Slough Power Station showing constraints to demolition works.

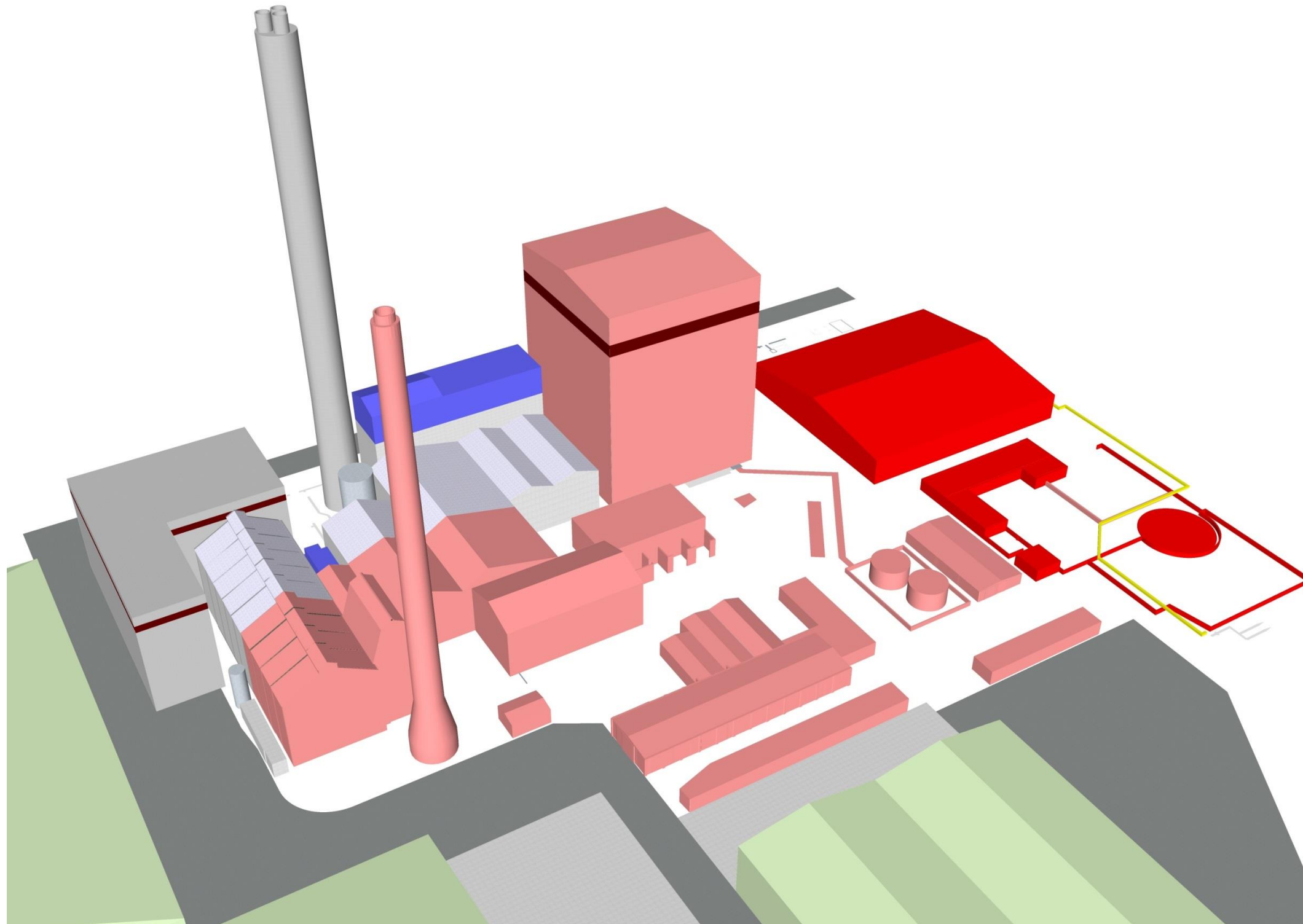
Site Establishment – Contractor to ensure establishment installed to a high standard



Area 1 Works – Buildings to be demolished shown in red – Traditional Machine Demolition



Area 2 - Fuel Storage Building - Buildings to be demolished shown in red – Traditional Machine Demolition



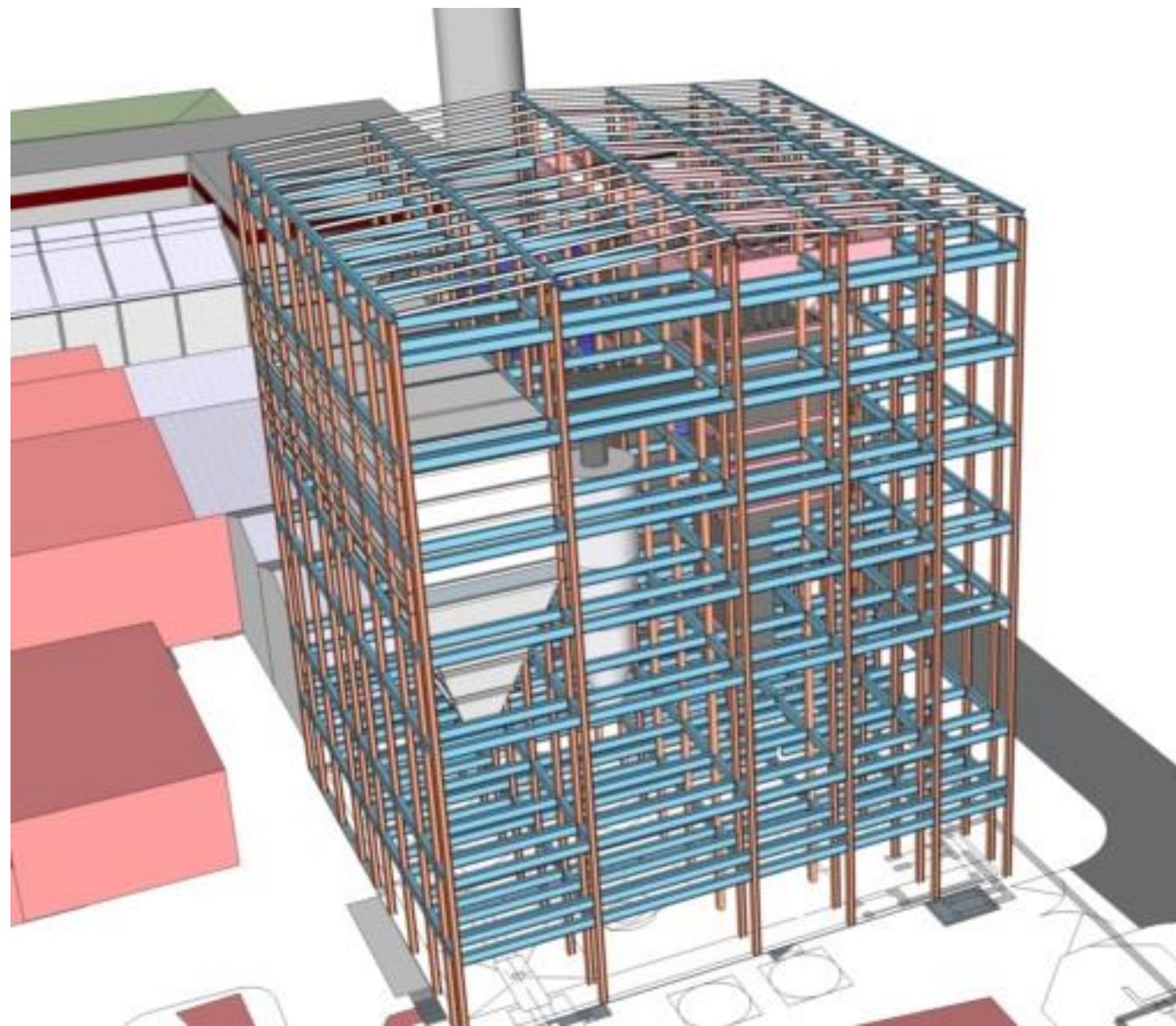
Area 3 - Boiler house Demolition

Boilerhouse Construction

The main Boilerhouse on the site was constructed circa 1990 and comprises:

- Piled Foundations supporting
- Heavy reinforced concrete Basement and Ground Floor Slab supporting
- Steel Framed beam and column superstructure supporting
- Steel floor plates typically including close spaced secondary support grillage

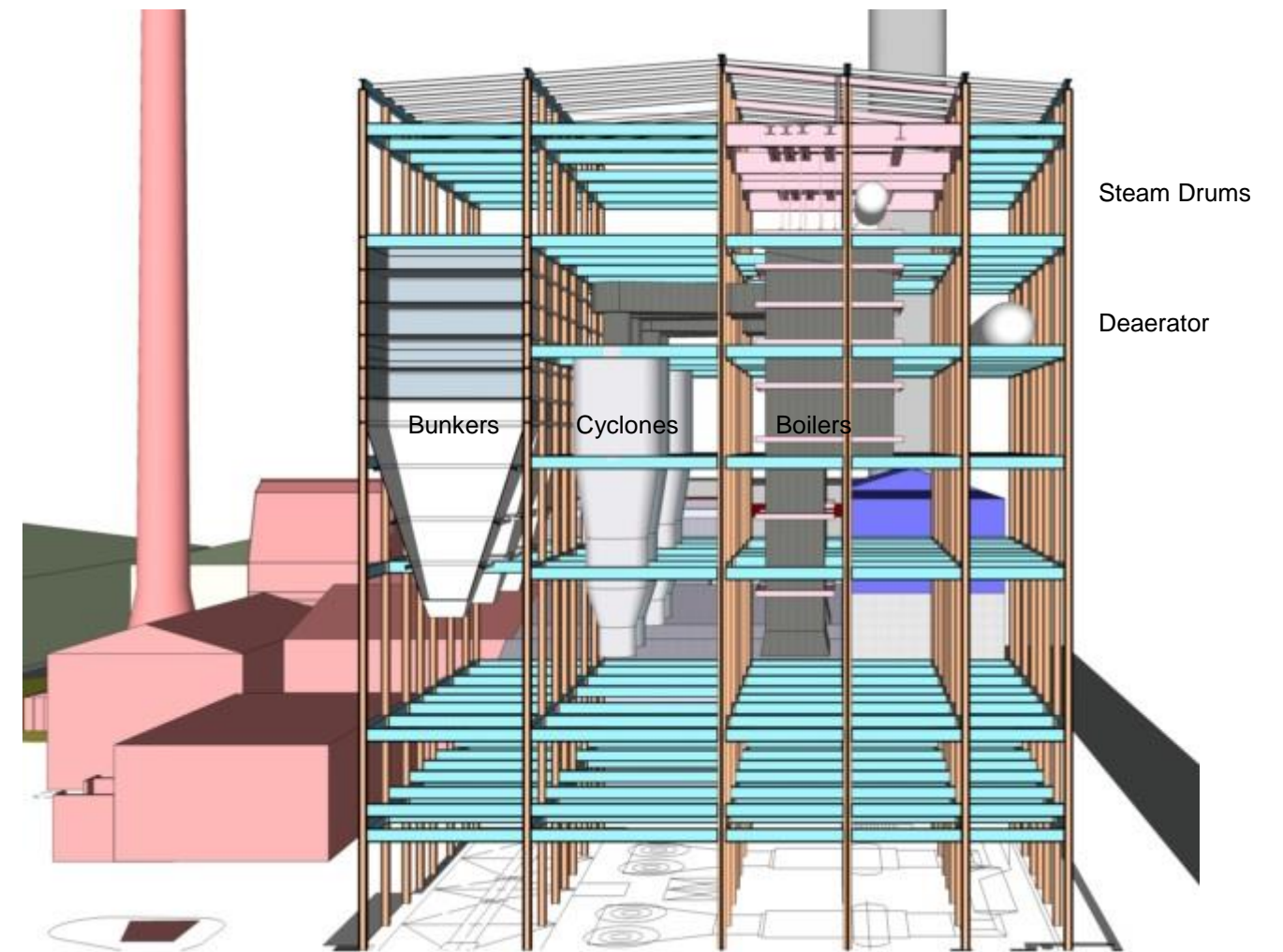
Sufficient on site survey has been carried out by SSE to allow modelling of the structure and the main elements of plant. An external perspective view of this model is shown below with external cladding removed for clarity.



The cross section below identifies the main elements of plant inside the Boilerhouse which includes:

- Original Bunkers extending near full width on the south bays of the building
- Top Hung Boilers – 2 no.
- Steam Drums over the Boilers – 2 no.
- Cyclones – 2 no.
- Deaerator Drum

The building is located near to the boundary with Edinburgh Lane, and other retained buildings on the site. This dictates the requirement for a highly controlled form of demolition that can ensure all materials are contained within the footprint of the building g or onto the internal yard laydown area.

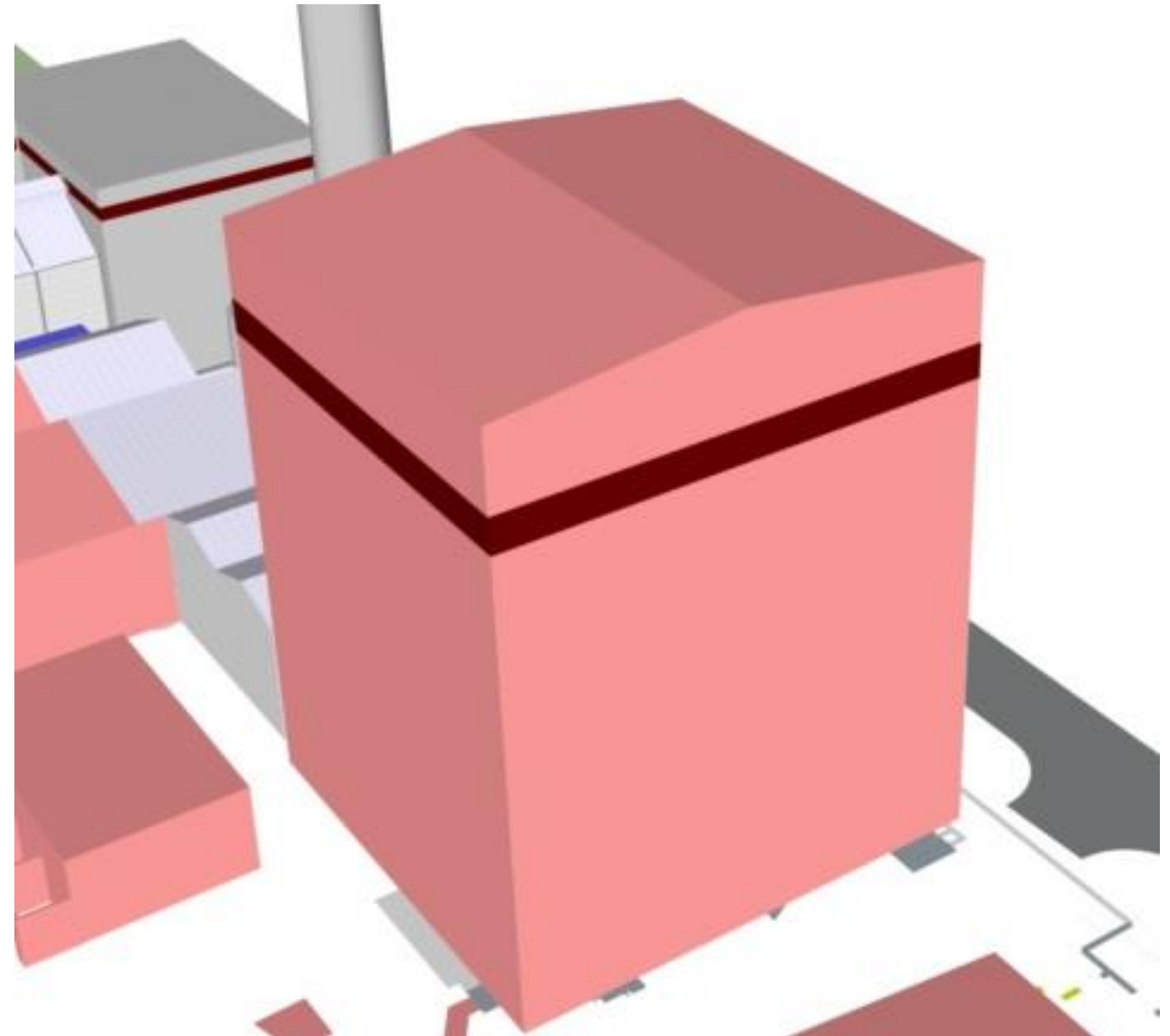


Boilerhouse Demolition

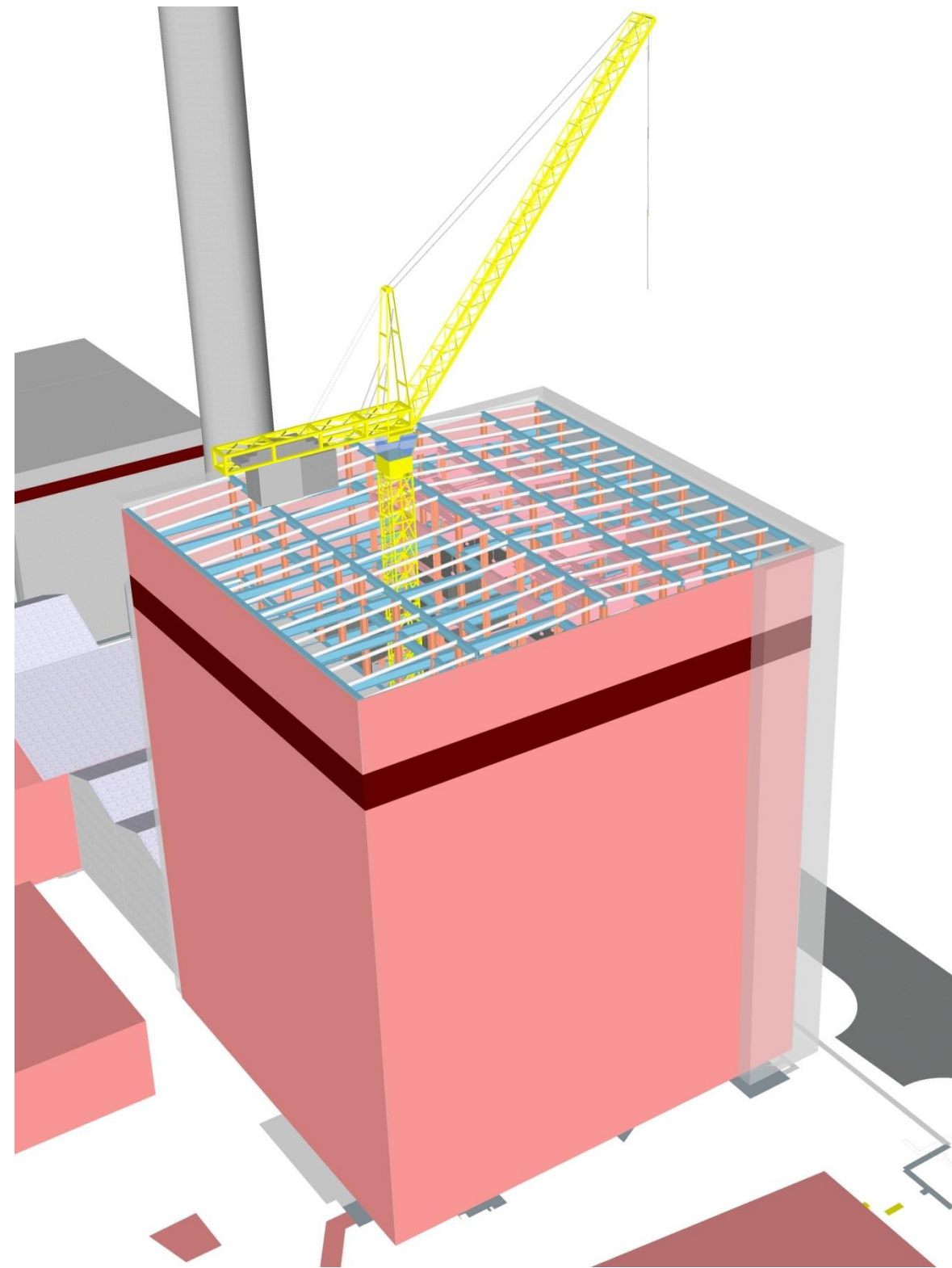
Taking account of the constraints affecting demolition of the Boilerhouse, the complexities involved in deplanting the Boiler, and the absolute need to ensure control and safety of the workforce, the following methodology is to be used by the contractor:

- Use of a Tower Crane to facilitate Top down dismantling of the building structure and removal of plant in the reverse operation to the Boilerhouse original construction.
- Boilers to be lowered internally using a proprietary ALE Strand Jack system, with the boiler plant cut up at ground level.
- Cladding to be removed in one continuous operation at commencement of the Boilerhouse demolition.
- Scaffolding to be erected full height on the north and north east elevation to provide protection to the adjacent public road and footpath
- Structure to be taken down to the levels shown for follow-on machine demolition where it can be guaranteed that all materials can be contained within the building footprint.

