

CARMODY GROARKE

Power Hall and
Decarbonisation

Science and Industry
Museum

20th April 2021

Design and Access Statement - Package 1

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This document is intended to be read in conjunction with the following documents which form part of the submission: The Vision Document, Heritage Impact Assessment, M&E strategy

1 Introduction

1.1 Project Aims

1.2 Works Packages

1.3 Project Team

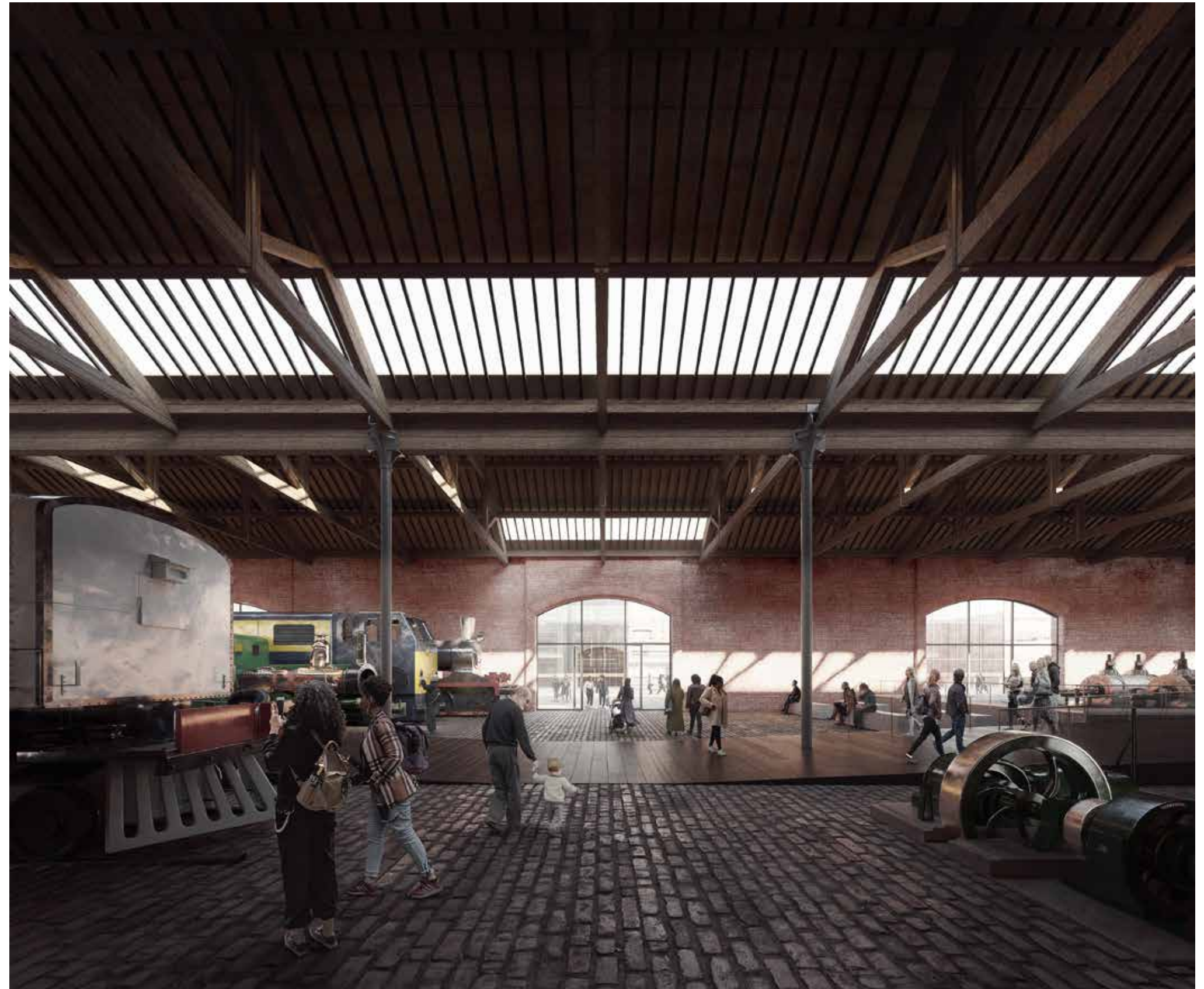
1.4 Context

Introduction

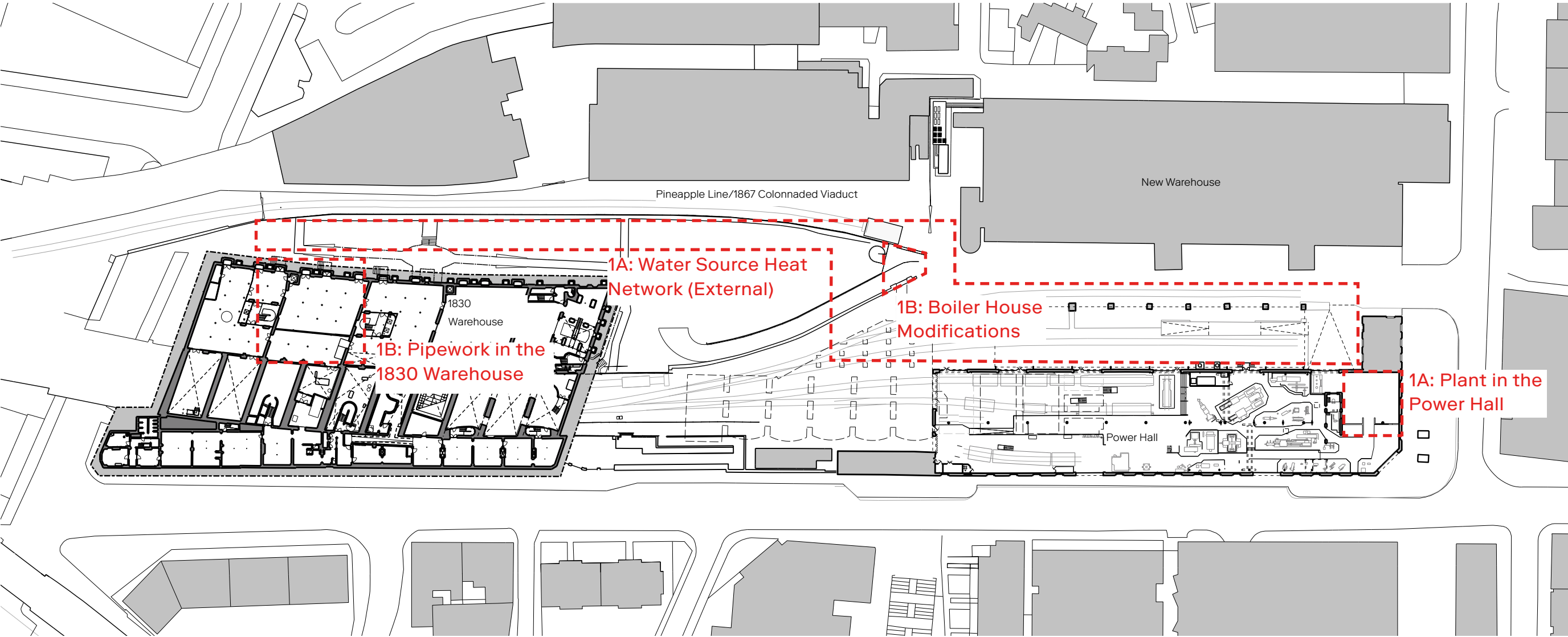
This Design and Access Statement has been prepared to support one of several Listed Building Consent and/or Planning Applications in relation to a new *Power Hall and Decarbonisation* project at the Science and Industry Museum (SIM), Manchester site.

Overall project aims

- Re-open the Power Hall, which was closed to the public for repair work in 2018
- Create a new gallery design with a simple and clear circulation route in the Power Hall which is accessible for all
- Reveal the historic structure of the Power Hall and carry out essential repairs to future-proof the building for years to come
- Install new plant to the Power Hall which will allow recommissioning of some of the steam exhibits
- Install site wide plant to reduce the museum's carbon footprint. Part of a journey towards net zero carbon for the Science and Industry Museum



View of the proposed Power Hall concept



The Power Hall and Decarbonisation project is to be delivered as one project. However, the required Planning and Listed Building Consent applications must be split into several separate applications due to the different Listings of the buildings and the deadlines for the Government’s Public Sector Decarbonisation Scheme which needs to be completed this year. Splitting the consent packages will also allow construction work to start on site earlier and ensure we meet the Government deadlines.

The table across details the timeline for the applications.

Works Package	Package Description	Planning and Listed Building Consent Applications	Submission Date
1A	- Water Source Heat Pump Network (External) - Water Source Heat Pump and associated plant in the Power Hall	Application for Listed Building Consent for alterations to the Grade II Listed Power Hall for the creation of openings and the installation of plant plus the introduction of a services trench within its curtilage.	April 2021
1B	- Boiler House External Modifications (to facilitate installation of a new sub-station) - Pipework in the 1830 Warehouse (to facilitate installation of a new water source heat pump)	- Application for Listed Building Consent for installation of a services trench within the curtilage of the Grade II Listed New Warehouse. - Application for Planning Permission for external works to the Boiler Room including removal of an external staircase and making good in addition to the installation of a new balustrade and new doors. - Application for Listed Building Consent for alterations to the Grade I Listed 1830 Warehouse for the creation of openings and the installation of pipework plus the introduction of a services trench and borehole cover within its curtilage.	
2	Power Hall Roof and 1980s Platform Removal (to allow early investigative work)	Planning Permission and Listed Building Consent	May 2021
3	Power Hall New Roof, Windows & Doors	Planning Permission and Listed Building Consent	May 2021
4	Power Hall Gallery Refurbishment	Planning Permission and Listed Building Consent	Autumn 2021



Special Exhibitions Gallery at the Science in Industry Museum, Manchester



New Architecture Gallery at the Grade II* RIBA headquarters, London



Windermere Jetty Museum, Lake District National Park

This statement has been prepared by Carmody Groarke on behalf of the Science and Industry Museum, Manchester, in collaboration with the design team:

Services Engineer – Max Fordham

Structural Engineer – Conisbee

Quantity Surveyor – Appleyard & Trew

Project Managers - Gardiner & Theobald LLP

Heritage Consultants - Donald Insall Associates

Planning Consultant - Deloitte Real Estate

Carmody Groarke has extensive experience designing cultural projects within historic settings, these include:

- Special Exhibitions Gallery in the grade II listed New Warehouse at the Science in Industry Museum
- New Architecture Gallery at the Grade II* RIBA headquarters, London
- Windermere Jetty Museum, Lake District National Park
- Grade II listed Dorset County Museum, Dorchester
- Grade I listed Tullie House masterplan, incorporating a contemporary vision for a Public Library, Museum and School of Art, Carlisle
- Refurbishment of a Grade I listed artist's house, Norfolk
- Grade I listed Abbot Hall Gallery masterplan, Cumbria
- Waddesdon Manor Pavilion, National Trust and Rothschild Foundation



Grade II listed Dorset County Museum, Dorchester



Masterplan for Grade I listed Tullie House, Carlisle.

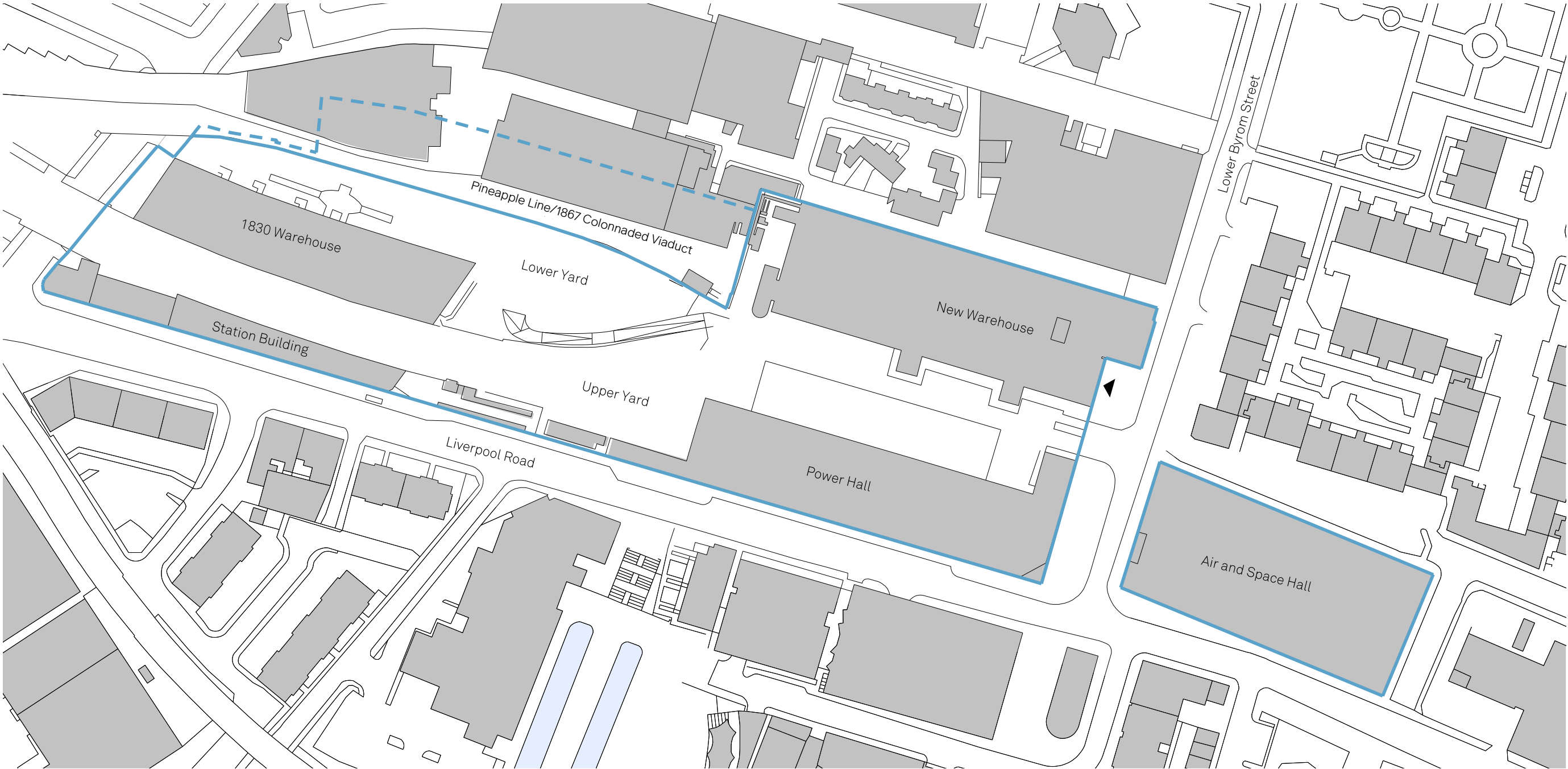


Refurbishment of a Grade I listed artist's house, Norfolk



The Science and Industry Museum is located within the Castlefield Conservation Area, an area with a mixture of visitor attractions, offices and residential uses. A number of new developments are proposed around the Museum boundary, including a new arts complex and mixed use development.

The Science and Industry Museum is situated on the site of a former railway station –Liverpool Road Station – which opened as part of the Liverpool and Manchester Railway in September 1830. The railway yard eventually fell out of use in the 1970s, was purchased by Greater Manchester County Council in 1978 and became the Museum's home in 1983.



The site is formed by a complex of railway structures and buildings and is regarded by Historic England as one ‘of the most significant railway sites in the world’:

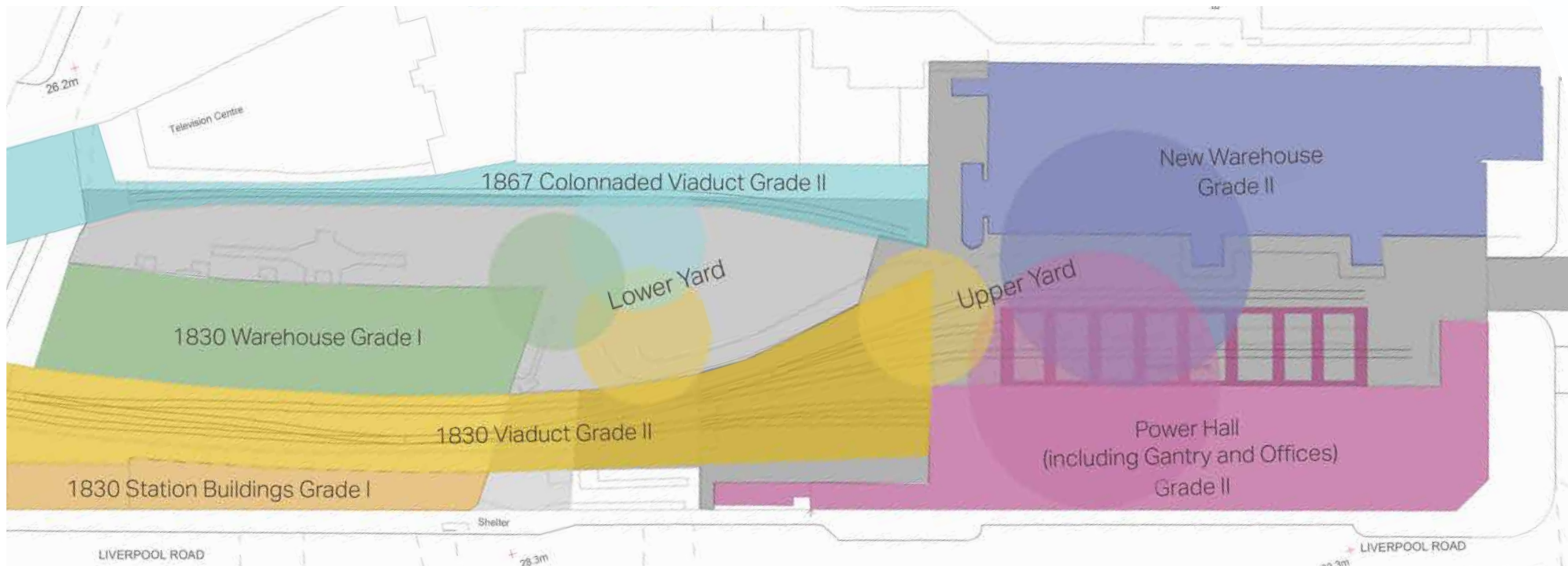
- Grade I listed 1830 Warehouse, the first railway warehouse in the world.
- Grade I listed 1830 Station, the oldest surviving purpose-built railway passenger station.

