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Jeremy Gardner Associates
Technical Note



NESTLES AVENUE HAYES
FIRE ENGINEERING REVIEW
BL5004/of/15tf
19 March 2018

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INTRODUCTION

The project is a proposed new development comprising of nine residential apartment blocks. Each block contains between 3 and 10 storeys above Ground, as shown in Figure 1.

The number of storeys and height above Ground is as follows:

- Block A, B1 and B2 - ground + 10 storeys (31.5m)
- Block C1 and D1 - ground + 9 storeys (28.4m)
- Block C2 and D2 - ground + 7 storeys + communal terrace (25.3m)
- Block C3 and D3 - ground + 3 storeys (9.8m)

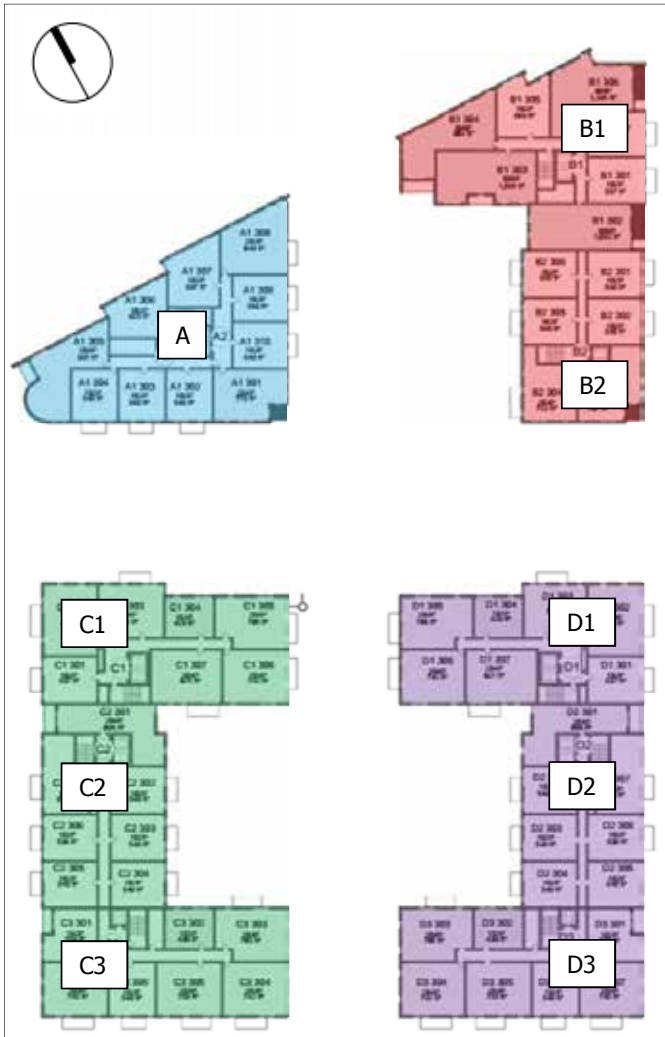


Figure 1: Site plan

SPRINKLERS

Blocks with a floor more than 30m above adjacent ground Level will require sprinklers. This is the case in Blocks A, B1 and B2. All other blocks have therefore been assessed without sprinklers. The provision of sprinklers will support extended corridor travel distances and provide flexibility in the apartment layouts.

Residential sprinklers will be needed in open plan apartments unless there are no inner room bedrooms and the total travel distance to the flat entrance is no more than 9m.

APARTMENTS

Both conventional apartments with protected entrance halls and open-plan apartments are possible.

Travel distances in entrance halls should be no more than 9m. The entrance hall should be a 30 minutes fire resistant enclosure.

Open-plan apartments with bedrooms accessed directly from the living space will require sprinklers and LD1 alarm and detection systems.

COMMON AREAS

Common Corridor Smoke Venting

Smoke venting is needed in the common corridors. The method of venting depends on the escape distances in the corridor.

Escape distances up to 7.5m are possible with a single 1.5m² automatically opening vent on the elevation. Inboard corridors will require either a 1.5m² natural smoke shaft or a mechanical smoke extract via a fan assisted shaft. The mechanical solution is more space efficient as the shaft would typically have a cross section area of ~0.6m², with an extract rate of 3-5m³/s.

Escape distances longer than 7.5m in unsprinklered blocks will require a mechanical smoke extract system with dedicated inlet, either mechanical or natural (referred to as push-pull hereafter). This is summarised in Table 1.

The distances given reflect our experience on many projects. However, it is more likely that sprinklers will be needed in the future where distances in the corridors exceed 15m.

Smoke system control	Maximum travel distance		Details
	Without sprinklers	Sprinklers	
Push-pull	15-18m	30m	Uses two ~0.6m ² reversible mechanical shafts, or one mechanical extract with inlet through vent shaft, or one mechanical extract with inlet through a loosely hung stair door that opens into the corridor at the far end from the extract shaft
Mechanical extract	10m	20m	Uses a ~0.6m ² mechanical extract shaft
Natural venting	7.5m	15m	A 1.5m ² natural automatically opening vent

Table 1: Smoke control summary



Where a mechanical or push-pull system is used a CFD analysis on the corridor will likely be required.

The drawings indicate corridor escape distances exceeding 7.5m in all blocks. Options for supporting these distances are presented below.

Note that where we have stated that the Block will not have sprinklers, this assumes the apartments are not open plan.

Smoke Control - Push/Pull

All of the Block C and D corridors show travel distances exceeding 10m, therefore a push-pull system would be suitable.

A potential layout for a push-pull system in Block C3 is given in Figure 2, where current travel distances are approximately 16m from the end of the corridor. The vents should be positioned within 5m of the dead-end sections of corridor to prevent stagnant smoke build-up, however a CFD study is likely to show small extensions to this are possible.

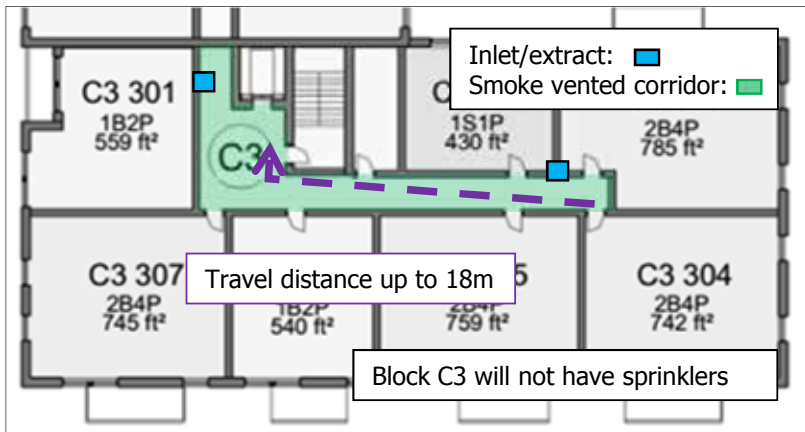


Figure 2: Block C3 - Push/pull option

This configuration is also shown for Block C2 in Figure 3, where the drawings show travel distances are approximately 17m.

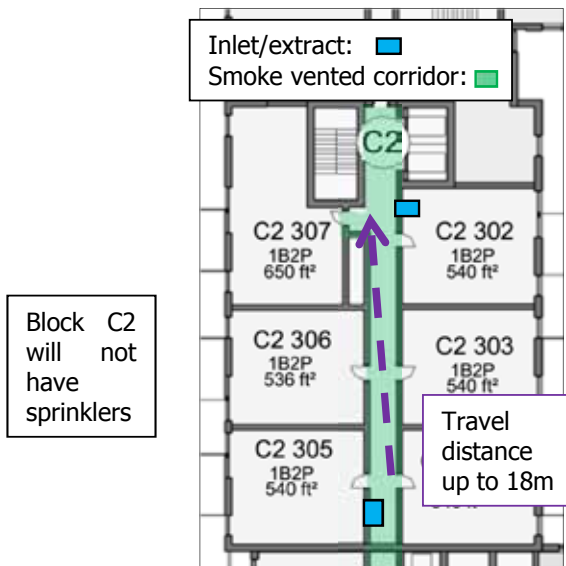


Figure 3: Block C2 - Push/pull option



Smoke Control - Mechanical Extract

Block B1 is sprinklered and has travel distances of up to 12m. A single mechanical extract would be sufficient to support this, as shown in Figure 4.

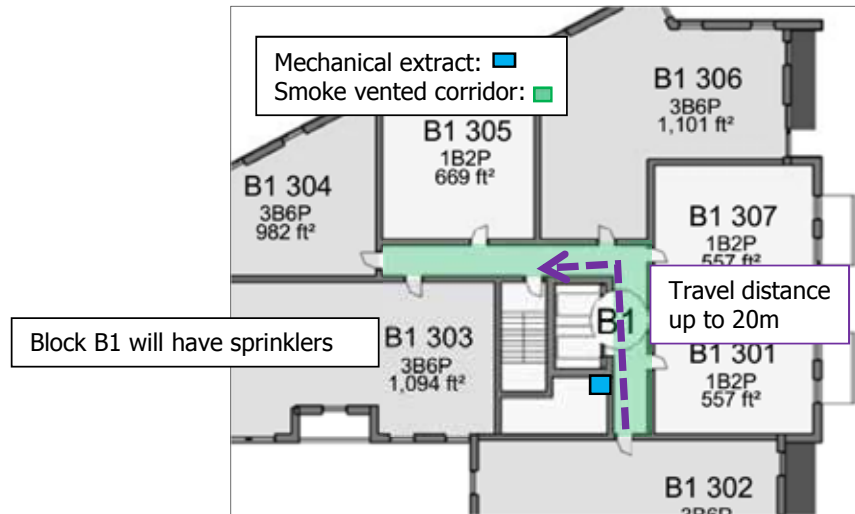


Figure 4: Block B1 - Mechanical extract

This solution would also be suitable in Block B2, as shown in Figure 5.

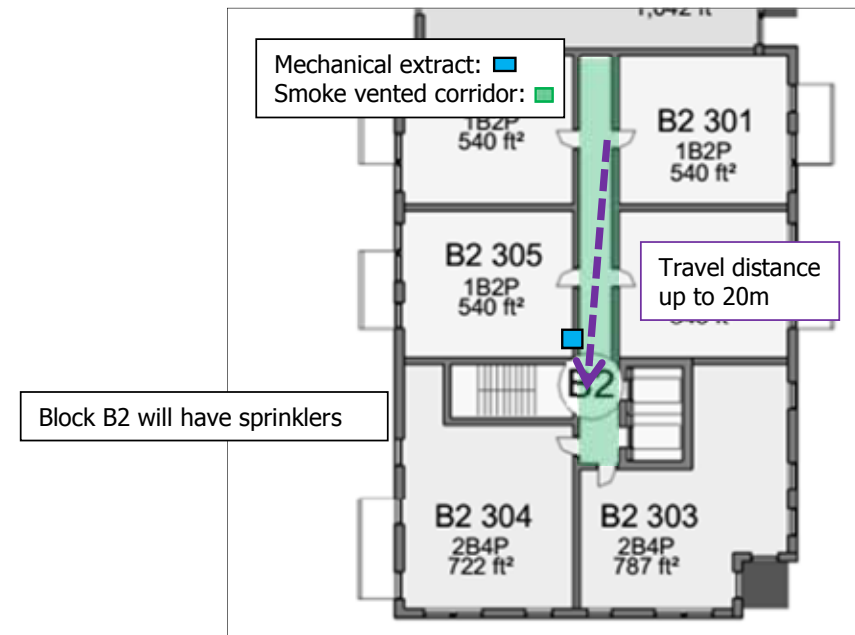


Figure 5: Block B2 - Mechanical extract

Block A has access to two stairs at every level. Guidance recommends that where the corridor has escape via two stairs, cross-corridor doors should be provided with smoke venting in each of the two dead-end sections. However, a solution for Block A using a single stair with two mechanical extract shafts is possible. Therefore, a case could be made to omit the cross-corridor doors between the two stairs in Block A.