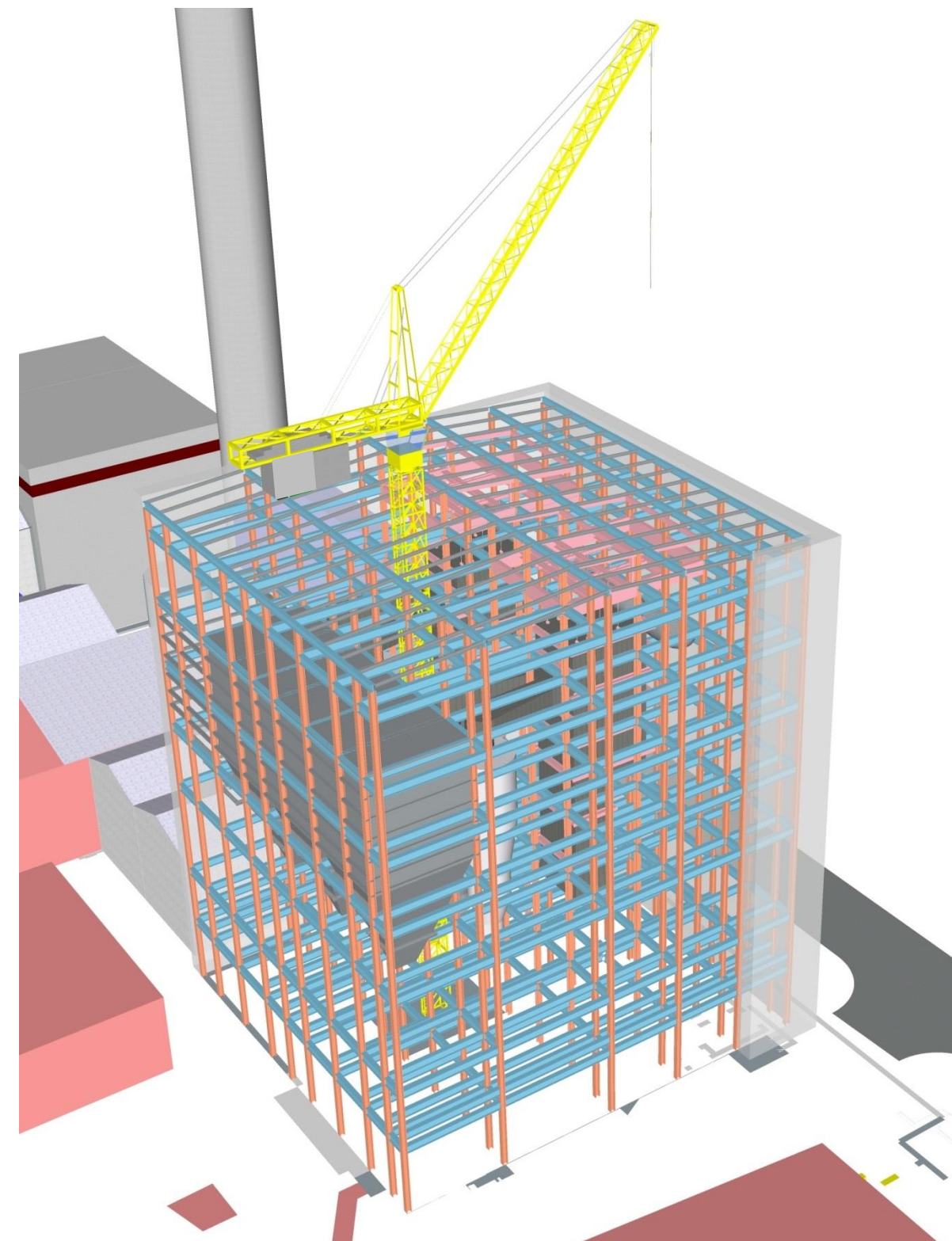
Boilerhouse as Existing



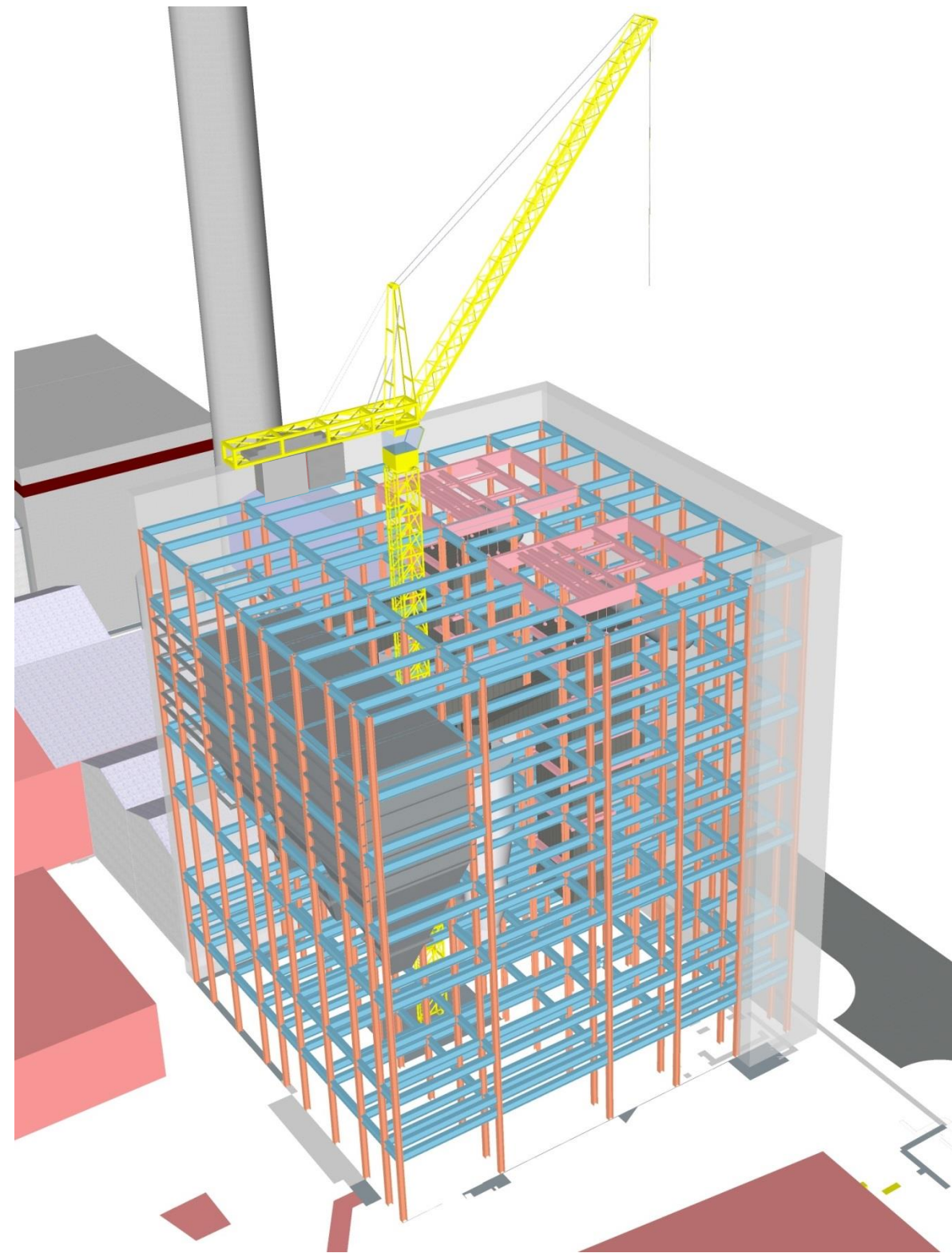
Boiler House Stage 1 – Erect Tower Crane and Remove Roof Cladding



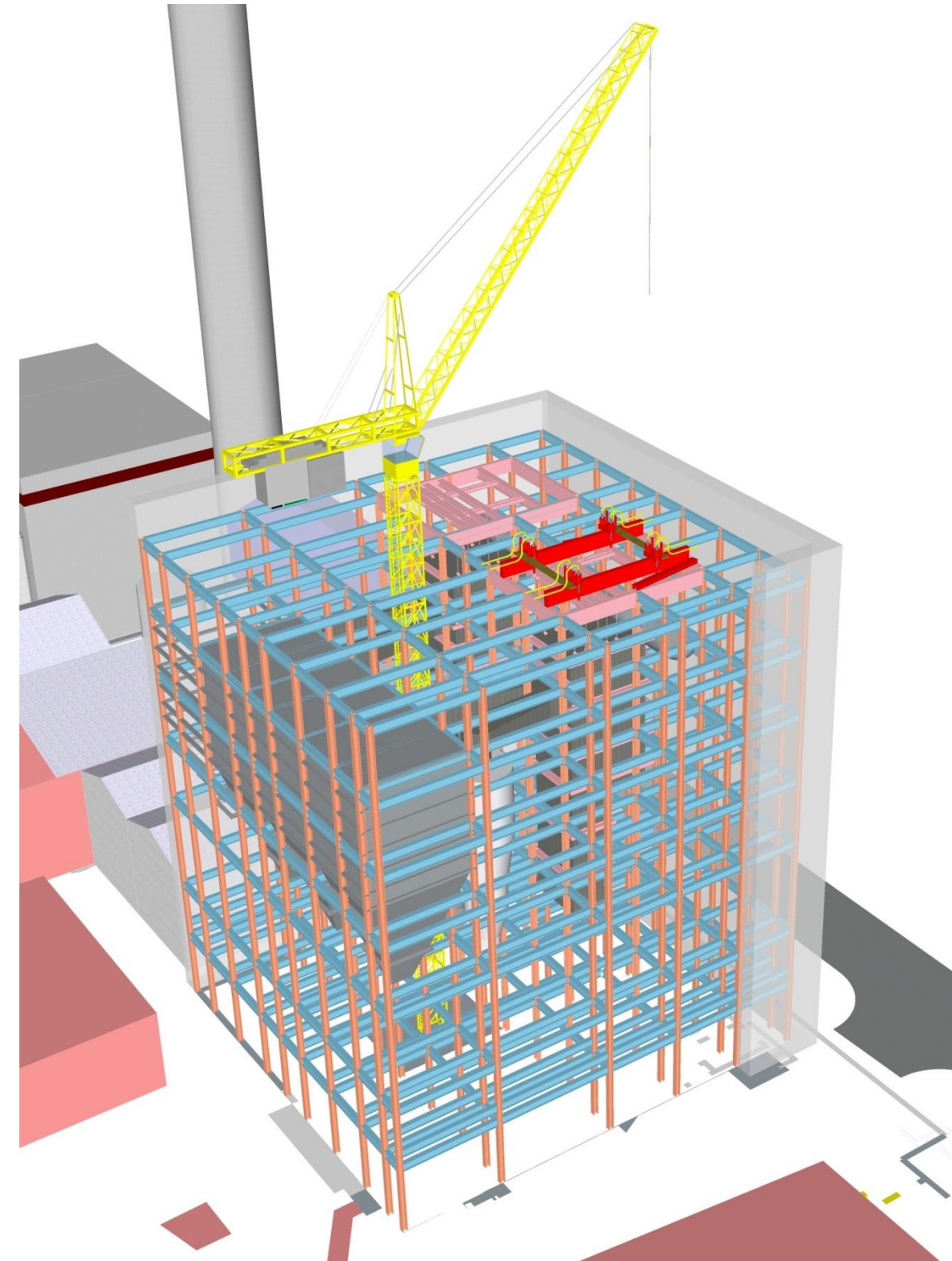
Boiler House Stage 2 – Erect complete encapsulating scaffold around all sides of boiler house.
Note: Scaffold omitted from south and east elevations on 3D model for clarity.



Boiler House Stage 3 – Crane off Lightweight Roof Structure



Boiler House Stage 4 – Erect ALE Strand Jack and Lifting Frame Boiler Lowering System



Removal of Boilers

The two boilers are independent from each other and top-hung with suspension rods taking support from a steel grillage at 40.90 m. This grillage spans in turn onto main perimeter support beams.