- Grade II listed 1830 Viaduct, brick railway viaduct connecting the two buildings.
- Grade I listed, Station Master’s House,
- Grade II listed New Warehouse (Former Lower Byrom Street Warehouse).
- Grade II listed 1867 Colonnaded Viaduct (known as the Pineapple line), built in 1867

- Grade II listed Shipping Shed (known as the Power Hall), a transit shed added to the station in 1855
- Grade II listed, Goods Office (New Warehouse)
- Grade II listed Air and Space Hall.

Key

 SIM boundary



Science and Industry Museum Site Curtilage Diagram

The Upper Yard

The Upper Yard was formed following the construction of the 1867 Viaduct and the New Warehouse, this area became a goods yard, characterised by the open space between tall railway buildings, the crane gantry and the rail tracks. Despite its alteration, the Upper Yard retains its identity as a former goods yard.

- The Upper Yard is considered to be of moderate historical, evidential and aesthetic value and forms a key element of the setting of the Grade II-listed New Warehouse, Power Hall and 1830 Viaduct in particular;
- The Upper Yard is curtilage listed in association with the above listed buildings;
- The tarmac surfaces are inappropriate to the otherwise setted and railed Yard, and the plant and 1980s platform visually clutter the space.

The Lower Yard

The Lower Yard came into use in 1830, its western end providing accommodation for carts delivering goods to and collecting them from the 1830 Warehouse and its eastern end serving as a timber and coal yard. These functions remained unchanged when the Lower Yard was reduced in area in 1831 following the construction of the two Cotton Stores. Its character was altered in 1867 following the destruction of these two stores (by fire) and the construction of the 1867 Viaduct.

- The Lower Yard is considered to be of moderate historical, evidential and aesthetic value and forms a key element of the setting of the 1830 Warehouse (Grade I) and 1830 and 1867 viaducts (both Grade II) in particular;
- The Lower Yard is curtilage listed along with

the aforementioned listed buildings;

- The overall form of the Yard is of moderate significance overall and contributes to the setting of the listed buildings;
- The mismatched setts form bands and a 'patchwork' across the Yard and despite their varied age and appearance, collectively they contribute positively to the setting of the nearby listed buildings;
- The tarmac paths and patch repairs detract;
- The large metal ramp (1980s), detracts, as does the car ramp and metal spiral staircase connecting the Upper and Lower yards (1999-2000).

Key

Upper Yard

Lower Yard

Indicative curtilage listing of yards

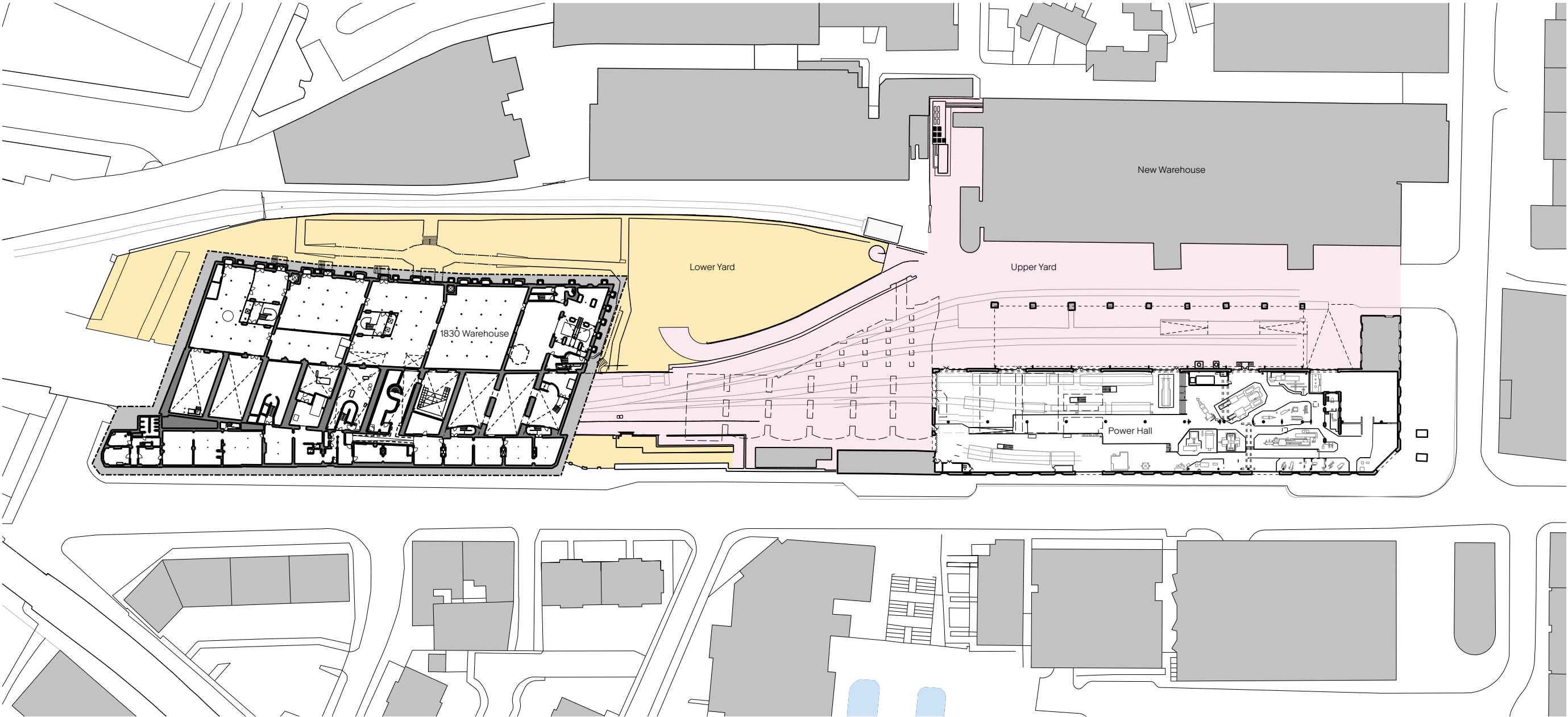
2 Water Source Heat Network (External): Work Package 1A

2.1 Context

2.2 Design Proposals

2.1 Context

2.1.1 Lower and Upper Yards



The Lower and Upper yards are open setted spaces which connect the historic buildings of the Science and Industry Museum, Manchester. Visitors can walk across these spaces to travel between exhibitions.

Key

Upper Yard

Lower Yard



1. Exterior view of the Power Hall at the Eastern end, next to the entrance



2. Exterior view of the Power Hall at the East end, looking towards the platform



3. Exterior view of the Power Hall at the West end, looking East

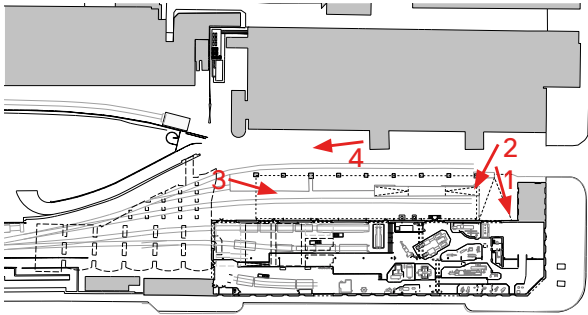


4. View of the Upper Yard looking West, towards the lower yard

The Upper Yard
The Upper Yard is bounded by the New Warehouse to the North, Power Hall to the South and 1830 Viaduct to the West.

The historic electric gantry covers the Southern half of the yard space, running along the length of the Power Hall.

Much of the surface of the yard have a finish of historic setts while areas under the Power Hall gantry and in front of the New Warehouse have been replaced as part of modern interventions. These areas are finished with modern tarmac and concrete pavers which detract. A series of railway tracks, some historic and some relaid, cut across the upper yard and run along the yard.



Key Plan



1. Exterior view of Lower Yard, looking East towards the Upper Yard



2. Exterior view of the 1830 Warehouse, looking West

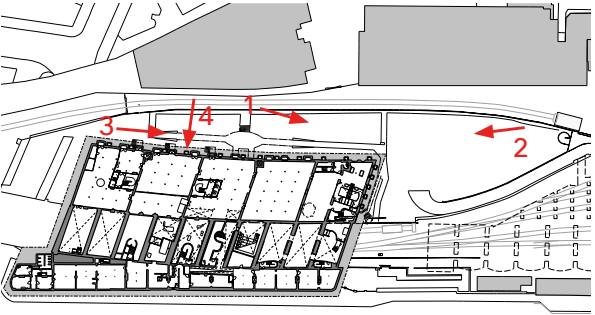
The Lower Yard
A patchwork of setts from different eras covers much of the Lower Yard. Within the yard a new ramped structure, designed to give access to the 1830 Warehouse, sits in front of this building. A modern tarmac finish covers the ramps and adjoining pathways. A modern car ramp connects the Lower and Upper yard, running alongside the Grade II listed 1830 Viaduct.



3. Exterior view of the 1830 Warehouse at the West end, looking East



4. Exterior detail view of the 1830 Warehouse Bay 2



Key Plan

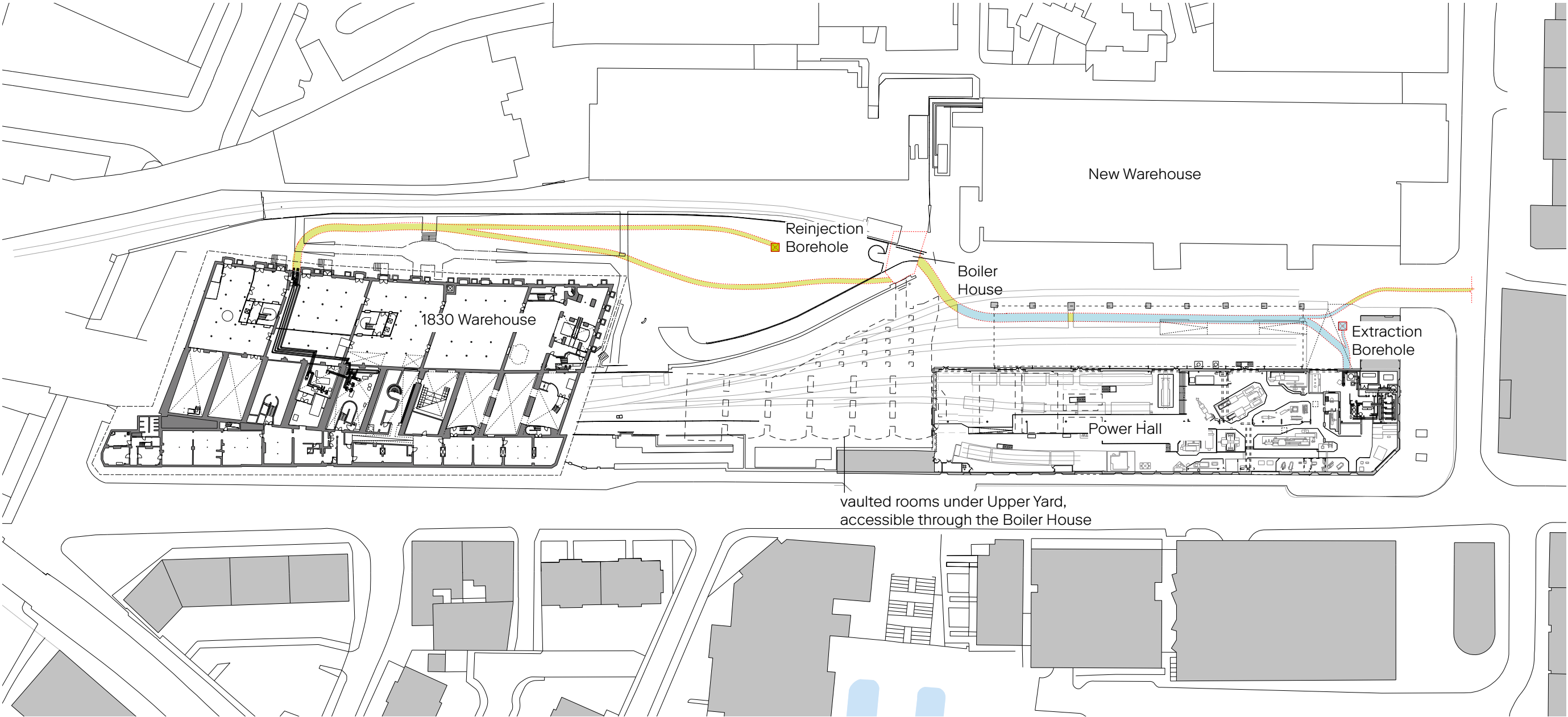
2.2 Design Proposals

2.2.1 Water Source Heat Pump Network

2.2.2 Lower Yard

2.2.3 Upper Yard

2.2.4 Trench Design



Proposed water source heat pump network
The plan above shows the proposed layout of the new water source heat pump network which will supply the Power Hall and 1830 Warehouse with sustainable energy for the future. The East of the site, on the Upper Yard, water will be extracted from a new borehole and it will be reinjected in the Lower Yard.

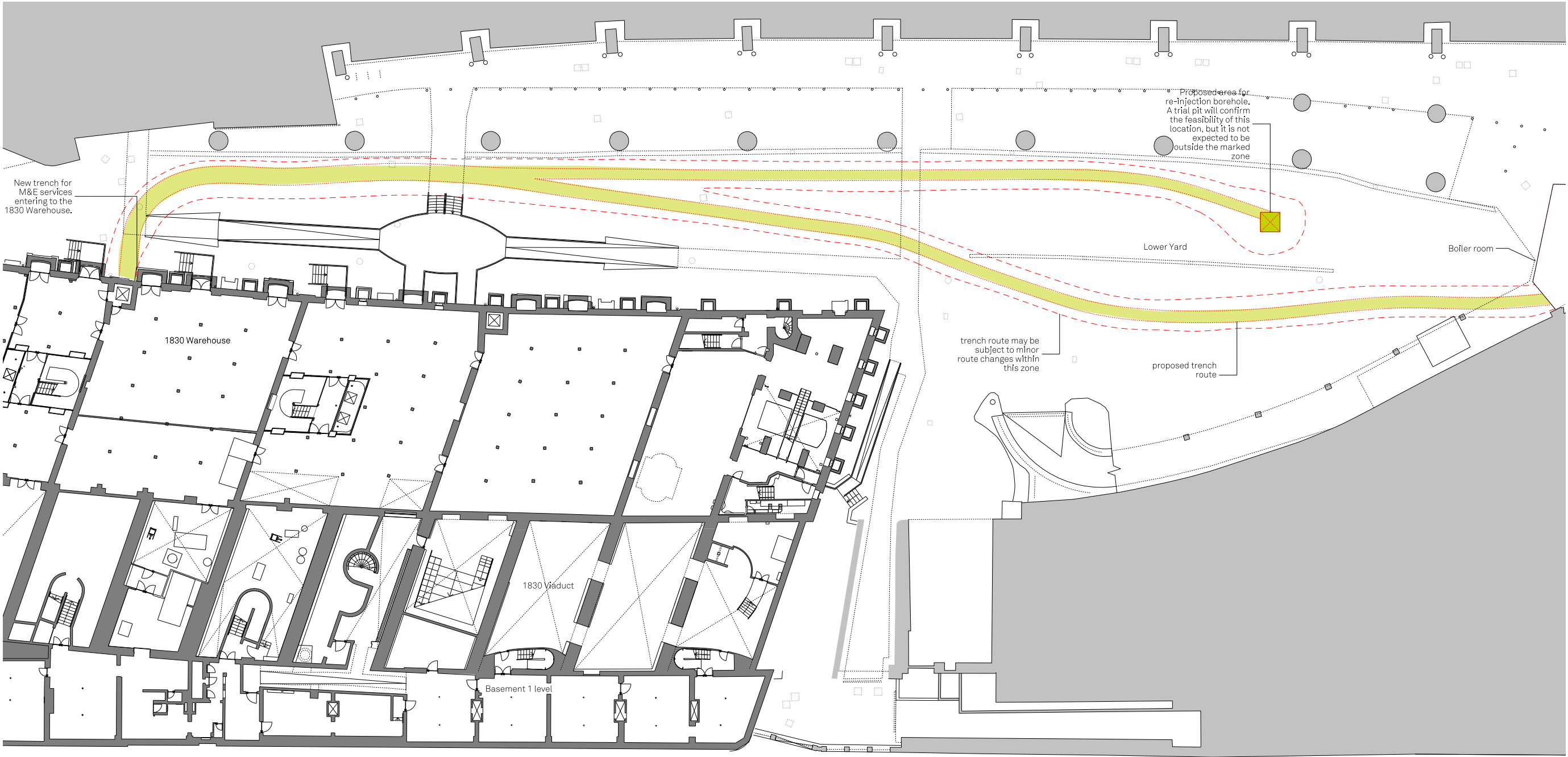
The plan above shows the areas of new trenching required where the new pipework for the water source heat pump and other services will be installed. Green areas show the extent of

the trenching in settled areas. In these areas the setts will be set aside and reinstalled once the pipework has been laid.

