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Flood Risk and SuDS Assessment Rev0

Corner of Maryland Road and High Road,
London,
N22 5AR

13 December 2023

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Prepared by	Checked by	Date
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1. Introduction

This Flood Risk and SuDS Assessment has been prepared to support the planning application for the proposed redevelopment of a position of land located at the corner of Maryland Road and High Road, London.

A site location plan is provided in **Appendix A**.

Development Proposals

The site is currently comprised of an existing building (the latest use being a Church), with associated hard and soft landscaped areas.

A copy of the existing site layout is provided in **Appendix B.**

Proposals are for the demolition of the existing building, and the construction of a new building (including lower ground floor) to comprise 6no. flats with associated hard and soft landscaped areas.

A copy of the proposed site layout plans is provided in **Appendix C.**

2. Planning Policy – Flood Risk, and Surface Water Management

National Planning Policy Framework

The aim of the National Planning Policy Framework (NPPF) (and accompanying Planning Practice Guidance (PPG)) is to direct development away from areas at highest risk of flooding; where development is necessary, it should be made safe without increasing flood risk elsewhere.

The NPPF states that a Flood Risk Assessment (FRA) is required to support a planning application for developments that are:

- located in Flood Zone 2 and/or Flood Zone 3
- located in Flood Zone 1 and comprise 1ha or above

In some instances, for example where a site is located in Flood Zone 1 and comprises less than 1ha, an FRA may be required if the site is within an area which has critical drainage problems (i.e. a Critical Drainage Area - CDA) as notified to the Local Authority by the Environment Agency (EA).

In order to provide an indication of the flood zone classification of the site, and to ascertain whether an FRA is required, the starting point is the EA flood maps which are available on the EA website.

Environment Agency Flood Map

The EA flood maps show fluvial and tidal flood outlines based on the following:

- Flood Zone 1 - land assessed as having less than 1 in 1000 annual probability of river or sea flooding
- Flood Zone 2 - land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding, or between a 1 in 200 and 1 in 1000 annual probability of flooding from the sea
- Flood Zone 3 - land assessed as having a 1 in 100 or greater annual probability of river flooding, or a 1 in 200 or greater annual probability of flooding from the sea

The flood maps available on the EA website confirm that the site is located in Flood Zone 1.

Given that the site is located in Flood Zone 1, and comprises less than 1ha, an FRA would not generally be required, unless the site is located within a CDA.

Reference has been made to the London Borough of Haringey 'Critical Drainage Area' (CDA) maps; the site is shown to be in CDA Group4_010, and on this basis an FRA is required to support the planning application.

An assessment of all potential sources of flood risk is provided in the following section.

Haringey Council

Local SuDS Standards

Haringey Council Local SuDS Standards document states:

SuDS Principles

LS1a *Sustainable drainage systems are to be designed to control surface water run off close to where it falls as rainfall and mimic natural drainage as closely as possible in accordance with National Planning Practice Policy.*

LS1b *Proposals for SuDS must result in capture for reuse, discharge into the ground, to a surface water body or, where these are demonstrated to be not achievable, to the storm sewer or combined sewer where no storm sewer is available. The destination of runoff for proposed SuDS must be justified using a methodology acceptable to Haringey.*

LS1c *Storage and treatment of surface runoff should be provided through provision of a management train.*

Peak flow control

LS2a *For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event.*

__LS2b__ The design of the drainage system accounts for the likely impacts of climate change and potential changes in impermeable area over the design life of the development.
__LS3a__ For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.
__LS3b__ Where Greenfield rates cannot be achieved Haringey request that 50% of the Greenfield runoff rate attenuation volume be provided and outflows controlled to Greenfield runoff rates.
__LS3c__ For developments which were previously developed, the design of the drainage system accounts for the likely impacts of climate change and potential changes in impermeable area over the design life of the development.

Volume control
__LS4__ To ensure no increase in flood risk elsewhere, for greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.
__LS5__ To make provision for reduction in catchment floodrisk, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event. Haringey will seek to ensure that all means of volume reduction have been fully explored.
__LS6__ Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with __S4__ or __S5__ above, the runoff volume must be discharged at a rate that does not adversely affect flood risk. Haringey will request this rate to be a maximum discharge rate of Qbar for the 1 in 100 year rainfall event with allowance made for climate change and application of urban creep where appropriate. Where development proposals do not meet these proposals Haringey will request that detailed hydraulic modelling be provided to demonstrate that there is no increased flood risk elsewhere in the receiving catchment.

Flood risk within the development
__LS7__ The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event.

LS8 *The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.*

LS9a *The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100 year rainfall event are managed in exceedance routes that minimise the risks to people and property.*

LS9b *SuDS design to ensure resilience to blockage and provide for exceedance. Drainage design proposals should be examined for the likelihood and consequences of any potential failure scenarios (e.g. structural failure, blockage of inlets or outlets, blockage of pipes, impediments along conveyance routes), and the associated flood risks reduced where possible.*

LS9c *Where development proposals do not meet these proposals Haringey will request that detailed hydraulic modelling be provided to demonstrate the risk of flooding within the development is manageable and that there is no increased flood risk elsewhere in the receiving catchment.*

Structural integrity

LS10 *Components must be designed to ensure structural integrity of the drainage system and any adjacent structures or infrastructure under anticipated loading conditions over the design life of the development taking into account the requirement for reasonable levels of maintenance.*

LS11 *The materials, including products, components, fittings or naturally occurring materials, which are specified by the designer must be of a suitable nature and quality for their intended use.*

Designing for maintenance considerations

LS12 *Pumping should only be used to facilitate drainage for those parts of the site where it is not reasonably practicable to drain water by gravity. Designs should ensure accordance with **S1a** before pumping is considered.*

Construction

LS13 *The mode of construction of any communication with an existing sewer or drainage system must be such that the making of the communication would not be prejudicial to the structural integrity and functionality of the sewerage or drainage system.*

LS14 *Damage to the drainage system resulting from associated construction activities must be minimised and must be rectified before the drainage system is considered to be completed.*

Water Quality

LS15 *For greenfield developments, the frequency of runoff from the development to any highway drain, sewer or surface water body should not be increased. The surface water runoff should be managed to prevent any discharge of surface water from the site for rainfall events less than 5mm in depth and prevent runoff from the first 5mm of rainfall for larger events. This should be achieved for the majority of all rainfall events that take throughout the year. S1a should be adhered to, otherwise the design should demonstrate that there is no runoff from 80% of rainfall events during summer events and 50% for winter rainfall events using time series rainfall hydraulic modelling analysis.*

LS16 *Where surface water is likely to be contaminated, effective management is required to reduce contaminant loads and concentrations in the runoff to acceptable levels, in order minimise the risk of pollution of receiving waterbodies and/or protect receiving sewers*.

The London Plan 2021

Policy SI 12 Flood risk management

A Current and expected flood risk from all sources (as defined in paragraph 9.2.12) across London should be managed in a sustainable and cost-effective way in collaboration with the Environment Agency, the Lead Local Flood Authorities, developers and infrastructure providers.

B Development Plans should use the Mayor's Regional Flood Risk Appraisal and their Strategic Flood Risk Assessment as well as Local Flood Risk Management Strategies, where necessary, to identify areas where particular and cumulative flood risk issues exist and develop actions and policy approaches aimed at reducing these risks. Boroughs should cooperate and jointly address cross-boundary flood risk issues including with authorities outside London.

C Development proposals should ensure that flood risk is minimised and mitigated, and that residual risk is addressed. This should include, where possible, making space for water and aiming for development to be set back from the banks of watercourses.

D Developments Plans and development proposals should contribute to the delivery of the measures set out in Thames Estuary 2100 Plan. The Mayor will work with the Environment Agency and relevant local planning authorities, including authorities outside London, to safeguard an appropriate location for a new Thames Barrier.

E Development proposals for utility services should be designed to remain operational under flood conditions and buildings should be designed for quick recovery following a flood

F Development proposals adjacent to flood defences will be required to protect the integrity of flood defences and allow access for future maintenance and upgrading. Unless exceptional circumstances are demonstrated for not doing so, development proposals should be set back from flood defences to allow for any foreseeable future maintenance and upgrades in a sustainable and cost-effective way.

G Natural flood management methods should be employed in development proposals due to their multiple benefits including increasing flood storage and creating recreational areas and habitat

Policy SI 13 Sustainable drainage states:

A *Lead Local Flood Authorities should identify – through their Local Flood Risk Management Strategies and Surface Water Management Plans – areas where there are particular surface water management issues and aim to reduce these risks. Increases in surface water run-off outside these areas also need to be identified and addressed.*

B *Development proposals should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible. There should also be a preference for green over grey features, in line with the following drainage hierarchy:*
1) rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)
2) rainwater infiltration to ground at or close to source
3) rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)
4) rainwater discharge direct to a watercourse (unless not appropriate)
5) controlled rainwater discharge to a surface water sewer or drain
6) controlled rainwater discharge to a combined sewer.

C *Development proposals for impermeable surfacing should normally be resisted unless they can be shown to be unavoidable, including on small surfaces such as front gardens and driveways.*

D *Drainage should be designed and implemented in ways that promote multiple benefits including increased water use efficiency, improved water quality, and enhanced biodiversity, urban greening, amenity and recreation**.***

9.13.1 *London is at particular risk from surface water flooding, mainly due to the large extent of impermeable surfaces. Lead Local Flood Authorities have responsibility for managing surface water drainage through the planning system, as well as ensuring that appropriate maintenance arrangements are put in place. Local Flood Risk Management Strategies and Surface Water Management Plans should ensure they address flooding from multiple sources including surface water, groundwater and small watercourses that occurs as a result of heavy rainfall.*

9.13.2 Development proposals should aim to get as close to greenfield run-off rates as possible depending on site conditions. *The well-established drainage hierarchy set out in this policy helps to reduce the rate and volume of surface water run-off**.***

Rainwater should be managed as close to the top of the hierarchy as possible. There should be a preference for green over grey features, and drainage by gravity over pumped systems. *A blue roof is an attenuation tank at roof or podium level; the combination of a blue and green roof is particularly beneficial, as the attenuated water is used to irrigate the green roof.*

9.13.3 *For many sites, **it may be appropriate to use more than one form of drainage**, for example a proportion of rainwater can be managed by more sustainable methods, with residual rainwater managed lower down the hierarchy. In some cases, direct discharge into the watercourse is an appropriate approach, for example rainwater discharge into the tidal Thames or a dock. This should include suitable pollution prevention filtering measures, ideally by using soft engineering or green infrastructure.*

In addition, if direct discharge is to a watercourse where the outfall is likely to be affected by tide-locking, suitable storage should be designed into the system. However, in other cases direct discharge will not be appropriate, for example discharge into a small stream at the headwaters of a catchment, which may cause flooding. This will need to be assessed on a case-by-case basis, taking into account the location, scale and quality of the discharge and the receiving watercourse. The maintenance of identified drainage measures should also be considered in development proposals.