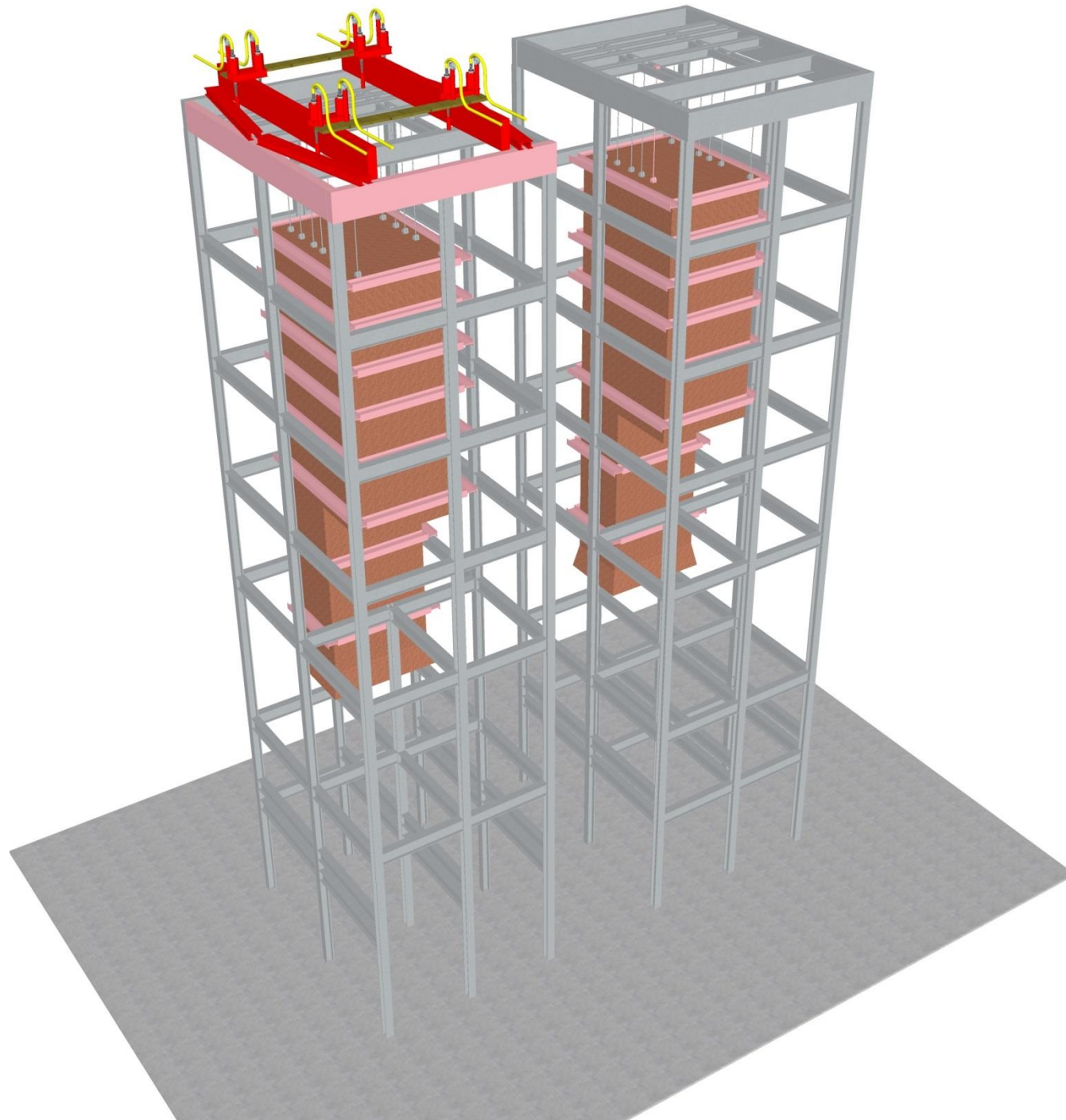


Hanger Rods – Top Connection Details

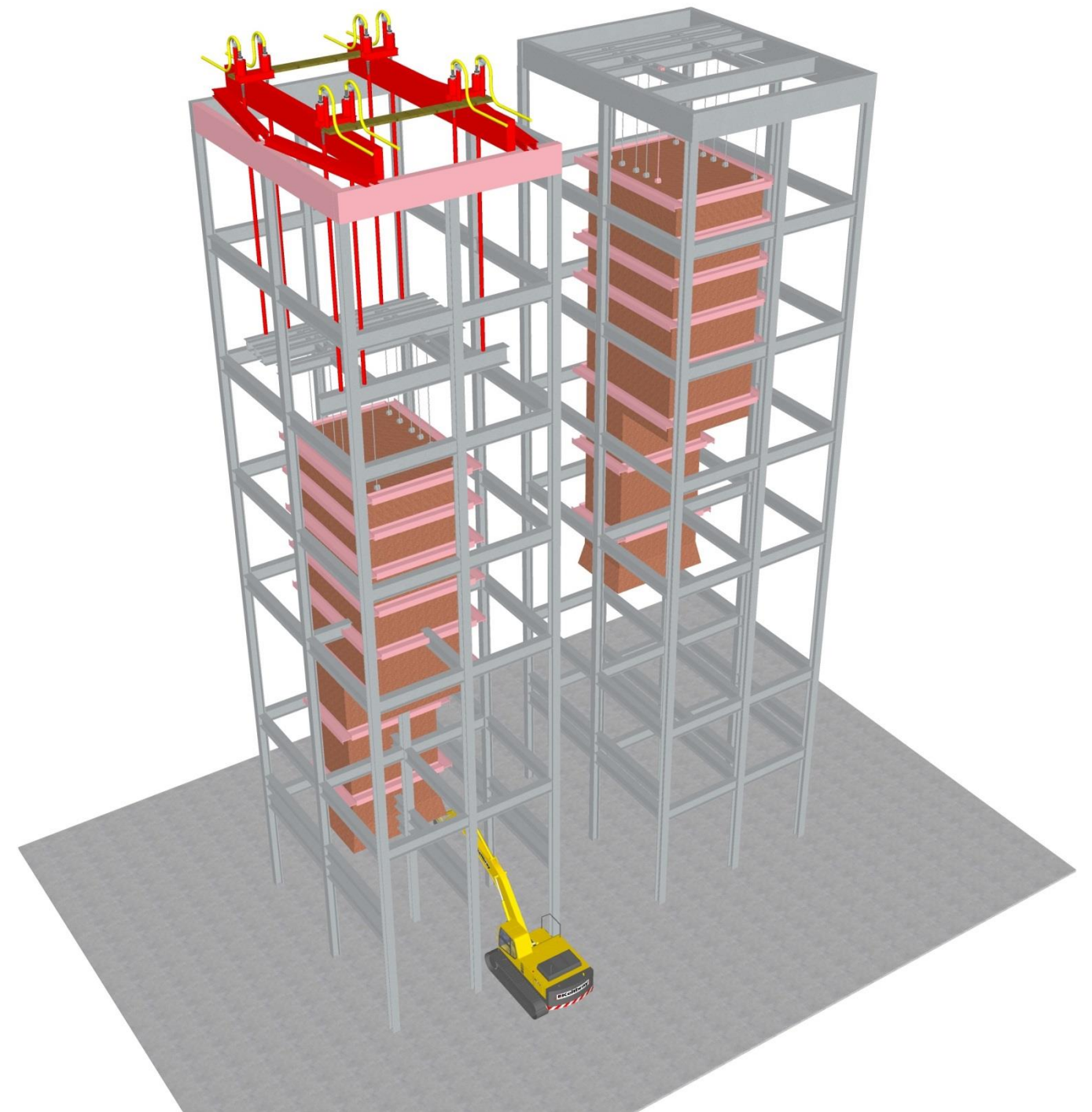


Hanger Rods – Bottom Connection Details

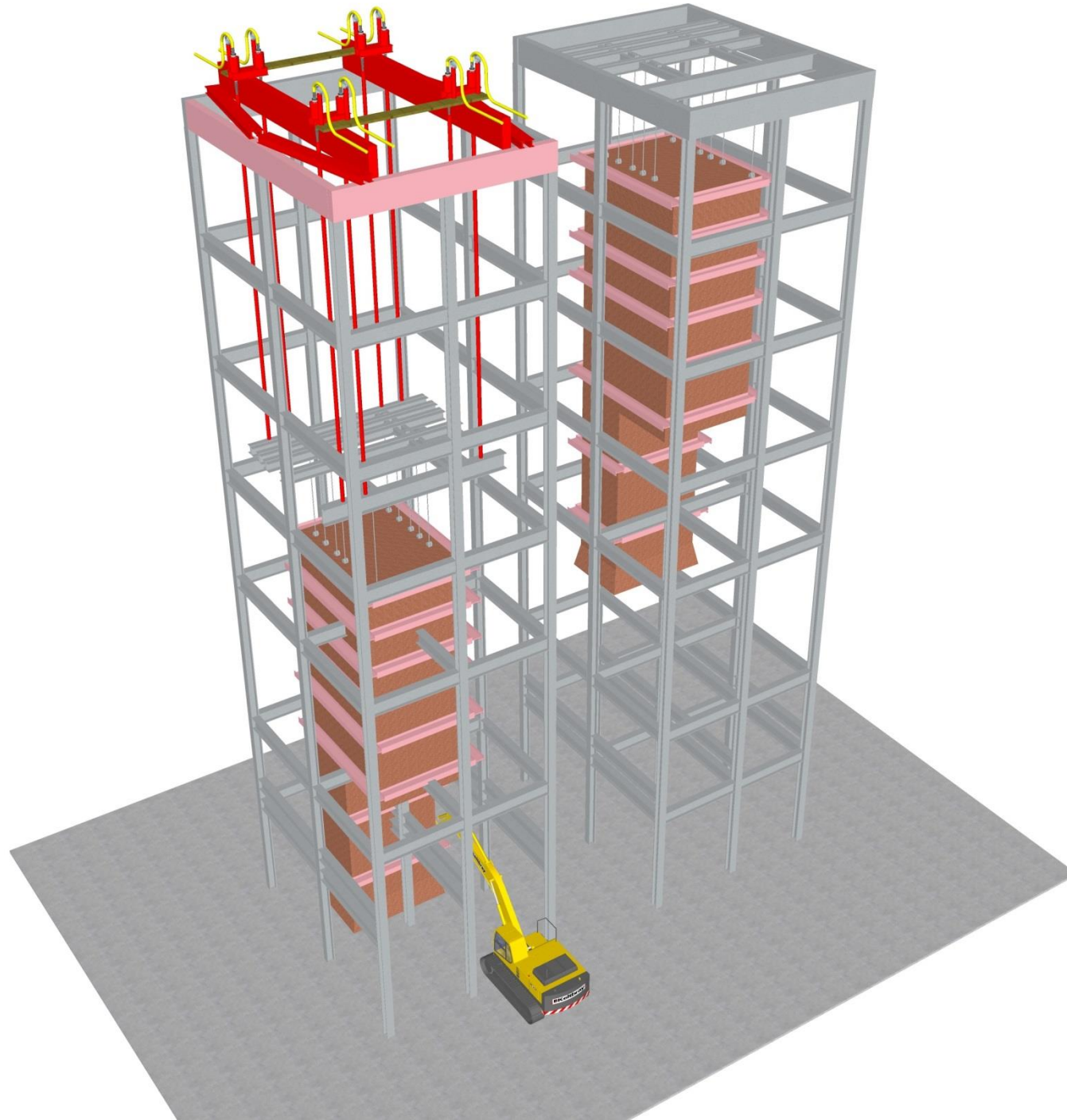
ALE Strand Jack System



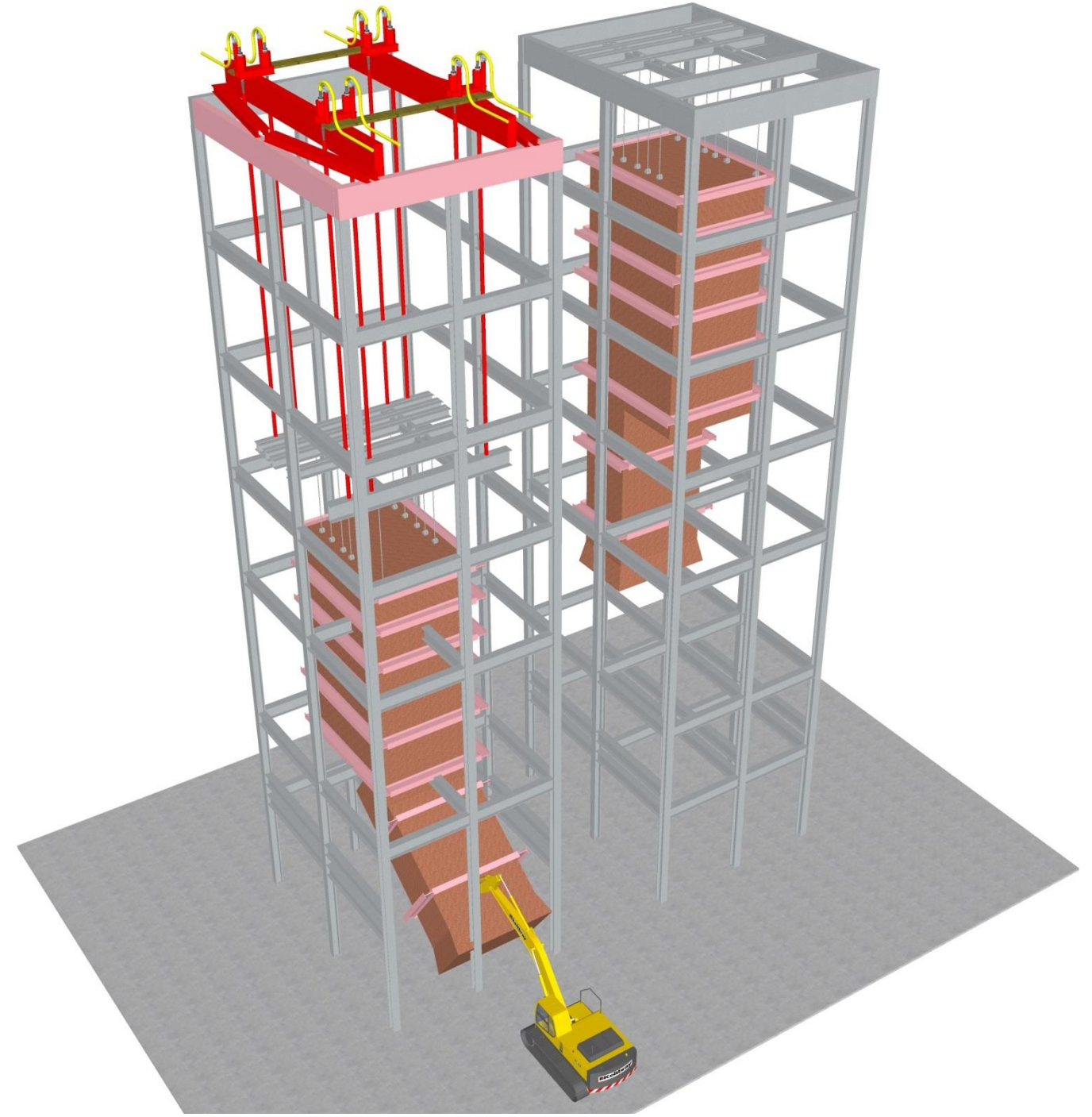
ALE Lifting Frame and Strand Jacks are positioned at on top of Steel Frame Boiler Support Structure



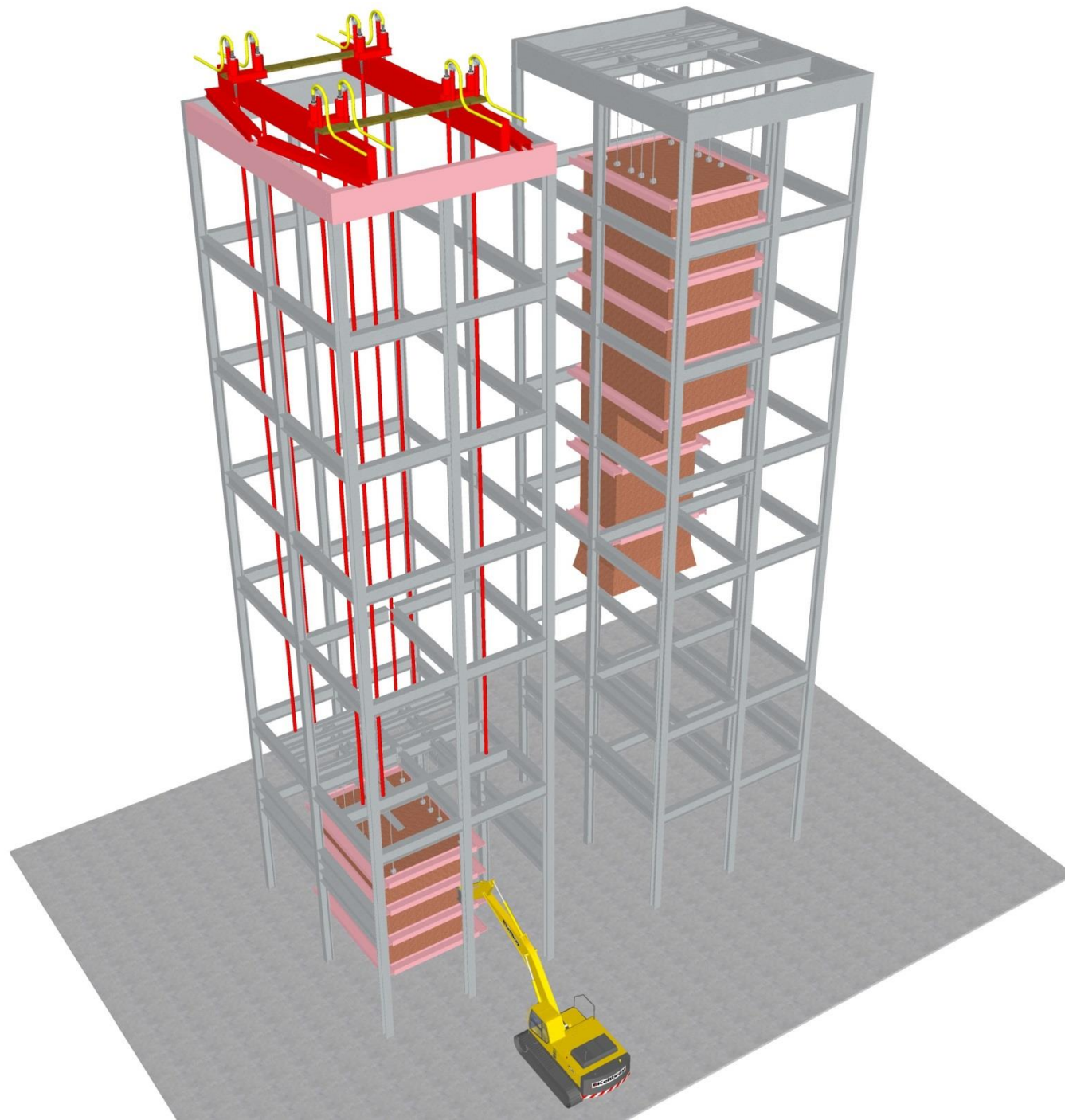
Existing Steel Support Beams are hot cut and complete assembly lowered to ground level



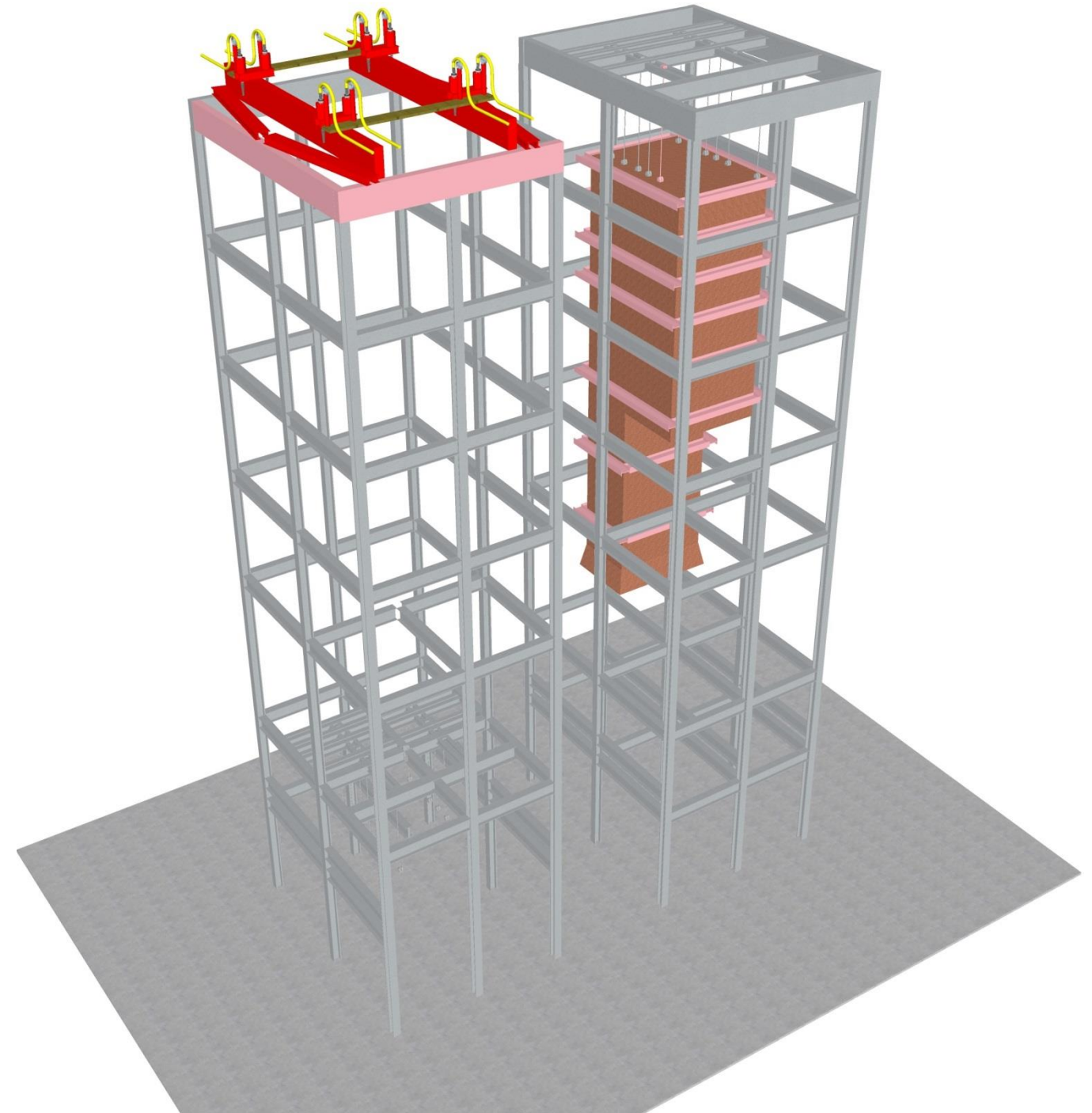
25Te demolition spec machine fitted with shear is positioned at ground floor level in readiness for processing boiler sections as the assembly is progressively lowered.



25Te demolition spec machine fitted with shear processes boiler into manageable sections for removal and disposal.