Car Parks

The drawings show escape distances from the south carpark exceeding the recommended limit of 45m where there is a choice of escape route. A fire engineering solution can be developed to support the current layouts. Alternatively, additional routes could be provided from the carpark to either Core C3 or D3 via smoke vented lobbies. A similar approach should be taken for the north carpark.

Note that all occupants would need access to both escape routes, without having to rely on electronic activation of locks. However, once in the stair occupants need egress only to outside at Ground, so there is no need to allow them access to any of the apartment levels from within the stair.

It is proposed to provide a car stacker in the Block A and B carpark, and a number of pallet parking spaces in the Block C and D carpark. Due to the increased fire load and risk of fire spread, sprinklers should be provided in both carparks to support the stacker and pallet parking.

Podium

The drawings show an exit from each core onto the south podium at Level 2. The use of the podium needs to be confirmed. However, if the escape route provided from the podium is accessible to all occupants, this would offer significant benefit for the arrangement of the Ground Floor entrance lobbies. A similar approach can be taken for the north podium located at Level 1.

Final Exits from Stairs

Entrance Lobbies

Given the size of the entrance lobbies to the Cores, we anticipate that there will be a desire for these areas to be fitted out to provide concierge, social spaces etc. This can be a problem for escape, as a fire in the lobby could then discount the entire escape route from the stair.

One option is to severely restrict fire loading in the lobbies to non-combustible, or limited combustibility materials. However, the podiums provides an opportunity to provide an alternative escape route from the stairs. There appears to be an external escape route off the Level 2 south podium, if this is the case, a fire engineering solution can be developed to provide much more flexibility for fit out in the entrance lobbies. Smoke venting would be needed and potentially sprinklers. There may be a requirement for emergency lighting on the podium. This would need to be reviewed as the scheme develops.

Connections to other Uses

The final exits from all blocks should open directly to outside or by way of a protected corridor which is separated from any accommodation by at least one smoke vented lobby. Connections to refuse stores, car parks, plants, bike stores etc. are not recommended by Building Regulations guidance. However, they can be justified based on the provision of additional lobby protection, smoke venting and sprinklers.

Currently the drawings show the carpark opening directly onto the C1 and D1 stairs, as well as the C2 and D2 stair lobbies at both Ground and Level 1. Each of the stairs should be separated from the carpark by two lobbies, at least one of which should be smoke vented. This is illustrated for Block C1/C2 in Figure 6.

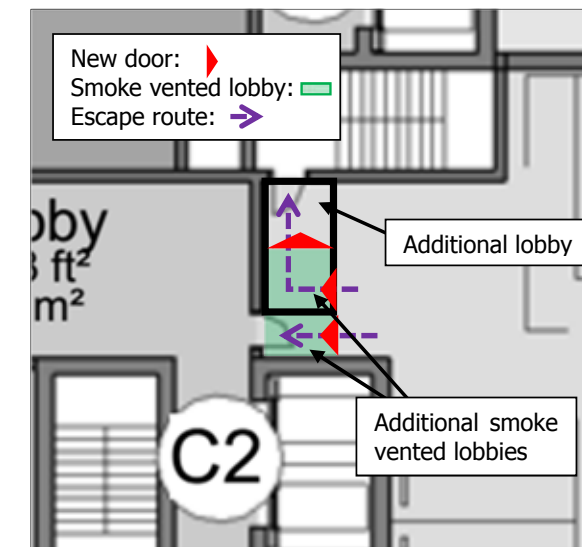


Figure 6: Carpark escape C1/C2

This solution can be used for both Ground and Level 1 where Cores C1/C2 and D1/D2 connect with the carpark. We can advise further as the scheme develops.

The drawings show a large cycle store connecting onto the final escape route of Block B1. This should be separated by at least one smoke vented lobby. Single smoke vented lobby separation from the bike store should be adequate given the low fire load present and the provision of sprinklers.

The single direction travel distances in this bike store are up to 50m. Travel distances in a bike store should be limited to 45m where there is a choice of escape. Therefore, a second exit should be added.

CAR PARK SMOKE VENTING

Smoke venting is needed in the car parks. There are two options:

- Natural smoke venting - permanent openings equivalent to 2.5% of the floor area of the car park. Of this, 0.625% needs to be provided on each of two opposing elevations. The remaining 1.25% can be provided anywhere.
- Mechanical smoke venting - provide an extract duty of 10 air changes per hour. Equipment needs to be rated to withstand temperatures of 300°C for 1 hour.



FIREFIGHTING

Firefighting Core

Blocks A, B1, B2, C1, C2, D1, and D2 will exceed 18m in height. Therefore, each of these blocks cores will need to be constructed as a firefighting core and will include:

- Firefighting stair at least 1.1m wide
- Firefighting lift opening within 7.5m of the door to the firefighting stair
- Smoke venting in the common corridor or lobby at every level
- Dry riser outlet located within the stair enclosure at each level

The dry riser inlet to each core should be within 18m and in sight of the vehicle parking position on the road.

Fire Hydrants

Fire hydrants should be provided within 90m of the dry riser inlets in each residential building, and should not be more than 90m apart.

Fire Vehicle Access

Fire vehicle access will need to be provided so a parking position is within 18m of a dry riser inlet. The drawings indicate that this should be achievable with the current vehicle access route. A hammerhead or turning circle will be needed where a dead-end access road exceeds 20m in length, and there should be at least one access route to the north carpark. The principles are shown in Figure 7.

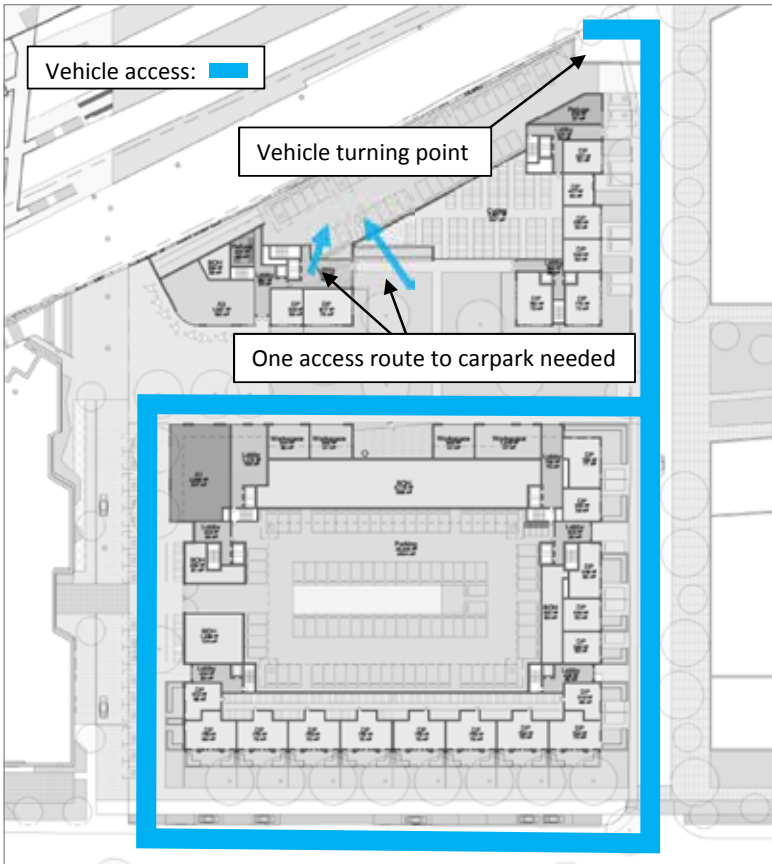


Figure 7: Vehicle access



STRUCTURE AND COMPARTMENTATION

Structure

The structure of the blocks should achieve the fire resistance periods shown in Table 2.

Blocks	Fire resistance period
C3 and D3	1 hour
C1, D1, C2 and D2	90 minutes
A, B1 and B2	2 hours

Table 2: Structural fire resistance

Compartmentation

All blocks will require compartment floors to the same fire rating as the structure. All shafts will need to be constructed as protected shafts and achieve the same fire resistance.

The following should be constructed as 1 hour compartment walls:

- Walls between flats
- Walls between flats and common areas
- Walls between flats and other uses

All firefighting cores should be enclosed in 2 hour fire resisting construction.

The retail/workspace units should be separated from the residential areas by construction achieving the same fire resistance as the structure.

ELEVATIONS

Glazing and non-fire resisting construction

The building is generally well separated on all sides from the site boundary, and we do not anticipate any restrictions on the amount of glazing to the elevations.

External Wall Materials

The external wall construction, including the core of cladding panels, of buildings with a storey more than 18m above ground should be of limited combustibility. As some of the blocks exceed 18m in height, products which form part of the external wall construction should comply with this.

This does not apply to masonry cavity wall construction, or to cladding systems which meet the performance criteria given in BR 135 for the exact wall build up proposed.

External surfaces should also meet the recommendations given in Approved Document B, Diagram 40, for surface spread of flame. However, it should be noted that a Class 0 surface spread of flame rating does not mean the product is also a material of limited combustibility.

COMMERCIAL UNITS

Following the Grenfell Tower fire we expect that the fire safety requirements for retail units in the blocks will be more onerous. In the blocks which are taller than 18m it may be necessary to install fire shutters on the shopfronts to prevent fire spread up the elevation, unless the external walls are non-combustible. Where they are proposed in the blocks which are taller than 30m then sprinklers may be needed.

FAÇADE ACCESS STRATEGY

233 – 236 Nestles Avenue



AccessAdvisors

The clear thinkers of façade access

Report: **Façade Access**
Project: **233 – 236 Nestles Avenue**
Issue: **00 – Stage 2**

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QA	Written by	Checked	Date	Stage	Issue	Document ref	Comments
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- 1. Introduction
- 2. Key regulations & Codes
- 3. Materials Selections
- 4. Selection of Strategy “the Options”
- 5. Operational & Coordination Items
- 6. Equipment interface with building
- 7. Residents Interface
- 8. Architecture
- 9. Public Realm Interface
- 10. Cost Effective
- 11. Cleaning cycle
- 12. Warranty Requirements
- 13. Equipment Storage & Transfer
- 14. Services
- 15. Health & Safety
- 16. Conclusion
- 17. Design Notes & Drawings

1.0 Introduction

To preserve the façades of the proposed redevelopment to 233 - 236 Nestles Avenue, it is essential that a robust, safe, and economic Facade Cleaning & Maintenance strategy is provided.

This report specifically deals with this subject and has been developed with Farrells and the wider design team providing outline options and guidance on how Façade Access Cleaning, Maintenance & Glass Replacement is carried out.

A robust strategy will deliver several benefits, not least protection of the building asset itself, which represents a significant investment.

2.0 Key Regulations and codes

There are many codes, standards, and regulations that a Façade Access Strategy (FAS) needs to comply with. The key driver is, as with all design within the UK, the CDM 2015 Regulations, and this is the centre pin for the selection and design process.

Work at Height (WAH) Hierarchy

The Working at Height regulations 2005 and CDM 2015 provides clear guidance on the hierarchy for the selection of work practices & Equipment when working at height.

This hierarchy is a simple systematic process outlining what the Duty Holder (The Client) and the designers should consider when planning work at height.

In simple Terms the levels are:

1. Avoid working at height where possible. This might be by utilizing inwardly opening window or extendable cleaning poles from ground level.
2. If working at height select work equipment that will prevent a Fall. This is commonly referred to as a “Collective Measure”

and would typically include the use of a safe stable platform or barrier such as a BMU (Building Maintenance Unit,) MEWP (Mobile Elevation Work Platform) or Scaffold.

3. Where they cannot eliminate the risk of a fall, use work equipment that minimizes the distance and consequences of a fall. This is commonly referred to as an “Individual or Personal measure” and would include the use of a safety harness system, or Abseiling (Rope Access Techniques).

