Alexandra Road Estate
Thermal Improvements to Dwellings

Design and Access Statement | December 2023

Levitt Bernstein People.Design

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1.0 Introduction

1.0 Introduction

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This report has been produced by Levitt Bernstein with input from Butler and Young Associates, to put forward proposals for thermally upgrading all homes within Blocks A, B, and C on Alexandra Road Estate.

This report details proposals to improve the existing building fabric, within the constraints of its grade II* listing, and proposals to provide new heating within the homes in place of the existing system which can no longer be maintained.

These upgrades are necessary to allow the replacement of the hot water distribution infrastructure around the estate, and are a necessary first step to decarbonisation in line with the Camden Climate Action Plan.

The quality and importance of the Alexandra Road Estate has been widely recognised both in England and abroad. It is a powerful icon of the optimism and idealism that underpinned post-war public sector architecture.The Alexandra Road Estate is a residential estate of 520 dwellings in Camden, NW9.

The majority of the estate was listed Grade II* in 1993, the remainder now falling within the Alexandra Road Conservation Area, designated in 1996. The Estate is considered among the most ambitious social housing schemes of this time, one of a series of low rise, high density schemes.

This report should be read in conjunction with the parallel planning and listed building applications to replace the hot water distribution infrastructure, and with the Low and Zero Carbon Study report that forms part of this application.

1.1 Site Location

The Alexandra Road Estate is bounded by, Loudoun Road on the east, on the south by Boundary Road, Abbey Road on the west, and by the West Coast Main Line to the north. Block A follows the geometry of the tracks and is organised in the form of a ziggurat, stepping down in height towards the central pedestrian street, Rowley Way. Block B, a lower, 4-storey block runs along the other side of Rowley Way. Block C runs east-west along the southern edge of the site, sitting parallel to another public walkway.

Block B, the lower 4-storey building along Rowley Way, contains maisonettes with shared access, terraces, and gardens over-looking the park at the rear. Maisonettes also occupy the top two levels of Block A opposite, with entrance from a walkway on the 7th floor that runs the entire length of the structure. Dwellings in the lower floor in this block are entered from open stairs serving two dwellings per floor. The flat roofs of the stepped elevation provide private outdoor areas for every home.

There are a number of six different dwelling types, all sharing a similar approach and a number of key features. The high density of the estate led to tight interior layouts, mitigated by open plan elements. Sliding doors and glazed partitions allow flexible arrangements, with the potential for views and light to pass through each dwelling.

The proximate relationship of public and private is eased by porches, decks and planting. Finishes are restrained, white paint contrasting with stained timber and brown tiling. Internally, simple joinery shelves and cupboards are formed from plywood, while the stairs are a more developed piece of joinery work. In the kitchens, concrete worktops form a striking, almost sculptural element. These are tiled, as are the walls, forming a very deliberate composition.

The construction of the Estate is of white board marked concrete with areas of self-coloured render. The predominant materials are light in colour with contrasting joinery, inside and out. Concrete forms the large, complex section, and the areas of self-coloured render is a reference to the Regency terrace. At Alexandra Road the quality and detailing of the materials is high. The care devoted to the internal fittings was perhaps unique amongst local authority departments at this time.

The quality and importance of the estate has been widely recognised both in England and abroad. It is a powerful icon of the optimism and idealism that underpinned post-war public sector architecture. It continues to be regularly visited by architectural students and practitioners.

1.2 Site History

Designed in 1968 and built between 1972 and 1978 by the London Borough of Camden Architects Department, Alexandra Road Estate is one of the most ambitious examples of the innovative new social housing emerging from the Department at this time, and of new housing in Britain. Its architect was Neave Brown.

London Borough of Camden was formed in 1965 from the London Boroughs of Hampstead, Holborn and St Pancras and was one of the largest, wealthiest and most ambitious of the new London Boroughs. The architect's department under the leadership of Sidney Cook was, like all local authorities, under great pressure to build large amounts of housing. Camden developed low rise, high density schemes to meet this demand rather than the system built high rise schemes adopted by many other local authorities. The Estate was seen as an opportunity to improve a whole area by the inclusion of a public park and the provision of social buildings such as the community centre, shops and special needs school.

The street is the dominant element in the design and seen as a modern translation of the traditional London Street, where the sum of the whole exceeds the individual parts in creating a meaningful urban space. All dwellings are entered directly from the streets, which are freed of traffic by the parking garage provided at low level.

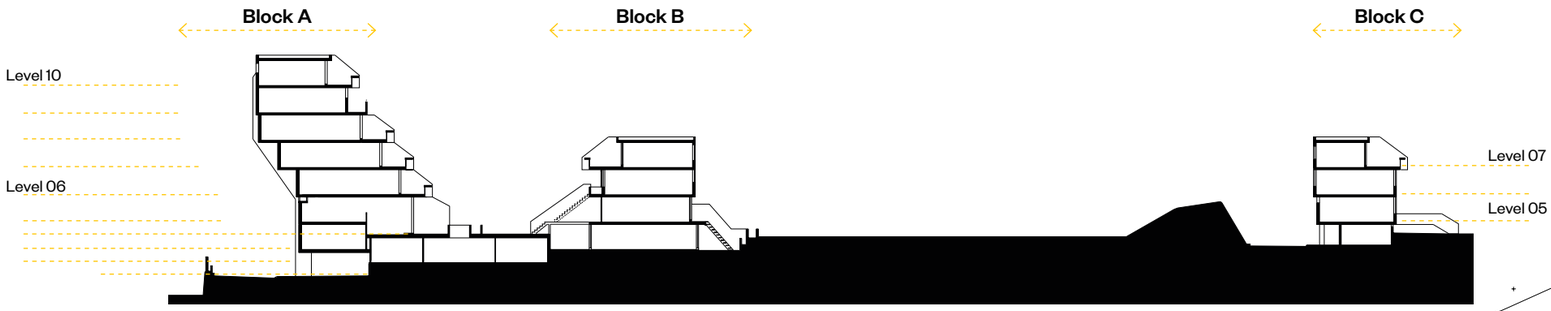
The estate can be seen as one of the most successful examples of the segregation of traffic and the pedestrian, and it remains a successful social space.

The linear stepped section was influenced by work developed by Leslie Martin - an idea also developed by Denys Lasdun at the University of East Anglia (1962-68) and by Patrick Hodgkinson at the Brunswick Centre in Bloomsbury (1967-72). At Alexandra Road the stepped section enabled all dwellings to have a sunny outdoor space and was further utilised to shield the estate from the noise of the railway line to the north. Alexandra Road Estate also represents a development of Neave Brown's earlier work for housing societies, undertaken while he was in private practice, at Winscombe Street and Fleet Road. Though on a much smaller scale, these too were essays in high-density developments of stacked dwellings and the considered sequencing of spaces moving from public and semi-public to private and semi-private.

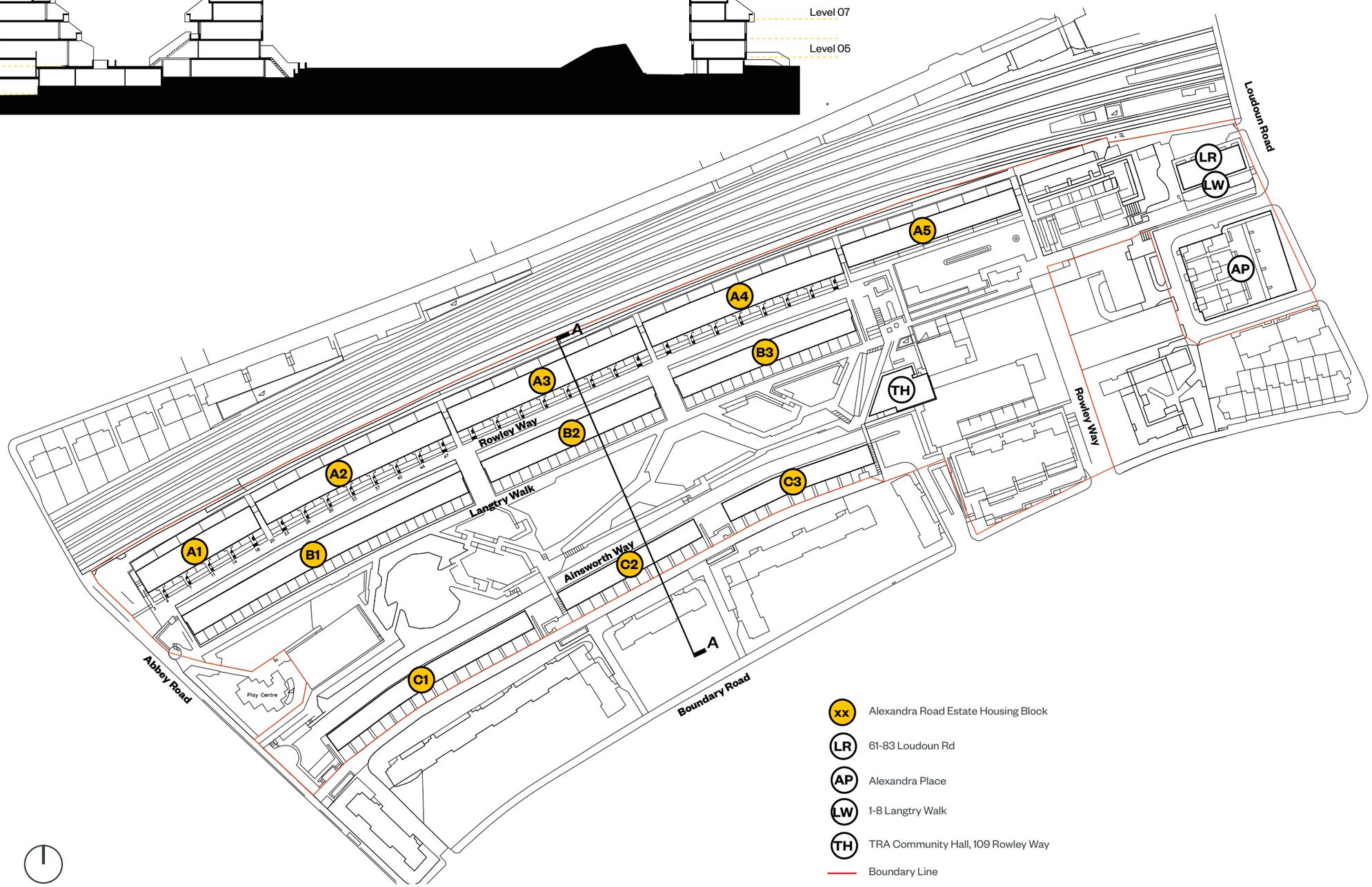
1.3 Key Features

The high density of the estate led to tight interior layouts, mitigated by open plan elements. Sliding doors and glazed partitions allow flexible arrangements, with the potential for views and light to pass through each dwelling.

Internal finishes are restrained, white paint contrasting with stained timber and brown tiling. Simple joinery, shelves and cupboards are formed from plywood, while the stairs are a more developed piece of joinerywork. In the kitchens, concrete worktops form a striking, almost sculptural element. These are tiled, as are the walls, forming a very deliberate composition.



Site Cross Section A



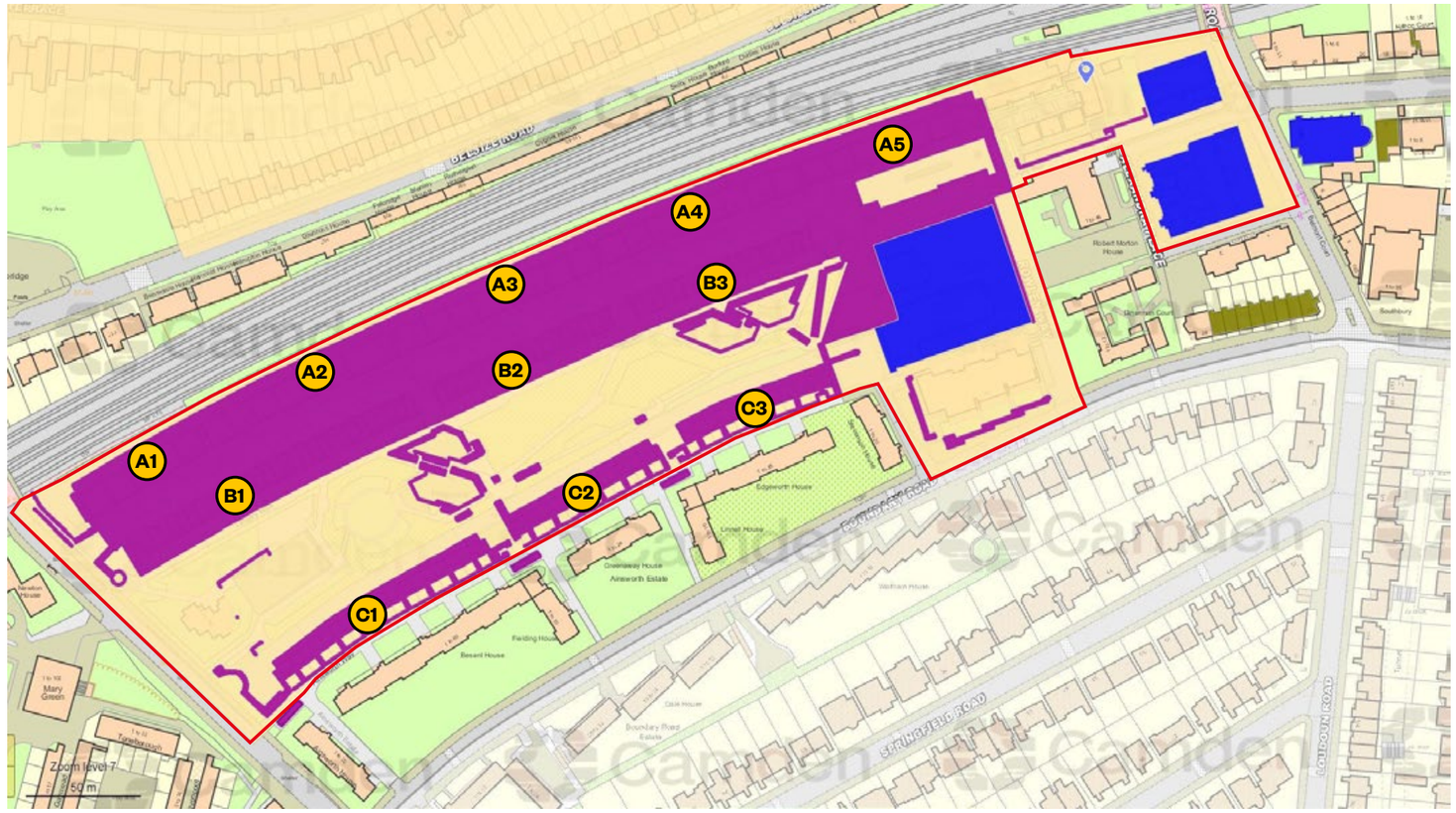
Site Plan

- xx Alexandra Road Estate Housing Block
- LR 61-83 Loudoun Rd
- AP Alexandra Place
- LW 1-8 Langtry Walk
- TH TRA Community Hall, 109 Rowley Way
- Boundary Line

1.4 Site Listing

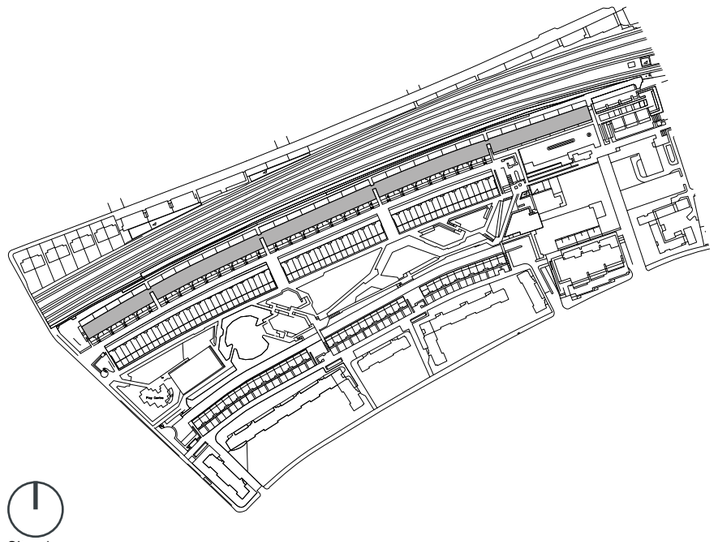
As the conservation area covers land which was redeveloped by one landowner, the council, over a relatively short time span in the 1970s, the character of the area is homogenous.

The estate has a strong geometric quality, orthogonal arrangements being varied by the use of bold chamfers, in both plan and section. Use is made in all the blocks of stepped and overhanging sections. Throughout the estate, play is made of changes of levels with associated ramps, stairs and lightwells. Much of the estate is constructed of fair-faced, white concrete with chamfered arrises. Careful attention was given to the detail and execution of the board-marking and day-work joints. The north face of A block, the south face of B block and both faces of C block are of self-coloured render.



1.5 Block A

Block A north facade from Abbey road



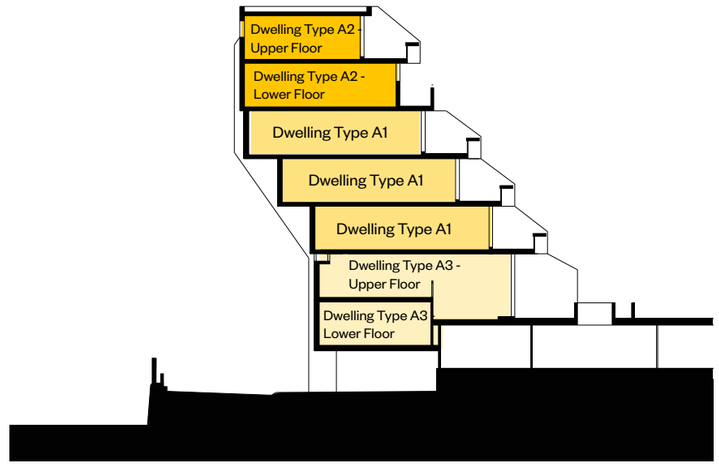
Site plan

Block A is the tallest (7-storeys plus basement parking) and backs on to the railway to the north of the Estate, presenting a mostly solid elevation with relatively small double-glazed aluminium windows. The south facing aspect is more open and steps down to Rowley Way, which is paved with red brick and lined with trees. The curved sweep of Block A is punctuated by the recessed glazed lift enclosures, which restricts access for maintenance and repair.

Block A is made up of 3 Flat Types varying from 1 bedroom (A1 Flat Type) , 2 bedroom (A2 Flat Type) , and 3 bedroom flats (A3 Flat Type). The top two floors are occupied by the A2 Flat types whilst the two bottom floors are occupied by the A3 flat types. The intermediate floors are inhabited by the A1 flat types.

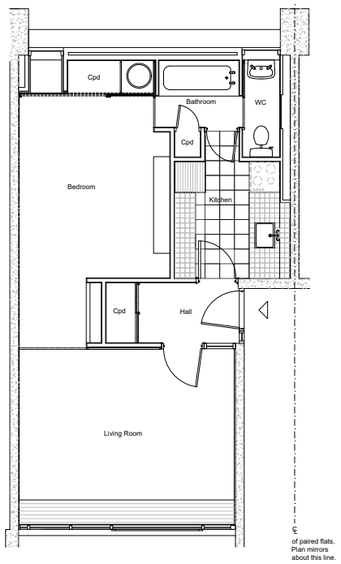
Block A looking west along service road to north

Block A south elevation



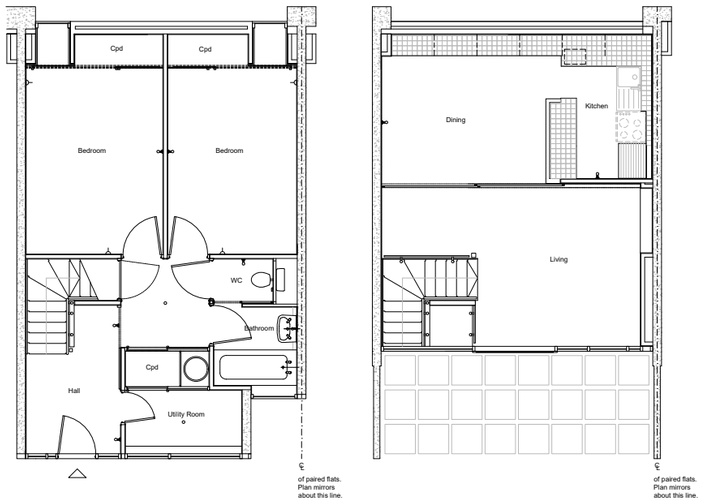
Block A cross section looking east

1.5 Block A - Flat Types



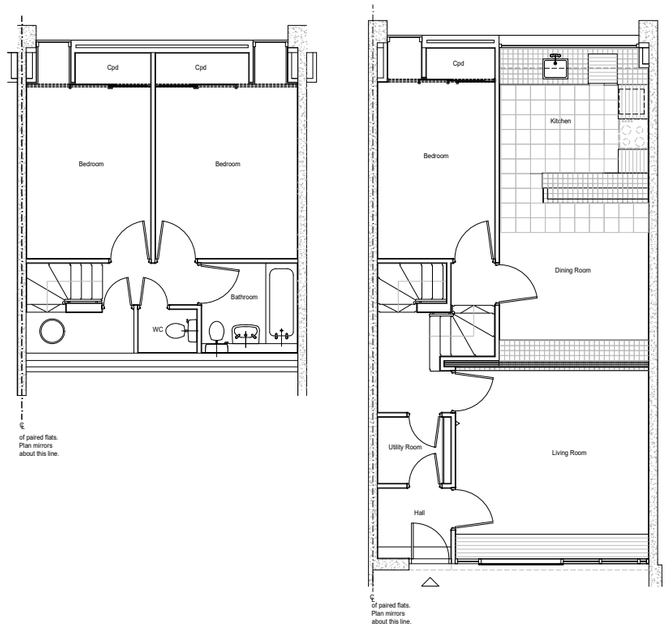
A1 Flat Type - 1 Bedroom Flat

The flat is a single storey arrangement with one bedroom. A living room at the front opens onto a south facing terrace over the shared walkway. To the rear, a bedroom and WC look over the mainline railway. The kitchen and bathroom are interconnected and form a circulation route from the hall to the bedroom.



A2 Flat Type - 2 Bedroom Flat

This is a duplex arrangement with two bedrooms. The entry level contains two bedrooms and the bathroom. The kitchen/dining room is at a mezzanine level which also contains the living room and is accessed via the stair in the entrance corridor.



A3 Flat Type - 3 Bedroom Flat

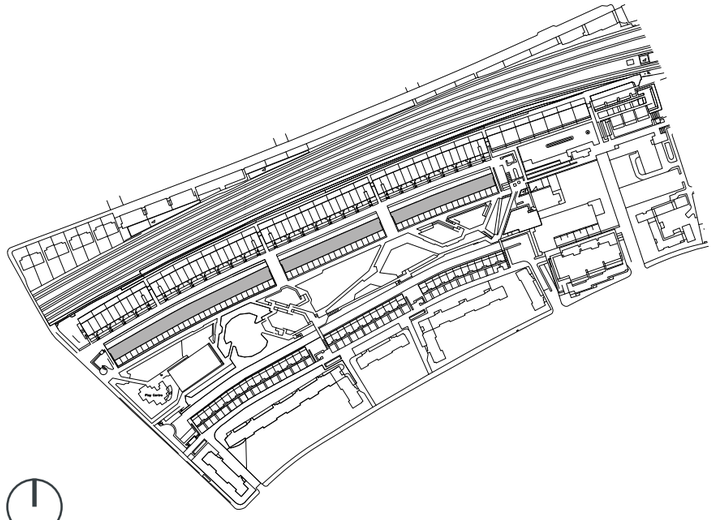
This is a duplex arrangement with three bedrooms. The entry level contains a double storey living space with stairs leading up to the kitchen, dining and a bedroom. The lower level contains two bedrooms, a bathroom and a WC.