9.13.4 *The London Sustainable Drainage Action Plan complements this policy. It contains a series of actions to make the drainage system work in a more natural way with a particular emphasis on retrofitting.*

Non-Statutory Technical Standards for SuDS

The Non-Statutory Technical Standards for SuDS, (and accompanying Local Authority SuDS Officer Organisation (LASOO) Practice Guidance) sets out the details which should be addressed within a SuDS Report, including:

- Flood Risk Outside of the Development
- Peak Flow Control and Volume Control
- Flood Risk Within the Development
- Runoff Destinations
- Structural Integrity
- Designing for Maintenance Considerations
- Construction

3. Sources of Flood Risk

Fluvial Flood Risk

The EA Flood Maps confirm that the site is located in Flood Zone 1 and is therefore considered to be at low risk of fluvial / tidal flooding.

Critical Drainage Area (CDA)

The Surface Water Management Plan (SWMP) defines a CDA as: '*a discrete geographic area (usually within an urban setting) where there may be multiple and interlinked sources of flood risk and where severe weather is known to cause flooding of the area thereby affecting people, property or local infrastructure*'.

The site is shown to be in CDA Group4_010.

Section 4 of this report details the surface water drainage strategy for the site; this will ensure that the proposals do not exacerbate surface water flooding at the site or surrounding areas.

Groundwater Flooding

Groundwater flooding generally occurs during intense, long-duration rainfall events, when infiltration of rainwater into the ground raises the level of the water table until it exceeds ground levels. It is most common in low-lying areas overlain by permeable soils and permeable geology, or in areas with a naturally high water table.

Reference has been made to the British Geological Survey (BGS) geology maps; these indicate that the site is underlain by London Clay.

BGS also provide borehole records and although none are available at the site location, there is a record for Glendale Avenue to the south of the site. This confirms the presence of London Clay (see **Appendix D**).

On this basis, the risk of groundwater flooding may be considered as low.

However, the proposals do include basement development and therefore more investigative works may be required to assess the impact of any potential standing groundwater and/or through flow.

Surface Water Flooding

Surface water flooding results from rainfall generated overland flows, before the runoff reaches a watercourse/ drainage system, or where the watercourse/ drainage system is overwhelmed and unable to accept further runoff. Surface water runoff is usually associated with high intensity rainfall events but may also occur with lower intensity rainfall where the ground is saturated, developed or otherwise has low permeability resulting in overland flows and ponding within depressions in the topography.

The EA provide maps on their website which illustrate the risk of surface water flooding along with potential depths and velocities; these show that the site is in an area at medium risk of surface water flooding with maximum depths up to 900mm.

Section 4 of this report details the surface water drainage strategy for the site to ensure that the proposals will not exacerbate surface water flooding at the site or surrounding areas.

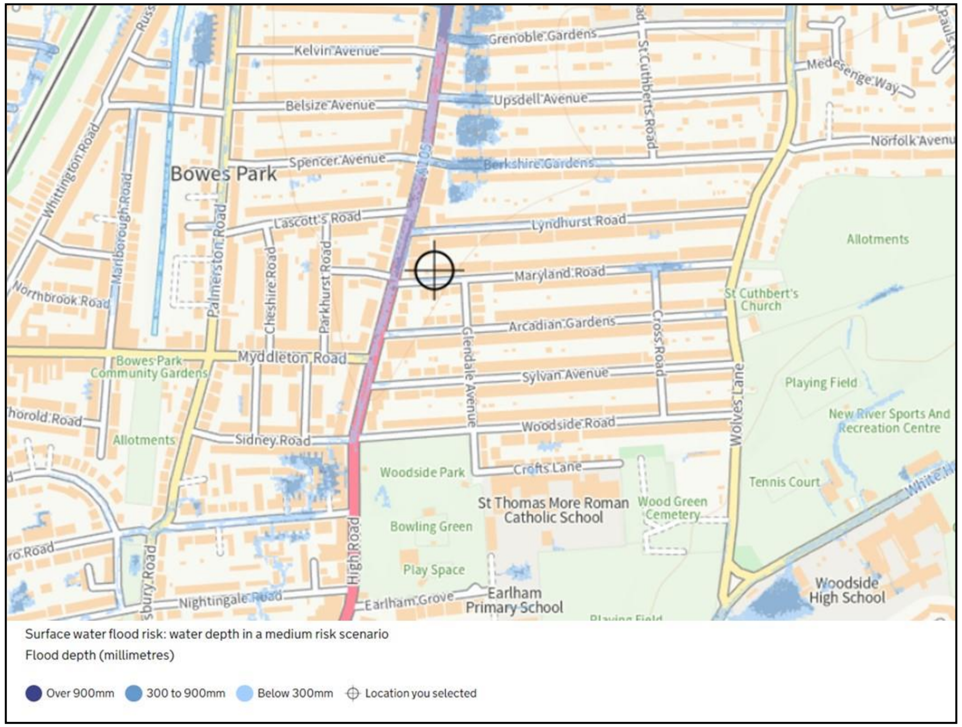


Figure 1 - Environment Agency Surface Water Flooding Maps

Sewer Flooding

Sewer flooding occurs when the capacity of underground sewerage systems is exceeded, resulting in flooding inside and outside of buildings. Normal discharge of sewers and drains through outfalls may be impeded by high water levels in receiving waters.

There are no known records of surface water flooding at the site location.

4. Surface Water and SuDS

Site Area

The whole site is 0.042ha.

Rates of Runoff

As previously stated, the London Plan requires proposals to aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible.

In the first instance the **ICP SuDS** method within Micro Drainage has been used to calculate flow rates from the total (as detailed in **Appendix E** and shown in **Table 1**).

Table 1 – ICP SuDS – Existing Site Runoff Rates (l/s)

Return Period	Flow Rate from 420m^2. (l/s)
Qbar	0.2
1 in 30 year	0.3
1 in 100 year	0.5

The London Plan Hierarchy

Following redevelopment, site areas will be:

- Roof areas ~ 160m^2
- Hardstanding ~105m^2
- Landscaping ~155m^2

The following outlines the most feasible ways to manage surface water runoff from hardscaping areas in line with the London Plan hierarchy.

1) Rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)
Rainwater reuse would not be a feasible solution, given the proposed site layout.

2) Rainwater infiltration to ground at or close to source
As previously noted, the British Geology Survey (BGS) Geology Maps indicate that the site is underlain by London Clay.

Given the underlying clay, we do not recommend a strategy based on infiltration.

3) Rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)
A simple rain planter could feasibly be incorporated.

4) Rainwater discharge direct to a watercourse (unless not appropriate)
There are no watercourses in the immediate vicinity of the site.

5) Controlled rainwater discharge to a surface water sewer or drain, and 6) Controlled rainwater discharge to a combined sewer.
It is understood that surface water connects into the public surface wate sewer. Surface water will continue to drain as existing, via attenuation storage with controlled outlet. More details are provided overleaf.

SuDS Option

SuDS aim to mimic natural drainage and can achieve multiple objectives such as removing pollutants from urban runoff at source, controlling surface water runoff from developments, ensuring that flood risk is not increased further downstream and combining water management with green space which can increase amenity and biodiversity value. When selecting SuDS, consideration needs to be given to a range of factors including the ground conditions, type of proposals, and the constraints of the site.

In this instance, given the review of underlying ground conditions, and in line with the London Plan hierarchy, the following are proposed to manage flows from hardstanding areas:

- Rainwater recycling (water butt)
- Rain planter
- Attenuation storage with a controlled outlet into the public sewer system

Rainwater Recycling

In order to provide a level of rainwater recycling, a water butt will be provided. Water butts afford the opportunity for future occupants to reuse water collected in the water butt, for example when watering the garden/or washing cars etc. If this supply is used frequently this may also ensure that some additional storage is available during an extreme rainfall event.

However, it is not recommended that water butts are used for storm water storage as there is a possibility that they maybe full before the onset of a storm and as such there is no guarantee that these types of system will provide additional storage when required.

Rain Planter

An area of rain garden or a rain planter will be incorporated into the proposals.

Typical Design

- *Freeboard – 100mm*
- *Topsoil – 300mm (ratio of approximately 50% sand, 30% topsoil and 20% compost)*
- *Subbase –300mm*
- *Planting to be shrubs / wildflowers / perennial flowering plants*
- *The downpipe will feed water directly onto the rain garden. Stones or gravel will be used to dissipate the energy of the water and prevent heavy flows from washing away soil.*
- *Underdrain and 25mm orifice to limit flows to 0.5/s – i.e. existing 1 in 100 year rate of runoff*

Attenuation Storage with a Controlled Outlet

Micro Drainage has been used to calculate storage for surface water runoff from roof and hardstanding areas (~265m^2) in up to the 1 in 100 year plus 40% allowance for climate change.

Flows have been restricted to 0.5l/s; this is the existing 1 in 100 year greenfield rate of runoff (see **Table 1**).

As shown in **Appendix F**, a total storage volume of 12.8m^3 will be required. The storage has been designed at a depth of 1.5m, filling to 1.0m and with a 0.5m freeboard provided, should any excess flows be received.

The storage could feasibly be provided beneath the parking areas.

SuDS Maintenance

Schedules are provided below (taken from Ciria C753 The SuDS Manual): the management company will ensure that these, or similar schedules are followed.

Water Butts

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	*The water butt should be routinely checked for litter – leaves can become trapped in the water butt which could lead to blockage of the taps and overflow*	*Monthly*
	Where appropriate, and if safe to do so, the water butt should be cleaned annually to prevent smells associated with stagnant water, and to remove any algae.	*Annually*

Rain Garden

Maintenance Schedule	Required Action	Typical Frequency
During Establishment Period (Years 1 and 2)	Watering	Weekly
	Weeding Litter picking Pruning and trimming Check / clean channels, inlets and outlets	3 Monthly
	Mulching	Annually or as required

Following Establishment Period (Year 3 onwards)	Weeding Litter picking Pruning and trimming Check / clean channels, inlets and outlets Replanting	6 Monthly Annually or as required

Site Runoff Pollution

As previously detailed, the existing site is occupied by a residential dwelling, located within a residential area. As such, it is unlikely that there will be any significant pollution of surface water runoff associated with the current land use.

Amenity Design

The SuDS Manual states that rain gardens and rainwater storage provide indirect amenity value by supporting the resilience of developments and their landscape to changes in climate and water resource availability.

5. Conclusions

This Flood Risk and SuDS Assessment has been prepared to support the planning application for the proposed redevelopment of a position of land located at the corner of Maryland Road and High Road, London.