This is further informed and guided by:

1. BS 8560: 2012 Code of practice for the design of buildings incorporating safe work at height
2. Ciria - C686 Safe access for maintenance and repair. Guidance for designers second edition 2009
3. LOLER 98 - The Lifting Operations and Lifting Equipment Regulations 1998
4. PUWER 98 -The Provision & use of work equipment regulations 1998

Figure 1 - Key Codes & CDM

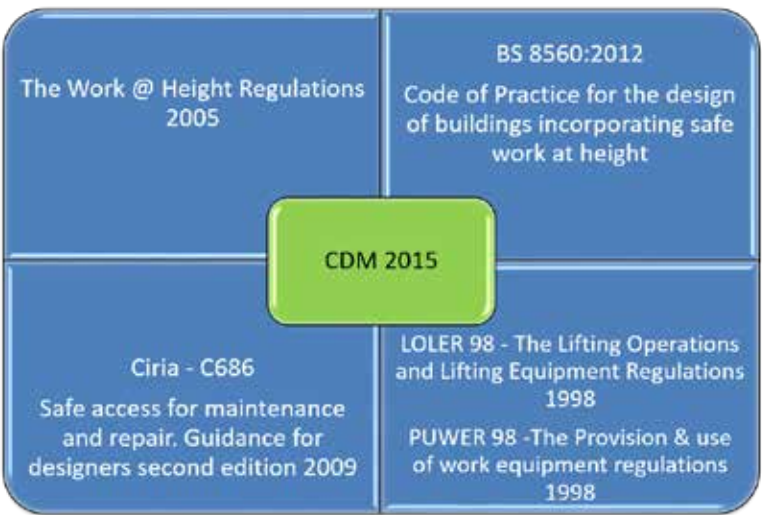
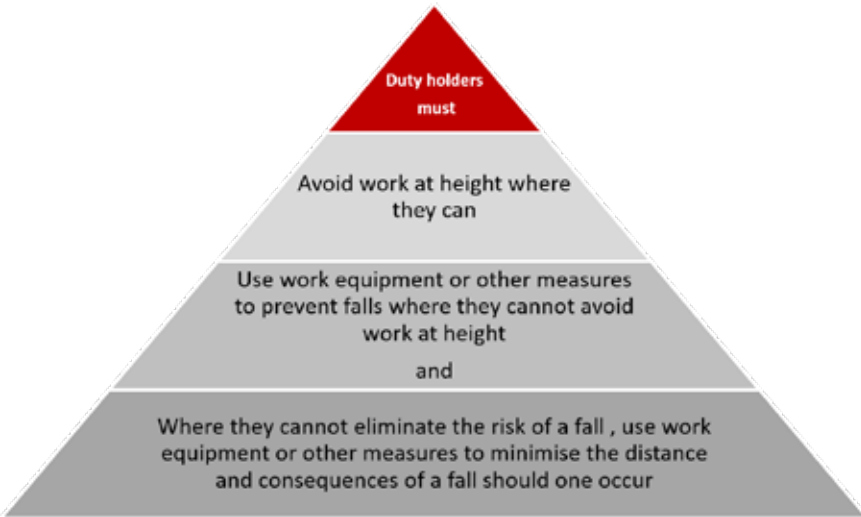


Figure 2 - HSE Selection of Work Equipment

Below is a simple guidance hierarchy for the process of selection of work equipment as defined by the regulations and the HSE



3.0 Material Selection

There is a broad range of materials selected for the facades, some of which will require access for either regular cleaning or maintenance.

Material and finish can also play a large part in the selection of a strategy particularly when it reduces the intensity of access that might be required.

Applied finishes such as Anodised and Powder coat, Glass and gaskets etc. require regular planned clean to satisfy aspirational intent and Minimum Maintenance requirements for the finishes,

Below is a list of Material used on the project and as can be seen many are non-maintainable with Low or no leaning requirement.

FACADE DETAILS KEY

- A. Brick Slip – Horizontal Stacked Bond
- B. Brick Slip – Vertical Stacked Bond459
- C.
- D. Brick Slip – Horizontal Running Bond

- E. Brick Slip – Vertical Running Bond
- F. Glazed white brick slip
- G. Glazed Brick Slip – Vertical Running Bond
- H. 20mm Grout and expansion joint lines
- I. Balcony : Brick Faced solid panel
- J. Balcony : Metal Handrail
- K. Balcony : Glass Handrail
- L. 2200 High glazed window / door with anodised aluminium frame
- M. Anodised aluminium sill detail
- N. 5500 High Glazed shopfront panel with anodised aluminium frame and solid panels.
- O. 30x500mm anodised aluminium feature fin
- P. Precast concrete breeze blocks. Custom 750 sq format.
- Q. Curved Brick nose detail with vertical and horizontal running bond details
- R. Glazed shopfront panel with anodised aluminium frame and louver panels.
- S. Concrete frames arcade detail with brick cladding
- T. Green Wall to detail
- U. Feature cover plates to aluminium

- realm and roads
- Cleaning Cycle
- Warranty Requirements
- Glass replacement
- Equipment storage & Transfer of Equipment – around the building.

As noted in section 2 the design and selection of a FAS should prioritise the use of Collective measures above individual measures. Within this report we have identified 2 base options for access to the Façade at height, these base options are then supported from other means including Rope access, De-ionized extendible cleaning poles, Simple Scissor lift type MEWPS and direct access from the balconies, terraces and external areas for lower areas, these are:

1. Building Maintenance Unit (BMU) – Strategy
2. Rope Access (RA) – Strategy

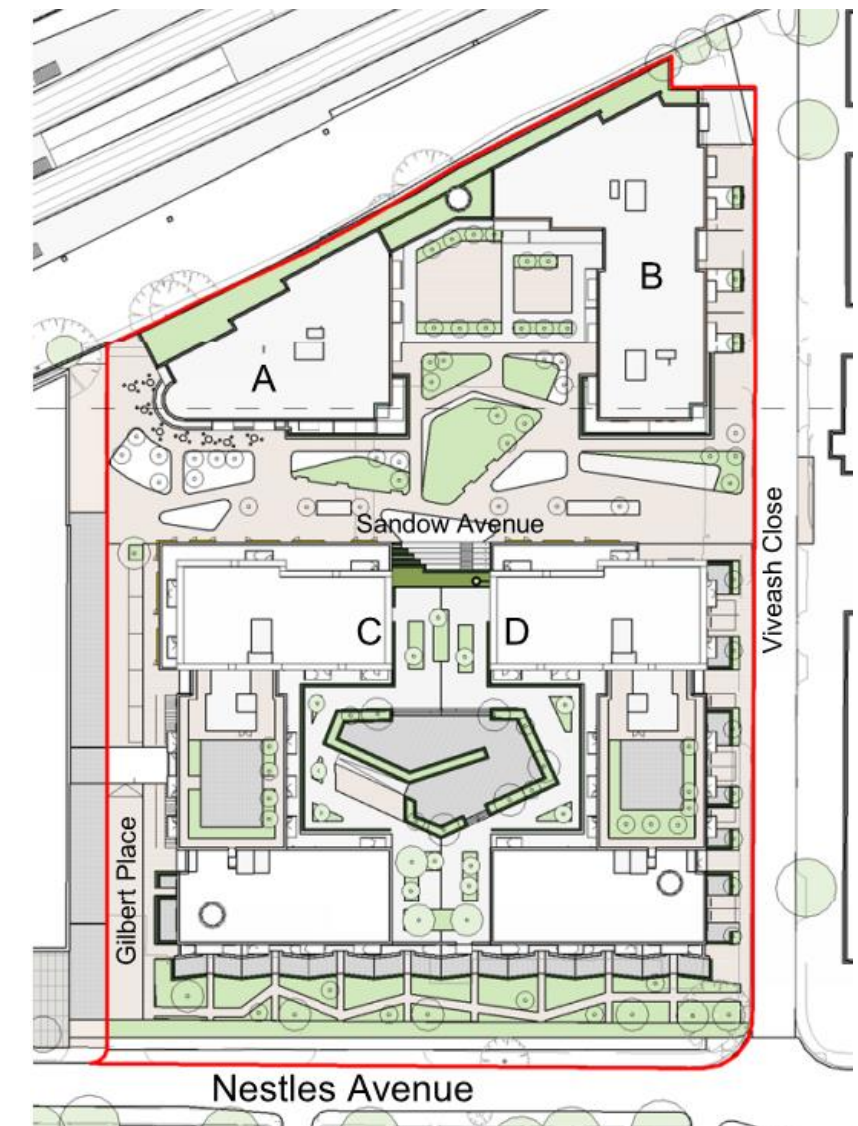
The purpose of providing the two approaches is simple, the Regulations require the Duty Holder and his designers to Prioritise a collective strategy and this is best demonstrated by the implementation of a BMU based strategy.

However, it should be understood that the Materials selected and number of areas that could be accessed directly without the use for work at height are many on this project i.e.

1. Extensive use of non-maintainable façade materials, particularly the brick slips
2. *Balconies Balustrades are generally non-maintainable with a few exceptions such as glass*
3. The Balconies are in column formation and generally always at each floor, meaning these areas (subject to part K compliance) may be able to be cleaned by the Tennent / Resident.

The final selection for the Strategy will need to be evaluated and de-risked during the next stage.

Figure 3 Site Plan



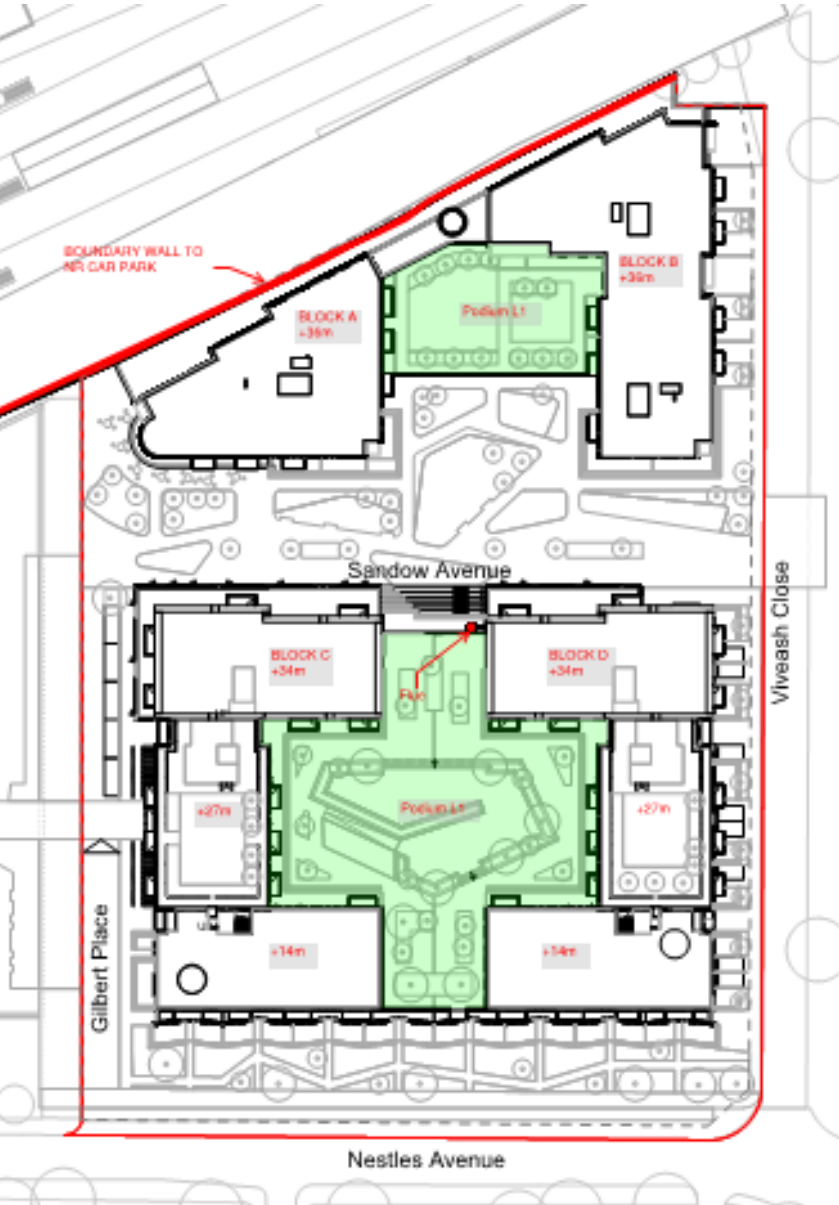
DDN 001 – HyS is shown at the back of the report and demonstrates the Façade access strategy options, the following page are extracts from this DDN 001 – HyS.

