



Methodology for the Demolition of 42m High Concrete Chimney

**Site: Wythenshawe Hospital, Southmoor Road,
Wythenshawe, Manchester, M23 9LT**

1. Brief

Rafferty Specialist Access Services Ltd has been employed by Manchester University NHS Foundation Trust to provide a methodology for the demolition of the 42m high concrete chimney at Wythenshawe Hospital, Southmoor Road, Wythenshawe, Manchester, M23 9LT.

2. Project Overview

The 42m high concrete chimney at Wythenshawe Hospital is now redundant and The Trust is looking to partially demolish the chimney to a level where ongoing inspection and maintenance is no longer a requirement.

3. Description of Chimney

The chimney stands at an overall height of 42m above ground level, has a diameter of 4.45m and is constructed from cast in-situ reinforced concrete. Housed within the structure of the concrete chimney windshield are 4 No. internal liners. The three main liners are constructed from a single course of brickwork up to the top internal floor level. Above the top internal floor level the liners are constructed from carbon steel. The fourth liner consists of a small steel flue which appears to have previously been dismantled to the top internal floor level. There are 5 No. concrete floors fitted at various levels throughout the chimney internally. There is no fixed access to this chimney internally and we are currently not in possession of any construction drawings.

4. Client Responsibilities

The responsibilities of The Trust are generally detailed as follows;

- Provide welfare facilities for site operatives. If The Trust does not wish to provide welfare facilities then they need to inform contractors at Tender stage so provisions can be made by contractors at Tender stage.
- Removal of glass panels on boiler house building – see fig. 1
- Demolition of brick flue within boiler house building – see fig. 2
- Removal of section of boiler house wall to enable access to base of chimney – see fig. 3
- Demolition of single storey buildings on site access route - see fig. 4
- Scaffold protection i.e. crash decking for all items of plant and pipework in the direct vicinity of the chimney
- Provide contractors with all available construction drawings on the chimney and a copy of the most recent inspection report
- Responsibilities under CDM Regs.



Fig. 1

Showing glass panels which will need to be removed from boiler house building prior to the commencement of the chimney demolition



Fig. 2

Showing brick flue in boiler house which will need to be demolished prior to the commencement of the chimney demolition



Fig. 3
**Showing boiler house wall which will need to be removed
prior to the commencement of the chimney demolition**



Fig. 4
Showing single storey buildings to be demolished
prior to the commencement of the chimney demolition

5. Scope of Works

- All equipment delivered to site will be positioned within the agreed exclusion zone.
- An exclusion zone will be set up around the chimney and the relevant buildings, the exclusion zone would be marked out on the site plan and agreed with the client. Heras fence panels will be erected to form the exclusion zone.
- Danger warning signs will be positioned around the exclusion zone on each elevation to inform on site personnel that high level works are in progress.
- The gates will be locked at all times when works are been carried out, it will then be locked after entry. This will deny unwanted access to the working area.
- Erect sectional steeplejack ladders on one elevation for the full height of the stack complete with secondary fall arrest system.
- Gain access to the termination point via the in-position steeplejack ladders.
- Erect a scaffold tube cat head arrangement from the termination point that would have a snatch block arrangement installed. There will be a winch wire reeved through the blocks and to the electric winch positioned at ground level. Install a diagonal guide wire from the top of the stack and connect the winch wire to the guide wire. This lifting arrangement would be proof loaded and be used to hoist and lower equipment.
- Using the electric winch hoist to the high level movable band modular framed scaffold which would be close boarded, complete with double handrails, toe boards, netting and sheeting.
- Erect a scaffold over the termination point using ladder beam arrangement. Supply a man riding winch at ground level, feed a winch wire through a series of snatch blocks and through the ladder beams. There will now be a man riding gondola attached to the load end of the winch wire. Proof load the arrangement prior to use.
- At the base of the chimney a suitable sized aperture will be formed in the concrete chimney windshield sufficient to remove all rubble resulting from the demolition. Design calculations are to be issued to confirm aperture details.
- Mobilise to site a heavy lifting mobile crane.