Refer to HH Smith's method statement for full methodology.

Please refer to Max Fordham's M&E strategy for further details of the water source heat network.

- Key**
-  Trench routes through Upper and Lower Yards
 -  Trenching beneath historic surfaces and rails
 -  Trenching through tarmac and other modern fabric - to be agreed via exchange of correspondence with MCC

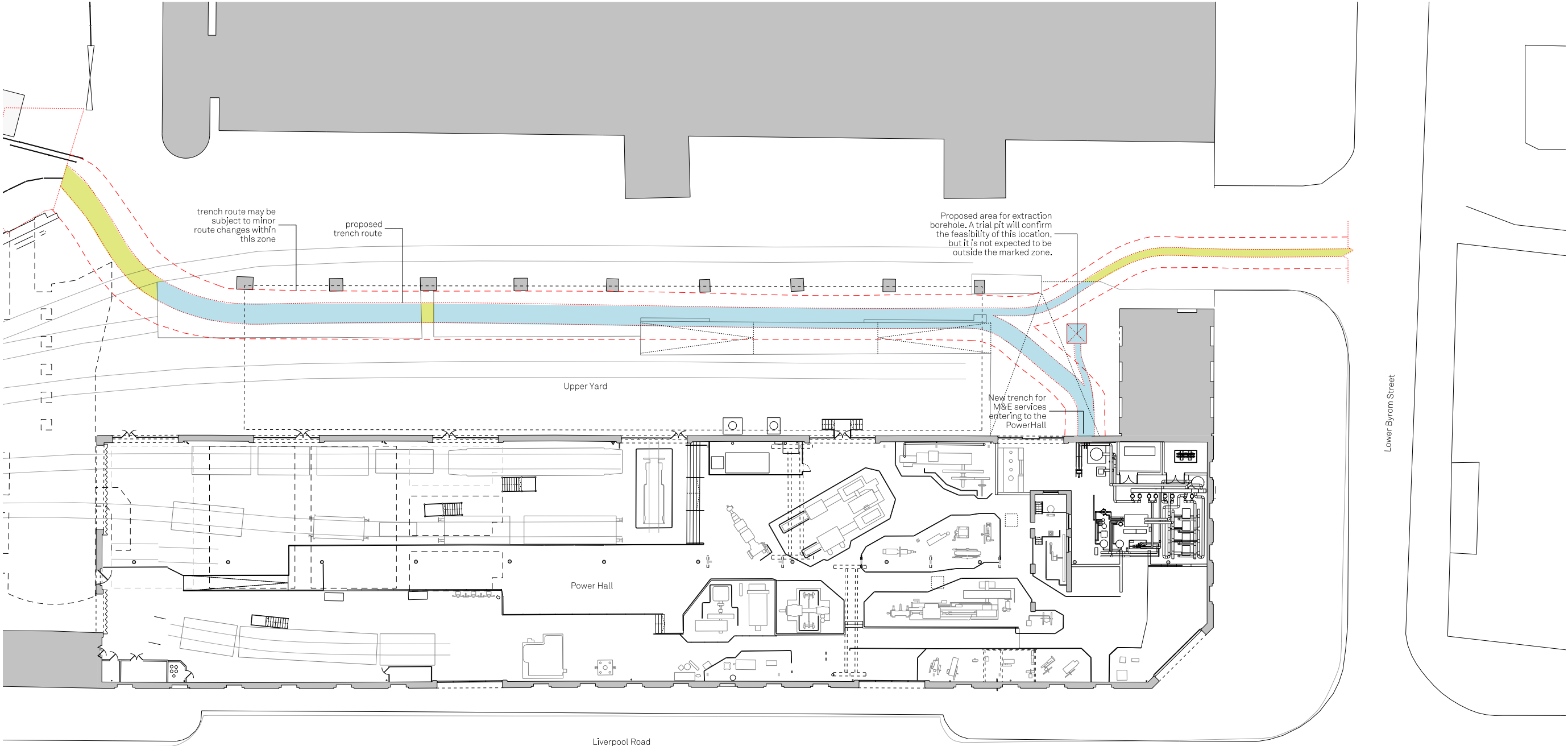


Proposed water source heat pump network
The plan above shows the proposed layout of the new water source heat pump network within the curtilage of the 1830 Warehouse, in the Lower Yard.

The red zone indicates the potential trenching area. It will likely be narrower than the zone indicated once investigations are complete and the final line is agreed.

Refer to HH Smith Construction Method Statement for trial pit methodology.

- Key**
-  Trench routes through Upper and Lower Yards
 -  Trenching beneath historic surfaces and rails
 -  Trenching through tarmac and other modern fabric - to be agreed via exchange of correspondence with MCC
 -  Trench routes may be subject to minor changes within this zone

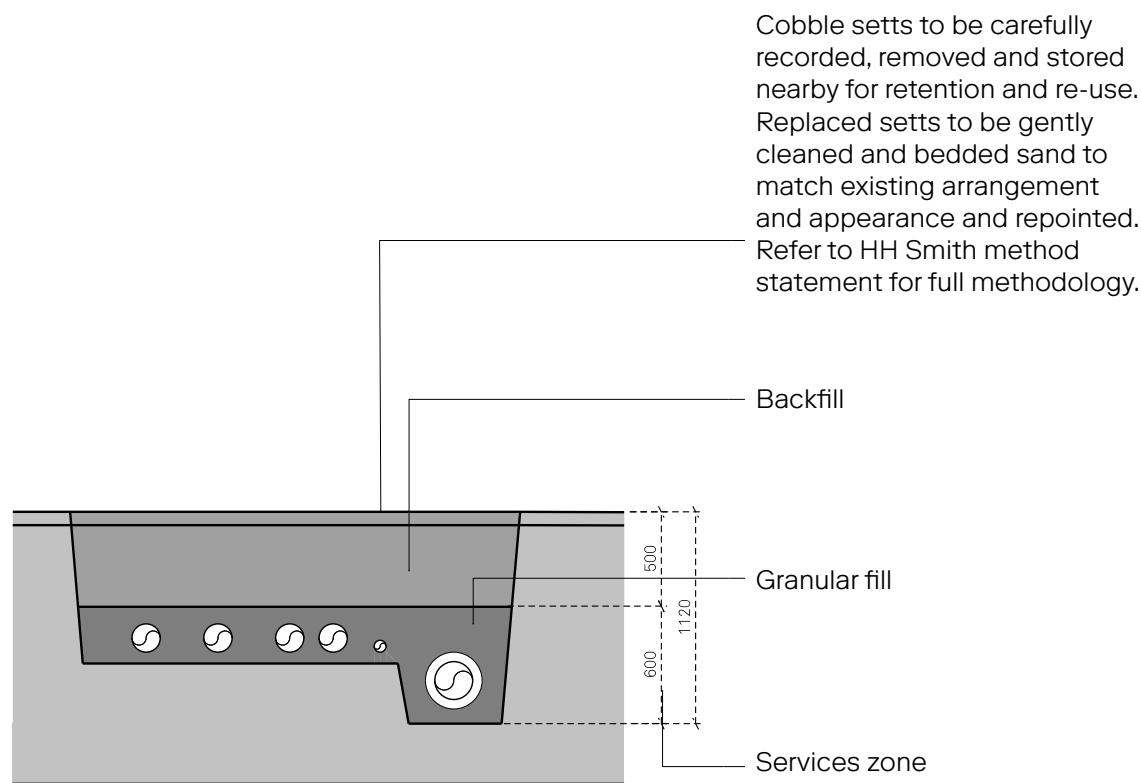


Proposed water source heat pump network
The plan above shows the proposed layout of the new water source heat pump network within the curtilage of the Power Hall and the New Warehouse, in the Upper Yard.

The red zone indicates the potential trenching area. It will likely be narrower than the zone indicated once investigations are complete and the final line is agreed.

Refer to HH Smith Construction Method Statement for trial pit methodology.

- Key**
- Trench routes through Upper and Lower Yards
 - Trenching beneath historic surfaces and rails
 - Trenching through tarmac and other modern fabric - to be agreed via exchange of correspondence with MCC
 - Trench routes may be subject to minor changes within this zone



1 Typical trench proposed section detail

Typical trench detail section
The drawings above show the typical detail for the trenching under setted areas. It is proposed that the setts are to be carefully set aside before digging the trench, and reinstalled after the pipework has been laid. Refer to HH Smith method statement for full methodology.

Trial Pits
Prior to commencement of the works it will be necessary to carry out trial pit surveys. It is proposed that the locations for trial pits are as shown in the drawing 321_1A_P_15_00 and 321_1B_15_00 submitted as part of the Package 1 applications.

Refer to HH Smith's Construction Method Statement document for a full trial pit methodology.

3 Water Source Heat Pump and Plant in the Power Hall: Work Package 1A

3.1 Historic Context

3.2 The Existing Building

3.3 Design Proposals

3.1 Historic Context

3.1.1 History of the Power Hall

3.1.2 1980s Works

3.1.3 Historic Platform



Exterior view of the Power Hall and external gantry, prior to restoration



Exterior view of the Power Hall south-east, prior to restoration

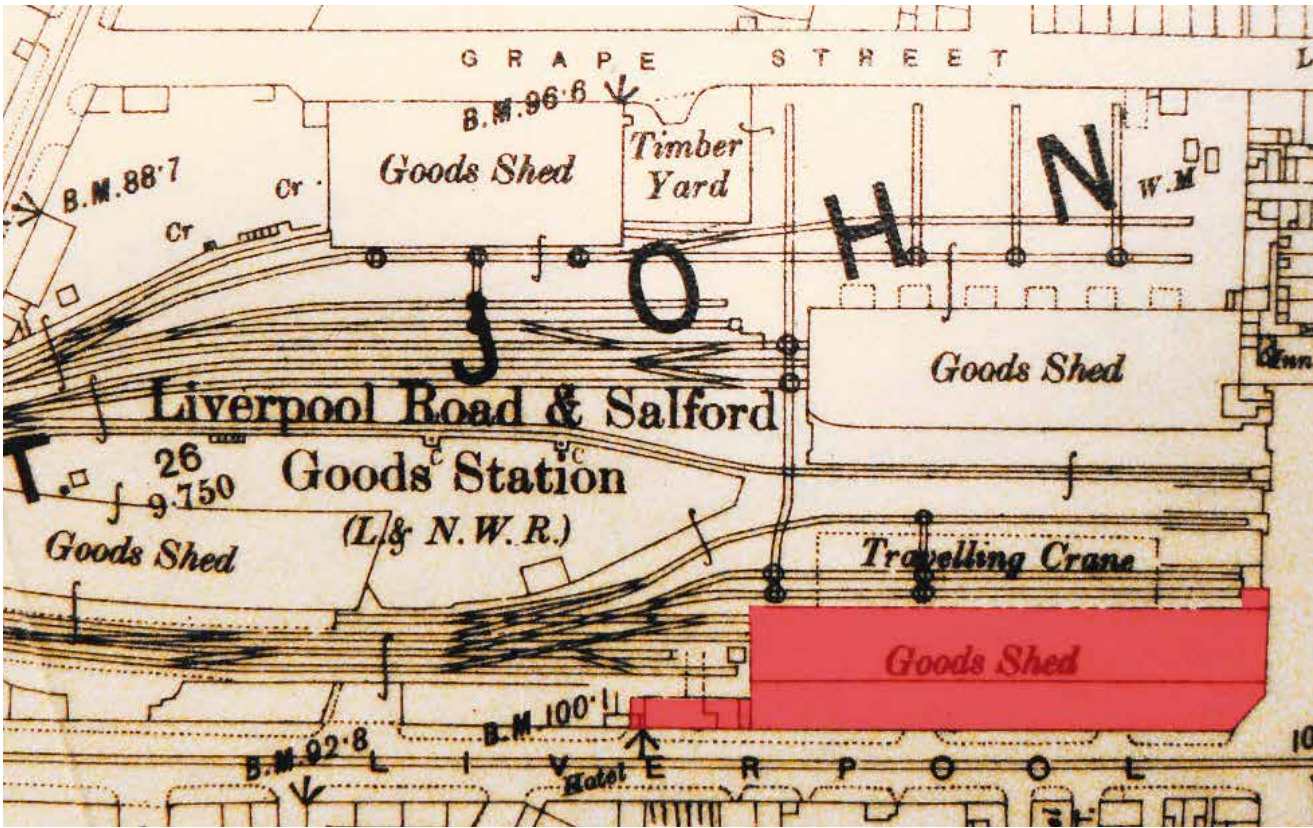
From Shipping Shed to Power Hall
The Liverpool Road Railway Station was the Manchester terminus of the first inter-city passenger railway network in the world. Opened in 1830, the station served passenger trains for just fourteen years, and when Manchester Victoria Station opened in 1844, Liverpool Road became a goods depot.

The Power Hall was built in 1855 to serve as a Shipping Shed for the London and North Western Railway company (LNWR). The building served the purposed of unloading goods from trains, which entered the building to the north of the platform, and immediately loading them in to carts and trucks, which lined up on the south of the platform, for distribution.

In the early 1860s, an office block was added to the south western corner of the Power Hall, and around 1881, the exterior gantry crane was installed in the North Yard, adjoining the northern elevation of the Power Hall. The building was used as a goods transfer shed until 1975.



The Power Hall prior to restoration



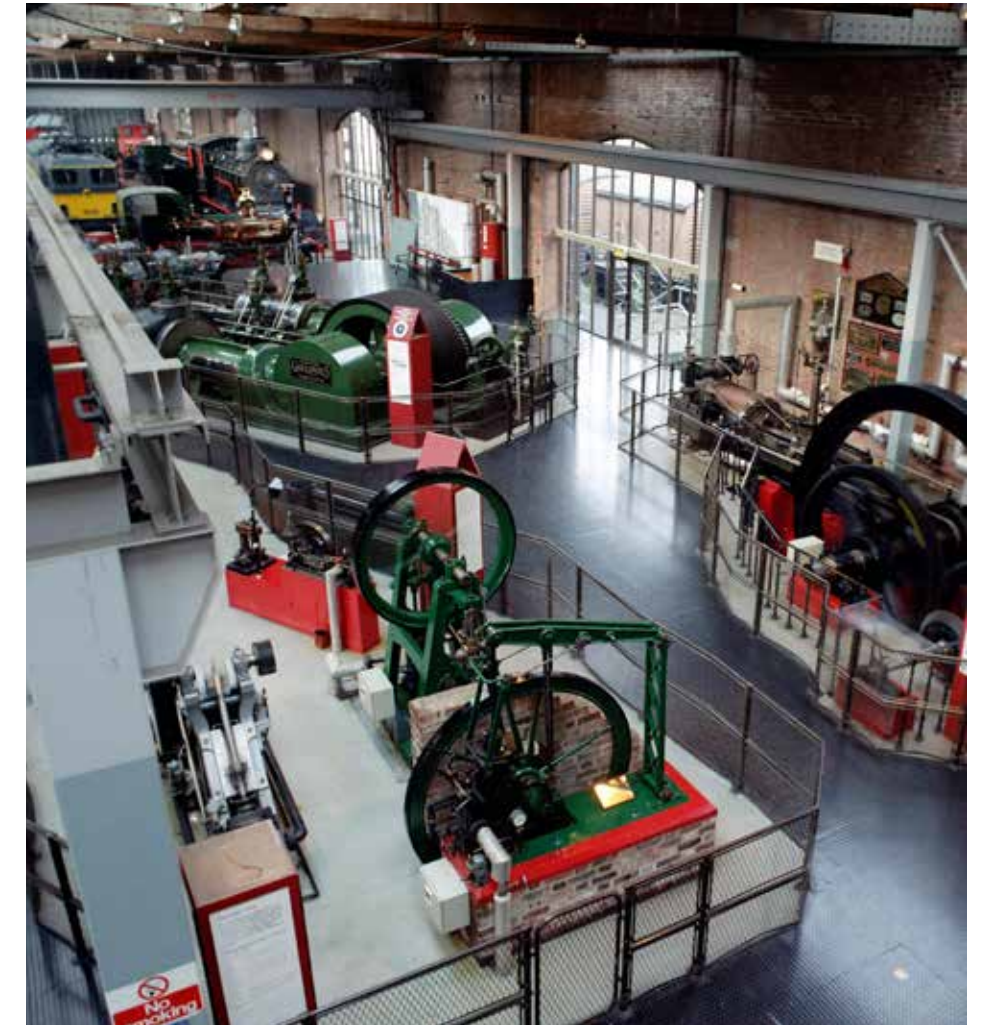
Historic plan showing the historic configuration of the Science and Industry Museum site



The Power Hall during 1980s restoration



The Power Hall during 1980s restoration



Today's Power Hall exhibition layout

From shipping shed to Power Hall

Manchester City Council purchased the entire station site for £30,000 when it became disused as a goods yard. In 1979, the Power Hall underwent a rapid series of structural repairs to enable it to open to the public for a celebration of the 150th anniversary of the Liverpool Road Station in 1980. In the early 1980s, further alterations and extensions were carried out to convert the building into an exhibition space. When it opened to the public in September 1983 the former Shipping Shed was officially renamed the 'Power Hall'.