4.0 Selection of the Strategy “The Options”

The Key drivers in developing the strategy have been:

- Compliance & Safety
- Material Selection – Cleaning requirements
- Location of equipment
- Building users interface - a non-intrusive strategy as far as is practicable.
- Architecture - Minimal impact on architecture
- Public Realm Interface - minimal impact on the public

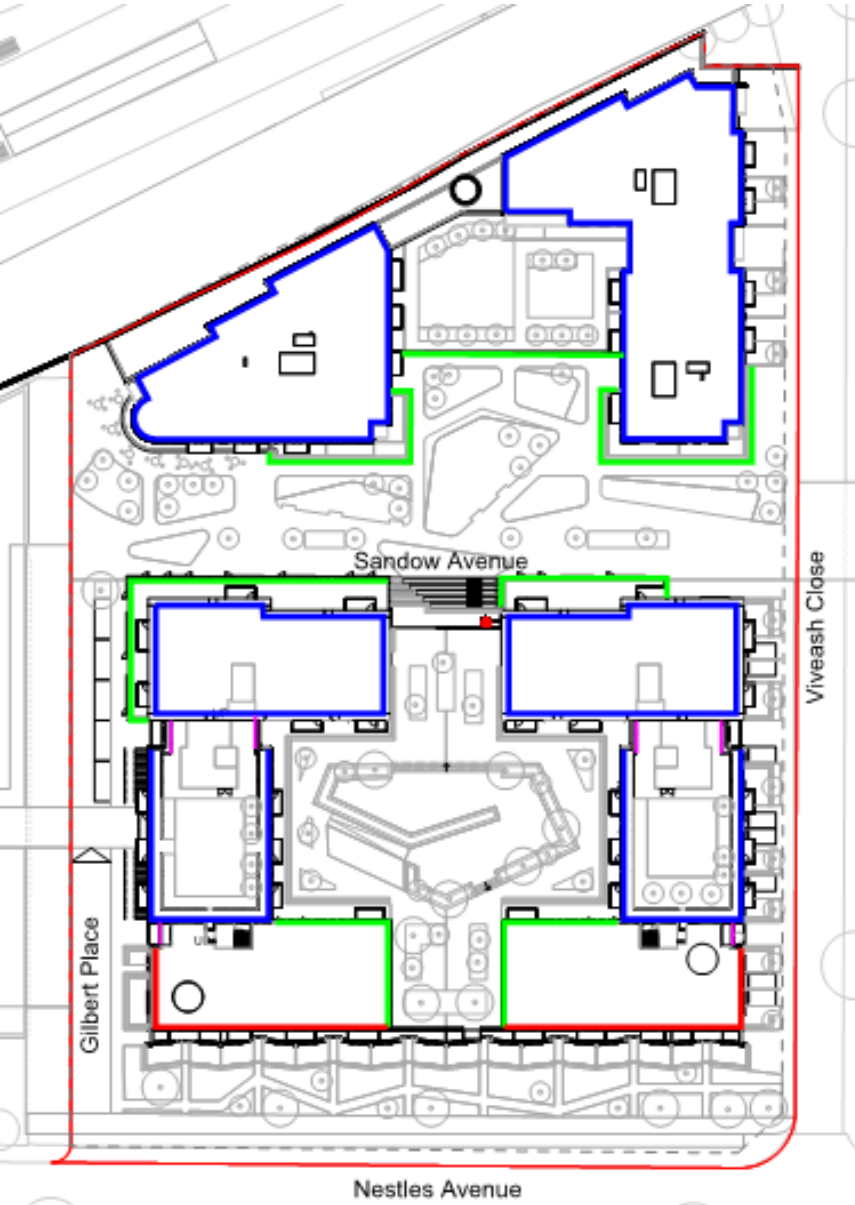
Figure 4 Site wide Features & Heights / Levels



Considerations

- The 4 main roofs to all Blocks range from 36 to 27m
- The Podiums are heavily landscaped and not suited to any type of mechanical work equipment i.e. MEWPs
- Extensive areas of Green roof to blocks C & D
- Balconies are in Column Form and only 1 floor separation
- The roads surrounding the site are relatively busy and not suitable for a MEWP due to disruption to traffic circulation
- The lower facades (DUPLEX) to Nestles Avenue are heavily planted and deep balconies and lower courtyards
- CAA possible restrictions roof mounted plant such as BMUs

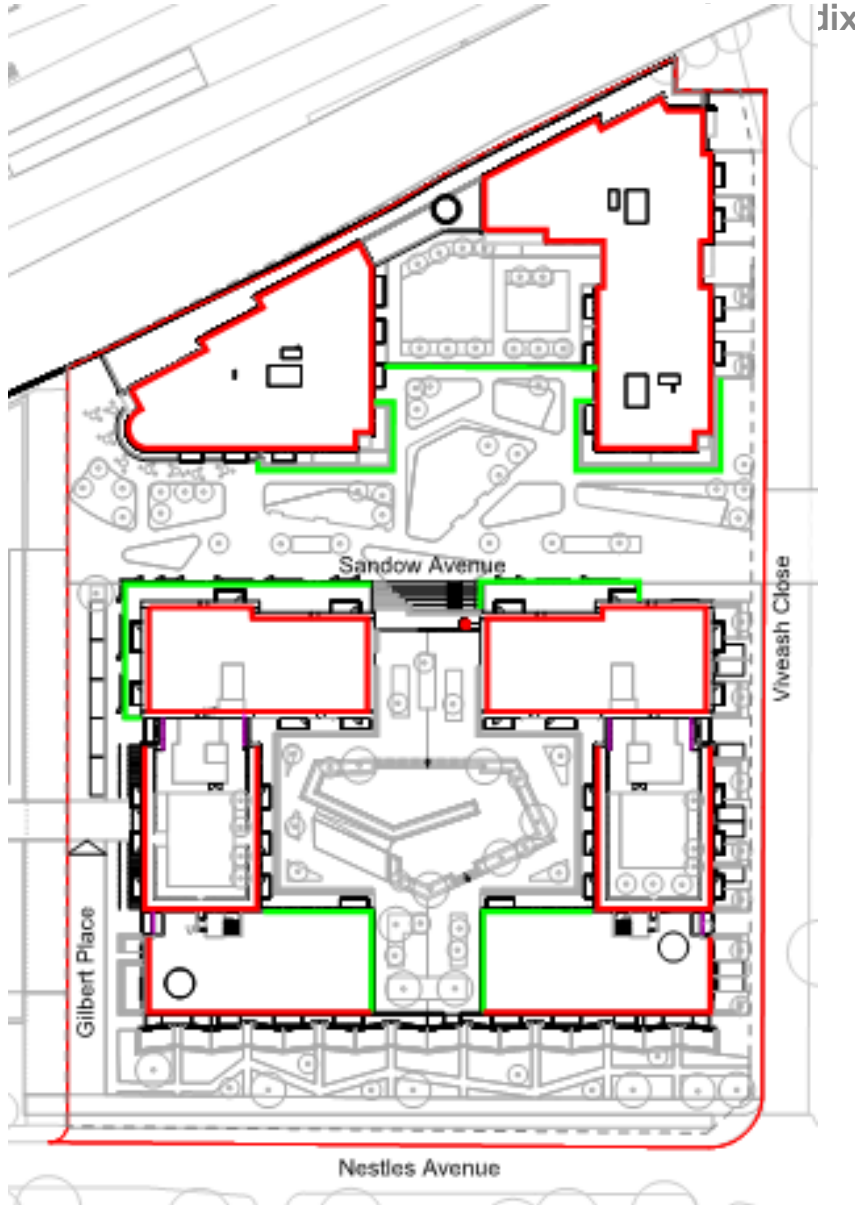
Figure 5 BMU as a Primary Strategy



KEY to FACADE ACCESS SYSTEMS



Figure 6 Rope Access as a Primary Strategy



KEY to FACADE ACCESS SYSTEMS



Direct Access to Balcony Balustrade

The Balconies Balustrades are a mixture of:

- Glass
- Brick Slip
- Metal Panels
- Metal Railing.

Of these the Metal Panel and Glass Balustrade will have a Minimum maintenance requirement (MMR) to satisfy the Warranty.

There is no direct Building Regs or British Standard guidance regarding reaching down to clean Balconies screens. However, there is a similar condition in Part K of the Building Regulations describing cleaning below a window from the inside, which recommends that a distance of not greater than 610mm from the Cill is accessible from a resident reaching down. If we apply the same guiding principle to the balcony, it will make cleaning difficult and it may need to be completed by a professional cleaner or potentially by the resident with supplied specialist tooling. Whilst maintenance will be completed by a BMU or Scaffold / MEWP or potentially a Rope Access Specialist

The Metal railings will be simple to clean safely from the Balcony, reaching through, whilst the brick slips will not require cleaning.

Figure 7 Part K Building Regs reaching Down to clean

See para 9.1

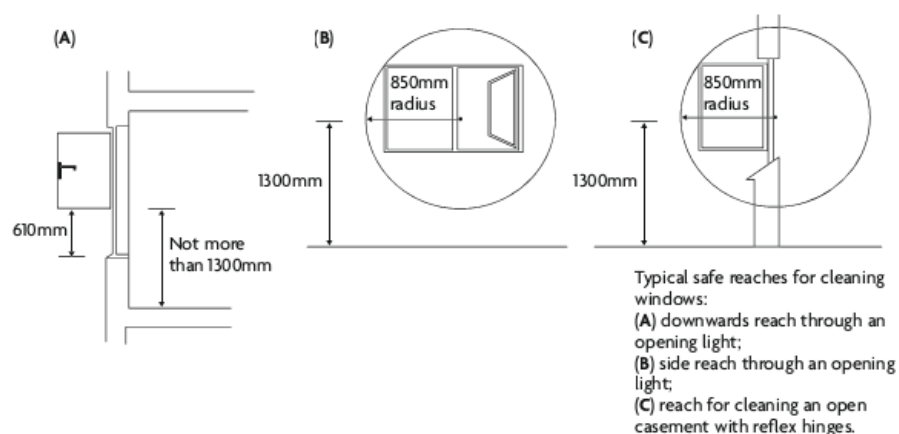
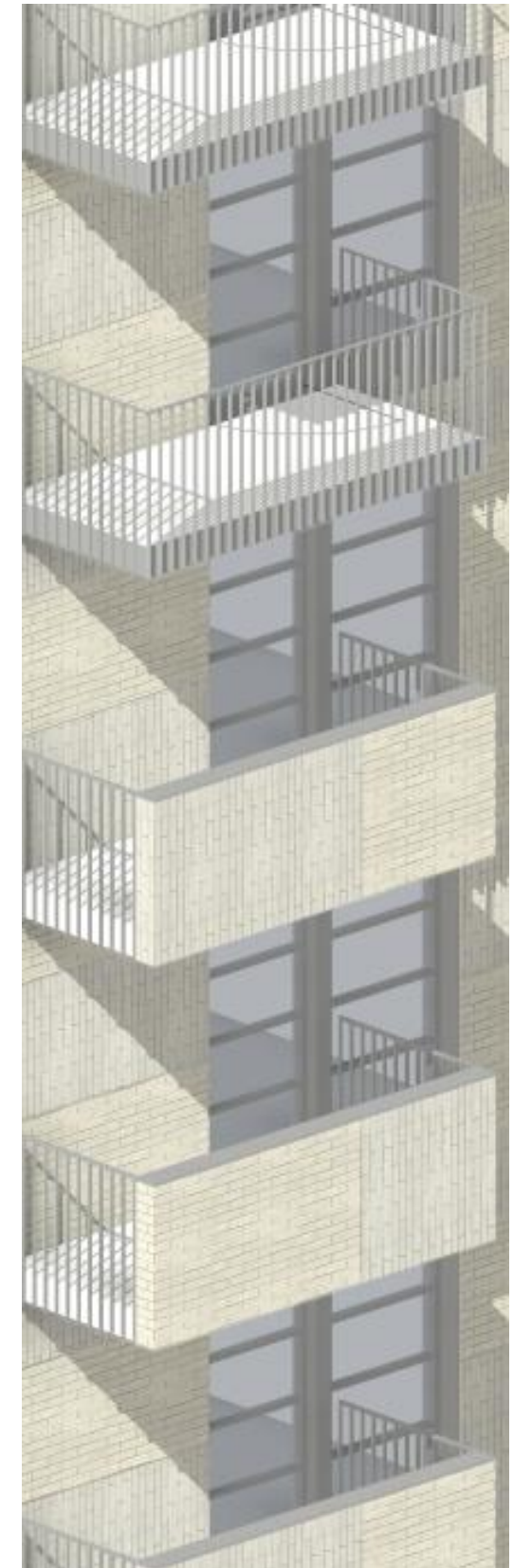


Diagram 9.1 Safe reaches for cleaning

Figure 8 Balcony – Glass & Brick Slip



Figure 9 Balcony – Metal railings & Brick Slips



Direct Access to Balcony Doors and Windows

The Balconies are in a column formation generally with only a single floor separation between them, these could be cleaned directly by the Resident without the need to work at height or overreaching.