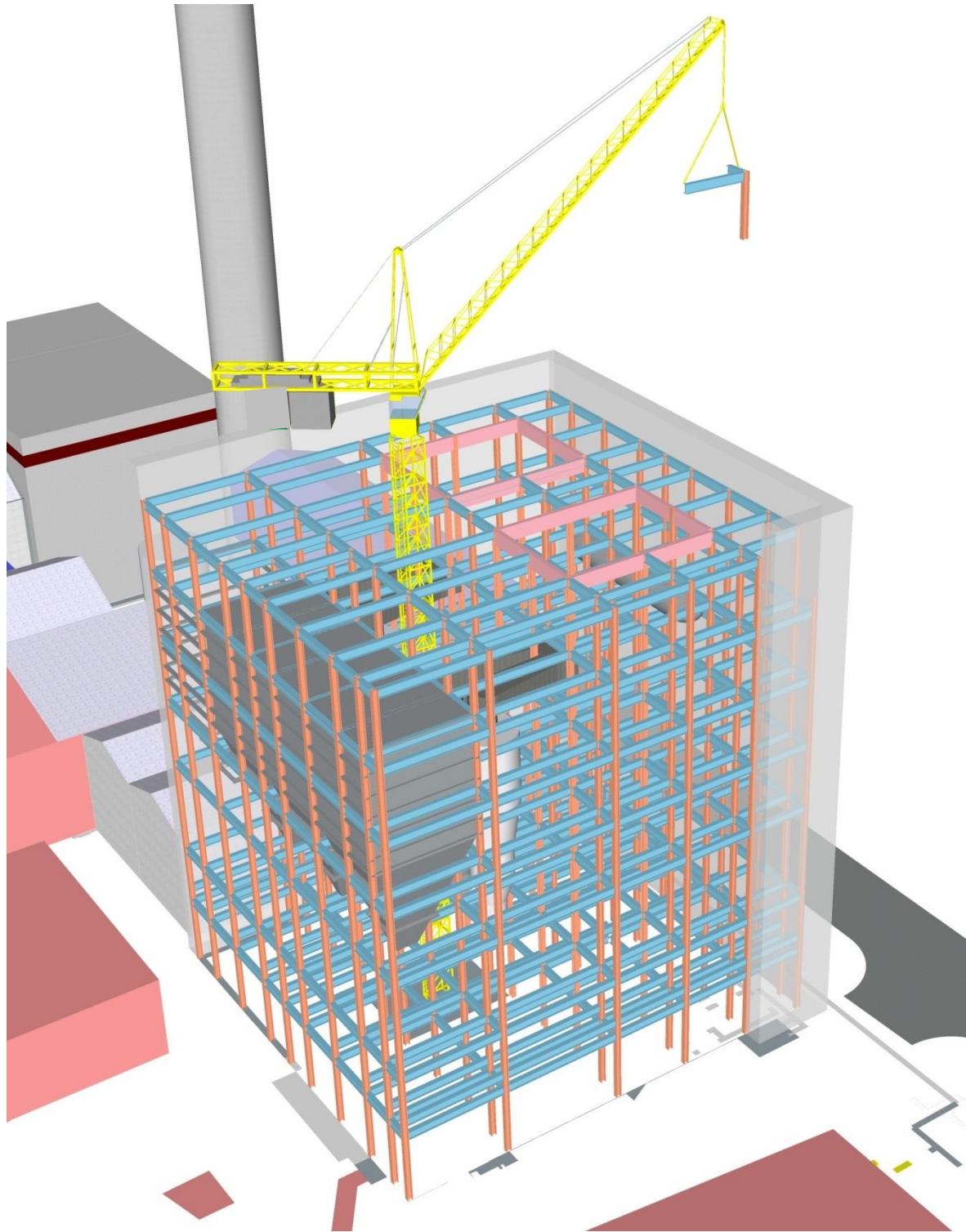


25Te demolition spec machine fitted with shear processes boiler into manageable sections for removal and disposal.

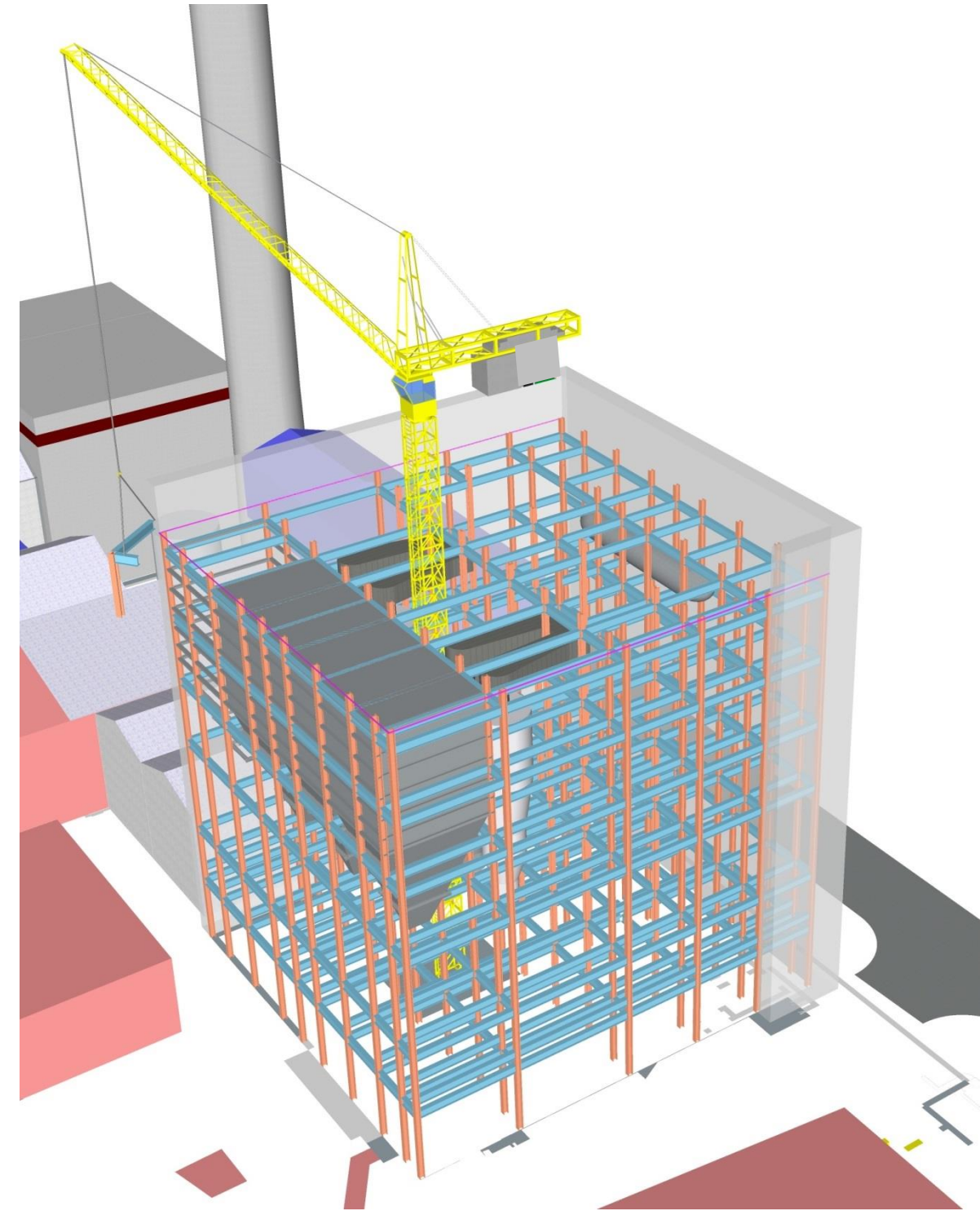


Following complete removal of Boiler unit 1, ALE Frame and Strand Jacks moved to Boiler 2 and repeat process.

Boiler House Stage 5 – Following Removal of Boilers – Dismantle Steel Frame

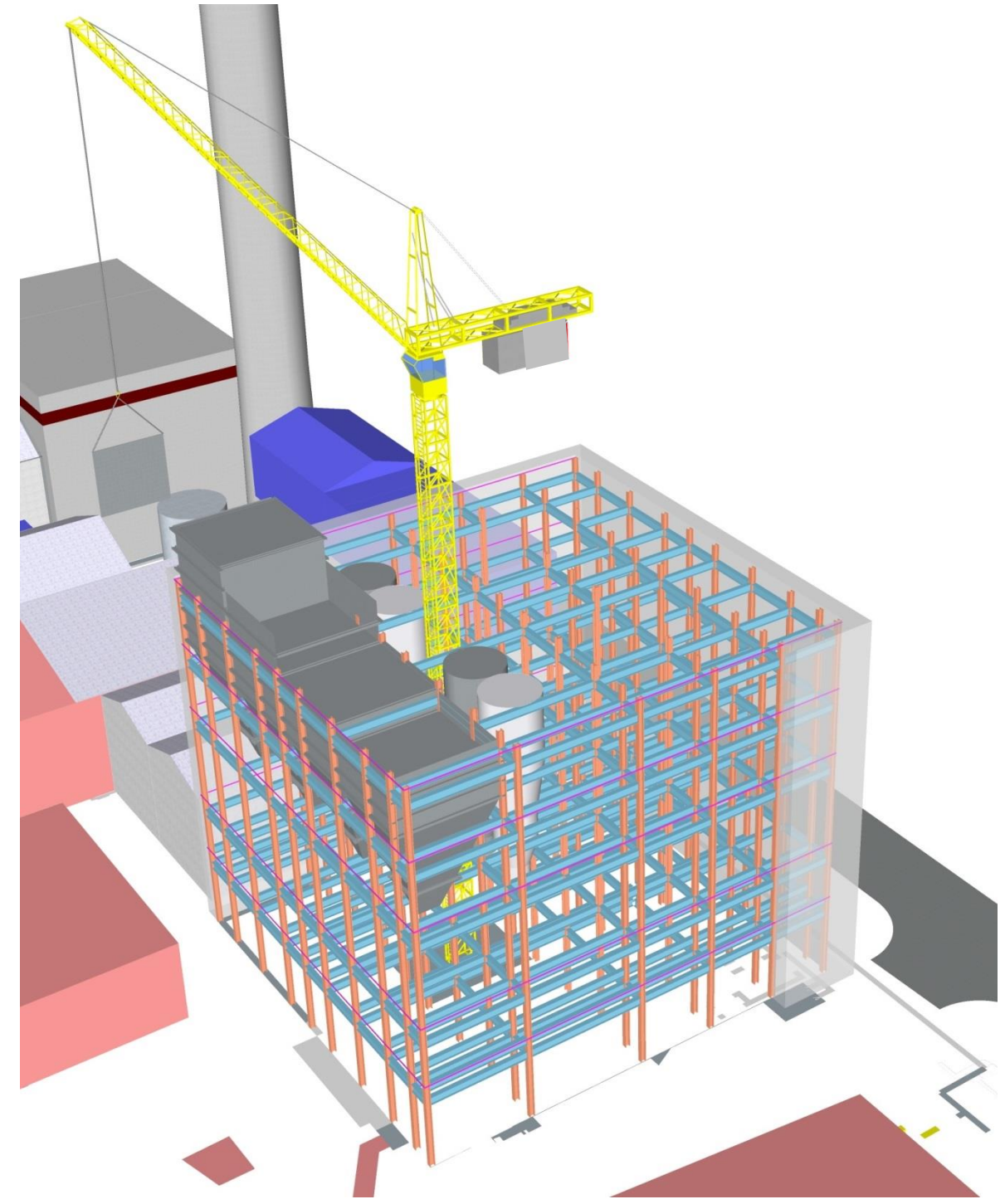
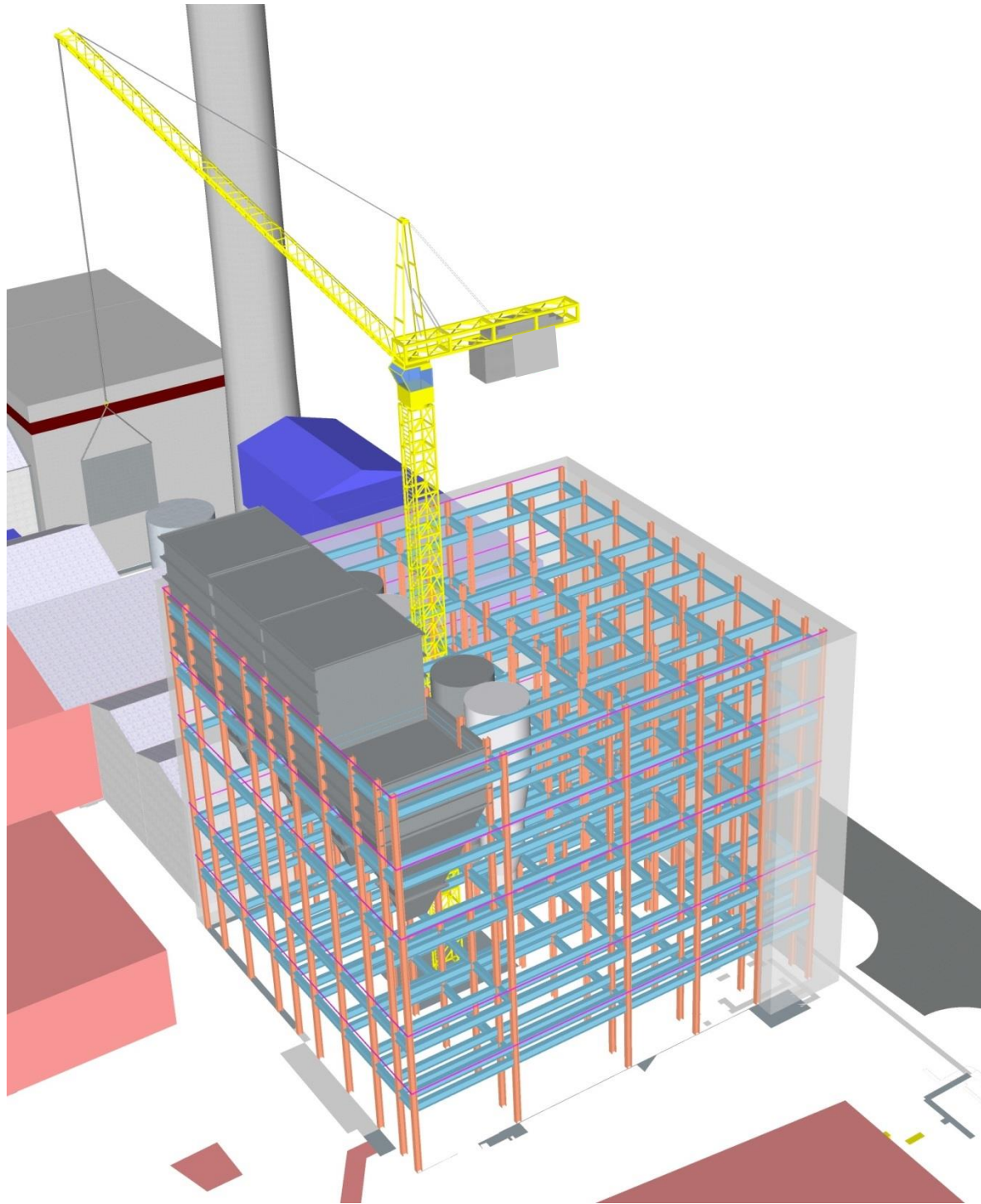