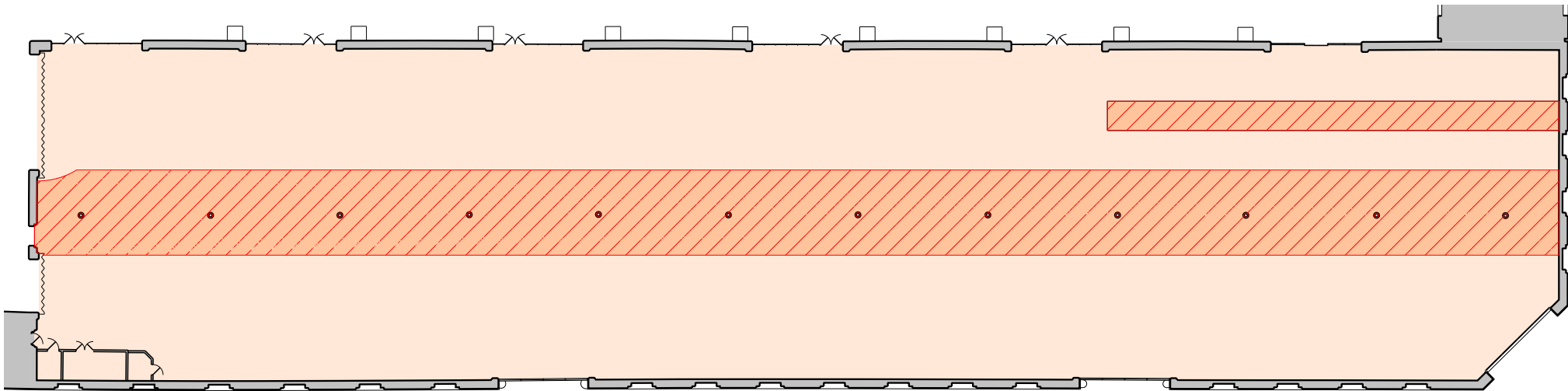
The works carried out in the 1980s enabled the exhibition of a collection of steam, gas and electric engines as well as locomotives. Many of the machines were in working condition and tell stories of industry in Greater Manchester. A raised platform, which incorporated the existing loading stage, was built. The platform provided an ideal level for visitors to experience the exhibits at eye level. It was also during this period that the brick enclosure to house the beam engine was built.

The two-storey extension to the north east corner of the Power Hall was also added in the 1980s with the intention of housing visitor welcome facilities and orientation.

Refer to the accompanying Heritage Impact Assessment by Donald Insall Associates for further details of the Power Hall's history.

A Central Platform
Historic photos of the Power Hall show the central platform running along the spine of the building, which was used by the workers who unloaded and loaded goods between trains and vehicles. The plan to the left shows the approximate extent of the platform before it was mostly dismantled as part of the 1980s works.

Most of the historic platform was unfortunately removed as part of the 1980s renovation works to convert the goods depot into the Power Hall exhibition space as it is today.



Plan indicating historic platform configuration



The Power Hall in 1978 prior to restoration



Unloading tobacco shipments in the Power Hall, 1934

Key

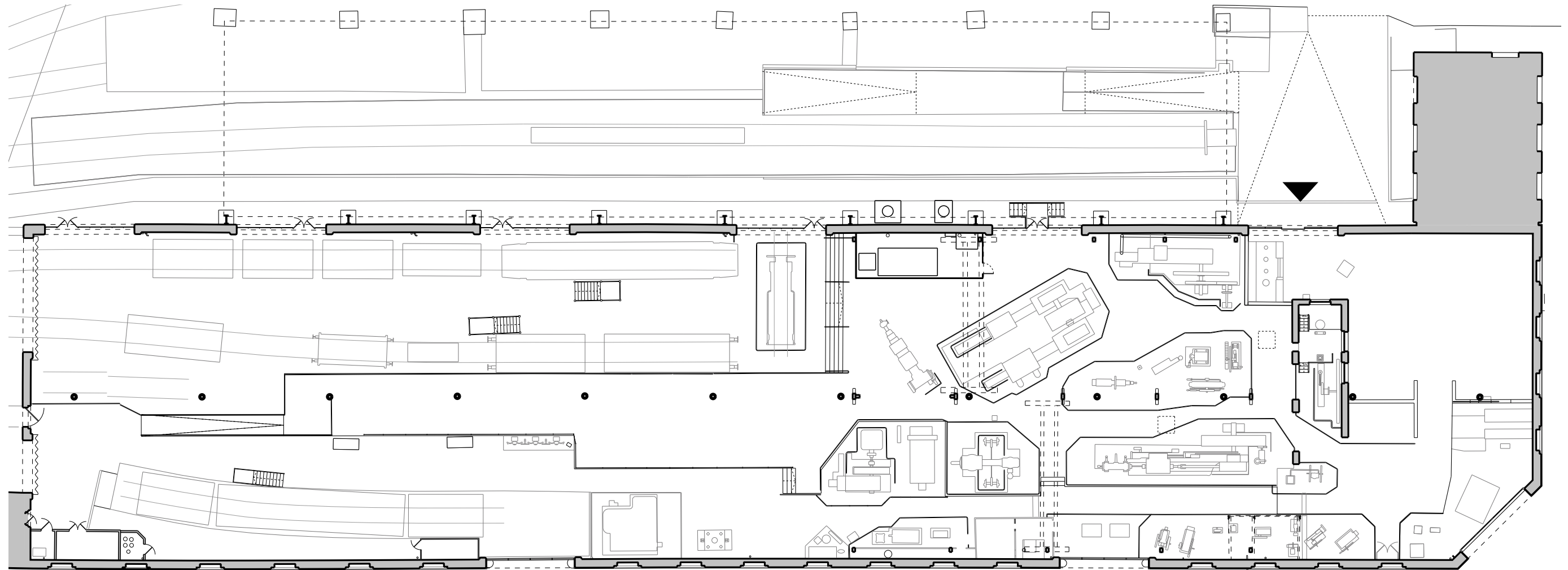
 Former extent of original loading platform

 Ground level

3.2 The Existing Building

3.2.1 Configuration

3.2.2 Current Condition



Following the urgent restoration of the Power Hall in 1979, carried out so that the building could open to the public to celebrate the 150th anniversary of the Liverpool Road Station, Manchester Council began to develop the site as a museum. This layout has remained largely unchanged since the building was redeveloped in to a museum in the 1980s, with walkways and exhibits remaining in the same positions.



The Power Hall with current 1980s platform



Aerial view on to the 1980s platform



Signage and balustrades currently detract from exhibits



Mismatched floor finishes contribute to unclear visitor route



Current entrance, gantry crane and disused exterior platform



The North Yard with Power Hall (right) wrapped in scaffolding since 2019



View of the central valley roof and scaffold enclosure



Interior view showing the covered exhibits

Current building condition

The Power Hall was closed to the public in 2018 due to roof leakage and risk of associated damage. It has since been covered with a scaffolding 'tent' to protect from rainfall and further deterioration. Further scaffolding was installed internally to provide a roof crash deck. The Historic Working Machines exhibited in the Power Hall, which cannot be moved without great expense due to their size and weight, have been covered with tarpaulin for protection.

Power Hall Access

Site ownership has now been taken by the contractor HH Smith, the contractor undertaking the Package 1 works on the site. Public access is not possible and the building will not be reopened to the public until the wider scheme has been completed.

The proposed Package 1 works will not change the current access arrangements.



View of the Power Hall exterior with scaffold enclosure

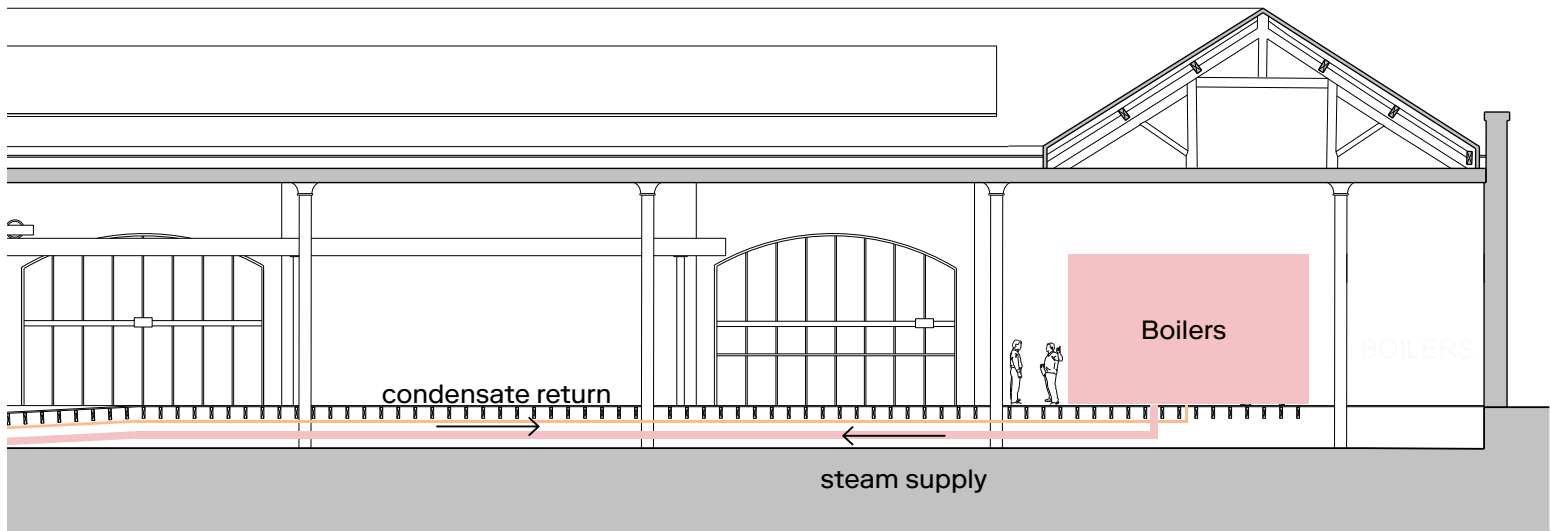


Interior view showing the covered exhibits

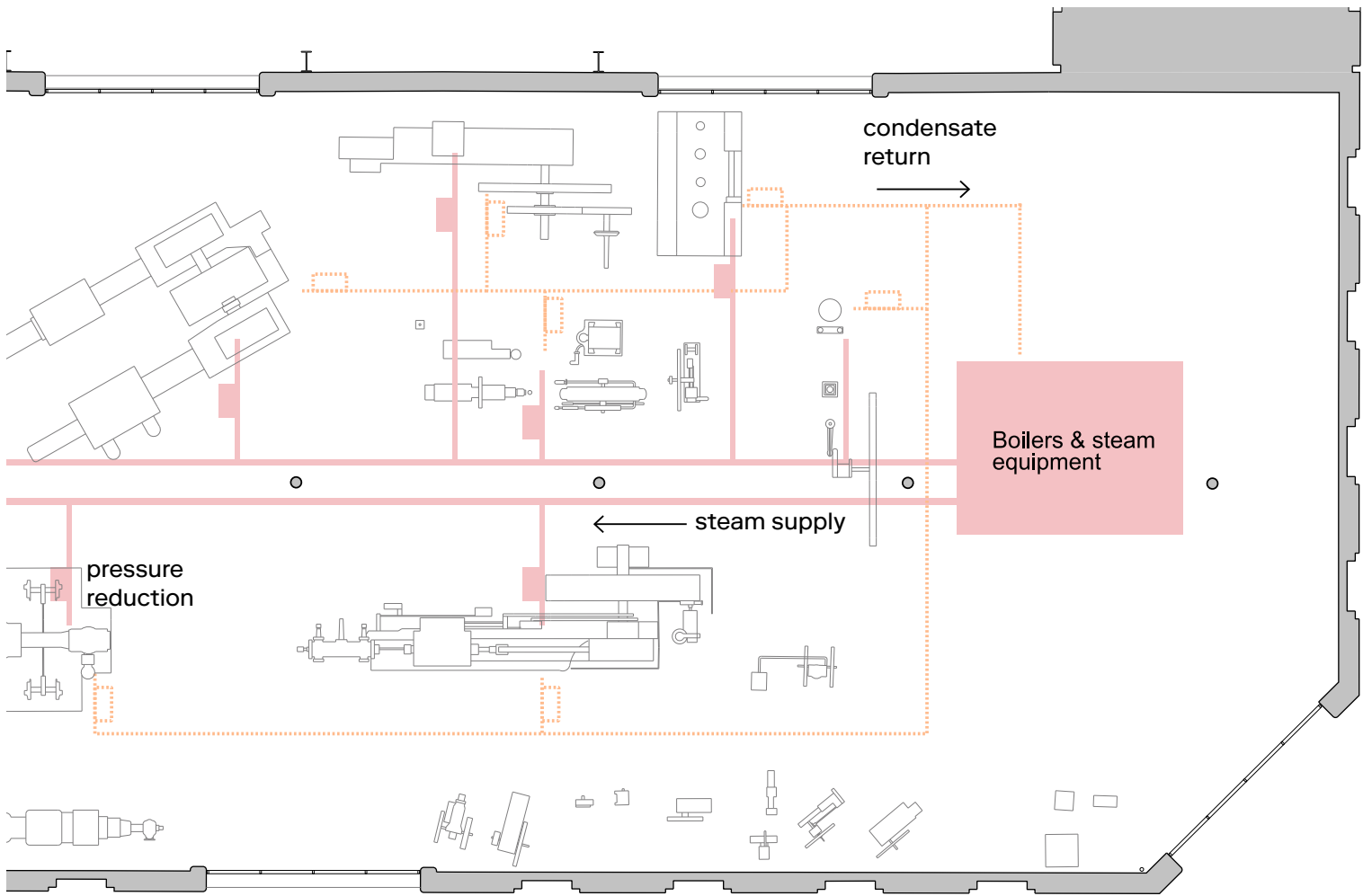
3.3 Design Proposals

3.3.1 Power Hall Plant: Part of a Wider Final Scheme

3.3.2 Proposed Plant



Proposed long section detail with future steam equipment layout



Proposed future ground floor plan schematic with steam equipment layout

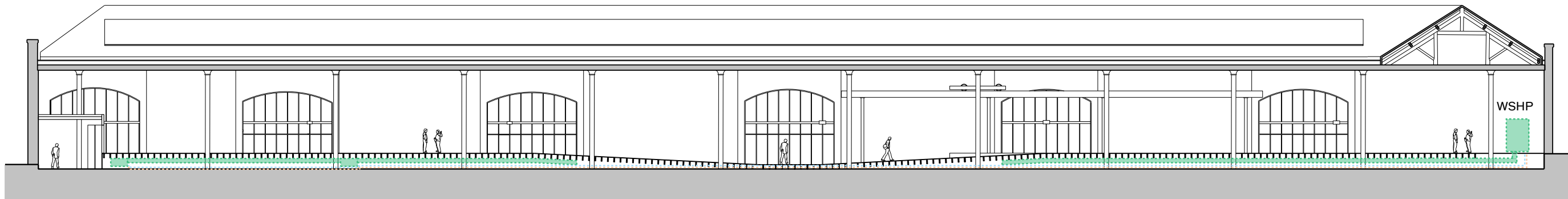
Future Steam Strategy

The exhibition includes several Historic Working Machines (HWM) which can be powered up by the Museum's team to give visitors an engaging experience of how they worked in the past. The extent of the HWMs to be run will be developed as part of the Package 4 works. As part of the 1980s refurbishment of the Power Hall, steam equipment was installed to supply these engines, but they have been out of service for the past few years due to issues with the existing plant.

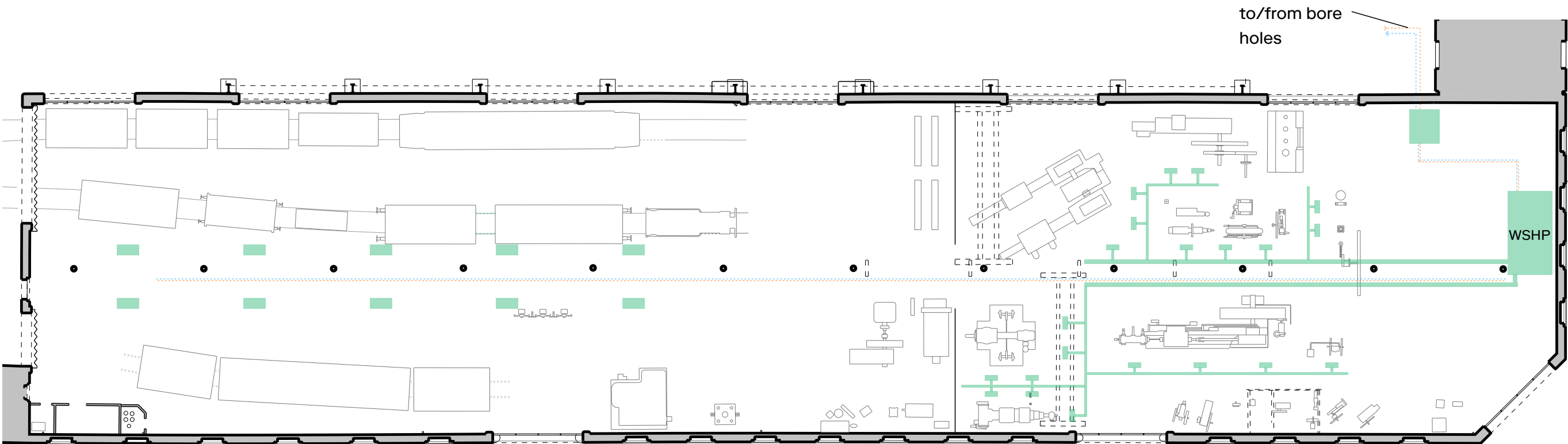
A new steam system will be installed to bring these machines back to life using a more sustainable approach. The new system will use electric steam boilers, avoiding the need for a gas boiler and associated flues.

