

Essential Works & Repairs, 1830 Warehouse

Science & Industry Museum

CONSTRUCTION METHOD STATEMENT



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SECTION 01 /

INTRODUCTION:

This summary report sets out how the general process will be managed, including how the historic fabric will be safeguarded during the construction period. It explains the construction principles and how the Listed Building and structures and wider Science and Industry Museum complex will be protected during construction. It identifies any measures required to minimise impact on the operation of the wider Science and Industry Museum complex whilst works are going on, including members of the public

The scope of works is as follows:

- Client enabling works to move collection objects in Bay 1 will be undertaken January to March 2023.
- Bay 1 and Bay 2 roof truss repairs.
- Re-profile valley gutters to Bay 1-5, to coordinate with rainwater calculations.
- Remove torching to Bay 4 and re-roof Bay 4.
- Replace and re-profile wood sills to base of cargo doors on south elevation.
- External brick and stone repairs primarily to north and south elevation with inspection of west and east elevation during the works.
- Redecorate rainwater downpipes (appropriate railway livery colours to be confirmed following analysis of historic paint colours).
- Internal brick and timber repairs.
- Localised strengthening works to increase the floor load rating to approx. 2.5kN/m2 across most of the floor areas.
- Internal metalwork repairs.
- Replace the large glazed screens to the Wagon Arches in Bay 1, Bay 2 and Bay 3 in the south elevation. Single glazing system of toughened and laminated glazing installed as part of an aluminium framed glazing system to provide weather protection and reduction in air leakage. Glazing requires UV reduction interlayer. Limited thermal improvement.
- Install hatches and step out landing to the roof access in Bay 2 and Bay 5.
- The main contractor will operate the 1830 Warehouse as a single CDM site as Principal Contractor. Other client works contractors will need to submit RAMS to the Principal Contractor.
- The intention is to avoid the need for full scaffolding. Temporary works design will be required for the combination of works to the south and west elevations and for roof access; works to Bay 4 roof and to the truss repairs in Bay 2. Works to other elevations would be undertaken via temporary and mobile elevated working platform (MEWP). The temporary works design will enable the main contractor trackside access to remove the existing glazing to the Wagon Arches with internal hoarding. The contractor will undertake investigations before and after the existing glazing has been removed.

SECTION 02 / THE SITE AND ITS CONTEXT:

2.1 Site Location

2.1.1 Science & Industry Museum, Liverpool Road, Manchester M3 4FP.

2.2 Context

- 2.2.1 The existing site for the proposed works is the 1830 Warehouse building, located within the grounds of the Science and Industry Museum in Manchester. The building is utilised as an exhibition space, conference facility and event space.
- 2.2.2 The building is adjacent to an existing viaduct railway line, which is also owned by the museum and does not have trains running. To the west of the site is an active railway viaduct.
- 2.2.3 The wider museum site will remain live throughout the duration of the works, with opening hours and access routes to be taken into consideration.
- 2.2.4 There will be concurrent construction/maintenance works within the museum grounds during the proposed timescale, which will require contractor liaison, planning and traffic management.
- 2.2.5 Due to a separate project to undertake renovation works to the Station Masters House to the south of the 1830s Warehouse and the viaduct, the allocated site compound / welfare area to the west of the warehouse, which will provide access via the viaduct, will need to be shared between the two Principal Contractors and planned accordingly.
- 2.2.6 Power supply for welfare has been identified adjacent to the Security Gates at the west boundary of the site, however water provision will require further discussion and arrangement between the Client and Principal Contractor.



SECTION 03 / SITE ACCESS:

3.1 Site Access and Egress Points

- 3.1.1 The site will be accessed from Water Street, with proposed access and site logistics (ref. SDA Drwg No. 275/PD/03).
- 3.1.2 Due to parallel works, the Principal Contractor will need to liaise with other Contractors in regard to access and egress. Due to ongoing works construction works and access within the Science and Industry Museum grounds, it has been proposed by the project team that materials and equipment for the works to Bays 01 and 02 are lifted to the viaduct via the access point to the West of the warehouse building. This will need to be coordinated with sufficient lifting plans and RAMS in place, please see photos of potential material/equipment access above.

3.2 Project timescale

- 3.2.1 Date of commencement of construction period: May 2023
- 3.2.2 Completion date: October 2023.

3.3 Site Hours

- 3.3.1 Manchester City Council stipulates the following hours for operation of construction sites within central Manchester.
- 3.3.2 Monday – Friday: 07:30-18:00
- 3.3.3 Saturday: 08.30-14:00
- 3.3.4 Sunday / Bank Holidays: No work permitted.
- 3.3.5 Operating hours limited to 08:00 to 16:00 each day, 8 May 2023 to 5 October 2023.

3.4 Vehicle access to site

- 3.4.1 Adequate signage will be displayed from the road, to warn road users of the potential danger from vehicles gaining access / egress from the site. The roads adjacent to the site access point will be kept in a clean and tidy manner; any excess mud on the road will be cleared at regular intervals. All routes will be kept free of obstacles and trip hazards during the period of construction.
- 3.4.2 The site area should allow sufficient space for the Principal Contractor to plan for turning of vehicles reversing into the site establishment and not require reversing of vehicles into the public highway. The Principal Contractor is required to provide details, including a traffic management plan within Construction Phase Health Plan.
- 3.4.3 The 1830 Warehouse is situated on the corner of Water Street and Liverpool Road. Liverpool Road is a two lane highway while Water Street is a short road with entrance to the museum Lower Yard. Liverpool Road has a national 30 MPH speed restriction.

3.5 Parking

- 3.5.1 Contractor car parking will be available within the Lower Yard until 30th June and then after 17th Sept, between those dates' car parking will need to be off site in the nearest available public car park off Liverpool Road. Access for unloading etc will be allowed until 10am, prior to the yard being open to the public. Managed repairs (banksman, fenced etc) are allowed during open times, all to be agreed with the Client in advance.
- 3.5.2 The contractor will take into account any parking / unloading restrictions imposed by the local authorities or police and will restrict construction traffic parking and unloading to the site as far as practicable.
- 3.5.3 There is a pay and display car park located on Liverpool Road as well as designated on street parking which will be used by operatives and visitors for the site.
- 3.5.4 Very limited parking will be available on site. Access to the car park will be restricted during site hours and controlled with gates.
- 3.5.5 Parking around site will be utilised however contractor vehicles will not be permitted to park on footpaths or in a manner that restricts access to other parts of the site or surrounding roads.

3.6 On site traffic

- 3.6.1 Movement of on-site vehicles and MEWP's will be closely monitored and suitable and trained banks man employed. Risk Assessments will be done where the movement of vehicles on site affects other site activities.
- 3.6.2 Suitable demarcation will be maintained by the Principal Contractor to separate vehicle and pedestrian routes at all times throughout the duration of the project.
- 3.6.3 Alternative access to the 1830 Warehouse can be gained via the main entrance at the east end of the site from Lower Byrom Street, through the site and over the track which is all at the same level. Due to rough terrain a robust large wheeled telehandler will be needed, and this route will require liaison with the Power Hall CDM site as well as the Science & Industry Museum in relation to public pedestrian routes and traffic management.

3.7 Pedestrian access

- 3.7.1 A dedicated pedestrian entrance into the site compound area will be utilised from Water Street.
- 3.7.2 The entrance will be segregated from the construction activities & vehicle movements with barriers from the site entrance to the site office to allow visitors & all operatives to access the office/ welfare without the need of PPE.
- 3.7.3 A pedestrian gate leading onto construction areas from the compound will be controlled with a key code lock.

The photographs below illustrate the access from the Water Street side using the forecourt to gain access up to the viaduct level:



The above photographs illustrate the access from the Water Street side using the forecourt to gain access up to the viaduct level (see yellow arrow on Photo 3). This approach avoids using the Lower Yard to enable the museum operations and works contractors to continue without impact.



Alternative site access via Main Entrance on Lower Byrom Street

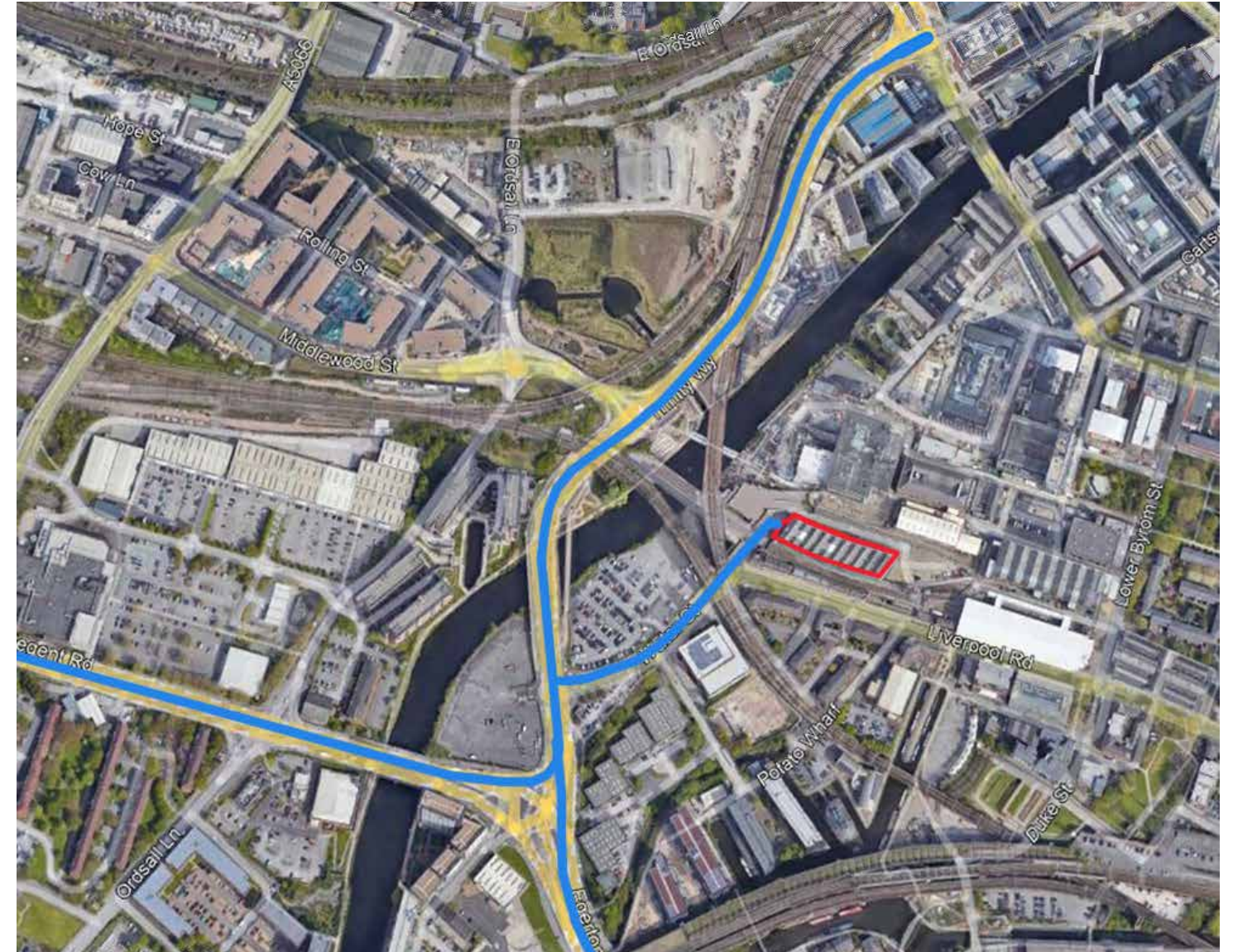
SECTION 04 / DELIVERIES OF MATERIALS USED TO SITE:

4.1 Deliveries to Site / Supply Chain Management

- 4.1.1 The site access point for deliveries will be from the existing site entrance off Water Street.
- 4.1.2 The primary contact for all deliveries is the site manager who is based on site throughout all operations.
- 4.1.3 The single point of contact for deliveries will be in place throughout. An alternative contact in case of unavailability or emergencies will be available at the contractor's site office.
- 4.1.4 All contract/ operative deliveries must be arranged & agreed with the site manager or site supervisors in advance. All deliveries no matter the size must be booked in on the contractor's delivery booking in form on site at least 24 hours prior to the delivery.
- 4.1.5 Any delivery attempted to site and not booked in will be turned away from site.
- 4.1.6 Delivery routes/ entrance for unloading/unloading areas will be highlighted with signs.
- 4.1.7 Deliveries to site will be arranged to avoid peak traffic times of the day within normal working hours to ensure minimal disruption to local business users, residents and traffic movements.
- 4.1.8 Deliveries are not permitted between: 8:00 – 9:30 am and 16:00 –17:00 in order to avoid the peak congestion periods.
- 4.1.9 Any deliveries attempted outside the agreed delivery times, or in contravention of the booking in system will not be allowed to enter site and will be turned away. All sub-contractors and suppliers will be advised that non-compliance with the agreed delivery schedule will result in an appropriate sanction.
- 4.1.10 Delivery drivers must contact the site manager or site supervisor before entering site. Arrangements will be made for the vehicle to be guided to & from site by the traffic marshal.
- 4.1.11 Deliveries and collections should also be planned to de-conflict with those related to the normal operation of the site.