The site is currently comprised of an existing building (the latest use being a Church), with associated hard and soft landscaped areas.

Proposals are for the demolition of the existing building, and the construction of a new building (including lower ground floor) to comprise 6no. flats with associated hard and soft landscaped areas.

Flood Risk

The EA Flood Maps confirm that the site is located in Flood Zone 1 and is therefore considered to be at low risk of fluvial / tidal flooding.

The site is shown to be in CDA Group4_010.

Based on the desktop study of underlying ground conditions, the risk of groundwater flooding may be considered as low. However, the proposals do include basement development and therefore more investigative works may be required to assess the impact of any potential standing groundwater and/or through flow.

The EA provide maps on their website which illustrate the risk of surface water flooding along with potential depths and velocities; these show that the site is in an area at medium risk of surface water flooding with maximum depths up to 900mm.

There are no known records of surface water flooding at the site location.

Surface Water

Based on the review of underlying ground conditions, and in line with the London Plan hierarchy, the following are proposed to manage flows from hardstanding areas:

- Rainwater recycling (water butt)
- Rain planter
- Attenuation storage with a controlled outlet into the public sewer system. Storage will be provided for surface water runoff from roof and hardstanding areas (~265m^2) in up to the 1 in 100 year plus 40% allowance for climate change. Flows will be restricted to 0.5l/s; this is the existing 1 in 100 year greenfield rate of runoff

Operation and maintenance schedules have been provided; these, or similar schedules, will be adopted by the management company.

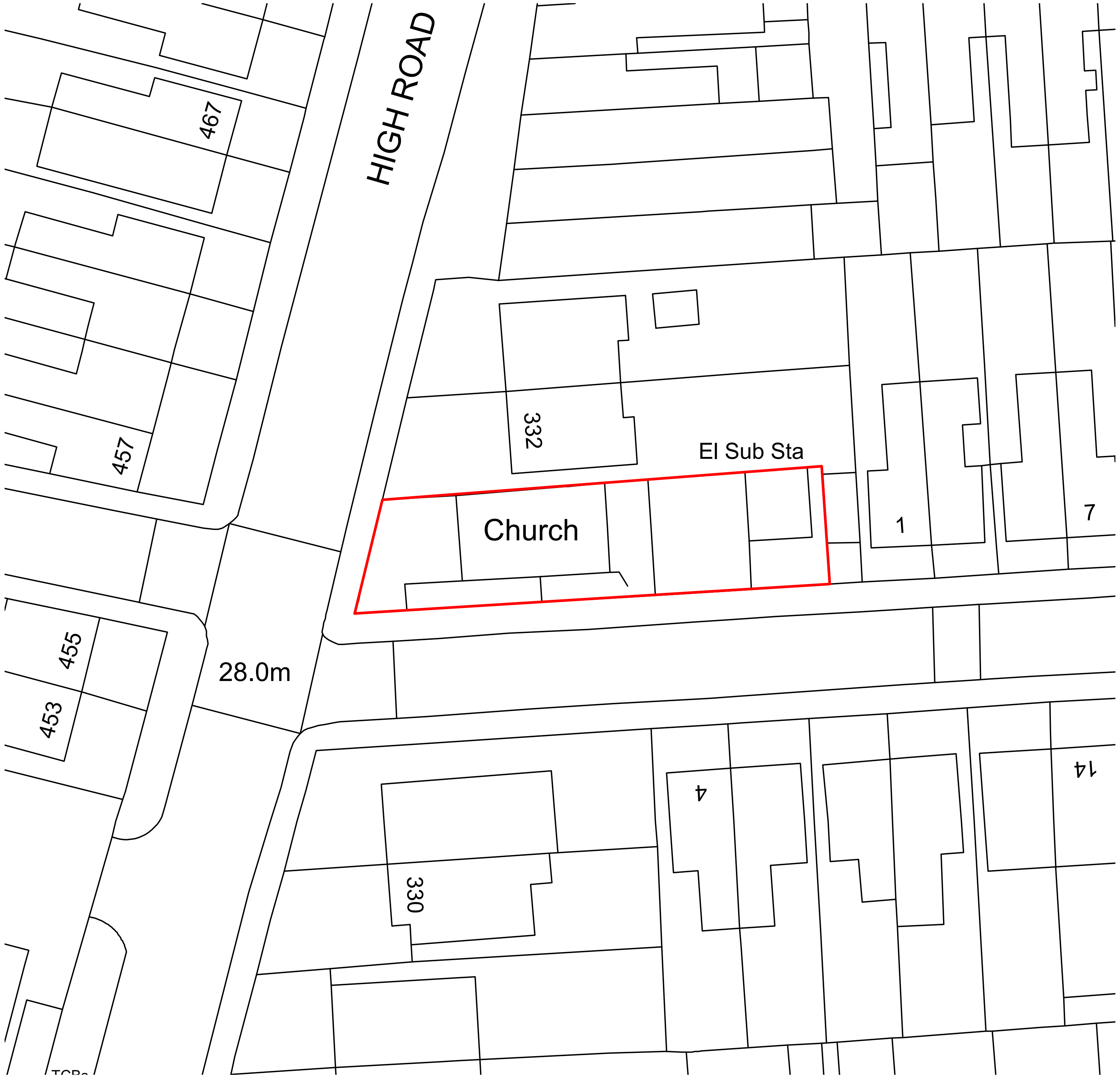
Appendices

Appendix A - Site Location Plan

REVISION:

REV/DATE

SITE LOCATION PLAN AS EXISTING, 1:1250



SITE LOCATION PLAN AS EXISTING, 1:1250

1:500@A3 5m 25m 50m

1:1250@A3 10m 50m 100m

All dimensions to be checked on site before any works commence.

B.U Investments LTD
Maryland Road
N22 5AR

CLIENT

152-001

DWG NO.

Site location plan

TITLE

09 NOV 2023

DATE

1:500@A3

SCALE

JS

DRAWN

EXISTING

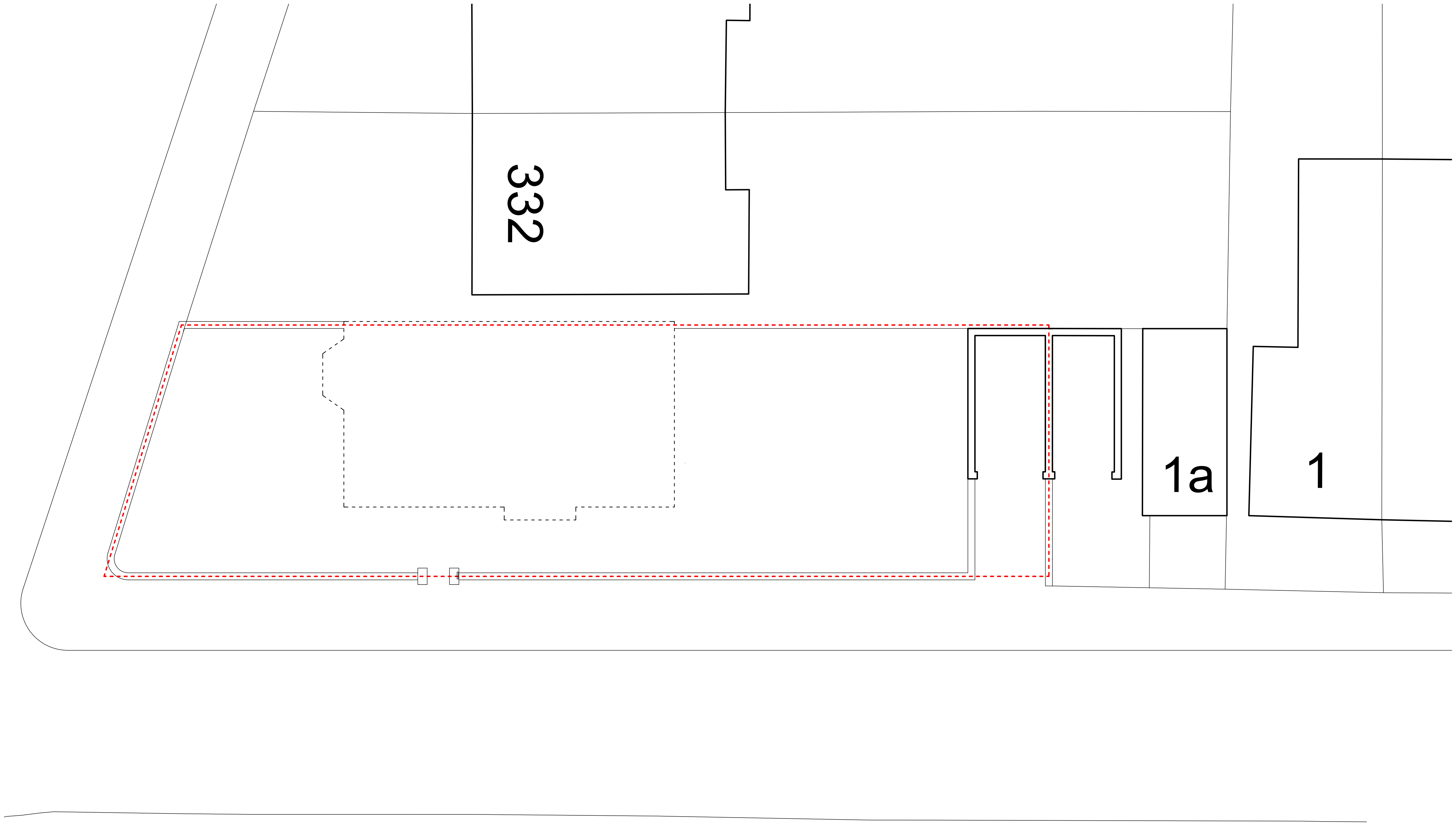
STAGE

SLEEP DESIGN STUDIO

Appendix B - Existing Site Plans

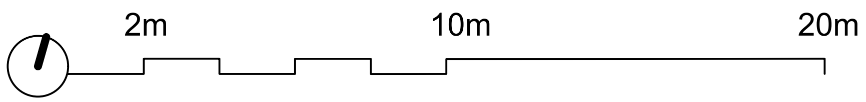
REVISION:

REV/DATE



GROUND FLOOR SITE PLAN

1:200@A3



All dimensions to be checked on site before any works commence.

B.U Investments LTD
Maryland Road
N22 5AR

CLIENT

152-100

DWG NO.