1.6 Block B

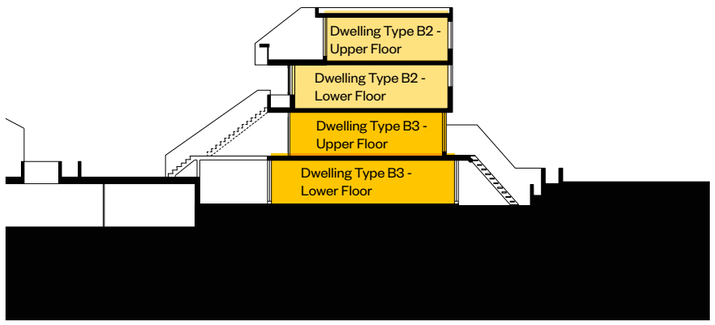
Block B to the south side of Rowley Way is lower (4-storeys) but also stepped in a manner similar to Block A. Each flat or maisonette is provided with its own terrace/garden area with integral in-situ concrete planters. Both Blocks A and B sit on a concrete deck. A parking garage is placed beneath Block A and Rowley Way as a response to requirement of the original brief to provide sufficient parking spaces for residents of the new estate and the existing Ainsworth Estate. The south elevation of Block B is of plain render and is not stepped. A broad band of landscaped lawns, enclosed play areas and integral seating, stretches two-thirds of the length of the site from Abbey Road in the west to the Tenants' Hall in the east and separates Blocks B and C.

Block B is made up of 2 Flat Types. The two top floors is made up of 2 bedroom flats (B2 Flat Type), and the two bottom floors are occupied by the 3 bedroom flats (B3 Flat Type)

Block B South Elevation , seen from Langtry Walk



Site plan

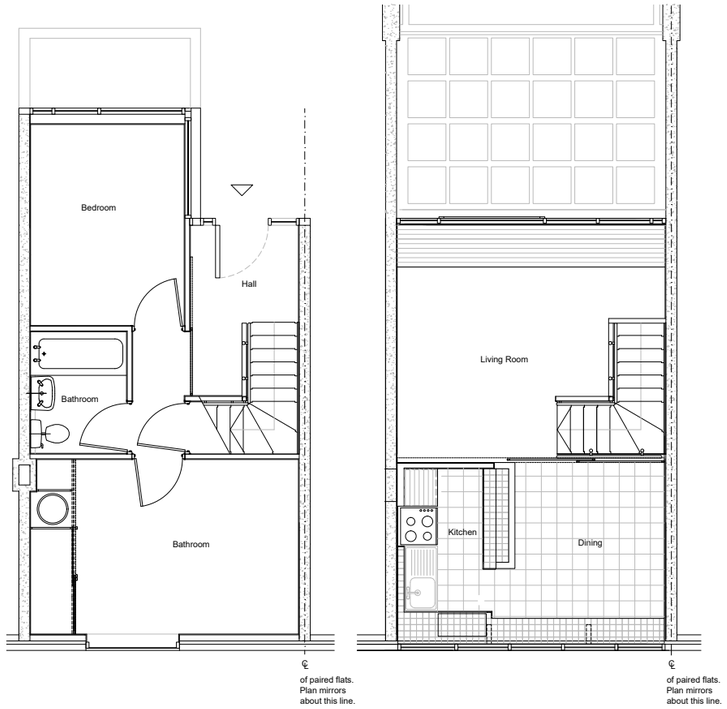


Block B cross section looking east

Block B North elevation, Rowley way, seen from Block A

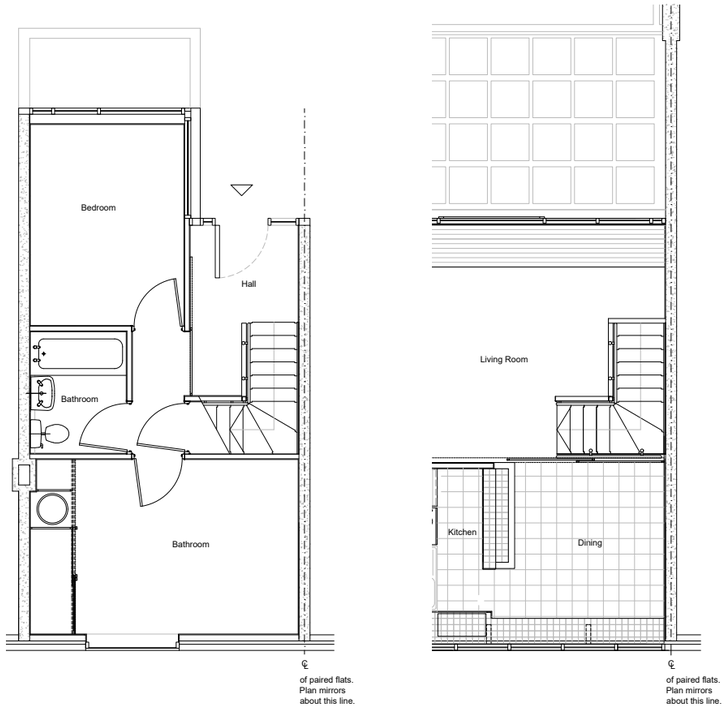
View South-Wet to block B from Block A Staircase

1.6 Block B - Flat Types



B2 Flat Type - 2 Bedroom Flat

This is a duplex arrangement with two bedrooms. The entry level contains two bedrooms and the bathroom. The kitchen/dining room is at a mezzanine level which also contains the living room and is accessed via the stair in the entrance corridor.

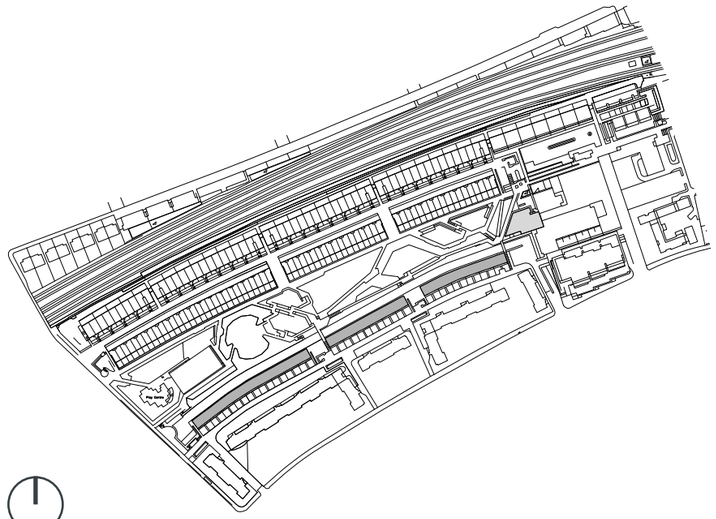


B3 Flat Type - 3 Bedroom Flat

This is a duplex arrangement with three bedrooms. The entry level contains the kitchen, dining and living room with stairs leading to the back garden. The lower level contains the bedrooms and the bathroom and WC.

1.7 Block C

Block C, Ainsworth Way

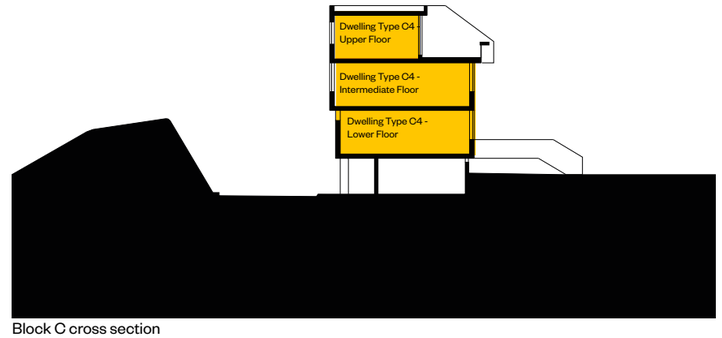

Site plan

Block C is a lower, modified form of Block B, and consists of three storey town houses. Below this, parking is provided in basements reached by one of the estate roads entered from Boundary Road. The gardens of Block C face south but are rather overshadowed by the neighbouring blocks of the earlier Ainsworth Estate.

Block C is made up of the C4 dwelling types which is comprised of 4 bedrooms across the three storey houses.

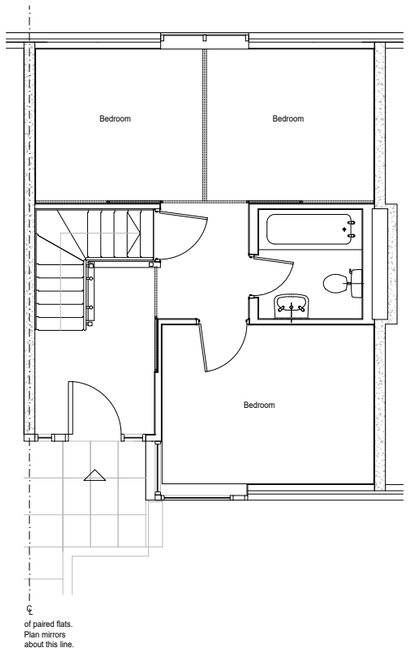

Link bridge between TRA Hall and block C

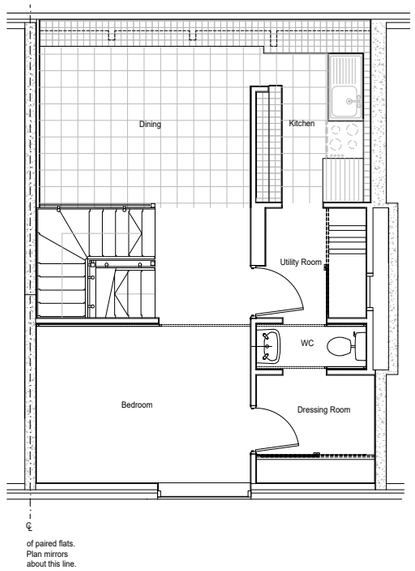

Block C from Boundary road (South elevation)

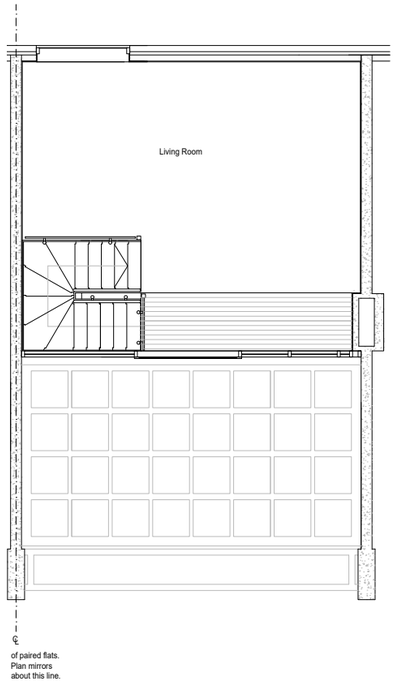


Block C cross section

1.7 Block C - Flat Types







C4 Dwelling Type

This is a terraced house arrangement with four bedrooms. The lower, entry level contains three bedrooms, bathroom and WC. There is an internal stair that takes you to the mid-floor, with the fourth bedroom, associated dressing room and kitchen/utility area, and then to the upper level that contains the lounge area.

1.8 Langtry Walk, Loudoun Road & Alexandra Place

1. 1-8 Langtry Walk block looking from west towards Loudoun Road

Site Plan

2. Alexandra Place from West along Langtry Walk

Eastern entrance from Loudoun road into Langtry walk. Conservation area boundary

At the eastern end of the conservation area, on Loudoun road, the council commissioned two mixed-use blocks of housing, shops and workshops, which were completed in 1981. Though in form and arrangement they are part of the Alexandra road family, these blocks are constructed of brindled metric stock bricks, incorporating pre-cast concrete units around window and vents.

The northernmost block consists of a parade of shops at ground floor level facing Langtry Walk. This is referred to as 1-8 Langtry walk with linked residential and commercial accomodation to the rear/north referred to as 61-83 Loudoun road. To the south of Langtry walk is Alexandra Place, which originally comprised workshop units at ground floor level. Behind and above are maisonettes and split level flats stacked in a typical stepped cross section.

Both blocks occupy prominent positions on the boundary of the conservation area; there are long views of them from both directions on Loudoun road. The two blocks are Grade II listed.

Key to site plan

1 - 1-8 Langtry Walk
- 61-83 Loudoun Rd

2 - Alexandra Place

1.9 Accommodation schedule

The Alexandra Road Estate blocks are designated as follows;

Blocks A, B and C
The 520 dwellings in Blocks A, B and C comprise of a mix of flats and maisonettes:

Block A1
8 x 3 bed (A3 Flat Type)
10 x 2 bed (A2 Flat Type)
32 x 1 bed (A1 Flat Type)

Block A2, A3 & A4 (each)
12 x 3 bed (A3 Flat Type)
16 x 2 bed (A2 Flat Type)
52 x 1 bed (A1 Flat Type)

Block A5
14 x 2 bed (A2 Flat Type)
42 x 1 bed (A1 Flat Type)

Block B1
30 x 3 bed (B3 Flat Type)
30 x 2 bed (B2 Flat Type)

Block B2 & B3
18 x 3 bed (B3 Flat Type)
18 x 2bed (B2 Flat Type)

Block C1
18 x 4 bed (C4 Flat Type)

Block C2
12 x 4 bed (C4 Flat Type)

Block C3
12 x 4 bed (C4 Flat Type)

2.0 Project Brief

2.1 Project Brief

All homes on the Alexandra Road Estate were designed to be heated by hot water coils cast into the concrete structural walls in each block. Water is heated in the central boiler house and fed to homes through distribution pipework connecting the boiler house to each of the residential blocks. This system is now at the end of its working life, and increasingly difficult to maintain. For many years the pipework has suffered from extreme corrosion, furring-up and leaks. The upkeep and maintenance is burdensome, costly, and unpredictable failures result in sporadic loss of heating and/or hot water for residents. It is clear that the patching up of the distribution pipework is no longer enough to ensure confidence in the system in the future.

A technical investigation of the heating system was carried out at the end of 2019. Visual inspections by the team and service records have made it clear that the heat distribution pipework is beyond repair and in need of urgent replacement to prevent catastrophic failure. Failure of this pipework could range from the loss of heating and/or hot water to individual dwellings or the whole of the Alexandra Road Estate. It is urgent that the London Borough of Camden Council replace the existing distribution infrastructure to the estate.

Investigations have also concluded that it is not practical, economical, feasible or energy efficient to continue to connect new pipework to the existing heating coils, and these must therefore also now be decommissioned and new heating emitters installed in each home. It is important that the space heating in each home:

- Is sympathetic to the listed building and original design intent as far as possible
- Is as discreet as possible both in heating emitter design and distribution
- Does not clash with exiting building features such as windows, sliding doors and movable wall partitions.
- Is thermally comfortable and can be controlled by residents
- Can be installed with residents in-situ
- Considers ease of maintenance and repair
- Is not cost prohibitive

In order to improve efficiency, and to minimise the size of new heat emitters, it is proposed to make thermal improvements to the building fabric, as far as allowable within the heritage constraints. Changes to the appearance of the buildings are not generally acceptable, and this prevents the installation of insulation to external walls. However, it is possible to refurbish windows and to replace the single glazing with slim double-glazed units without affecting the appearance of the windows. The existing windows are also poorly sealed and drafts lead to a significant heat loss. It's calculated that 30% of the heat lost from homes is via the windows, so improving the thermal performance of the glass while reducing drafts was identified as the single best way to reduce heat loss.

The proposed works to improve building fabric are detailed in section 4, and the selection of proposed new heating system is detailed in section 5 of this report.

The proposed works to the distribution pipework around the estate are described in a parallel planning / listed building application, which connects the central heating plant to a new heat interface unit (HIU) in each home. The HIU will be positioned in the same location as the existing domestic hot water cylinders. The hot water cylinders will be made redundant as part of this process meaning the interior flat layout need is retained as existing.

The proposed works have been completed in two pilot flats on the estate (26A and 46A) to develop the design and specification of heating emitters, the pipework routing around the homes, and the thermal improvements to building fabric to minimise emitter sizes. These two flats have been viewed by residents, by LB Camden's conservation officers and by Historic England, as section 7 of this report.

3.0 The Existing Homes

3.1 Summary of previous reports, research and findings

All reports and studies discussed in this section can be made available on request.

Thermal imaging of building fabric

In October 2019 Levitt Bernstein carried out thermal imaging of block A externally and internally. This report supplemented an internal thermal imaging report carried out by Max Fordham also in October 2019.

The Levitt Bernstein report documented the heat loss through the building fabric. Thermal imaging emphasised the heat loss from homes especially through the thermal bridge on the heated walls and through wall and floor junctions in the cast concrete. The figures opposite are extracted from the Thermal Imaging report.

Temperature logging

In June 2020 Levitt Bernstein carried out temperature logging in two apartments, one heated by the embedded wall coils and one unheated. The report concluded that homes with their current embedded coil heating system experienced high internal temperatures, which could have an affect on occupant's comfort and sleep. It would be excessive for a new heating system to be installed with a matching heat output.

Heat loss during the night in living rooms highlighted the need for double glazing, especially for the largest windows.

Heating technical report

In February 2020 Camden Council brought together a team to carry out a qualitative and quantitative review of the current heating infrastructure and evaluate which areas could be retained and re-used and which areas would require replacement and/or repair. This included a review of the heritage, visual, mechanical, technical and practical implications.

Figure 3.1 - Block A - south stepped facade

Figure 3.2 - Rear of block A showing the heated party wall from the coils and the unheated wall.

Figure 3.3 - The western end wall of block A illustrating heat loss from the dwellings and significant thermal bridges at the floor and wall junctions.

Figure 3.4 - Eastern end wall of block A illustrating heat loss from the heating coils in the dwellings.

As part of this exercise Levitt Bernstein, Max Fordham, Butler and Young Associates, GEM and Camden Council appraised the heating system as a whole and carried out more in depth testing on areas of concern.

The outcome of the team's investigations were as follows:

1. Estate heat distribution pipework is beyond repair
Visual inspections by the team and service records made it clear that the heat distribution pipework is beyond repair and in need of urgent replacement to prevent catastrophic failure. Failure of this pipework could range from the loss of heating and/or hot water to individual dwellings or the whole of the Alexandra Road Estate.

2. Condition of embedded heating coils
Pressure testing was carried out on a sample set of heating coils in Block B to determine whether the embedded coils were in working condition and could be re-used. The sample embedded coils in Block B were found to be in serviceable condition. No tests were carried out in Blocks A or C.

3. Tail connections to the heating coils are impractical to access
The testing of the heating coils provided the opportunity to review the composition, location, condition/corrosion of the connection tails. It was found that the tails to the coils are not easily accessed or connected to.

The testing revealed that, in Block B, to access the tails to the heating coils, it would be necessary to temporarily remove of the front door of the dwelling and break open of some of the concrete fabric. The condition of the tails varied and therefore were difficult to physically connect to for testing purposes. The testing also necessitated the temporary disconnection of heating to the dwelling below.

While the testing of Block B was found to be challenging, it is noted that Block B is one of the easier blocks to access the tails. The testing of heating coils in Block A and Block C were aborted due to the significant disruption required to residents and the building fabric. To test a single coil in Block A three adjacent dwellings would require parts of their walls and/or floor to broken open simultaneously to access the necessary tails and valves. To test heating coils in Block C there would be significant disruption to walls on multiple stories of each home. From a heritage perspective it is undesirable to damage the building fabric in this way.

For this reason it was determined that it is not practical nor reasonable to attempt to test the coils in Blocks A and C.

4. It is not possible to replace the distribution pipework and connect to the existing heating coils
The testing of the heating coils and the subsequent tail location exercise demonstrated that the site-wide distribution pipework requires renewal and it will be intrusive to heritage and disruptive for residents to connect to the heating coils. Therefore, it was concluded that it is necessary to abandon the embedded heating coils and seek an alternative heating system for each dwelling.

Section through Block A - showing heating coils, tails and valves

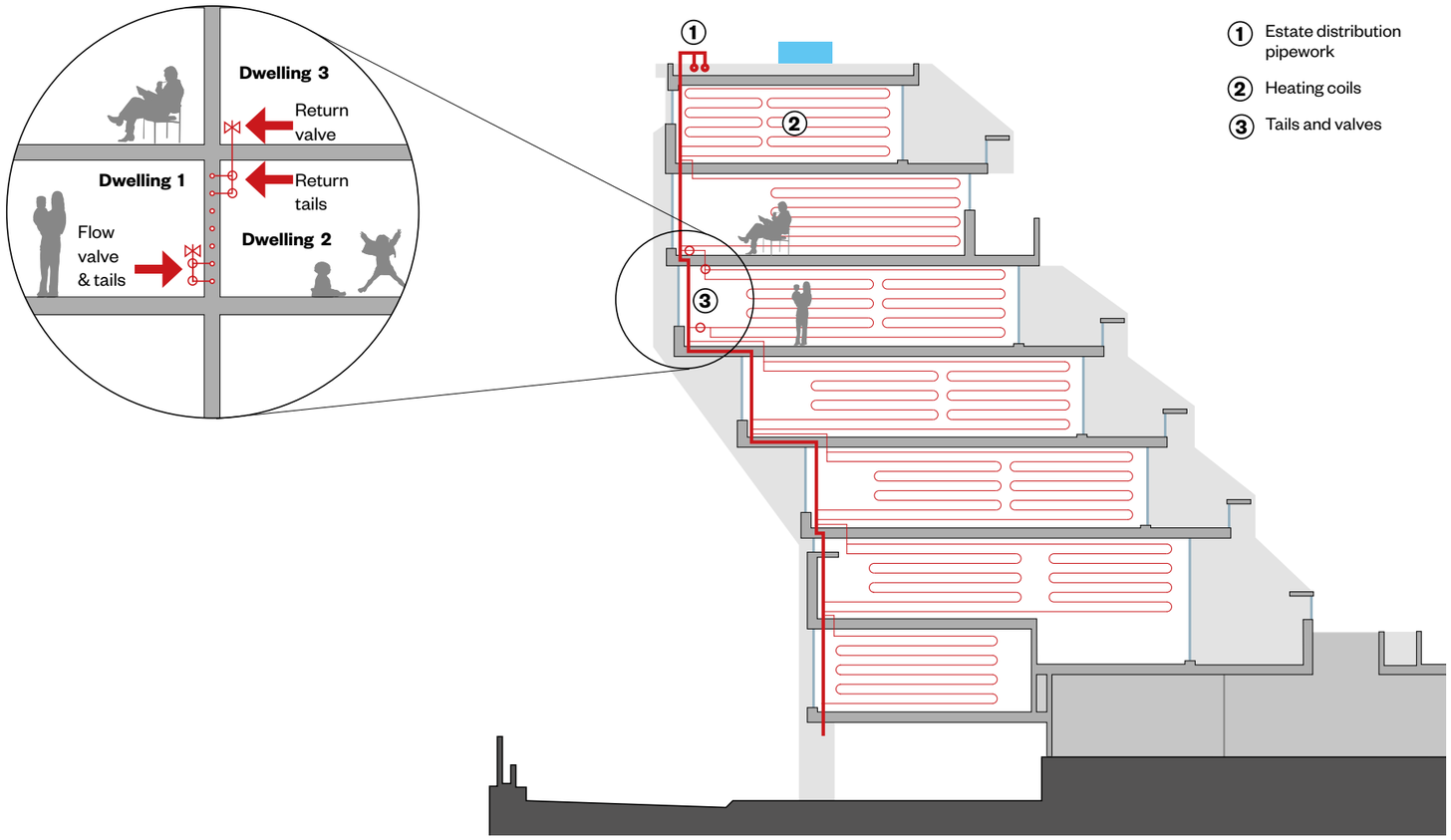


Figure 3.5 - Section through block A , showing estate distribution pipework, heating coils and tails

Conclusion
The investigation concluded that the estate distribution pipework is in desperate need of repair. It is clear that the patching up of the distribution pipework is no longer enough. To make the system fit for purpose again it must now be replaced.

As a consequence of this, the embedded heating coils have been reviewed to determine if they can be reconnected to the new distribution pipework. Investigations concluded that it is not practical, economical, feasible or energy efficient to continue to use the heating coils. The heating coils must now be

decommissioned and new heating emitters installed.

Previous planning applications

In March 2020 planning permission and listed building consent was sought to install externally mounted estate distribution pipework and extend plant rooms. This is critical to ensure the works can begin as soon as possible to prevent catastrophic failure of the heating and hot water system on the estate.

In November 2020 full planning permission and listed building consent was granted for the infrastructure portion of the works.

Parallel planning and listed building applications have been made to make minor changes to the proposed pipework routes in the consented design.