4.2 Unloading & loading of deliveries & plant

- 4.2.1 On arrival at the site, the driver must stop and report to the site office.
- 4.2.2 Drivers must not park or leave vehicles in areas that obstruct the local highways & footpaths.
- 4.2.3 Prior to deliveries accessing the construction areas/ delivery off load areas the contractor will make suitable arrangements for the vehicle to be guided to & from site by the traffic marshal.
- 4.2.4 Traffic marshals will guide the vehicle safely to the project offload area, including overseeing any reversing, and their instructions must be followed accordingly.
- 4.2.5 All delivery drivers must have full PPE (i.e. hard hat, safety footwear, hi-vis vest or jacket and suitable gloves) before entering CDM construction areas
- 4.2.6 Reversing of vehicles on highways or site should be avoided. If reversing cannot be avoided suitable controls must be implemented; exclude pedestrians, use suitable number of traffic marshals to guide/ control movements, vehicle audible warning when reversing, enough space to manoeuvre etc.
- 4.2.7 When unloading takes place directly off the public roads the traffic marshal must supervise either side of the vehicle to ensure the public are not at risk.
- 4.2.8 The above transport management plan will be issued to all suppliers & subcontractors to ensure the agreed routes & procedures are followed to create minimum disruption on site and on local highways.



Traffic delivery and collection routes (ref. Appendix 3)

4.6 Plant and Equipment

- 4.6.1 All plant and equipment brought to site will be subject to inspection, an emergency spill kit should be provided and located within the project boundary to contain any leaks and discharge that may occur. Restrictions with regards to the overall movement of vehicles have already been identified within this document and the Principal Contractor will ensure that these restrictions are followed.
- 4.6.1 The Principal Contractor will need to ensure equipment used is suitable for use on site, complies with all Permits to Work, site rules and regulations that are applicable, including but not limited to the following:
 - a. Select and provide equipment and plant that is fit for purpose with respect to its integrity, where it is to be used and the tasks or processes for which it shall be used;
 - b. Equipment and plant shall be maintained in an efficient state, in efficient working order and in good repair as required, with auditable maintenance logs kept up-to-date as required by relevant Legislation.
 - c. All equipment and plant, whether purchased or hired, shall be examined and checked by the Principal Contractor prior to being used and he shall ensure all necessary information, instructions and manuals are provided;
 - d. The Principal Contractor shall ensure that their own and that of their sub-contractor's plant, equipment, and construction tools required for the execution of the works meet all legal requirements and are maintained in a safe and efficient condition and in accordance with manufacturers recommendations.

4.7 Consultation and neighbourhood liaison

- 4.7.1 Prior to commencing works on site a letter drop will be undertaken around the area notifying neighbours & local business of the works start date & expected programme of the works.
- 4.7.1 The site manager's contact details will be included within the letter and will be encouraged to contact him for any feedback positive or negative.
- 4.7.1 The proposed site traffic management plans & delivery plans will be agreed with the local council and highways to ensure suitable routes is agreed so minimum disruption is caused to the local highways.
- 4.7.1 Deliveries to site will be arranged to avoid peak traffic times of the day within normal working hours to ensure minimal disruption to local business users, residents and traffic movements.
- 4.7.1 Prior to any abnormal deliveries due to size or number of vehicles i.e. muck shift wagons, glazing and metalwork deliveries to site on articulated wagons a leaflet/ letter drop will be done to notify the Neighbours & local business of this.

SECTION 05 / HOARDING:

5.1 Unauthorised Access to Site/ Hoarding

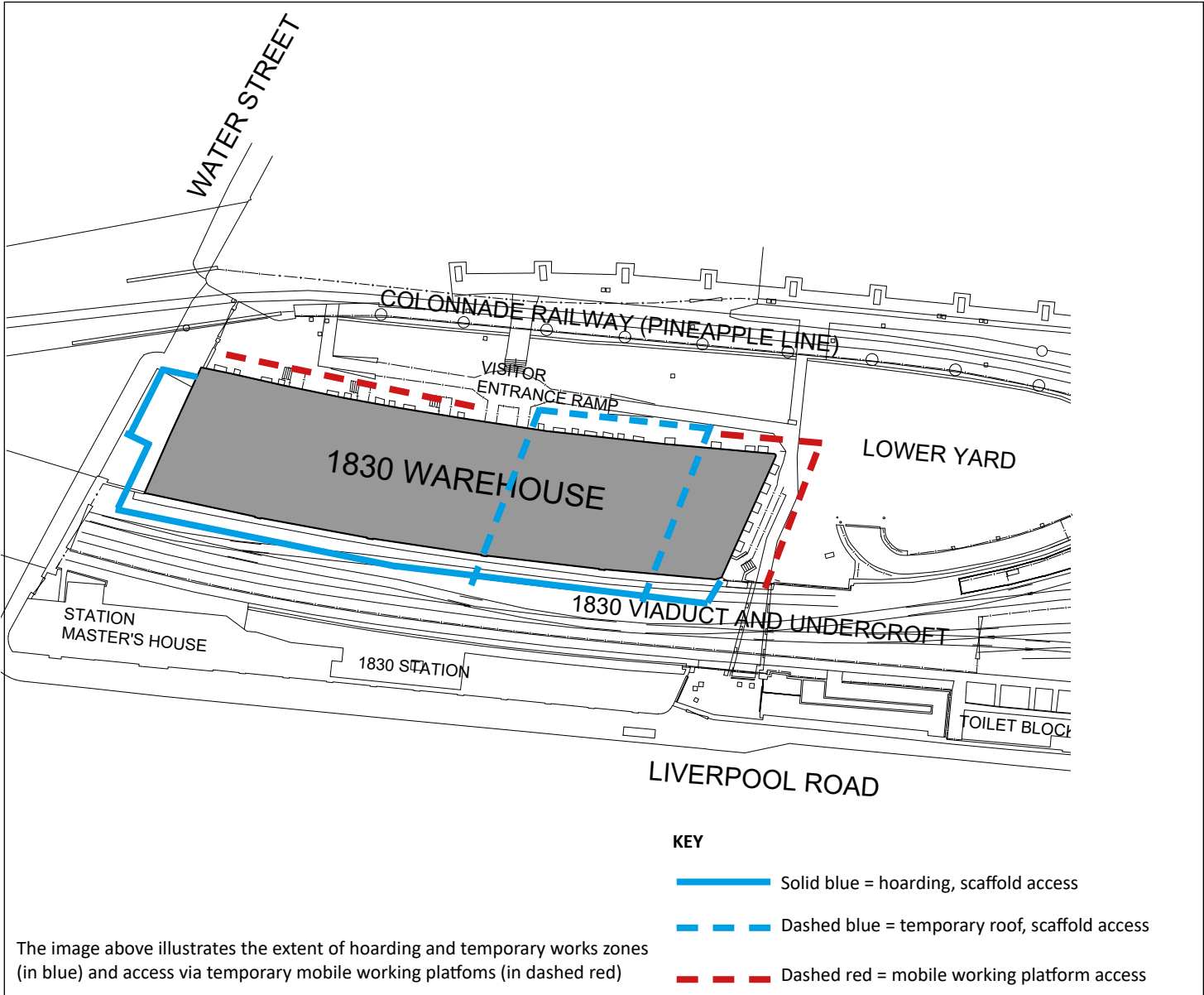
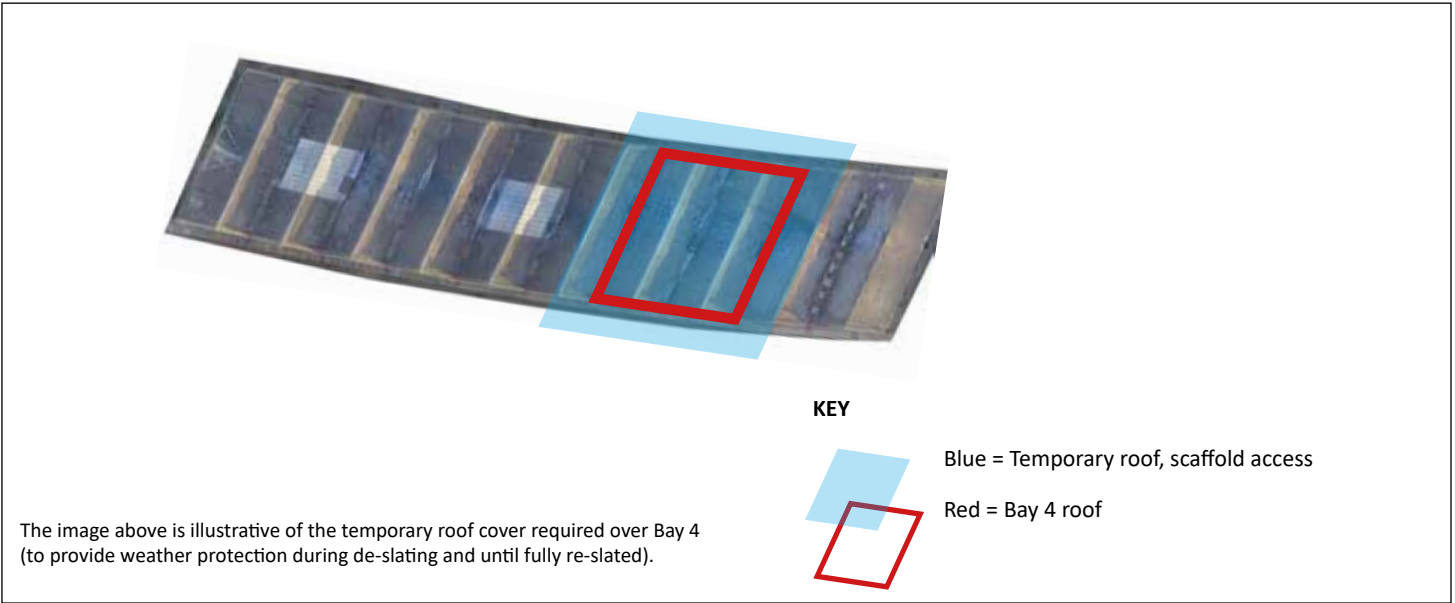
- 5.1.1 Hoarding surrounding the site perimeter will be set-up.
- 5.1.2 Hoarding externally and internally to the wagon arches will be set-up to provide protection against dust, wind and some insulation value in the case of Bay 3 at the building's main reception.
- 5.1.3 The site entrance will be kept closed at all times and signs will be erected around the perimeter of the site. Pedestrian access to the site will be through the authorised access point only and will be controlled through the booking in system and with the use of digital door locks. Information boards will be sited at entrances to identify access procedures and contact telephone numbers.

5.2 Compound Area

- 5.2.1 A permanent site office, canteen, drying room & WC facilities will be used.
- 5.2.2 For details of access to the site compound, plant and materials storage areas, please see Appendix 2.
- 5.2.3 Security arrangements will comprise of a CCTV system installed to view strategic areas which will be remotely monitored during times when the site is non-operational.

5.3 Plant and Machinery movements

- 5.3.1 All necessary steps will be taken to reduce noise levels from plant, machinery and work activities in accordance with the Noise at Work Regulations 2005. Where reasonably practicable, noise levels will be reduced at source to their lowest reasonable level.
- 5.3.2 If necessary the site manager will carry out noise assessments with guidance from the Health & Safety Manager, where considered necessary and appropriate measures taken to protect site operatives, residents and members of the public from site noise.
- 5.3.3 Any possible excessive noisy work activities will be carried out at times that will cause least possible disturbance to the local residents, surrounding business or schools etc.
- 5.3.4 Noisy plant & equipment will be placed as far as possible from areas that may be affected from the noise.
- 5.3.5 Noise dampening measure will be taken if required to reduce noise reaching sensitive buildings.
- 5.3.6 Traffic Marshal will guide plant if crossing pedestrian routes, highways or any other area where plant may come into contact with public or pedestrians.



SECTION 06 /

TEMPORARY SUPPORT:

6.1 Working at Heights

- 6.1.1 MEWP access planned for north and east elevation structural repairs. principal contractor must prepare sufficient RAMS for review by Client prior to access, and ensure that all tools and materials are tethered, weather is suitable for plant and the area below is clear and cordoned off from operatives and the public.
- 6.1.2 Particular consideration is required for use of the MEWP above the allocated compound area.
- 6.1.3 Access to the south and west elevation of the warehouse will be via scaffolding erected on the adjacent viaduct. Planned access to the viaduct is through use of a haki stair and elevated walkway over a separate construction compound area. The Principal Contractor must ensure there is liaison with the client and implement mitigations for potential dropped objects etc over those working below.
- 6.1.4 Works to the valley gutters on the roof are to be carried out, with access via south elevation scaffold.
- 6.1.5 The Principal Contractor shall comply with all relevant legislation regarding working at heights and adopt a suitable hierarchy of controls as defined within the Work at Height Regulations 2005. The Principal Contractor shall ensure a management system is in place for managing site access equipment for all contractors e.g. ladders, tower scaffolds and carry out a risk assessment and take the appropriate precautions before commencing any work at height.

6.2 Fire Damage, Structural Modifications

- 6.2.1 The structure is known to have had a number modifications and refurbishments over previous years. It is important the appointed Principal Contractor considers the structural survey undertaken by Conisbee and is the point of contact for further information and must be consulted if anything of concern is discovered during the works.

6.3 Temporary Works

- 6.3.1 All Temporary Works will be designed by a competent contractor (refer to Methodology set out in Appendix 5 of this Construction Method Statement).
- 6.3.2 A Temporary Works Engineer will survey and issue any requirements for temporary support during the construction phase.
- 6.3.3 The Temporary Works design will be issued to a competent person with qualifications relevant to structural work required to review & amendments made if any is required.
- 6.3.4 Once the design has been agreed a competent contractor will install/ erect the temporary support as per the design. The temporary works will be installed/ erected using the materials/ equipment specified as per the manufacturer instruction guidelines & design.
- 6.3.5 Once the temporary works have been installed/ erected a competent person will inspect the installation to check if it has been installed as per the temporary design.
- 6.3.6 Once the installation has been signed off work can commence.
- 6.3.7 No person can alter or dismantle the temporary support installed unless instructed or advised by a competent person.

