Design & Access Statement (DAS) - Oxford Biomedica – Two Storey Extension

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Imagine Create

The Design and Access Statement defines the fundamental goals and overall visions of the planning application proposing the erection of a two storey side extension to existing Oxbox facility, relocation of fire escape, additional parking, cycle shelter, and associated infrastructure and building work. .

Design & Access Statement (DAS) - Oxford Biomedica – Two Storey Extension

The Statement
Oxford Biomedica's - Vision and Masterplan

Oxford City is a place where experimentation is encouraged, and technology is developed that transforms people's lives. At the heart of the science, space and health tech sector, Oxford & Cowley area is a centre of progress and an established beacon of global science and discovery.

Oxford Biomedica has embarked upon an ambitious expansion plan with a footprint of 500sq metres of new two storey extension attached to the side of the existing building, providing working & research space. Importantly this will be supported by people working on other sites they operate in Oxford together with improved on-site amenities.

As part of the Phase 2 works , a separate planning application will be submitted relating to external works located towards the Northern section of the Oxbox site, including the addition of control rate freezers, future holding tanks , LN2 store , wastes stores and plant compounds .

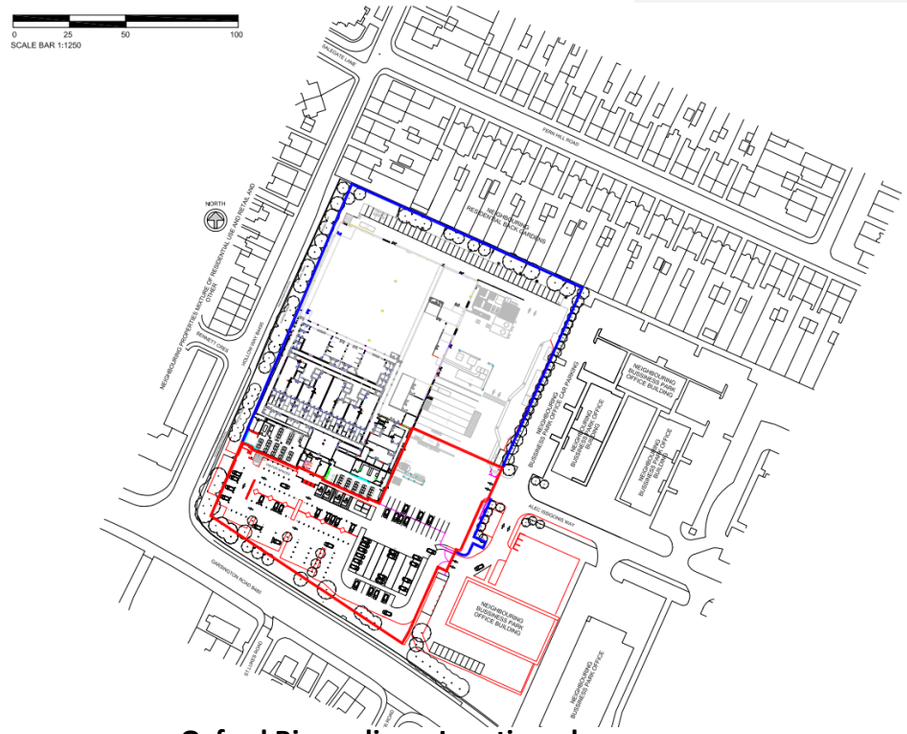
In April 2022 Oxford Biomedica approved WHP's Design for Fit out of the remaining fallow area into Manufacturing cleanrooms & extension of Offices & QC laboratory facilities to be situated at Cowley Oxford. These will support and enhance the existing facilities and lead to increased job security & inward investment into Oxford region.

The site is a operational manufacturing facility, in Cowley, Oxfordshire, England. The site is immediately south of the south of centre of the city Oxford. Historically the site was formerly a car manufacturing site, then redeveloped in the 1990s as a Post office sorting office , so as a result it has a large service yard to the East with multiple RS doors/loading dock, and has wide spans in its structure & height required for pharmaceutical & biotechnology manufacturing . Sitting on approx 2 acres, south of the historic city of Oxford, Cowley welcomes new life sciences facilities, businesses and people each year.

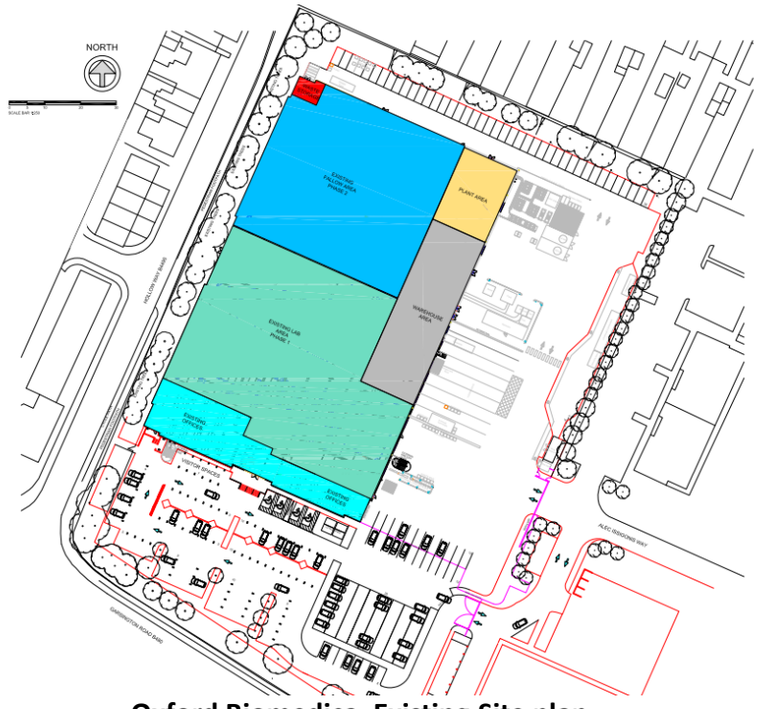
This D.A.S document outlines the design context relating to the proposed development site and the relationship with its surroundings. It establishes a framework for the overall development of the site in terms of use, siting, landscape, environment and infrastructure.

Ian Pearson (WHP) Derell Consultants
Principal of Architecture
June 2023

Imagine
Create



Oxford Biomedica - Location plan.



Oxford Biomedica Existing Site plan.

Introduction

1. This Design and Access Statement, is in support of a full planning application for a 2 storey extension for offices and QC support facilities. The application has been submitted after consultation (PRE-APPLICATION) with the local planning authority in 2022 regarding the physical massing & existing characteristics of the surrounding facilities within the site & Local area.
2. The site plot is **0.90 Hectares .**
3. Oxford Biomedica operate several other Research & manufacturing facilities in Oxford , and the operations on this site relate to these.
4. The Oxford Biomedica Campus is an existing manufacturing operation near the centre of Cowley , Oxfordshire, England. The site is about 2 miles (2.4 km) south of Oxford. A large part of the site was formerly a Postal sorting depot until 2020 when Oxford Biomedica fitted out Phase 1 for the manufacture of cell and gene therapy products.
5. It has seen a transition to its new role as a Biologicals manufacturing facility by Oxford Biomedica . Sitting on an existing manufacturing site in Cowley to the south of the historic city of Oxford, welcomes new facilities, businesses and people each year . Phase 2 fit out and the associated small extension for additional offices & QC laboratories enables the manufacturing facility to meet demands from new clients which provide new high added value science employment .

The Oxford Biomedica Site Location

In addition to this statement, the planning application is supported by accompanying documents regarding the strategy towards existing park planning conditions, landscaping, traffic movement, ecology, sustainability etc, and the planning application drawings listed below:

- OS Location Plan
- Existing Site layout
- Existing Elevations
- Proposed Site Plan
- Proposed Ground floor layout
- Proposed First Floor layout
- Proposed Roof Plan
- Proposed Elevations
- Proposed Landscaping Plan / Planting Plan

Development Site Location

1. The planning application seeks consent the ercetion of a two storey side extension to existing Oxbox facility, relocation of fire escape, additional car parking, cycle shelter and associated infrastructure.

2. The existing building fallow area [Phase 2] is to be fitted out with a single floor of cleanrooms for the manufacture of biological products, similar to ones already manufactured [in Phase 1]. Within the plot there are existing areas designated for staff & visitors secure car parking which have extended to provide additional parking for Accessible parking, EV designated parking and standard parking bays plus an increase of the bicycle and motorcycle parking . These have been designed for a easy access to and around the building by car and pedestrian foot traffic .

The existing building is to be extended to form additional offices [First floor] and QC laboratories [Ground floor] . Within the Oxford Biomedica plot an area designated for staff & visitors secure car parking has been designed for a easy access to and around the building by car and pedestrian foot passage.

The proposed floor area of the new facility is as set out below:

Overall building footprint gross external floor area (G.E.F.A.) **7029m² [Existing Building Total area]**
Ground floor QC laboratory extension area **499m²**
Total New ground floor footprint [Extn & Fit out] **499m²**

First Floor office new area **499m²**
Total first floor area **499m²**

Total new Building extension floor area (Ground+Mezz+First floor)= **998m²**

Total Car Parking when complete = (160No Standard Spaces + 6No disabled + 12No EV charging spaces + 7No Visitor Spaces) = **185** spaces
Building Parapet height = **14.1 m [New Extension & Existing Building]**
Stair tower height 1no.[New Fire Escape from Offices] = **4.0m [to match Existing on the South Elevation**

3.0 DESIGN PRINCIPLES

FACILITY FUNCTIONALITY OVERVIEW [1 of 2]

The Proposed new extension is split into 4 functional areas :-

1. **QC Laboratory Area (Ground Floor)**

The QC Laboratory consists of a number of individual laboratories, Cold Rooms, Incubator Rooms, Waste Handling, Goods In/Out and a specialist SAPO3 Laboratory. The laboratories handle and process samples from the main production facility. The QC Laboratory area has a dedicated change area and Materials Handling Lobby and all functions are linked with a dedicated corridor. The corridor has Fire Exits to safe external locations on the Ground Floor.

The SAPO3 Laboratory handles SAPO3 products and has its own dedicated entry/exit airlocks, independent HVAC system and waste management via Autoclaves and waste collection systems.

The goods in/out from the QC Laboratories consists of small scale items typically collected by van.

2. **Freezer Storage (Ground Floor)**
There is a dedicated area on the Ground Floor to house specialist upright and chest freezers.

3. **Office Area (First Floor)**

New office space including desks, meeting rooms, toilets and breakout area is proposed for the first floor. This area will be accessed from the existing first floor office.
The existing Fire Escape will be reinstated on the external wall of the new extension

4. **Plant Space (Mezzanine)**

With access from the Office Area via stairs, a dedicated plant mezzanine will be erected in the roof void to house all of the HVAC and Electrical Plant for the new extension.
This is a non-habitable space.