Boiler House Stage 6 – Dismantle Steel Frame down to level of coal bunkers

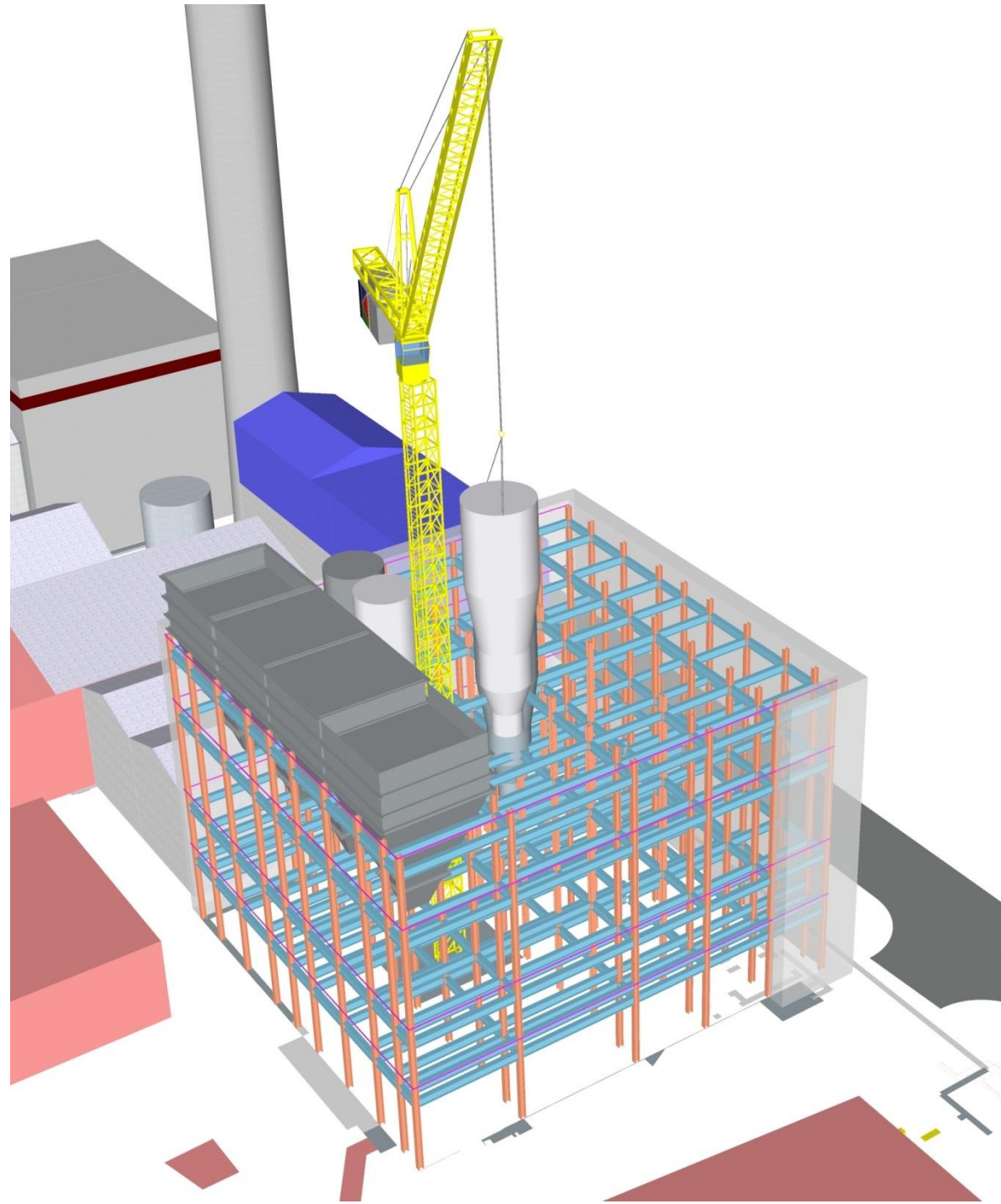


Boiler House Stage 7 – Dismantle Coal Bunkers into Manageable Sections

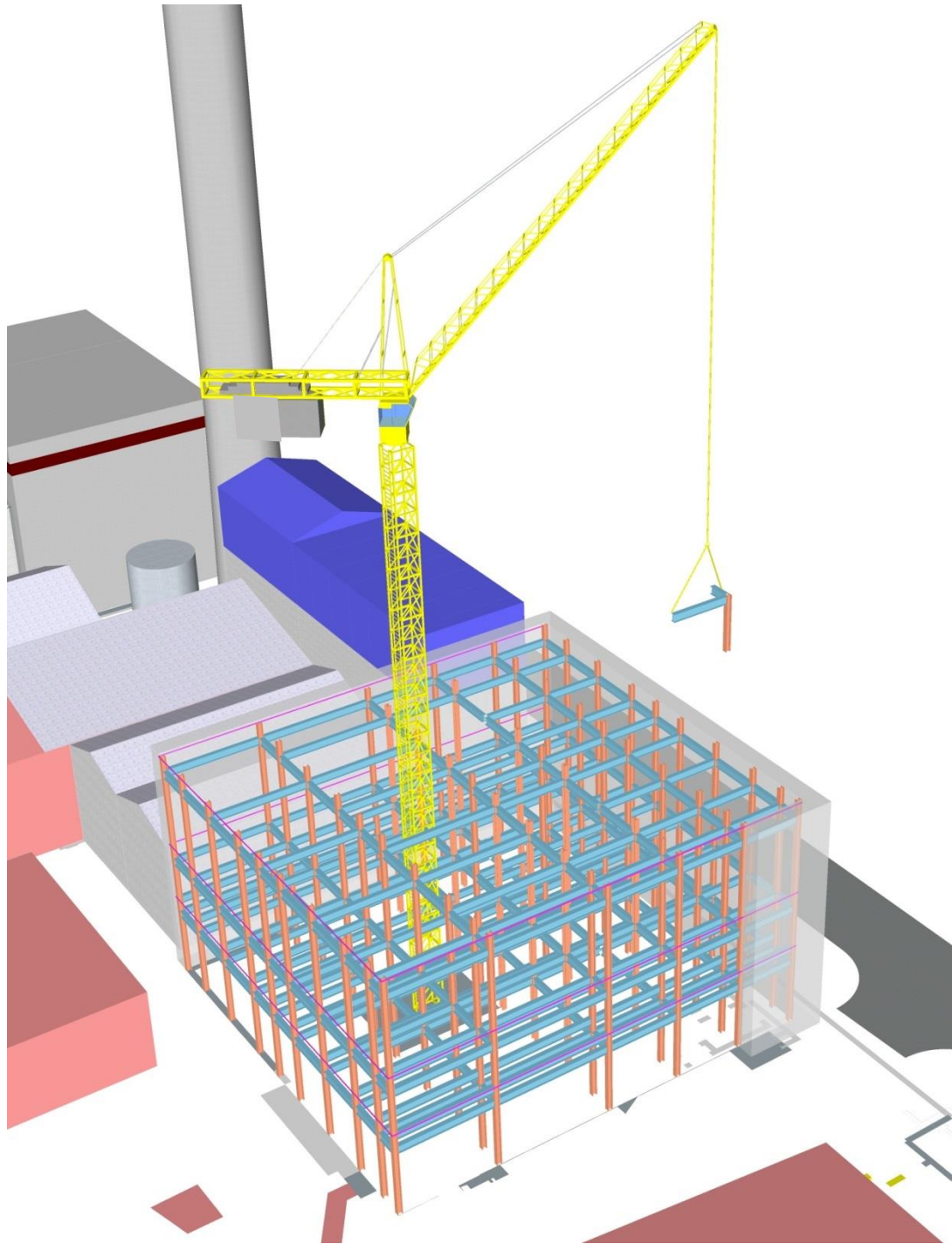
Boiler House Stage 7 – Dismantle Coal Bunkers into Manageable Sections



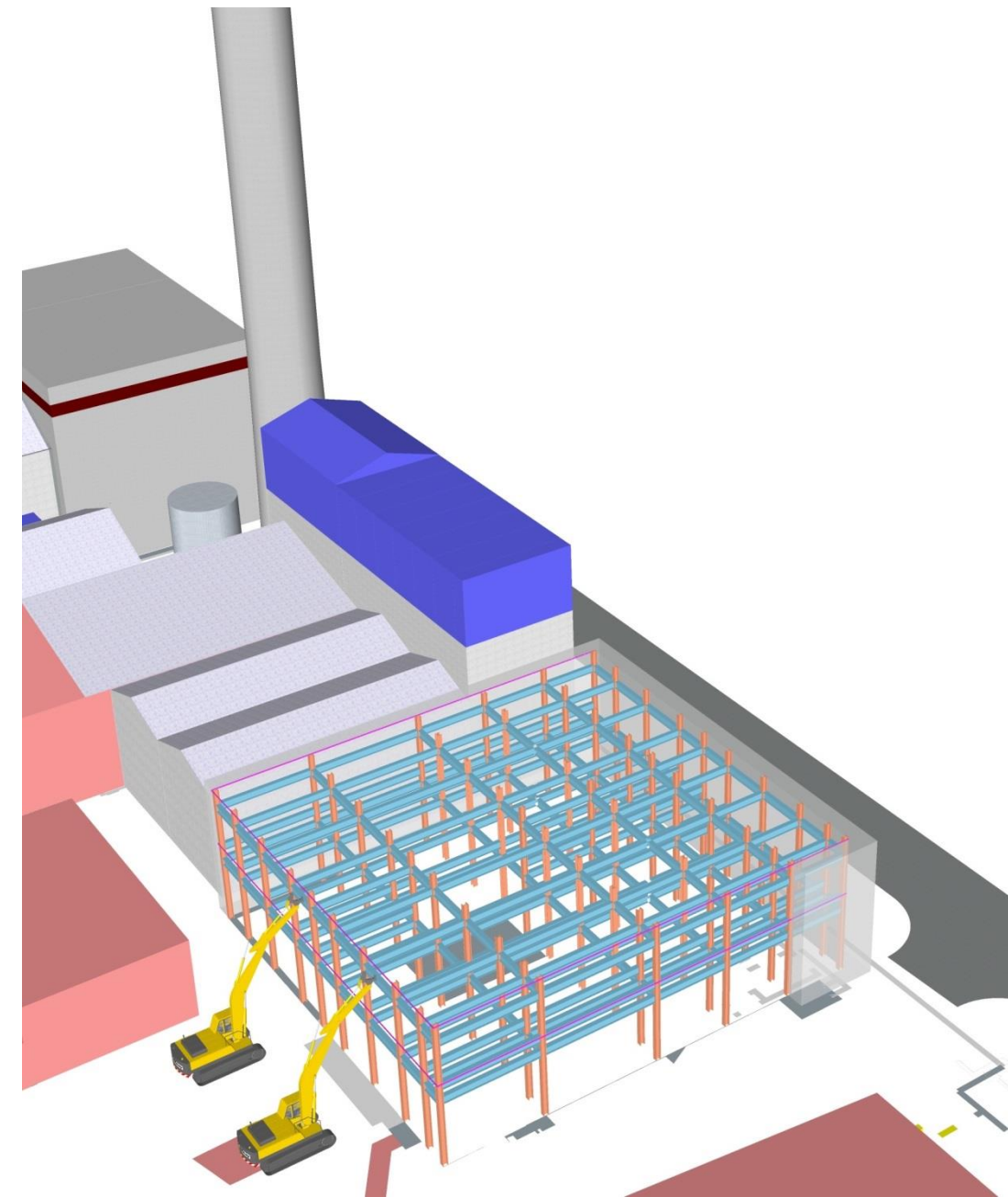
Boiler House Stage 8 – Lift off and remove cyclone units



Boiler House Stage 9 – Dismantle remaining steel frame down to 12.00m level

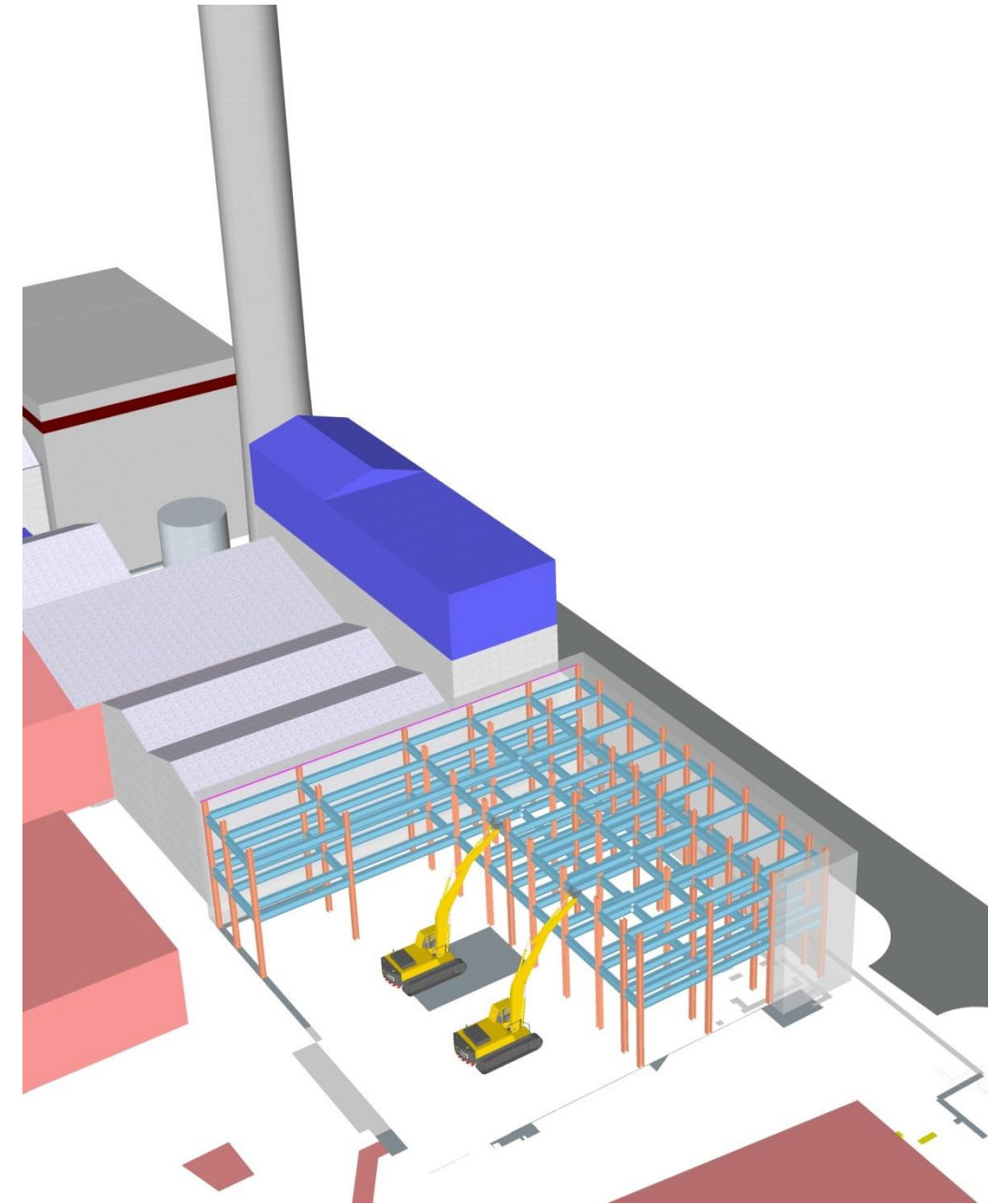
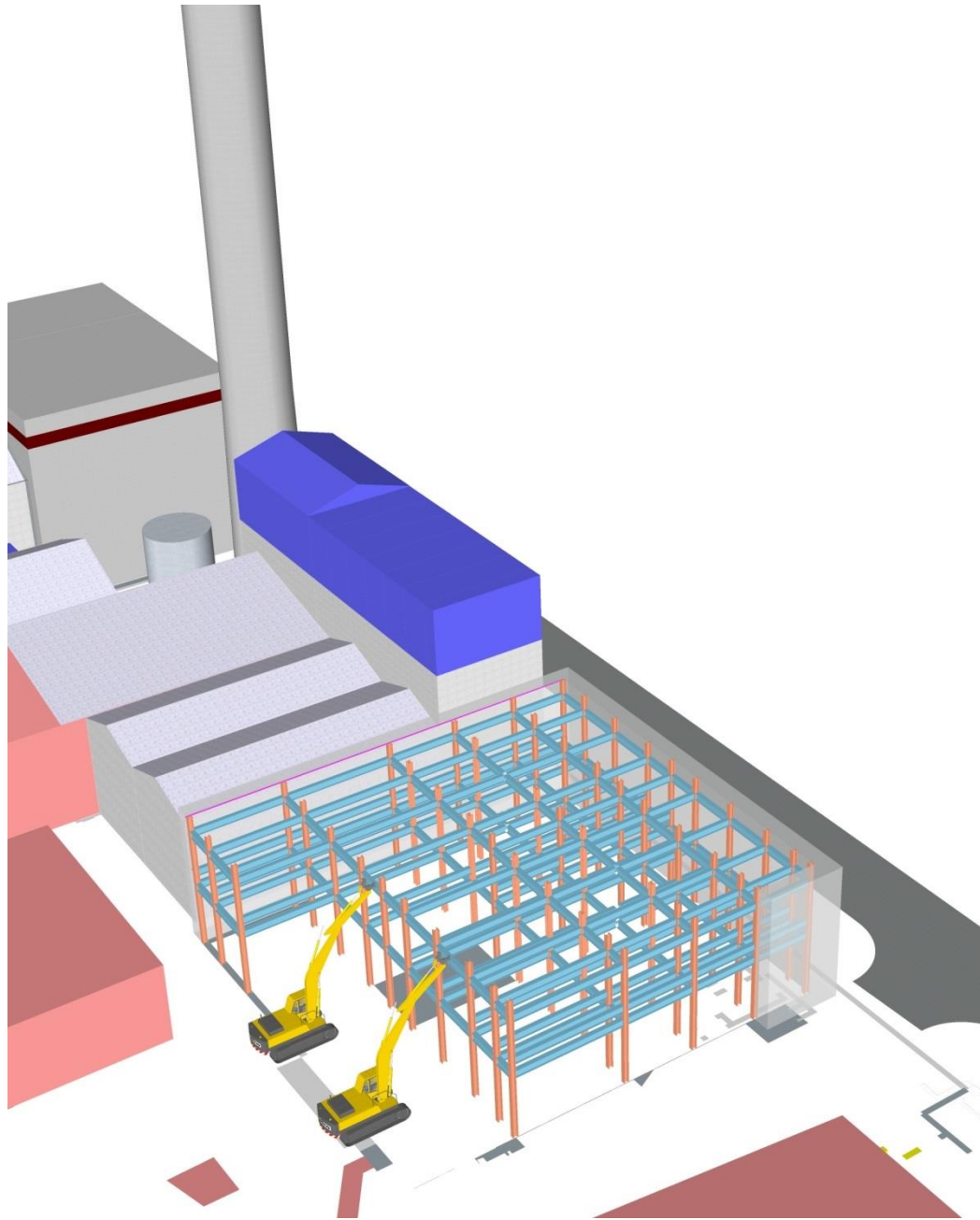


Boiler House Stage 10 – Machine demolish remaining steel frame from 12.00m level down.

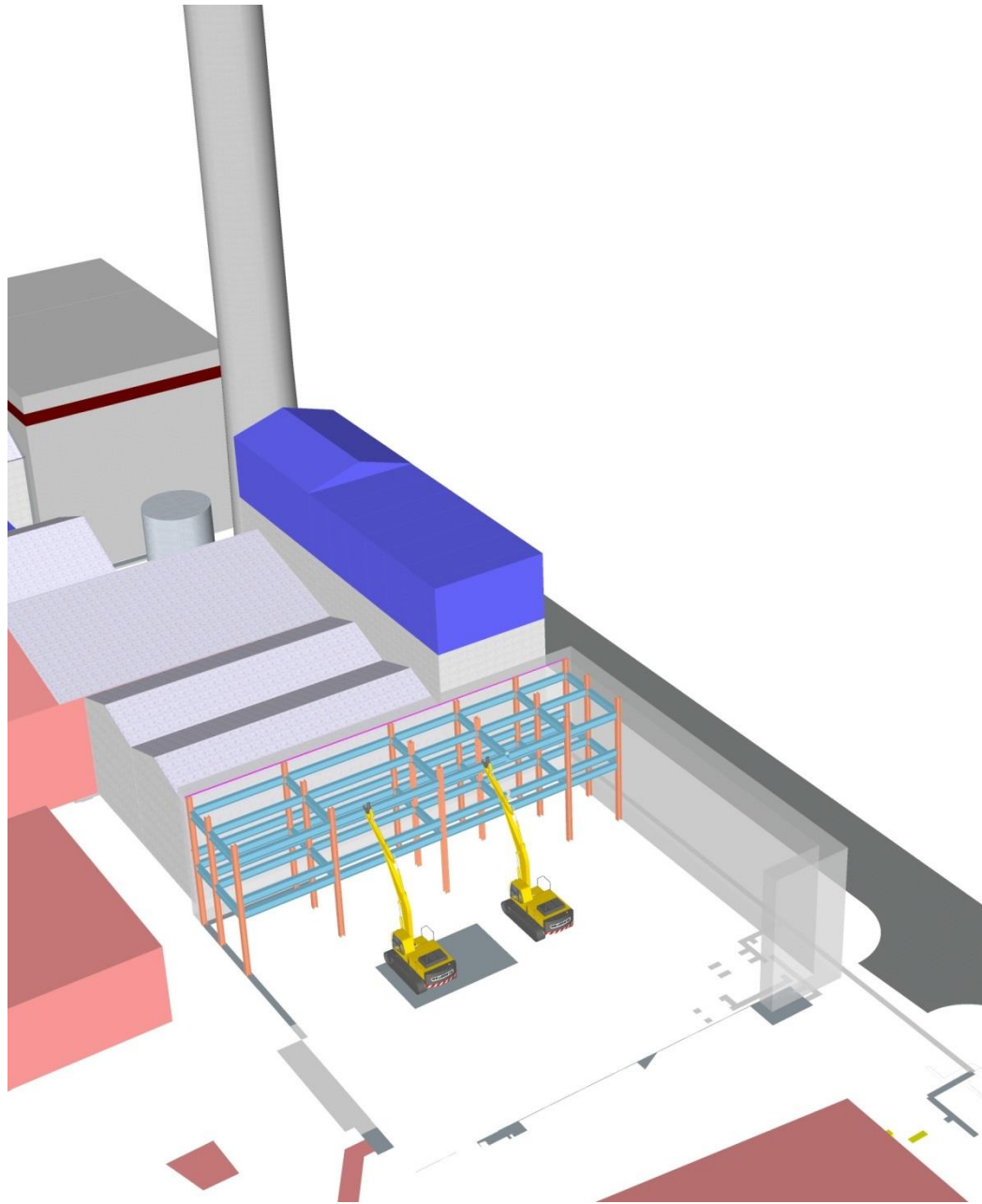


Boiler House Stage 10- Machine demolish remaining steel frame from 12.00m level down.