Site plan

TITLE

09 NOV 2023

DATE

1:200@A3

SCALE

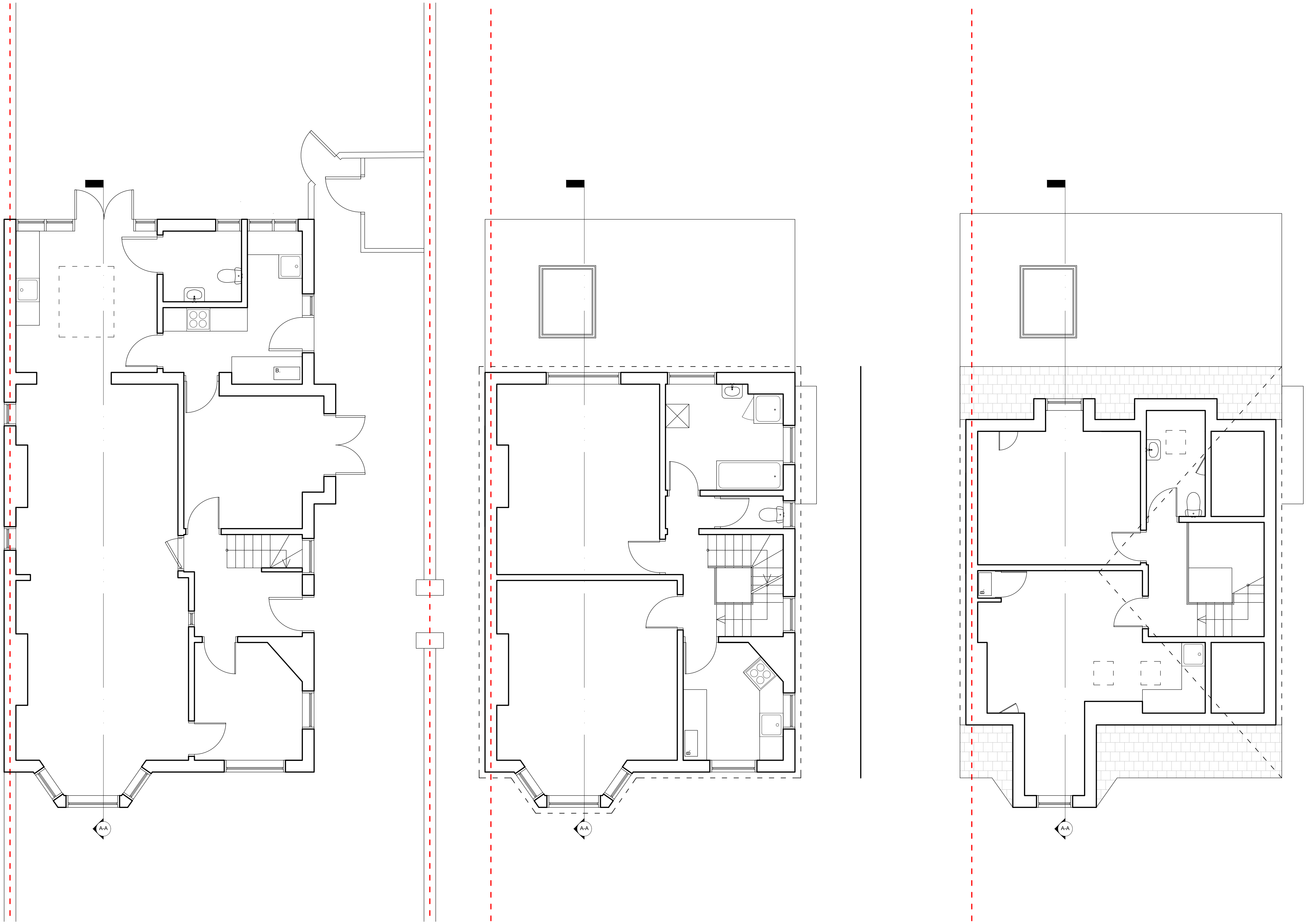
JS

DRAWN

EXISTING

STAGE

SLEEP DESIGN STUDIO



GROUND FLOOR PLAN

FIRST FLOOR PLAN

SECOND FLOOR PLAN

1:100@A3 1m 5m 10m

REVISION:

REV/DATE

All dimensions to be checked on site before any works commence.

B.U Investments LTD
Maryland Road
N22 5AR

CLIENT

152-101

DWG NO.

Floor plans as existing

TITLE

09 NOV 2023

DATE

1:100@A3

SCALE

JS

DRAWN

EXISTING

STAGE

SLEEP DESIGN STUDIO

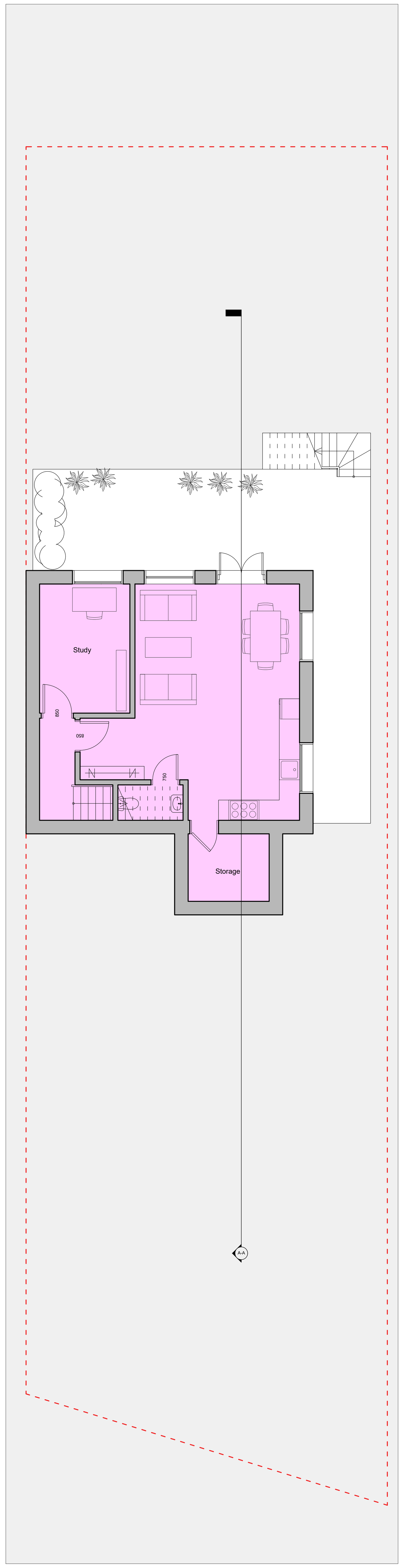
Appendix C- Proposed Site Plans

REVISION:

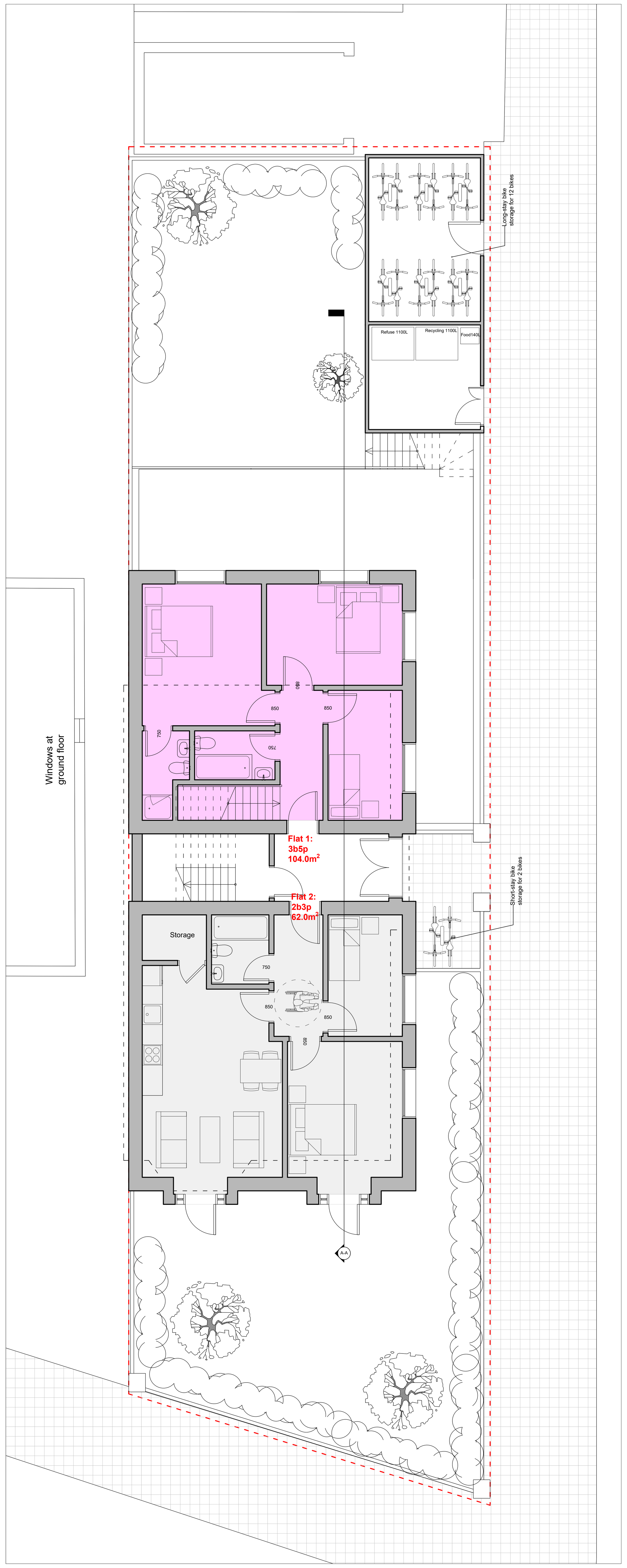
REV/DATE

Bedrooms	Amount
1	2
2	3
4	1
Total	6

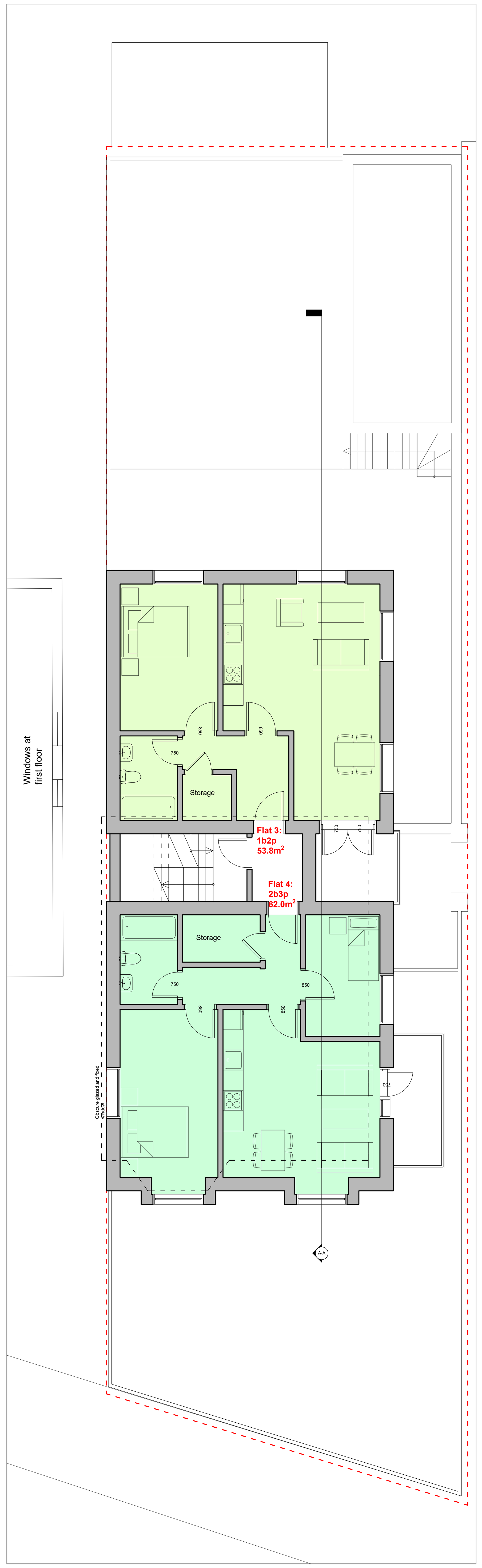
Flat	Size	Bedrooms
1	104m^2	3
2	62m^2	2
3	54m^2	1
4	62m^2	2
5	54m^2	1
6	62m^2	2