3.0 DESIGN PRINCIPLES

FACILITY FUNCTIONALITY OVERVIEW [2 of 2]

- The proximity of the proposed centre within the local site infrastructure, is entirely appropriate to its proposed manufacturing & distribution function, permitting immediate access to the major road infrastructure within Cowley/Oxford network.
- The overall height and plan dimensions of the two storey office extension to the unit are a product of its process operational function, as indeed are the requirements for full vehicle circulation, service points to the two elevations East(Goods) and South(Personnel), and parking for some 185 vehicles on the plot, in addition to the infrequent HGV vehicles / large vans parked in front of the existing loading dock doors.

- The existing separation of both pedestrian and vehicular access, and goods and private car access is continued in the amended circulation layouts, both on the grounds of safety and security. Centrally located control of goods vehicle access and egress, together with controlled car barriers , gates for the service yard , and designated pedestrian route from the site and marked crossing points, achieve this desirable site infrastructure objective.
- The scale of the two storey extension to the side extension matches the character of the existing Oxbox facility , minimising the visual impact on the existing site and surrounding area.

Design:-

- The Proposed new office facility extension on the Oxford Biomedica site seeks to maintain the high quality of external appearance of the existing building, appropriate to its location .
- The steel framed structure to the building will be clad in a mix of composite cladding & structural glazing , strip windows and brickwork walls to match the existing South and East elevations . It is 14.1m above adjacent ground level as noted on the Project elevational drawings.
- Materials to be employed for the external cladding will be a combination of horizontal and vertical flat Kingspan composite metal panels, typically Dark grey / Black in colour, and brickwork to match the elevations of the existing offices /production buildings all as indicated on elevations accompanying this application. Samples of all materials will be submitted for approval in due course.
- The extension to existing building will sit comfortably within the site and the adjacent surroundings, with the office and collaboration areas having windows and doors that are a comfortable scale for people and match the windows on the existing office building .

3.0 DESIGN PRINCIPLES

Access

1. HGV arrival and departure from the site will be via the adjacent Alex Issigonis Way .

2. Parking for 185 cars, 15 motorbikes & 100 Cycles, is to be provided to the east of the facility in a Oxford Biomedica controlled parking area at the plot . Designated accessible parking, is to be located close to the building. It is envisaged that 75% of spaces will only be fully utilised at times of shift changeover during campaigns. As the site is not for public access. Charging facilities for electric vehicles will be provided within the front of house car parking scheme.

- Cycle parking will be provided for 100 covered and secure cycle racks on the East side of the existing Oxford Biomedica facility in the site .

- An existing well lit pedestrian route from Facility will connect the infrastructure road pathways to a controlled facility car park with accessible Kerbs , and existing designated level crossing points for wheelchair users to gain access to the building within the site off the main roads .

- Safe access for disabled users to all areas but certain areas by their nature [QC laboratory functions] will not be accessible by wheelchair users.

- All access points into the offices are level with no trip hazards. Access to offices are on 2 levels , personnel escape doors from the warehouse and production for ambient disabled are all level with external finishes. Within the main office building entrance there is an existing accessible compliant lift to access the first floor offices.

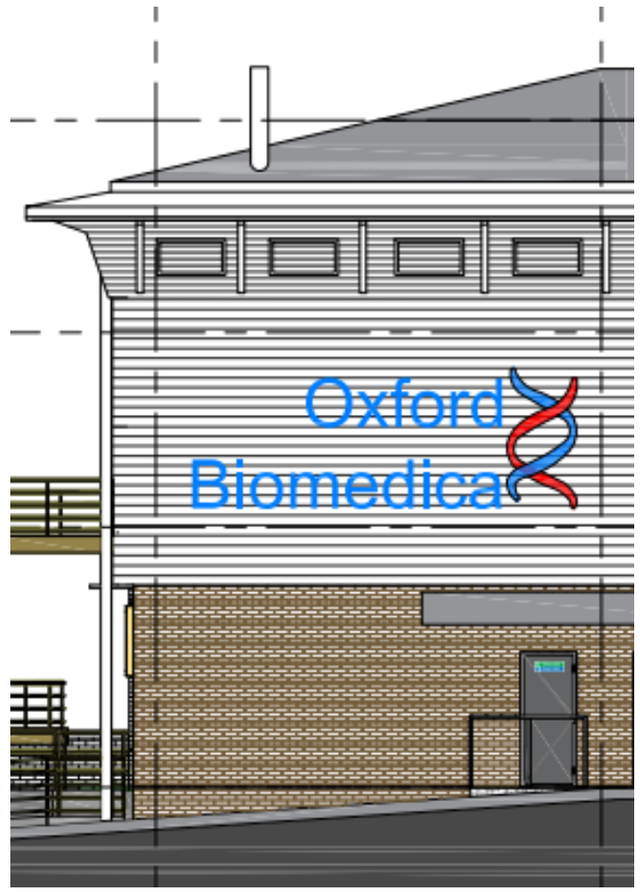
- Main office entrance is via an accessible compliant security swing access door suite, leading onto an accessible compliant lift through the main access stairs.

- Overall the design has taken into account the different age groups who will use the building with ambulant disabled staircases, lift, level access at all entrances and exits. The layout has been designed for safe and easy movement and to H&S requirements.

- All new toilets, shower, locker rooms, and changing facilities have been designed to be Neutral gender specific. [Existing central changing areas are reconfigured to increase the quantity of locker spaces required for the increased manufacturing area which has been applied for in separate Application 4]

Landscape strategy

The new landscaping has been introduced for the site and has been discussed in detail with the client and this mainly consists of hard landscaping in the new parking areas to maximise the number of spaces for cars, accessible spaces , EV spaces & cycle/ motorcycle parking. The materials to be used will utilise the same pallet of materials used in the existing facility landscaping areas, to ensure the new landscaping is integrated with the existing. The cycle shelters will be of a covered type.
The soft landscaping has been integrated into the existing landscape character of the site.
The hard landscaping materials will be specified to match those already used in the existing carparking area , in the new car park extension .
The staff break out area has been increased from the size of the existing and re-located to the East elevation opposite the bicycle and motorbike parking. This is out of the main carpark traffic flows.



Sustainability strategy

Whilst BREEAM accreditation is not required, the client aspiration for the two storey office & QC laboratory extension is to be designed and constructed to achieve a building which is similar to one which could achieve BREEAM Good rating. There is more detail on the sustainability principles used in the building services and architectural design in Appendix 6.

Lighting

The site lighting strategy will incorporate the existing external lighting of the external faces of the building, the existing car park and the existing pedestrian and cycle routes through the site, to ensure staff safety . The current lighting installation will be amended and extended into the new car parking & cycle / motorcycle parking areas with the same lighting types and lighting levels to minimise the impact to neighbours during hours of darkness.

Fencing and security

The new security fencing is proposed around the service yard boundary to match the height , colour and material of the of the existing boundary fence.
The existing layout on site has cars and HGVs vehicles separated with have separate entrances and control barriers and gates . Existing external CCTV camera systems provide surveillance over the car parking & entrance area.

Landscape concept

Oxford Biomedica Plot Drainage Concept (1 of 2)

Introduction

The following statement details the approach to drainage for the Oxbox facility . As part of the development of this concrete hardstanding area of the site Oxford Biomedica are to provide new connections to existing drainage from the extended building.
Other drainage systems on the site will remain as existing , as they are live drainage , and the design strategy is to keep foul & surface water discharges from the site at the rate they currently have been currently consented .

Sustainable Drainage systems:-
Suitable SuDs measures will be utilized & selected as part of the detailed design of the drainage system & hard landscaping to parking ie permeable paving in parking bays , attenuation tanks under new parking areas / oversized drainage pipework, to attenuate outflows with the permitted site discharge limits .

Existing Drainage :-
A number of existing foul water manholes and sewers are located within the site., which are all live and connected to by the building. There are as built drawings of the existing drainage and all modifications / connections to it carried out in the Phase 1 fit out of the main building in 2020.
The existing car park is positively drained and discharges into an existing surface water drainage network , the new parking area will discharge into existing drainage gulleys in either their existing locations [as set out for existing lorry parking] or in new amended locations to suit the detailed parking layout. The surface water discharges will be unchanged as the current hard standing finishes are very similar to those to be installed for the new parking layout. All of the existing drains within the site are generally deep and should be suitable to receive proposed connections via gravity from the development site where the new two storey extension is proposed.

Drainage Survey :-
A geophysical survey of the site along with a CCTV survey of existing drainage will be undertaken as part of the detailed design period.

Proposed Drainage :-
The proposed drainage connections are to be in accordance with the normal standards for drainage system design, and the drainage connections for the two storey extension will be into existing foul and surface water drainage systems. It is proposed to make a new connection and manhole into an existing West-East run of drainage to the south of the front entrance . This new connection will take fouls waste drainage from the new toilets and showers in the first floor of the two storey extension. This strategy is to avoid any issues with the existing foul drainage in the operational facility , which operates 24hours a day / 7 days a week .

Oxford Biomedica Plot Drainage Concept – (2 of 2)

Surface Water Proposals :-
It is expected that there will be no increase or reduction to the existing surface water flow rates as the area to be build on is already a concrete hard standing laid to falls and has its own surface water drainage outlets . These outlets will be relocated to outside the building footprint and where required new ones added to collect the surface water from the new roof area of the small extension building.
All consultation with the Lead Local Flood Authority and Thames Water has been carried out as part of any detailed desig , as the site discharge rate will not change , as the area being drained is the same – It is currently hardstanding and will be roof plus hardstanding when the development is completed. .

The below drainage proposals are subject to change following confirmation of the detailed drainage design. The current proposal is to utilise gravity roof drainage for the extension , but the location of downpipes is unknown currently and the assumption has been made that the roof drainage will be routed to the East, elevation to avoid further works to this roof drainage system for any future building extension works that may be proposed in the future . This also minimised new drainage works to a smaller area of the site and minimizes distruption to the live site operations and vehicle traffic .

The proposed drainage network is to be connected into locally to suit rainwater discharges from the new two storey extension. There is an existing drainage system draining the surface water from the delivery yard area which is directed through an existing fuel interceptor in order to deal with any oil spills etc. The surface water from the car park and roof and be connected into the proposed surface water drainage network after the existing fuel interceptor.
The proposed car park area in the east of the site is proposed to be drained using permeable block paved car parking bays. The surface water leaving this car park and entrance access road is to be restricted in order to avoid an increase in the size required for the attenuation storage or capacity of the existing system. Current proposals are to restrict the surface water flow from the car parking area to no greater than that which the existing system is designed for , so there will not need to be any additional attenuation capacity designed within the new car park area.