3.2 Review of building fabric and space heating

1 **The existing heating coils will be decommissioned**

In August 2019 Camden Council brought together a team to carry out a review of the current heating infrastructure and evaluate which areas could be retained and re-used and which areas would require replacement and/or repair.

The investigation concluded in February 2020 that the patching up of the estate distribution pipework is no longer enough to keep it working*. To make the system fit for purpose again it must now be replaced.

The exercise also concluded that it is not practical, economical, feasible or energy efficient to continue to use the embedded wall heating coils. The heating coils must now be decommissioned and new ways of heating the homes investigated.

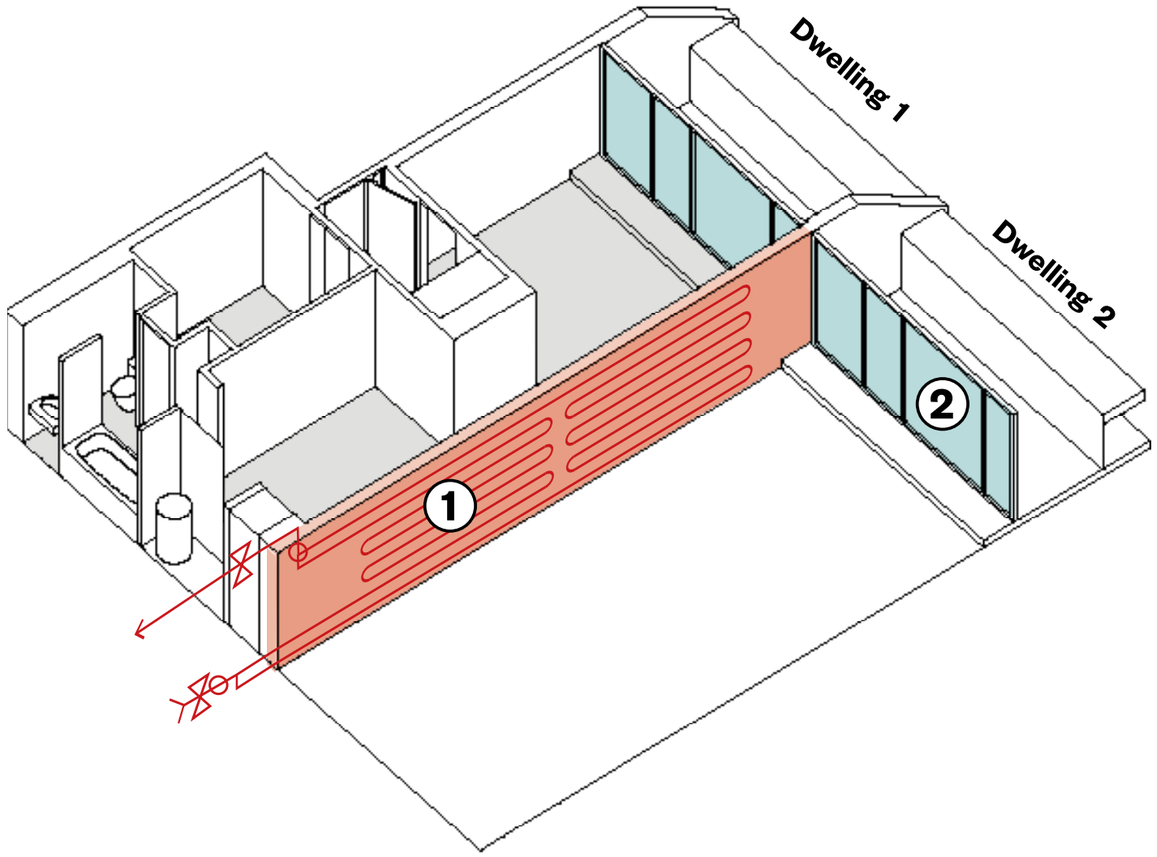
2 **Improving the building fabric will reduce the amount of space heating required**

The heating options have been developed in parallel with potential fabric improvement options for the Estate.

As part of the review of space heating we have looked at options to make improvements to the building fabric. This is to help keep homes warm and reduce resident's future heating bills.

The fabric improvements have focused on the installation of double glazing. This has been explored as a way of reducing the amount of space heating needed in the homes and therefore the size of the new heating emitters where possible.

This is described more in Section 4.



* Refer to Alexandra Road Estate, Heating Infrastructure Technical Report, February 2020

4.0 Building Fabric Improvements

4.1 Long term appearance and heritage constrained retrofit

The listing of the Estate severely constrains the options for insulating the building fabric and reducing thermal bridging. While the roofs have already been insulated, any further fabric works will need to take a more holistic approach to reduce and prevent moisture and condensation forming on internal surfaces, leading to mould growth and fabric damage long term.

External insulation

While external insulation is the most effective in terms of energy efficiency and building fabric protection, it is also the most controversial and unsympathetic to the heritage features and listed status of the Estate - requiring a complete re-clad of the board-marked concrete and render. It changes the appearance of junctions such as window reveals, unless windows are also able to be moved to replicate the original reveal depths. It also covers over the patina of age on surfaces, which are part of the visual historic importance.

The possibility of adding external insulation has been discussed with LB Camden's conservation officer, and with Historic England. While they are sympathetic to the reasons for proposing this, they have confirmed that the changes to the appearance of the building resulting from adding insulation would be too significant for such works to be granted consent. Some potential areas of external insulation have been discussed include:

- The re-cladding of the rear of block A would not allow for all thermal bridges to be dealt with and would affect the depth of the concrete fins while deepening window reveals, altering the character of the façade
- The re-cladding of the flank walls at the ends of blocks. Again the iconic concrete makings, detailing and patina of age would be sacrificed in these prominent locations.
- Insulating the soffits to exposed floors below homes, such as the underside of the east end of Block A. Again, this would also not deal with thermal bridging, while only reducing heat loss to a handful of dwellings. In some areas, there is limited headroom to accommodate additional insulation.
- It is not considered possible to externally insulate the terrace façades nor between dwellings where stairwells exist, due to the fundamental change in appearance and the reduction in space that this would bring. The thermal bridging in these areas would also be prohibitively complex.

While the external appearance of the Alexandra Road Estate remains an integral part of the heritage value, there is very little that can be done to fundamentally reduce heat loss through the building fabric.

Internal Insulation

A layer of insulation could be fixed on the inside of external facing walls, floors and roofs and re-clad with plasterboard to allow redecoration of the home.

This is considered partially effective to reduce heat loss, but means that difficult junctions and thermal bridges would still remain. It also reduces the size of homes where the walls, floors and roof are brought inwards.

At Alexandra Road Estate the internal, original and recently refurbished features such as the kitchens, integrated cupboards, floor to ceiling sliding internal doors and wall to wall windows makes insulating effectively internally a particular challenge. It would not be prudent to insulate parts of walls, floors or ceilings due to the risk of exacerbating moisture and mould forming on adjacent uninsulated surfaces.

For more information on the constraints of providing external and internal insulation, refer to Sections 8.1 and 8.2 of the Zero Carbon Report

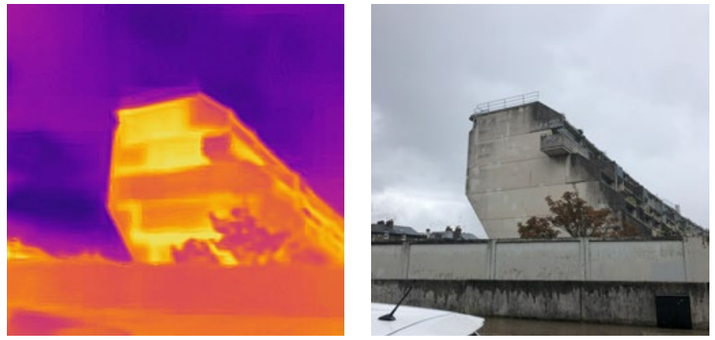
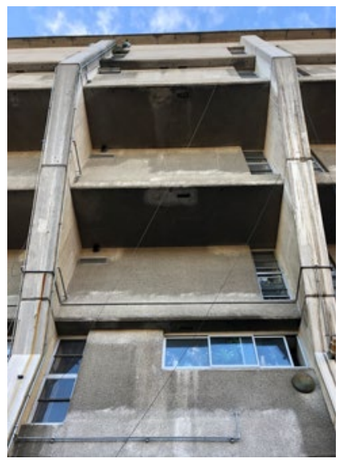


Figure 4.2 - Flank walls at ends of blocks. Thermal image shows heat loss and thermal bridging

Figure 4.3 - Exposed floors at the eastern end of block A



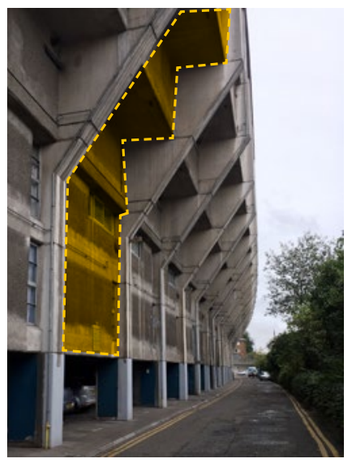


Figure 4.1 - Potential re-cladding of the rear of Block A between concrete fins

Figure 4.4 - Terrace façades and between walls to stairwells

4.2 Glazing options considered

While changes to the appearance of the buildings are not generally acceptable, it is possible to refurbish windows and to replace the single glazing with slim double-glazed units without affecting the appearance of the windows. The existing windows are also poorly sealed and drafts lead to a significant heat loss.

It's calculated that 30% of the heat lost from homes is via the windows, so improving the thermal performance of the glass while reducing drafts was identified as the single best way to reduce heat loss.

In addition to the thermal benefits of refurbishing the timber windows, many are in poor condition, and repairs and refurbishment (or in some cases replacement) are anyway necessary to extend their life.

This could be achieved in two ways:

1. **Re-glazing of window panes only**

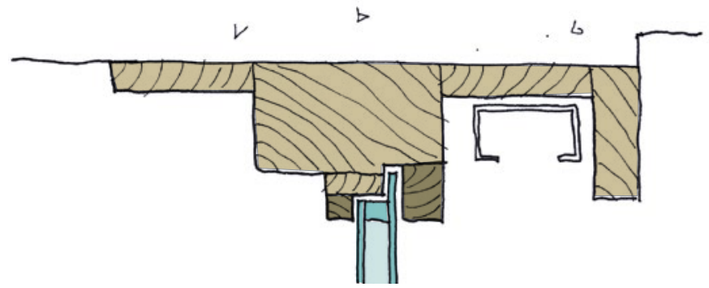
    - Replace existing single glazing with stepped double glazing or vacuum glazing within the existing timber frame, reseal and make good.
    - Potential replacement of metal framed windows.
    - Upgrade existing ply side-vents to main window sets facing balconies.

2. **Full replacement of window pane and frame**

    - Replace the whole window set (pane and frame) for both timber and metal framed windows with double glazed well sealed units.

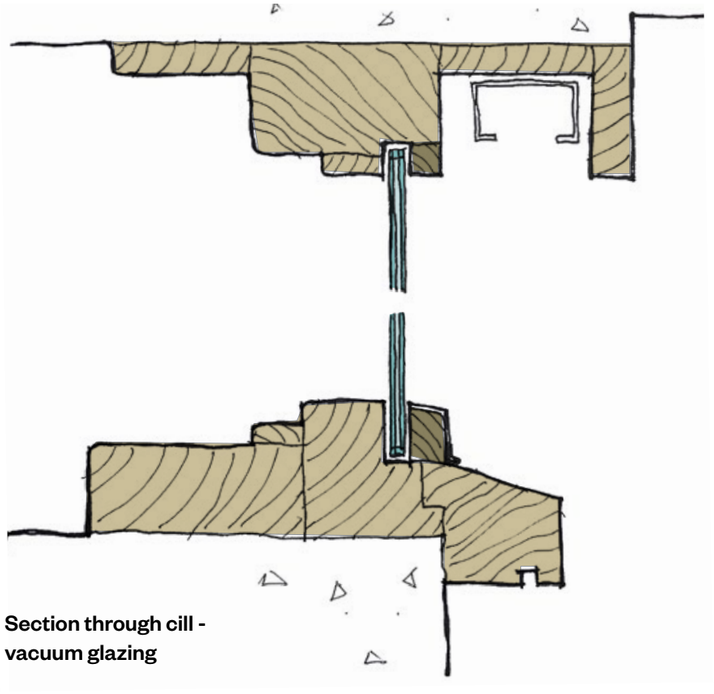
The window frames are generally in good condition, therefore retention of the existing timber window frame was considered important for heritage value. It is proposed that timber elements will only be replaced where necessary.

The preference and practical solution for glass replacement was determined to be vacuum glazing. This is due to its slim profile and ability to fit within the existing window frame depth without affecting appearance.



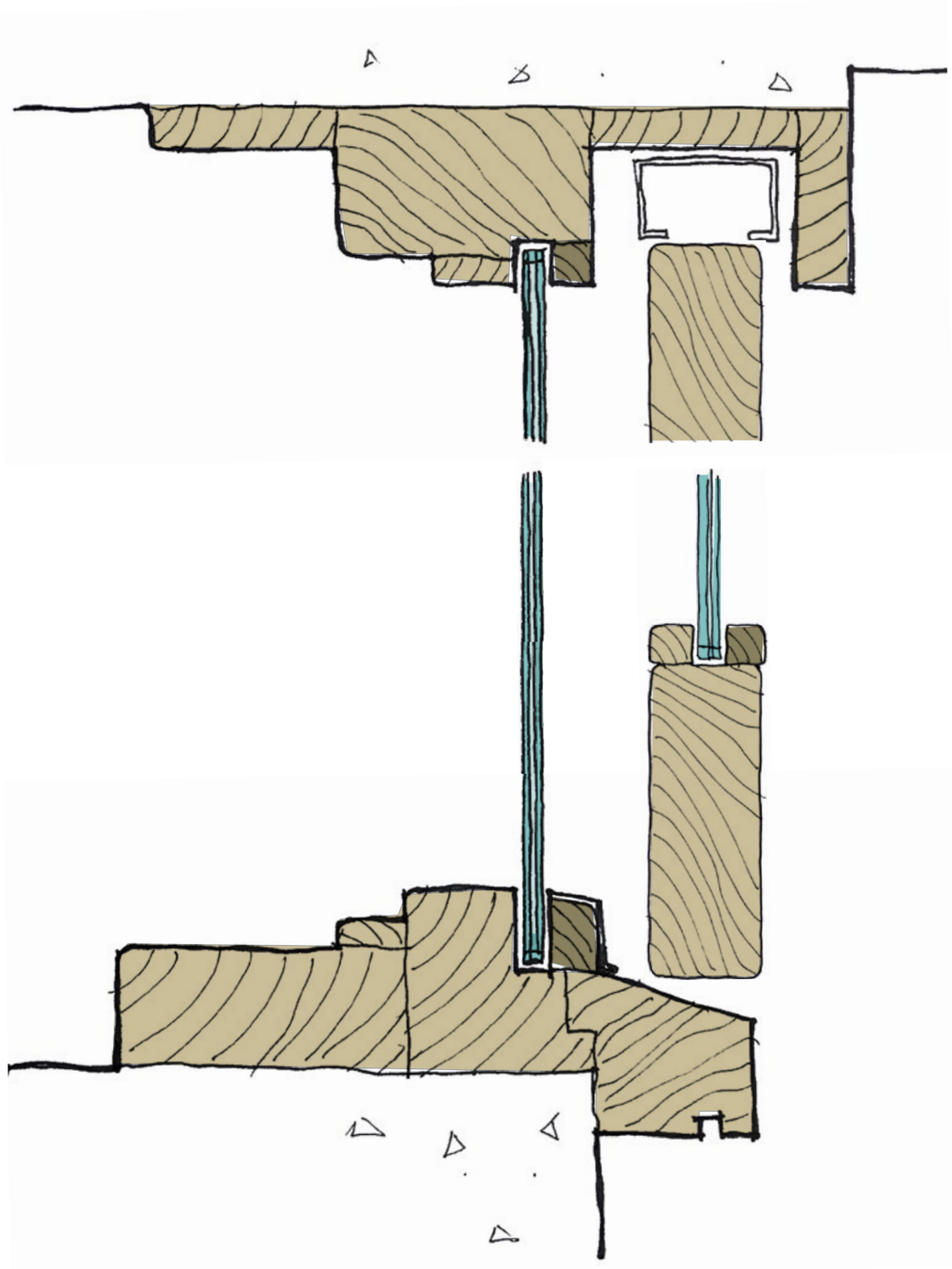
Section through cill - stepped glazing

Section through existing cill - single glazing



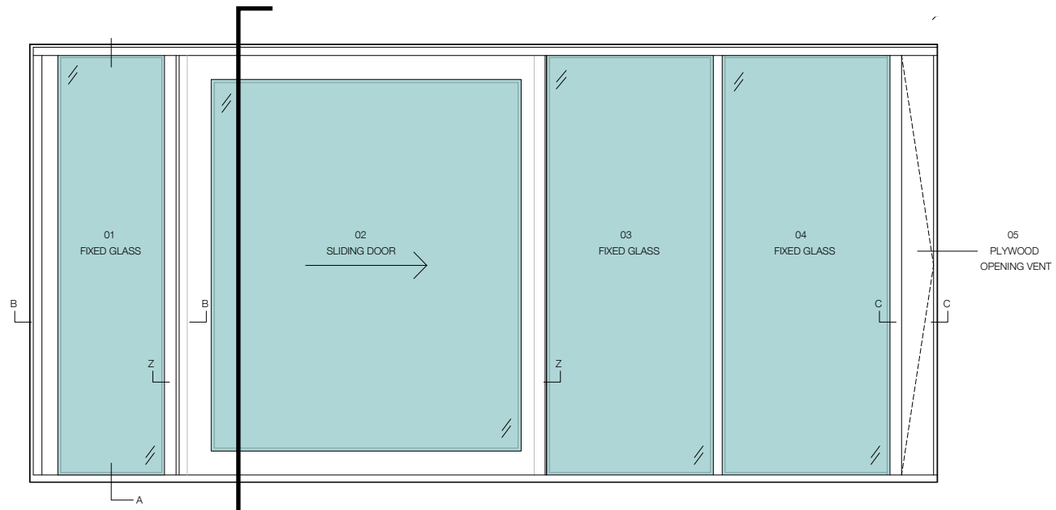
Section through cill - vacuum glazing

4.3 Proposed window refurbishment works



Proposed works

Single glazing to be replaced with double vacuum glazing within existing douglas fir frame.



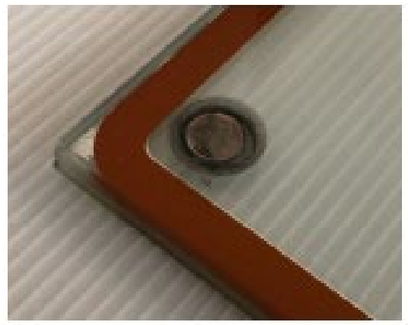
Section through head and sill of fixed and sliding windows - vacuum glazing

4.3 Proposed window refurbishment works

The Vacuum Glazing is 8.3mm thick with a u-value as low as 0.4W/m2.K. It will have small approx. 10mm diameter circles in the corners when installed. These will be visible but tucked tight into the corners of windows.

One of the circles is the vacuum plug where the air will be extracted from. The others (getters) help to absorb air molecules to maintain the vacuum.

On the larger panes there could be up to three getters and one vacuum plug.



1 Vacuum Plug

2 Vacuum Getter

Proposed works

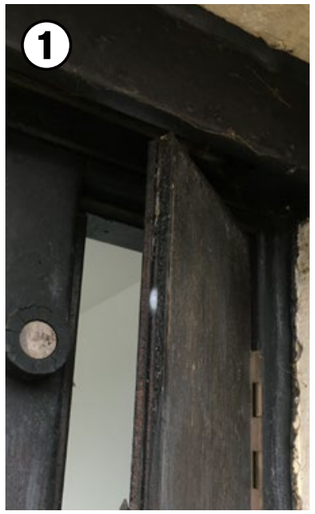
- Single glazing to be replaced with double vacuum glazing within existing douglas fir frame.

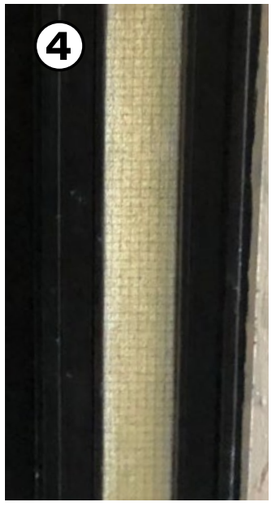
4.3 Proposed window refurbishment works

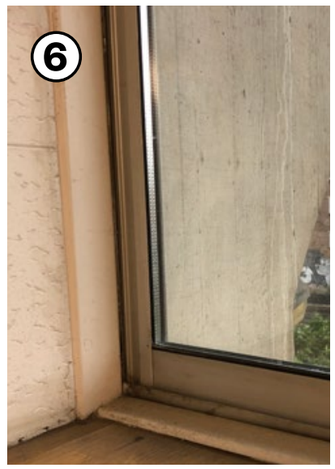
In addition to the re-glazing of the timber windows there are a number of features in the window sets that require slight modification, these include:

1. Plywood opening vents will be fitted with additional panels to improve insulation.
2. Trickle vents may be fitted with 'hit and miss' closers to allow background ventilation to be controlled
3. Sliding door running gear will be stripped, cleaned and overhauled
4. Wire glass will be retained and fitted with secondary glazing
5. Louvred vents will be replaced with new timber sashes
6. Existing aluminium windows will be retained, with any historic damage repaired
7. Secondary glazing to aluminium windows will be retained where it has not been removed in the past. It is not proposed to replace any missing secondary glazing.

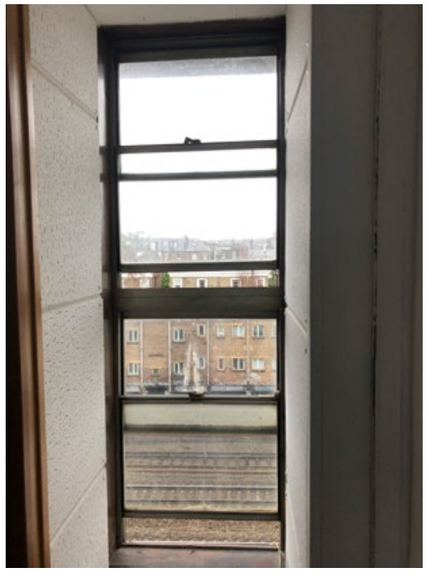
All timber windows will be checked for airtightness, and new seals installed as necessary.







4.3 Proposed window refurbishment works



Proposed works

- Review and re-seal window or door where necessary
- Fixed secondary glazing to be installed to retained wire glass
- Insulate plywood fixed panel
- Provide secondary opening vent and re-seal
- Refurbish secondary glazing where missing elements, difficult to operate or broken
- Replace louvred glass with bottom hung inward opening window on catch and restrictor
- Refurbish operation and seals of window where elements are missing, difficult to operate or broken

4.3 Proposed window refurbishment works

The A3 unit type has the louvred glass pane. This is proposed to be replaced with a bottom hung inward opening window. It will be operated by a pole and catch on the inside and will have a concealed restrictor fitted at the side.

Proposed works

- Replace louvred glass with bottom hung inward opening window on catch and restrictor

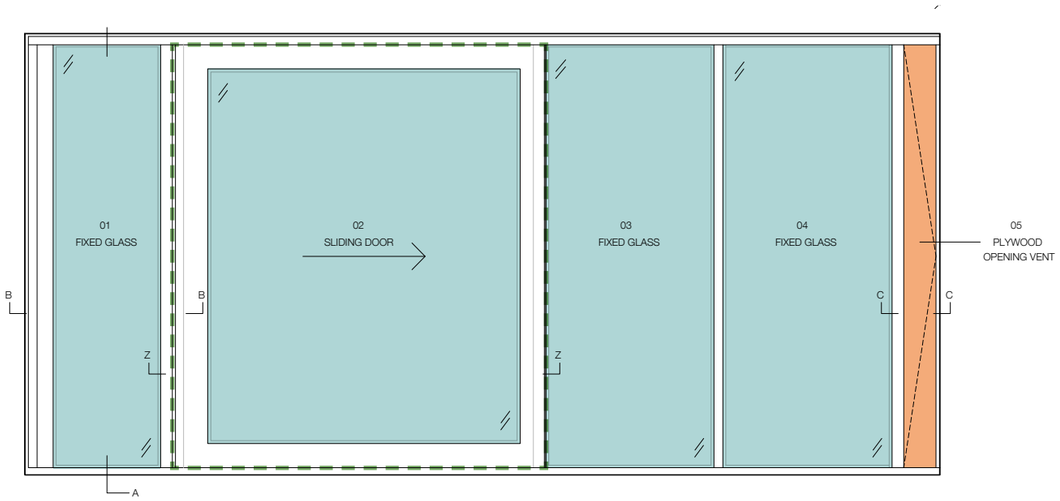
Ironmongery Precedents for Bottom Hung Opening Window:

Window Catch

Photo of bottom hung inward opening window as built in 26A pilot flat.