SECTION 07 /

HEALTH & SAFETY PROCEDURES FOR STAFF WORKING ON SITE:

7.1 Personal Protective Equipment

- 7.1.1 All PPE will be in compliance with the principal contractor's, Health and Safety requirements.
- 7.1.2 As a minimum, hard hat, high visibility vest and safety shoes must be worn at all times on site, and in addition, operatives must wear long trousers and short sleeve shirts as a minimum to protect them from UV radiation.
- 7.1.3 The principal contractor will make sun cream freely available to operatives in hot weather.
- 7.1.4 PPE requirements for specific high-risk tasks will be included in specific risk assessments and method statements for review by the client.

7.2 Security

- 7.2.1 Security arrangements will comprise of a CCTV system installed to view strategic areas which will be remotely monitored during times when the site is non-operational.
- 7.2.2 A full site hoarding will be erected around the site and continuously maintained throughout the project.
- 7.2.3 No authorised access to site will be allowed, particularly by children. The site will be left secure at the end of each working day.
- 7.2.4 All of the site workforce and visitors will sign in and out of the site as per the induction briefing on a daily basis.
- 7.2.5 All of the site workforce & visitors must wear company branded Hi Visibility Vests this will enable easy identification by client representatives, staff etc.

7.3 Buried Services

- 7.3.1 Services & utility surveys will be carried out before works start copies will be issued to all contractors that may be affected. Hard copies will be kept on site.
- 7.3.2 Prior to any task where ground will be broken with equipment or tools existing drawings or plans will be checked by the site manager for any possible services within the proposed work area, if no drawings or information is available a buried services survey will be carried out & findings recorded.
- 7.3.3 Survey for buried services.
- 7.3.4 A CAT scan & genny will be used by a competent operative with the relevant qualifications to carry out the buried services survey. If any services are found, they will be exposed and reported to contract administrator.
- 7.3.5 Prior to excavations works commencing a dig permit to work must be issued by the site manager.

7.4 Staff training and briefing procedures

General Training:

- 7.4.1 There is a commitment to ensure the training needs of all employees & contractors is reviewed on a regular basis and providing initial and refresher training for all of employees to ensure that adequate safety standards are met and maintained.
- 7.4.2 Employees will be given information on the risks to their health & safety. Training is linked to capabilities to ensure that anyone given a specific task is capable of carrying this out in the prescribed manner.
- 7.4.3 In addition, employees and sub-contractors will be provided with adequate health and safety training through induction briefings prior to commencement and "Tool box" talks aimed to make employees aware of the risks and necessary controls prior to commencing an operation.

Site Specific:

- 7.4.4 All personnel employed on the site will receive a site-specific induction before commencing work on site.

Site Liaison:

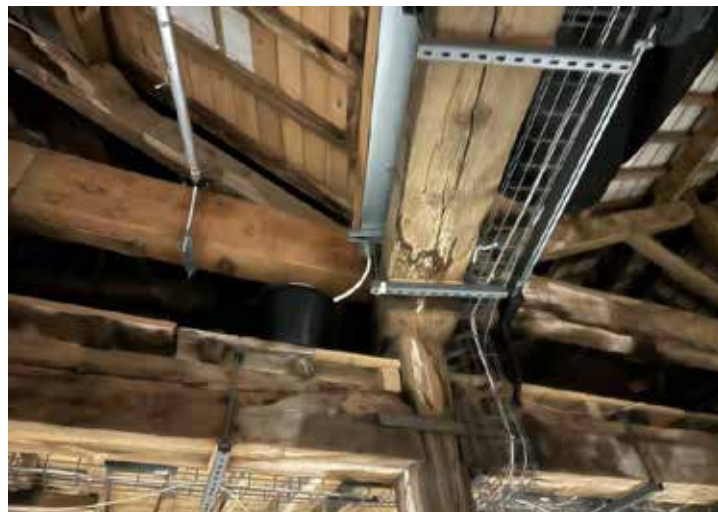
- 7.4.5 Regular site meetings will be held with all operatives, client representatives and major suppliers, at which the company will present the following information in relation to health, safety & environmental: A report on any accident along with any comments, lessons learnt and a copy of the accident report.
- 7.4.6 Notes of any meeting between the client/local managers/police/emergency services.
- 7.4.7 Arrangements for co-operation and co-ordination between the on-site operatives and major suppliers will be discussed and methods agreed for ensuring that all health and safety decisions will be passed between all parties and to the site operatives.
- 7.4.8 Meetings to discuss health and safety will be held as and when required either by the client, the principal designer and principal contractor.
- 7.4.9 Any unforeseen eventualities during the execution of the works, which could have implications on health and safety, will be brought to the attention of the contractor's Safety & Assurance consultant immediately.
- 7.4.10 Any of the following events will be reported to the client, principal designer and the site manager immediately.

Accident/incident/Near Miss:

- 7.4.11 Visit to site by any Enforcement Agency.
- 7.4.12 Improvement or Prohibition Notices issued by an Enforcement Agency
- 7.4.13 Any formal warning issued to Operatives

7.5 Existing Services (Utilities)

- 7.5.1 The building is currently fully operational with gas, water, electric and telecom services.
- 7.5.2 A Measured Building Survey was carried out by Greenhatch Group in January 2018, prior to repair works to the 1830 Warehouse that have since been carried out and included a review of existing M&E for the structure.
- 7.5.3 Existing M&E is present in internal areas that will need to be accessed for the additional torching works (Bay 04) and roof valley gutter works, which will need to be taken into account. The contractor will review all existing and available site information which has been provided and must ensure that all services are correctly identified, and precautions established in line with current regulatory guidance to prevent damage to any services and harm to persons



Evidence of existing services along internal roof structure



Evidence of existing services along internal roof structure

7.6 Arrangements

- 7.6.1 A system of monitoring the construction works to ensure effective management of safety throughout the project duration shall be implemented by the Principal Contractor. This shall include, but not strictly limited to:
 - a. Workplace inspections – general site safety;
 - b. Statutory inspections – scaffold, plant equipment, etc.;
 - c. Accident / incidents – reporting and investigating;
 - d. Subcontractors – monitoring of nominated subcontractors.

7.7 Permit to Work Systems

- 7.7.1 No work will proceed on site unless RAMS documentation has been reviewed and accepted by the principal contractor, and permission to commence the work has been authorised by his nominated representative e.g. Construction Site Manager.
- 7.7.2 All contractors and sub-contractors will carry out and produce RAMS for their work activities. All documents will be task specific, and be signed, dated and tracked by the principal contractor.
- 7.7.3 Due to the nature of the project, it has been stated by the client that hot works are not be used when an alternative method is available, and all proposed hot works are to be discussed and agreed with the client in advance.

7.8 Fire Precautions

- 7.8.1 Science Museum Group require submission of a the principal contractor's site Fire Risk Assessment and Emergency Plan for review by a Science Museum Group Safety and Wellbeing Team Member prior to works commencing on site.

7.9 Health Hazards - Asbestos

- 7.9.1 An Asbestos Refurbishment Survey was carried out for the 1830s Warehouse by Lucion Environmental in December 2020, and further updated in March 2021, prior to the initial phase of repair works commencing February 2021. All areas in this scope of works were included in the survey and no asbestos containing materials were found.
- 7.9.2 Potential ACM's within Bay 02 (historic crane area) were investigated by Lucion Environmental in August 2022. No asbestos was detected.

7.10 Rail Operations and Vehicle Movement

- 7.10.1 It is not anticipated that there will be any rail operations due to track repairs and other projects preventing access. There will still be the need for all site operatives to have a basic track safety awareness briefing that will focus on the risks working on and around the rail environment. Especially the risks of slips and trips.

SECTION 08 / WASTE DISPOSAL :

8.1 Site waste management plan

- 8.1.1 An environmental plan along with a site-specific site waste management plan will be developed for the project.
- 8.1.2 The construction contract will result in a variety of wastes arising that shall be minimised as far as practicable, and the remainder managed in keeping with UK and international legislation. This plan provides detailed guidance to ensure that waste minimisation and effective waste management is practised. Additionally, resource management and storage & ordering procedures are a crucial element of waste minimisation and thus are included in this plan. Waste practices specified are also designed to achieve the aims and objectives for waste management.
- 8.1.3 The client's waste objectives and targets will be incorporated into the contractors waste objectives and targets for the duration of the contract/project as follows:
 - a. Reduction of wastes from services;
 - b. Restricting or suspending use of hazardous substances; and Identification of areas where energy savings can be made;
 - c. Quantify all significant waste streams and their disposal routes
 - d. Investigate and report on reuse or recycling possibilities for all wastes;
 - e. Set reduction targets for all wastes going to landfill
 - f. Review facilities for management of the creation, storage and disposal of hazardous wastes to maximise waste materials recycled via waste transfer station with remaining diverted from landfill to waste to energy.

8.2 Waste Disposal

- 8.2.1 The waste disposal process will be in line with site waste management developed specifically for the project.
- 8.2.2 Rubbish, debris, redundant materials, etc will be collected regularly from the work area, placed into segregated skips and not allowed to accumulate. Skips will be lockable and placed on skids to prevent damage to existing surfaces.
- 8.2.3 Arrangements will be made with a locally licensed Waste Disposal Contractor who will collect the skips regularly for disposal at an appropriately licensed disposal station.

8.3 Deliveries, Waste Collection or Storage Restrictions

- 8.3.1 Any material designated as waste will need to be sent to a licensed site and Waste Transfer Notes will be required by the client to ensure that no fly tipping has occurred. Prior to work commencing it shall be a requirement that a comprehensive waste management plan be developed and approved by the client.

SECTION 9 /

CONTROL OF DUST / DEBRIS :

9.1 Air Quality Monitoring

- 9.1.1 The air quality will be monitored where there is evidence of airborne hazardous materials or there is a risk of fumes or dust affecting the local area and take the required corrective actions.

9.2 Control of Noise and Vibration

- 9.2.1 All necessary steps will be taken to reduce noise levels from plant, machinery and work activities in accordance with the Noise at Work Regulations 2005.
- 9.2.2 Where reasonably practicable, noise levels will be reduced at source to their lowest reasonable level and PPE must only be employed as the last resort.
- 9.2.3 If necessary the site manager will carry out noise assessments with guidance from the Health & Safety Manager, where considered necessary and appropriate measures taken to protect site operatives, residents and members of the public from site noise.
- 9.2.4 Any possible excessive noisy work activities will be carried out at times that will cause least possible disturbance to the local residents, surrounding business or schools etc.
- 9.2.5 It is not likely that the scope of works will cause significant noise levels, but the client will be given prior notice should this change.

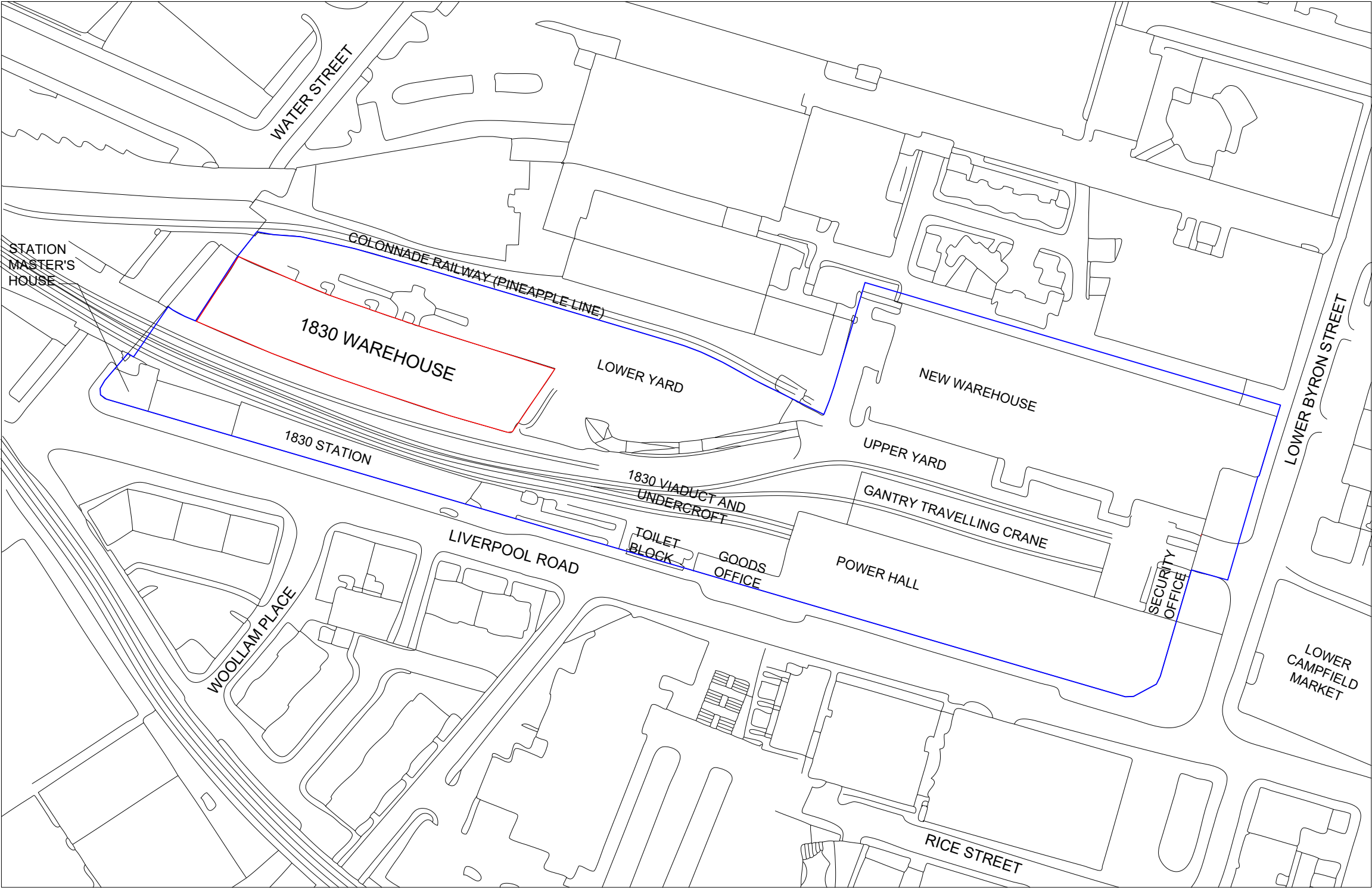
9.3 Control of Dust & debris on highways and air pollution