Figure 10 Stacked type balconies



Low Level Areas at Ground or Podium

Access permitting around the ground and podium floor levels, glazing between ground and 2nd floor can be cleaned directly from ground level using extended cleaning tools, by the FM team Specialist Subcontractor.

This is somewhat complicated by the private gardens along Nestles Avenue to the Duplex units, where access to these private gardens will be necessary to clean the windows above. Cross demise use may be required.

Maintenance will be completed by a combination of MEWP, Scaffold or potentially Rope Access.

Figure 11- Typical low-level Areas

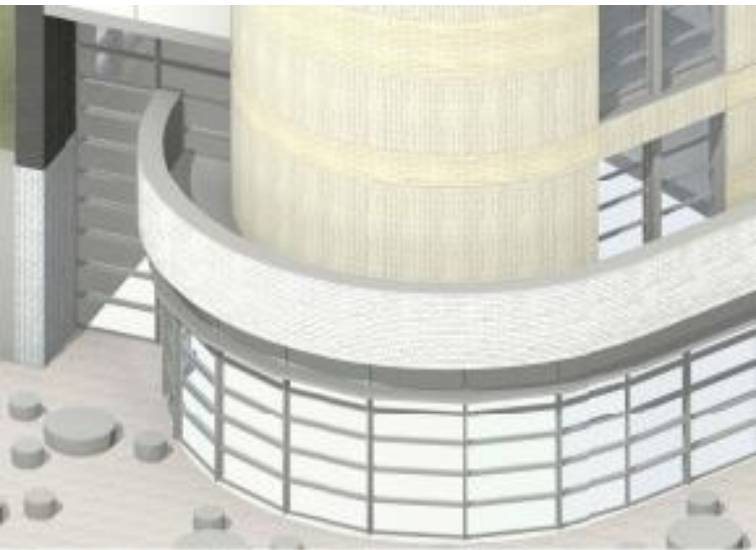


Figure 12- Deionised Water Fed pole up to 12m maximum



Figure 13 Non-Water fed pole up to 3.5m



Wall to Station Car Park

Access to the Network rail (NR)side of the Wall may become problematic, we have advised that the Wall should be built using maintenance / cleaning free materials and finish and be secured only from within the demise of the development red line, As access into NR property may prove difficult to arrange going forward, this should be further discussed post planning with NR.

Figure 14 Car Park Boundary Wall (NR)



General Access to the Main Glazed Facades Blocks A, B, C, D

Access to the main Glazed and metal elements of the Façade, shall be via either a BMU or Rope Access Davit systems at each main roof level. The exception to this is the Lower Block to C & D which shall be accessed using a combination of Rope Access, MEWP and Water Fed poles. The final selection shall be developed in the next design stage and will be largely influenced by a detailed analysis of the façade materials and their maintenance and cleaning requirements and frequencies

1) BMU Option (excluding Nestles Avenue)

There shall be up to 6No BMUs to the main roofs.

Where a BMU is used, it shall be designed to be circa 1500-1750mm high when parked and will operate in a zone circa 1400mm above the highest parapet height. The cradle will be for 2 persons and have a Glass / door replacement Auxiliary hoist fitted, this hoist could be shared between all the BMUs.

Figure 15 Example BMU



The BMUs shall traverse on Twin I beam tracks supported via concrete upstands back to the RC slab. The tracks and supports could be incorporated in to a roof deck or a green roof subject to further

development. The tallest Block at 36m will not require façade restraints into the façade for platform / Cradle Stabilization. Please refer DDN 001 - HyS

2) Rope Access Options (RA) All blocks Including Nestles Avenue

A series of RA systems comprising of RA Davits shall be positioned at roof level, generally positioned at 1200mm centres.

All Coping, Parapets and ledges will need to be designed to take RA contact, Impact and Foot fall loads.

Rope Access systems always operate on a top down principle, and anywhere where a descent completes there will be a need for the Operatives to egress, back to their original work position. This will be an area to study for Nestles Avenue in the next stage.

This will affect demise demarcations to some degree in a few areas particularly.

All glass replacement shall be carried out using alternative methods such a Cranes from the road, Internal Via the lifts (subject to Lift sizes and routes) or Temporary Counterweighted Davits (TCD).

Figure 16 Nestles Avenue Duplex and Gardens



Figure 17 Rope Access Davit



Figure 18 Rope Access Operatives on Façade



Figure 19 Curtain Wall to Facades



The final selection on Work Equipment to be used shall be taken post planning, we have advised that until such time, BMUs should be shown on the drawings to avoid any potential planning issue should they ultimately be required.

During the detailed study post Planning the FAS will be able to be rationalized.

Site Wide Strategies Considered but Discounted.

Davits using Cradles were considered for the Glazed elements but have been discounted, due to their high level of setting up costs and ongoing use, and impracticability of moving between and around roof levels and landscape areas.

MEWPS are also not entirely practical, as they cannot be used on the Podium structure and would cause traffic management challenges for Vehicle circulation along Sandow Avenue and similarly around the perimeter roads to the East, West and South.

Flue

The materials use on the Flue will require regular access for Cleaning and maintenance as they are applied Finishes I.e. Metal Polyester Powder Coat, which will have a Minimum Maintenance Requirement (MMR) of up to 2 x per year.

Using a BMU from the main roof to access this would be problematic, and a suspended platform from a Monorail, although possible would be difficult to manage with the articulation of the Flue created by the hoops and braces back to the main block.

It is therefore intended to utilise a high-Level monorail at the Top of the Flue (Circa 250mm from the façade) from which Rope Access Operatives shall descend. Access onto the Monorail shall from the safety of a Gantry walkway from the main roof. With a suitable permanent Fall Arrest Type Ladder from this to the Monorail with a landing platform within 1600mm of the monorail.

Figure 20 Flue Access Via Rope Access Monorail at top



Glass Replacement

There are a number of scenarios and potential options for Glass replacement.

- Balconies Windows and Doors
Direct Replacement Glass delivered via the Lifts (subject to Lift Interior size and Glass Size)
- Windows and Curtain Wall
BMU Auxiliary hoist, Low levels UNIC MINI Crane, High Levels Mobile Crane or Temporary Counterweighted Davits (TCD) from each roof level

Figure 21 BMU Glass Replacement



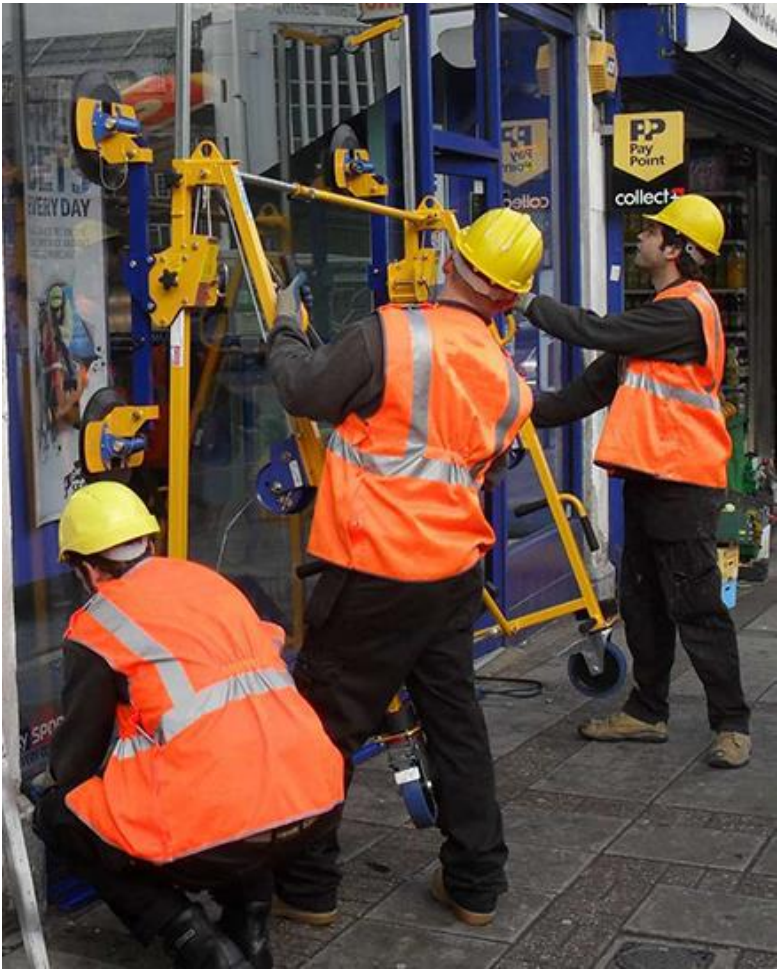
Figure 22 MEWP & UNIC Mini Crane – Glass replacement



Figure 23 Temporary Counterweighted Davit (TCD)



Figure 24 Low Level Glass Replacement Using a Sherpa Manipulator (300kg max)



5.0 Operational & Coordination items

LOLER 98 Regulations for Inspection

The BMU or Rope Access Option will utilize cast in Holding down units (HDU's), these fixings are essentially hidden from view and as such are subject to a 2 x yearly LOLER 98 Insurance inspection by statute.

To comply with LOLER, an independent authority (i.e. an insurance inspector) will visit site to witness that the HDU's have been cast- in correctly and in accordance with the Contractor's drawings/requirements.

The track or rope access Davit connection detail will be designed to allow access to the fixings for future inspections and maintenance. This would be on a six-monthly basis.

The structural engineer shall be responsible for a suitable detail to anchor the bolt units to the slab.

IRATA

It is essential that this Rope Access installation complies with the guidelines as detailed by IRATA (Industrial Rope Access Trade Association) and BS7985 code of practice for the use of Rope Access methods for industrial purposes.

Lightning Protection

It will be necessary for the BMU Track system or Rope Access Sockets to be connected to the lightning protection system via tags to the track.

Acoustics, noise & vibration

The BMU may cause a degree of noise and vibration to the floors below. This level of noise and vibration is difficult to quantify and will need to be developed further with the acoustics consultant.

From the BMU perspective, variable speed invertors shall be fitted to all slewing, hoisting and traverse motors. The track shall be installed

accurately, with minimal track joints. All of which will assist in reducing noise and vibration back into the building through the structure.

Building Over sail

The BMU jib and Cradle, during normal working on the façade will over sail of 1500mm-1800mm during cleaning and glass replacement. There will be occasions where this dimension will temporarily be exceeded during initial positioning of the cradle. An over sail of approx. 1000m is required for a Rope Access system.

Efficiency & Aesthetics

Both a BMU Strategy or a Rope Access Strategy will allow an acceptable clean time and have minimal impact on the aesthetics of the building if well considered at an early design stage.

However, for Rope Access the cladding and façades will need to be considered carefully as there will be major interfaces with the parapets and facades in respect of materials used, as the operatives will predominantly use their hands and feet for positioning themselves on the façade during cleaning and on descent.

Loadings

BMU Loadings and Rope Access Loadings will be provided post planning.

For Rope Access the suspension systems shall be designed to accommodate the working dynamic load which shall not be less than 15kN per anchor this is a code requirement. As always double ropes and anchors shall be used for additional safety in use.