- Using the man riding winch for access and the mobile crane for heavy lifting, carefully commence flame cutting of the 3 steel liners on the top floor level. Hoist each liner section from the chimney and lower to ground level under control. All dismantled liner sections will be loaded onto transport and removed from site.
- Using the man riding winch for access the brick liners would be demolished individually from the termination point down, allowing all rubble to fall within the liner to ground level. The brickwork would pour through the aperture at ground level where the machine would load at regular intervals into waiting skips.
- Using the man riding winch for access, the remaining steel flue within the chimney would be dismantled in a piecemeal fashion.
- Using the man riding winch for access, demolish the concrete floors at each level starting with the bottom floor working up to the termination point. A machine would remove the concrete at regular intervals and load into waiting skips.
- Once the void of the windshield is clear, the concrete roof and concrete windshield would now be demolished using air driven rivet busters. The demolished rubble would be allowed to fall internally to ground level within the chimney base. The rubble would then be removed using the onsite machine and load into waiting skips.
- The moveable band scaffold would be lowered using steel chimney hangers and sets of chain blocks to the next position as the demolition proceeds. The scaffold area will be cleared of debris at regular intervals.
- The demolition of the chimney would terminate at 15m above ground level.
- The termination point of the chimney would be sealed using a purpose made steel capping plate.
- The hole in the base of the chimney would be sealed using a purpose made steel blanking plate.
- On completion of the work, all access scaffolding and equipment will be dismantled and removed from site.
- The site will be cleared and left in a clean and tidy condition to the satisfaction of the client.

6. Site Access Provisions

Access to the site for contractors and deliveries of plant, equipment, skips etc. is shown in fig. 5. Access in and out of the site will be via Floats Road and the access route is marked by the red arrows shown in the image. The Trust may need to make some provisions along the proposed access route.



Fig. 5

7. Exclusion Zone

- The exclusion zone will be erected from heras fence panels and would be secured in position with the specific fittings.
- There would be one access and egress point formed in the exclusion zone and this would be secured when operatives are working at height.
- There will be specific danger warning signs positioned on each elevation to inform that high level works are being carried out on the concrete chimney.
- There would be a groundsmen in position within the exclusion zone at all times when the works are carried out. If access was required into the working area then all high level works would cease.
- We anticipate the exclusion zone to be as outlined in red in the image below – see Fig. 6