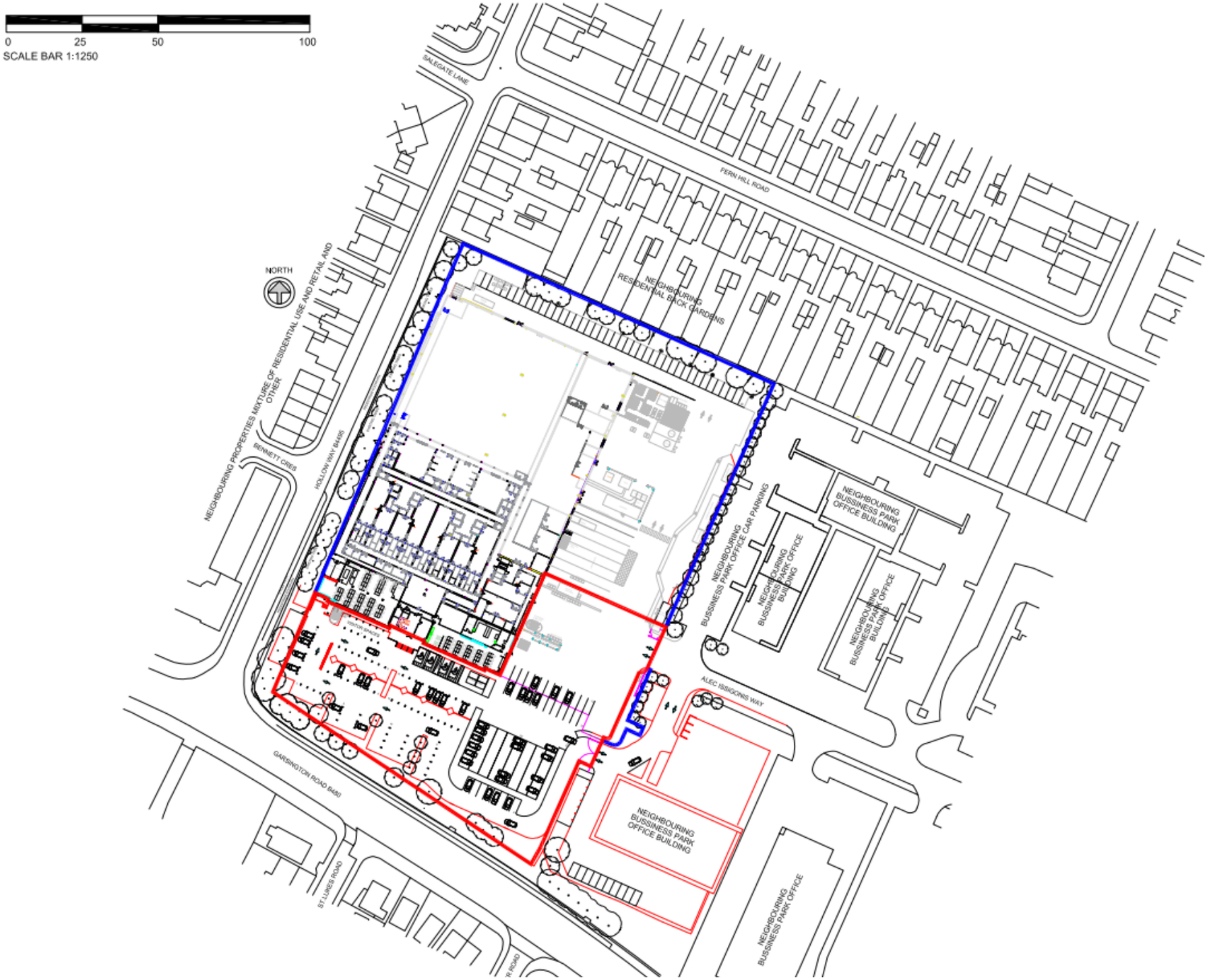
Foul Water Proposals
The current foul water sewers within the development plot are to be connected into and new connections are to be provided. There is a new foul manhole connection proposed in the site road that provides access to the carpark on the south side of the building , and the extensions foul drainage will be connected into this . There is not a significant increase in toilets capacity for the site , and the existing underground foul drainage run , is understood to have sufficient capacity already.
The proposed invert level of this foul connection is unknown, but it is assumed that it will be set at a sufficient depth to enable a gravity connection, as the existing facility drainage.

4.0 **Project CONCLUSION**

- The location of the proposal is optimum with ease of access to major road networks . The existing site is located in Cowley , accessed from surrounding urban roads using existing road access entrances used by the existing site traffic .
- The siting and outward appearance of the proposal will maintain the quality of the existing site and also match adjacent neighbouring office and commercial buildings in the Cowley area. It is similar in mass and appearance to the existing adjacent developments on the Alex Issigonis Way offices / commercial development .
- The operation of the unit will offer employment opportunity with an anticipated creation of approximately 100 new scientific skilled new jobs..

Appendix 1: Oxford Biomedica Site location

Site location – (1:1250 Scale)



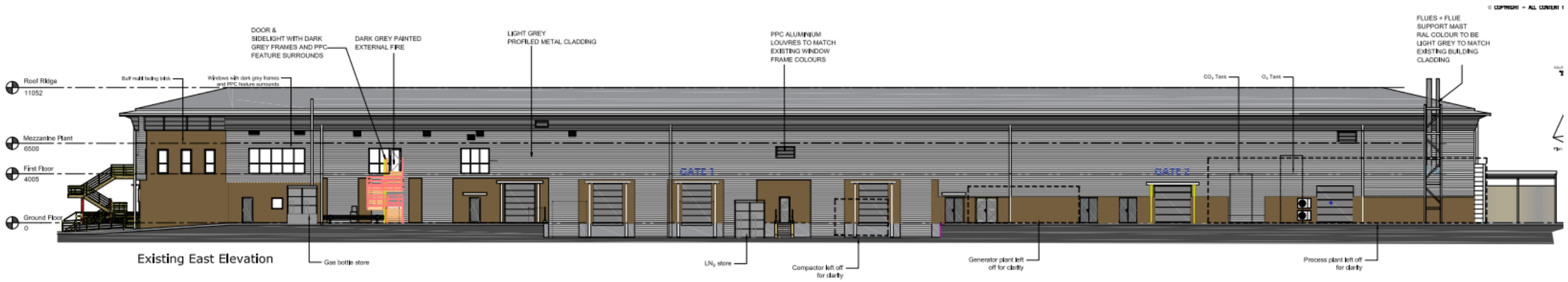
Appendix 2: Oxford Biomedica (Manufacturing Centre)

Existing Elevations (North,South,East,West)

Proposed Elevations (North,South,East,West)

Development Floor Plans (Ground, First, Plant Mezzanine, Roof)