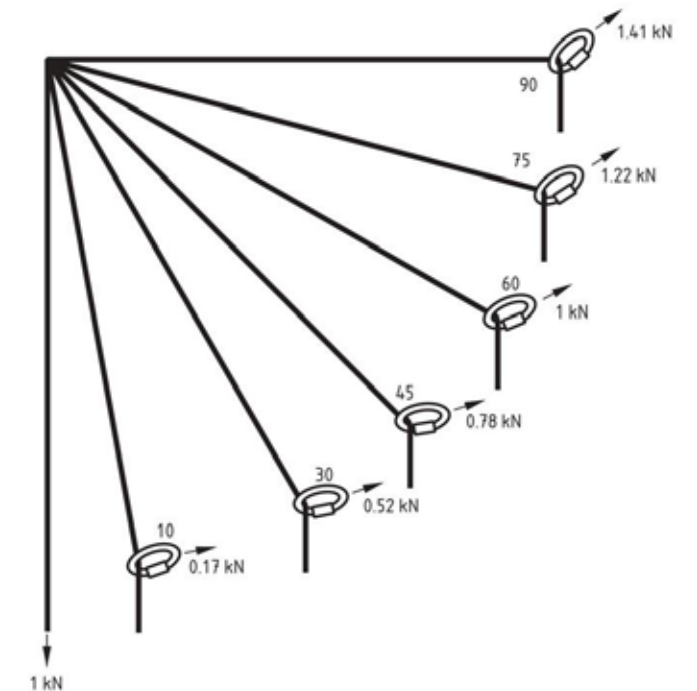
Access to Roofs

The majority of the roofs are protected by full height parapets where this is not the case a Restraint systems in the form of Safety Lines will be provided.

Figure 25 – Typical Safety Line system



Figure 26 – Indicative Preliminary Rope Deviation Loads



6.0 Equipment interface with building

The main areas of interface are listed below:

- Suitable Support Structure to accommodate associated loadings of the BMU
- Builders work for track Holding Down Units
- Impact Loadings on façade
- Glazing Replacement
- 3-Phase power supply roof levels
- Water supply at roof and Podium / Ground levels
- Suitable provision to park the BMU at roof level
- Rope Access Davit systems require a suitable support structure at nominally 1200mm centres system
- Loadings associated with the Rope Access installation is 15Kn for Mansafe/Rope Access supports
- Suitable access onto all roofs and terraces
- Edge Details for Rope Access to accept rope deviation loads as shown in this report.
- Trafficable Parapet copings

7.0 Residents Interface

A strategy that has zero or negligible effect on the residents is essential, by providing a BMU type strategy this is largely achieved.

However with Rope access this will be considerably more, additionally access will need to be available onto all of the roofs terraces.

8.0 Architecture

The BMU approach we have taken will have minimal effect on any planning requirements if planned correctly.

A Rope Access approach will have no effect on planning.

The BMU will be on view when in use but can parked away from the building edge between the Lift overruns and therefore out of view when not in use.

The strategy will need to be developed post planning and this will require further discussion to ensure that a coordinated strategy continues in line with the intent of this report.

Any CAA considerations will need to be understood also i.e when the BMU is in use.

The BMU will operate in a zone around 1400mm above the parapet when in use.

When Parked a height of between 1500 & 1750mm.

9.0 Public Realm Interface

The BMU strategy has very little interface with the public realm, except for ground level where suitable signage will be deployed during cleaning operations.

When the Abseilers are working, this will need to be managed and coordinated to reduce any disruption to the building occupants and public realm. This will ensure a safe working zone for everyone.

10.0 Cost Effective

The equipment selected in this strategy is widely available in the market and should be sourced competitively, the management / maintenance costs should also be reasonable as these BMU's and Rope Access Anchors are relatively simple to maintain and manage.

11.0 Cleaning cycle

For a development such as this we would typically expect a cycle of between 7 to 10 weeks. This is driven by the position of the site to the railway line and the general pollution levels in Hayes.

12.0 Warranty Requirements

The various window types and façade materials on the building will require different maintenance regimes. This will need to be understood and referenced in the Façade Contractors O&M'S (operation and maintenance manuals). All Façade Contractors will have a minimum requirement for the frequency particularly for the cleaning processes expected to maintain warranties.

The strategy we have recommended will deliver a cleaning frequency that at least meets the cleaning cycle for the Warranty of the façade provider.

13.0 Equipment Storage & Transfer

All BMU equipment is stored at roof level.

Access will need to be provided onto the roofs and terraces for the window cleaners/Abseilers.

14.0 Services

The BMU will require a 415v, 3phase, 32-amp power supply with 30ma RCD, and onto the emergency power supply system.

The BMU and Rope Access systems will require designated water supply points at all roof levels.

15.0 Health & Safety

Reference must be made to the Working at Height Regulations 2005. This requires an assessment to be carried out before starting any work at height.

There will be a need, due to the building's design, for operatives to work at height. This work must be properly planned and organised in advance by a competent person to ensure the most appropriate work equipment is selected, considering the nature of the work to be carried out.

An additional regulation is “The Use of Work Equipment Regulations 1998 (PUWER)” This regulation requires the risks from using equipment at work to be prevented / understood and mitigated or controlled.

Closely linked to PUWER is LOLER. “The Lifting Operations and Lifting Equipment Regulations LOLER”. This requires that any equipment used for lifting or lowering loads or people should have been designed to specific standards and is independently thoroughly examined before first use and at regular intervals thereafter of not greater than 6-months.

As always, safety is key when developing a cleaning and maintenance strategy and the use of systems. This will not only affect the operatives but will also affect co-worker’s users of the building and users of the public realm.

All equipment must comply with Statutory Regulations and we have based the strategy on UK and European directives.

All operatives must be suitably trained and Qualified to Work at Height and where required, be specifically, theoretically, and practically trained in the use of the work equipment used i.e.

- BMU’s
- Safety Harnesses
- Rope Access Techniques (IRATA Trained)
- First Aider

Safe methods of work shall be used to minimise Health and Safety hazards.

Risk Assessments and Method Statements must always be provided to ensure that all risks are understood, anticipated mitigated to eliminate, reduce and control the risk.

Lone working should always be avoided, and all equipment / Access should be designed to be operated or used by a minimum of 2 people in case of incapacitation.

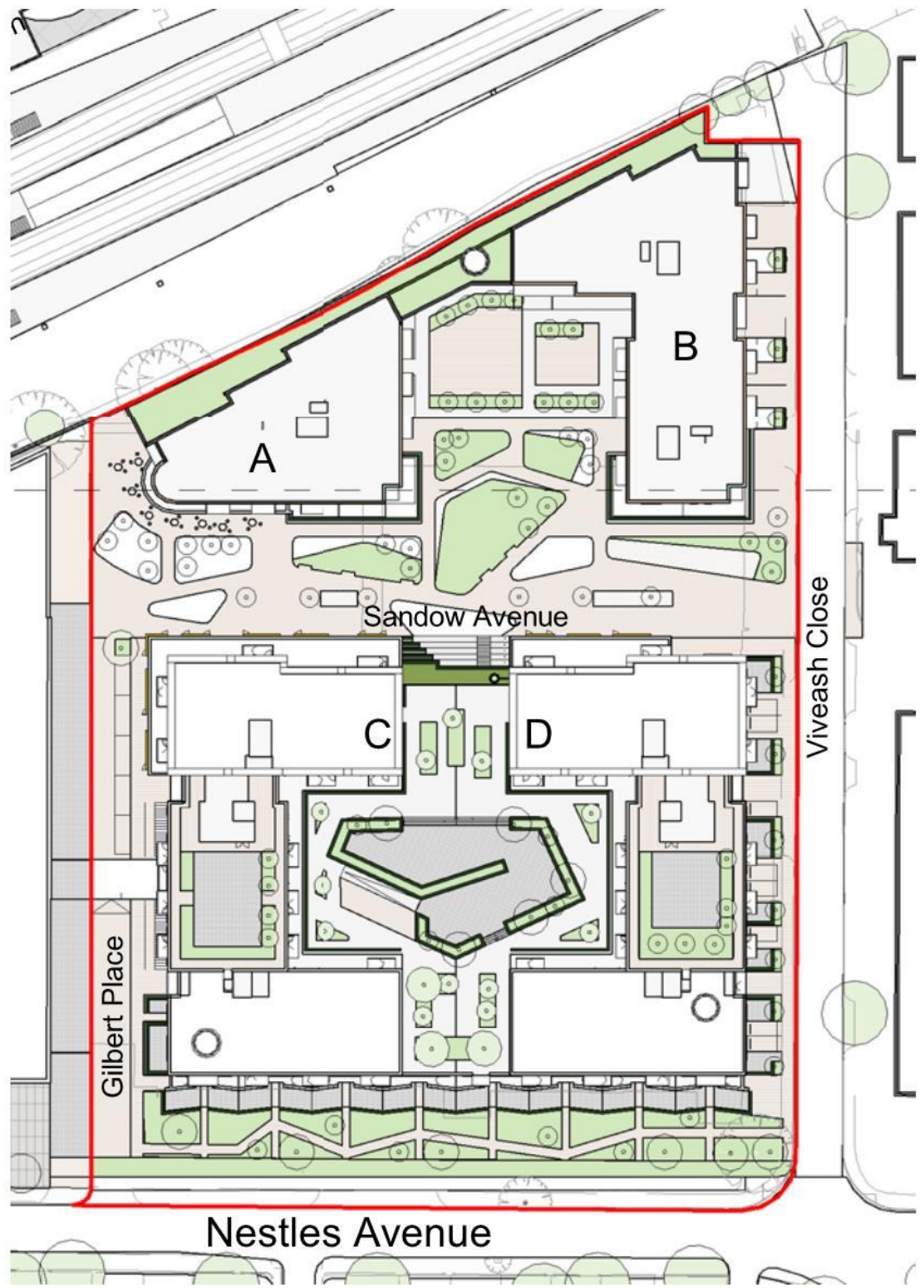
Emergency access / rescue must be considered, and the equipment shall be installed and designed with ability to provide for this.

16.0 Conclusion

Having reviewed the proposed scheme, Access Advisors can confirm that good access can be achieved for without compromising safety when following the principles and using the strategy described in this report.

The proposed strategies will need to be developed post planning to ensure that a coordinated strategy continues in line with the intent of this façade access report.