- 9.3.1 The existing hard standing tarmac areas leading onto site & car park areas that will be used as delivery areas will be retained during the construction period thus minimise the risk of dust or debris on the highways.
- 9.3.2 All necessary precautions will be taken to protect the building residents, members of the public and site operatives from the effects of the inhalation of respirable dust that may be caused by the works.
- 9.3.3 All operations that may create dust will include a type of dust suppression technique, such as damping down or mechanical dust extraction. This applies specially to cutting or grinding operations. All operatives will be issued with and required to wear suitable goggles and masks or respirators, wherever this type of work is being carried out.
- 9.3.4 Vehicles transporting aggregates or waste to & from site will be suitable covered.
- 9.3.5 Where there is a stockpile of soil these areas shall be damped down to reduce the risk of dust emissions. The handling of spoil should be kept to a minimum to reduce the emission of dust.
- 9.3.6 No materials will be burned on site.
- 9.3.7 Wheel wash will be used to clean deliver vehicle wheels when leaving site.
- 9.3.8 The site manager will arrange for the surrounding highways to be swept with a road sweep as and when required.
- 9.3.9 Emissions from plant will be controlled by ensuring plant is in good order by regular services & maintenance. Plant must not be left running for long periods when not used.
- 9.3.10 The reuse of materials on site will be encouraged.
- 9.3.11 Plant used on site to crush materials should be done with an environmental permit issued from the local authority. The works must be done as per the procedures within the permit. Where plant is used to recycle materials the appropriate Environmental Permit from the environmental agency shall be obtained

APPENDIX:

- **Appendix 1 Existing Site Plan**
- **Appendix 2 Site Set-up**
- **Appendix 3 Traffic Management**
- **Appendix 4 Programme**

- **Appendix 1 Existing Site Plan**

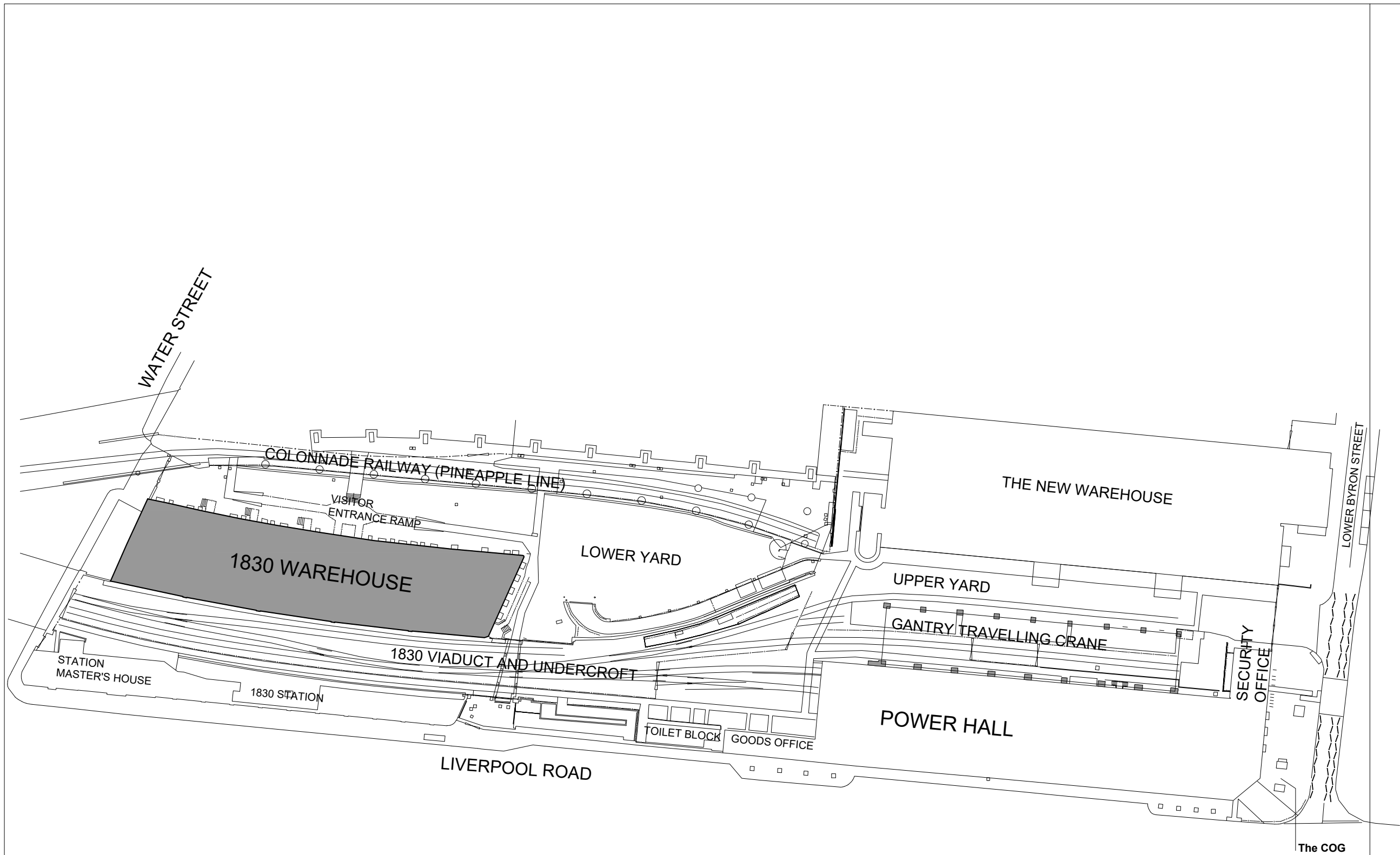


SITE LOCATION PLAN
1:1250

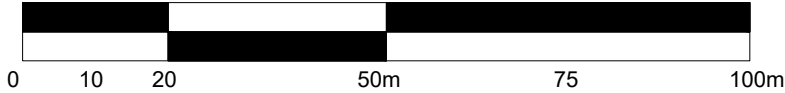
LOCATION PLAN 1:1250 @ A3



INDICATIVE NORTH NORTH WEST EAST SOUTH			
Based on Topographical Survey by Green Hatch, 2006			
JOB TITLE Essential Repairs, 1830 Warehouse, Science & Industry Museum M3 4FP	JOB NO. 275	DRWG. TITLE Location plan	STATUS Planning
		DRWG. NO. 275 / PD / 01 (A1 ORIGINAL FORMAT)	REV: SCALE: 1:1250 @A3
Studiodownie	TEL: +44 (0) 20 7299 7766 info@studiodownie.com	All dimensions to be checked on site by the Contractor and confirmed with the Architect prior to construction. Do not scale off this drawing. Drawn by: JJP DATE: 03/02/23	