4.3 Proposed window refurbishment works

Unit Type A1



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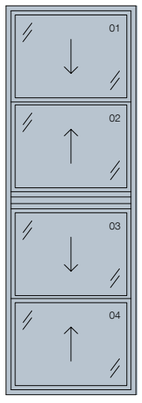

A - N - 00

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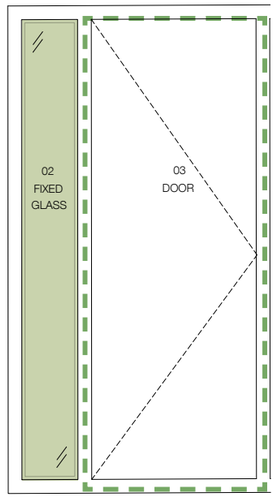
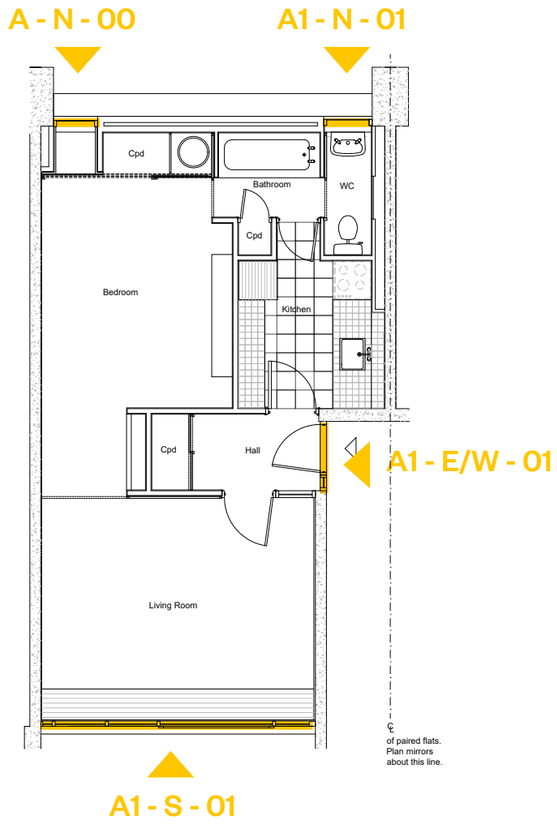


A1 - E/W - 01

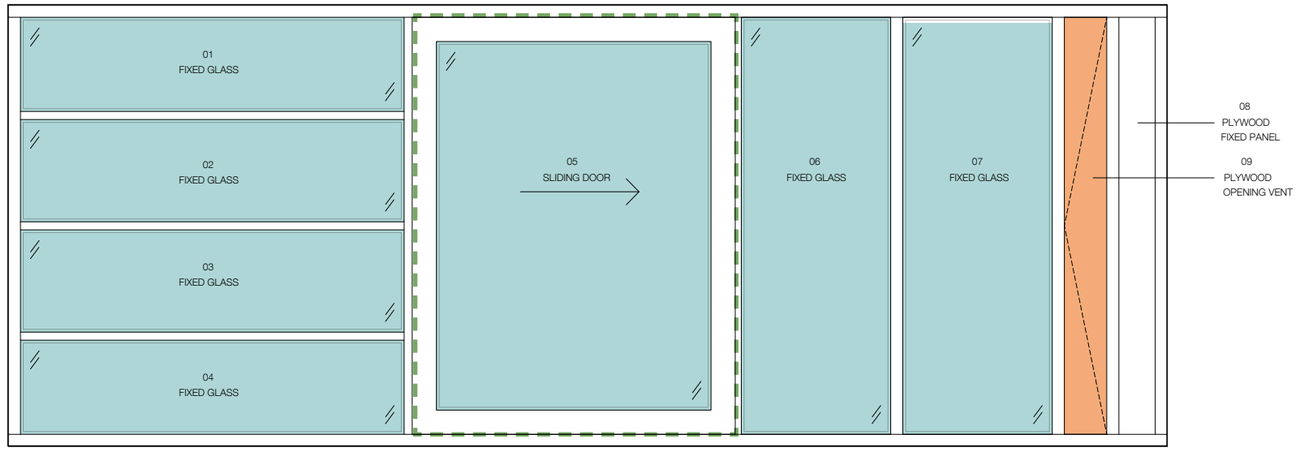


Proposed works

- Single glazing to be replaced with double vacuum glazing within existing douglas fir frame.
- Review and re-seal window or door where necessary
- Provide secondary opening vent and re-seal
- Fixed secondary glazing to be installed to retained wire glass
- Refurbish operation and seals of window where elements are missing, difficult to operate or broken

4.3 Proposed window refurbishment works

Unit Type A2



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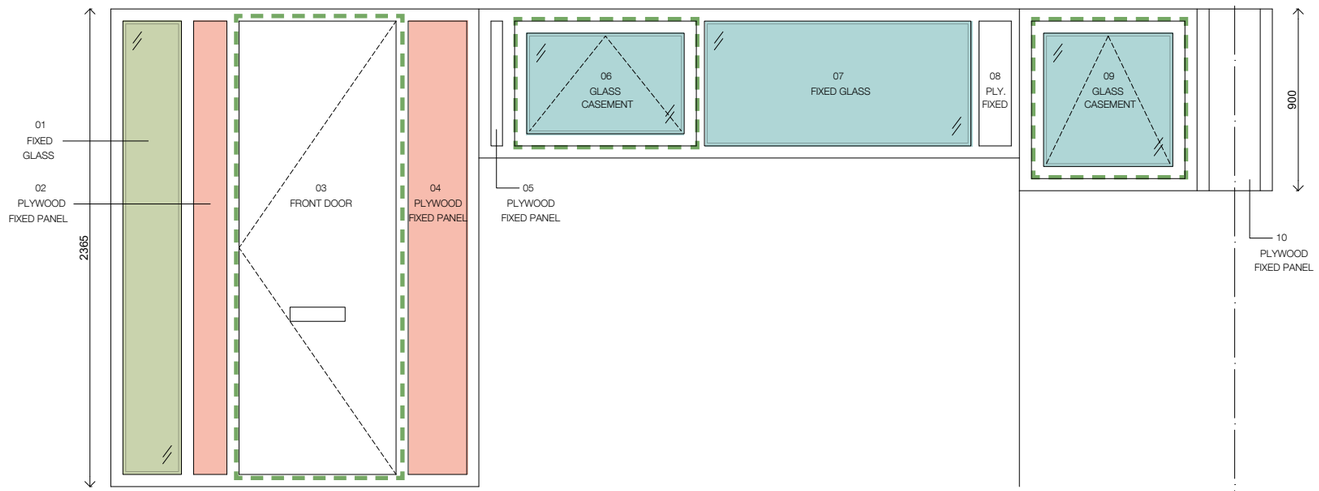
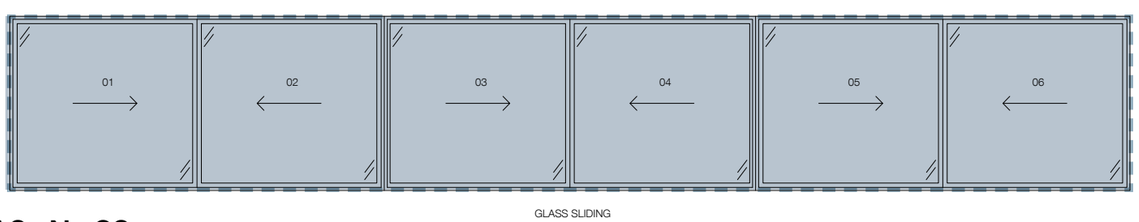


A2 - S - 01



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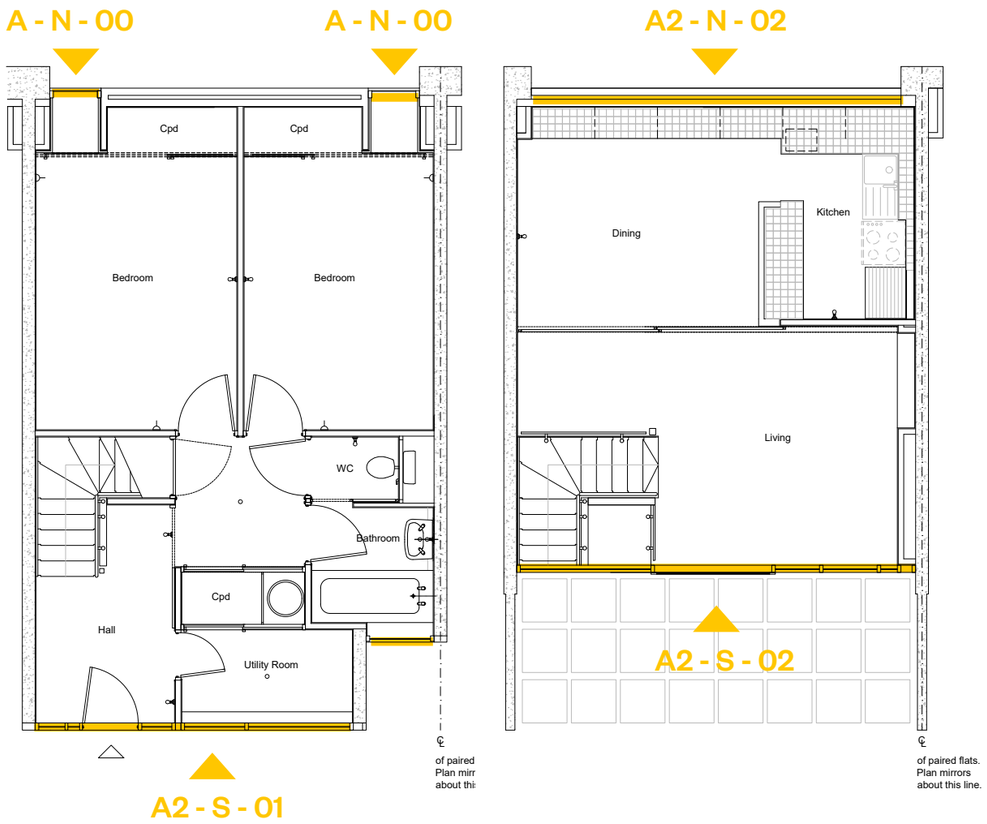
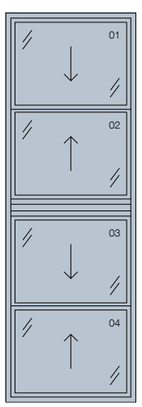




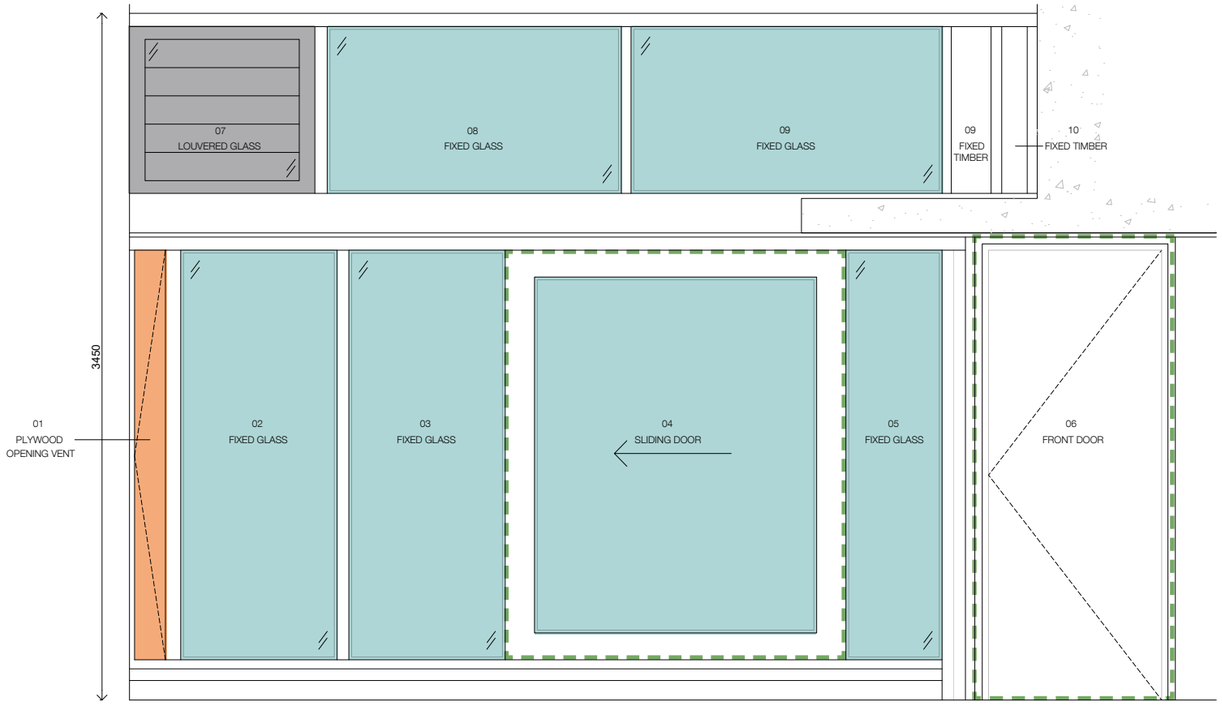
A - N - 00

Proposed works

- Single glazing to be replaced with double vacuum glazing within existing douglas fir frame.
- Review and re-seal window or door where necessary
- Provide secondary opening vent and re-seal
- Fixed secondary glazing to be installed to retained wire glass
- Refurbish operation and seals of window where elements are missing, difficult to operate or broken
- Insulate plywood fixed panel
- Refurbish secondary glazing where missing elements, difficult to operate or broken

4.3 Proposed window refurbishment works

Unit Type A3



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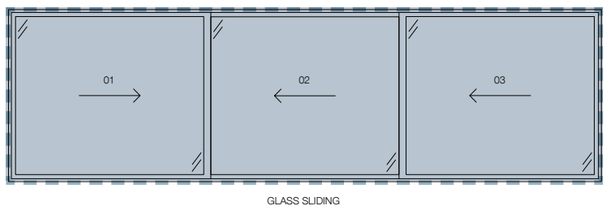

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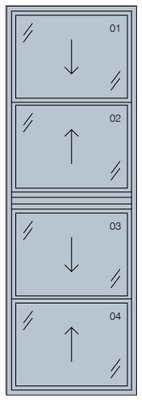

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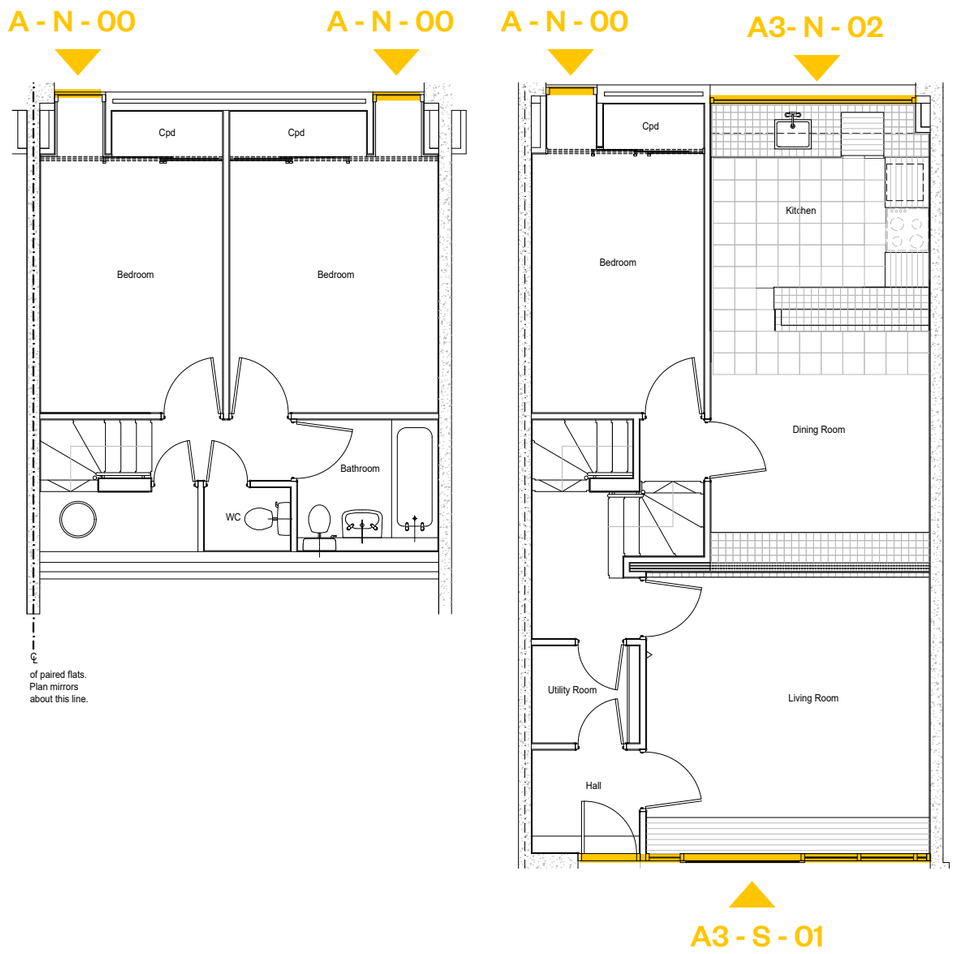
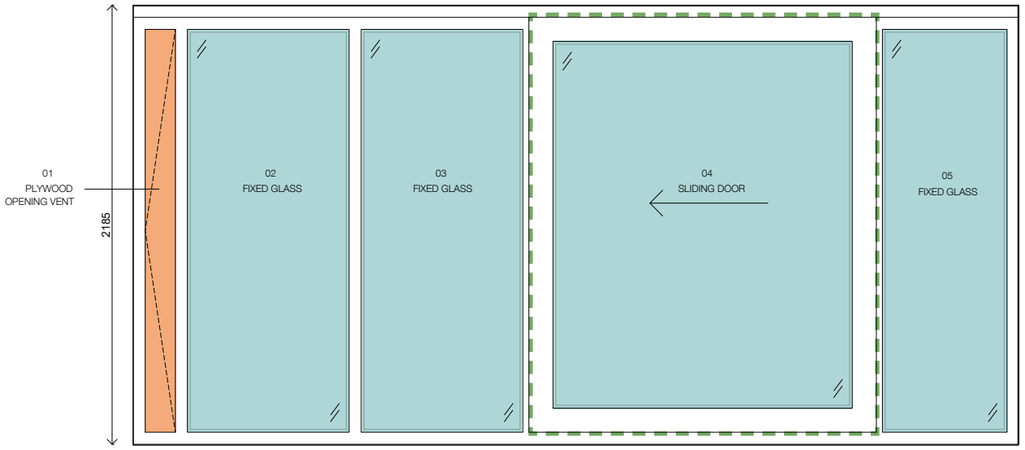


Proposed works

- Single glazing to be replaced with double vacuum glazing within existing douglas fir frame.
- Review and re-seal window or door where necessary
- Provide secondary opening vent and re-seal
- Refurbish operation and seals of window where elements are missing, difficult to operate or broken
- Replace louvred glass with bottom hung inward opening window on catch and restrictor
- Refurbish secondary glazing where missing elements, difficult to operate or broken

4.3 Proposed window refurbishment works

Unit Type B2



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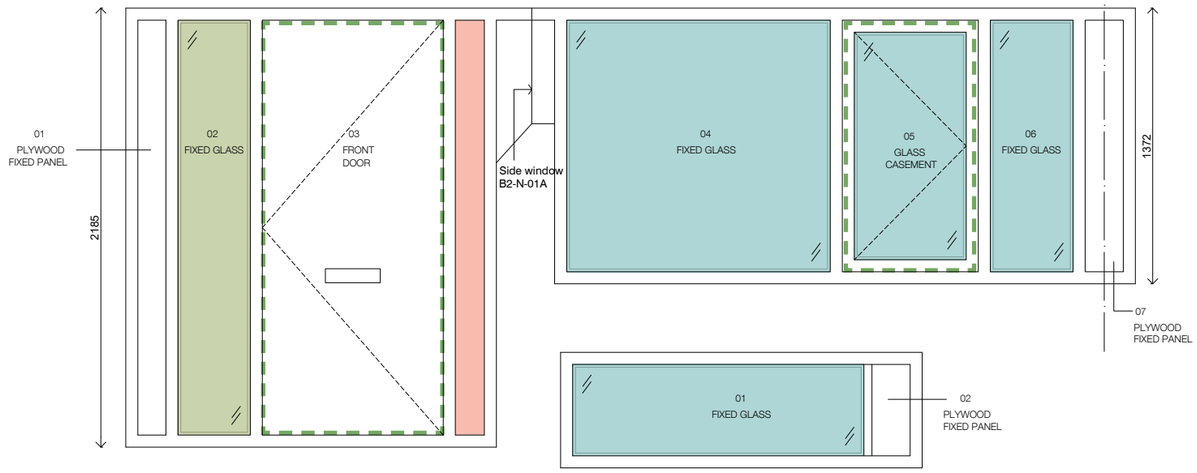
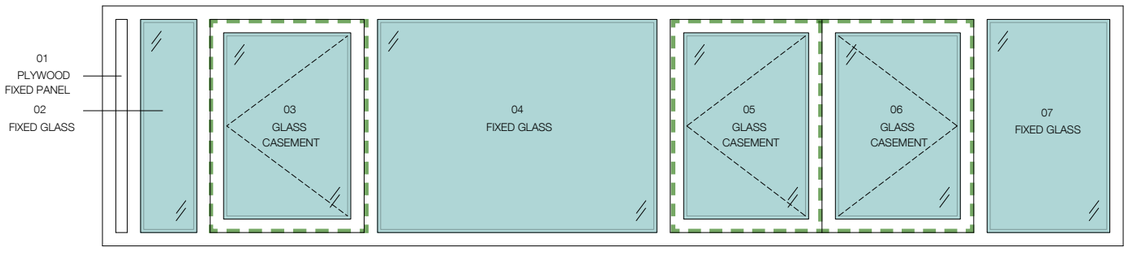


B2 - N - 01

B2 - N - 01A



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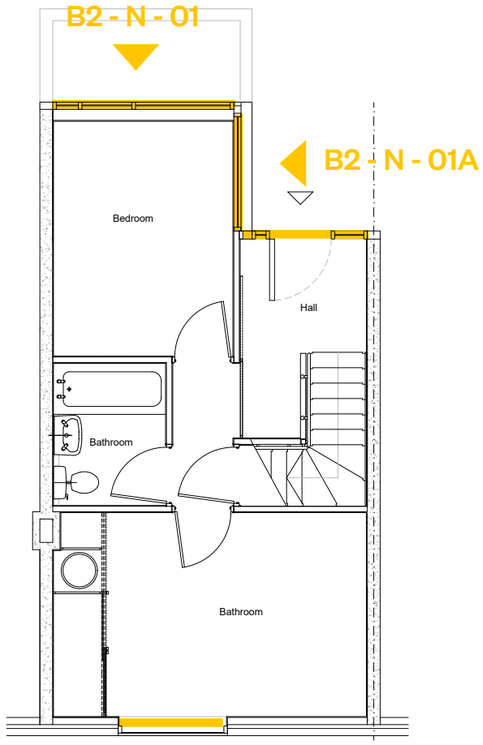