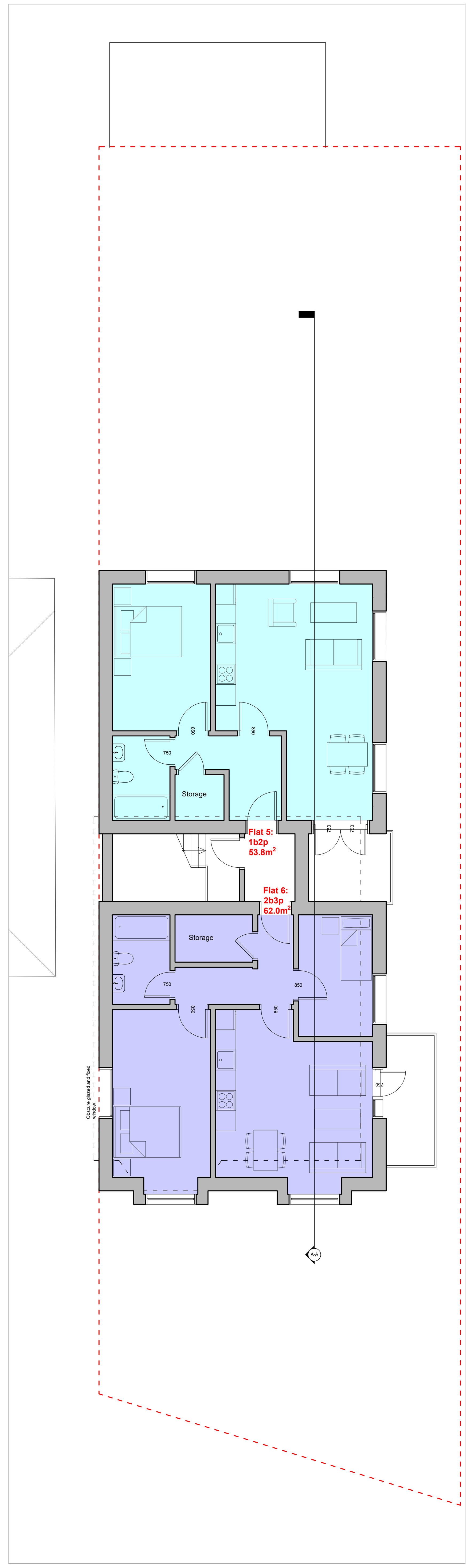
BASEMENT FLOOR PLAN



GROUND FLOOR PLAN



FIRST FLOOR PLAN



SECOND FLOOR PLAN

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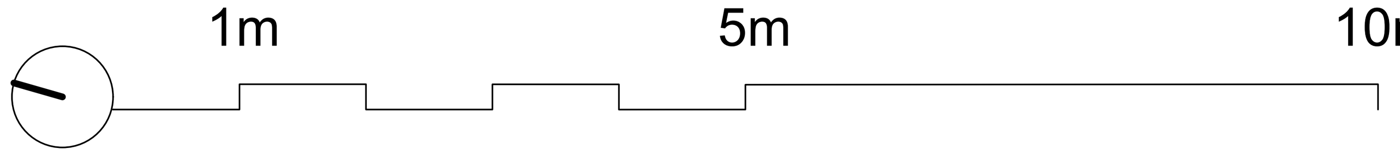
1:200@A3



B.U Investments LTD
Maryland Road
N22 5AR

CLIENT

152-300

DWG NO.

Floor plans

TITLE

09 NOV 2023

DATE

1:100@A1
1:200@A3

SCALE

JS

DRAWN

PLANNING

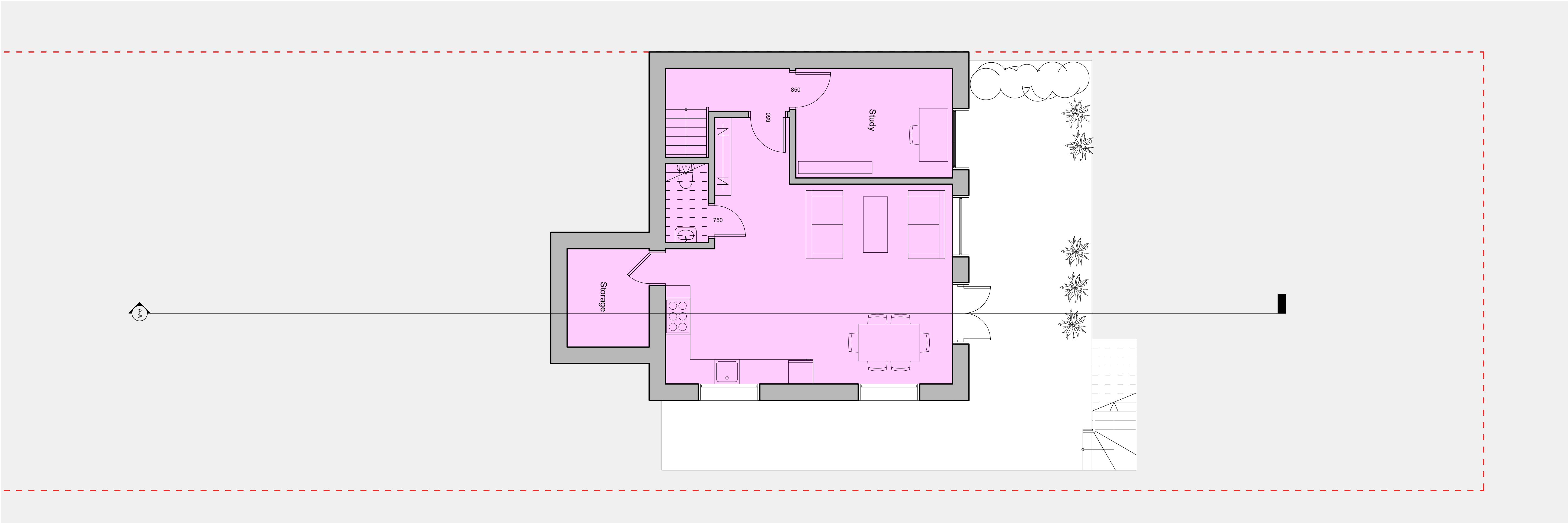
STAGE

SLEEP DESIGN STUDIO

REVISION:

REV/DATE

All dimensions to be checked on site before any works commence.



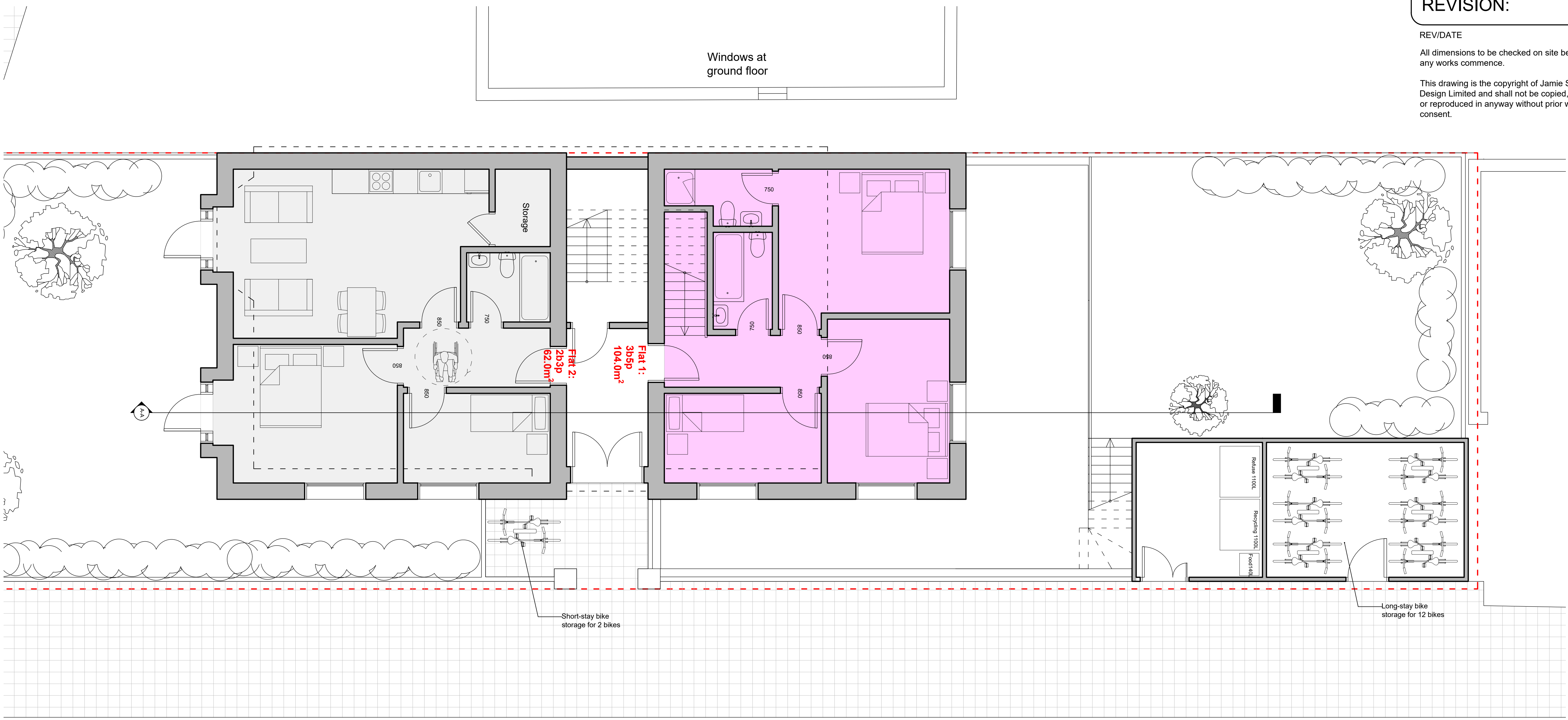
GROUND FLOOR PLAN

1:100@A3

1m 5m 10m

CLIENT	B.U Investments LTD Maryland Road N22 5AR
DWG NO.	152-301
TITLE	Basement floor plan
DATE	02 NOV 2023
SCALE	09 NOV 2023
DRAWN	JS
STAGE	PLANNING

SLEEP DESIGN STUDIO



GROUND FLOOR PLAN

1:100@A3

1m 5m 10m

REVISION:

REV/DATE

All dimensions to be checked on site before any works commence.