Rather than using external heat dissipaters to condensate the returned steam from the machines, which would look like the existing external cooling towers currently installed on the North facade of the Power Hall, this will be done using water from a borehole. This approach would also mean some of the heat dissipated by the condensating steam will be used in the new heating system for the Power Hall.

In order to minimise exposed ductwork and blocking views of the historic building, the steam supply and return pipes will run in the void under the new raised mesh platform to the east of the building. Access hatches will be required for maintenance and further details of these will be developed in the next design stages. The boilers themselves have an industrial aesthetic which reflects the historic engines and it is proposed that they would sit on top of the platform, forming a part of the exhibition and would become part of the story of the 'future of power'.



Long section showing future heating and ventilation system layout



Ground floor plan showing future heating and ventilation system layout

Future Heating and Ventilation Strategy

Heating will be provided for visitor comfort and to prevent the risk of condensation and rusting of the historic machines. In order to reduce the visual impact of the equipment, pipes will run at low level under the platform. Warm air will be blown out from under the platform and will naturally distribute to the rest of the space.

In order to provide heating at the west end of the room, remote fan-coil units will be installed, which can be supplied with warm water from the east end of the building. These narrow water pipes can easily be chased into the

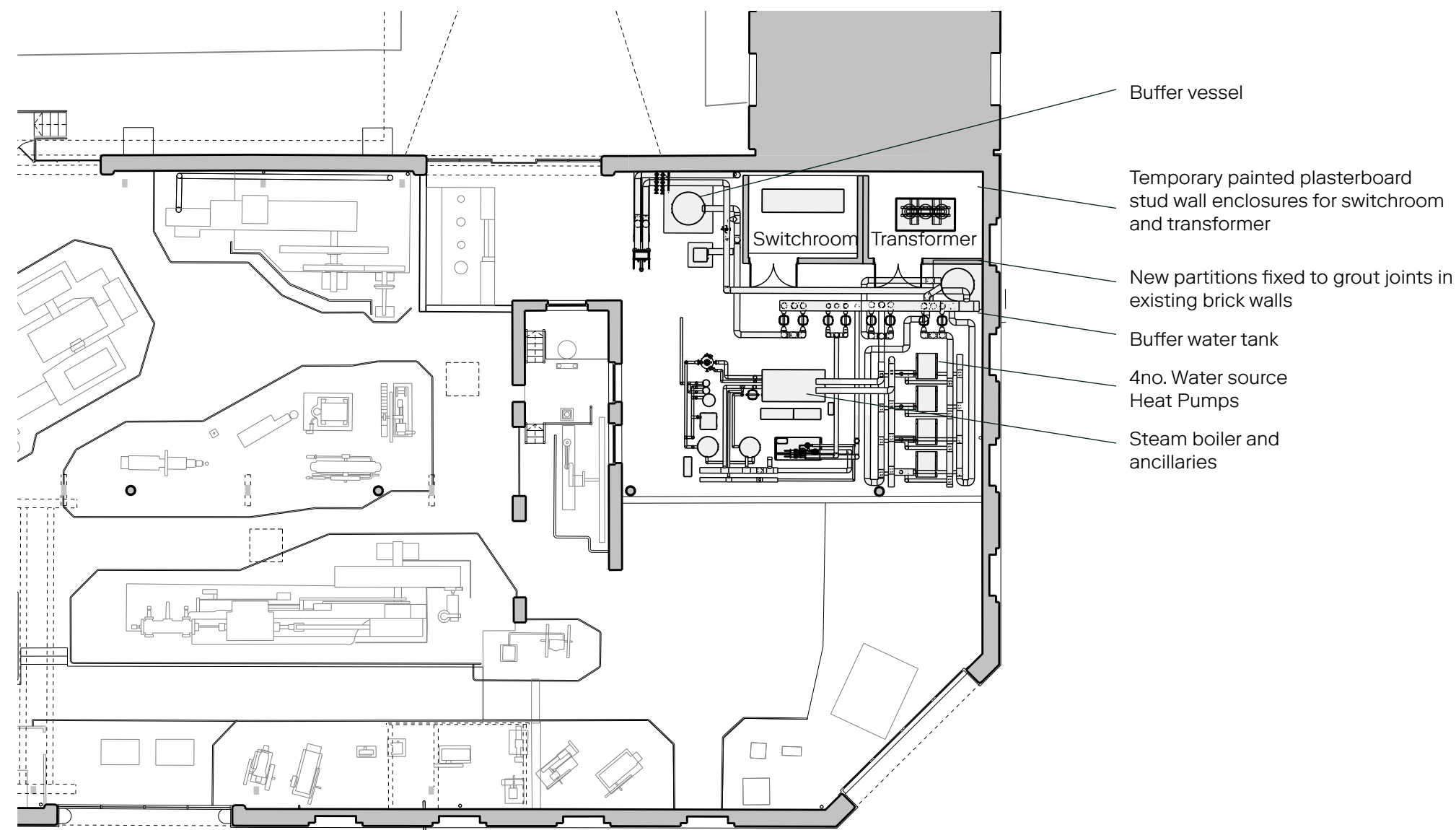
ground underneath the central part of the platform where there is no void. As indicated in the above plan, this strategy allows for all services to be concealed under the platform, reducing visual impact on the historic building.

Heat Pump

The new system will use a water source heat pump, taking hot water from a new borehole located nearby.



Underneath the 1980s platform - it is unsafe and a further application will be submitted for removal of this non-original structure



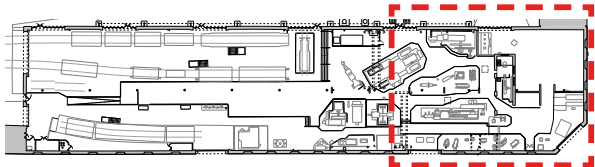
Plant to be installed as part of Package 1A
The Public Sector Decarbonisation Scheme funded steam boiler and water source heat pumps, along with associated substation and switch room, and pipework connections are proposed as part of Package 1A.

As shown in the plan above these are located in the North-East corner of the Power Hall on the existing 1980s concrete slab in this area. The plant is intended to be a part of the exhibition and therefore will be made visible to visitors.

The new main equipment that will be installed within the Power Hall plantroom area will be:

- 1 No. electric steam boiler and associated equipment (water treatment, blow down vessel, hotwell)
- 1 No. packaged steam-to-water heat exchanger
- 4 No. water source heat pumps
- 2 No. water buffer tanks
- 1 No. plate heat exchanger
- 4 No. pump set
- 1 transformer (housed in a suitable enclosure)
- 1 Main switchboard (in a suitable enclosure)

The substation and switch room are located in the far corner in a temporary housing which will be replaced with a permanent construction as part of the Package 4 works, details of this will be confirmed within the Package 4 Planning Permission and Listed Building Consent submissions.



Key plan - Power Hall



Typical boiler clad in polished metal



Typical pipework clad in polished metal



Typical boiler clad in polished metal



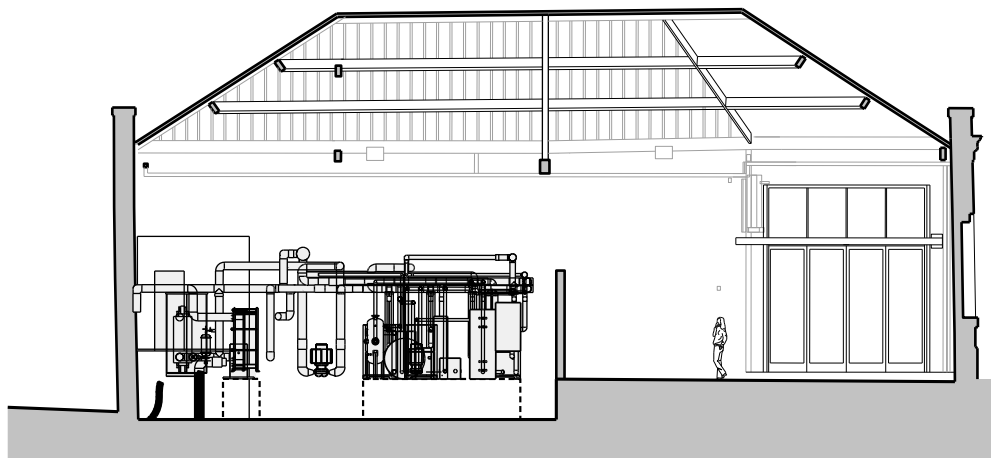
Typical pipework clad in polished metal

Material Finishes

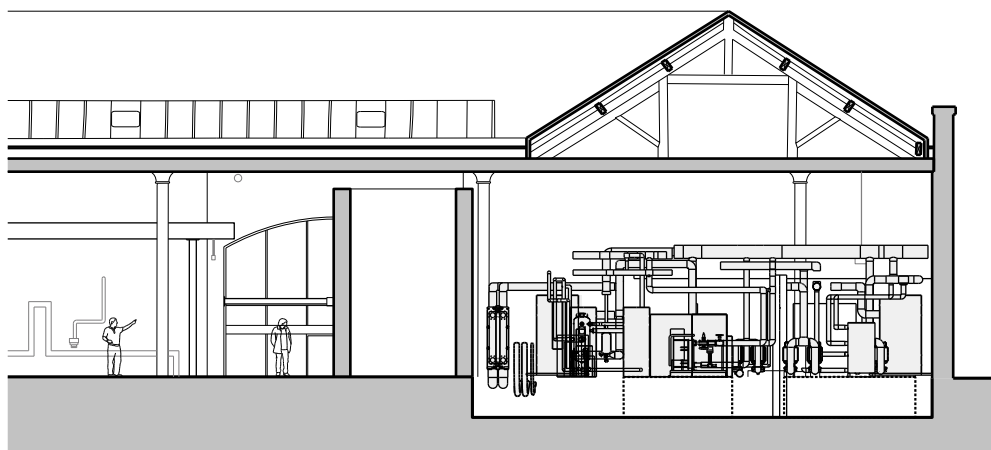
The plant equipment is intended to form part of the interpretation of the building, adding to the story of steam with an Package of future technology. It is therefore important to present an aesthetically pleasing design which contributes positively to the exhibition. All pipework and plant will be insulated for efficiency and safety, and clad with polished metal as in the examples shown to the left.

Maintenance

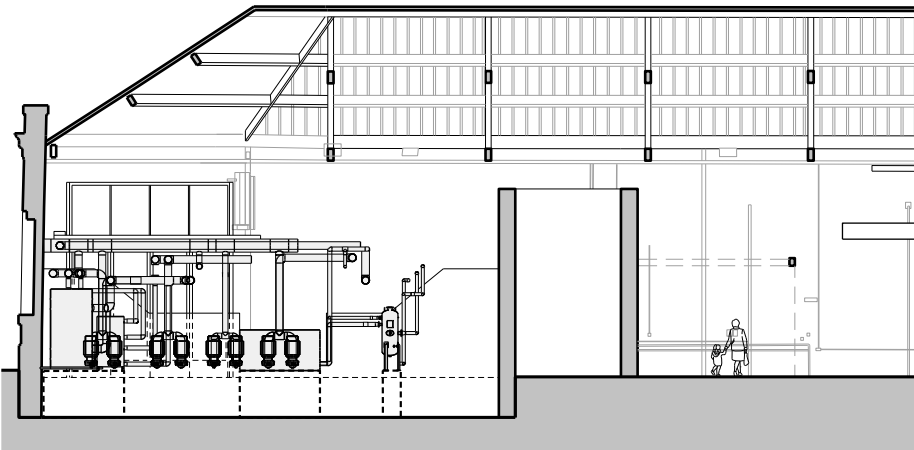
All of the equipment can be brought in and out of the existing entrances for maintenance and replacement. Access to the plant can be gained via the main space.



Proposed internal elevation 01

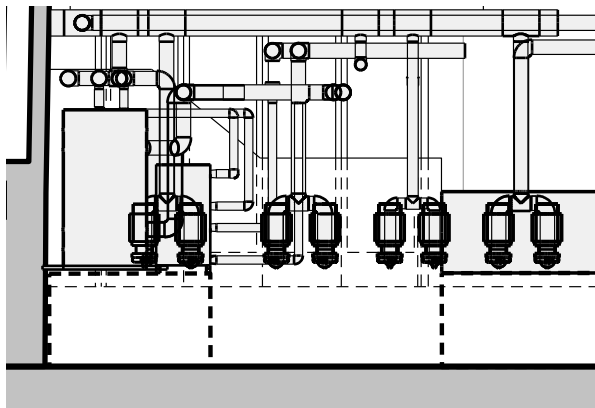


Proposed internal elevation 02

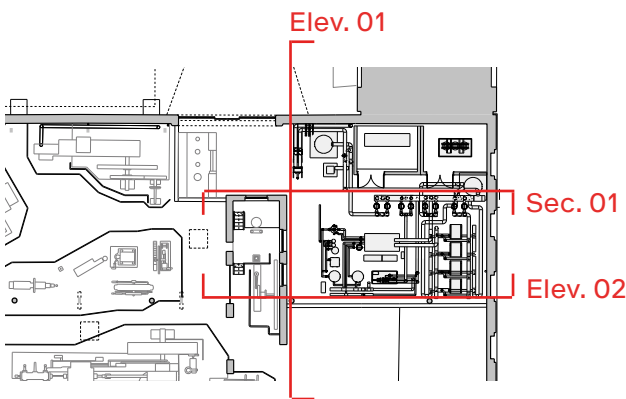


Proposed section 01

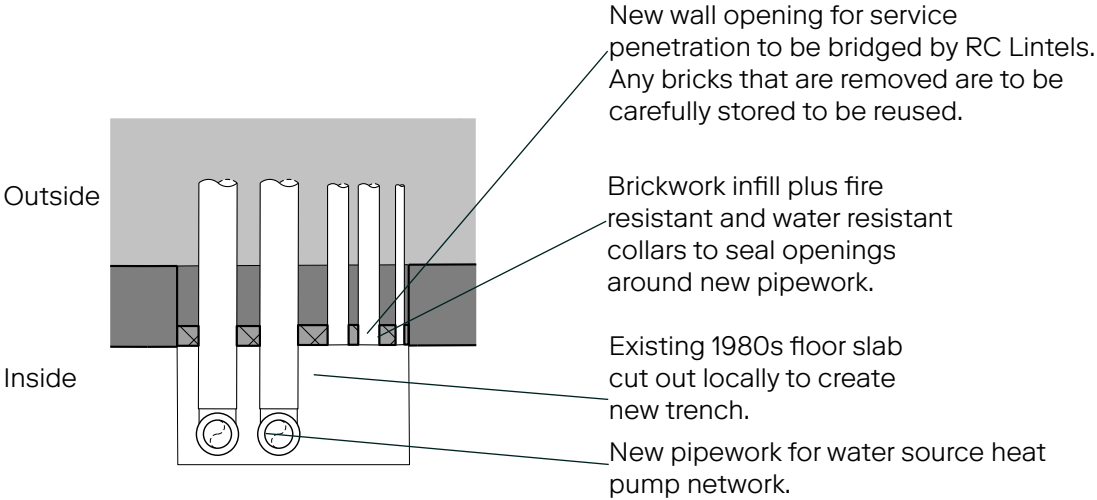
Proposed Plant Elevations
Elevations showing the Package 1A plant located in the North-west corner of the Power Hall. The plant will be installed in relation to the future platform level with a void below. New painted steel plant bases will be installed to raise the plant up to the correct level.