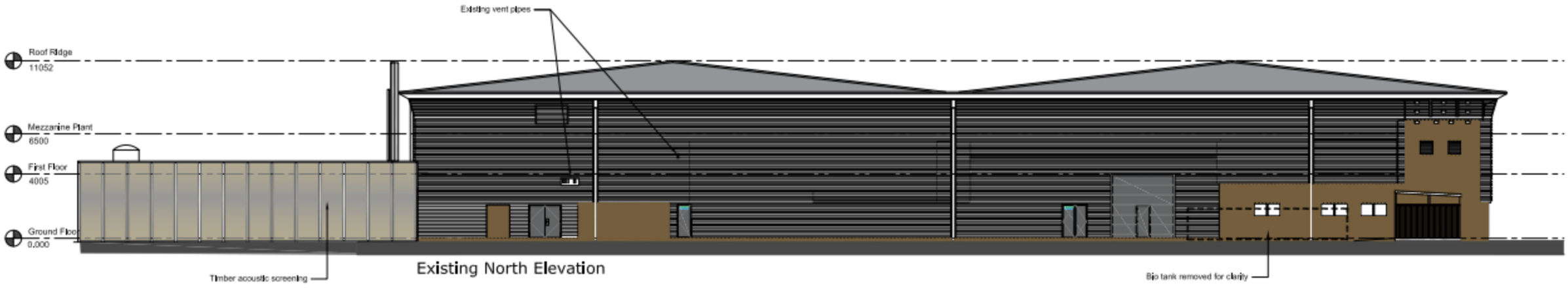
Existing Elevations –J9860-3002



East Elevation

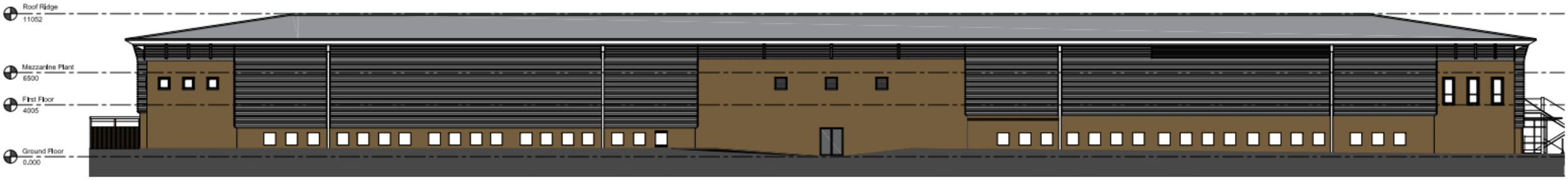
South Elevation

Existing Elevations – J9860-3002



Existing North Elevation

North Elevation



Existing West Elevation

West Elevation

Proposed Elevations – J9860-3004

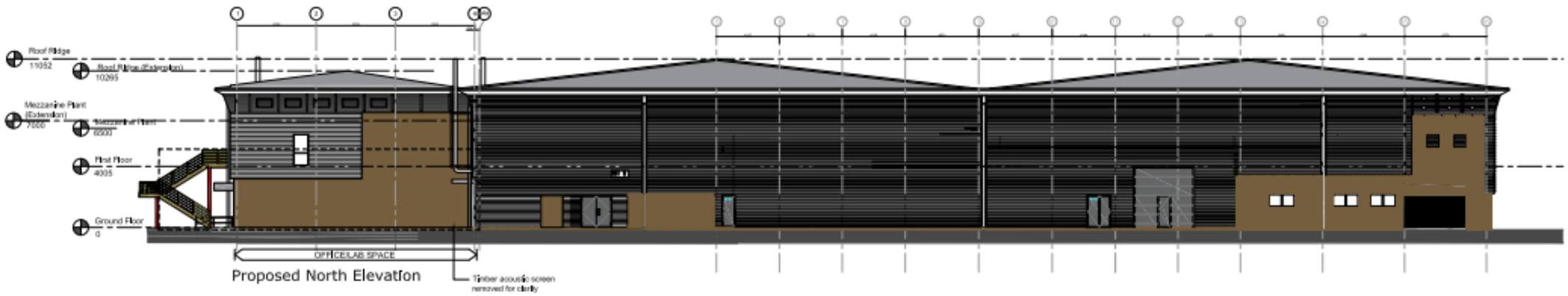
Proposed East Elevation

East Elevation

Proposed South Elevation

South Elevation

Proposed Elevations – J9860-3004

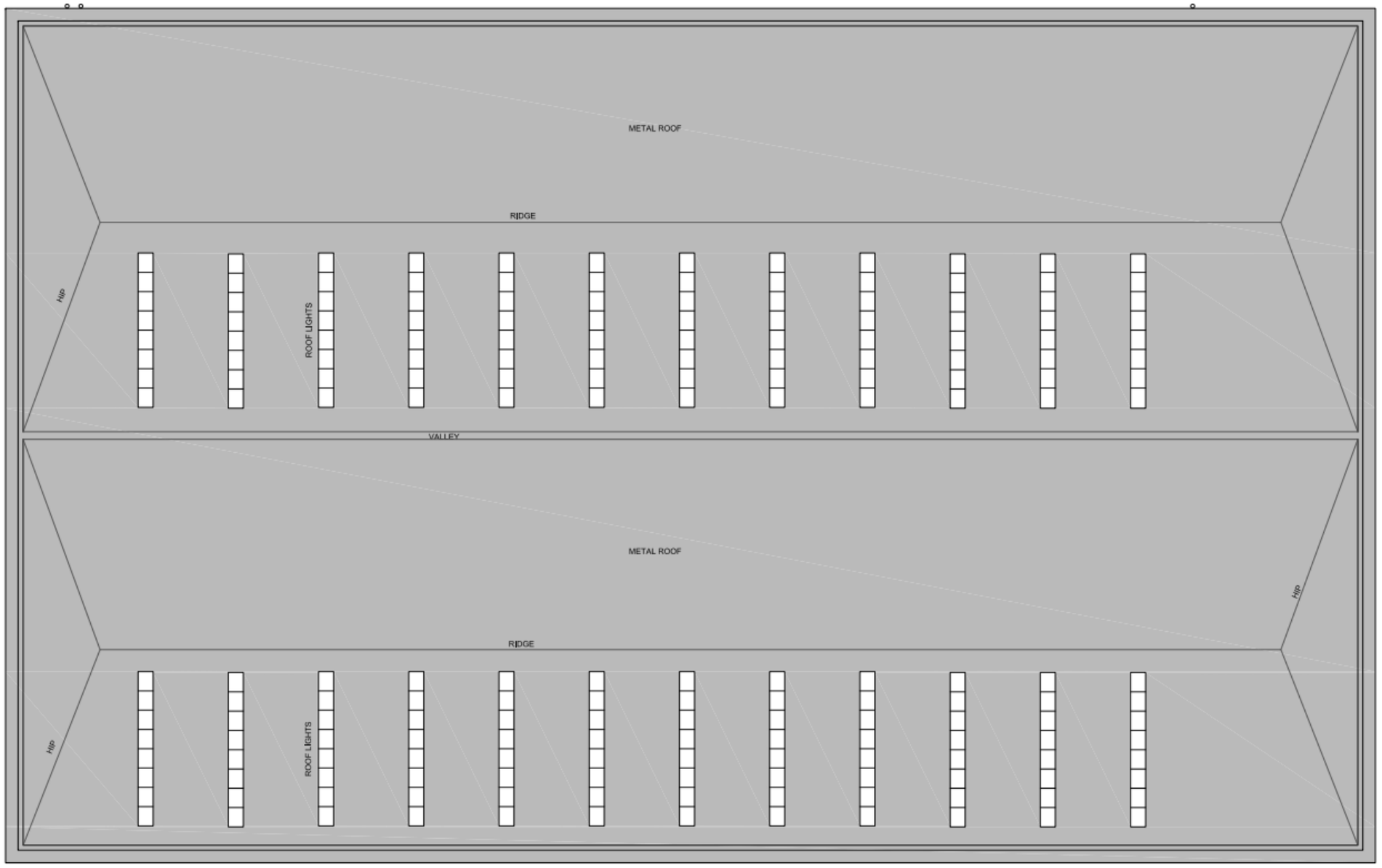


Proposed North Elevation

North Elevation

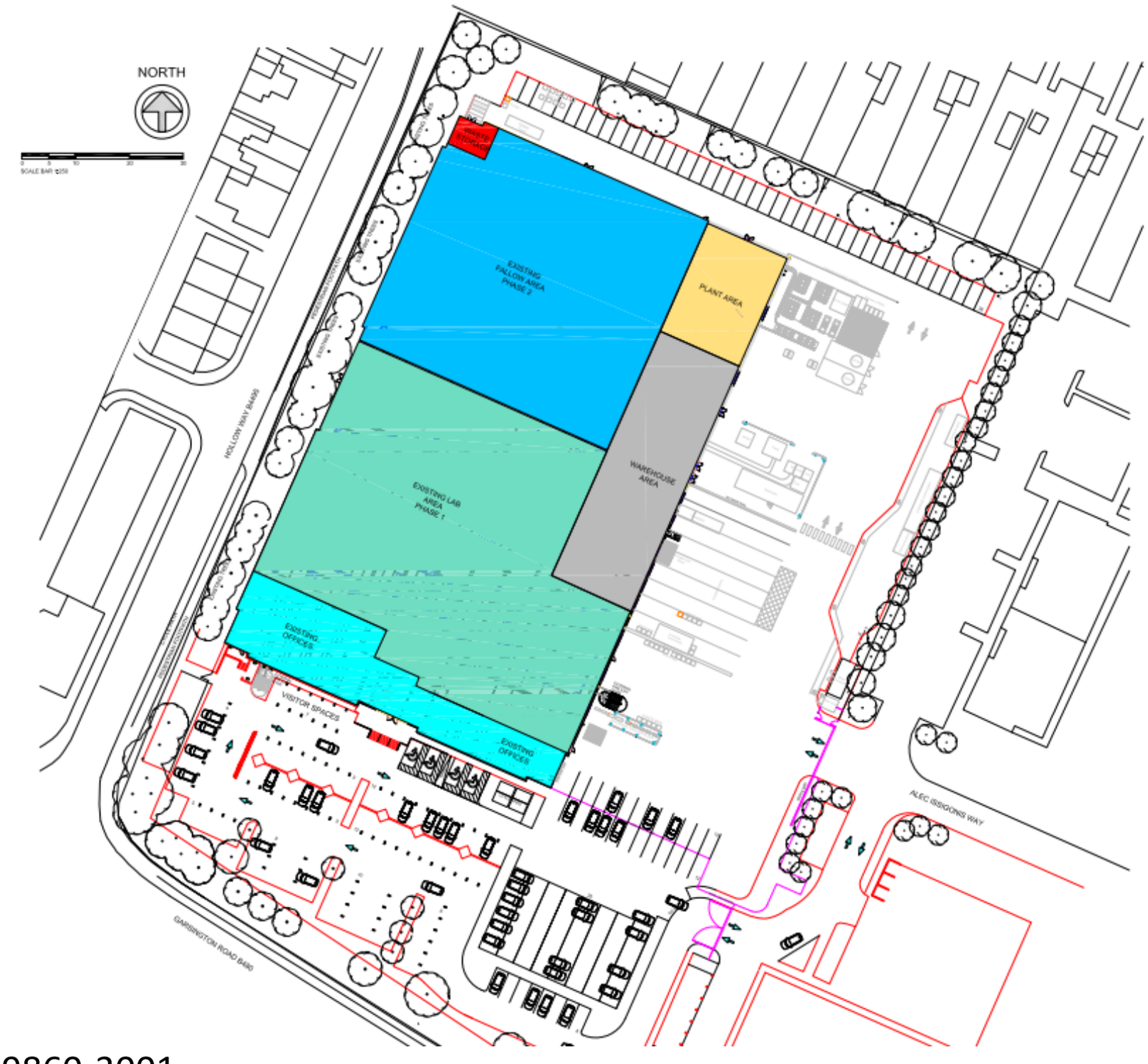
West Elevation

Development Plans



Roof Layout –Existing –J9860-3009

Development Plans

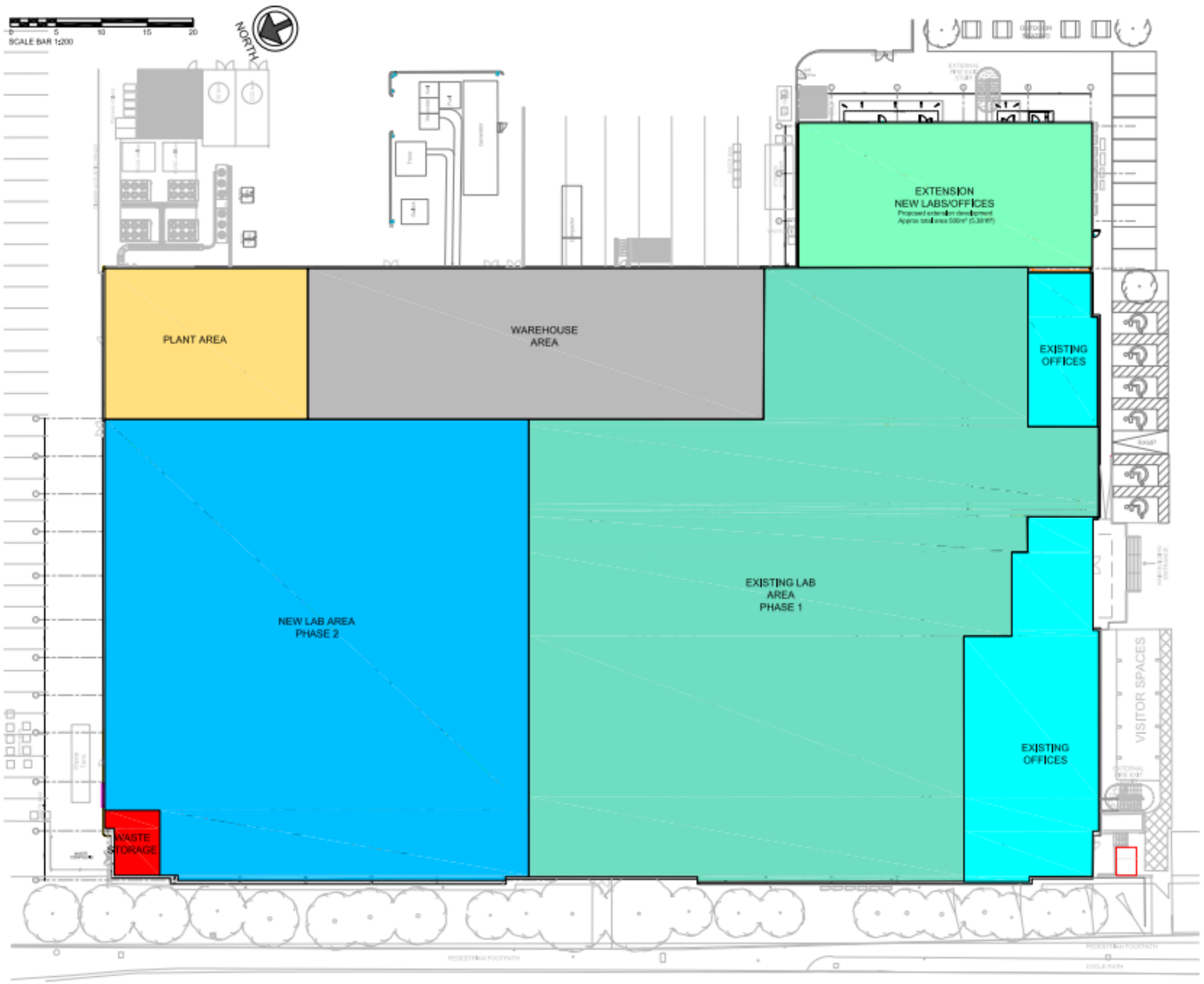


Existing Site Plan- J9860-3001

Development Plans

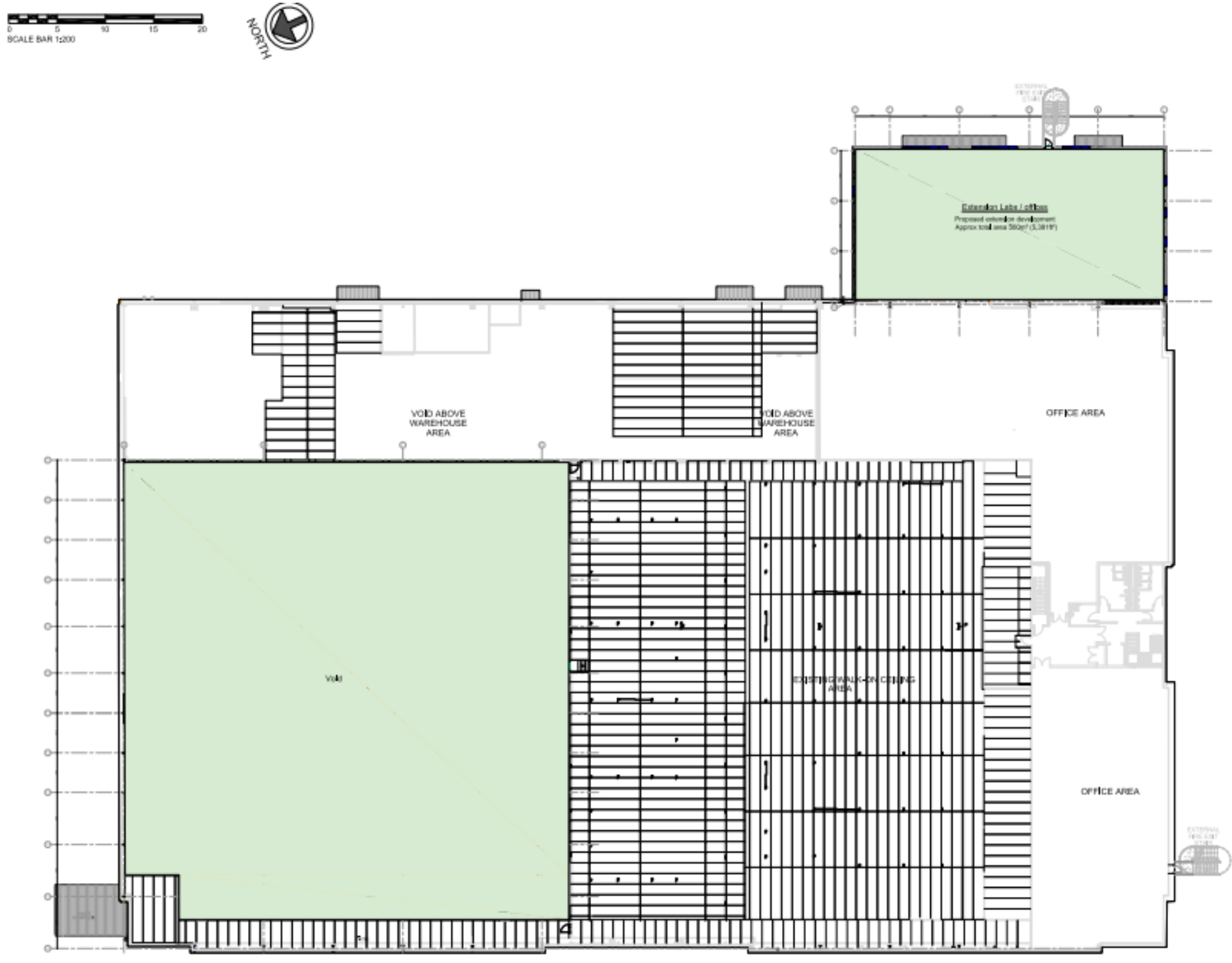
Proposed Site Plan-J9860-3000

Development Plans



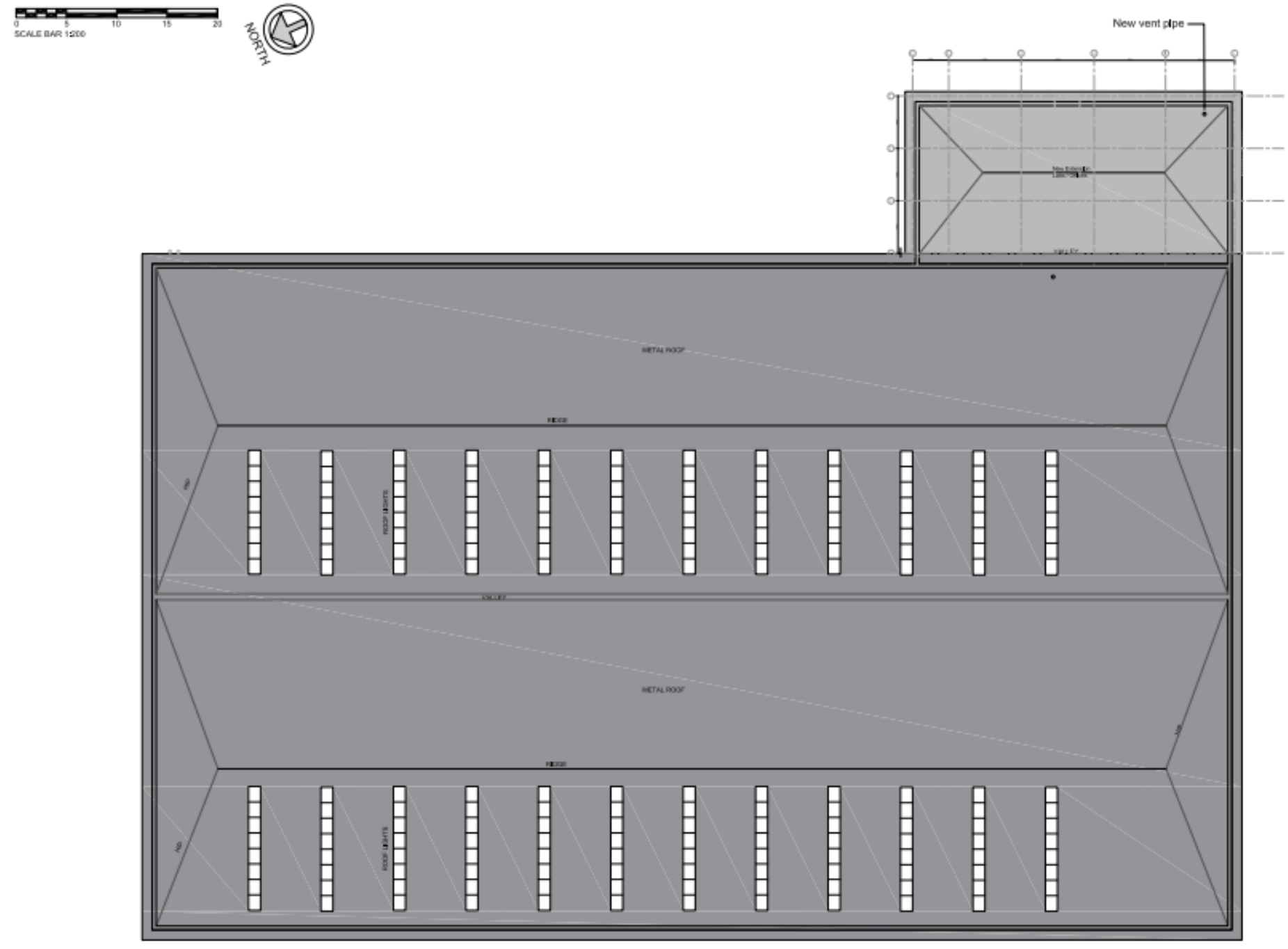
Ground Floor Layout –J9860-3010

Development Plans



First Floor Layout –J9860-3011

Development Plans



Roof Layout – Proposed J9860-3012

Appendix 3 :Traffic Assessment , Plot Vehicle tracking and Pedestrian Route on Site

Traffic Assessment

Site Location

Oxford Biomedica Plot Development
Site Location within local business park.

Public Transport

The existing site is located directly off the Alex Issogonis Way in Cowley, Oxford, and is well served by existing public transport services :-

London Heathrow airports are less than one hour by road. Oxford Airport, 30 minutes from the site, is expanding and currently runs scheduled flights that include Geneva and Jersey with connections to more than 1,000 airports across Europe..
Oxford Mainline Rail Station is only 2 miles away, with direct services to Central London (Paddington) in less than 45 minutes and Oxford City Centre in less than 15 minutes.

Frequent bus services from the city of Oxford serve the site

HJV Transport Consultants will detail further in their Transport Statement submitted as part of this application

Traffic Statement and Pedestrian Routes to plot within the Cowley Business Area

1. Summary

This Appendix presents a Transport Statement of the impacts from the proposed Phase 2 fit out and two storey extension within the Oxford Biomedica site. The transport statement has been carried out by separate consultants HJV Transport Consultants.