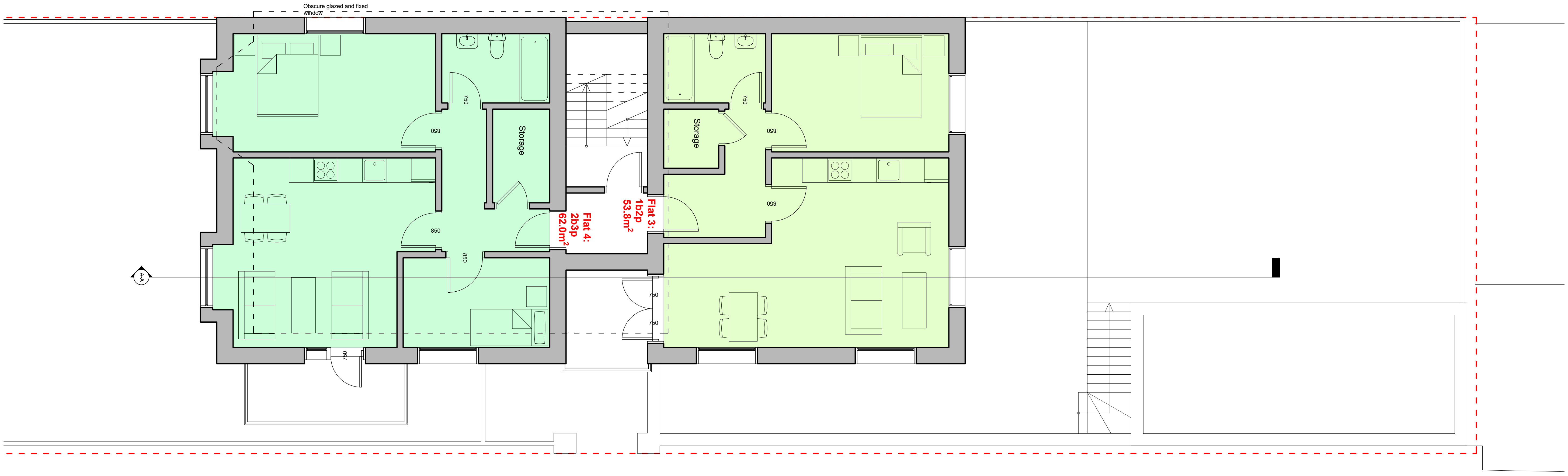
CLIENT	B.U Investments LTD Maryland Road N22 5AR
DWG NO.	152-302
TITLE	Ground floor plan
DATE	09 NOV 2023
SCALE	1:100@A3
DRAWN	JS
STAGE	PLANNING

SLEEP DESIGN STUDIO

REVISION:

REV/DATE

All dimensions to be checked on site before any works commence.

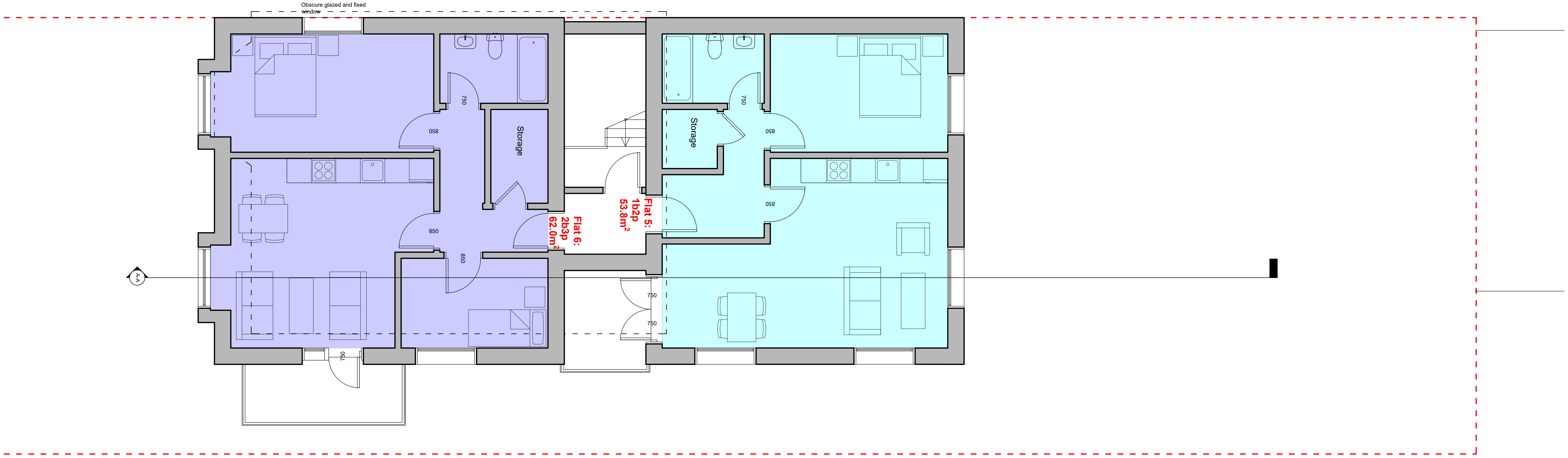


FIRST FLOOR PLAN

1:100@A3 1m 5m 10m

CLIENT	B.U Investments LTD Maryland Road N22 5AR
DWG NO.	152-303
TITLE	First floor plan
DATE	09 NOV 2023
SCALE	1:100@A3
DRAWN	JS
STAGE	PLANNING

SLEEP DESIGN STUDIO



SECOND FLOOR PLAN

1:100@A3 1m 5m 10m

REVISION:

REV/DATE

All dimensions to be checked on site before any works commence.

B.U Investments LTD
Maryland Road
N22 5AR
CLIENT

152-304
DWG NO.

Second floor plan
TITLE

09 NOV 2023
DATE

1:100@A3
SCALE

JS
DRAWN

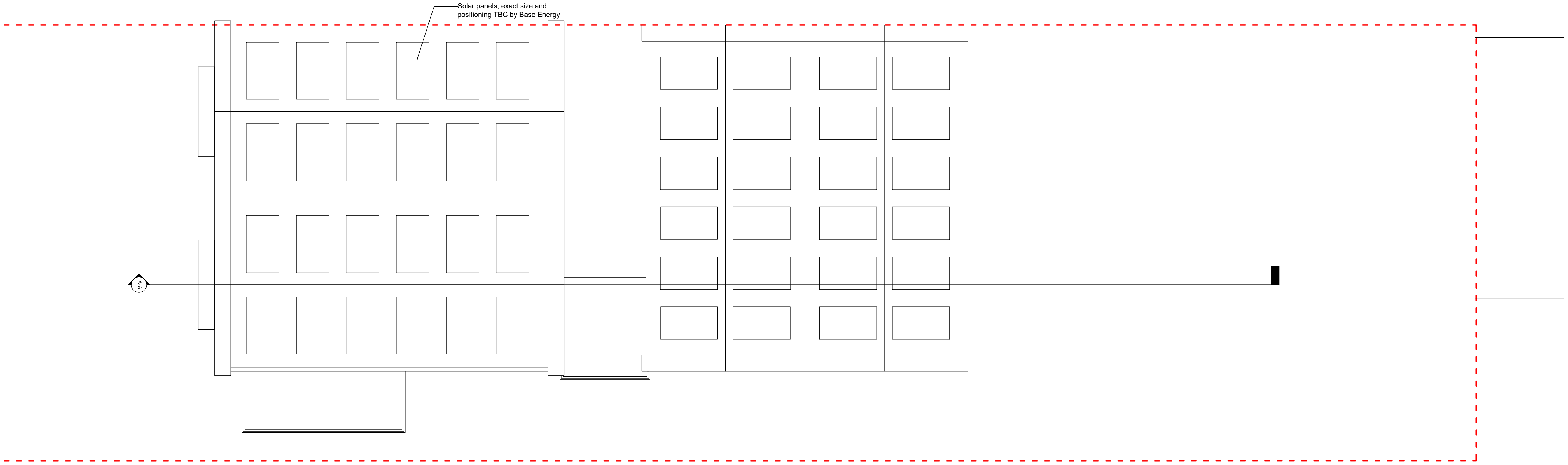
PLANNING
STAGE

SLEEP DESIGN STUDIO

REVISION:

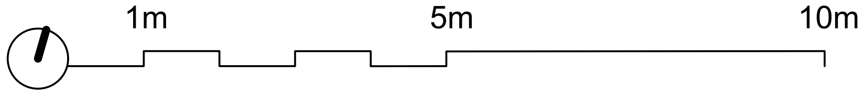
REV/DATE

All dimensions to be checked on site before any works commence.



ROOF PLAN

1:100@A3



B.U Investments LTD
Maryland Road
N22 5AR

CLIENT

152-305

DWG NO.