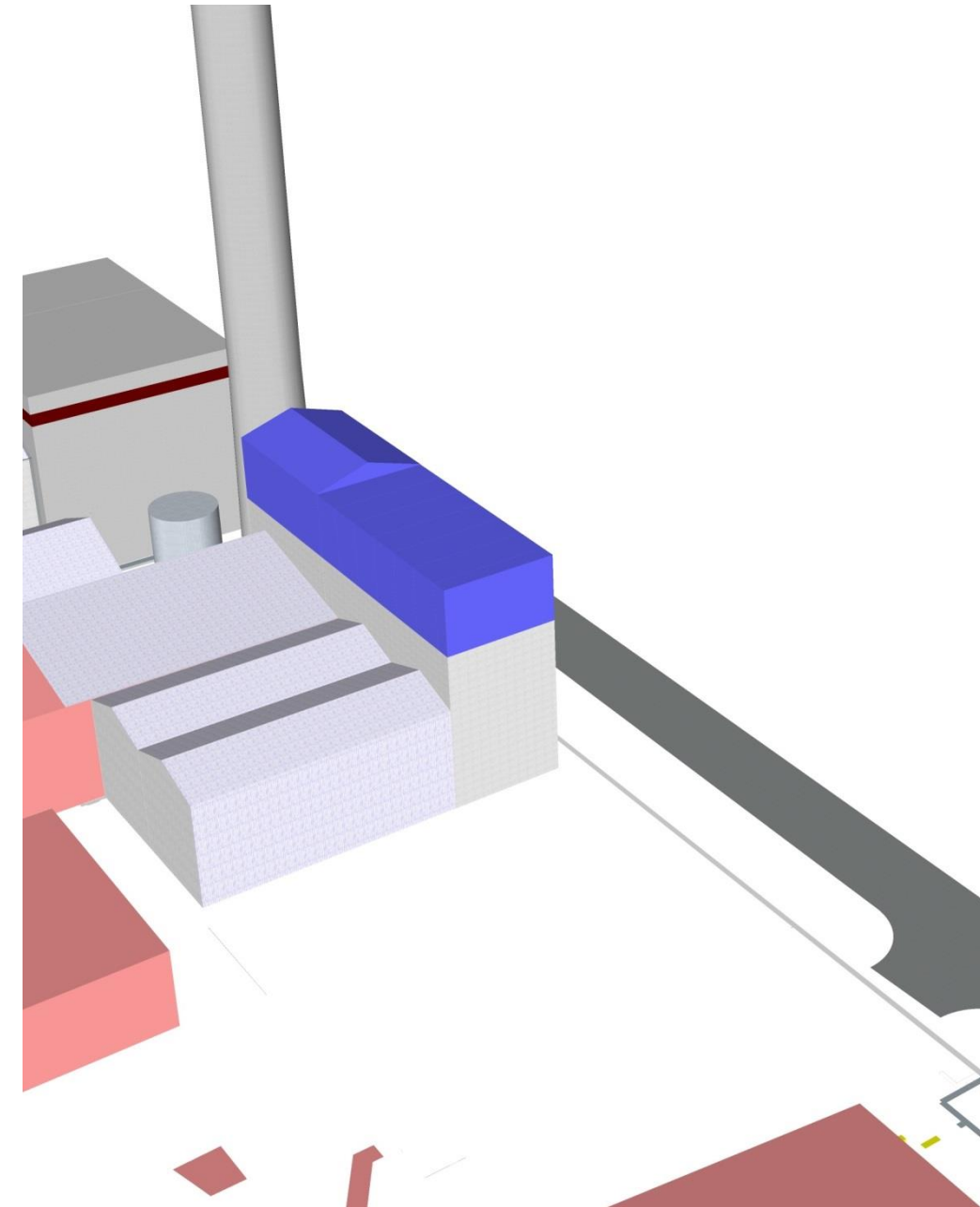
Boiler House Stage 10- Machine demolish remaining steel frame from 12.00m level down.



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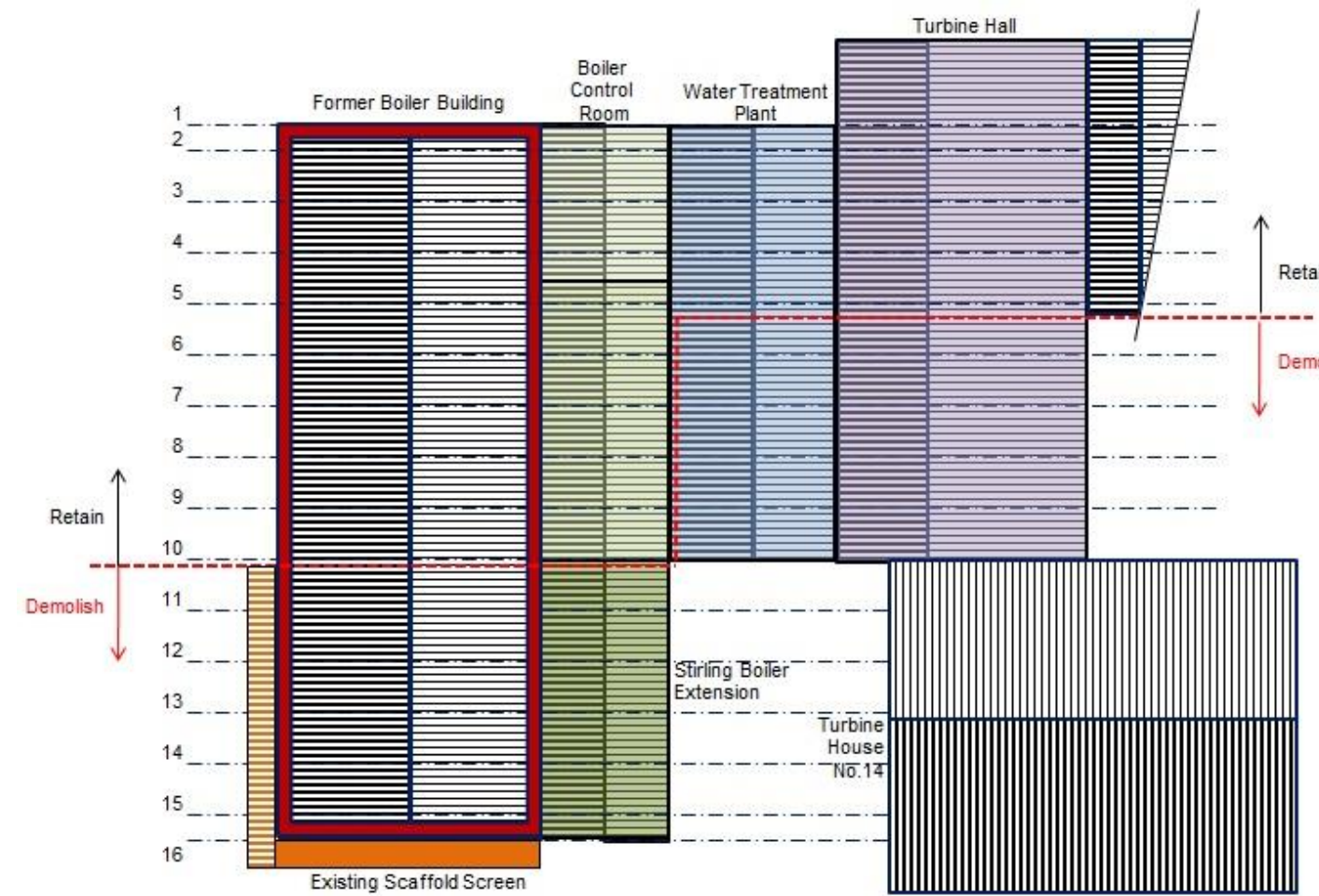


Boiler House - FBB Building End State



Partial Demolition of Former Boiler Building and Connected Buildings – Areas 4 and 5.

The works scope specifies partial demolition of a number of structures as shown in outline below.

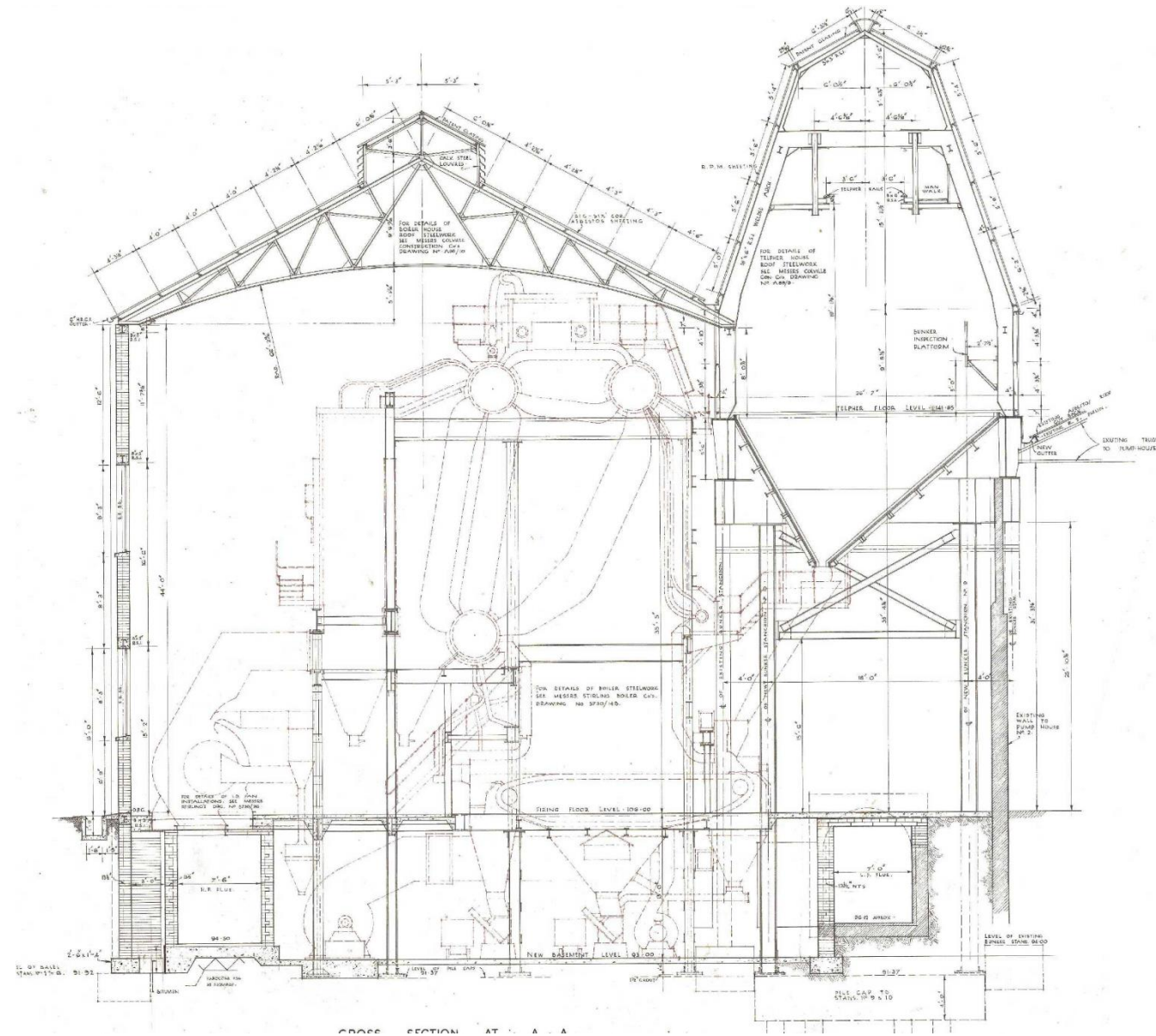


The buildings are of traditional lightweight steel construction, typically with no internal cross walls:



Inside View of Original Boiler Building

Given the age of the buildings and alterations and additions carried out over their serviceable life, a comprehensive schedule of the existing main supporting framework has not been available to SSE, although typical cross section details have been recovered from archive.



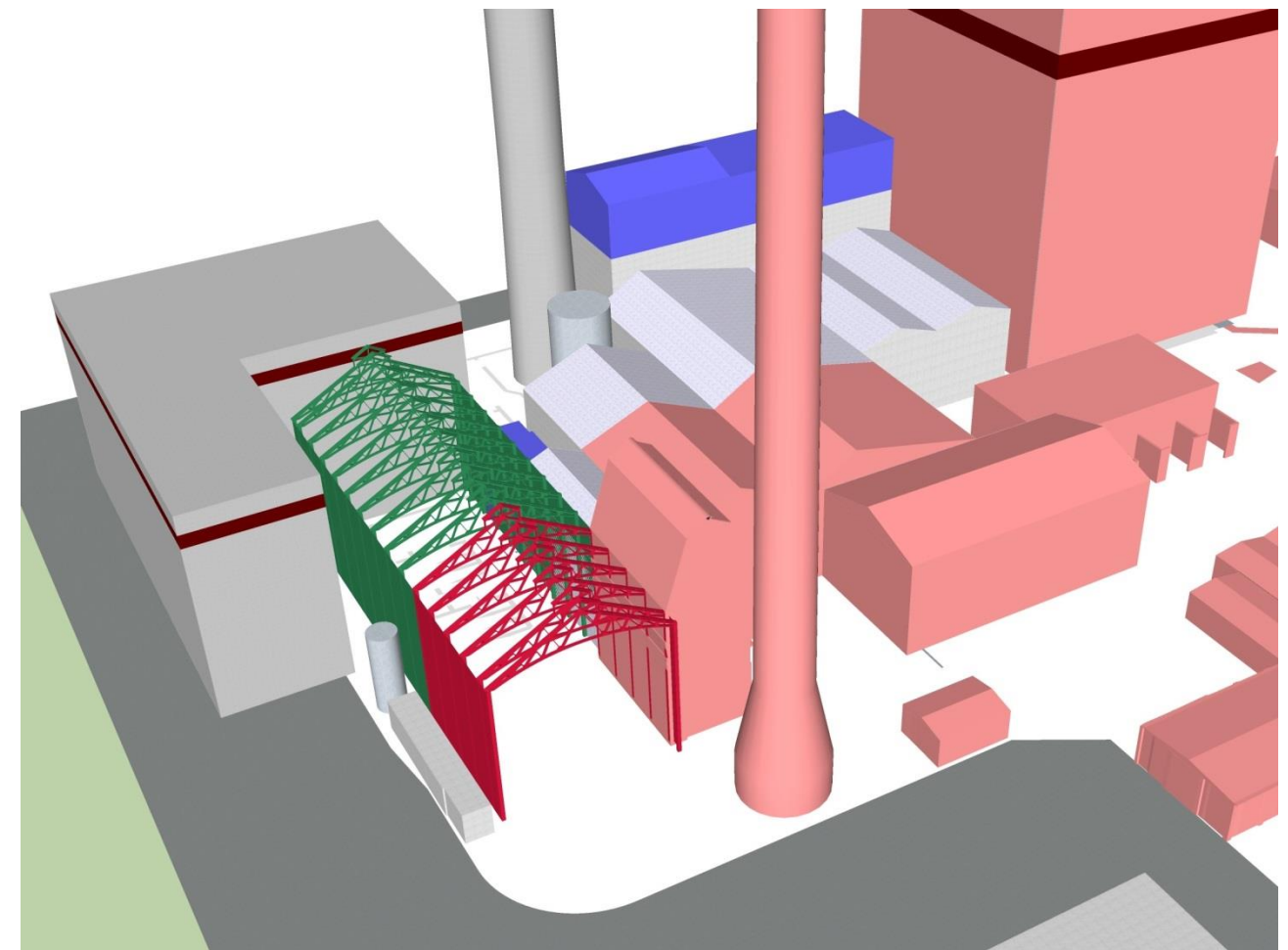
From inspections carried out by our Structural Engineers on site in preparation for the works Tender, we consider it reasonable to summarise the form of construction as:

- Lightweight steel roof trusses, supported on
- Longitudinal wall-head beams running the length of the buildings, supported on
- Steel columns spaced on an irregular grid

Overall stability of the structures appears to be provided by:

- Roof trusses stabilised in part by lightweight steel plan bracing
- Longitudinal stability by brickwork panels built between the external elevation beams and steel cross bracing to internal columns
- Lateral cross-building stability by an irregular arrangement comprising gable brickwork, mutual support of the connected structures and the comparatively rigid braced roof structures tying in the wall heads.




The image below shows a snapshot 3-D model of the former Boiler Building structure with brick walls and roof omitted for clarity.

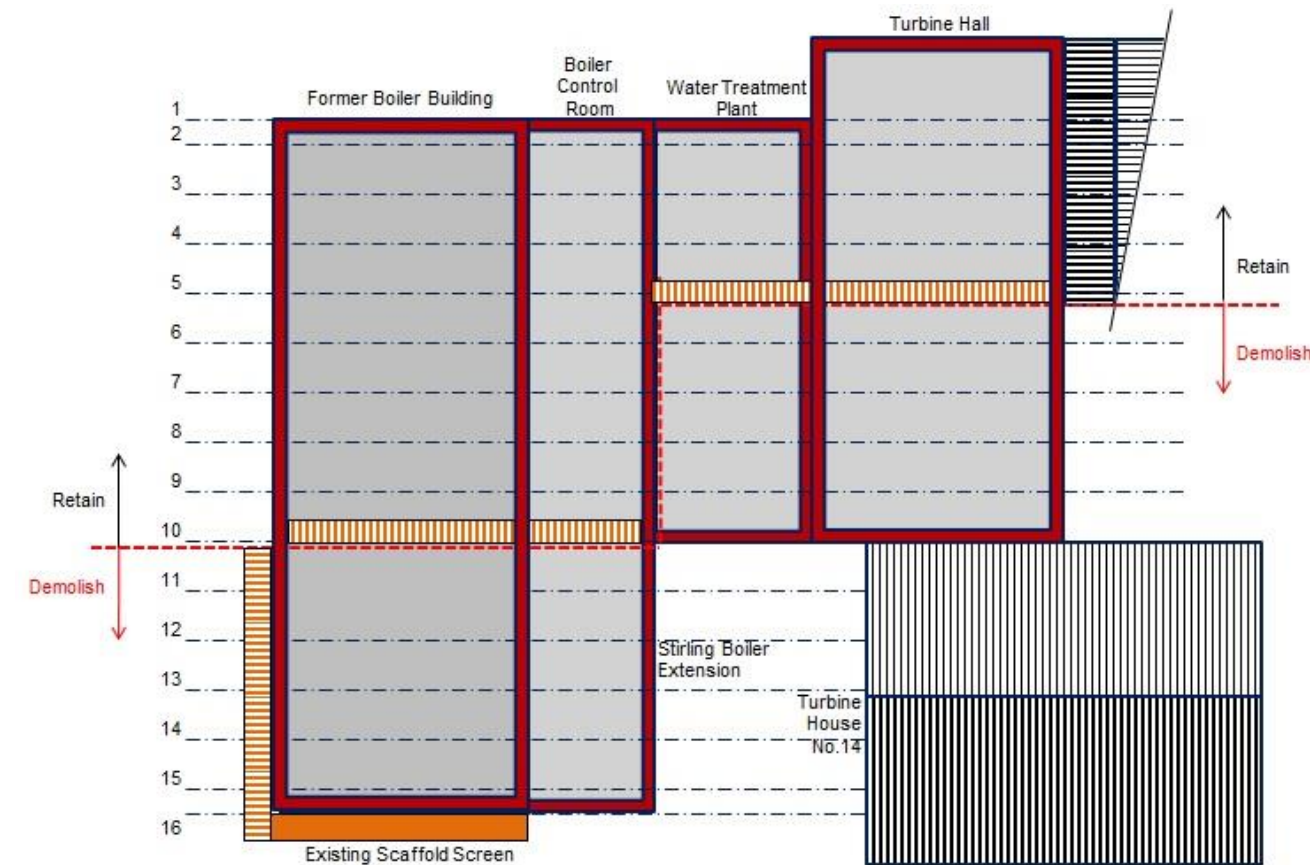


It will be essential to ensure the continued stability of the remaining parts of these structures both during the demolition project and during the reroofing works. Parts of the buildings will also continue to be operational and will require to be weather tight.