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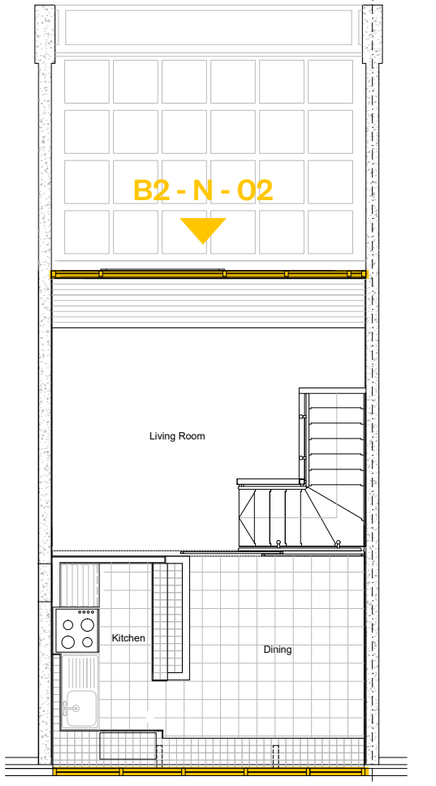

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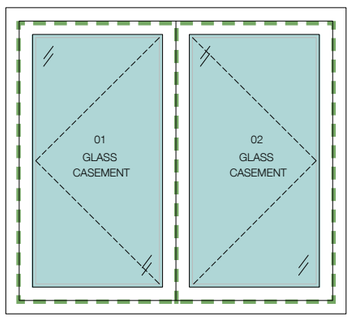


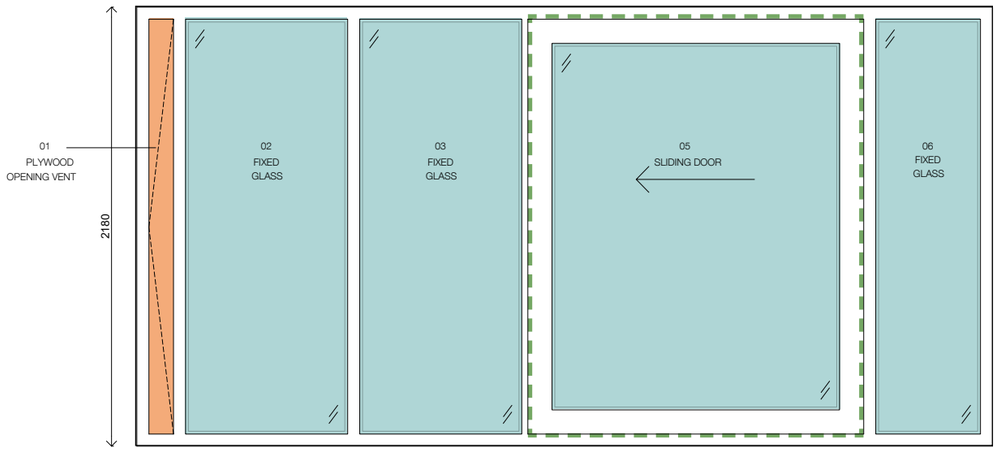
B2 - S - 01

Proposed works

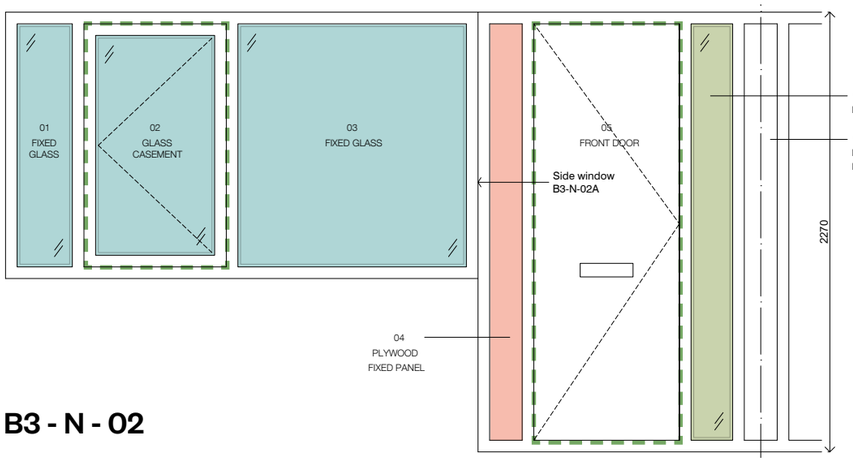
- Single glazing to be replaced with double vacuum glazing within existing douglas fir frame.
- Review and re-seal window or door where necessary
- Provide secondary opening vent and re-seal
- Fixed secondary glazing to be installed to retained wire glass
- Insulate plywood fixed panel

4.3 Proposed window refurbishment works

Unit Type B3



B3 - S- 02



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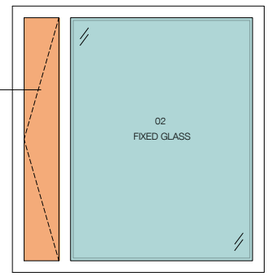

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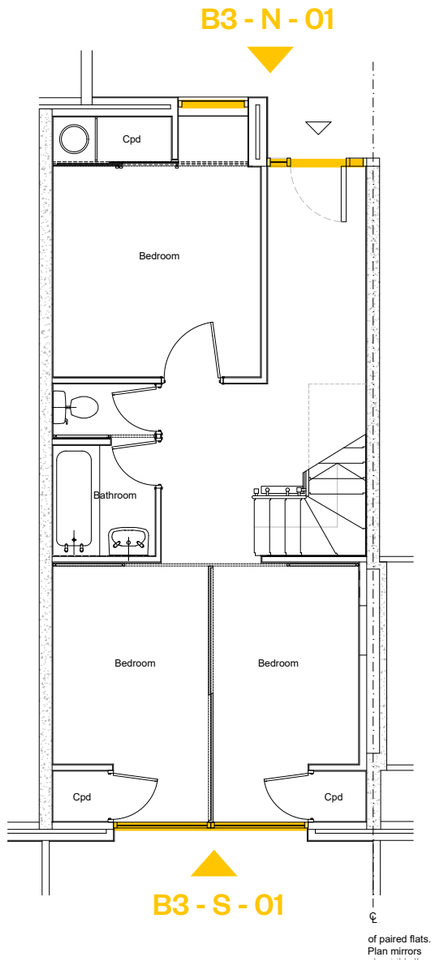

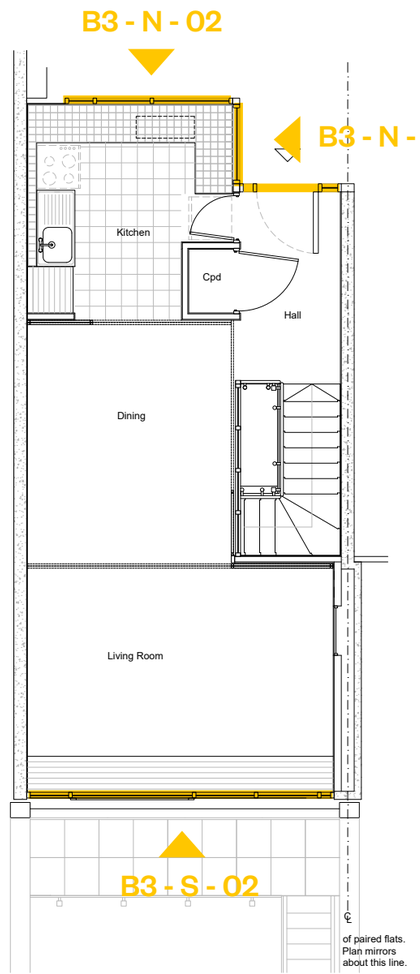

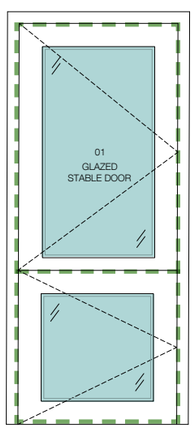

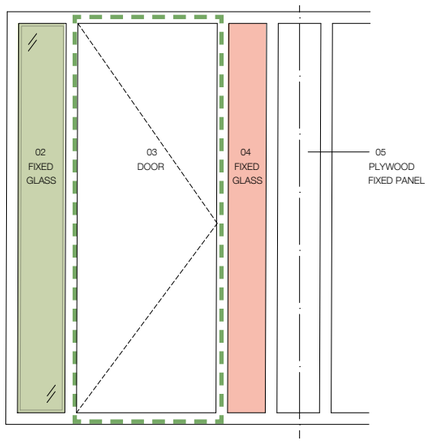

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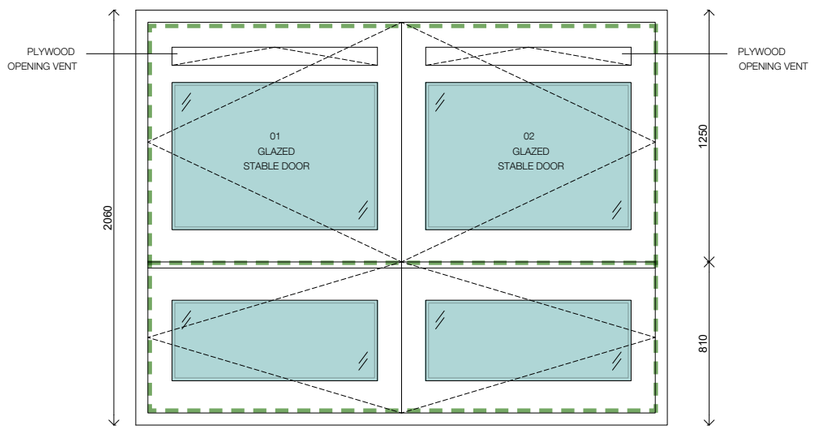


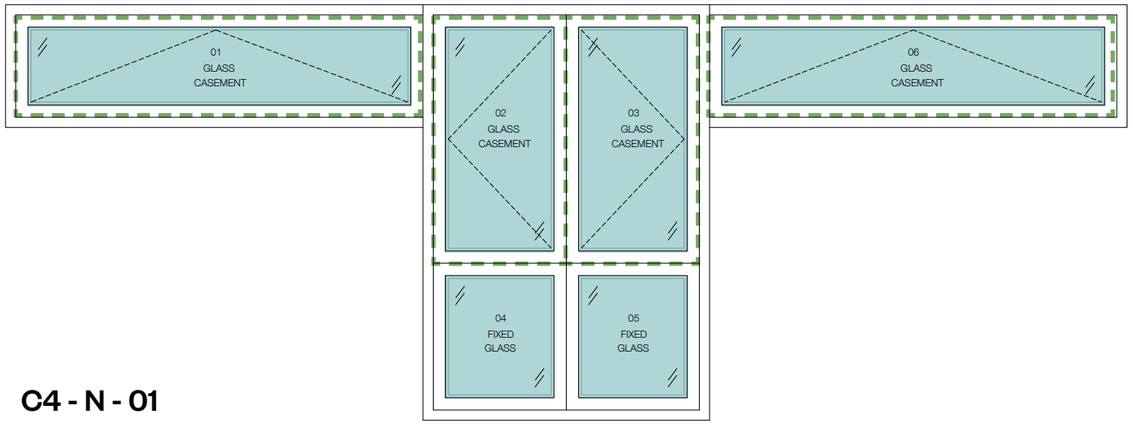
B3 - S - 01

Proposed works

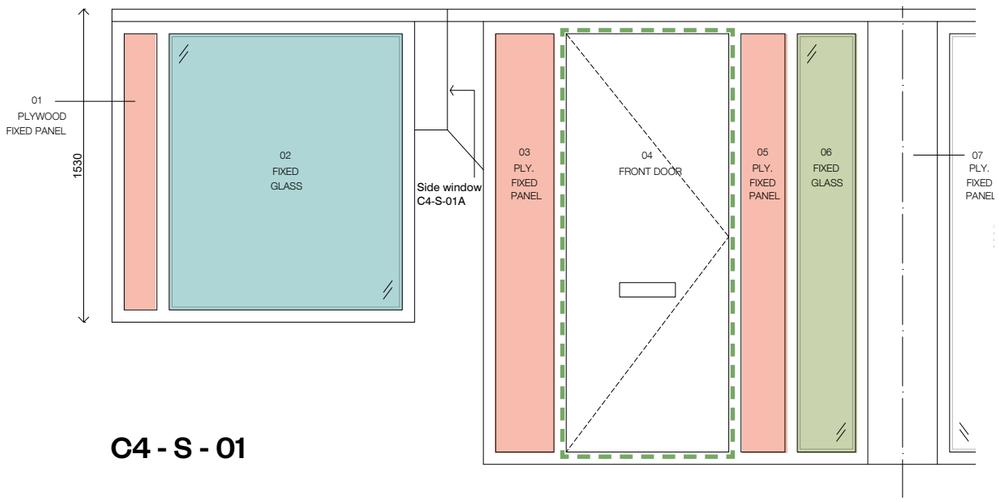
- Single glazing to be replaced with double vacuum glazing within existing douglas fir frame.
- Review and re-seal window or door where necessary
- Provide secondary opening vent and re-seal
- Fixed secondary glazing to be installed to retained wire glass
- Insulate plywood fixed panel

4.3 Proposed window refurbishment works

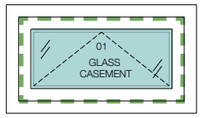
Unit Type C4



C4 - N - 01

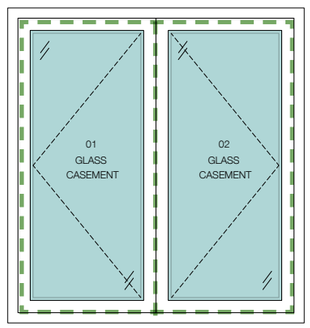


C4 - S - 01



C4 - S - 01A

C4 - N - 02



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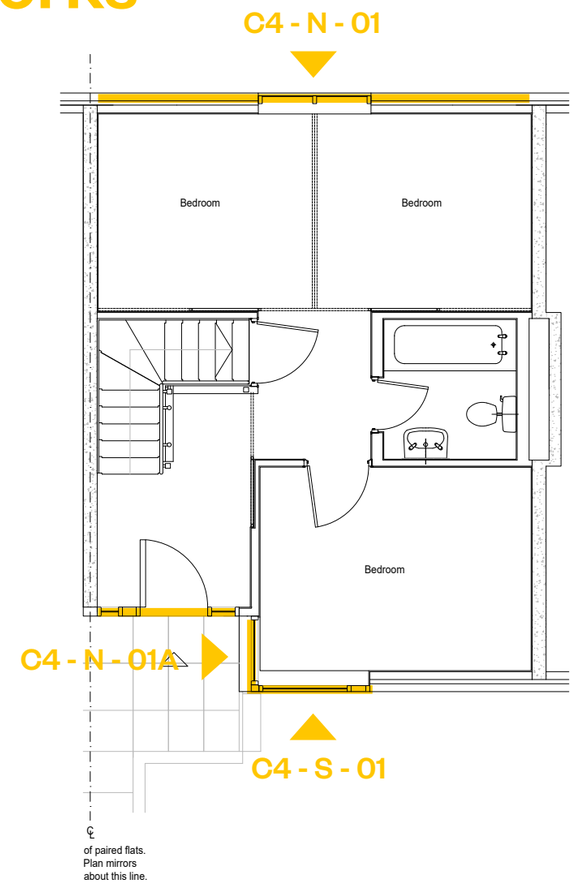
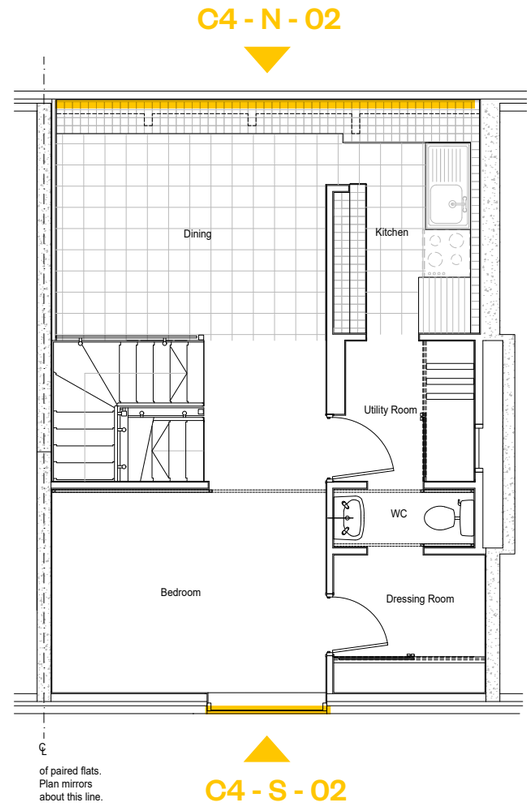


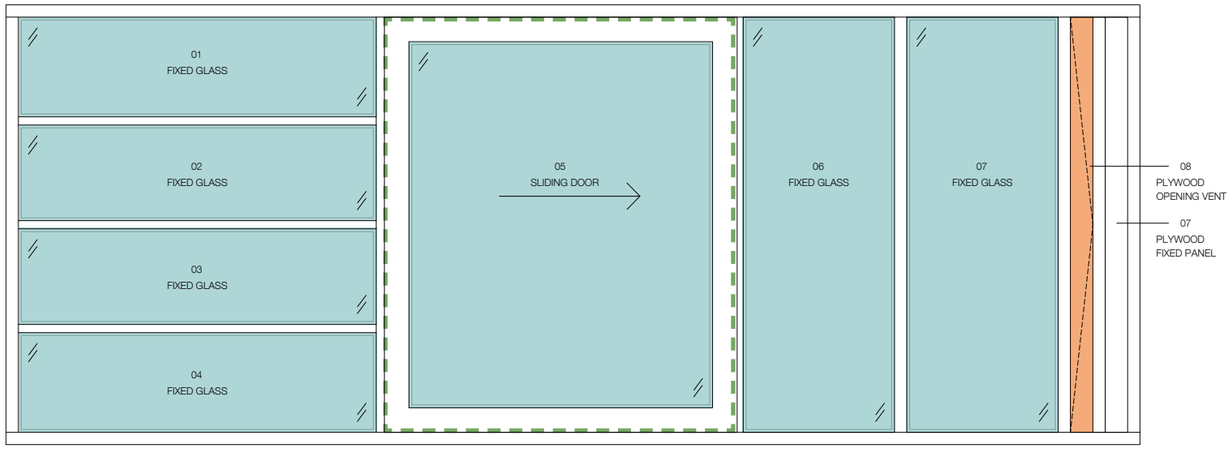


Proposed works

- Single glazing to be replaced with double vacuum glazing within existing douglas fir frame.
- Review and re-seal window or door where necessary
- Fixed secondary glazing to be installed to retained wire glass
- Insulate plywood fixed panel

4.3 Proposed window refurbishment works

Unit Type C4



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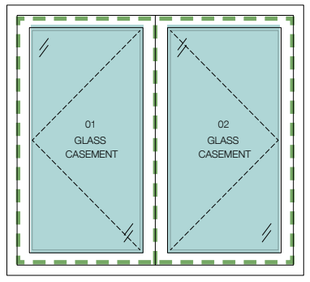

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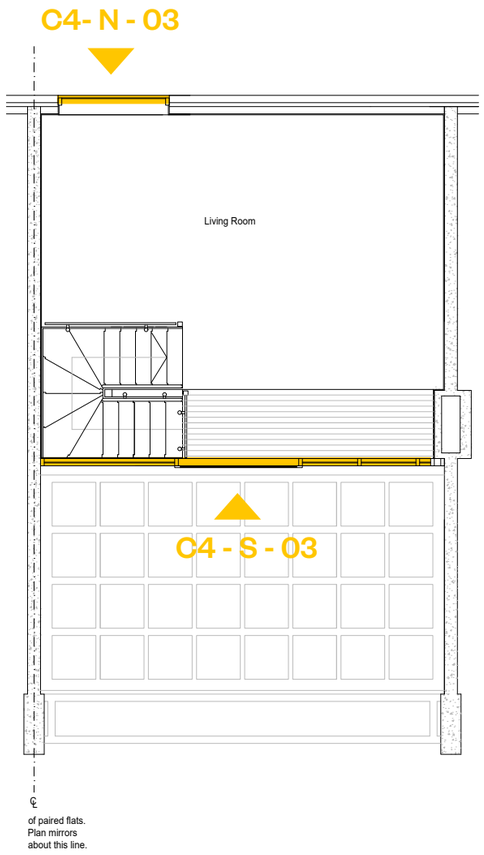
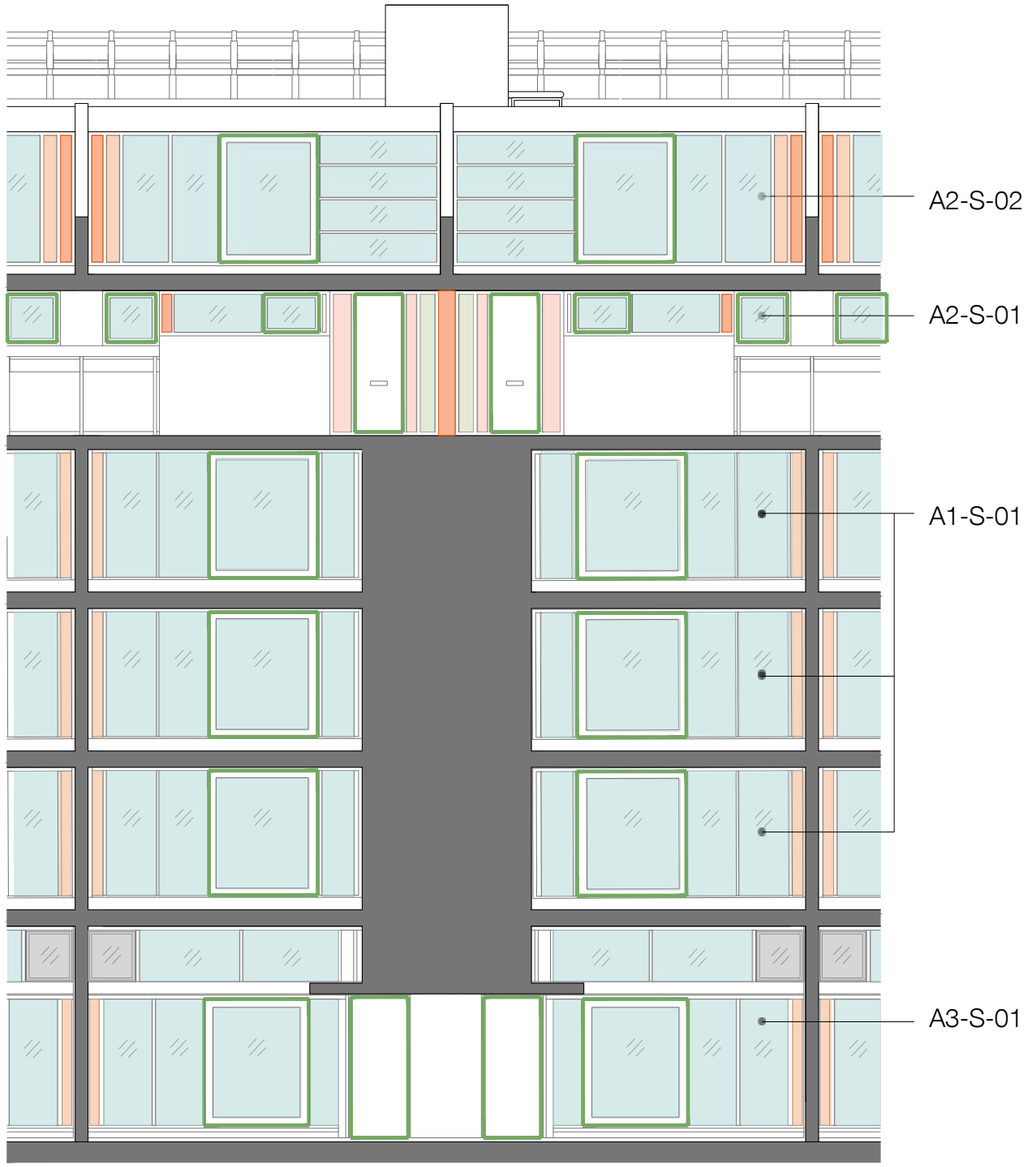


Proposed works

- Single glazing to be replaced with double vacuum glazing within existing douglas fir frame.
- Review and re-seal window or door where necessary
- Provide secondary opening vent and re-seal