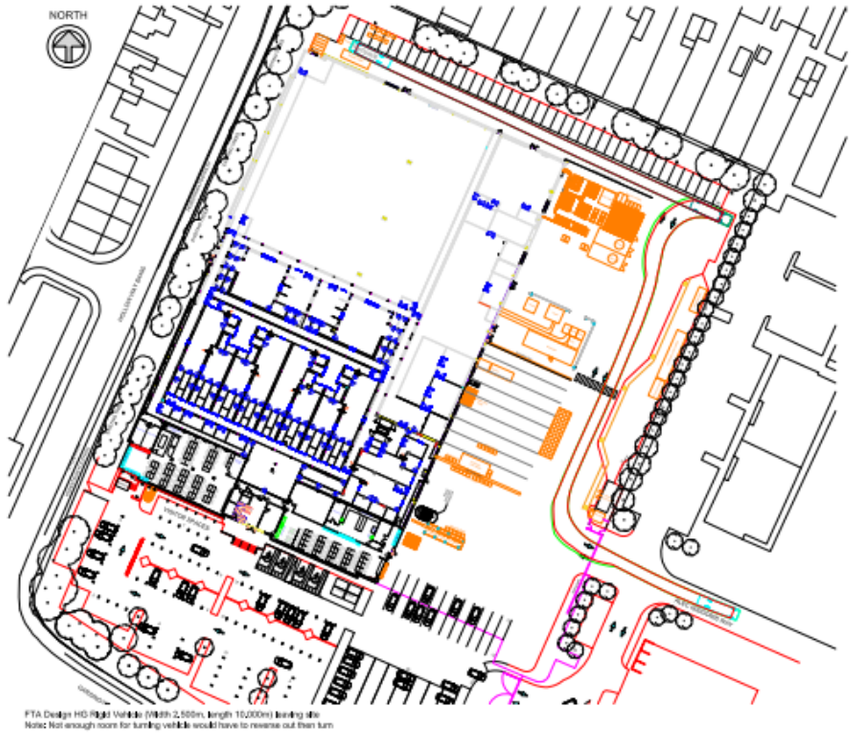
The key findings of the Transport Statement are:

1. The impact of the vehicle trips associated with the operation of the proposed development on the existing highway network users is expected to be of minimal impact;
2. The proposed existing car and proposed increases in parking for cars, bicycles and motorbike within the site are acceptable to the number of personnel to be housed in the Phase 1 and Phase 2 fit out areas and the two storey extension
3. The accident history of surrounding feeder roads, does not raise any significant accident concerns, and the proposed development within the Cowley area and is not expected to increase accident rates on the highway and surrounding areas as a result.
4. The proposed access/parking/Pedestrian footpath arrangements for the extension and extended car parking , is expected to be effective to ensure limited congestion onto the local highway – Alex Issigonis Way.

In summary, the Scheme is expected to have a negligible impact on the existing highway

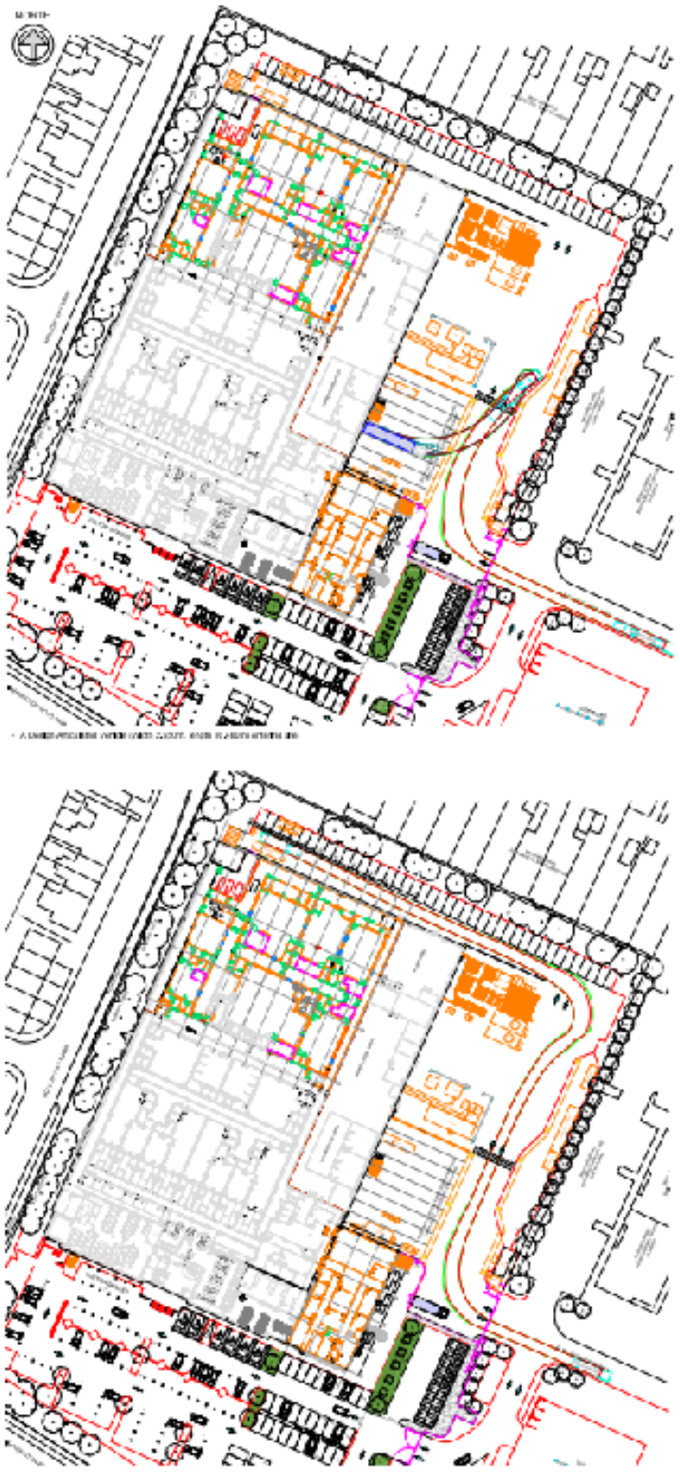
Refer to separate Transport Statement carried out by HJV Transport Consultants.

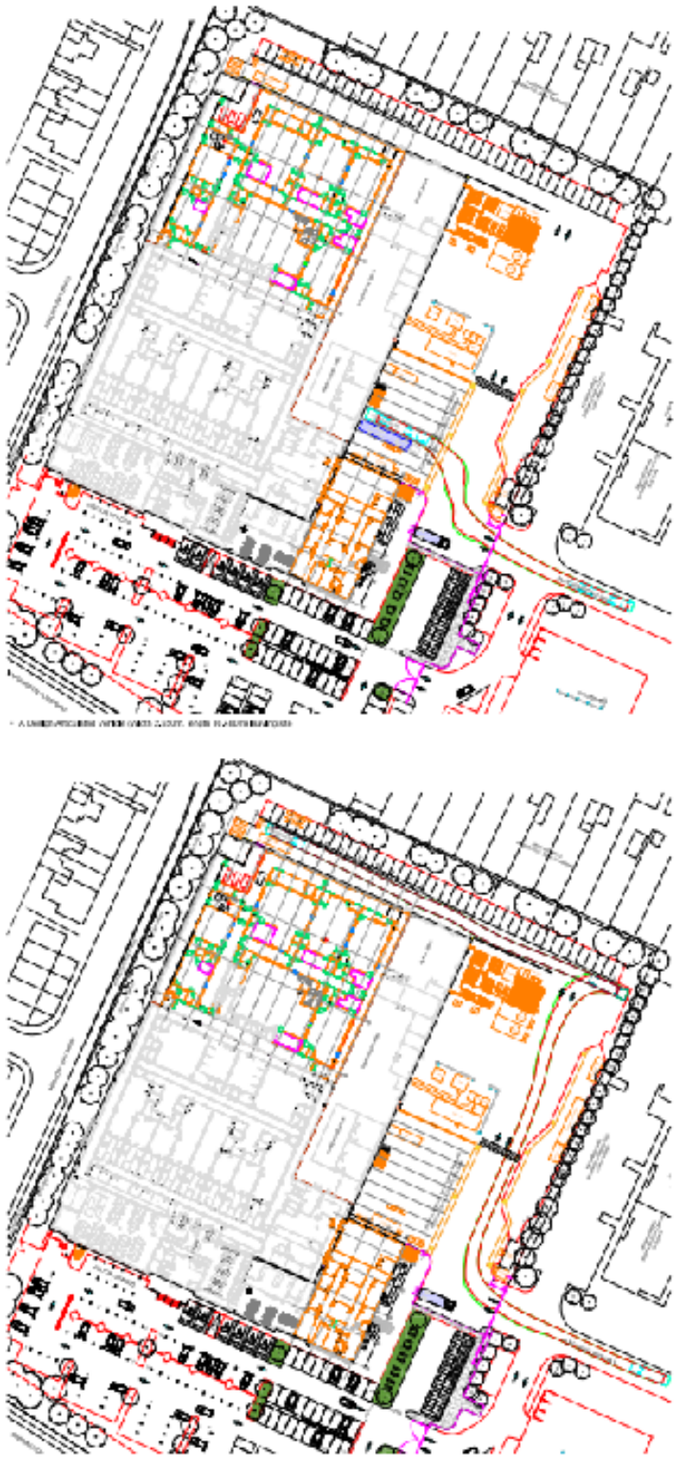
Development Plans



Vehicle Tracking Layout –Existing –J9860-3005

Development Plans





Vehicle Tracking Layout –Proposed (1 of 2) –J9860-3006

Development Plans

Vehicle Tracking Layout –Proposed (2 of 2) –J9860-3006A

Appendix 4: Site Plot link Establishment Plan.

Location Plan- J9860-3013

Appendix 5: Drainage Strategy .

Fig 1 Location

1. Introduction

1.1 Scope:-

Booth King Partnership Ltd have been appointed by WHP as Civil and Structural Engineers for the proposed extension of Oxford Biomedica Oxbox. The proposal consist in a two storey building adjacent to the existing building with a total extension footprint of 518 m2. A proposed development overview is shown in Figure 1.

This report identifies the drainage strategy to be employed on site, and how this is to be managed and maintained over time to ensure that the system continues to work satisfactorily.

A site-specific Flood Risk Assessment has not been prepared, as Environment Agency legislation states that a Flood Risk Assessment is only required for developments with a total area of more than 1Ha. The total site area of the Oxford Biomedica extension is 518m 2. Despite the site being beneath the threshold for an FRA, we have nonetheless reviewed the EA Flood Map for Planning and the LA's own SFRA and concluded that the site lies within Flood Zone 1 in its entirety.

Some key information and design criteria which have been used during the development of the design are as follows:

- For design purposes, a brownfield discharge rate of 5.0l/s to an adjacent private SW network. The drainage is to be designed for a 1 in 100 year plus 40% climate change storm return period.
- The Environment Agency 'Flood Map for Planning' shows that the site, including the proposed developable areas, is located within an area outside of the extreme flood extent (Flood Zone 1), meaning it has a less than 0.1% (1 in 1000) annual probability of flooding.
- The proposed location where future development will take place is a brownfield area of 0.05 Ha.
- Sustainable Drainage Systems (SuDS) are to be implemented and maintained for the lifetime of the building.
- SI shows made ground which reaches 4m. below current ground level with a layer of silty sand underneath. It's not feasible to excavate that deep, but further investigations will be taken to verify the possibilityof infiltration on site. At this stage we will consider partial infiltration with an infiltration rate of 0.05 mm/hr.

1.2 Standards and Regulations

All elements of the works will be designed in accordance with the latest relevant British Standards and the Building Regulations and will comply with any relevant statutory or Local Authority requirements. Specifically, the below ground foul and surface water drainage systems will comply with:

- BS 752 Part 1 to 7;
- Local Authority Requirements;
- The SuDS manual by CIRIA;
- Building Regulations Part H;
- SSG

2. Below Ground Drainage Strategy

Performance Objectives

The below ground drainage network is designed to convey water from the building to a suitable outfall. The principle objective is for surface water (from rainfall) to be separated from foul water flows, and conveyed to separate outfalls. Where possible, in line with the National Planning Policy, Sustainable Drainage Systems (SuDS) should be used for restricting surface water flows off site.