Taking this into account we show below the outline sequence of works:

Stage 1

-  Erect protective scaffold on the west face of the former Boiler Building as indicated.
-  Erect protective scaffolding and weather-sheeting internally on the building cut lines. This scaffold to be tied in at roof and side wall levels and designed to resist wind loading
-  Install temporary roof cross bracing if found to be required following structural survey.

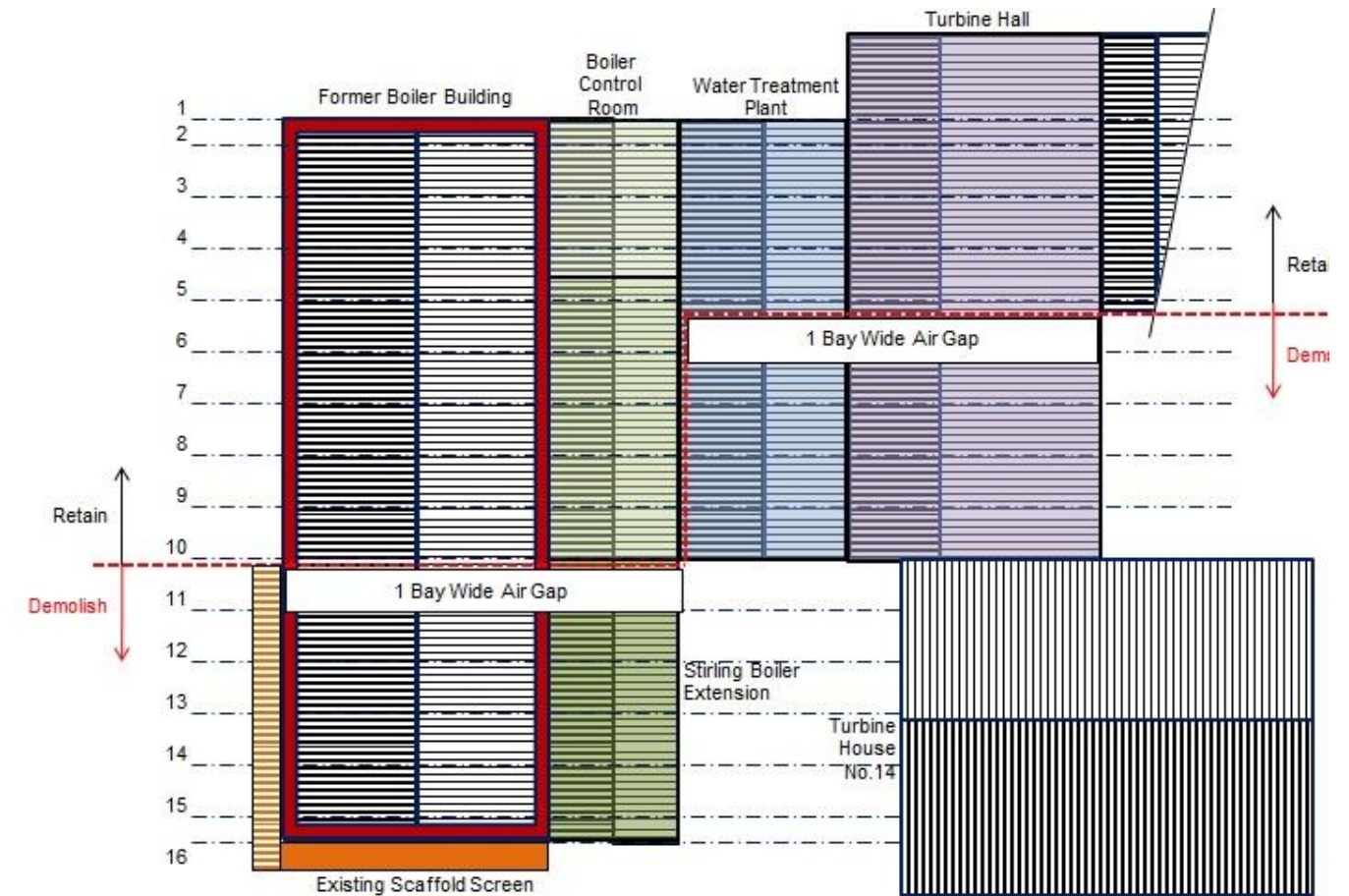


At this stage roof sheeting to remain intact.

It is proposed that replacement of roof sheeting (by specialist roofing contractor) be carried out as a continuous operation to avoid creating dominant openings in the external building envelope which can lead to increased wind loading on individual wall panels.

Stage 2

-  Form clear air gap using hand demolition techniques using MEWP access



Stage 3 – Building Demolition

Boiler Buildings

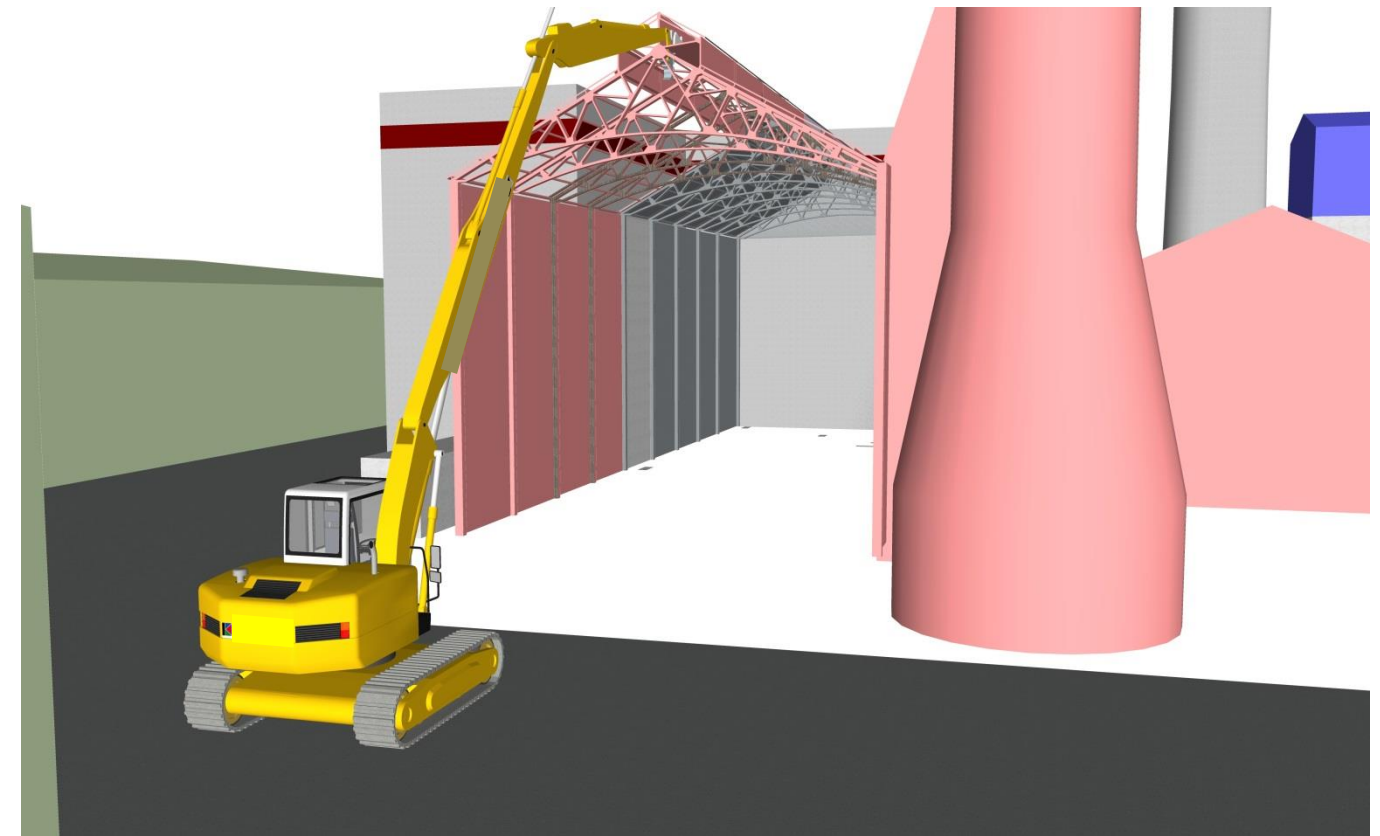
- Break out ground slab over basement area
- Infill basement with crushed demolition arisings laid and compacted in layers
- Using long reach machine with concrete pulveriser attachment, operating on hardcore infill, carefully break down west elevation brickwork to 2 metres above ground floor slab level
- Shear down roof trusses progressively working south to north using long reach machine with shear attachment
- Machine demolish remaining Boiler Building and Stirling Boiler Extension Building

Water Treatment Plant and Turbine Hall Buildings

- Working from south to north, shear through roof purlins between two most southerly trusses.
- Shear west end of roof south truss where connected onto Boiler Control Room Structure and lower truss end to ground level.
- Shear and lower east end of truss and clear truss from area.
- Machine demolition of east wall structure up to next truss line.
- Repeat over the length of the building.

Turbine House

- Machine demolition of structure, turbine blocks and ground slabs.



Area 5 - Chimney Demolition

Chimney Construction

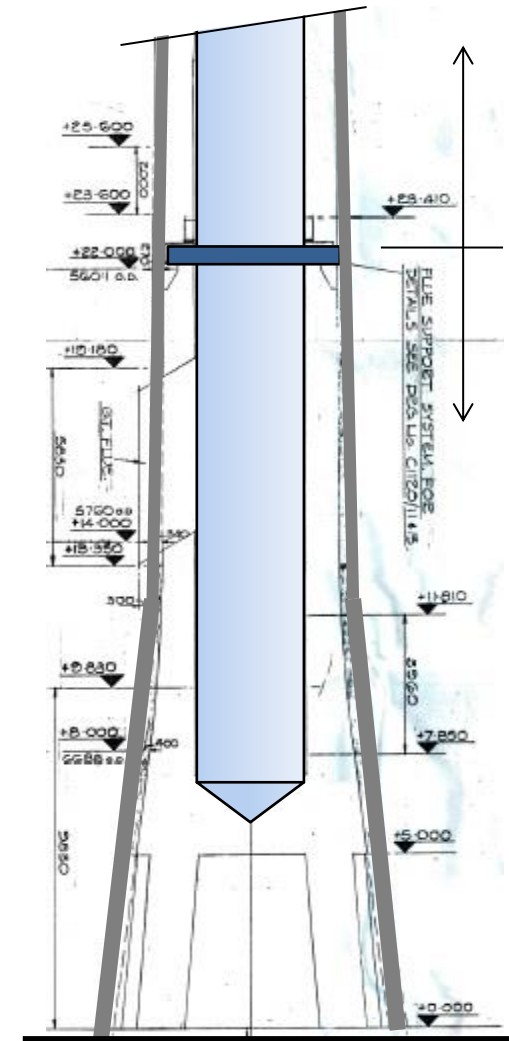
The Chimney scheduled for demolition is of reinforced concrete with an internal insulated stainless steel flue.

- Chimney Height 79.3m
- Shell Thickness 0.50m to 0.18m varying bottom to top
- Chimney Weight

Section	Section Height m	Level m	Shell Thk m	Diameter		Volume			Weight tonne
				Ext m	Int m	Ext m ³	Int m ³	Net m ³	
4	57.30	79.30	0.18	4.50	4.14	1,161.67	1,003.23	158.44	380.26
		22.00	0.18	5.64	5.28				
		8.00	0.36	5.80	5.08				
		14.00	0.40	7.17	6.37				
3	8.00	8.00	0.40	7.17	6.37	198.92	155.10	43.82	105.17
2	6.00	8.00	0.40	7.17	6.37	198.92	155.10	43.82	105.17
1	8.00	0.00	0.50	9.00	8.00	412.47	325.75	86.72	208.13
Total Weight									782.30 tonnes

Internal Flue Construction

Flue is stainless steel with mineral wool or refractory insulation.



The flue section above 22m support level extends above the top of the concrete barrel to 82.3 metres height.

The flue is supported off steel brackets within the chimney shell at approximately 22 metres level.

The flue section below support level extends to approximately 7 metres and the section below effectively suspended

Chimney Demolition

A number of demolition options are available for demolition of tall chimney structures, with the controlled use of explosives typically proving to be the safest in terms of comparative workforce risk, and with the lowest cost.

This methodology would however only be relevant where considered practicable. A number of difficulties exist in this respect:

- Expected general resistance to the controlled use of explosives in such a built up area.
- Accordingly achieving sign-off from the Regional Authorities and Stakeholders.
- Disruption to live operational businesses on the day of blowdown.

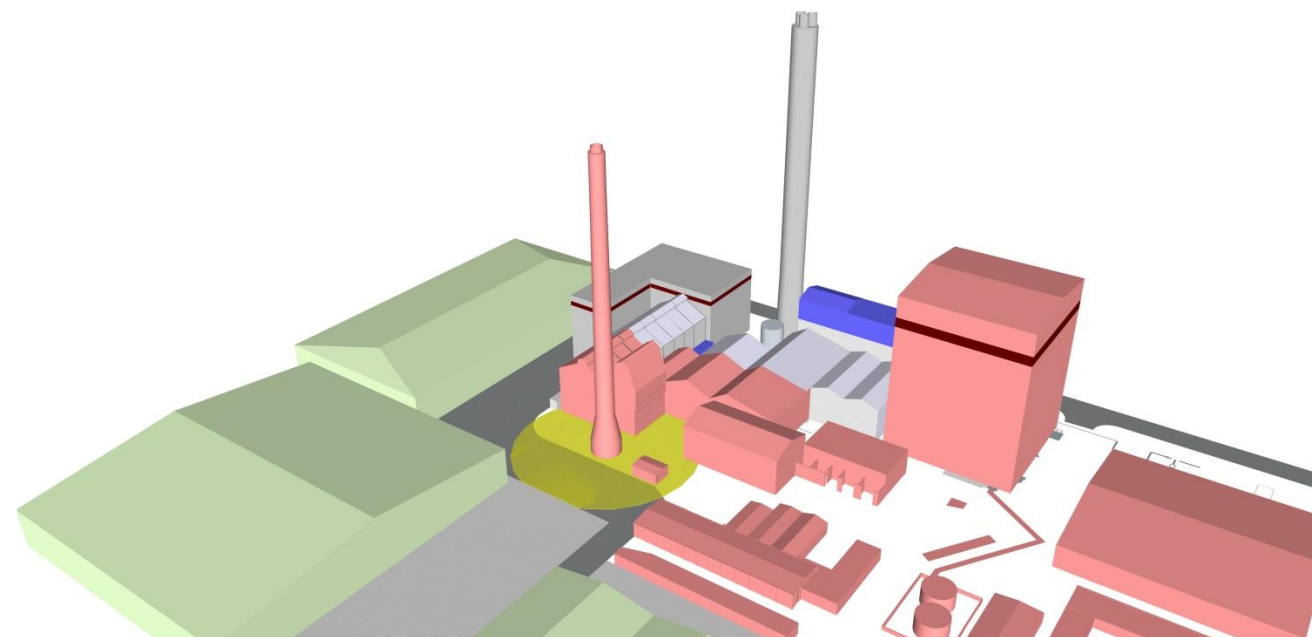
Demolition by the controlled use of explosives has accordingly been discounted by SSE as a practicable option.

It is accordingly proposed to progress with a top-down form of demolition of the chimney and internal flue using an external moveable platform down to the 22m internal flue support level and use long reach machine to demolish the remaining lower section.

A specialist subcontractor will be used for the work-down element of the concrete chimney and flue, with works sequencing as described below:

1. Form an Exclusion Zone using Heras Fencing set 20 metres around the perimeter of the chimney lower shell – 24.5m radius from chimney centerline. Refer model opposite. The Exclusion Zone could restrict traffic maneuverability in the adjacent yard area – this can be managed by Banksmen.
2. Disconnect all ducting from the inner flue.
3. Remove all ancillary plant in and around the base of the chimney.
4. Working from inner platform supported off 22m level steelwork, cut and drop lower section of flue progressively working from approximate 6.5 metre level to underside of 22 metre level support steelwork.
5. Install protection over flue openings in lower concrete shell to prevent lateral spillage of materials dropped down the inside of the flue and chimney.
6. Install climbing platform around the external perimeter of the chimney.
7. At ground level 2 no. Fraco mast climbers to be positioned on opposite each other.
8. Each diesel operated mast climber shall be erected to the full height of the Chimney by bolting rack and pinion masts to the side of the Chimney.
9. At ground level 2 bridge sections will be installed to create a full perimeter work platform around the Chimney. The bridges are fully telescopic and can self-adjust during ascent and descent.
10. Raise the platform to the top of the chimney.
11. Erect scaffolding to give access for cutting down top projecting 3 metres of flue. Arisings to be dropped internally down the inside of the flue.
12. Using internal platform supported from installed suspension beams, cut down internal flue progressively top to 22m support steelwork level using varying techniques at mineral wool and refractory lined sections.
13. Arisings to be dropped internally down the inside of the flue and will be cleared progressively.
14. On completion of inner flue removal, the flue support steelwork will be cut and dropped at 22 metre level.
15. Demolition of the main concrete barrel will be carried out with operatives working from the external platform using PAM demolition breaker down to 22 metre level.
16. External platform lowered to ground level and removed.
17. Mast climbers removed progressively during this operation.
18. Remaining lower 22 metres of the concrete barrel to be demolished using long reach demolition excavator fitted with concrete pulveriser attachment.

All squad members shall be fully SQEP, have the appropriate skills and training to carry out their designated roles.