Roof plan

TITLE

09 NOV 2023

DATE

1:100@A3

SCALE

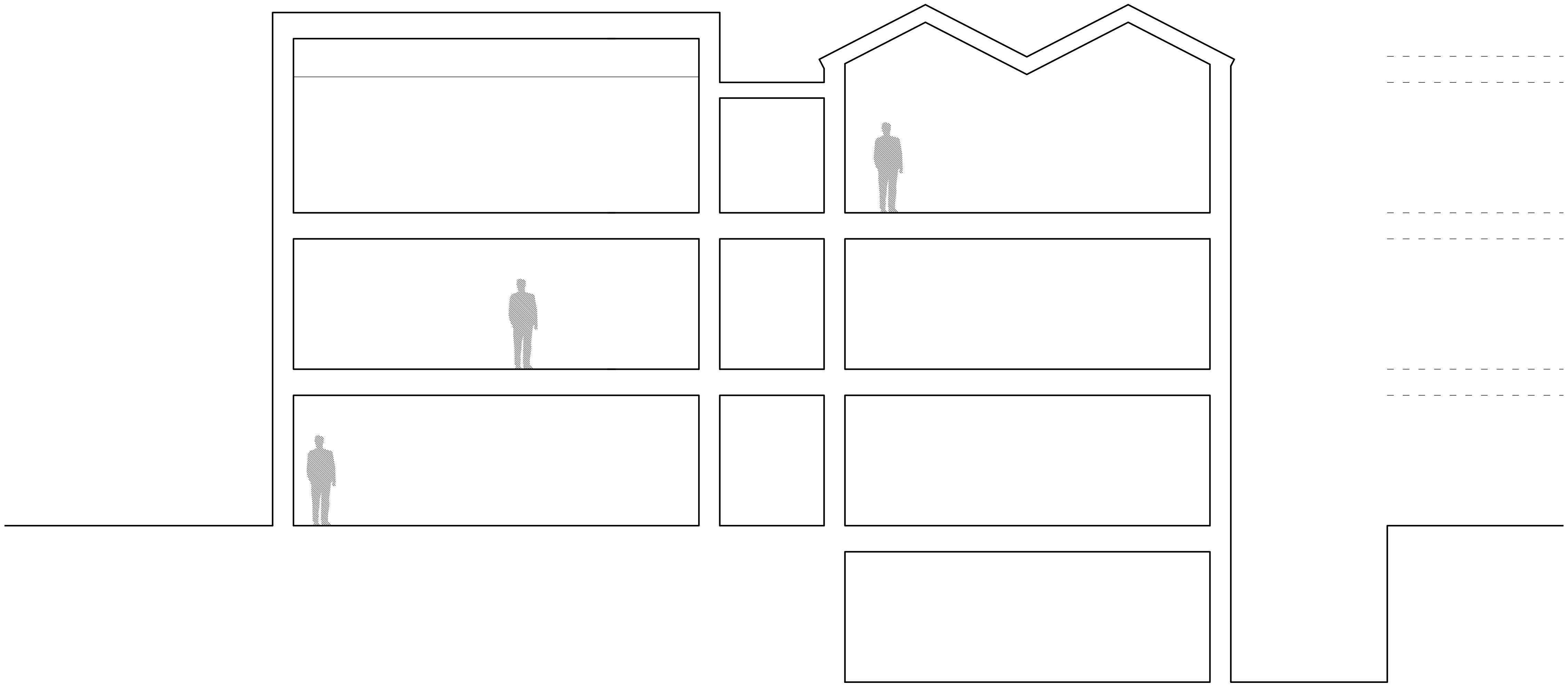
JS

DRAWN

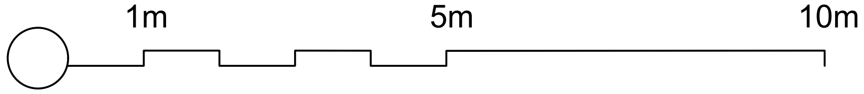
PLANNING

STAGE

SLEEP DESIGN STUDIO



SECTION A-A



REVISION:

REV/DATE

All dimensions to be checked on site before any works commence.

CLIENT	B.U Investments LTD Maryland Road N22 5AR
DWG NO.	152-310
TITLE	Sections
DATE	09 NOV 2023
SCALE	1:100@A3
DRAWN	JS
STAGE	PLANNING

SLEEP DESIGN STUDIO

REVISION:

REV/DATE

SIDE (SOUTH) ELEVATION

FRONT (WEST) ELEVATION

1:100@A3 1m 5m 10m

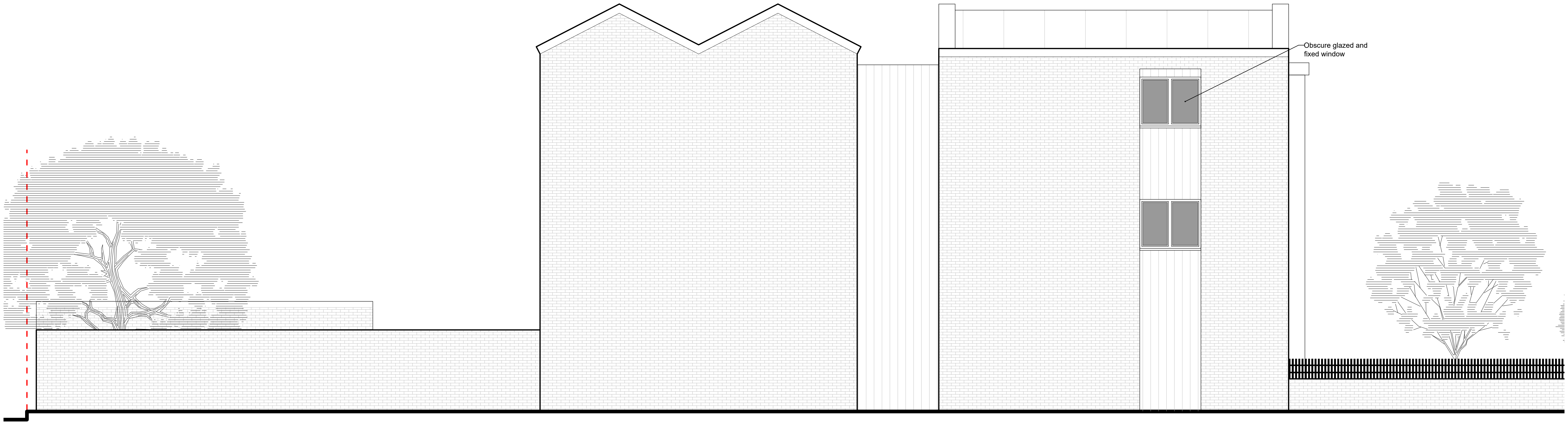
All dimensions to be checked on site before any works commence.

CLIENT	B.U Investments LTD Maryland Road N22 5AR
DWG NO.	152-320
TITLE	Elevations
DATE	09 NOV 2023
SCALE	1:100@A3
DRAWN	JS
STAGE	PLANNING

SLEEP DESIGN STUDIO

REVISION:

REV/DATE



SIDE (NORTH) ELEVATION

REAR (EAST) ELEVATION

1:100@A3 1m 5m 10m

All dimensions to be checked on site before any works commence.

CLIENT	B.U Investments LTD Maryland Road N22 5AR
DWG NO.	152-321
TITLE	Elevations
DATE	09 NOV 2023
SCALE	1:100@A3
DRAWN	JS
STAGE	PLANNING

SLEEP DESIGN STUDIO

Appendix D - Greenfield Runoff Calculation

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	0.042	Urban	0.000
SAAR (mm)	600	Region Number	Region 6

Results	**l/s**
QBAR Rural	0.2
QBAR Urban	0.2
Q100 years	0.5
Q1 year	0.1
Q30 years	0.3
Q100 years	0.5

Appendix E - British Geology Survey Borehole

May Gurney	May Gurney (Technical Services) Limited	JOB No. 45009
LOCATION: ST. THOMAS MORE SCHOOL, GLENDALE AVENUE, HARINGEY, LONDON.		
COMMENCED: 13.06.89 COMPLETED: 13.06.89	DIAMETER: 150mm	BOREHOLE No: 3 (1 of 2)

DESCRIPTION TQ39SW 238. 311,911

DESCRIPTION	LEGEND	DEPTH (m)	REDUCED LEVEL	SAMPLE/TEST	DEPTH (m)	REMARKS
GROUND LEVEL		0.00				
MADE GROUND - soft brown humic sandy silty clay with some rootlets and fragments of brick and concrete				J1	0.20	
				S	0.75	N = 6
				J2	0.75	
				B1	0.75-1.25	
FIRM brown to grey mottled finely laminated, fissured silty CLAY with occasional crystals of secondary selenite		1.30		U1	1.30	(25)
				J3	1.80	
				S	2.00	N = 9
				J4	2.00	
				B2	2.00-2.50	
				U2	2.70	(40)
				J5	3.30	
(WEATHERED LONDON CLAY)						
FIRM to STIFF brown brown to grey finely laminated fissured silty CLAY		4.50		S	4.50	N = 15
				J6	4.50	
				B3	4.50-5.00	
				U3	6.00	(40)
				J7	6.50	
				S	7.50	N = 21
				J8	7.50	
				B4	7.50-8.00	
...becoming STIFF below 9.00 metres				U4	9.00	(60)
				J9	9.50	
BOREHOLE CONTINUES		10.00				

SAMPLE/TEST KEY

- J Jar disturbed sample
- B Bulk disturbed sample
- U Undisturbed sample (No of Blows)
- P 100mm dia. piston sample
- W Water sample
- S Standard Penetration Test
- C Cone Penetration Test
- N = No. blows per 300mm penetration
- FHT Falling Head (results elsewhere)
- V Vane test

GROUNDWATER NOTES

DATE/TIME	STRUCK	STANDING	RATE OF RISE	DEPTH OF CASING	DEPTH OF SEAL
DRY					

REMARKS

May Gurney	May Gurney (Technical Services) Limited	JOB No. 45009
LOCATION: ST. THOMAS MORE SCHOOL, GLENDALE AVENUE, HARINGEY, LONDON.		
COMMENCED: 13.06.89 COMPLETED: 13.06.89	DIAMETER: 150mm	BOREHOLE No: 3 (2 of 2)

DESCRIPTION TQ39SW 238	LEGEND	DEPTH (m)	REDUCED LEVEL	SAMPLE/TEST	DEPTH (m)	REMARKS
BOREHOLE CONTINUED		10.00				
STIFF brown fissured silty CLAY with occasional local orange to brown discolouration along fissure planes and occasioanl thin bands of grey mudstone				S J10 B5	10.50 10.50 10.50-11.00	N = 27
				J11 U5	11.90 12.00	(40)
				J12	12.50	
(WEATHERD LONDON CLAY)				S J13 B6	13.50 13.50 13.50-14.00	N = 39
VERY STIFF dark brown laminated fissured silty CLAY		15.00		U6	15.00	(40)
				J14	15.50	
(LONDON CLAY)				S J15 B7	16.50 16.50 16.50-17.00	N = 24
				U7	18.00	(40)
				J16	18.50	
				S J17	19.50 19.50	N = 27
END OF BOREHOLE		20.00				