4.4 Proposed Elevations

Block A South Elevation - Cut Away



Proposed works

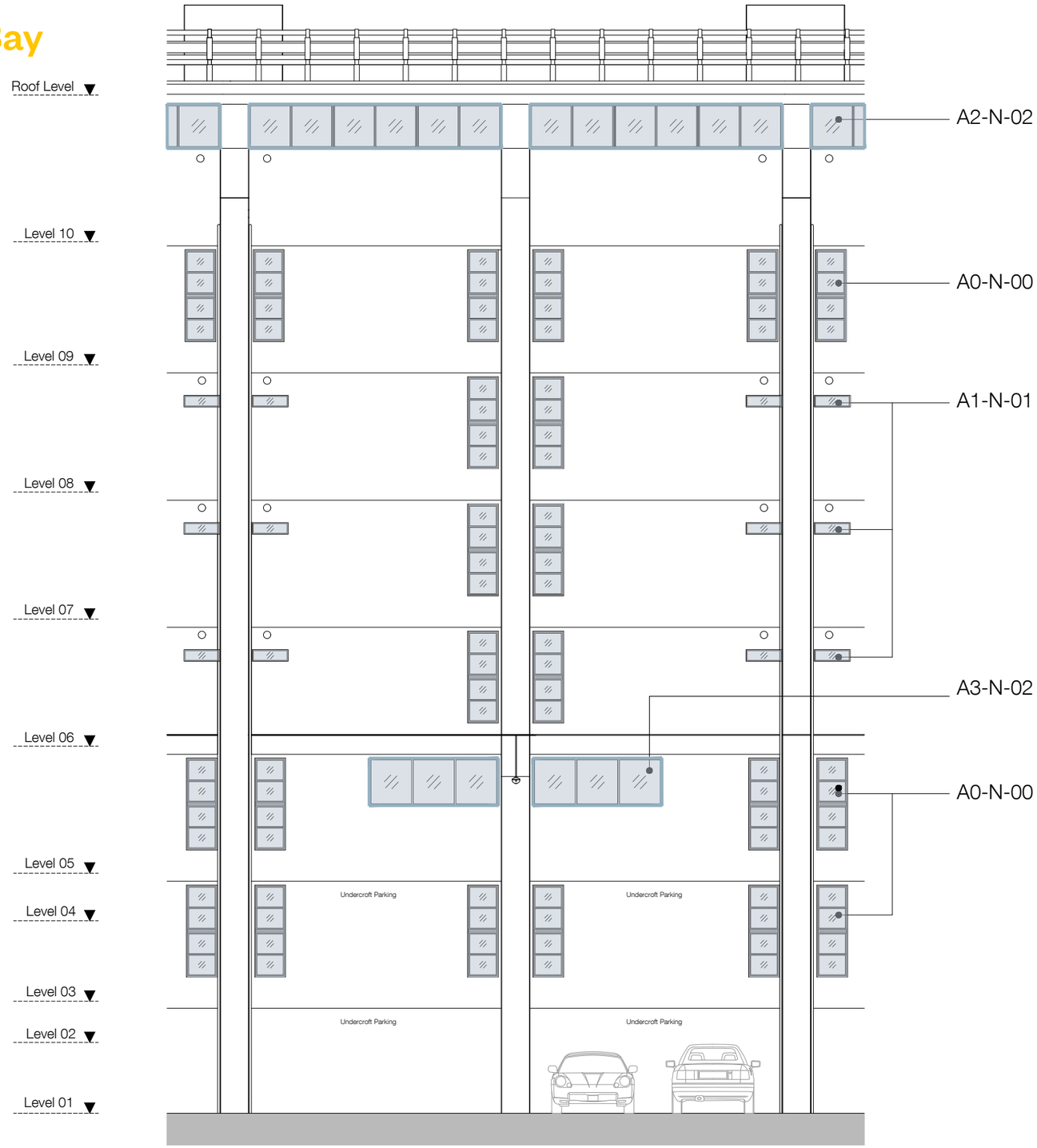
- Single glazing to be replaced with double vacuum glazing within existing douglas fir frame.
- Review and re-seal window or door where necessary
- Provide secondary opening vent and re-seal
- Fixed secondary glazing to be installed to retained wire glass
- Refurbish operation and seals of window where elements are missing, difficult to operate or broken
- Insulate plywood fixed panel
- Refurbish secondary glazing where missing elements, difficult to operate or broken
- Replace louvred glass with bottom hung inward opening window on catch and restrictor

4.4 Proposed Elevations

Block A North Elevation - Typical Bay

Proposed works

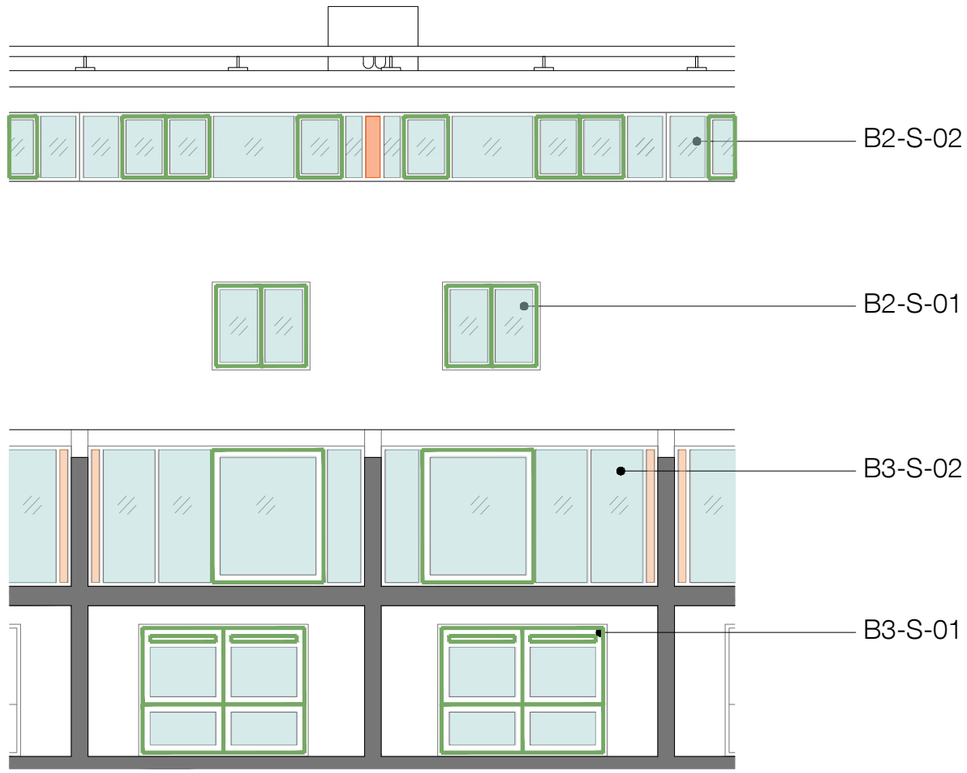
- Refurbish operation and seals of window where elements are missing, difficult to operate or broken
- Refurbish secondary glazing where missing elements, difficult to operate or broken



4.4 Proposed Elevations

Block B

Block B - North Elevation - Cut Away



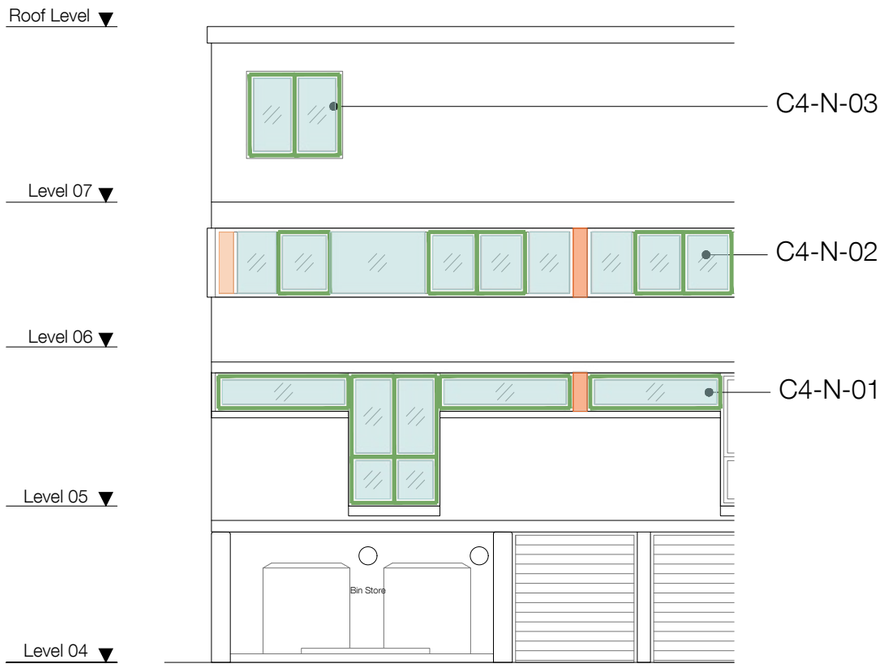
Block B - South Elevation - Cut Away

Proposed works

- Single glazing to be replaced with double vacuum glazing within existing douglas fir frame.
- Review and re-seal window or door where necessary
- Provide secondary opening vent and re-seal
- Fixed secondary glazing to be installed to retained wire glass
- Insulate plywood fixed panel

4.4 Proposed Elevations

Block C



Block C - North Elevation - Typical Bay

Block C - South Elevation - Cut Away

Proposed works

- Single glazing to be replaced with double vacuum glazing within existing douglas fir frame.
- Review and re-seal window or door where necessary
- Provide secondary opening vent and re-seal
- Fixed secondary glazing to be installed to retained wire glass
- Insulate plywood fixed panel

5.0 Space Heating Works within Dwellings

5.1 Summary of Heating Options considered

Replacement of the gas boilers in the communal heat network plant room with a lower carbon alternative should be a consideration when the gas boilers come to the end of their operational life, around 2039. It is relativity simple to swap out the gas boilers for alternative low carbon technologies such as heat pumps. It would be considered wasteful to remove the boilers before the end of their operational life, it would also not be cost effective for Camden or leaseholders who have recently paid for these and would need to pay for an alternative to be installed before necessary.

While not due to happen imminently, it is important to understand what options are available for replacing the gas boilers at the end of their operational life and what alternatives exist to the communal heating system.

The following options have been appraised:

1. The use of heat pumps instead of gas boilers (whether ground, air or water source)
2. A high temperature network - with water flowing inside the communal heat network at higher temperatures
3. A low temperature network - with water flowing inside the communal heat network at lower (ambient) temperatures
4. The decommissioning the communal heat network and installation of individual gas boilers for each home
5. The decommissioning the communal heat network and installation of individual air source heat pumps for each home
6. The decommissioning the communal heat network and installation of individual direct electric connections for heat for each home

Each of the options has been appraised against the following criteria:

- Amount of carbon emissions
- Heritage impact
- Capital cost of installing the systems
- Running costs to residents
- Reliability and maintenance of the system
- Disruption to residents to install the system
- Future climate resilience of the system

For more detail information, refer to section 7.3 of the Zero Carbon Report

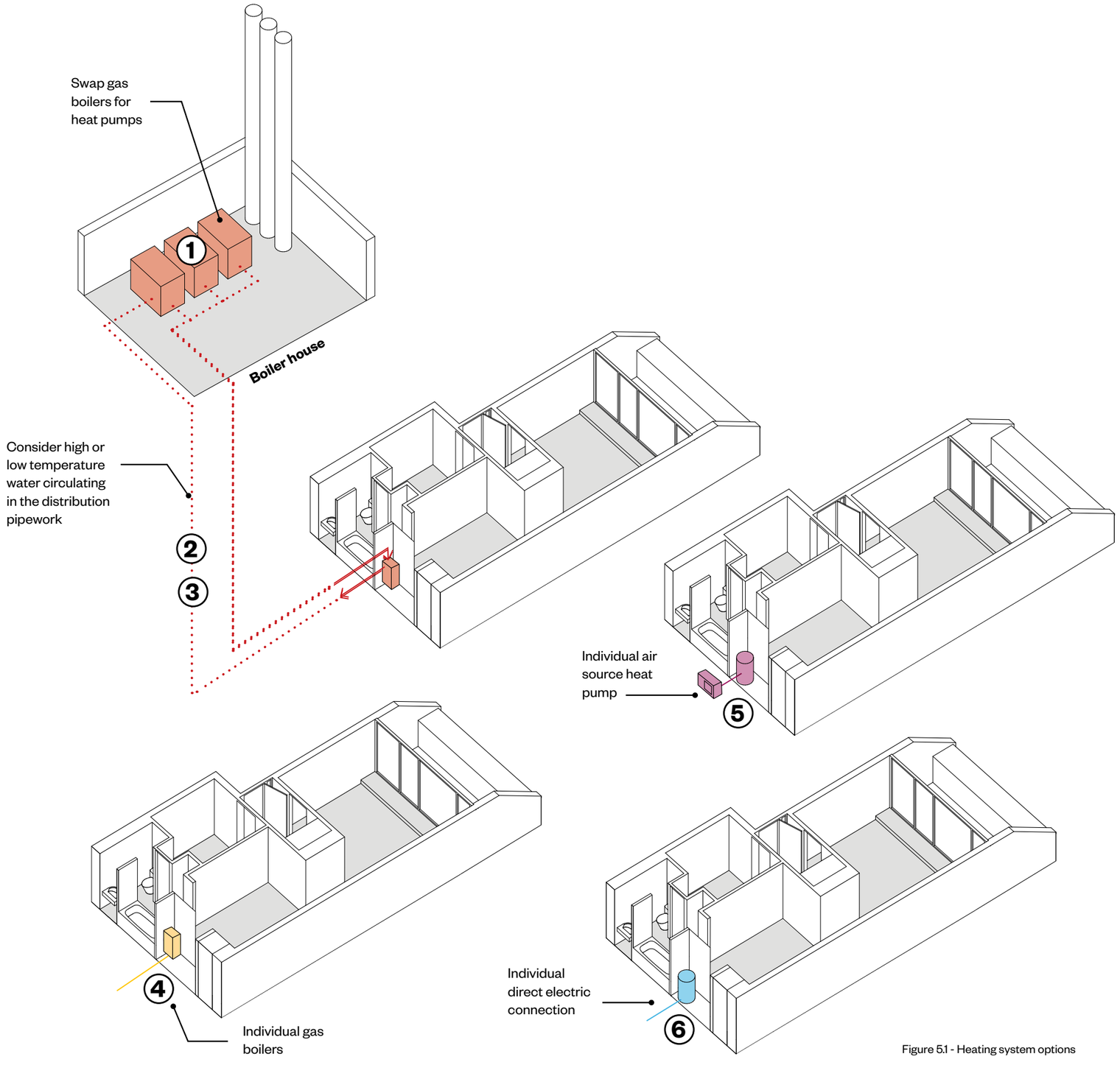


Figure 5.1 - Heating system options

Matrix of heating options - summary

Key

✓ Low impact - Medium impact X High impact

Heating system evaluation of options

Emitter type	Carbon emissions	Heritage impact	Capital cost	Running cost	Reliability/ maintenance	Disruption on installation	Future climatic resilience	Outcome	
① **Communal heat pump** Swap the gas boilers in the main plant room for heat pumps	-	✓	-	-	✓	-	-	✓	Swapping the communal gas boilers for heat pumps in the future is a low carbon, low capital and low running cost option.
② **Communal high temperature heat network** Use of a high temperature heat network connected to heat pumps	-	✓	-	-	✓	-	-	✓	The use of a high temperature heat network is comparable with the current and a future heat network.
③ **Communal low temperature heat network** Use of a low temperature heat network connected to heat pumps	-	-	X	-	X	-	✓	X	The use of a low temperature network is not compatible with the current proposals and requires local heat pumps to be installed in every home.
④ **Individual gas boiler** Individual gas fired boilers in each home	X	X	-	-	-	X	-	X	Installing new gas boilers is not compatible with meeting the UK and Camden's climate goals.
⑤ **Individual air source heat pump** Individual air source heat pumps in each home	✓	X	X	-	X	X	-	X	Individual heat pumps are not a heritage friendly option, nor are they practical for this Estate.
⑥ **Individual direct electric connection** Individual direct electric connection to each home	-	✓	✓	X	✓	✓	-	X	Individual direct electric connections would require upgrades to the electrical network on site. Direct electric would also be more carbon intensive and expensive for residents than heat pumps.

Note - Although not a predetermining factor, the cost of the works is a significant project constraint. The solution has primarily been driven by heritage, quality, energy use, carbon emissions and running costs, however, the future costs for this work will also need to be proportionate for both Camden and leaseholders.

5.2 Proposed new heating system

Communal high temperature heat network

The current communal heat network on the Estate is a form of high temperature network. However, the distribution pipework is in need or replacement and upgrade as part of the critical works.

Heat is generated centrally at a high temperature (around 70°C) and distributed to each dwelling for heating and hot water. The distribution pipes are hot and unavoidably lose much heat when circulating around the Estate, even when insulated, increasing how much heat the system needs to generate. There are ways to mitigate this, however the distribution system must always be hot enough to provide hot water to residents throughout the year.

Current best-practice is for dwellings served by high temperature heat networks use a Heat Interface Unit (HIU) within each dwelling to separate the home from the network and exchange heat. From the HIU the space heating and hot water for bathing and washing are provided to the home. The HIU will replace the existing domestic hot water cylinders

.

The decarbonisation pathway for this system involves replacing the gas fired boilers with an electrically driven heat pump installation. This heat pump will need to be capable of producing high temperature water as the gas boiler currently does. A large centralised air source heat pump installation would be physically large and noisy and currently challenging to integrate into the site. However, we expect heat pump technology to improve rapidly over the next decade or so.

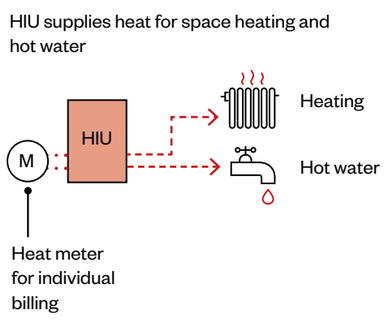
To work well with future heat pump technology, the network has been designed for low return temperatures, and requires return temperature limiters at each HIU. The electrical infrastructure serving the boiler house will also need upgrading when new heat pumps are to be installed.

The current proposals for the upgrades to the heat network are designed to operate at a 70°C flow and 40°C return. This is expected to be compatible with the flow and return temperatures required by heat pumps. This HIU has been acoustically tested carried out, to confirm that the noise levels are suitable for bedrooms.

Proposals for the upgrade of the distribution pipework are described in more detail in the parallel planning and listed building applications for these works.

Existing gas boilers

Example of large scale heat pumps



Example of heat interface unit

Figure 7.5 - Components of a communal high temperature network

5.3 Summary of Emitter Options considered

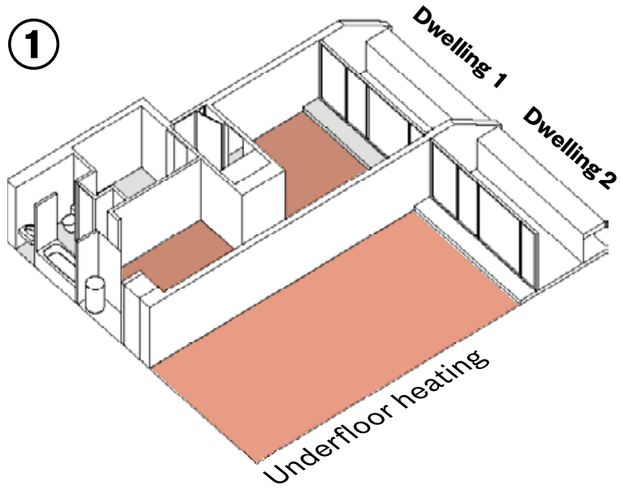
A number of methods of providing space heating have been explored.

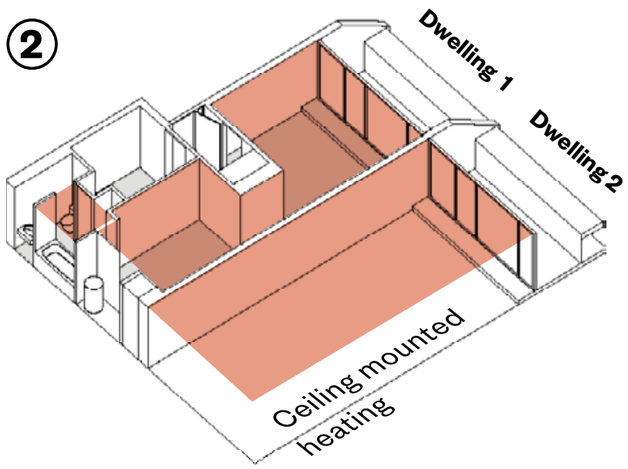
It is important that the space heating in each home:

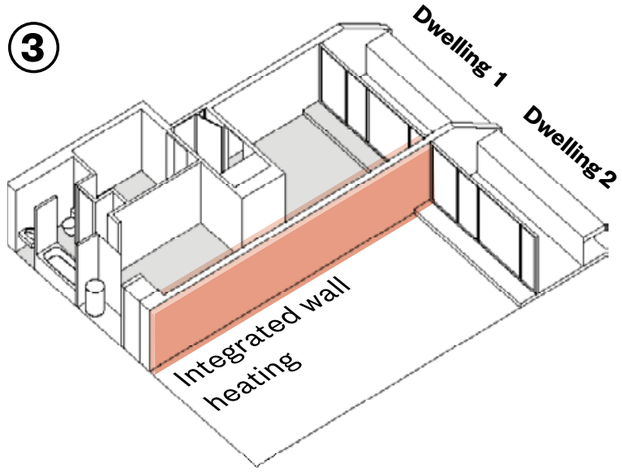
- Is sympathetic to the listed building and original design intent as far as possible
- Is as discreet as possible both in heating emitter design and distribution
- Does not clash with existing building features such as windows, sliding doors and movable wall partitions.
- Is thermally comfortable and can be controlled by residents
- Can be installed with residents in-situ
- Considers ease of maintenance and repair
- Is not cost prohibitive.