Foul Drainage

Foul water drains have been sized using the discharge unit method contained in BS EN 12056 Part 2.

The system is designed to flow not more than three-quarters full and will be laid at gradients that allow self-cleansing velocities to be achieved.

The on-site foul water network connects to existing foul UU 150mm pipe which crossed the site near the proposed building. An easement zone has been installed to keep this drain away from the proposed building.

Surface Water

Sustainable Drainage Systems (SuDS)

The National Planning Policy Framework states that Sustainable Drainage Systems (SuDS) should be used for restricting surface water flows off site.

Reference has been made to the Oxford Council Strategic Flood Risk Assessment (SFRA). This report states that;

"The Flood and Water Management Act 2010 requires new developments and redevelopments in England and Wales to have drainage plans for surface runoff approved by the Sustainable Drainage Systems Approval Body (SAB) where the construction work would have drainage implications. The SAB is responsible for adopting and maintaining new SuDS that serve more than one property and have been constructed as approved and function as designed."

The current National Standards for Sustainable Drainage Systems require all new developments, where practicable (excluding single properties), to implement SuDS. The standards set out appropriate design criteria based on four main parameters:

1. Runoff Destination hierarchy (in order of preference);
    a. To ground;
    b. To surface water body;
    c. To road drain or surface water sewer;
    d. To combined sewer
2. Peak flow rate and volume (pre and post development)
3. Water Quality (based on potential hazards arising from development and sensitivity of the runoff destination)
4. Function (design; flood risk; operation and maintenance)

2. Below Ground Drainage Strategy [Cont]

Ground Conditions

The Geotechnical site investigation indicates the presence made ground encountered up to 4 m below ground level which was found over silty sand.

Due to the presence of made ground, infiltration of surface water is unknown to be possible but further SI is taking place to verify this. Therefore is designed at this stage as partially infiltration, and, in accordance with the runoff destination hierarchy shown in section 2.3.1, the preferred destination of surface water runoff is therefore discharge into private SW sewer located in the site.

Outfall Location

A comprehensive utilities survey has been carried out by showing all the services located around the area of the proposed development. Unfortunately there is not a watercourse in the location and as such, we are proposing to discharge into the adjacent private SW sewer. Figure 2.

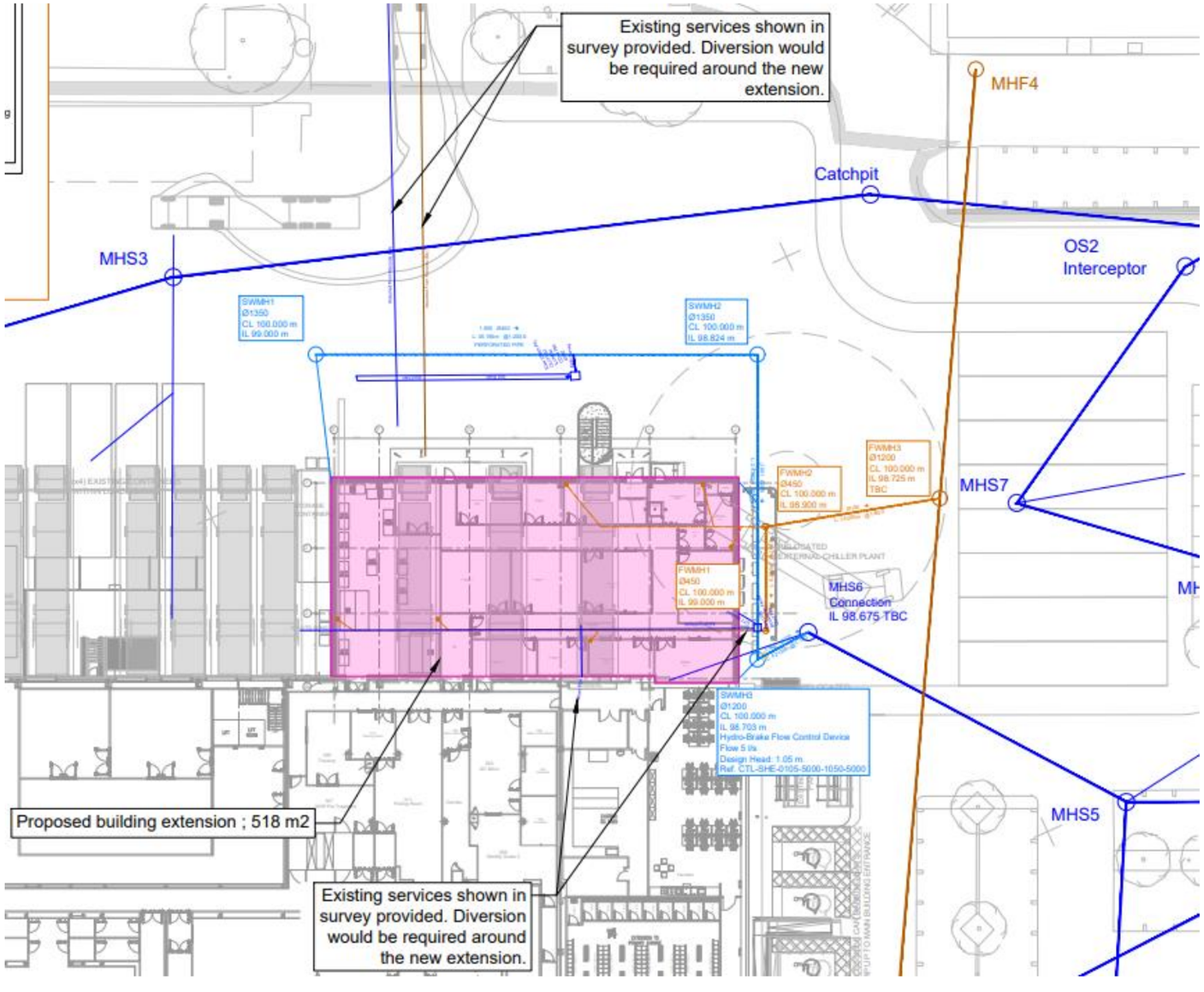


Figure 2 Surface Water Outfall

2. Below Ground Drainage Strategy [Cont]

Assessment of surface water flows (existing and proposed)

The below ground surface water network collects water from all hard-standing areas on site.

The surface water flows have been fully analysed for the existing hard standing within the site and the proposed arrangement including the roofs and all hardstanding areas surrounded.

The on-site network has been sized using the Causeway Flow with the following design criteria:

- No surcharging within the system for storm with a return period of 1:1 years;
- No surface water flooding for storms with a return period of 1:30 years;
- No surface water flooding for storms with a return period of 1:100-year;
- Controlled water flooding for storms with a return period of 1:100-year + 40% increase for climatic change.
- Additionally the proposed SuDS system has been sized to reduce discharge rates at the outfall for each of the above events.
- Greater than 50% betterment for most of storm events with flow discharge limited to 5 l/s.

Drainage

The drainage from roofs is collected and conveyed through a SW network based in a conventional pipes and manholes features, with a 450mm perforated pipe to allow infiltration. The flow is restricted to 5 l/s for all storm events, and discharge into the existing private SW network.

Viability of this hybrid solution it needs to be verified.

Development Discharge Rates

Storm Event	Brownfield Flow Rates	Proposed Flow Rates (>50% Betterment)
1	7.3 l/s	5 l/s
2	9.4 l/s	5 l/s
30	17.8 l/s	5 l/s
100	23.2 l/s	5 l/s
100 + 40% cc	32.5 l/s	5 l/s

Supporting drawings and calculations

A full set of calculations are provided with this submission analysing the surface water network and verifying the above flow rates for the existing and proposed arrangements. The existing drainage network is shown on drawing no. 14449-BKP-ZZ-ZZ-DR-C-0500- P02 - Drainage GA.

3. Maintenance Requirements

The Drainage network and inherent SuDS have been designed with minimal maintenance in mind. The maintenance is generally of a 'common sense' approach and is to comprise:

- Regular day to day care: - litter collection, grass cutting and checking the inlets and outlets where water enters or leaves a drainage feature.
- Occasional tasks: - managing vegetation in wet areas and removing any silt that builds up in the drainage features.
- Remedial work: - repairing damage when, and where, necessary.

Specific recommendations for each feature are provided in the following sections, and should be referred to in the first instance if there are any issues. Please contact Booth King Partnership Ltd. if any further advice is required.

During the course of the phase 1 and phase 2 works Seddon Construction subject to agreement from their client will ensure that all drains on which the proposed drainage works rely will be jetted out and made good as required to ensure correct operation.

Manholes

Manholes are typically sized in accordance with Sewers for Adoption, which relates to the incoming and outgoing pipe diameters. However, as the system is not Adopted, PPICs have been used where manufacturer's limitations permit.

Manholes have been located outside the building in all cases which will allow much greater freedom with future maintenance access.

Maintenance·Schedule¤	Required·Action¤	Frequency¤	¤
Occasional¶ Maintenance·and· Monitoring¤	Covers·should·be·lifted·and·inspected·for·litter·and· debris·to·ensure·that·the·runs·are·free-flowing.¤	3·Monthly·(or· as·required).¤	¤

Hydro-Brake Flow Control device

The Hydro-Brake Flow Control is a versatile, self-activating device with a unique geometry designed to harness the energy of vortex flow.

The Hydro-Brake is used to maximize savings on new construction projects by minimizing stormwater detention volumes. The Hydro-Brake can be installed in downstream manholes to restrict the outflow without requiring the construction of additional detention volumes.