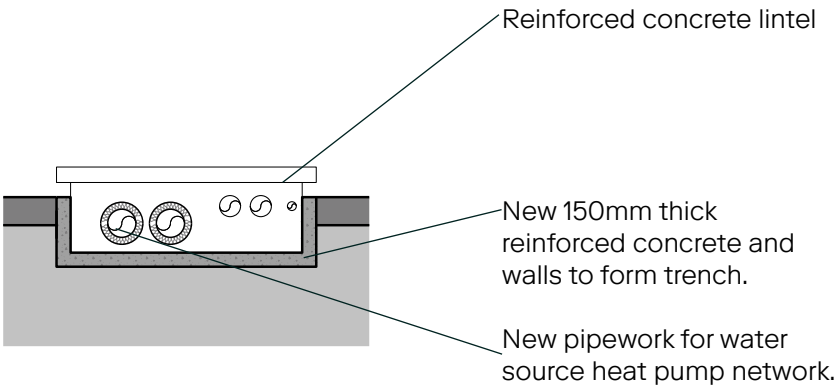
Steel framed plant bases - installed in relation to future platform level with void below



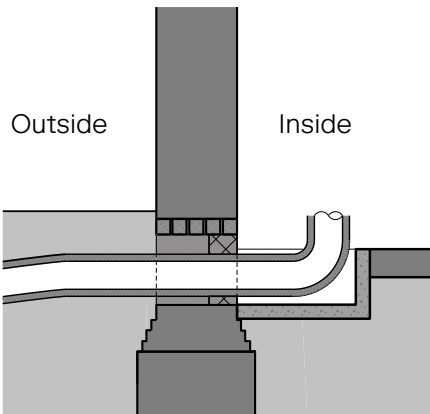
Key plan - Power Hall



1. Detail plan of proposed Power Hall wall opening



2. Elevation of proposed Power Hall wall opening

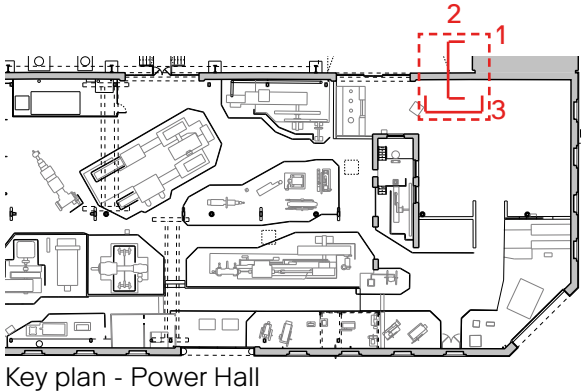


3. Section showing proposed opening in the wall of the Power Hall

Wall Penetration for Heat Pump Network
In order to connect the new water source heat pump to the new boreholes in the upper and lower yard a new wall penetration is proposed at below external ground level. Internally, a section of the existing 1980s concrete slab will be removed to allow for the pipes. New concrete lintels are installed to support the new wall opening. This opening is below ground level externally, and will be below the level of the platform to be installed as part of the Package 4 works.

Trial Pits
The drawings above have been based on assumed design of the existing Power Hall foundations. Prior to commencement of the works it will be necessary to carry out trial pit surveys to expose the face of the wall and the underside of the foundation to confirm its dimensions and the bearing stratum.

Refer to HH Smith's Construction Method Statement document for a full trial pit methodology.



4 Boiler House External Modifications: Work Package 1B

4.1 Existing Context

4.2 Design Proposals

4.1 Existing Context

4.1.1 Car Ramp

4.1.2 Boiler House



View of the ramp connection Lower and Upper Yard



View of the ramp connection Lower and Upper Yard

The car ramp (C.1991) and spiral staircase (1999-2000) connect the lower and upper yards for pedestrians and vehicles. They are considered to detract from the heritage of the site.

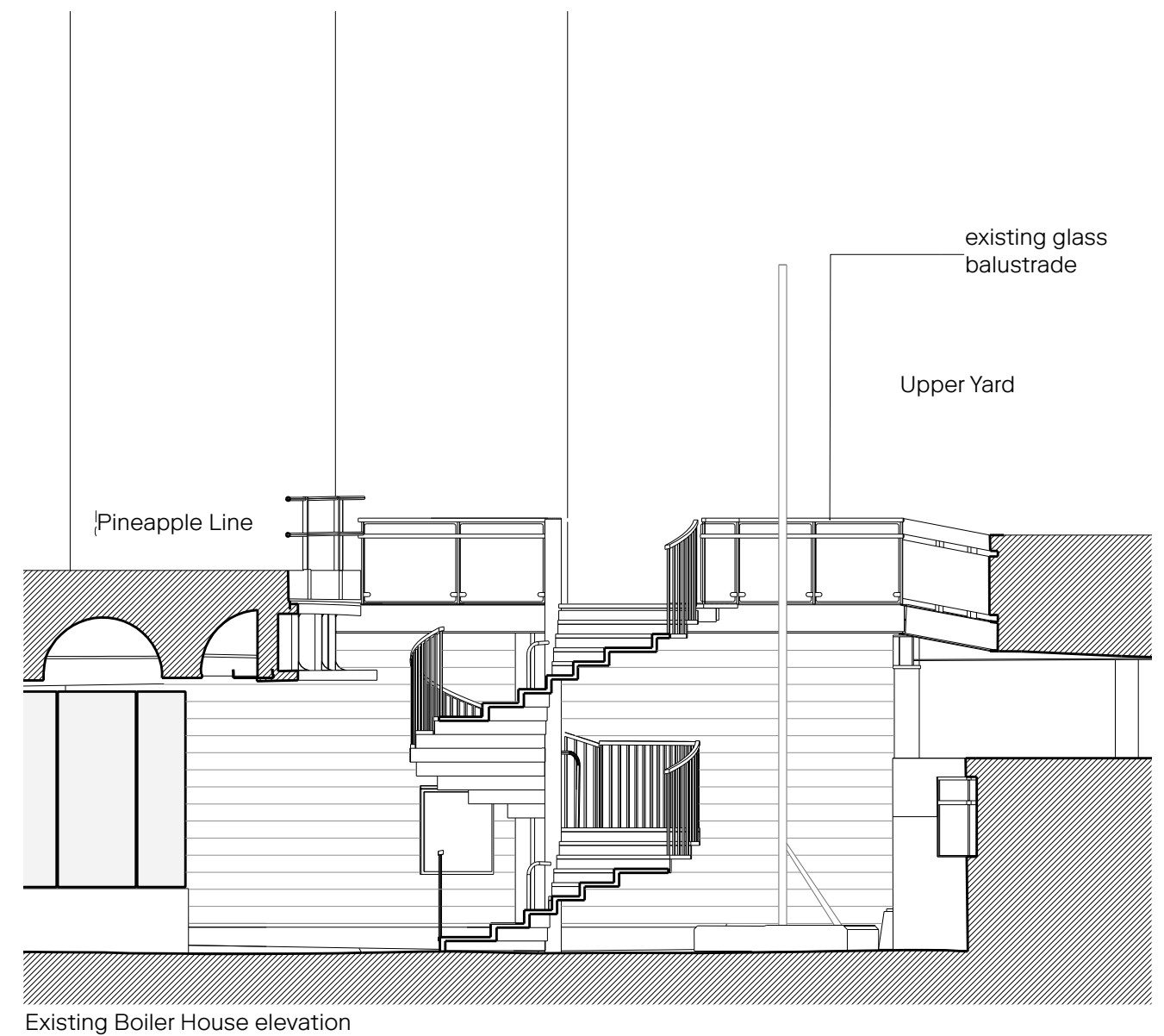
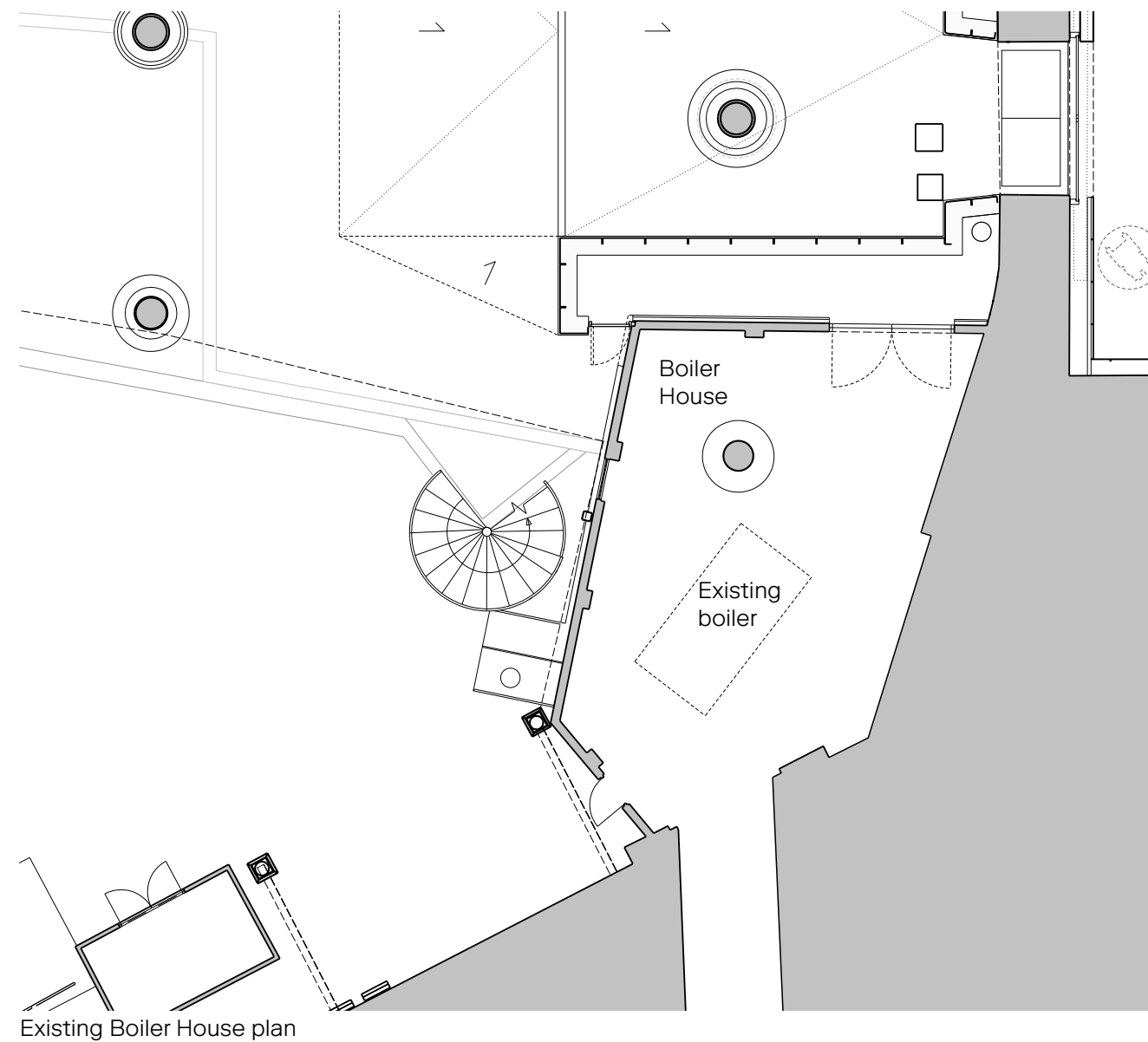
Underneath the car ramp various plant has been installed, including an electrical substation and switch room in white temporary housing which can be seen in the photos. Behind the spiral stair is a boiler room which houses various pieces of plant equipment, including a large steam boiler which was used to power some of the steam powered exhibits in the Power Hall. This boiler is now defunct.



Lower Yard, showing the existing spiral staircase



Lower Yard: showing the car ramp connecting to the upper yard



Existing Boiler House Layout

The existing Boiler House contains a modern steam boiler which was installed to power the Historic Working Machines (HWMs) in the Power Hall. A few years ago the boiler became defunct and can no longer be used. Also in the Boiler House space are several rainwater pipes and an existing column - part of the colonnade supporting the Pineapple line above.

The existing access route to the Boiler House is via a doorway and corridor to the north, behind a new wall which was installed as part of the Special Exhibitions Gallery works.

Externally the Boiler House walls are clad in dark painted horizontal timber slats. A window in the wall allows a view into the Boiler House space.

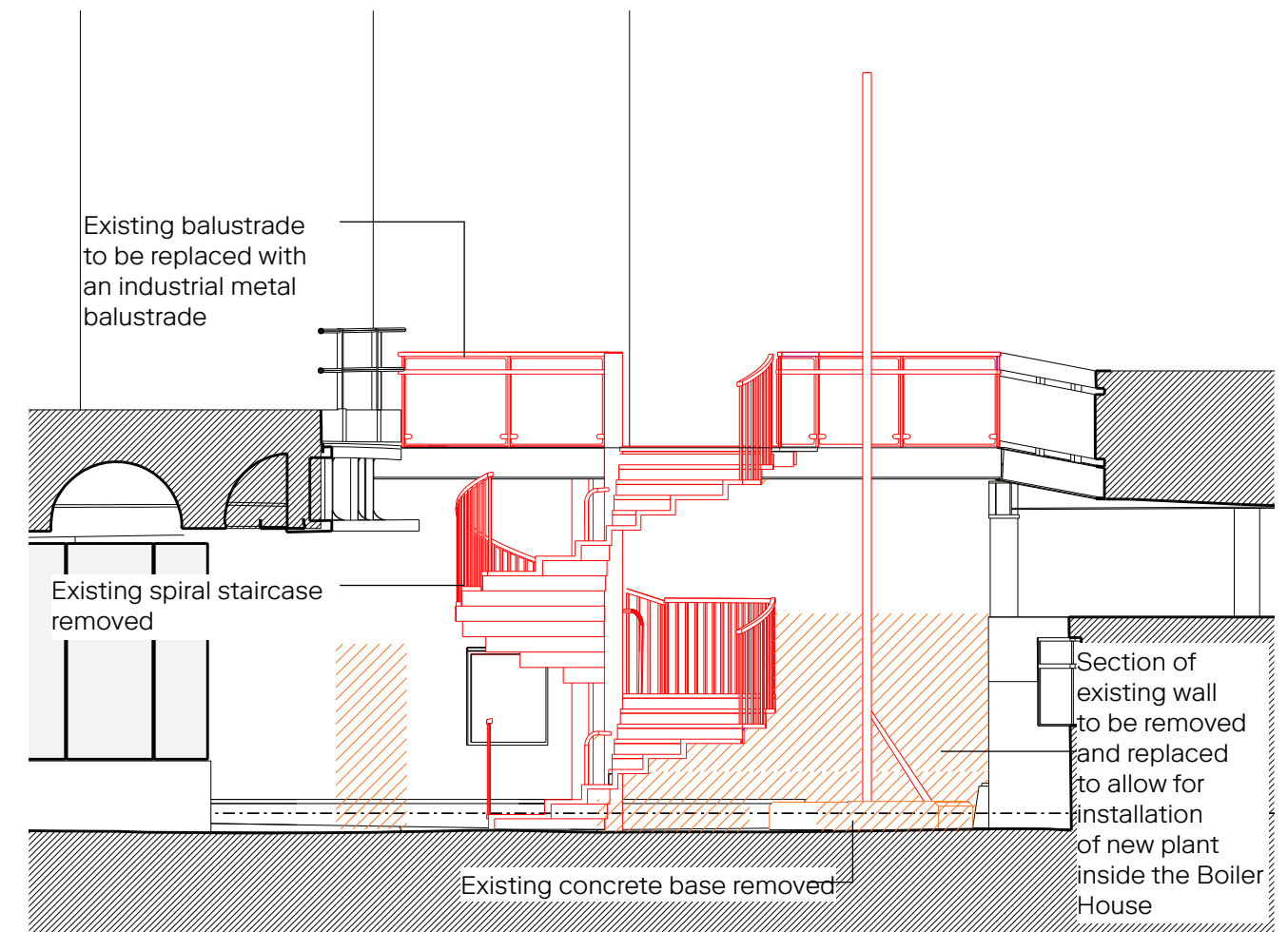
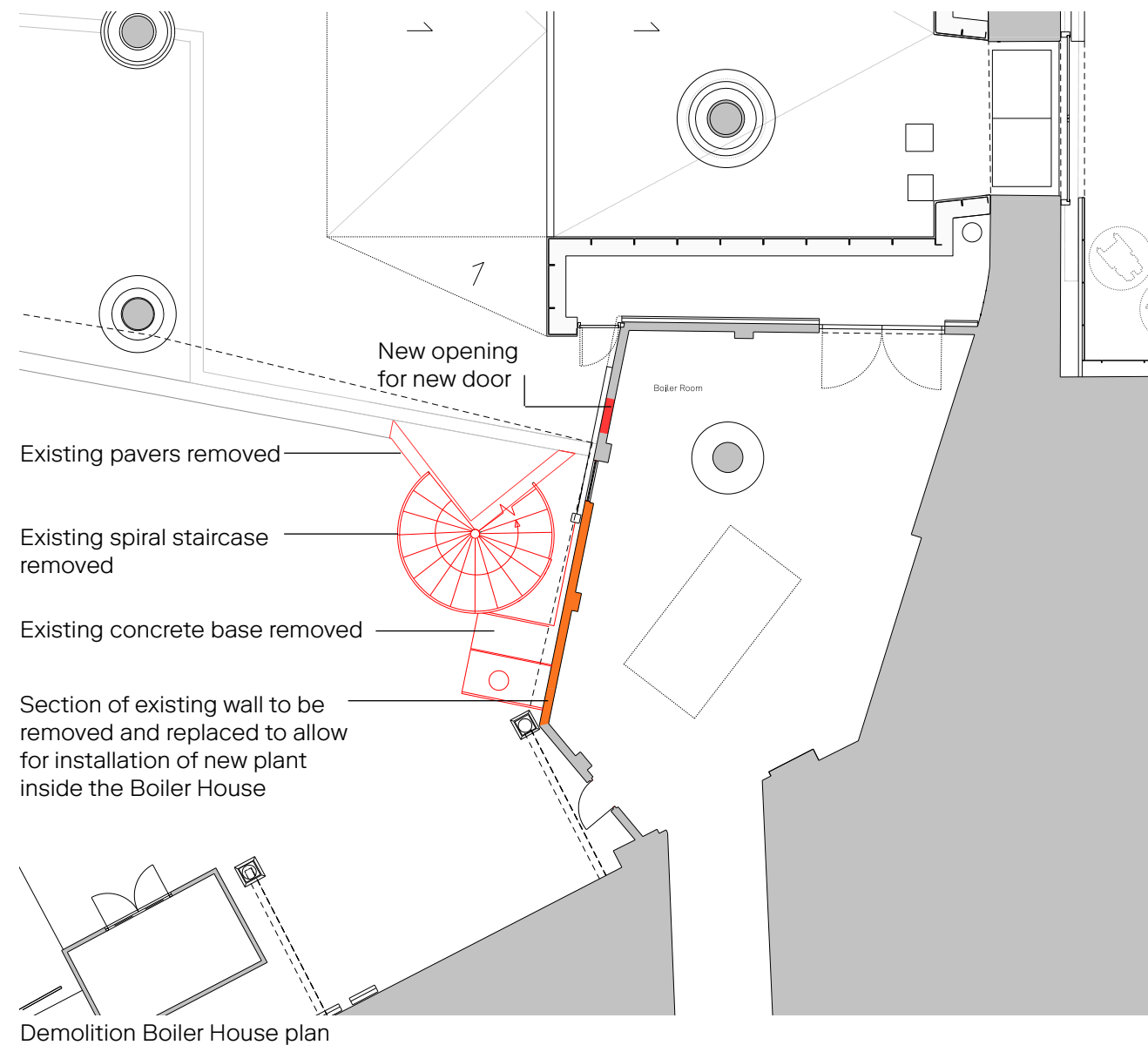
In front of the Boiler House wall is a concrete and metal spiral staircase which connects the upper and lower yards.