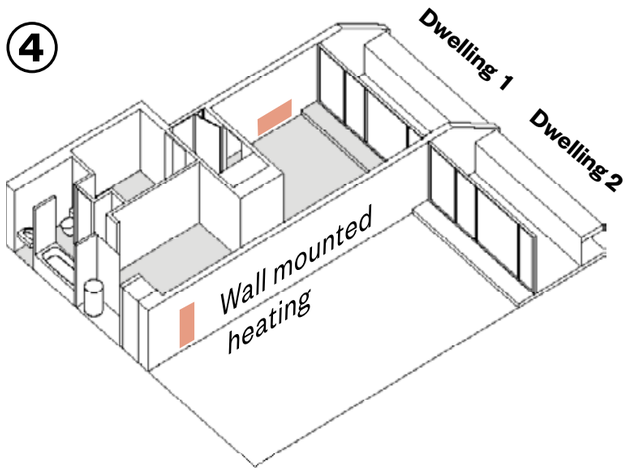
To this end the pros and cons of a number of heating emitter types have been considered together with the distribution pipework required to serve them:

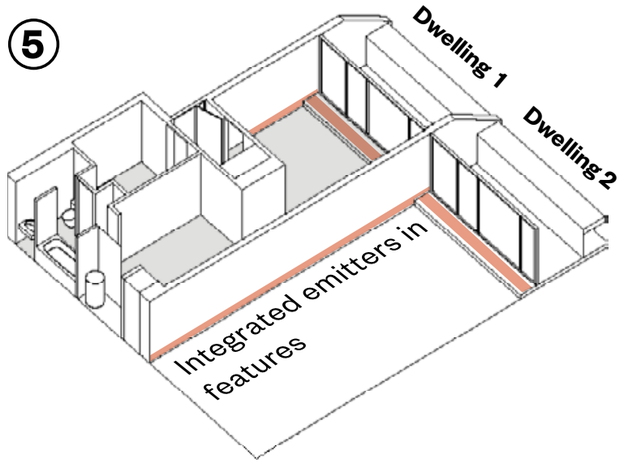
1. Underfloor heating
2. Ceiling mounted heating
3. Integrated wall heating
4. Wall mounted heating
5. Integrated emitters in architectural features
6. Reinstatement of fan heaters or similar

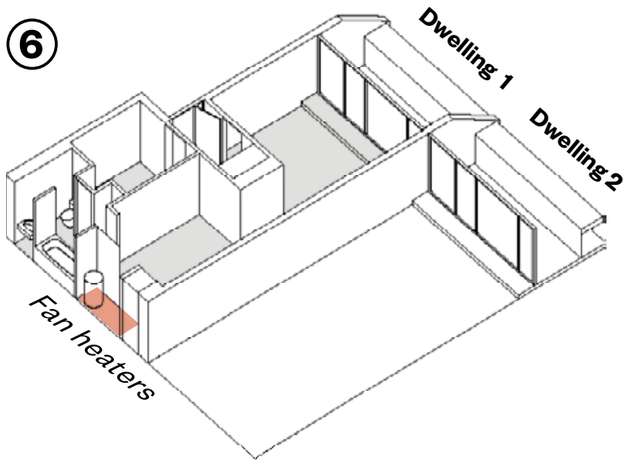












Matrix of heating emitter options - summary

Key

✓ Low impact - Medium impact X High impact

Heating emitter evaluation of options

Emitter type	Sympathetic to the original design	Clashes with heritage features	Distribution of heat in the home	Control of heat	Installation	Distribution pipework	Reduction in size of rooms	Maintenance and repair	Outcome	
① **Underfloor heating** Underfloor heating is a form of heating in which the floor surface is heated by hot water pipes underneath.	✓	X	✓	✓	X	✓	-	X	X	Although underfloor heating would provide a comfortable heating system, it cannot be installed in the homes due to the disruption to residents and the significant clashes with heritage features.
② **Ceiling mounted heating** Ceiling mounted heating follows the same concept as underfloor heating whereby hot water pipes are run in a ceiling void within the homes.	X	X	✓	✓	X	✓	-	X	X	As with the underfloor heating system, the ceiling mounted heating cannot be installed in the homes due to the disruption to residents and the significant clashes with heritage features.
③ **Integrated wall heating** A new layer of wall could be added to existing walls with heating pipework embedded within.	✓	X	-	✓	X	X	X	X	X	This system is sympathetic to the original design, however, there is disruption to residents during installation and significant clashes with heritage features.
④ **Wall mounted heating** Heating emitters such as radiators could be surface mounted on walls in each room.	X	✓	✓	✓	✓	X	✓	✓	✓	While wall mounted emitters are least sympathetic to the original design, they provide a heat source which has the least disruption for residents on installation and will clash the least with heritage features.
⑤ **Integrated emitters in architectural features** Heating emitters could be concealed in architectural features such as skirting boards and plinths.	✓	✓	-	✓	X	✓	✓	✓	✓	Integrated emitters in architectural features will be visually sympathetic. There will be moderate disruption on installation and clashes with heritage features will be kept to a minimum where possible.
⑥ **Fan heaters** The original design contained fan heaters concealed as part of the ventilation system under the built-in cupboards.	✓	✓	X	✓	X	-	✓	X	X	Due to the limited options on location and the poor quality and distribution of heat in the home, this system has been discounted.

Note - Although not a predetermining factor, the cost of the works is a significant project constraint. The solution has primarily been driven by heritage and quality, however, the final costs for this work will also need to be proportionate for both Camden and leaseholders.

5.4 Chosen Heating Emitter Option

Integrated emitters in architectural feature

As far as possible, it is proposed that the new heating system be integrated into the existing architectural features of the homes.

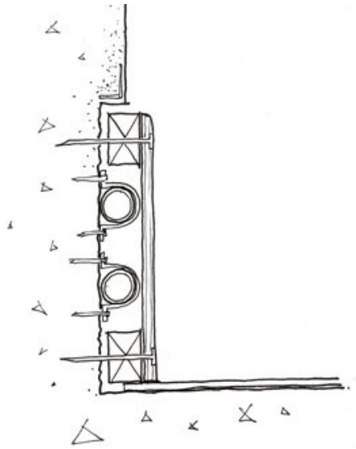
Heating distribution pipes around the dwellings will be concealed in existing features such as skirting boards and plinths, to minimise any change to the appearance of the homes.

Within blocks B and C, timber plinths adjacent windows will be modified to house a trench heater, and so avoid the need for emitters to be fitted to walls in these rooms if preferred. Unfortunately, the pilot works have shown that to install trench heaters in block A flats, the plinths need to be extended as they conceal concrete structure. In most block A flats it is not expected that this will be accepted by residents, and wall-mounted emitters are anticipated.

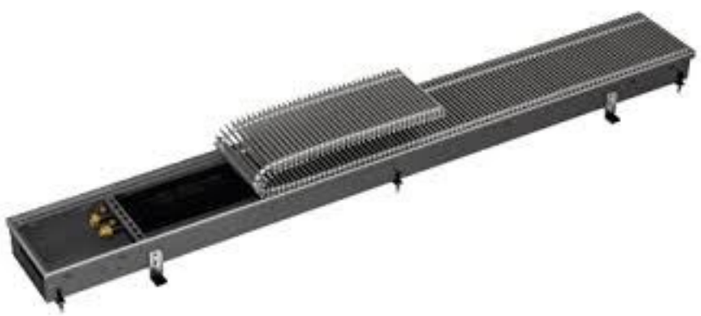
To provide sufficient heat output, additional emitters will be required to be installed around the dwellings. The residents will be given the opportunity to choose where the radiators are located along the walls where the distribution pipework runs to suit their furniture layout and needs. Furthermore, they will have the option to choose between two types of heating emitters that are both simple in design and offer minimal visual impact.

During installation, residents may need to move their furniture away from the affected walls in each room where skirting heating is to be fitted during the works. Although causing some minimal disruption, this option enables the residents to remain in-situ whilst the works are carried out. Whereas other options would require the residents to move out of their homes, cover and protect their furniture due to the disruption and mess caused during installation.

Concealed heating pipes at skirting level

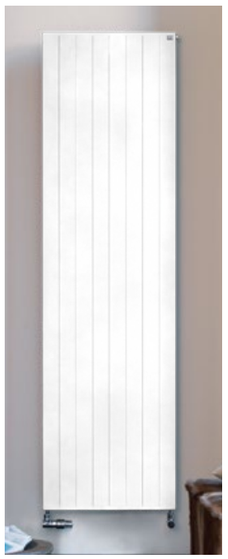


Plinth integrated heater with grille top and temperature control



Stelrad - Panels

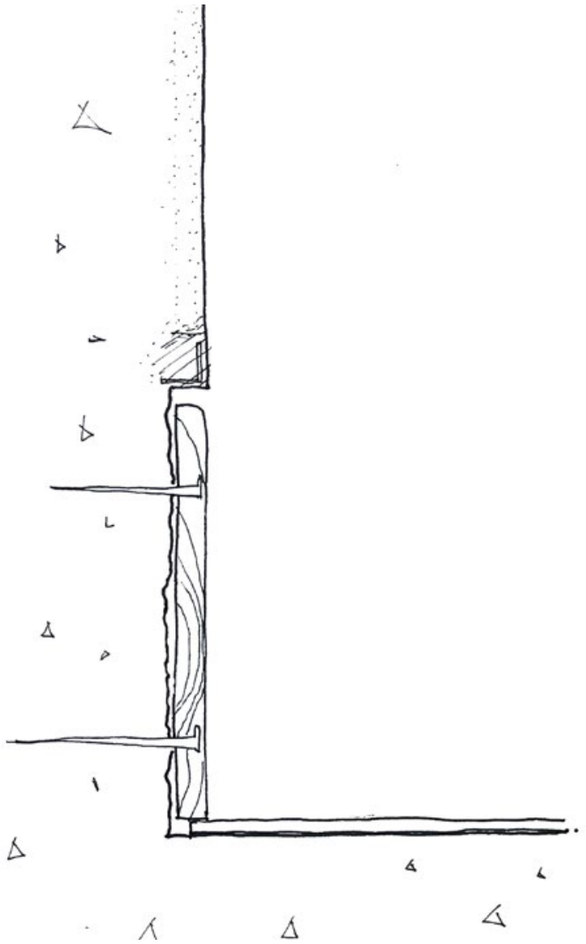
- Flat panel with grilled top
- Horizontal and vertical formats
- Limited size choices
- 83/129mm projection from wall
- 61/102mm panel depth



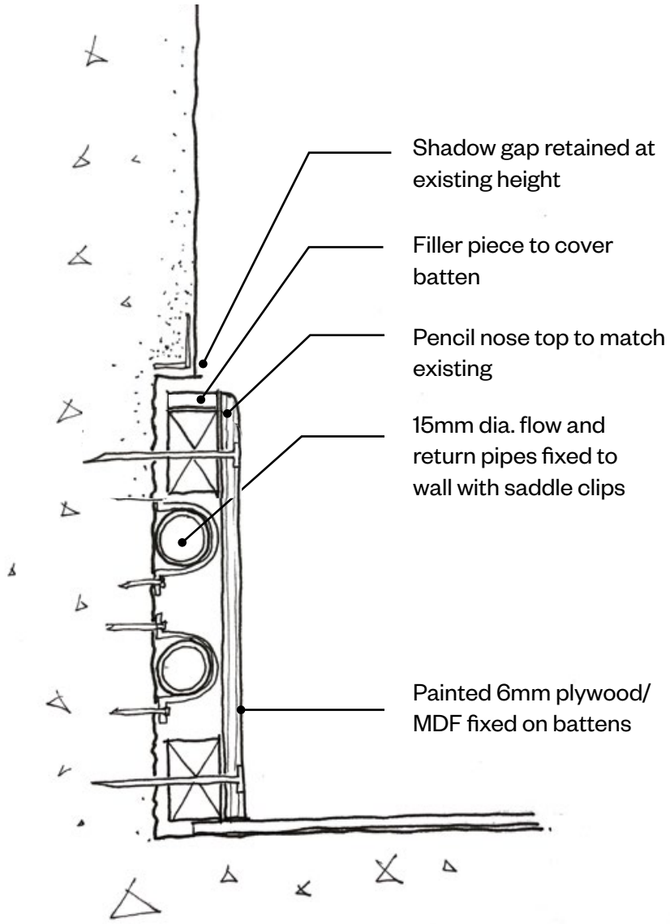
Zehnder - Radiapanel

- Closed body panelled appearance
- Horizontal and vertical formats
- 71-80mm projections from wall
- 38/63mm panel depth

5.5 Skirting Detail



Existing skirting - 10mm thick, 150mm tall



MDF or plywood - Approx. 24mm thick, 150mm tall

Proposed for concealed distribution of pipework at skirting level. Pipework is uninsulated to reduce the thickness of the skirting board.

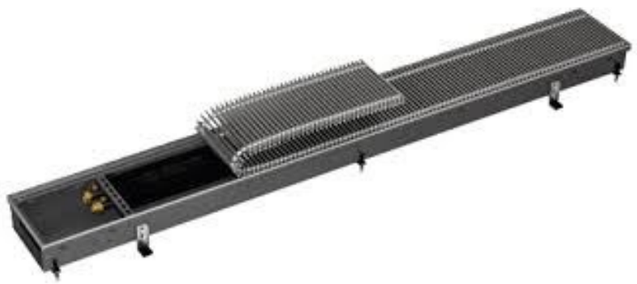
Pipework will be insulated where it is boxed in or runs under cupboards.

Proposed skirting section in pilot flat

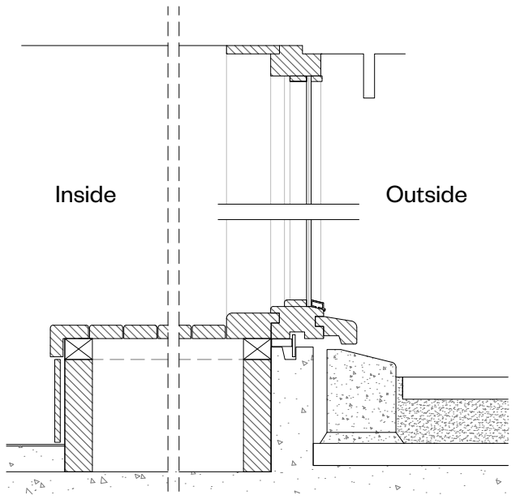
Proposed finished skirting board in pilot flat

5.5 Plinth integrated trench emitter

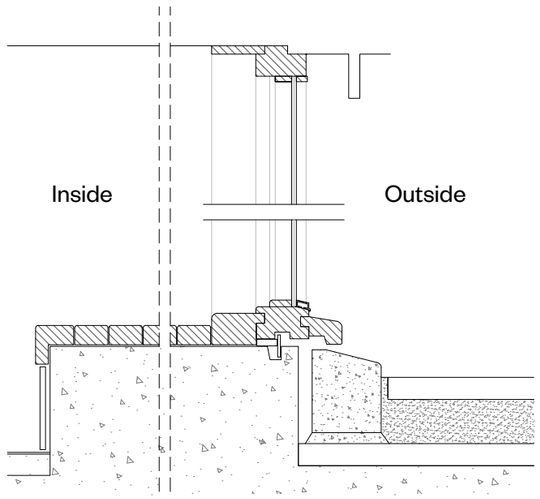
Plinth in living room of 46A pilot flat (B3 Flat Type) with integrated trench heater



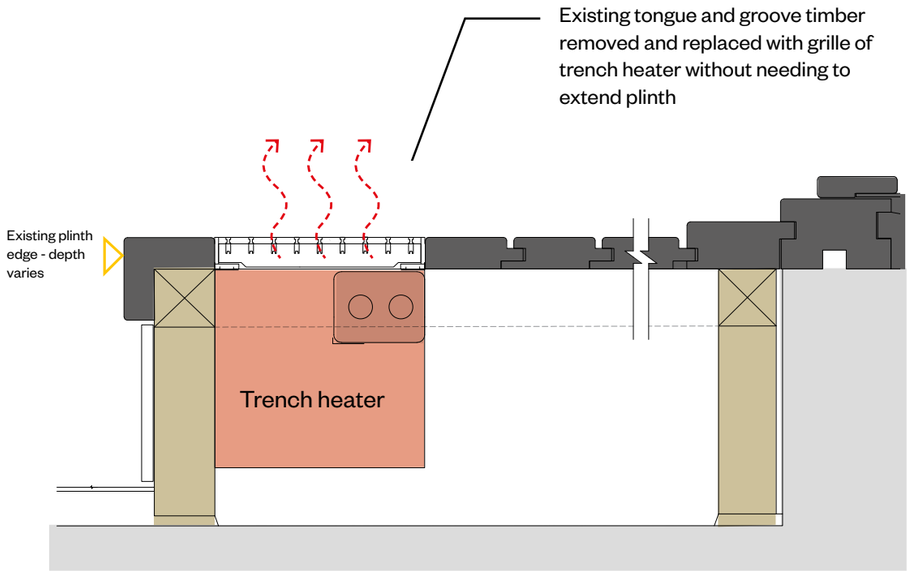
Plinth integrated heater with grille top and temperature control



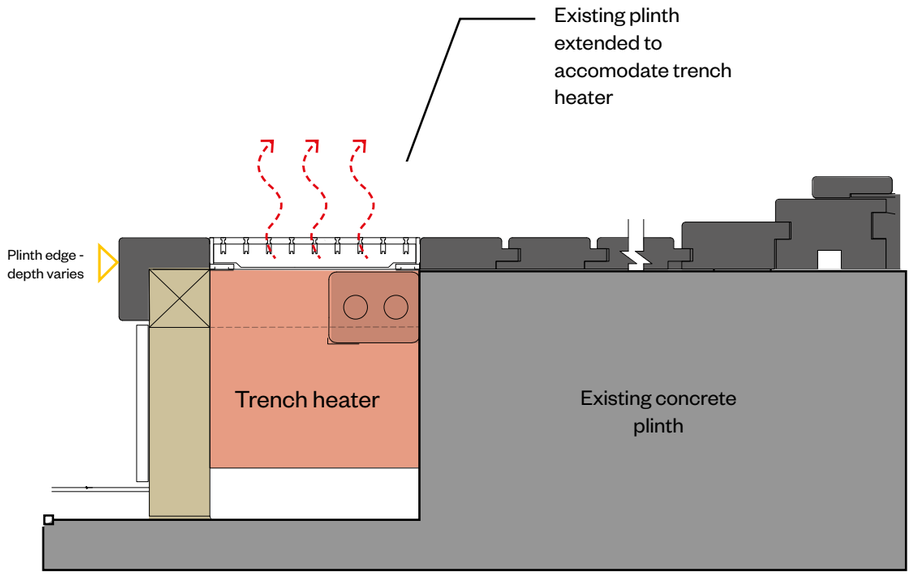
Blocks B and C plinth - existing



Block A plinth - existing



Example section detail through trench heater in plinth in Block B and C

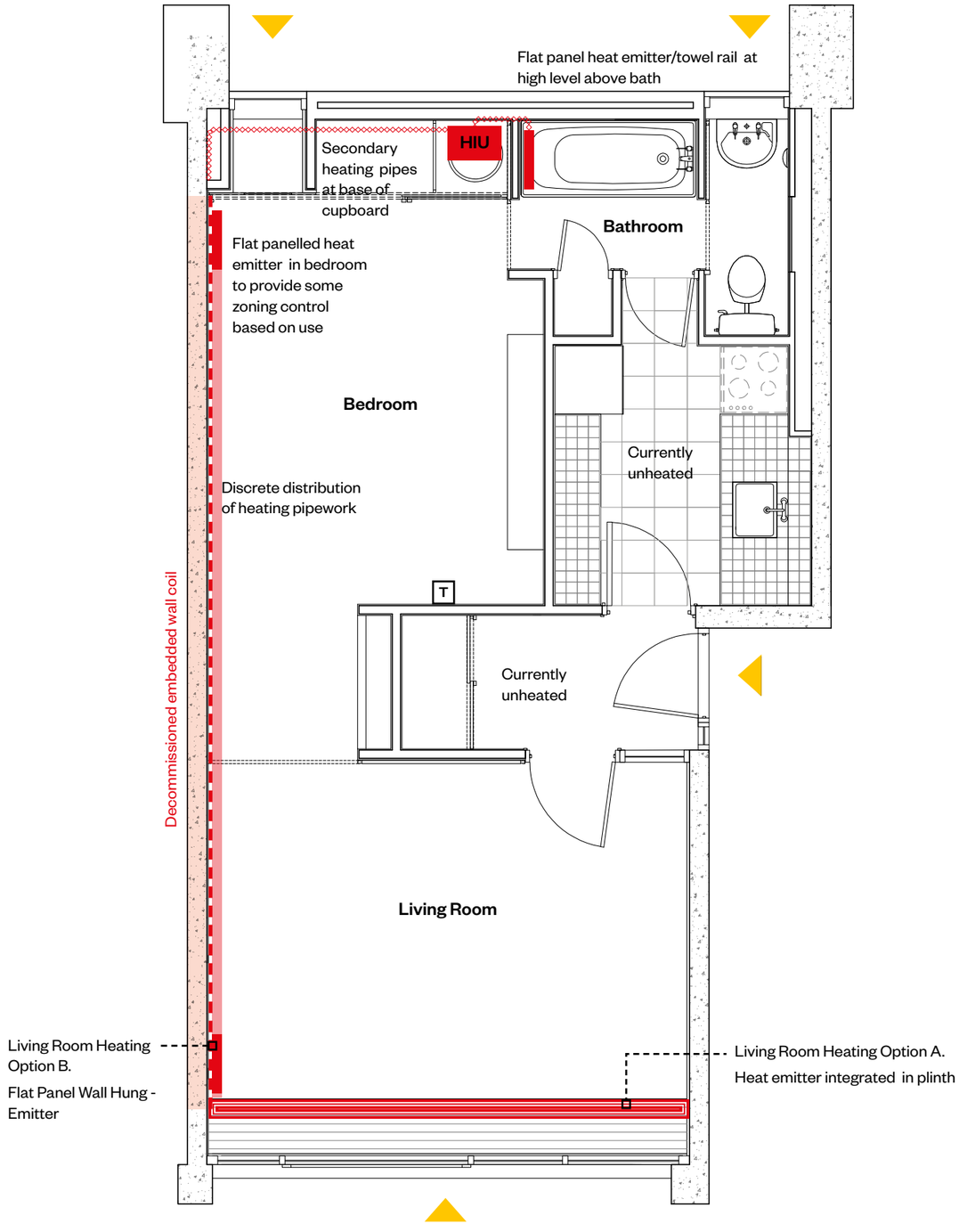


Example section detail through trench heater in plinth in Block A1 and A2 Flat

Note: Timber plinth will be extended to avoid breaking out of concrete plinth and noise disruption to residents and neighbours during installation.

6.0 Proposed works to Flats

Dwelling type A1



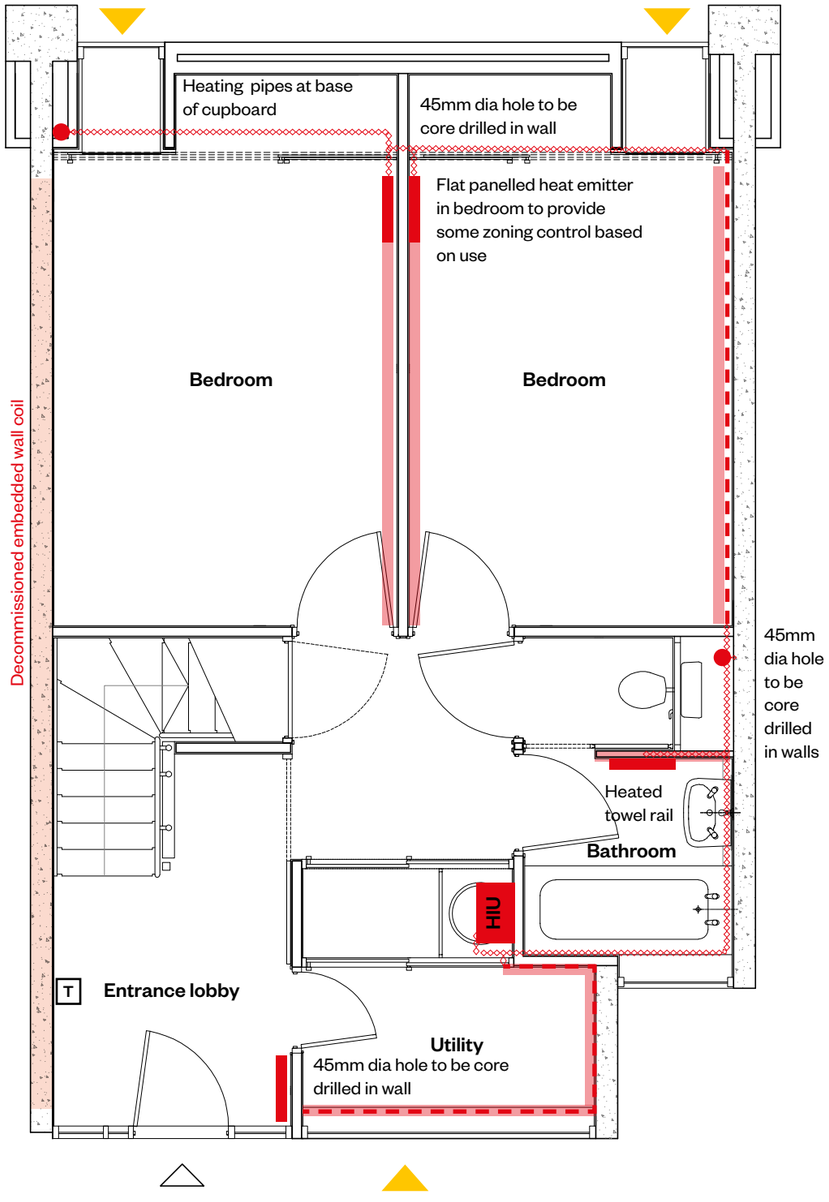
From the HIU, heating pipes will be hozirontally distributed underneath the base of the cupboard and concealed within the skirting boards. The pipes would then travel along the wall shared by the bedroom and living room. Along this wall, wall mounted emitters will be installed in the location chosen by the residents in the bedroom.

Residents will be given the option wether to have a trench heater which will require the plinth extended further into the living room space or to have a wall mounted radiator which would mean no further work to the plinth.