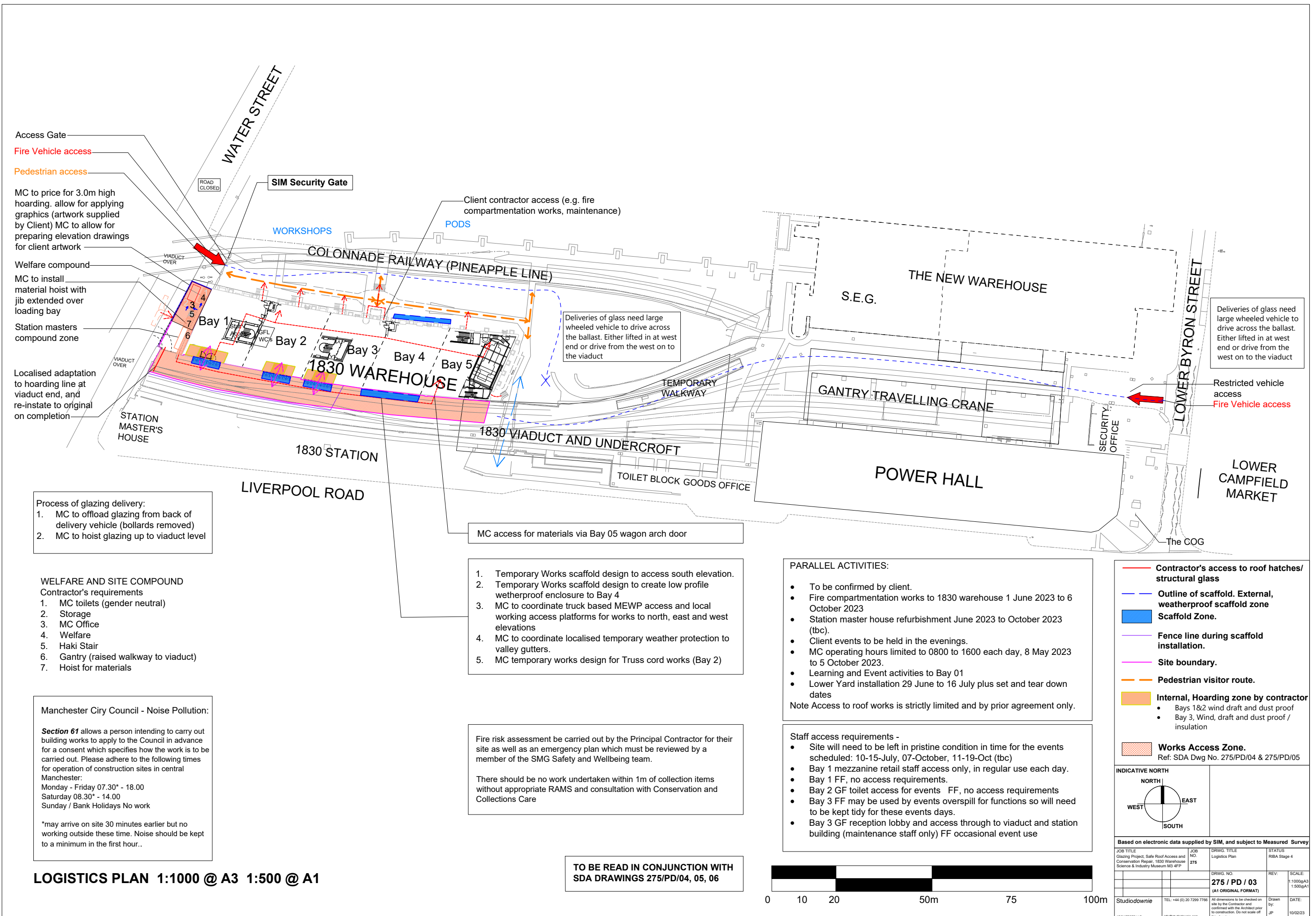


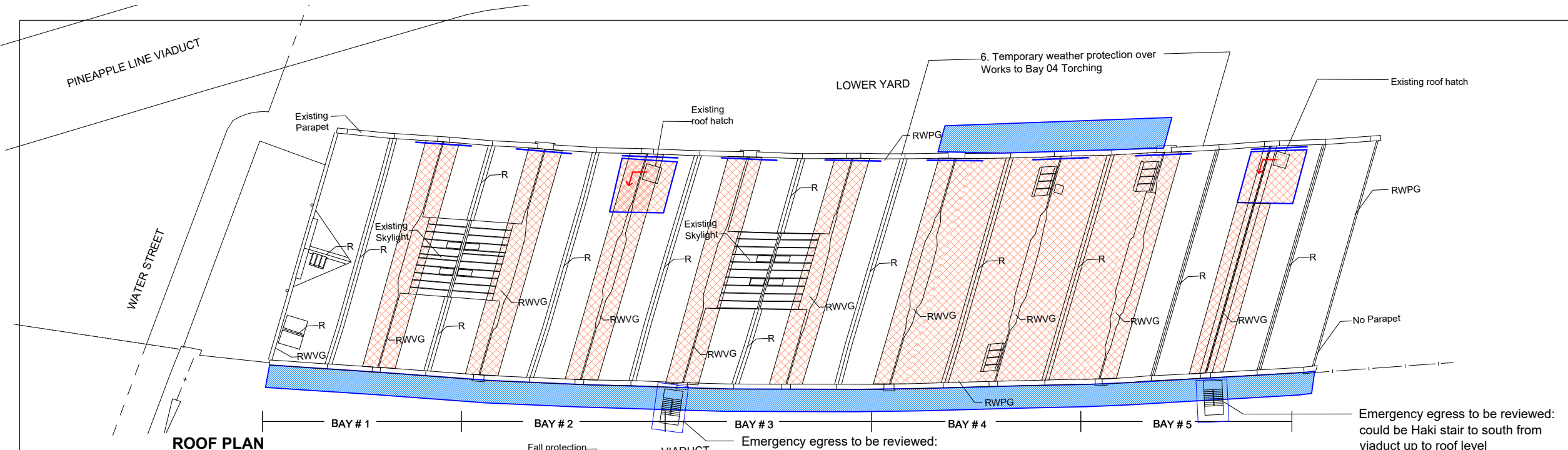
SITE PLAN 1:1000 @ A3 1:500 @ A1



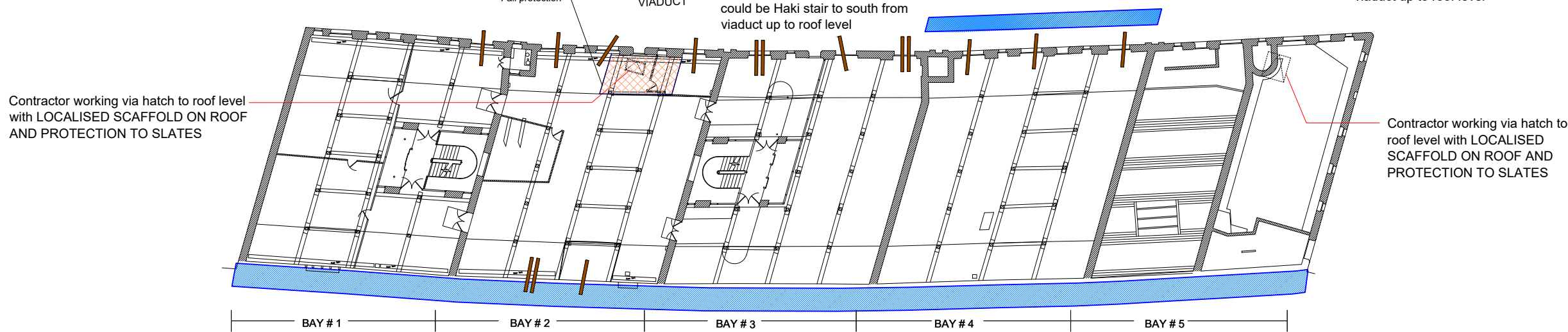
INDICATIVE NORTH			
Based on Topographical Survey by Green Hatch, 2006			
JOB TITLE Essential Repairs, 1830 Warehouse Science & Industry Museum MG 4FP	JOB NO. 275	DRWG. TITLE Site plan	STATUS Planning
DRWG. NO. 275 / PD / 02 (A1 ORIGINAL FORMAT)		REV.	SCALE: 1:1000@A3 1:500@A1
Studiodownie	TEL: +44 (0) 20 7299 7766 info@studiodownie.com	Drawn by: JP	DATE: 03/02/23
ARCHITECTS LLP			

- **Appendix 2 Site Set-up**

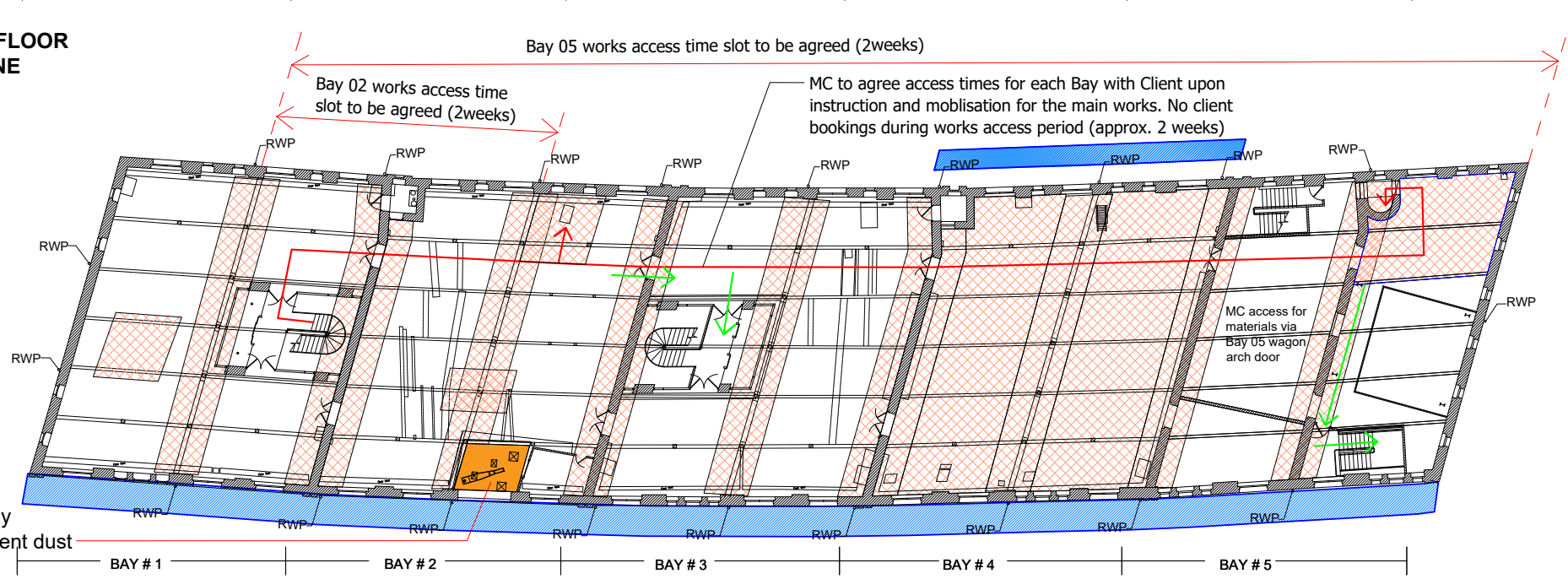




ROOF PLAN



SECOND FLOOR MEZZANINE

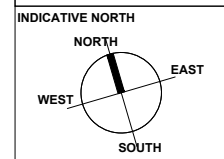


SECOND FLOOR

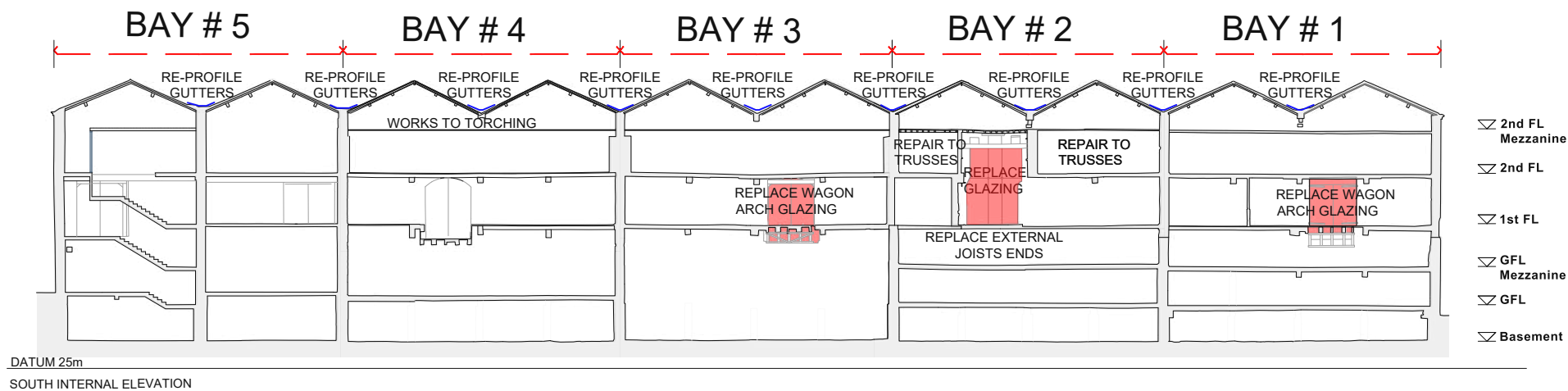
LOGISTICS PLAN: ROOF WORKS 1:400 @ A3 1:200 @ A1

R = Ridge
RWVG = Rainwater Valley Gutter
RWPG = Rainwater Perimeter Gutter

- KEY**
- Contractor's access to roof hatches/ structural glass
 - Alternative emergency egress only
 - Fence line during scaffold installation.
 - Outline of scaffold.
 - Scaffold Zone.
 - Works Access Zone.
 - Temporary Edge protection and debris netting
 - Internal, Hoarding zone by contractor
 - Bays 1&2 wind draft and dust proof
 - Bay 3, Wind, draft and dust proof / insulation

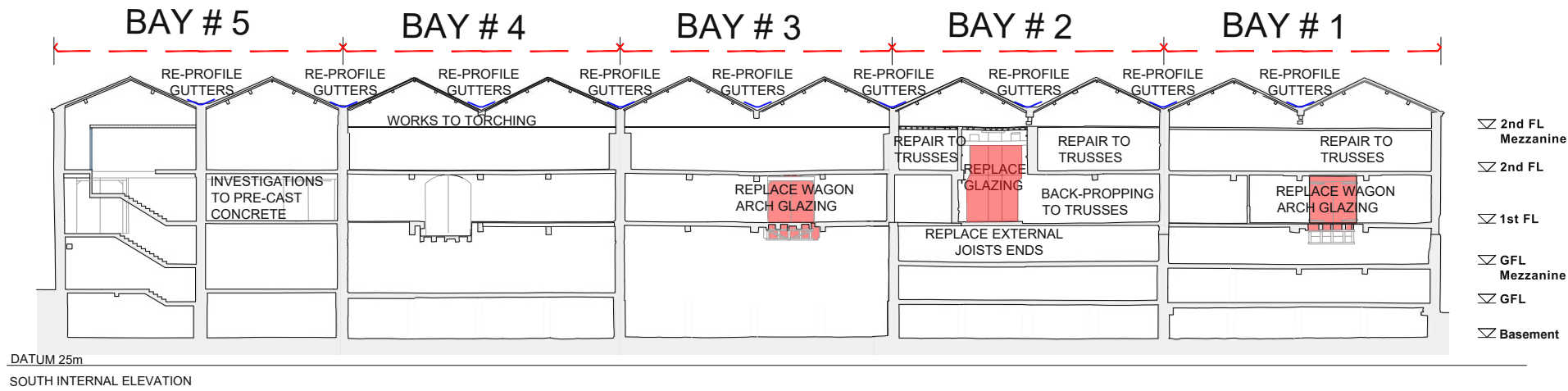


BASED ON MEASURED SURVEY BY GREEN HATCH, 2018			
JOB TITLE Glazing Project, Safe Roof Access and Conservation Repair, 1830 Warehouse, Science & Industry Museum M3 4FP	JOB NO. 275	DRWG. TITLE Logistics Plan: Roof Works	STATUS RIBA Stage 4
DRWG. NO. 275 / PD / 05 (A1 ORIGINAL FORMAT)	REV. 1:400@A3 1:200@A1	SCALE	DATE 10/02/23
Studiodownie TEL: +44 (0) 20 7299 7766 info@studiodownie.com All dimensions to be checked on site by the Contractor and confirmed with the Architect prior to construction. Do not scale off this drawing.			



- MC temporary works (design,review,install)
 - MC set up site compound
- FIRST FLOOR (VIADUCT TRACKSIDE LEVEL)
- MC-CPD Wagon arch glazing submittals
- BASEMENT
- repairs to metalwork
- INTERNAL/EXTERNAL LEVELS - SPOT ITEMS
- external brick repairs
 - external stone repairs
 - external works to windows sills

8 May to 7 July: works Phase A
8 July to 16 July: no works due to scheduled events



- ROOF LEVEL
- re-profile gutters
 - install safe access to roof hatch
- SECOND FLOOR
- works to Torching in Bay 04
 - repair to Trusses in Bay 01 and Bay 02
 - investigation to internal concrete repair
 - investigation to soffit Bays 1-3,5.
 - investigation to internal concrete repair
 - M&E isolation, disconnection, make good.
- FIRST FLOOR (VIADUCT TRACKSIDE LEVEL)
- re-profile wood sills / **metal bars**
 - replace external joist ends to Bay 01 and Bay 02
 - replace Wagon Arch Glazing Bay 01-03
- BASEMENT
- decorations to metalwork
- INTERNAL/EXTERNAL LEVELS - SPOT ITEMS
- internal/external brick repairs
 - external stone repairs
 - internal timber repairs
 - external works to windows sills
 - replace external sills to cargo doors
 - redecorate external downpipes