4.2 Design Proposals

4.2.1 Boiler House External Modifications

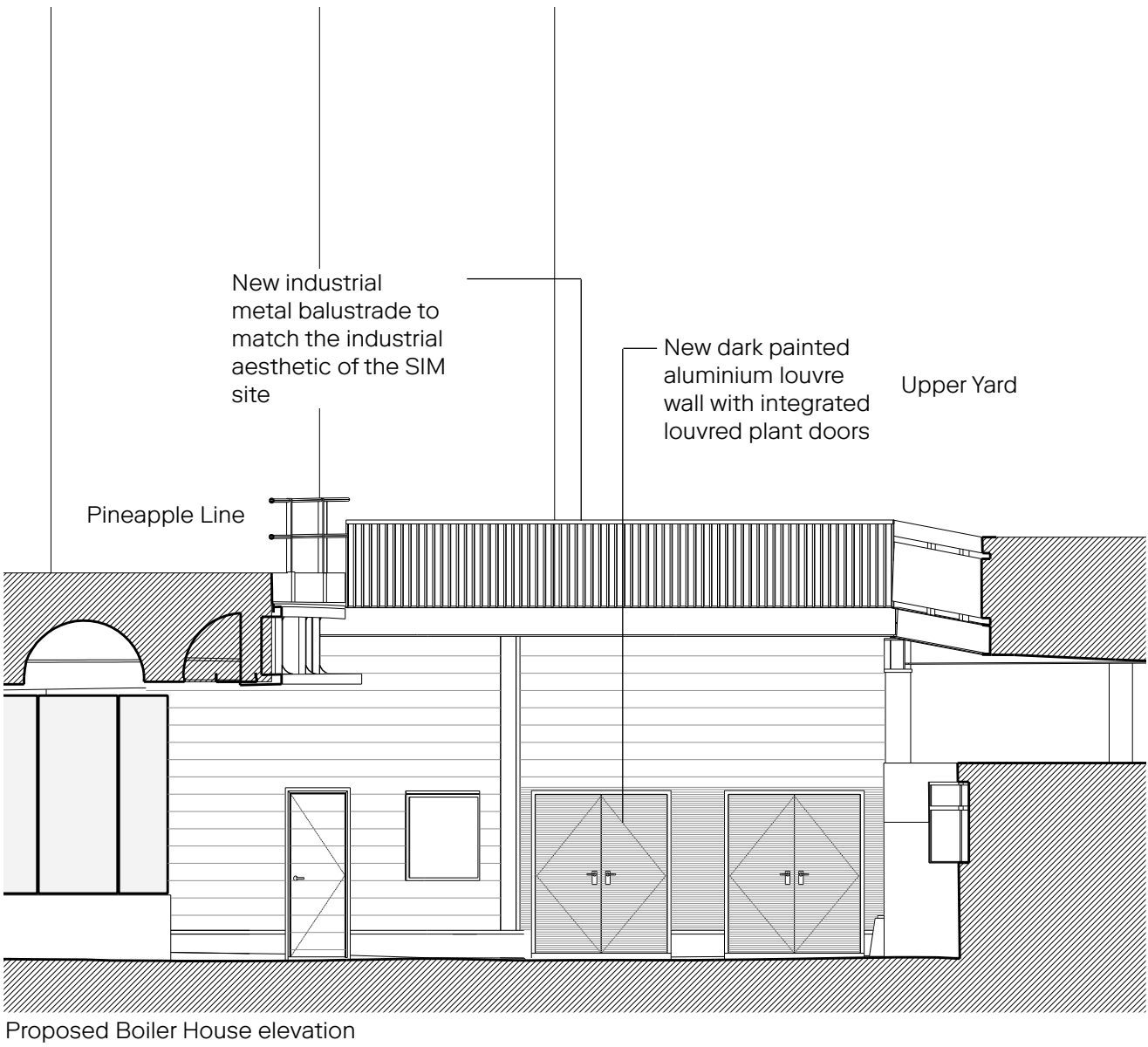
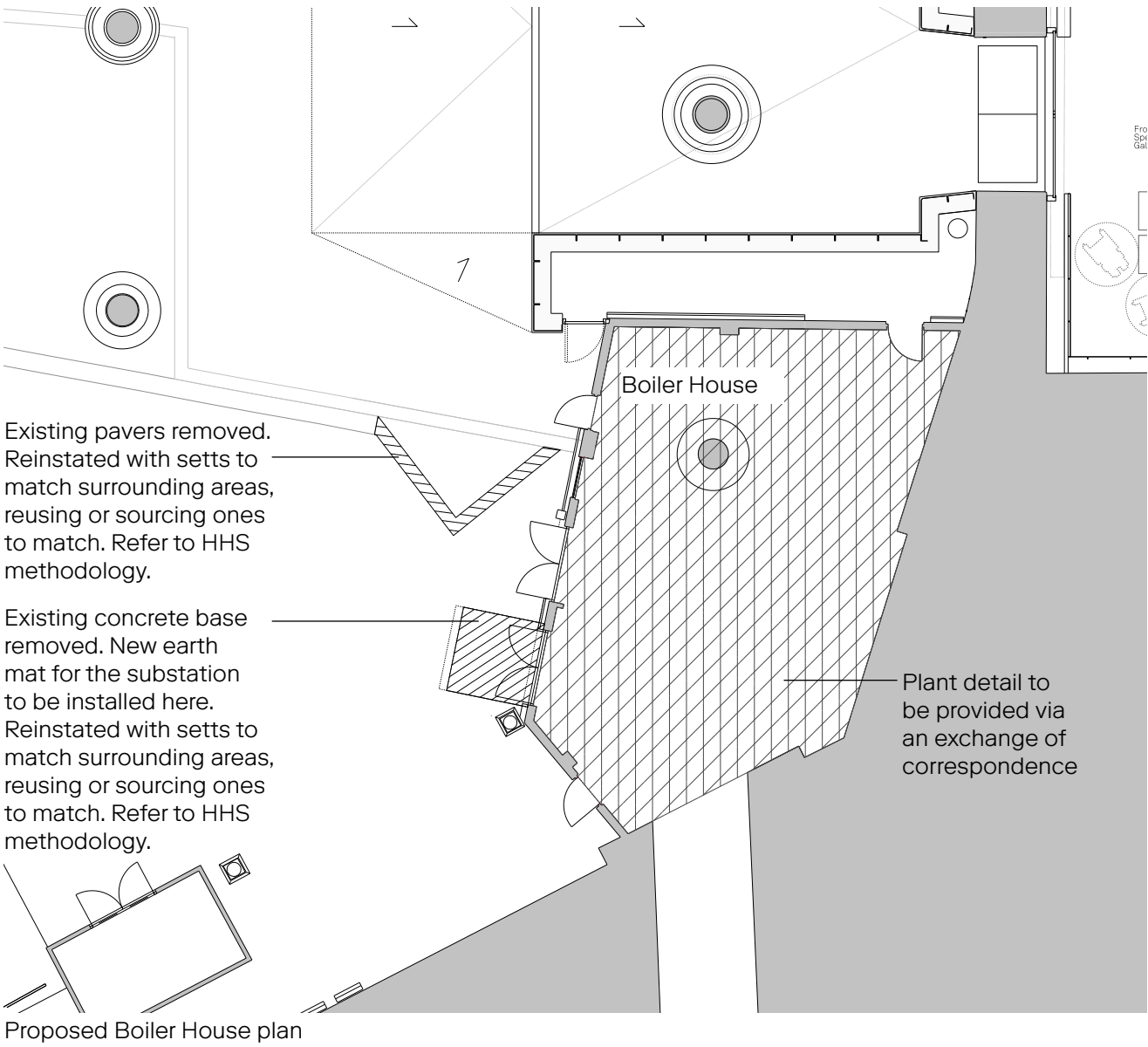
4.2.2 Access



Proposed Demolition

The demolition shown in the drawings above is proposed to allow the proposed works to be carried out in this area. It is proposed that the sections of wall highlighted above will need to be removed to allow a suitable opening for the new equipment to be brought into the Boiler House and installed.

Outside the Boiler House the spiral staircase and existing redundant plant support structure block the means of access for the new equipment and will need to be removed to allow for the installation of the new plant.

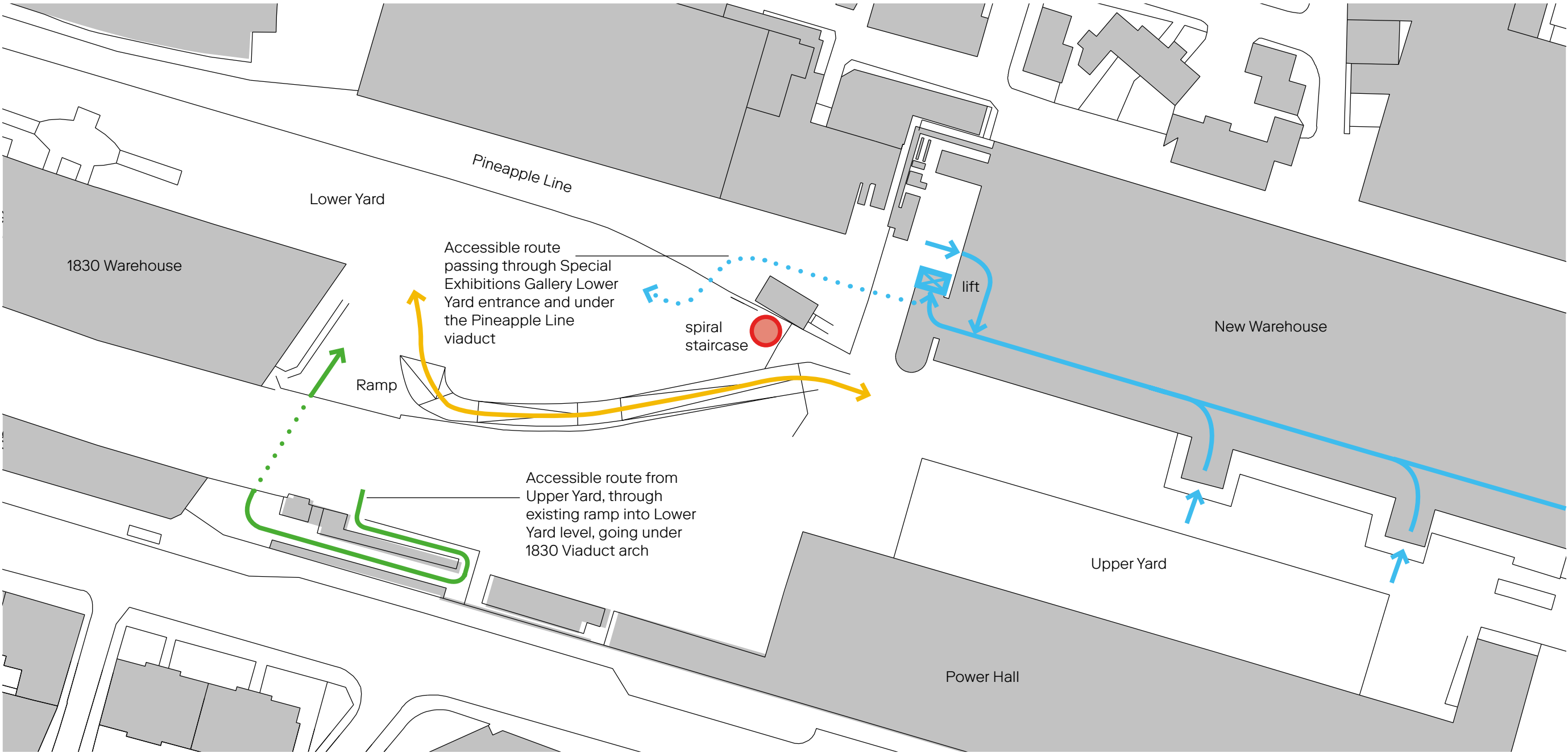


Proposed Changes to the Appearance

New access doors will be required for the new plant within the Boiler House, as shown in the drawings. The existing access to the south wall of the Boiler House will also be retained. The new elevation of the Boiler House will be clad in painted horizontal timber slatting to match the existing, with an area of wall louvred to allow for ventilation of new plant.

Externally an earth mat is required, which will be located adjacent to the Boiler House. The earth mat will be installed in the location of the removed plant slab, to avoid any removal of existing setts. The area of existing pavers under the stair will also be removed. These areas will be reinstated with setts to match surrounding areas, reusing matching setts stored elsewhere on the site.

Above the Boiler House a new rail will be required in the location of the removed stair. This will be a new industrial metal balustrade to match the industrial aesthetic of the SIM site.



Access changes

It is proposed that the existing modern spiral staircase is removed as part of the works. The impact of this will be mitigated by various other routes connecting the Upper and Lower Yards. Visitors will still be able to use the existing ramp connecting the two yards, a more accessible route between the two. Further to this there is access between the two levels internally through the New Warehouse, which takes visitors via the Special Exhibitions Gallery.

Key

- Removed staircase
- Accessible route passing through Special Exhibitions Gallery Lower Yard entrance and under the Pineapple Line viaduct
- Exterior accessible pedestrian route via ramp
- Accessible route from Upper Yard, through existing ramp into Lower Yard level, going under 1830 Viaduct arch

5 Pipework in the 1830 Warehouse: Work Package 1B

5.1 Existing Context

5.2 Existing Building

5.3 Design Proposals

5.1 Existing Context

5.1.1 1830 Warehouse Heritage



Painting of the Station and Warehouse circa 1830 painted 1980



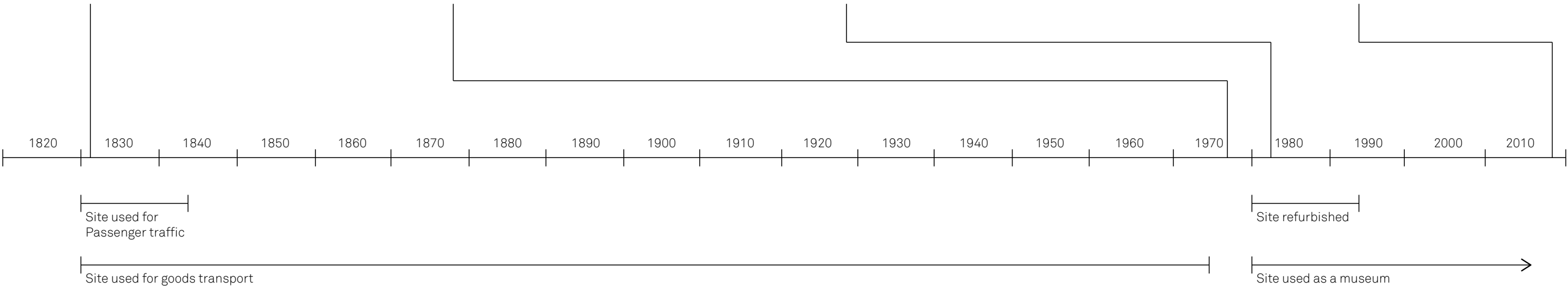
Photograph of the Station circa 1970/1980 - Source: Manchester Picture Archive



Photograph of the Station being rebuilt 1986



Photograph of the site today



Site History
The 1830 Warehouse, Station Building and Viaduct were constructed in 1830 followed by a series of other warehouse buildings in 1831 and 1837, the majority of which were demolished in 1866 following a series of fires.

The site was initially used for passenger and goods transport, with a train line running from Manchester to Liverpool. The number of railway lines entering the site increased with the Pineapple Line constructed on the site's northern boundary in 1867.