SITE WIDE KEY PLAN

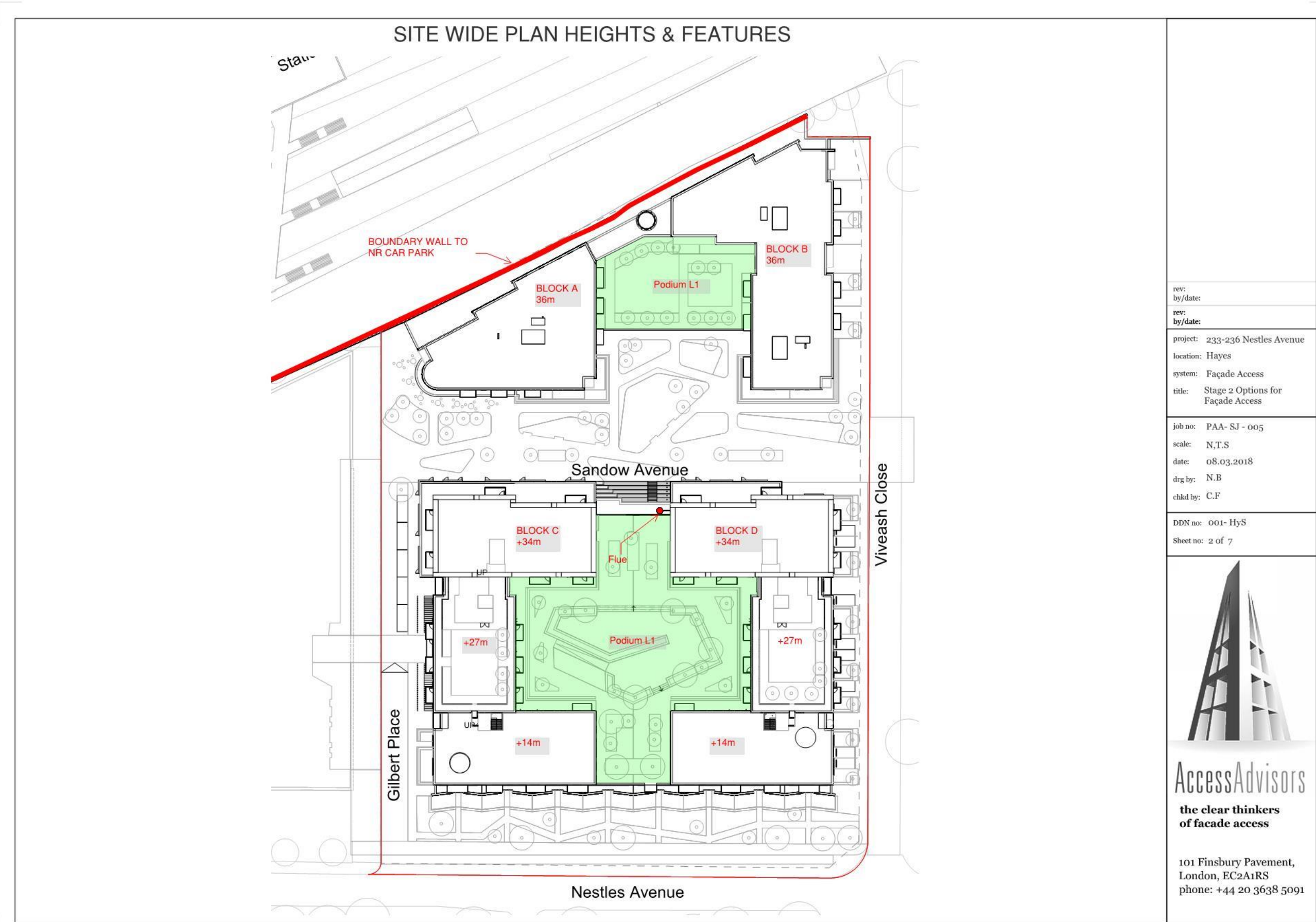


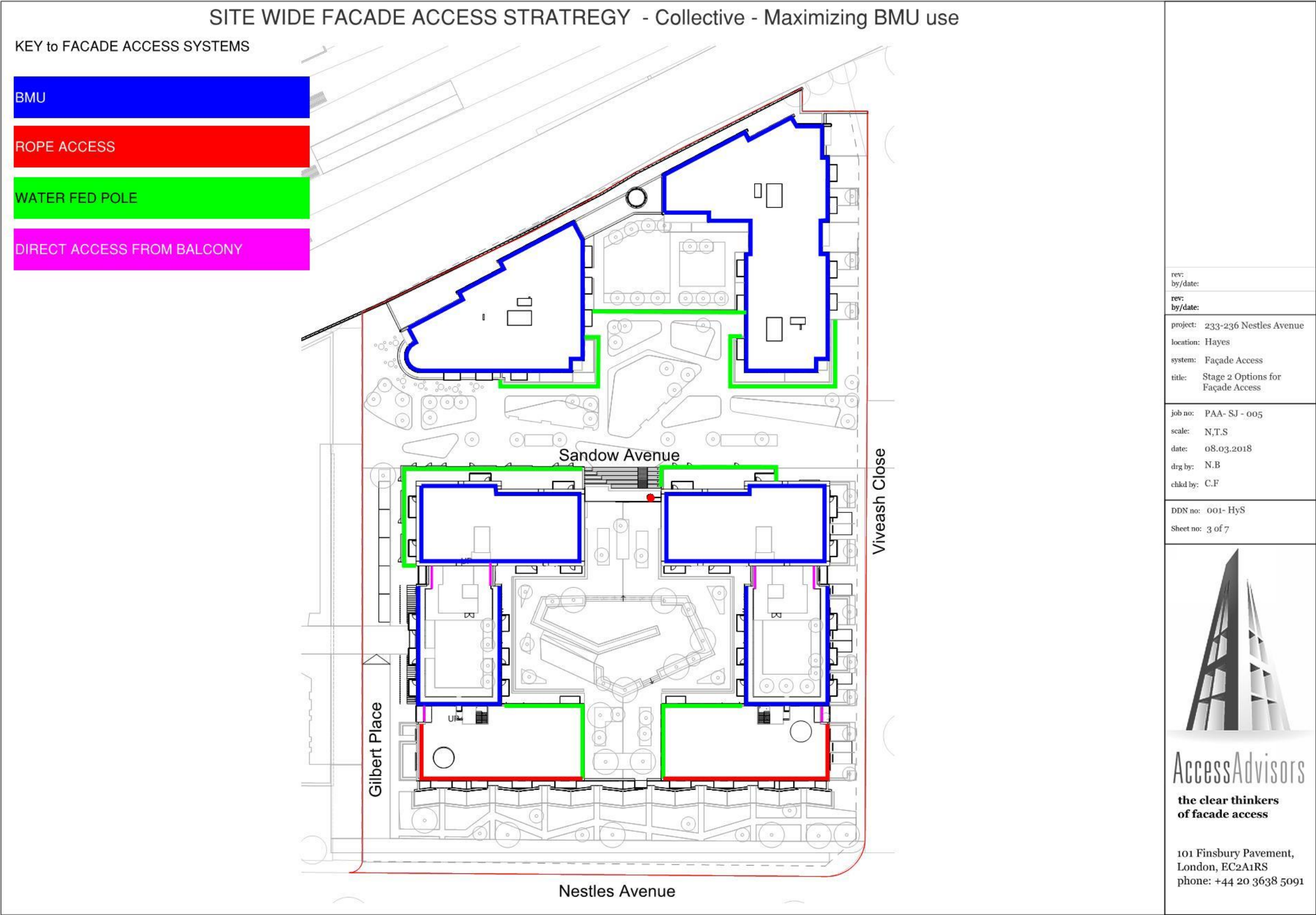
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location:	Hayes
system:	Façade Access
title:	Stage 2 Options for Façade Access
job no:	PAA- SJ - 005
scale:	N.T.S
date:	08.03.2018
drg by:	N.B
chkd by:	C.F
DDN no:	001- HyS
Sheet no:	1 of 7