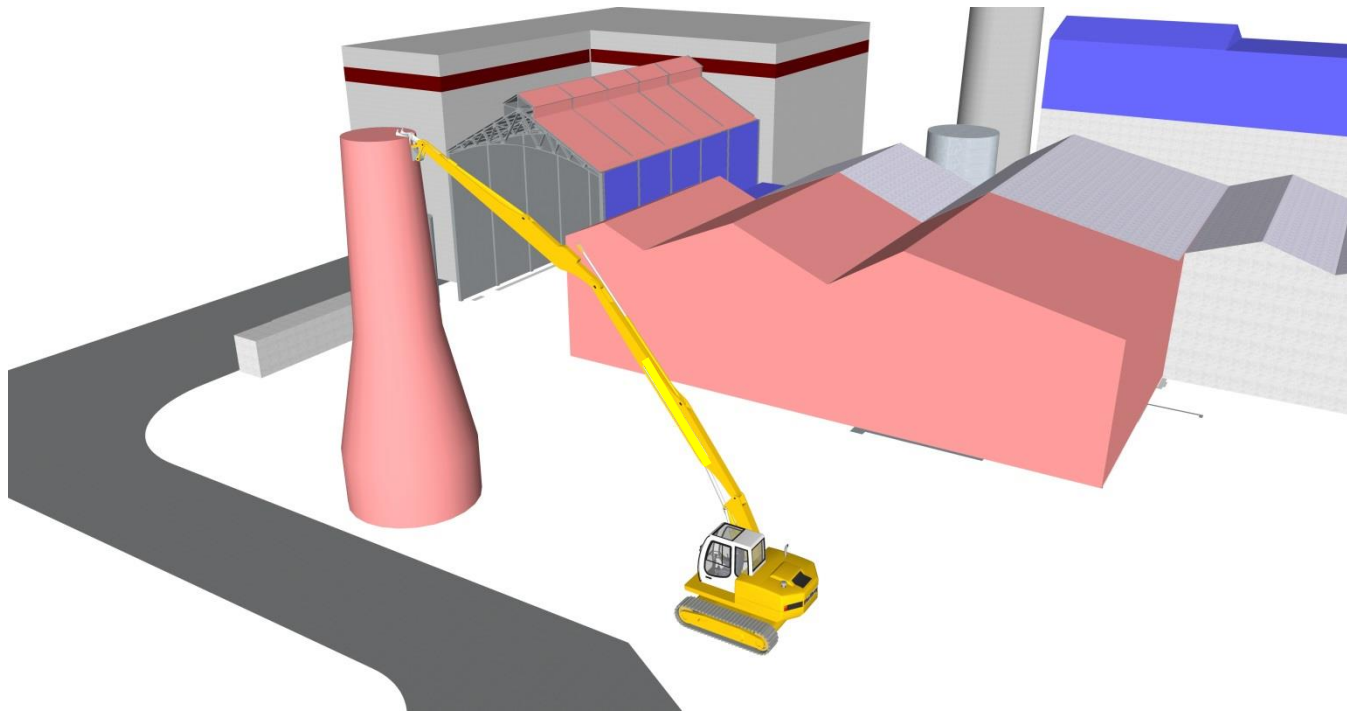
20 metre Exclusion Zone around perimeter of Chimney base

It will be noted that the Chimney Exclusion Zone overlaps the south end of the original Boiler House complex in Area 4. Work in this area has been programmed to be carried out only on completion of the chimney demolition.

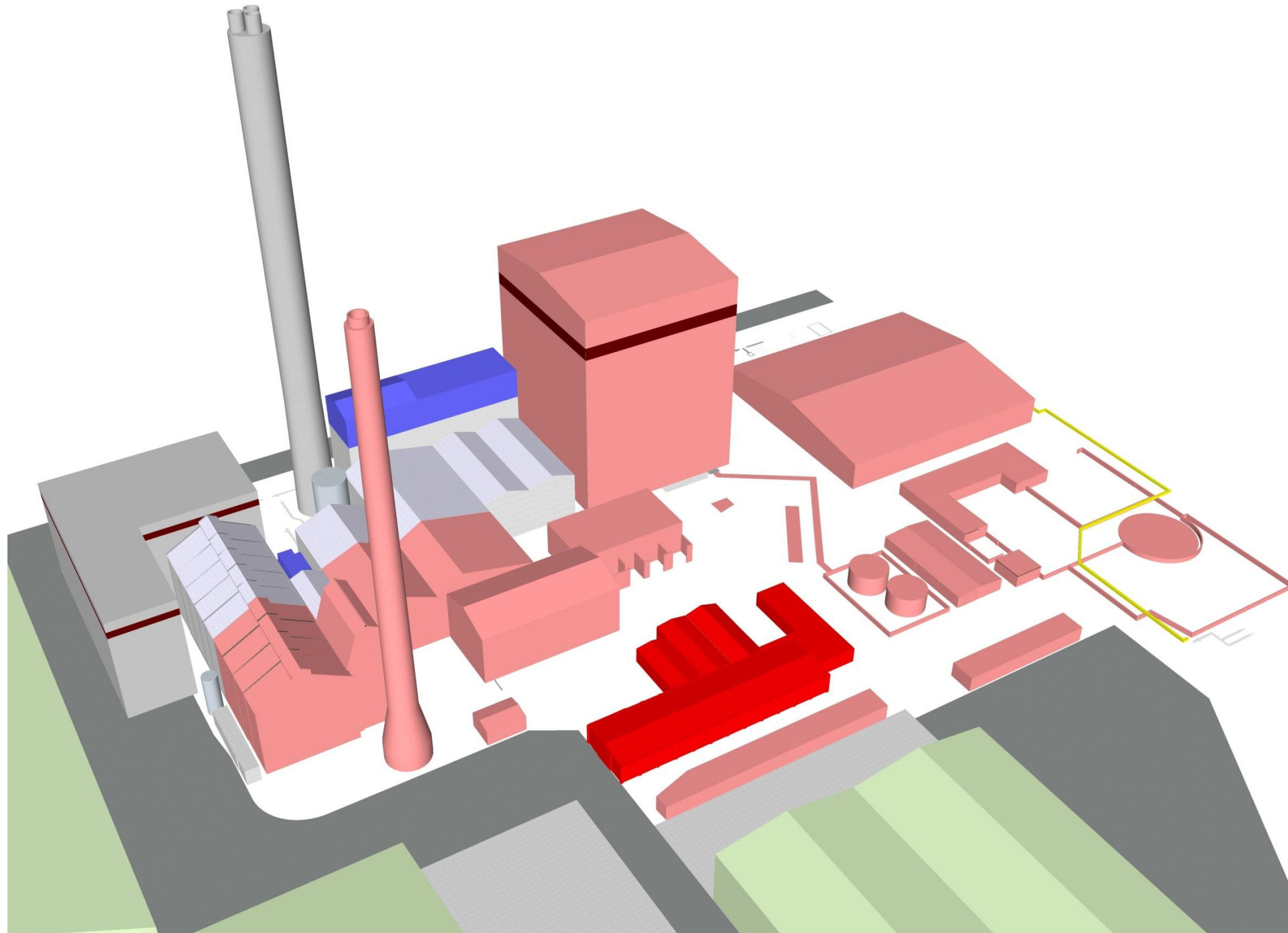


Example of external adjustable access platform

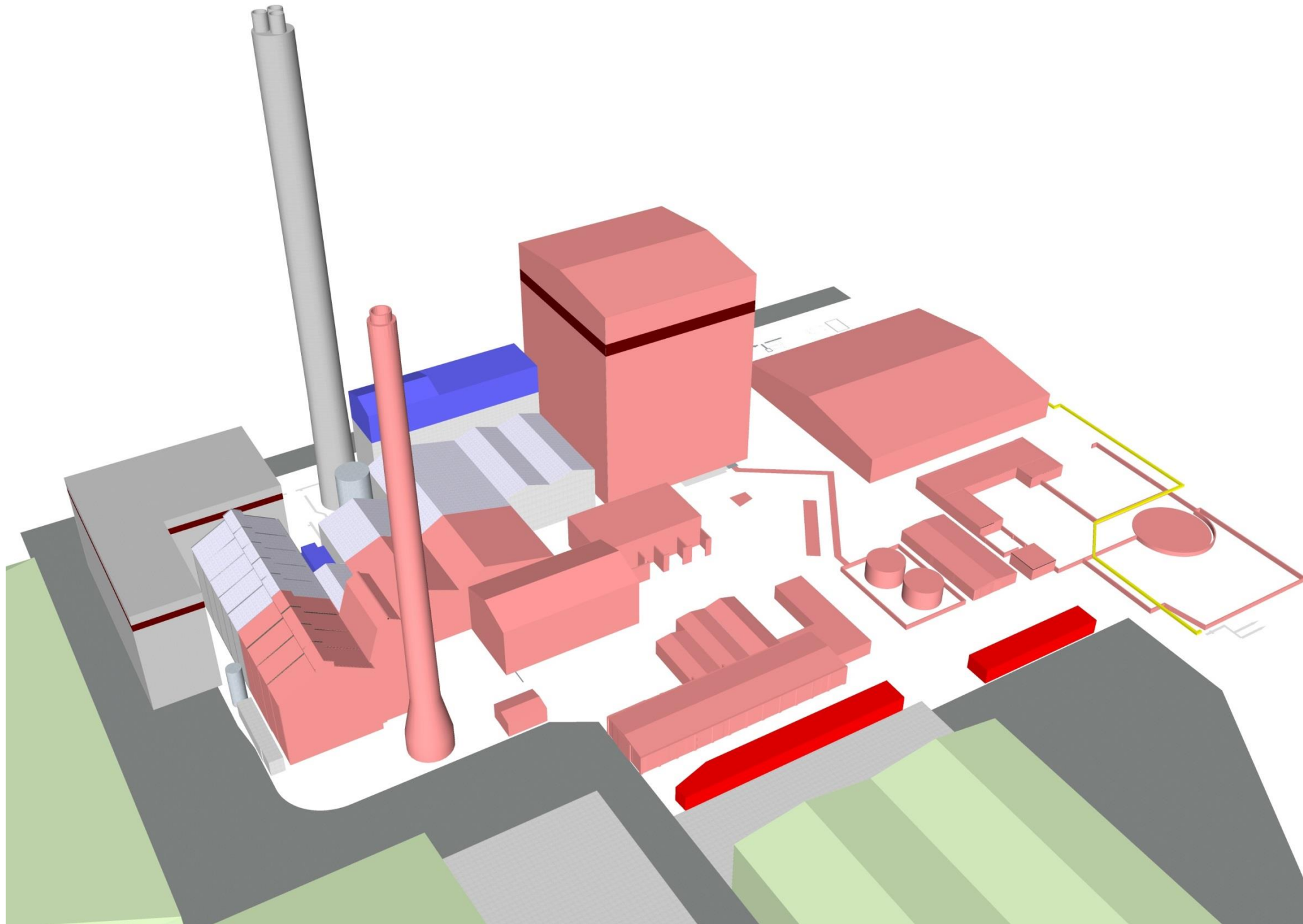
Machine Demolition of lower 22 metres of Chimney Barrel



Area 6 – Buildings to be demolished shown in red – Traditional Machine Demolition



Area 7 – Buildings to be demolished shown in red – Traditional Machine Demolition



Area 8

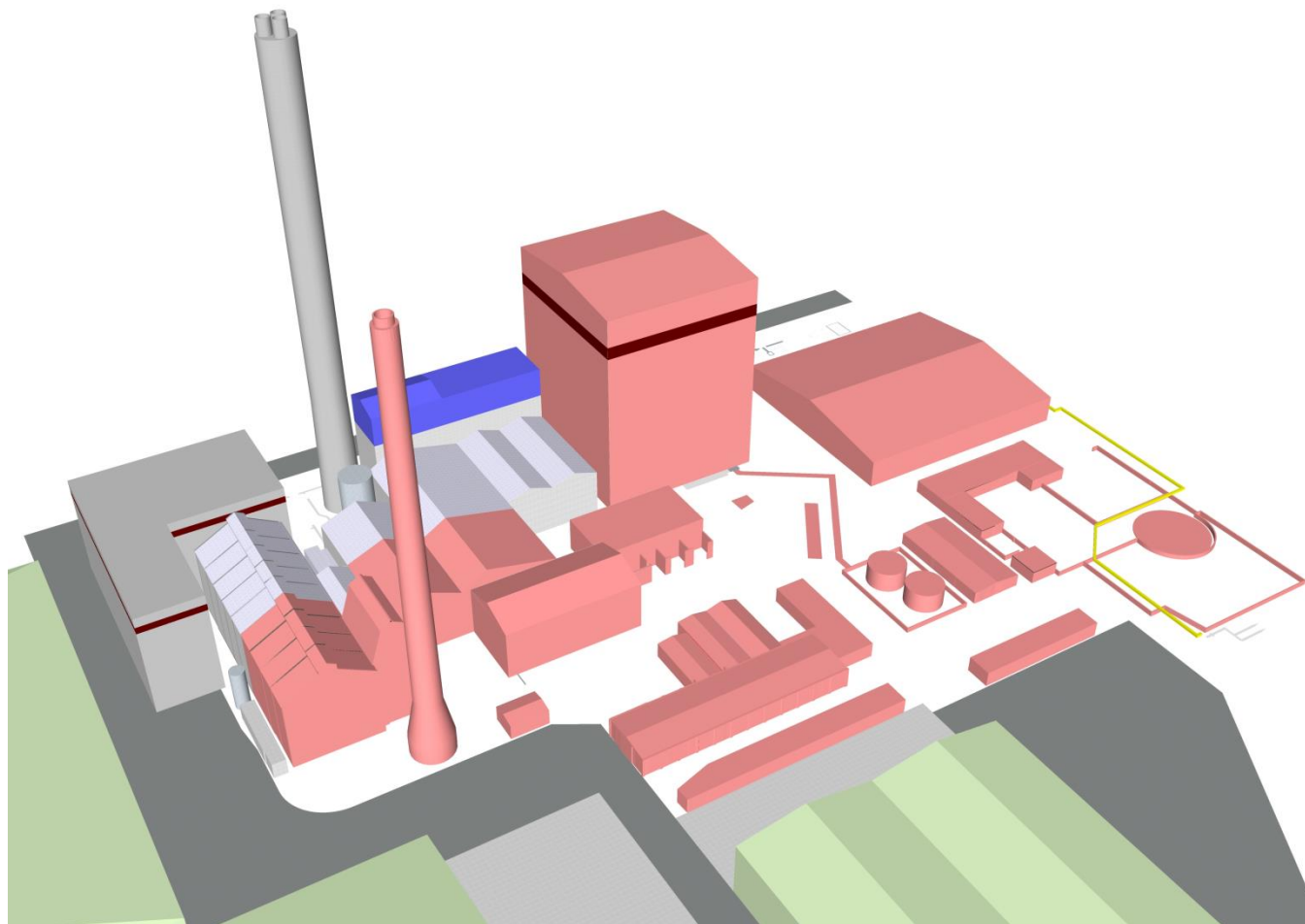
Turbine Hall – Removal of High Level Plant and Structures.

The Bag Filter area located on top of the Turbine Hall has to be de-planted and removed as part of the demolition scope of works. Access to this area is restricted due to its location on the site, with a live road to the North, Live Buildings to the South and West and FBB boiler house demolition to the East.

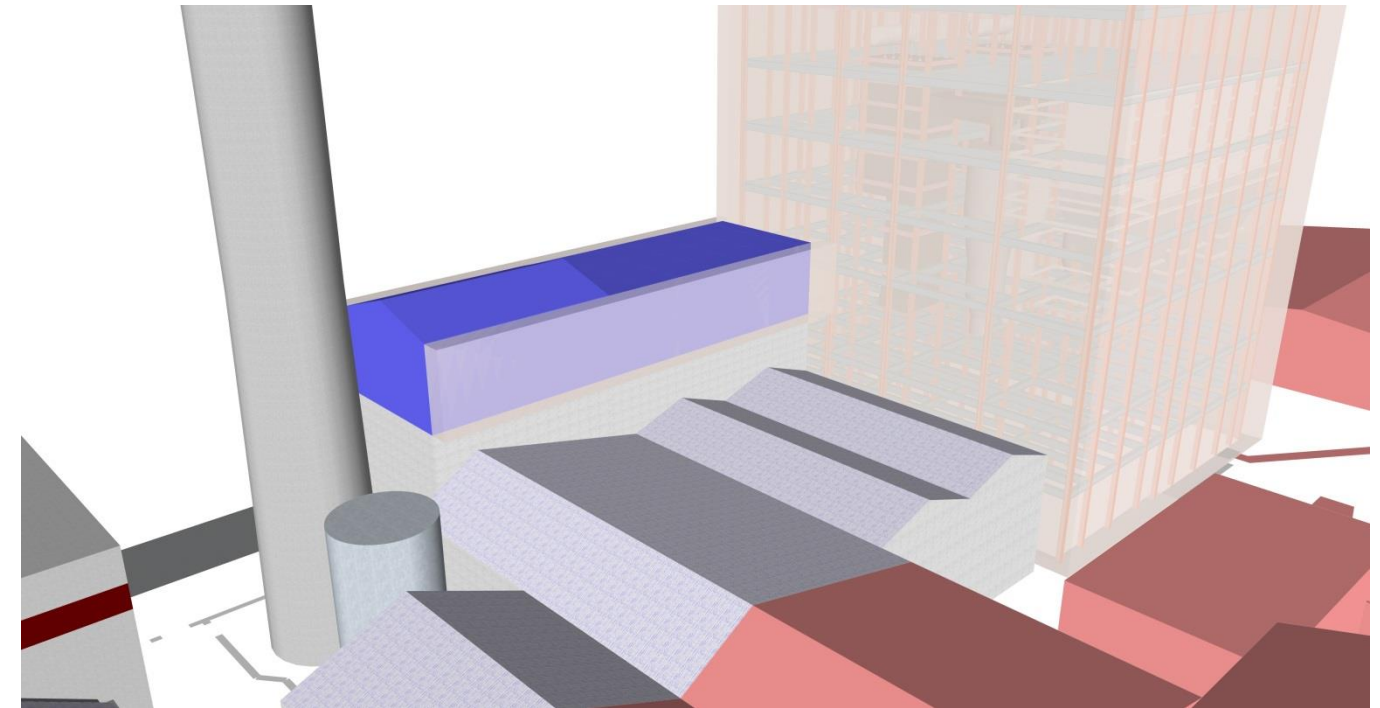
Following consideration of available methodologies and taking account of the constraints noted above we propose a piece small dismantling operation from the top down, with the area encapsulated in scaffolding to provide both edge protection and protection to adjacent live assets.

SSE's team of chartered structural engineers will carry out design check and verification on the existing turbine hall roof structure and will strategically position any required plant to ensure that load transfer onto the existing structure is within permissible amounts.

The image below shows the location of the filter bag house in blue on the site.



Phase 1 Demolition – Install Protective Scaffolding



Phase 2 Demolition – Piece small dismantle using spider crane