Passenger transport stopped in 1844. The site continued to be used for goods transport until 1975 before falling into disrepair. The 1830 Complex in particular was recorded as being in a significantly bad state of repair in the 1970s. At this time the timber structure of the 1830 Warehouse was failing, the Station Building facade had temporary propping to support it, and the bridge was in-filled and banked with earth.

In 1978 the site was sold by British Rail to Manchester City Council and developed into the Museum of Science and Industry.

The buildings were refurbished over the following years for Museum use. The most significant changes across the 1830 Complex were:

- Demo and rebuild of the Station Building
- Structural works relating to the bridge
- New circulation cores
- The removal of the timber structure and insertion of concrete and steel structures and large exhibit into the eastern most bays (5a and 5b) of the 1830 Warehouse
- The construction of a series of openings, staircases and mezzanines within the Railway Viaduct

In 2012 the Museum of Science and Industry became part of the Science Museum Group. This application is for the first of a series of master-plan projects being undertaken by the Museum.

5.2 Existing Building

5.2.1 Configuration

5.2.1 Existing Plant in Warehouse Bay 2



1830 Warehouse and Viaduct Basement 1 Plan

Basement 1 Warehouse Bay 2
Warehouse Bay 2 at basement 1 level is the second major bay along from the left in the plan above.

The proposals use this room to connect the external water source heat pump pipework in the Lower Yard with the new heat pump plant in the 1830 Viaduct. The room is currently used as a plant room and contains a mix of live and redundant plant.

Key

Water source heat pump in 1830 Viaduct, to be agreed via exchange of correspondence with MCC

Warehouse Bay 2



1



2



3

The photos to the left show the existing plant room space at basement level in the 1830 Warehouse. A number of existing plant equipment items are located in this room.

Two existing pipes enter from the North-west corner of the room and follow the West and South edge of the room at high level as shown in images 7, 8 and 9.



4



5



6



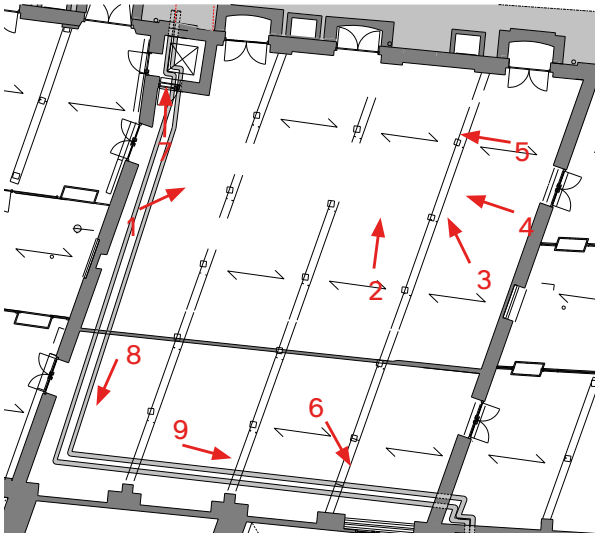
7



8



9

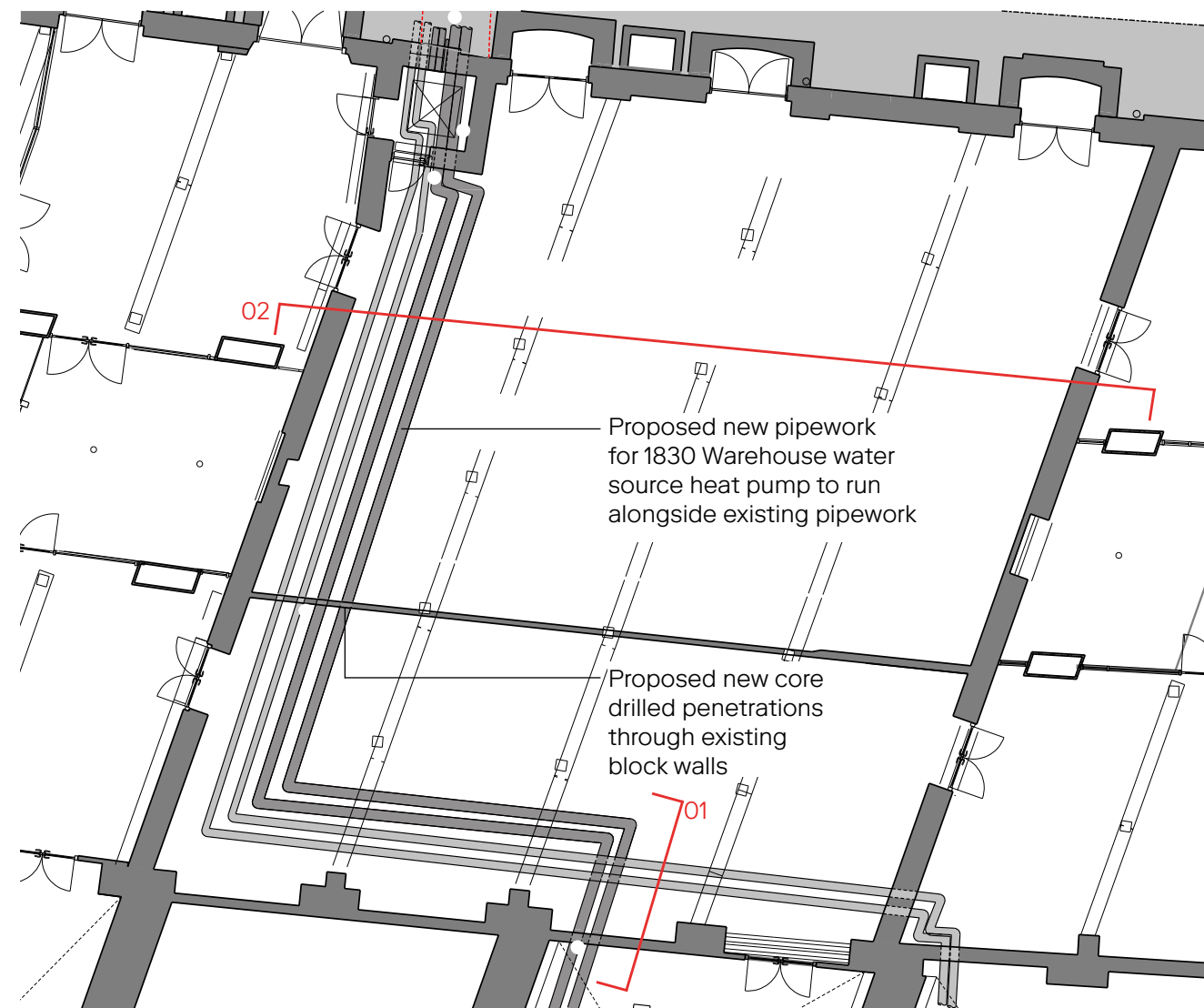


Key plan

5.3 Design Proposals

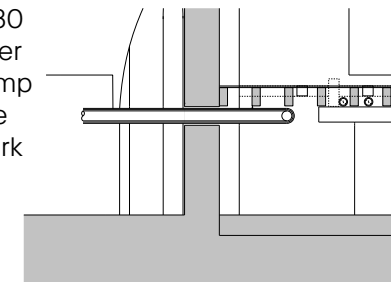
5.3.1 Proposed New Plant Route

5.3.2 Proposed New Penetrations

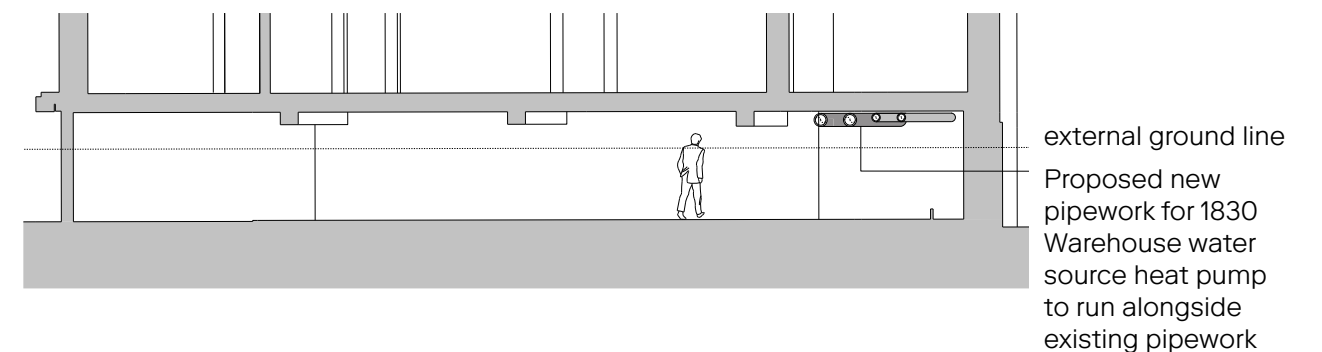


Proposed 1830 Warehouse Bay 2 RCP

Proposed new
pipework for 1830
Warehouse water
source heat pump
to run alongside
existing pipework



Proposed 1830 Warehouse Section 01



Proposed 1830 Warehouse Section 02

Proposed Drawings

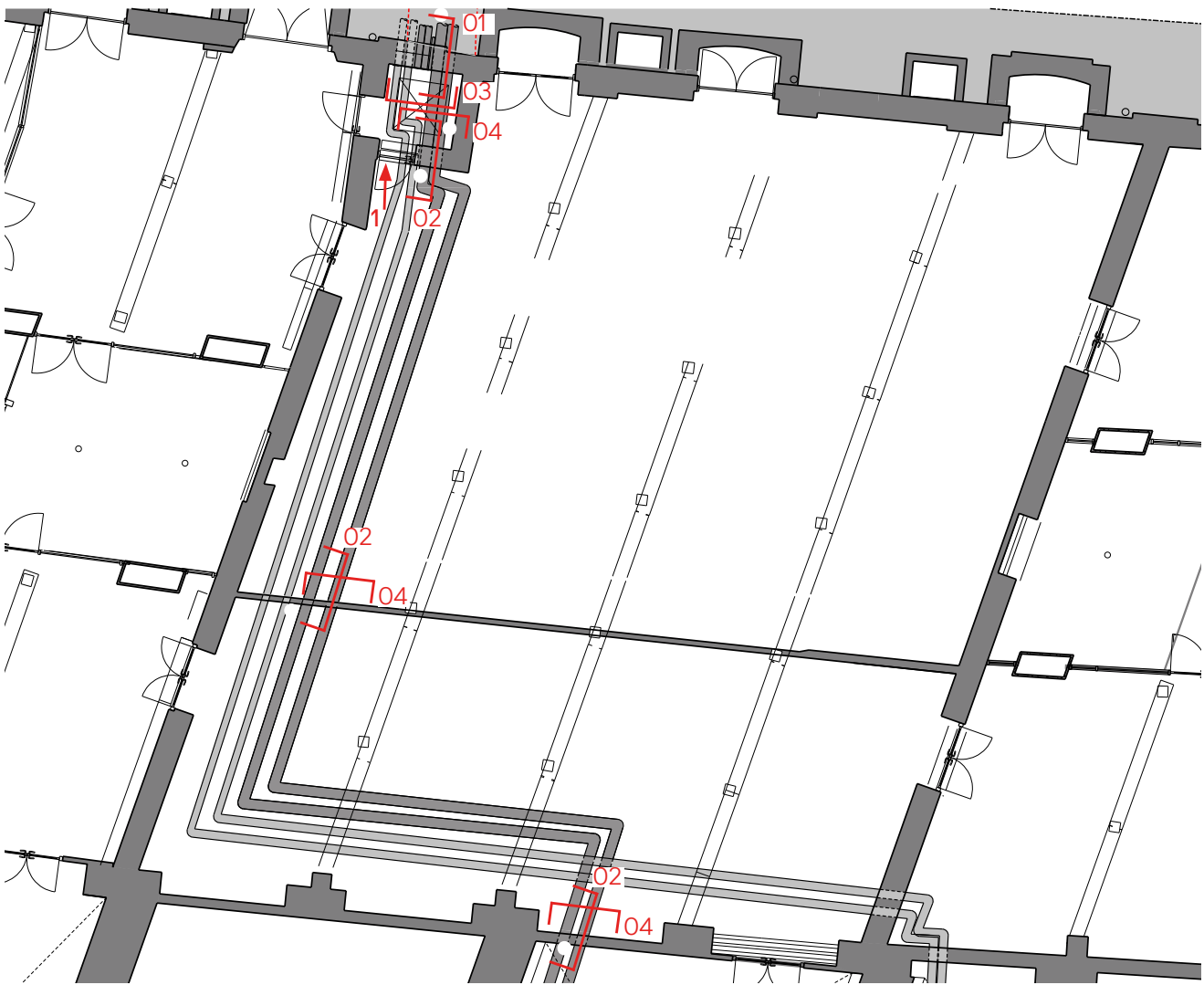
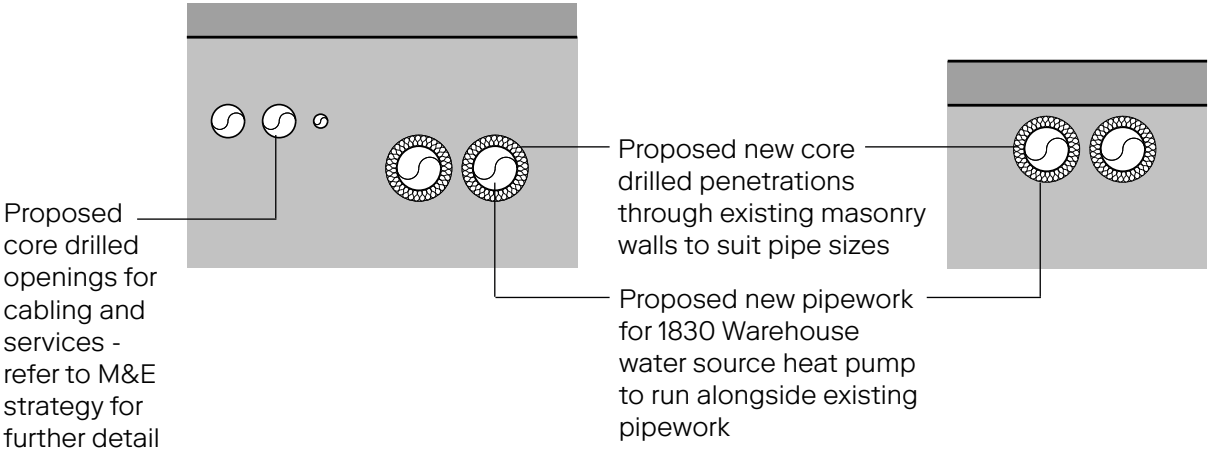
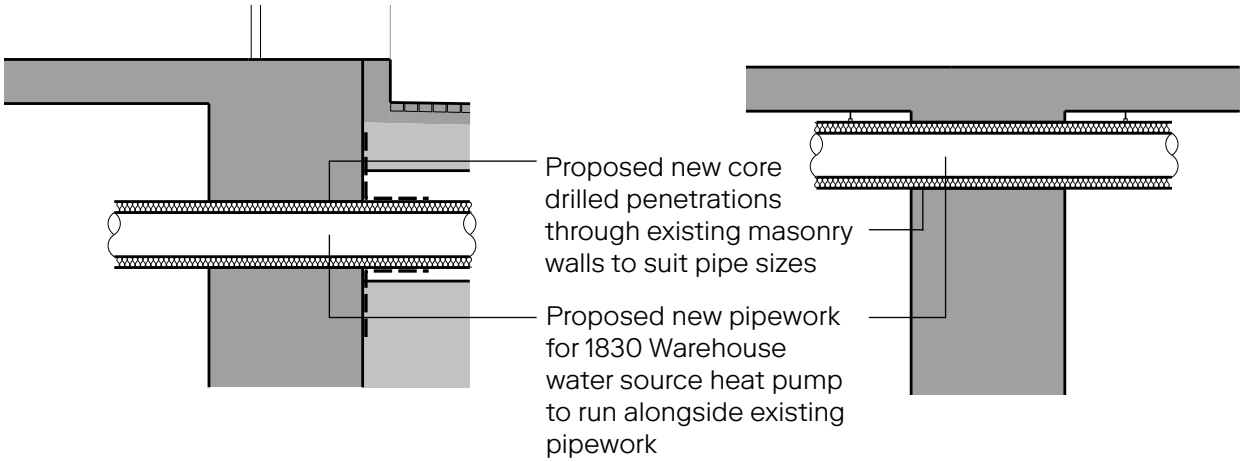
The drawings above show the proposed two new pipes for the water source heat pump in the 1830 Viaduct. The pipes will enter the building from the new trench in the lower yard and pass through the 1830 Warehouse at ceiling level, alongside other existing pipework.

Materials

It is proposed that the new pipes would be insulated and would have a similar appearance to the existing pipework in this plant room.

Access

The Warehouse Bay 2 plant room is a back of house space, not accessible to the public. Access in this area will be unchanged with the installation of these pipes.



Proposed New Penetrations
New core drilled openings are proposed to allow for the new pipes to pass from the external trench, through the existing 1830 Warehouse and into the 1830 Viaduct where the water source heat pump is located. This method is proposed as the lightest impact to the existing fabric.

The two new pipes will be hung on a cable suspension system from the modern ceiling (1990s). Refer to the M&E strategy



1 Existing pipework entering 1830 Warehouse