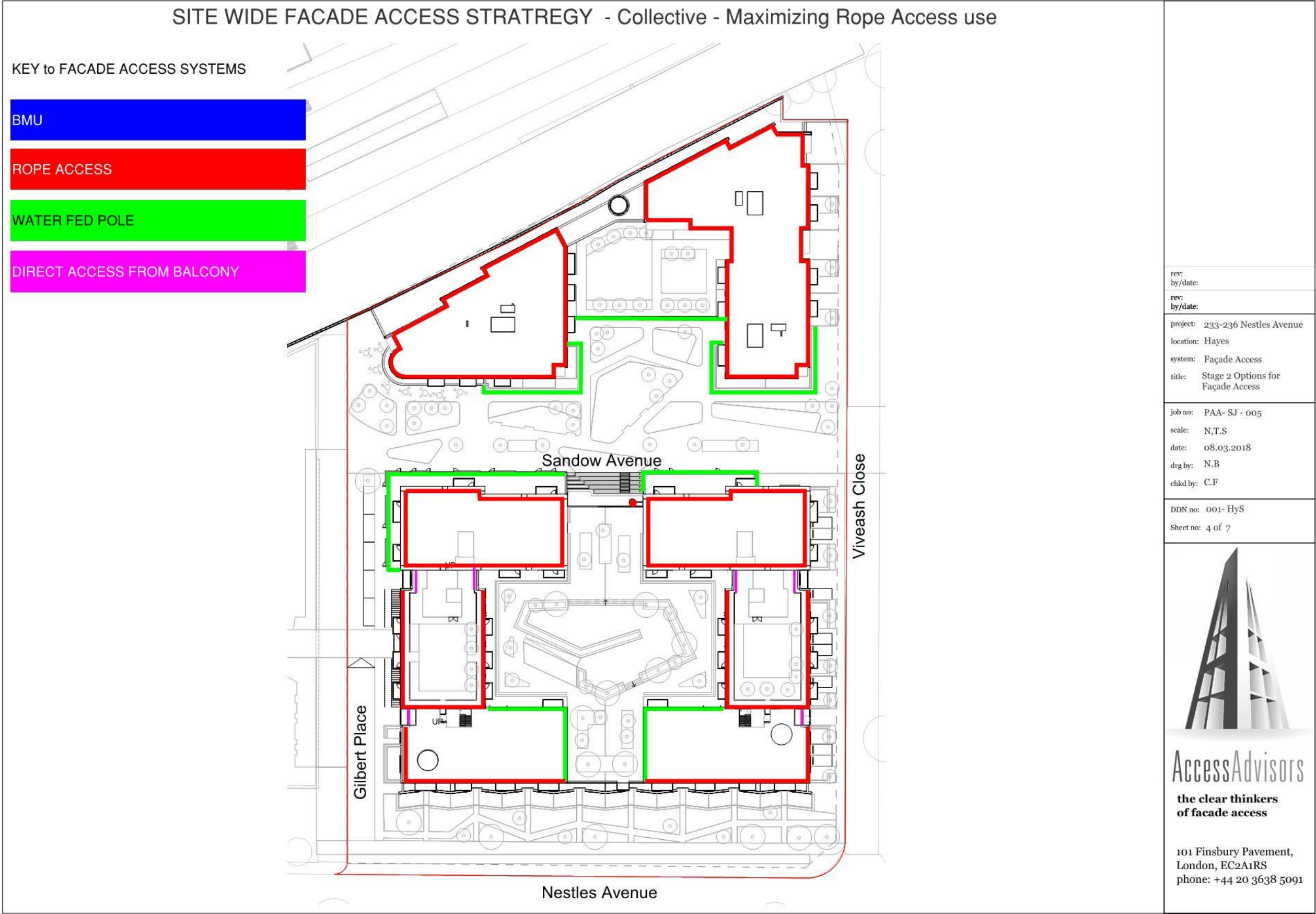


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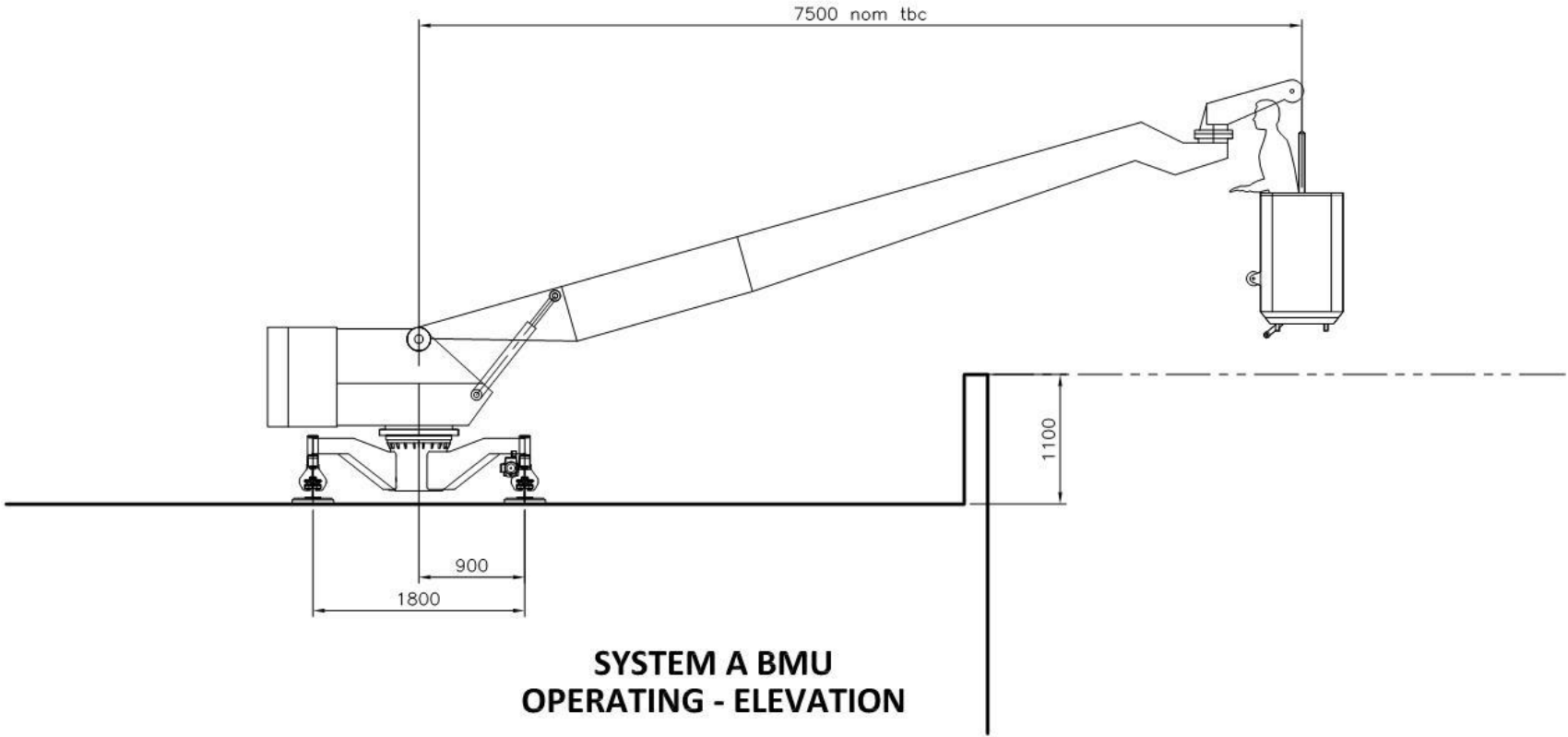
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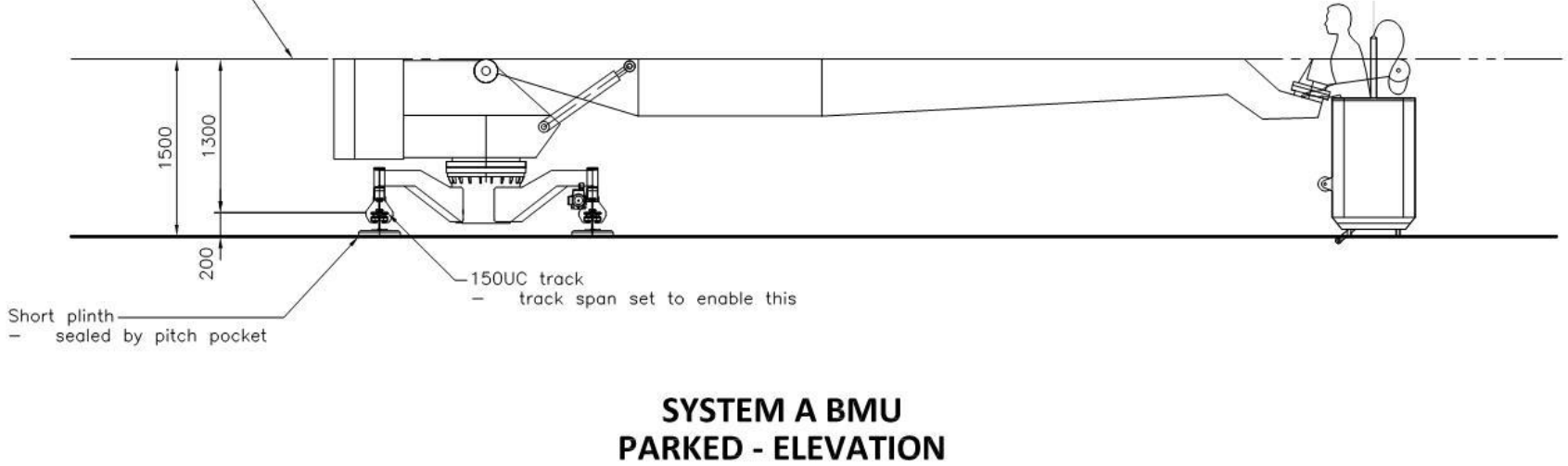




Example BMU Low Profile - Collective



Maximum overall height when parked
– BMU design bespoke to enable this



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rev:	
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DDN no:	001- HyS
Sheet no:	5 of 7

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Example BMU Track Systems within Amenity & Green Roof Build ups



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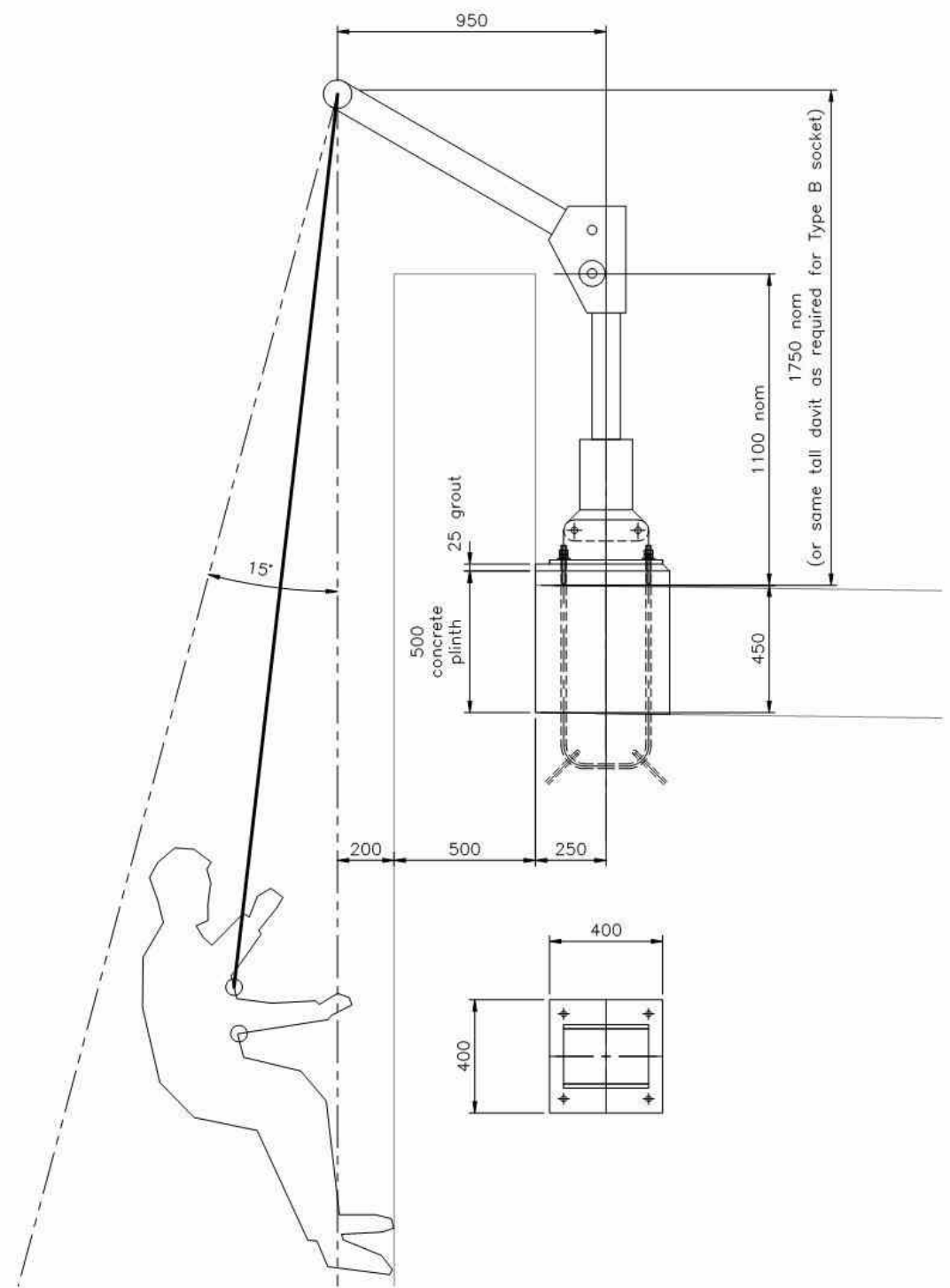
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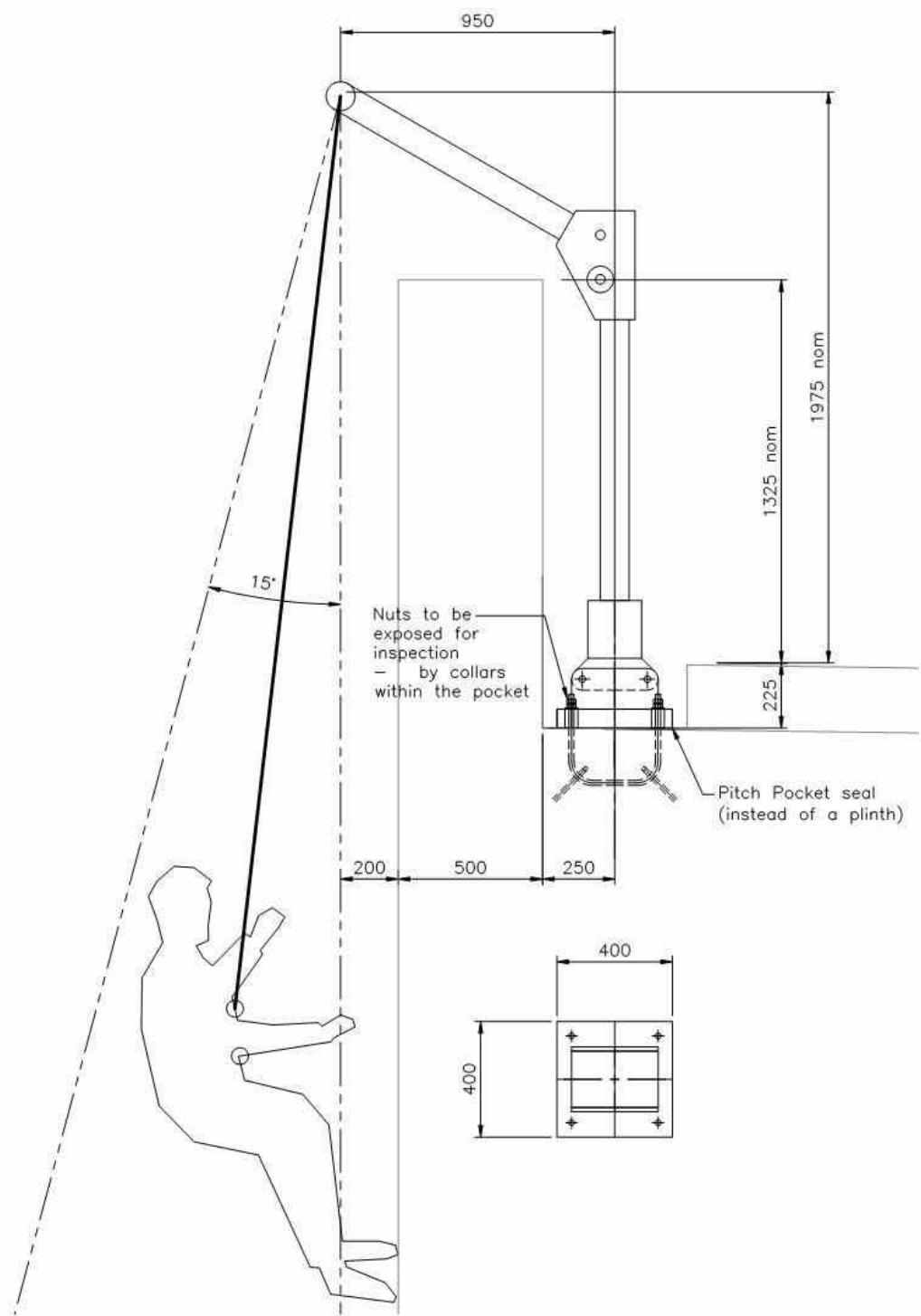
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Rope Access DAVITS - Individual



TYPE A - EXPOSED SOCKET



TYPE B - RECESSED SOCKET

TYPICAL ROPE ACCESS DAVIT

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