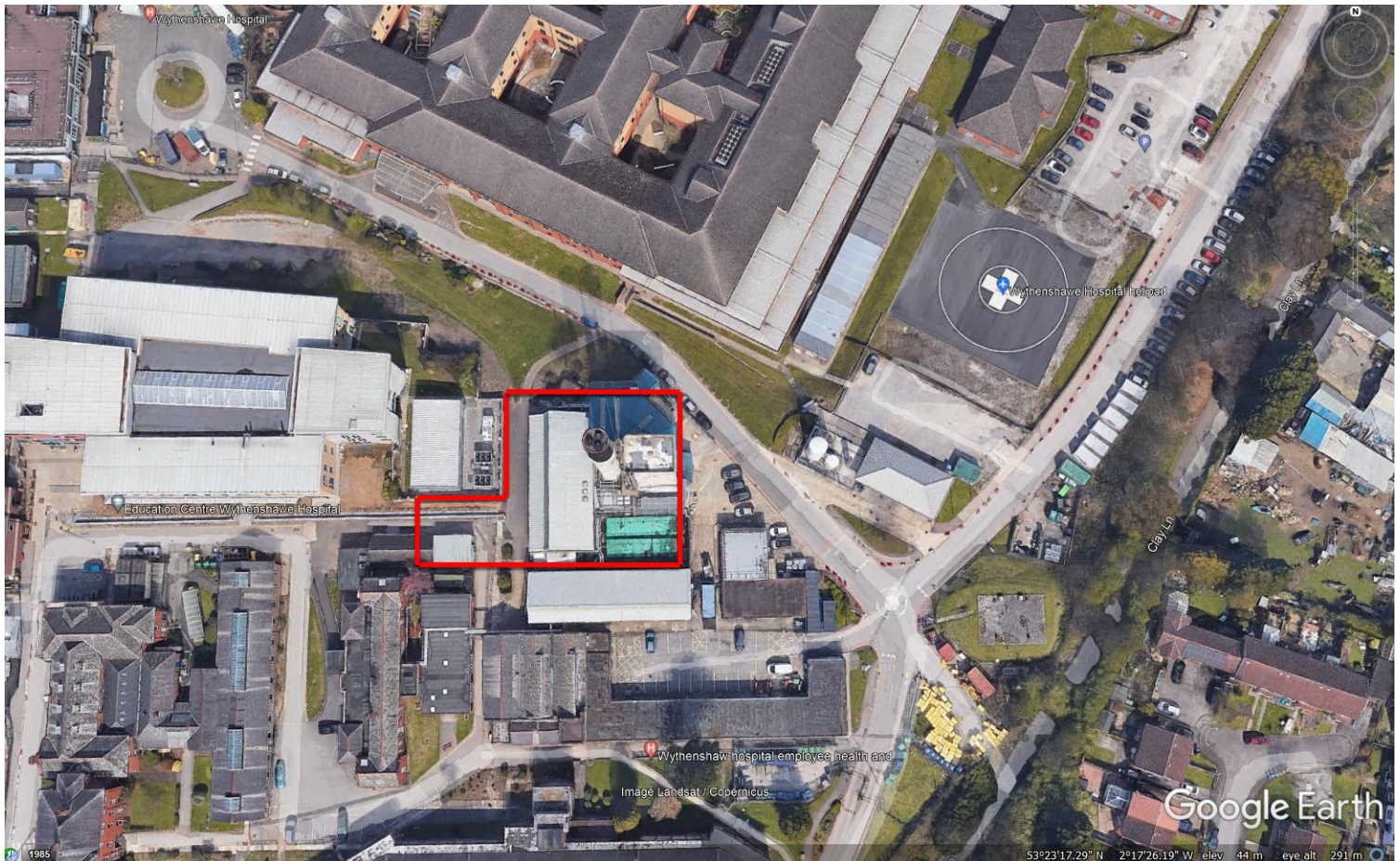


Fig. 6

8. Crane Position

- A heavy lifting mobile crane will be required from the removal of the steel liners within the chimney at the top floor level.
- The RAMS and crane plan would be compiled by a CPCS Appointed Person.
- The crane will be sited in the area highlighted in red below – see Fig. 7



Fig. 7

9. Moveable Band Scaffold Platform

The moveable band scaffold will be of a specific design. The radius T sections of band scaffold will be installed for the full circumference of the concrete chimney at the termination point and connected via treaded bars through the holes of the lugs welded on each T section with flat washers and nuts on each end. Tension will be applied to the nuts on each T section to secure into position. Purpose made modular frames will be installed into the lugs on each T section and secured with a scaffold check clip. The movable band scaffold would be fully boarded with toe boards and double handrails. Debris netting will be attached on the scaffold and plywood would be cut to suit the radius of the chimney to ensure that all rubble would be contained. The movable band scaffold will be used for safe access to demolish the concrete chimney piecemeal and cutting of the reinforcing bars. The scaffold will be lowered under control down the chimney as the demolition proceeds using tested lifting equipment, chain blocks and steel chimney hangers secured over the chimney windshield. An example of a moveable band scaffold platform used for chimney demolitions is shown below – see Fig. 8



Fig. 8

10. Dismantling of Steel Liner Sections

The steel liners from the top internal floor to the termination point of the chimney would be dismantled using a heavy lifting mobile crane. Access to within the void of the chimney would be gained using a man riding winch and steel gondola. The steel liners would be cut, hoisted out of the chimney and lowered to ground level where they would be loaded onto transport and removed from site. Example photo of a steel liner be removed from a concrete chimney is shown below – see Fig. 9



Fig. 9

11. Demolition of Brick Liners & Internal Floors

The brick liners would be demolished individually from the termination point down, allowing all rubble to fall within the liner to ground level. The concrete floors would be demolished at each level starting with the bottom floor working up to the termination point, allowing all rubble to fall internally within the chimney. A man riding winch and steel gondola would be used for access during this stage of the demolition. The photograph below shows an example of an internal floor removal using a man riding winch & gondola for access – see Fig. 10



Fig. 10

12. Demolition of Concrete Chimney Windshield

The concrete windshield would be demolished in panels using the moveable band scaffold platform for access. Air driven rivet busters would be used to break out the concrete and expose the steel reinforcing. The steel reinforcing would then be cut using flame cutting equipment. Each panel would fold into the chimney and fall to ground level within the void of the stack. The photograph below provides an example – see Fig. 11



Fig. 11

13. Removal of Demolition Rubble

The demolition rubble will be removed from the base of the chimney using a machine and will then be loaded into waiting skips for removal from site. The photograph below provides a general example of the process – see Fig. 12



Fig. 12

14. Capping of Chimney

On completion of the demolition the chimney will be capped off with a purpose made steel capping arrangement. An example of a steel capping arrangement can be seen below – see Fig. 13.



Fig. 13