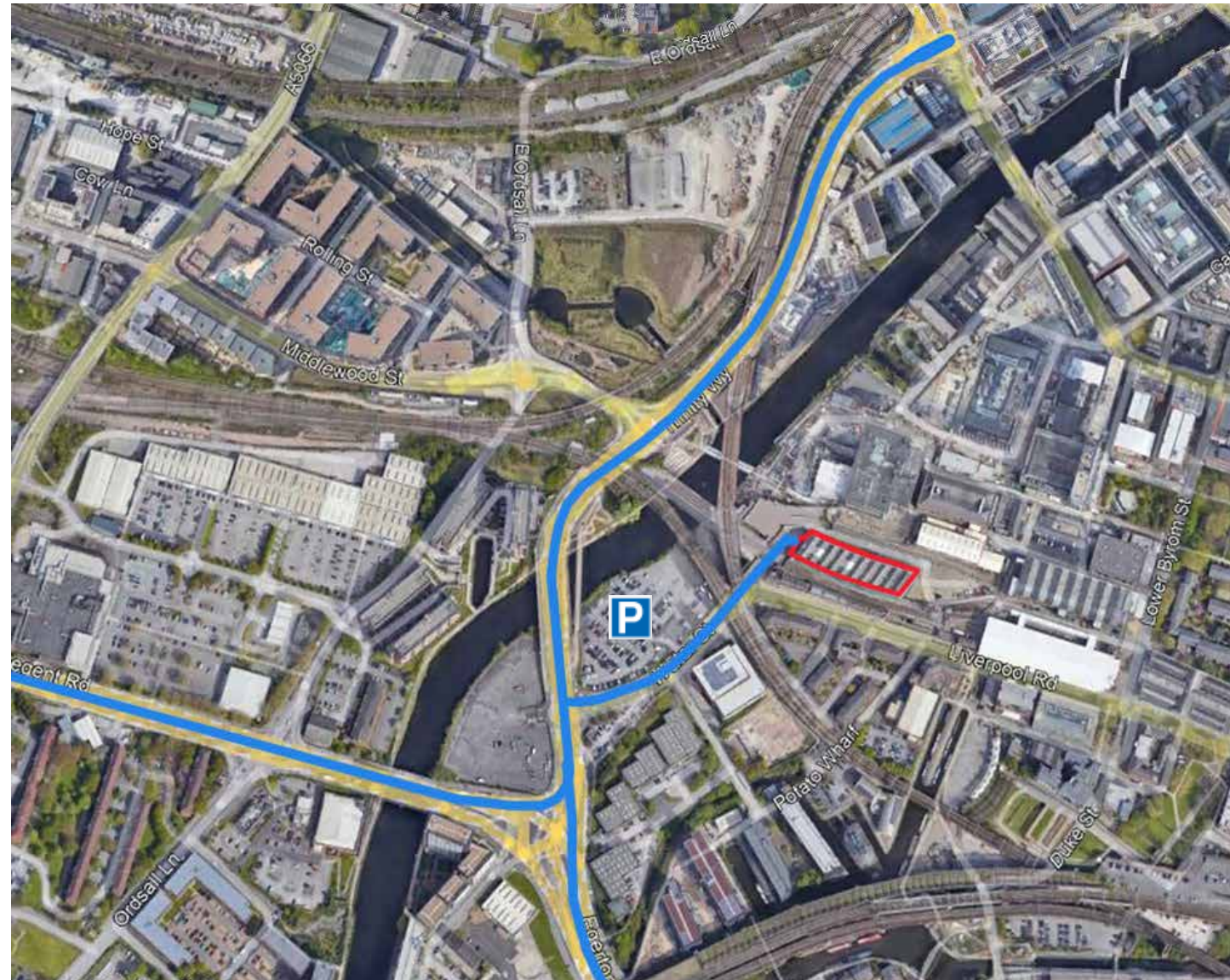
17 July to 7 October: works Phase B
7 October to 8 October: no works due to scheduled events
8 October to 31 October: limited works can be carried out due to client relocation

INTERNAL SECTION: PHASES FOR LOGISTICS 1:400 @ A3 1:200 @ A1

BASED ON MEASURED SURVEY BY GREEN HATCH, 2018				
JOB TITLE Glazing Project, Safe Roof Access and Conservation Repair, 1830 Warehouse, Science & Industry Museum M3 4FP	JOB NO. 275	DRWG. TITLE Internal sections - Phases for Logistics	STATUS RIBA Stage 4	
		DRWG. NO. 275 / PD / 06 (A1 ORIGINAL FORMAT)	REV: JP	SCALE: 1:400@A3 1:200@A1
Studiosdownie	TEL: +44 (0) 20 7299 7766 info@studiosdownie.com	All dimensions to be checked on site by the Contractor and confirmed with the Architect prior to construction. Do not scale off this drawing.		Drawn by: JP DATE: 10/02/23
ARCHITECTS LLP				

- **Appendix 3 Traffic Management**

Traffic Management Plan for 1830 Warehouse



Notes

- Delivery times will be restricted to before 10am when the museum is open.
- Delivery restriction in place to avoid disruptions to local business & surrounding residents.
- All contract/ operative deliveries MUST be arranged & agreed with the site manager or site supervisors.
- Prior to deliveries accessing the site suitable arrangements will be made for the vehicle to be guided to & from site by banks man.
- Delivery procedure will be issued to contractor's supply chain involved in the project.

Key

-  Contractor Parking at Pay & Display on Liverpool Road.
-  Main vehicle route to site for deliveries and collections.
All vehicle types.
-  Project perimeter.

- **Appendix 4 Programme**

[illegible]

- **Appendix 5**
Methodology for Temporary Works

Methodology for Temporary Works

Design Approach

- Several options for a scaffold solution were considered during the course of the project design. This enabled the relative merits of each scheme to be considered alongside the operational requirements of the Museum and the structural and heritage constraints of the building.
The options considered had to factor in:
 - The high designated grade of the listed building and thus high sensitivity of its materials.
 - The inherent structural qualities and relative heritage values of the exterior brick fabric and mortar joints and the largely cobbled nature of the surrounding yard areas.
 - The need to keep the 1830 Warehouse in use during works.
 - The need to maintain clear and safe access through and around the building during works for staff and members of the public.
- The facing brickwork of the 1830 Warehouse is a significant aspect of its aesthetic and material evidential interest. This is embodied particularly in the brick materials themselves, the quality of their faces and the bond of the brickwork with details at openings, corners and parapet. The pointing of the brickwork is considered of some merit but is, across the building, in poor condition with multiple areas of patched mortar. The mortar joints were considered less sensitive to temporary interventions than the facing historic brickwork. Where a tie into a brick is unavoidable due to strength requirements and efficiency of design, the contractor will (as previous phases) follow the careful refilling of the hole with a mix of brick dust and mortar.
- The temporary works design to the south elevation will be a buttressed design with a system of tie bolts set into the mortar joints to secure a scaffold structure. This option:
 - Removes the need for substantial cross bracing that would be required of a free-standing scaffold.
 - Minimises the stability issues arising from the inherently uneven surface to the adjacent railway tracks.
 - Leaves no remnant structural fixings or materials within the wall fabric following dismantling of the scaffold.
 - Impacts mortar joints and pointing rather than the primary building material - bricks except where unavoidable and in all cases a sensitive 'repair' will be made.
 - Enables the continued and ongoing use of the building through works, and free movement through the surrounding areas.
- Following completion of the works the scaffold and related fixing tie bolts will be removed and the facades of the building made good. Mortar repairs and re-pointing form part of the schedule of works, suitable mortar finish and colour will be established during the course of the works.
- The scaffold is essential to facilitate the essential repair of this listed building. There is high heritage benefit in securing these repairs. The impacts to the facing brickwork and mortar joints will be small in scale (considered over the building as a whole) and temporary with no long term change to the aesthetic of the building – this factors in careful mortar matching and the other brickwork façade repairs that are also part of the project schedule.

Specification

- The approach is a largely buttressed with the specification and quantity of ties developed by the scaffold designer to be minimal in number and detailed into mortar joints to minimise invasive work which can be sympathetically repaired without harm to the fabric.
 - Scaffold standards and ties
 - Scaffold screw installation PIS method statement
 - Scaffold screws, zinc, weld, bending check
 - Apollo Bolts, SC05, SC06, SC07
 - Nylon scaff plug
 - Scaffold Hooks
- Large elements of buttressing designed within the scaffold installation.
- Minimal ties into the external walls through mortar joints or through bricks,

- Does not disturb existing facing brickwork, There will be no alterations to the physical façade other than the tie hole mortar repairs and these will be sympathetically remediated to match the current mortar types and make-up.
- On completion, the ties will be removed and repaired with mortar to match the existing.
- Where there are fixings to the façade these locations will be carefully chosen and will also coincide with mortar joints in the brick façade.
- On dismantling, mortar bed repairs will be mixed to a colour and a constituent material matched mortar repair to the tie location once removed.

Methodology

- Materials will be stockpiled on the viaduct and loaded to scaffolder's loading sequence which will be:
 - Using HIAB sequence of loading of materials & HIAB Risk Assessment.
 - HIAB Risk Assessment as attached to be followed in respect of task specific hazard.
 - Daily Safe start to capture site specific or environment hazard, routes and interfaces before commencement.
- Materials within the capabilities of the machine to be relocated to work areas and off loaded
- The scaffolding will be erected in a logical and measured fashion to ensure continuity and care is taken during the critical erection phase of the scaffolding.
- The façade will be carefully inspected by the Temporary Works Designer to set out suitable locations for the nylon scaffold tie fixing and also for any window reveal friction ties.
- Due to the overall cautious approach to the works that need both care and attention given the Grade 1 listed nature of the project in order to minimise harm to the existing façade of the building there are large elements of buttressing designed within the scaffold installation to allow for minimal ties fixing to the building. Where there are fixings to the façade these locations will be carefully chosen and will also coincide with mortar joints in the brick façade.
- The scaffolding as it is sequentially stripped in the same manner as it was erected the contractor will have specialist heritage masons in attendance to make up a colour and a constituent material matched mortar repair to the tie location. This will be carefully installed to the tie location as per the other mortar repairs in previous phases.
- There will be no alterations to the physical façade other than the tie hole mortar repairs and these will be dealt with, with care and attention and sympathetically to the current mortar types and make-up.
- Detailed methodology follows on the following pages.

Quality Control;

- The specification and drawings will be adhered to fully. Any potential deviation or requirement to deviate will be fully discussed with design team taking on all comments regarding suitable solutions.
- Prior to the works being carried out in the particular location it will be photographed extensively to form part of the repair/remedial report and form part of the final records of the works.
- All stages of the methodology will be followed and adhered to.
- Upon completion of the repair work the area will then be photographed to form the final part of the repair/remedial report of the works.
- All evidence of the repair will be submitted to the design team electronically and also offered for physical inspection on site.

PRECEDENT ILLUSTRATIVE EXAMPLE: TIE BEING UTILISED



Image of system in use on listed building, (above) the narrow walkway close to the building, and (below) self tapping anchor eye-bolt fixed through mortar as a reversible fixing



(above) right hand side the horizontal scaffold pole abuts the building and is hooked on (below) into the bolt to minimise contact with the fabric



Erection of access scaffolding

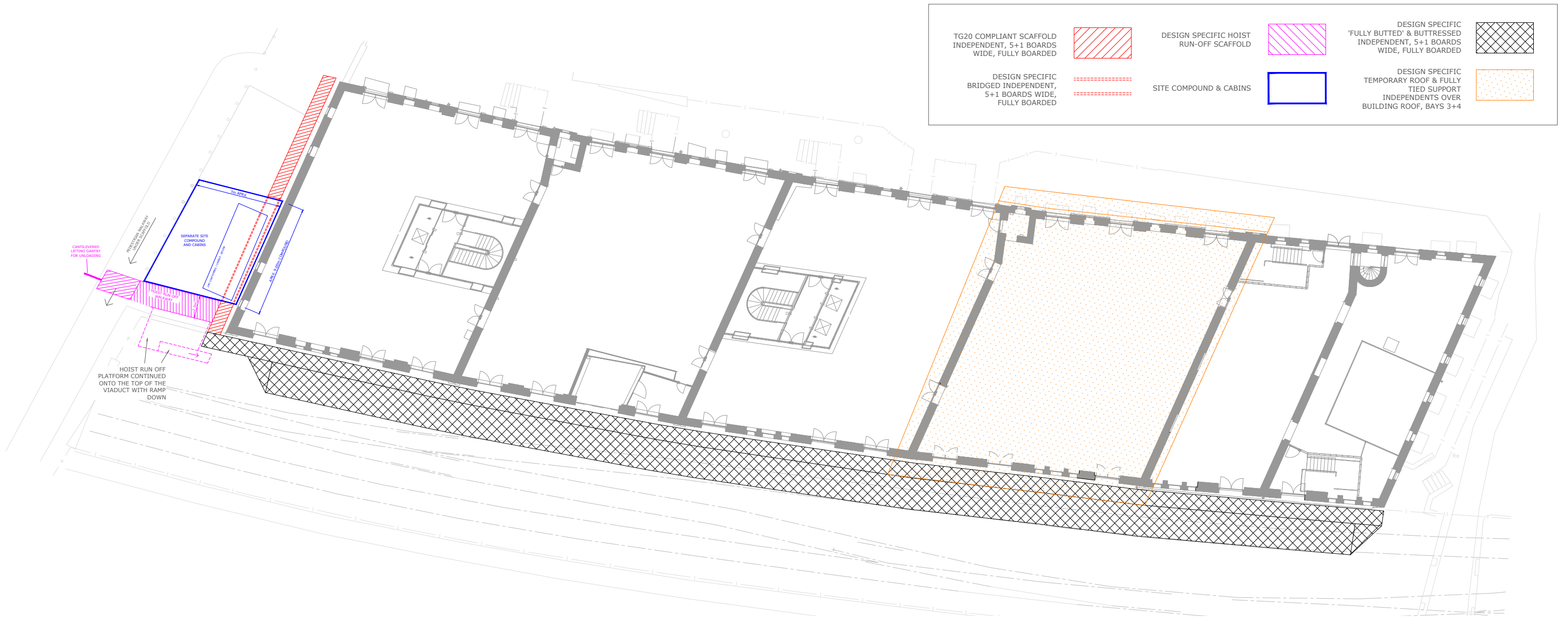
- Scaffolders will operate in 2-man teams. When erecting and dismantling any scaffolds. Only one Scaffolders at any one time working on the scaffold erecting or dismantling scaffold. The 2nd scaffolder will lay materials out in front of the scaffolder when erecting and remove materials from behind the scaffolder.
- MC to segregate all working areas to eliminate other trades working in the same areas
- Scaffold standards to be positioned to be set on base plates and sole pads/sleepers.
- Standards to be connected with ledgers and transoms at kicker lift level.
- Transoms to be positioned on ledgers to suit the boarding maximum 1200 metre centres.
- Once kicker lift is constructed including the double guardrail and toe-board this to be erected standing on ground level at all times. Boards are then to be placed to kicker level.
- 1st lift level to be constructed from the fully boarded, hand railed and toe boarded kicker lift.
- Ledgers and transoms are to be placed as per kicker lift level once complete safety step is to be used to fix the next level top handrail and mid-rail.
- Safety step to be placed on kicker lift top guard-rail with then scaffolder to clip their harness on to the back ledger before accessing the step.
- Double couplers are to be placed on the uprights so as both rails can be fitted once couplers are in place. The rails are to be fixed in the uprights with all fittings tied off and sleeves positioned where required to join the guardrails these also to be tied off from the safety step.
- Once all the next level guardrail is positioned the boarding can be placed to this level from the kicker lift level below.
- Once all boarding complete the ledger bracing is to be installed before any access to the level above.
- Once all bracing is complete, access can be gained to next level by safe means i.e. stair-tower or ladder access working from the access lift to be completed with toe board's ladder hatch/gate before any materials are passed onto the scaffold.
- All further levels to be constructed as per the detail above
- All ties will be pulled tested with certification passed onto MC site manager.
- No netting to be attached to the scaffolding until the scaffolding has been inspected and all ties are in place.
- Complete scaffold will be checked handed over and scaff-tagged as complete with certification issued to MC.