Not only will a Hydro-Brake allow more water to go downstream in the build-up of a storm event, but it will drain down quicker than alternatives leaving the tank volume ready to accept a following storm event. Some advantages include;

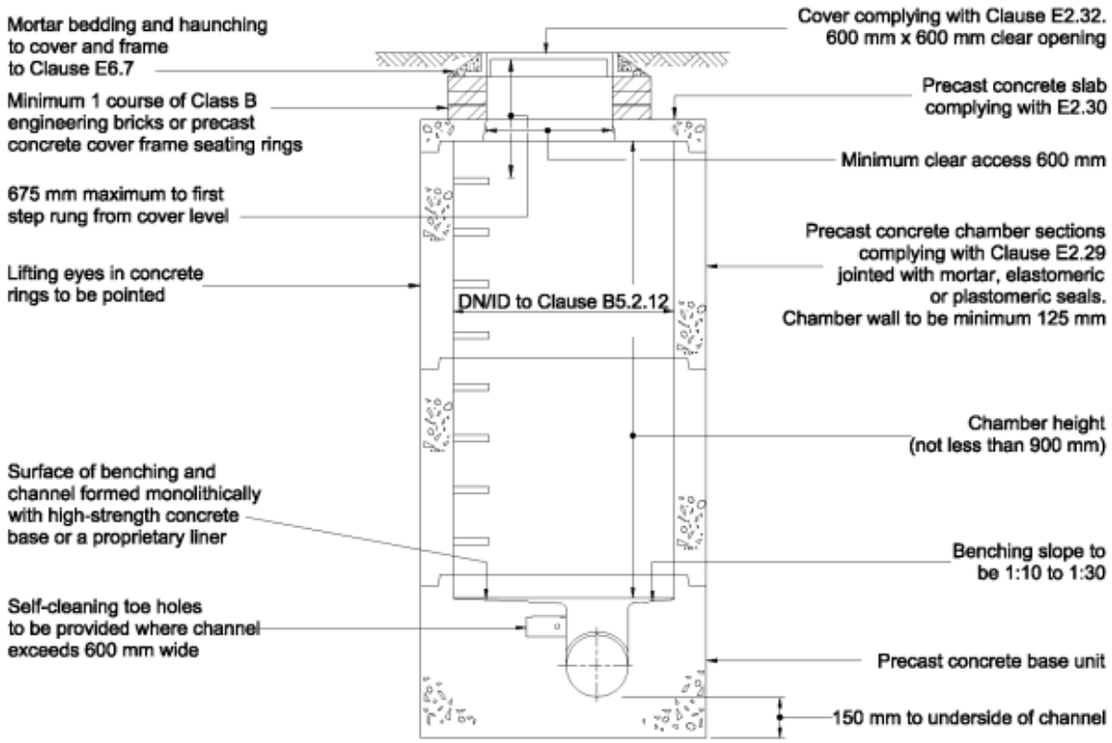
- Reduced stormwater storage volumes by up to 40%
- Up to 50% savings in project storage costs
- Self-activating with no moving parts or power requirements
- Available in wall-mounted or floor-mounted geometries
- Virtually maintenance free

Appendix A – Typical Manhole Details

For maintenance requirements, please refer to product manual.

The manual provides information on the specifications, installation details, typical applications and Technical Support information. Please refer to this documentation in the first instance for any future maintenance.

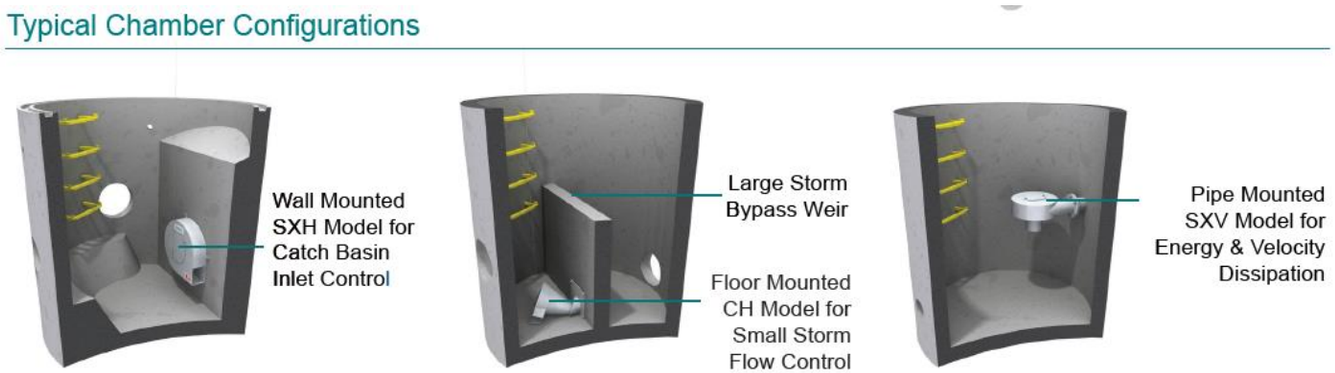
Figure B 9
Typical manhole detail – Type B
Depth from cover level to soffit of pipe 1.5 m to 3 m
Rigid material construction without concrete surround



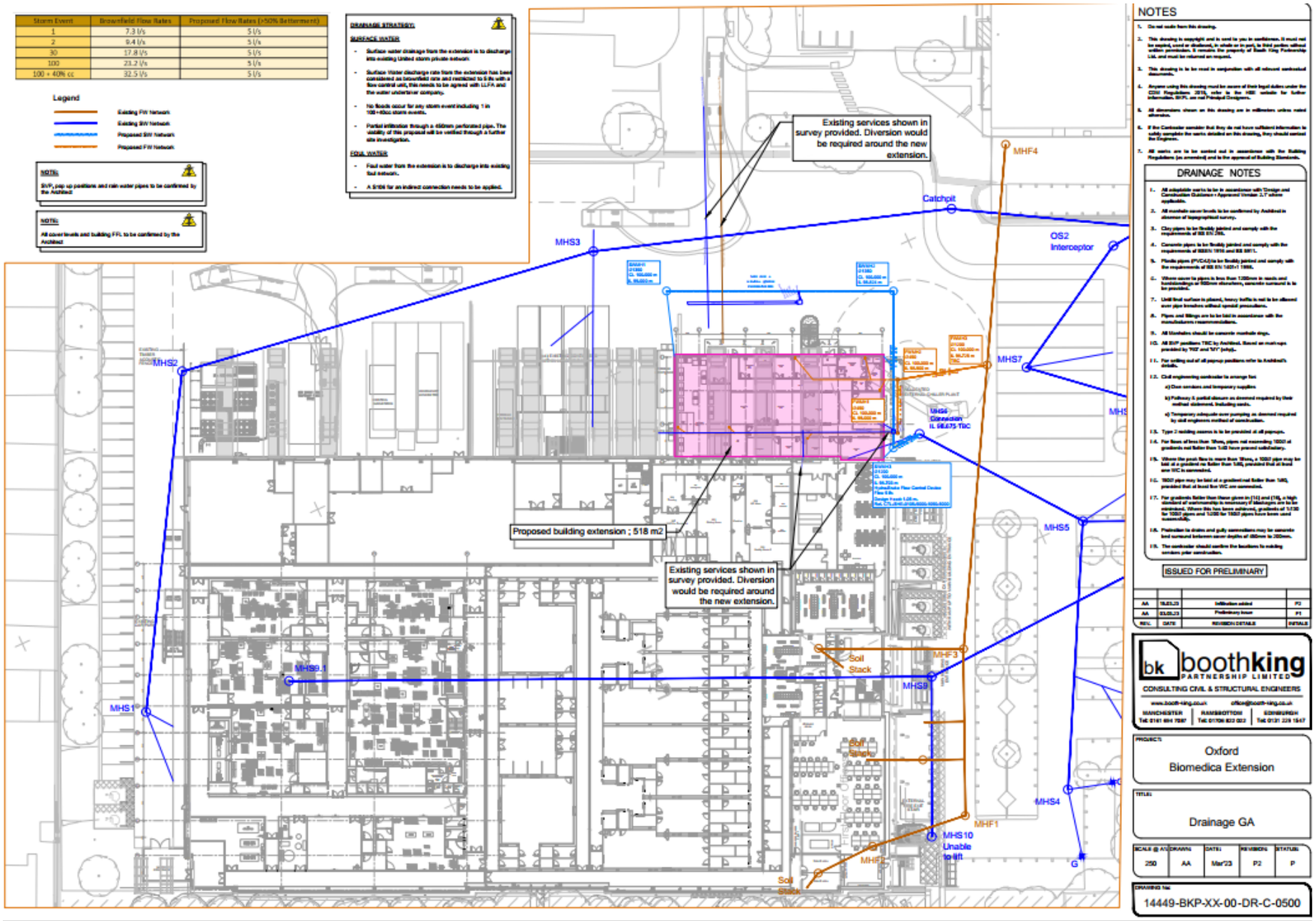
Appendix B – Hydro-Brake Flow Control Device

For maintenance requirements, please refer to product manual.

The manual provides information on the specifications, installation details, typical applications and Technical Support information. Please refer to this documentation in the first instance for any future maintenance.



Appendix C – Drainage Layout



Appendix D – Drainage Calculations

To be issued when required by Structural Civils engineer to Planning Authority

Appendix 6: Sustainable Design Strategy .

BUILDING SERVICES DESIGN

The following provides an overview of the building services measures that are included to improve the energy and operational efficiency of the new facility:

Primary Air Handling Units (AHU) will incorporate mixing boxes where feasible, to recirculate return air from the extract ductwork (from the zones/rooms) and mix with fresh air from outside, thereby reducing the energy output required from the AHU thermodynamic components.

In areas that are ATEX rated and require single-pass (no recirculation) ventilation. Heat recovery will be utilised in the form of run-around-coils to recover heat from the extract air stream and pre-heat the incoming air stream, thus reducing thermal load on AHU heating coils.

AHU's will be served with EC plug fans. EC (Electrically Commutated) combines AC and DC voltages to provide the best of elements of both technologies i.e., the motor runs on a DC voltage, but with a normal AC supply. EC fans are also capable of intelligent speed control further reducing energy consumption.

Room/Zone air changes per hour are to be kept to a minimum to achieve room classification, but not deliver too much air that impact on unnecessary energy expenditure.

Occupancy detection control strategies to be linked to mechanical ventilation systems wherever practical, resulting in 'on-demand' zoned ventilation control, lower delivered fan power and increased flexibility in building usage. This will be predominantly utilised in toilet and office areas.

Both supply and return distribution ductwork will be insulated to ensure no loss of thermal energy on any return ductwork, to maximise effect of plant heat recovery and mixing boxes.

Intake and exhaust air distances will be an acceptable distance apart to ensure no re-circulation of air impacts on efficiency of plant. All heat rejection plant will be installed to minimum requirements listed within manufacturers data for good airflow distribution.

All ventilation plant and pumps include high efficiency motors, not less than IE3 efficiency.

Any boiler plant will be highly efficient condensing type (up to 99.6% Gross Calorific Value), with low NOx emissions.

Any air-cooled chillers will be highly efficient scroll type, with a Seasonal Energy Efficiency Ratio (SEER) of 4.0 or greater.

LTHW heating and chilled water distribution temperatures will be designed to maximise the Seasonal Coefficient of Performance (SCOP) of the primary plant.

Office areas throughout the development will be by a high efficiency heat recovery VRF system (Minimum SCOP of 5).

ARCHITECTURAL DESIGN

The following provides an overview of the architectural measures that are included to improve the sustainability features of the new extension :

The shell building and the fit out has been designed in accordance with BREEAM "principles " as Oxford Biomedica has requested this even though it will not formally be assessed for a BREEAM accreditation.

The new parking has included the 25% EV charging to new places [12No] , but Oxford Biomedica plan to install considerably more than this as so many of their staff and visitors use Electric vehicles .