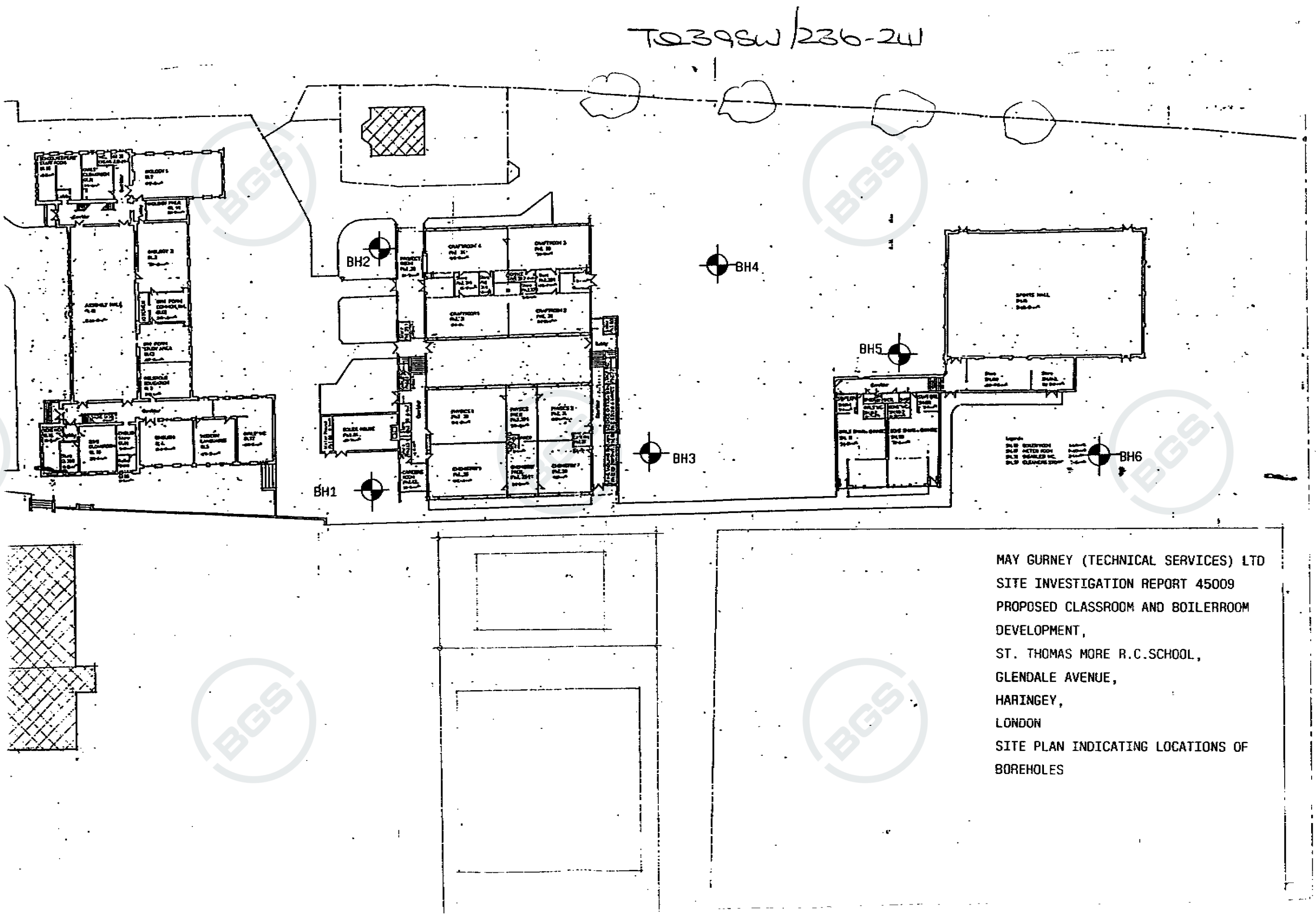
SAMPLE/TEST KEY

- J Jar disturbed sample
- B Bulk disturbed sample
- U Undisturbed sample (No of Blows)
- P 100mm dia. piston sample
- W Water sample
- S Standard Penetration Test
- C Cone Penetration Test
- N = No. blows per 300mm penetration
- FHT Falling Head (results elsewhere)
- V Vane test

GROUNDWATER NOTES

DATE/TIME	STRUCK	STANDING	RATE OF RISE	DEPTH OF CASING	DEPTH OF SEAL
DRY					

REMARKS STANDPIPE PIEZOMETER INSTALLED IN BASE OF BOREHOLE WITH GRAVEL RESPONSE ZONE FROM 16.50 TO 20.00 METRES


TQ39SW/236-241
BH1
BH2
BH3
BH4
BH5
BH6
MAY GURNEY (TECHNICAL SERVICES) LTD
SITE INVESTIGATION REPORT 45009
PROPOSED CLASSROOM AND BOILERROOM
DEVELOPMENT,
ST. THOMAS MORE R.C.SCHOOL,
GLENDALE AVENUE,
HARINGEY,
LONDON
SITE PLAN INDICATING LOCATIONS OF
BOREHOLES

Appendix F - Micro Drainage Storage Calculations

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	0.491	0.491	0.4	6.9	O K
30 min Summer	0.621	0.621	0.4	8.7	O K
60 min Summer	0.727	0.727	0.4	10.2	O K
120 min Summer	0.790	0.790	0.5	11.1	O K
180 min Summer	0.791	0.791	0.5	11.1	O K
240 min Summer	0.774	0.774	0.4	10.8	O K
360 min Summer	0.735	0.735	0.4	10.3	O K
480 min Summer	0.699	0.699	0.4	9.8	O K
600 min Summer	0.666	0.666	0.4	9.3	O K
720 min Summer	0.634	0.634	0.4	8.9	O K
960 min Summer	0.577	0.577	0.4	8.1	O K
1440 min Summer	0.478	0.478	0.4	6.7	O K
2160 min Summer	0.354	0.354	0.3	5.0	O K
2880 min Summer	0.224	0.224	0.3	3.1	O K
4320 min Summer	0.097	0.097	0.3	1.4	O K
5760 min Summer	0.057	0.057	0.3	0.8	O K
7200 min Summer	0.045	0.045	0.3	0.6	O K
8640 min Summer	0.038	0.038	0.2	0.5	O K
10080 min Summer	0.033	0.033	0.2	0.5	O K
15 min Winter	0.553	0.553	0.4	7.7	O K
30 min Winter	0.700	0.700	0.4	9.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	143.954	0.0	7.3	25
30 min Summer	92.629	0.0	9.4	39
60 min Summer	56.713	0.0	11.5	68
120 min Summer	33.583	0.0	13.6	124
180 min Summer	24.424	0.0	14.8	180
240 min Summer	19.389	0.0	15.7	208
360 min Summer	13.924	0.0	16.9	272
480 min Summer	11.018	0.0	17.8	338
600 min Summer	9.182	0.0	18.6	408
720 min Summer	7.908	0.0	19.2	476
960 min Summer	6.245	0.0	20.2	614
1440 min Summer	4.471	0.0	21.7	884
2160 min Summer	3.197	0.0	23.3	1280
2880 min Summer	2.518	0.0	24.5	1620
4320 min Summer	1.796	0.0	26.2	2256
5760 min Summer	1.413	0.0	27.5	2936
7200 min Summer	1.172	0.0	28.5	3672
8640 min Summer	1.006	0.0	29.3	4400
10080 min Summer	0.884	0.0	30.1	5080
15 min Winter	143.954	0.0	8.2	25
30 min Winter	92.629	0.0	10.5	39

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	0.824	0.824	0.5	11.5	O K
120 min Winter	0.904	0.904	0.5	12.7	O K
180 min Winter	0.914	0.914	0.5	12.8	O K
240 min Winter	0.898	0.898	0.5	12.6	O K
360 min Winter	0.850	0.850	0.5	11.9	O K
480 min Winter	0.804	0.804	0.5	11.3	O K
600 min Winter	0.758	0.758	0.4	10.6	O K
720 min Winter	0.714	0.714	0.4	10.0	O K
960 min Winter	0.631	0.631	0.4	8.8	O K
1440 min Winter	0.488	0.488	0.4	6.8	O K
2160 min Winter	0.299	0.299	0.3	4.2	O K
2880 min Winter	0.130	0.130	0.3	1.8	O K
4320 min Winter	0.052	0.052	0.3	0.7	O K
5760 min Winter	0.039	0.039	0.2	0.5	O K
7200 min Winter	0.032	0.032	0.2	0.4	O K
8640 min Winter	0.028	0.028	0.2	0.4	O K
10080 min Winter	0.025	0.025	0.1	0.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	56.713	0.0	12.9	66
120 min Winter	33.583	0.0	15.2	122
180 min Winter	24.424	0.0	16.6	178
240 min Winter	19.389	0.0	17.6	230
360 min Winter	13.924	0.0	18.9	286
480 min Winter	11.018	0.0	20.0	364
600 min Winter	9.182	0.0	20.8	440
720 min Winter	7.908	0.0	21.5	514
960 min Winter	6.245	0.0	22.7	662
1440 min Winter	4.471	0.0	24.3	946
2160 min Winter	3.197	0.0	26.1	1376
2880 min Winter	2.518	0.0	27.4	1624
4320 min Winter	1.796	0.0	29.3	2208
5760 min Winter	1.413	0.0	30.8	2912
7200 min Winter	1.172	0.0	31.9	3600
8640 min Winter	1.006	0.0	32.8	4392
10080 min Winter	0.884	0.0	33.7	5056

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.450	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.027

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.009	4	8	0.009	8	12	0.009

Model Details

Storage is Online Cover Level (m) 1.500

Tank or Pond Structure

Invert Level (m) 0.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	14.0	0.700	14.0	1.400	14.0	2.100	14.0
0.100	14.0	0.800	14.0	1.500	14.0	2.200	14.0
0.200	14.0	0.900	14.0	1.600	14.0	2.300	14.0
0.300	14.0	1.000	14.0	1.700	14.0	2.400	14.0
0.400	14.0	1.100	14.0	1.800	14.0	2.500	14.0
0.500	14.0	1.200	14.0	1.900	14.0		
0.600	14.0	1.300	14.0	2.000	14.0		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0032-5000-1000-5000
Design Head (m)	1.000
Design Flow (l/s)	0.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	32
Invert Level (m)	0.000
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	0.5
Flush-Flo™	0.143	0.3
Kick-Flo®	0.288	0.3
Mean Flow over Head Range	-	0.4

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.3	1.200	0.5	3.000	0.8	7.000	1.2
0.200	0.3	1.400	0.6	3.500	0.9	7.500	1.2
0.300	0.3	1.600	0.6	4.000	0.9	8.000	1.3
0.400	0.3	1.800	0.6	4.500	1.0	8.500	1.3
0.500	0.4	2.000	0.7	5.000	1.0	9.000	1.3
0.600	0.4	2.200	0.7	5.500	1.1	9.500	1.4
0.800	0.5	2.400	0.7	6.000	1.1		
1.000	0.5	2.600	0.8	6.500	1.2		