Dismantle of access scaffolding

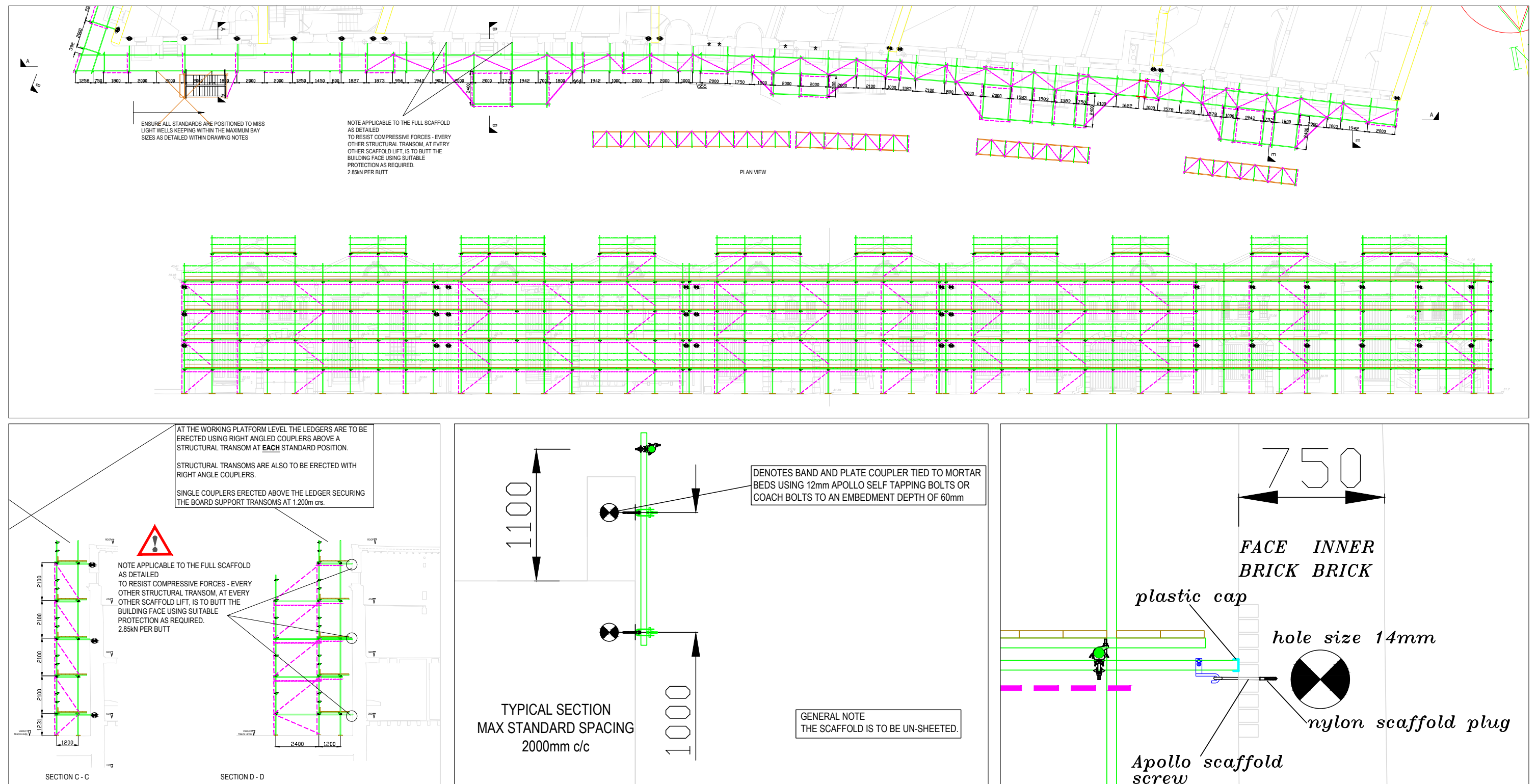
- Scaffolders will operate in 2-man teams. When erecting and dismantling any scaffolds. Only one Scaffolder at any one time working on the scaffold erecting or dismantling scaffold. The 2nd scaffolder will lay materials out in front of the scaffolder when erecting and remove materials from behind the scaffolder.
- MC to segregate all working areas to eliminate other trades working in the same areas.
- All scaffolds to be cleaned off before any works commence.
- Complete scaffold will be checked handed over and scaff-tagged "Do Not Use" with certification issued to MC.
- The top lifts can now be dismantled off the fully boarded lift following proceeding repetitively in adherence to risk controls for SG4:10 and work at height compliance as stated within the risk assessment section to the height required.
- Equipment from upper levels will be transported using 2 potential methods either by hand to operative below at ground level or locating the materials or stillages to a safe position. The controls specified in the risk assessment for manual handling, telehandler movements, demarcation and communication to be followed.
- All scaffold to be checked before the dismantling of each lift, i.e. all ties and bracing are in place.
- Once this has been carried out the lift can now be dismantled in accordance with SG4:15.
- On the scaffold dismantle the first operation will be to remove the boards from the level below.
- Once all boards are removed the scaffolder is to use the scaffold step to remove the higher level guardrail. Whilst on the scaffold step the scaffolder is to be clipped on at all times.
- Once the higher handrail tube is removed from the higher level the fittings that supported the handrail are to be removed.
- The scaffold level can now be dismantled and removed from the platform. All handrails and toe boards are to be left in place and secure whilst dismantling platform.
- Once the scaffold level and ties have been fully dismantled this also to include all sway braces.
- The toe-board is to be removed as the first operation of the edge protection removal.
- Once the toe-board has been dismantled and removed from the platform. The mid-rail is to be dismantled and removed. Once the mid-rail is removed the fittings supporting these are to be removed.
- If any operation on the boarded level requires kneeling or bending down below the top rail once the mid-rail has been removed then harnesses will need clipping to the top rail at all times.
- The top guardrails will be left in place with all fittings secured at all times.
- Repeat to 1st lift.
- The ledgers and standards and transom together with doubles to make a rectangle, which formed the first lift can then be removed
- The base plates on sole pads at ground level can be removed.

Erecting & dismantling of haki staircases to independent access scaffold.

- Scaffolders will operate in 2-man teams. When erecting and dismantling any scaffolds. Only one Scaffolder at any one time working on the scaffold erecting or dismantling scaffold. The 2nd scaffolder will lay materials out in front of the scaffolder when erecting and remove materials from behind the scaffolder.
- MC to segregate all working areas to eliminate other trades working in the same areas
- The haki staircase access scaffold will be erected off sole boards standards placed on base jacks.
- The ledger beam can be connected to higher level pockets and connect transom to same standard then next standard connected to transom and erect ledger until complete kicker lift is erected and levelled.
- Entrance step and landing placed over ledgers to square tower up then fit guard frames to standards
- Erect lifts to suit stair flights handrails to be erected from lift below
- Stair landing to next level placed over ledgers and pushed away now stair flight can be positioned vertically and located into slots of bottom landing then lower stair flight until top flight is fully located into top landing platform.
- The scaffolder will clip their lanyard to the inside ledger, then erect the top handrail post to landing then erect stair handrail into posts and engage locking catches
- Erection platform to opposite end to landing now next lift can be erected to suit next flight of stairs.
- Once scaffold reaches full height a small platform will be erected onto the scaffold.
- Haki staircase to be tied to the main steelwork using girder clamps in pairs.
- Haki staircase to be erected and tied as per manufacturer's guidelines
- All control measures referenced both internal & external will be followed.
- Once complete scaffold will be inspected tagged complete with certification passed onto MBC site manager.
- The process in reverse on dismantling.



INDICATIVE GENERAL ARRANGEMENT OF SCAFFOLDING



INDICATIVE ILLUSTRATION OF SCAFFOLD TO SOUTH ELEVATION



Product Information Sheet and Pictorial Installation guide for the Apollo Scaffold Screw System

Nylon Scaffold Screw System, Installation Procedure

Installation when the structure to be fixed into is visible

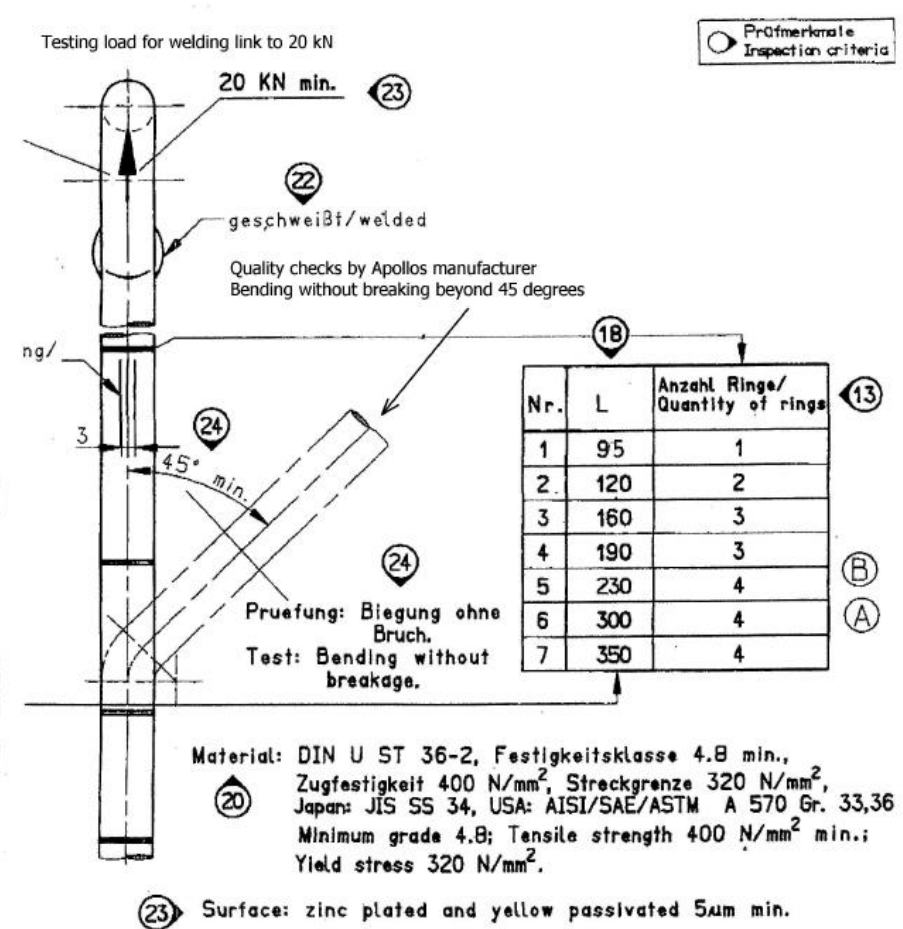
1. Choose the correct plug length and style.
The 70 mm length is considered suitable when fixing directly into brick, stone, granite, concrete most mortar joints and blockwork.
Plug lengths of 75 mm or 80 mm are not suitable alternatives and will have an adverse effective on performance and disrupt the setting procedure.
Plugs that do not have a collar are also not suitable as the collar not only controls where the expansion takes place but also assists in the correct setting of the system. Plugs without a collar can be pushed down the hole without intention when the screw is offered too the plug immediately prior to expanding it.
When a structure has been rendered or has rough cast use a plug length that provides a minimum but optimum embedment into the structural material of 70 mm.
2. Select the position that the hole is to be drilled by offering the tube to the structure whilst in contact with preferably 2 no. standards or ledgers.
(The position is determined by the type of scaffold hook being used).
Drill a 14mm diameter hole clearing as much dust as possible. Drill the hole to a depth of 15 mm longer than the plug length. This means that you do not have to blow the dust out of the hole.
3. Install plug into the hole until the plug collar is flush with the surface. When installing into mortar joints ensure that the expansion is in the direction of the brickwork / blockwork*.
4. Select the scaffold screw. Before screwing it into the plug identify the correct depth marking on the shank of the screw.
The correct depth marking is established by holding the plug alongside the scaffold screw with the both ends level. The top of the plug will line up with the appropriate depth markings.
Where allowed there are three depth markings but a fourth one will be introduced during 2012.
Screw the screw into the plug. After a few turns it will be difficult to screw it in by hand and a scaffold spanner handle can be placed through the screw eye.
Continue screwing until the correct depth mark is level with the plug collar. Stop screwing in the screw.
Over screwing does not improve the strength of the fixing.
Over screwing may take the screw to the bottom of the hole were if screwing continues on screw lengths of 230 mm or more it increases the risk of the screw shearing.
5. Installation complete. Whenever the tube butts up to the front of the screw ensure that the fixing and tube are perpendicular or close too perpendicular to the wall so compressive forces can be accommodated*.

*For further information contact Apollo.

Fax: 01527 64999 Apollo Construction Products Tel: 01527 63999



Product Information Sheet for Apollo Scaffold Screws



Fax: 01527 64999 Apollo Construction Products Tel: 01527 63999



Anchor systems

Apollobolt self tapping anchor for concrete and most masonry substrates

Diameters from 6 mm to 20 mm
Lengths from 35 mm to 200 mm



No plugs or inserts.

The Apollobolt self taps and cuts its own thread into concrete, granite and brickwork. They are also suitable for blockwork, mortar joints and sandstone.

This concept is an established principle within the fixing and fastening industry. Using threads in metals is standard practise for fastening within the engineering industry, as is using woodscrews to cut their thread into wood within the construction industry.

The Apollobolt offers the engineer a stress-free fixing that can be installed nearer to edges and closer together and at varying embedment depths. The Apollobolt performs well in a variety of solid and hollow substrates, is simple to install and is totally removable. An extremely versatile anchor, the Apollobolt offers good load carrying capacity for more arduous applications and is very cost effective.

The Apollobolt in scaffolding applications

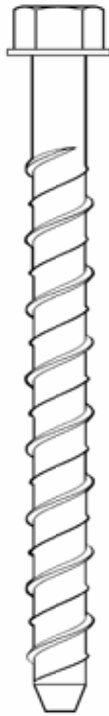
To connect a scaffold tube to an Apollobolt use either of the options displayed on the next page.

Purchaser and installer benefits

- You have a product that is suitable for most substrates.
- Its removable so you should not have too consider stainless steel when long term staining and rusting could become an issue.
- Easier to install than the traditional insert: no special setting tools, just clamp your fixture and the anchor is installed. Torque settings are only important when either 6 or 8 mm diameters are being used, as they may be over tightened or when a high load will be exerted onto the anchor (about 50% off the average failure load of the anchor).
- You can drill three 12 mm holes in the time it takes to drill a 20 mm hole
- Battery drills will become more efficient with a significant reduction in drilling time and more holes per battery.

Benefits over the traditional 16 mm internally threaded systems

- Stronger in place anchor than the traditional M16 system, re: most masonry substrates
- No critical setting procedures
- Provides low in place costs
- Quicker to install than the traditional insert
- Can be positioned substantially closer to a concrete edge
- Can be used in brickwork, sandstone and blockwork



Fax: 01527 64999 Apollo Construction Products Tel: 01527 63999

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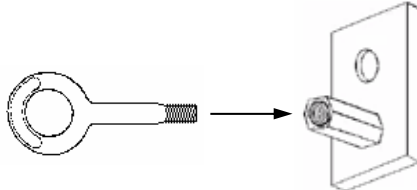


Anchor systems

Brackets and scaffolding applications for the Apollobolt self tapping anchor

Masonry brackets

See catalogue pages 8 and 9 for further information.



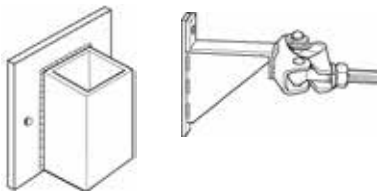
Masonry tie clips

See catalogue page 16 for further information.



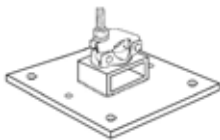
Edge Protection Brackets

See catalogue pages 14 and 15 for further information.



AST Shear tie brackets

See catalogue page 19 for further information.



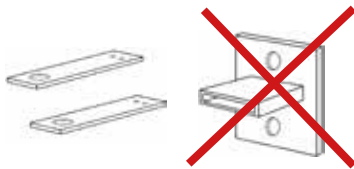
Panel brackets for thin concrete panels

See catalogue page 17 for further information.



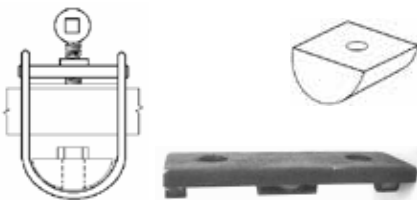
~~M16 system for fastening concrete~~
stonework, cladding boards and other thin joints

See catalogue page 18 for further information.



One and two hole band washers

The Apollo band washer programme can be viewed on catalogue page 49.



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Anchor systems

Apollobolt self tapping anchor for concrete and most masonry substrates

Diameters from 6 mm to 20 mm: Lengths from 35 mm to 200 mm

Performance data in C20/25 concrete

Anchor and hole diameter		6 mm		8 mm		10 mm		12 mm		16 mm	
Embedment Depth mm		30	45	40	60	50	75	60	90	80	120
Average Ultimate Load kN	Tension	8	16	12	24	18	35	25	52	40	72
	Safe Working Load kN	2	4	3	6	4.5	9	6.5	13	8	18
Average Ultimate Load kN	Shear	10	14	24	30	40	50	54	60	79.34*	
	Safe Working Load kN	2.5	3.5	6	7.5	10	12.5	13.5	15	19.84	
Normal Edge		Tension		60		60		80		90	
Distance (mm)		Shear		80		9		120		140	
Normal Spacing (mm)		Tension		100		120		170		200	

*Characteristic load. Performance values refer to the Hex head bolt style only. For performance data for other head styles and the hex head 20 mm diameters please call our technical services team.



Edge distance reduction factors for concrete, C20/25

Size mm	Edge mm	20	30	40	50	60	70	80	90	100	110	120	130	140	200	220	240
6	Tension	0.56	0.59	0.73	0.86	1.00											
8		1.58	0.72	0.86	0.93	1.00											
10			0.39	0.52	0.64	0.77	0.90	1.00									
12			0.52	0.60	0.69	0.77	0.85	0.92	1.00								
6	Shear	0.35	0.52	0.70	0.78	0.85	0.92	1.00									
8				0.32	0.40	0.48	0.65	0.83	1.00								
10						0.33	0.39	0.51	0.63	0.76	0.88	1.00					
12								0.32	0.36	0.48	0.61	0.74	0.87	1.00			
16								0.19						0.51	0.76	0.87	1.00

Spacing reduction factors for concrete, C20/25

Size mm	Distance mm	20	30	40	50	60	70	80	90	100	110	120	140	170	200	220	240
6	Tension		0.52	0.59	0.66	0.73	0.80	0.86	0.93	1.00							
8				0.78	0.81	0.84	0.87	0.89	0.92	0.95	1.00						
10						0.69	0.70	0.70	0.71	0.72	0.72	0.73	0.84	1.00			
12						0.76	0.77	0.77	0.78	0.78	0.78	0.79	0.85	0.92	1.00		
6	Shear					0.35	0.52	0.70	0.78	0.85	0.92	1.00					
8							0.32	0.40	0.40	0.48	0.65	0.83	1.00				
10								0.33	0.33	0.39	0.51	0.63	0.76	0.83	1.00		
12									0.32	0.36	0.48	0.48	0.61	0.74	0.87	1.00	

For performance details into brickwork, blockwork, sandstone and mortar joints please contact our technical services who have knowledge of anchoring into these substrates.

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Apollo Nylon Scaffold plugs
Manufactured from polyamide PA6 (nylon)



Apollo only supply scaffold plugs manufactured from high quality polyamide PA6. A scaffold plug differs in design and length to a standard nylon plug. A scaffold plug has a collar and when the plug is positioned in the hole the collar is flush with the surface. It provides control where the expansion of the plug takes place. It also provides a permanent visual guide to a correctly set scaffolding tie that should produce consistency in performance.

Genuine and dimensionally suitable scaffold plugs are only available in lengths of 70, 100, 135 and 185mm. Plugs without a collar are not suitable. They are not recognised as part of the system and a non collared plug will effect the consistency of setting.

Plug lengths of 75 and 80 mm are not suitable for any scaffold screw system as they do not allow a visual guide to the correct setting of the system during or after installation and are therefore likely to offer lower and inconsistent in place tensile loads.

Nylon, the optimal material for the Fastening world

Apollo nylon scaffold plugs are made from high grade Polyamide PA6. Due to its excellent characteristics PA6 can be described as the most valuable material in the fastening world.

- Large temperature range of – 40 C up to + 100 C
- Absorption of humidity results in high mechanical features such as impact strength and resistant to distortion
- Minor in flammability and is self-extinguishing
- Plugs are suitable as a safe means of mounting in dynamic loads (pulsating, shock and alternative)

Sound absorption and solidity under temperature influences

PA6 absorbs sound transmissions between construction unit and building material.
PA6 exhibits higher strength under temperature influences compared with conventional plastics.

Long term stability, deformation and the potential of ‘creep’

Deformation, distortion or ‘creep’ as referred to in certain documentation is a potential characteristic of polyamide PA6 which means that movement after installation is possible but not in western Europe. The potential movement equates to up to a maximum of 0.7 mm over a period of 10 years when subject to conditions that promote creep. TG4:11 states that an anchor used for restraining scaffolding can move by up to 1 mm before it is deemed to have failed and as the maximum potential movement over a 10 year period if exposed to the conditions that promote creep is 0.7 mm then Apollo’s supplier does not recognise creep being an issue or its effect on performance for installations remaining in place for up to 10 years. Even for installations that remain in place for 10 years creep may not be an issue.

Creep may develop when the weather conditions offer little or zero humidity a phenomenon that is not likely to exist in western Europe. Plastic plugs or low grade polyamide have a substantially higher deformation rate of 0.8 mm within one month and up to 2 mm over a 10 year period. The features detailed above (impact strength and resistant to distortion) remain key benefits of the genuine Apollo nylon scaffold plug that are relatively ‘thick walled’, another contributor to higher performance. These benefits relate to both the 2 and 3 way scaffold plugs supplied by Apollo. A similar phenomenon can exist in metal anchors* and may be created during installation and probably exists in far more circumstances than those associated with nylon anchors. *Details available on request.

On site and in house tests. Summary of tensile performances obtained.

Material	Strength / style	Embedment mm	Size mm	Average failure tensile loads kN
1. Common Brickwork	Single skin	70	14 x 70	8-12
2. Solid Brickwork	Single skin	70	14 x 70	10-20
3. Concrete	C20-30	70	14 x 70	12-20+

A safety factor of 2 is generally acceptable for scaffolding installations.

For connecting scaffold tubes onto scaffold screws or small diameter eyenuts

The internal hook butts up to the front of a scaffold screw or eyenut. With the hook pulling away this system create little or zero movement.

The external style allows a scaffolding tube to butt up to the structure close to the fixing point.

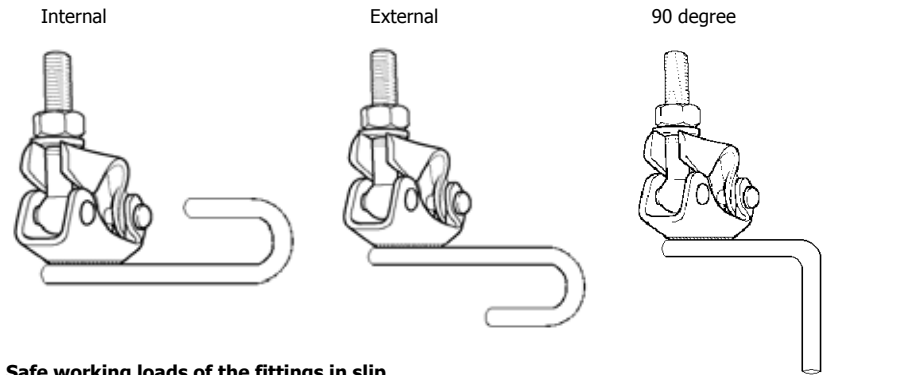
The 90 degree scaffold hook has been designed for ‘across the cavity’ application. Using either the internal or external styles in this application would provide dismantling difficulties once the outer skin to the structure has been constructed.

Hook diameter = 16 mm
Hook formed by cold forming therefore retaining its natural strength.

Coupler and hook connection: the weld is designed to produce a minimum average failure load of 25 kN.

Hook performance: When a scaffold screw is positioned correctly, that is within the curved area, the hook is designed to maintain its minimum tensile strength of 25 kN.

Information relating to the internal and external hooks only.
Should the connection onto the hook be within 10 mm to the end of the hook it will start to bend at 10 kN, rising to 17 kN at approximately 20 mm from the end. (Extract from the independent tests that were carried out by Bodycote’s material engineering). The wide internal curvature (20 mm) that exists on the Apollo hooks provides optimum performance whenever the screw is located in this area.



Safe working loads of the fittings in slip

As per NASC guidelines. Currently; pressed metal 6.1 kN,

Characteristic load performances of the coupler’s
Pressed Metal: 17 kN
Drop Forged; 22 kN

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