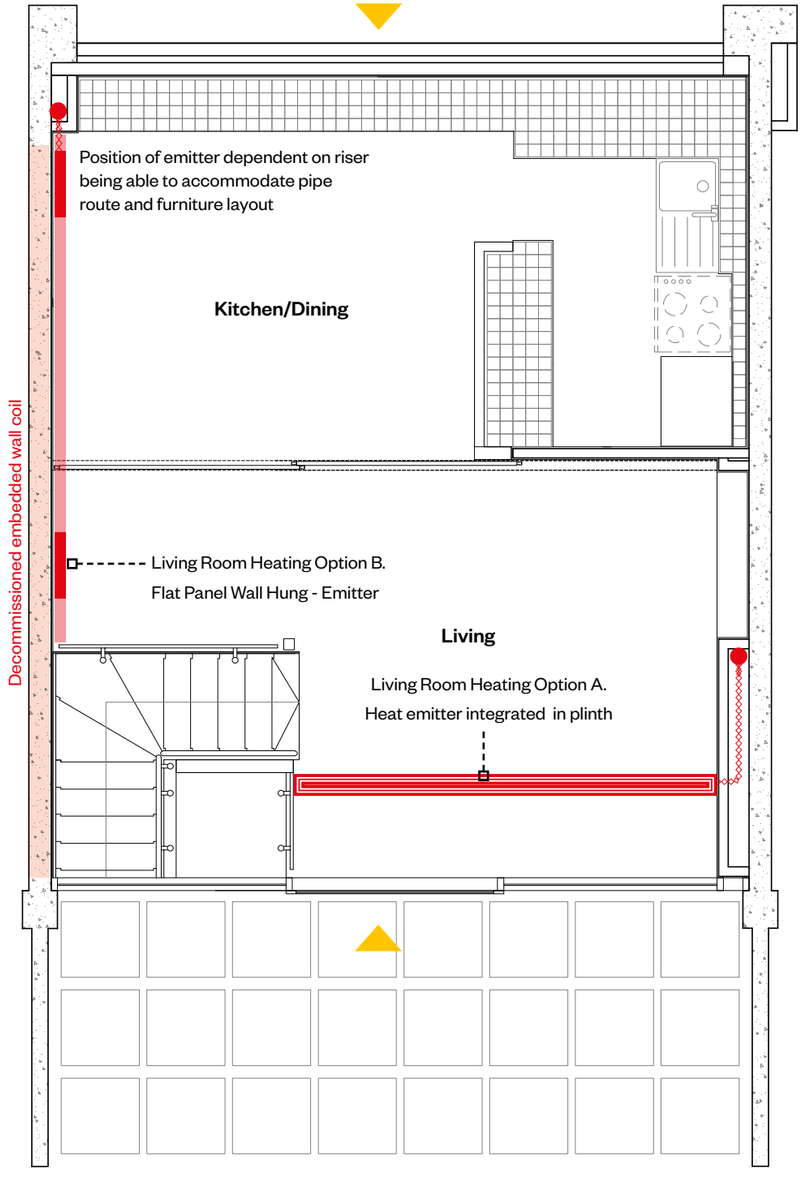
For the bathroom, heating will be provided by installing a small wall mounted emitter at high level above the bath

- Skirting board replaced
- Concealed uninsulated heating pipework in skirting
- Insulated pipework route (supply + return)
- Insulated pipework vertical riser (supply + return)
- T — Wireless wall mounted thermostat
- Plinth integrated heater with grille top and thermostatic radiator valve (TRV)
- Wall mounted flat panel emitter with TRV
- HIU — Heat Interface Unit
- Refer to Section 4.3 / page 32 for proposed works to windows

Dwelling type A2



Lower level



Upper Level

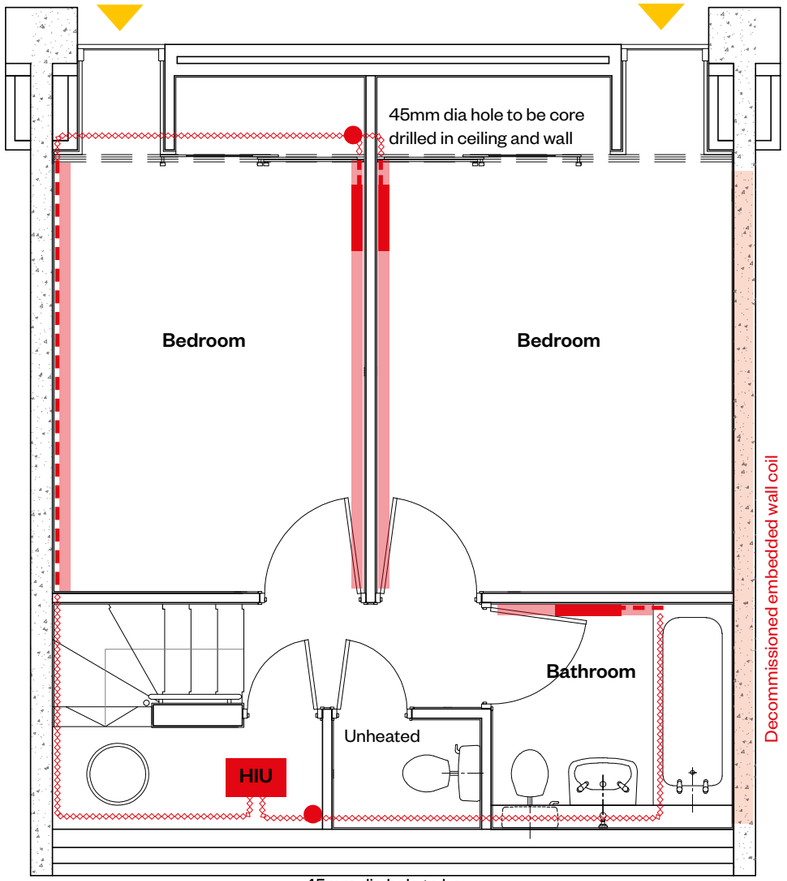
From the HIU, heating pies will be hozirontally distributed underneath the base of the cupboard and concealed within the skirting boards. The heating pipework will then be distributed along the lower level to service the emitters in the bedrooms, bathroom, and lobby.

Heating pipework will vertically travel through the existing risers into the upper level in order to provide heating to the kitchen/dining and living room.

Residents will be given the option wether to have a trench heater which will require the plinth extended further into the living room space or to have a wall mounted radiator which would mean no further work to the plinth.

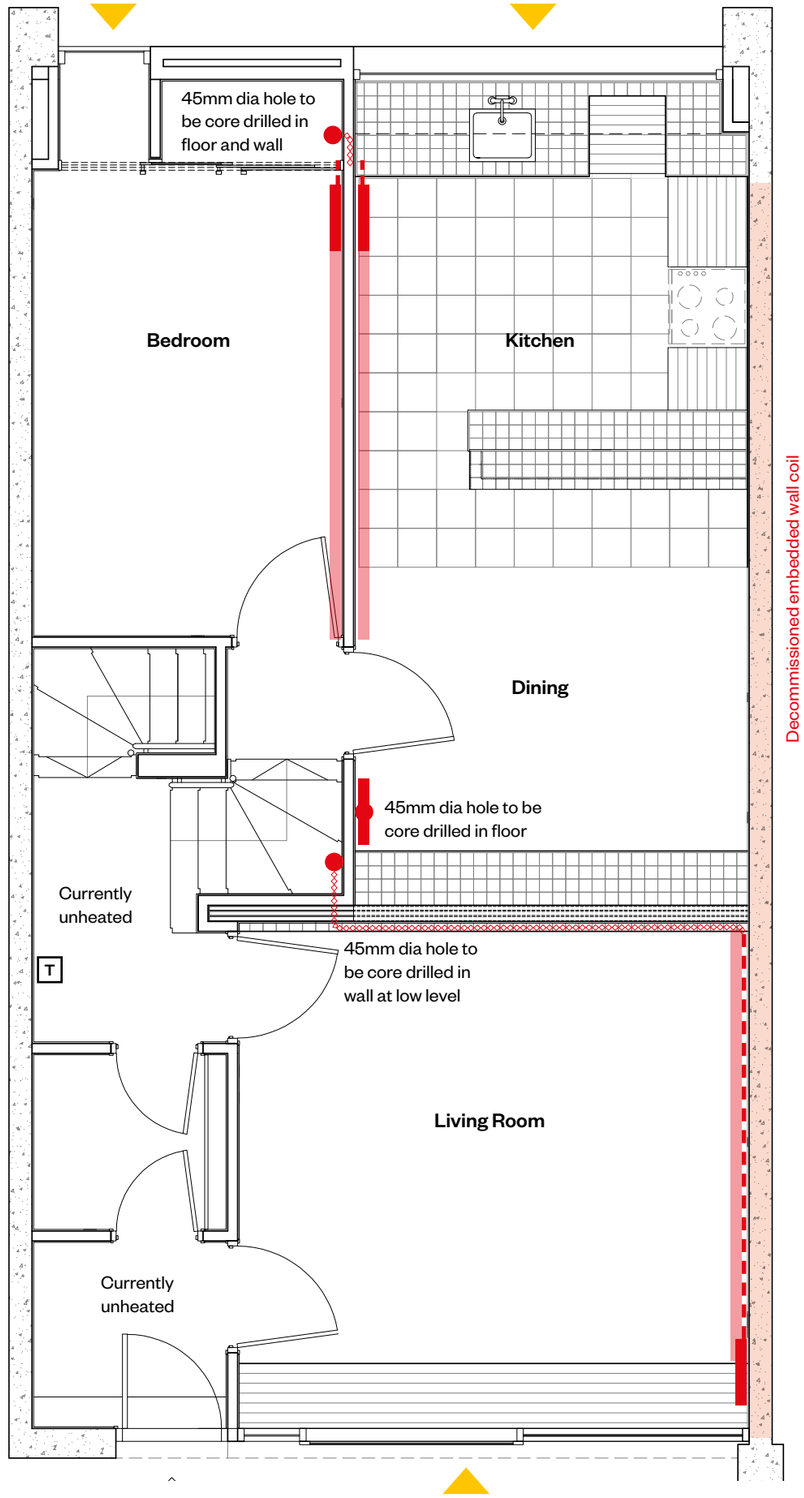
- Skirting board replaced
- Concealed uninsulated heating pipework in skirting
- Insulated pipework route (supply + return)
- Insulated pipework vertical riser (supply + return)
- T — Wireless wall mounted thermostat
- Plinth integrated heater with grille top and thermostatic radiator valve (TRV)
- Wall mounted flat panel emitter with TRV
- HIU — Heat Interface Unit
- Refer to Section 4.3 / page 33 for proposed works to windows

Dwelling type A3



45mm dia hole to be core drilled in wall and ceiling

Lower level



Upper Level

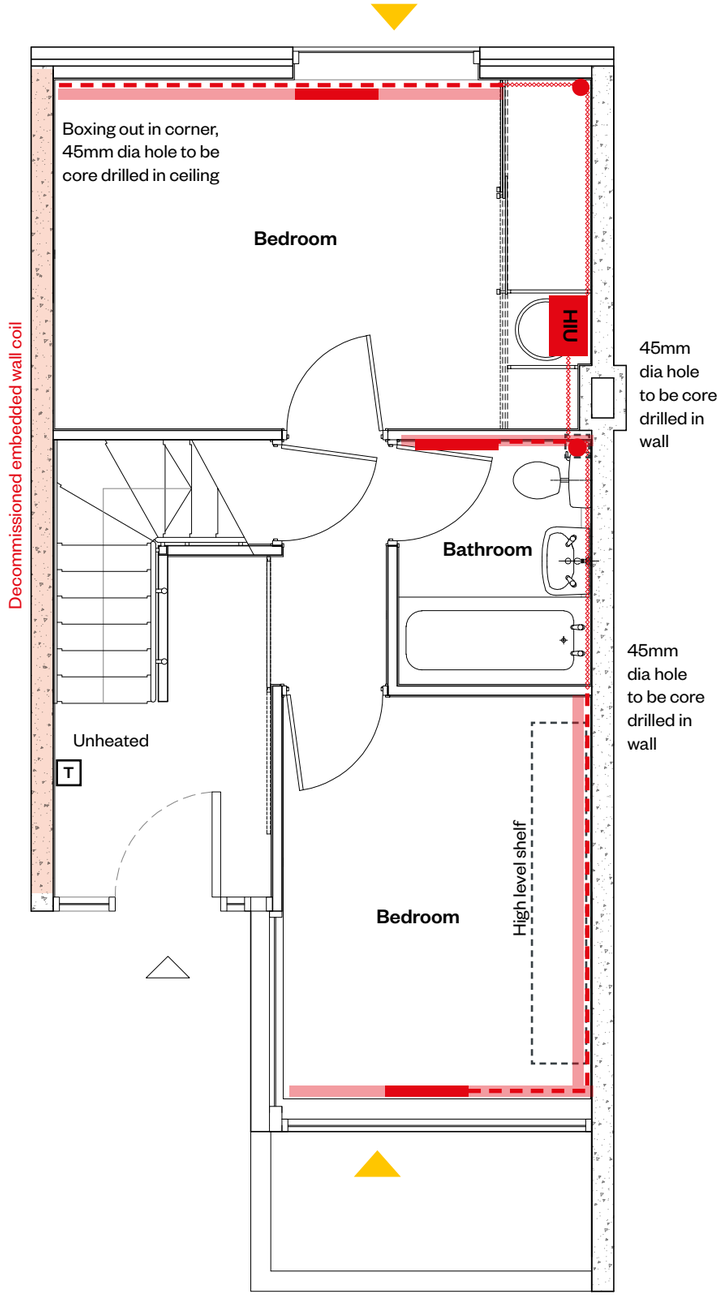
From the HIU, heating pipes will be horizontally distributed and concealed within skirting boards, cupboard plinths and behind bath panels into the specified emitter locations in the various rooms in the lower level.

The bedroom and kitchen in the upper floor level will be serviced through the heating pipework vertically travelling up from the cupboard location in the bedroom below. The dining room wall emitter will directly be connected to the HIU below through the pipework penetrating through the floor.

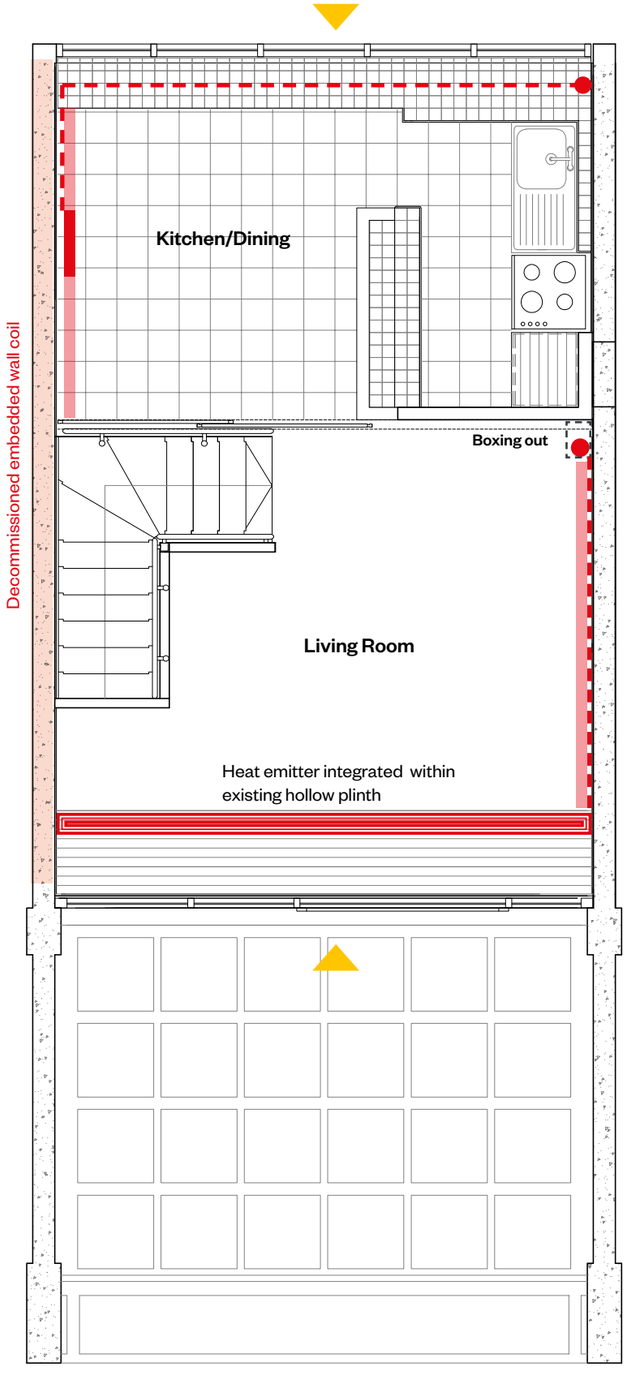
For the living room, the pipework would need to rise and horizontally penetrate through the partition wall and continue to be horizontally concealed behind plinths and skirting boards until it reaches the living room wall mounted emitter.

- Skirting board replaced
- Concealed uninsulated heating pipework in skirting
- Insulated pipework route (supply + return)
- Insulated pipework vertical riser (supply + return)
- T — Wireless wall mounted thermostat
- Plinth integrated heater with grille top and thermostatic radiator valve (TRV)
- Wall mounted flat panel emitter with TRV
- HIU — Heat Interface Unit
- Refer to Section 4.3 / page 34 for proposed works to windows

Dwelling type B2



Lower level



Upper Level

Boxing contains 2 x 15mm pipe with 22mm sleeve - this would require 45mm dia core drilled hole in slab. Potential to drill diagonally to reduce boxing out.

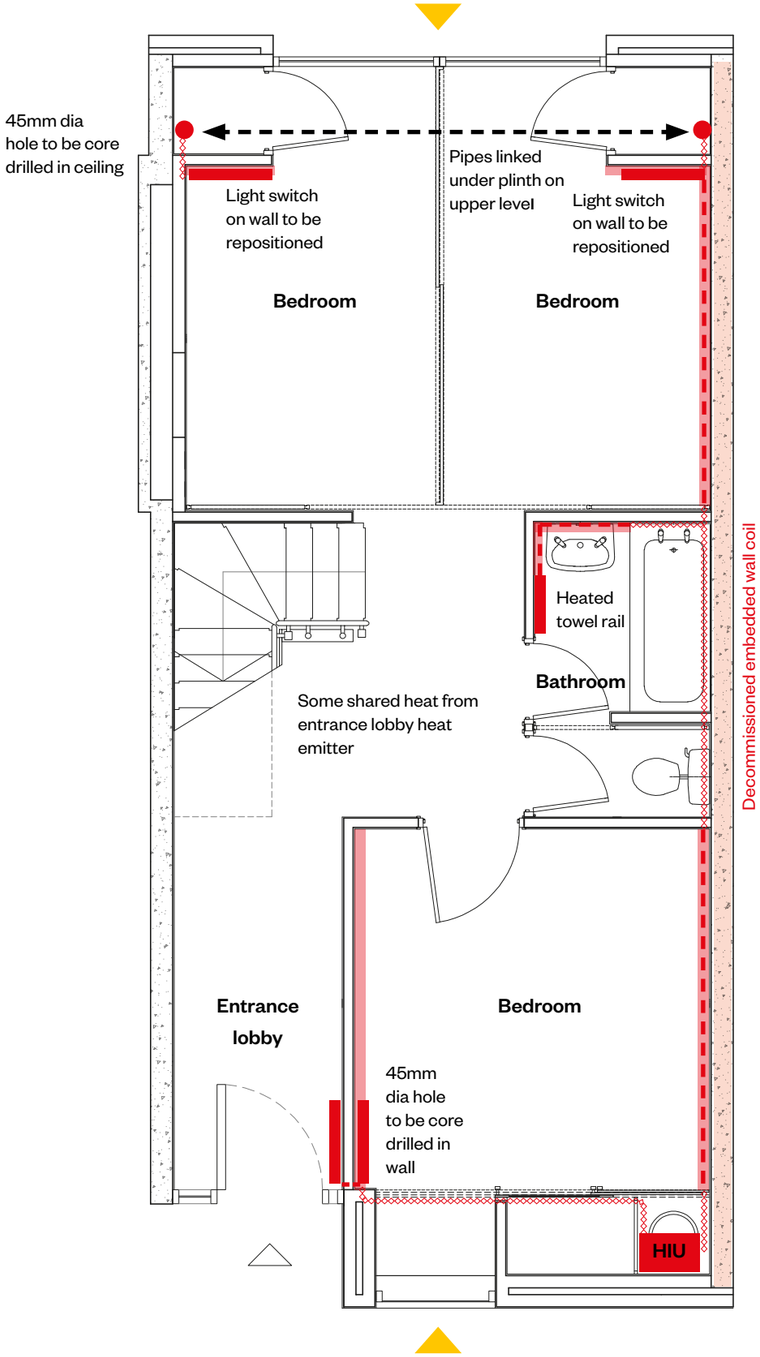
From the HIU, heating pies will be hozirontally distributed underneath the base of the cupboard and concealed within the skirting boards. The heating pipework will then be distributed along the lower level to service the emitters in the two bedrooms and bathroom.

The kitchen/ dining area in the upper floor level will be serviced through the heating pipework vertically travelling up from the cupboard location in the bedroom below and horizontally be distributed and concealed until it reaches the heating emitter.

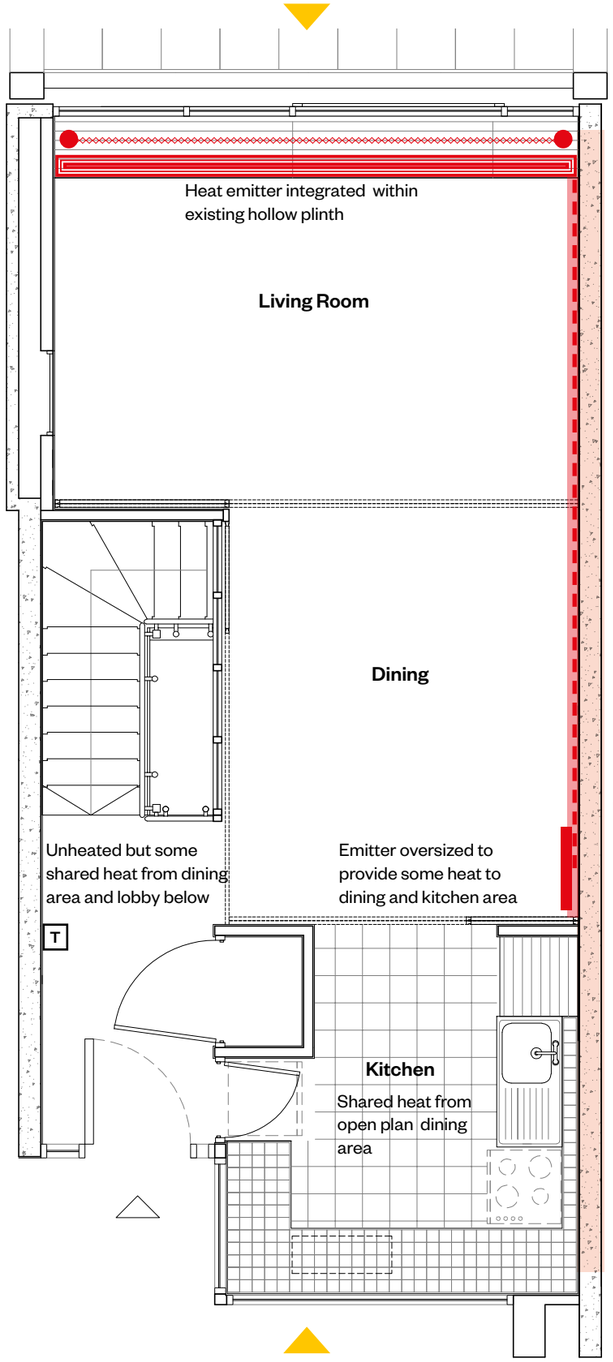
Heating pipes will also vertically rise up from the bathroom and into the living room before travelling across horizontally to reach the trench heater within the hollow plinth.

- Skirting board replaced
- Concealed uninsulated heating pipework in skirting
- Insulated pipework route (supply + return)
- Insulated pipework vertical riser (supply + return)
- T — Wireless wall mounted thermostat
- Plinth integrated heater with grille top and thermostatic radiator valve (TRV)
- Wall mounted flat panel emitter with TRV
- HIU — Heat Interface Unit
- Refer to Section 4.3 / page 35 for proposed works to windows

Dwelling type B3



Lower level



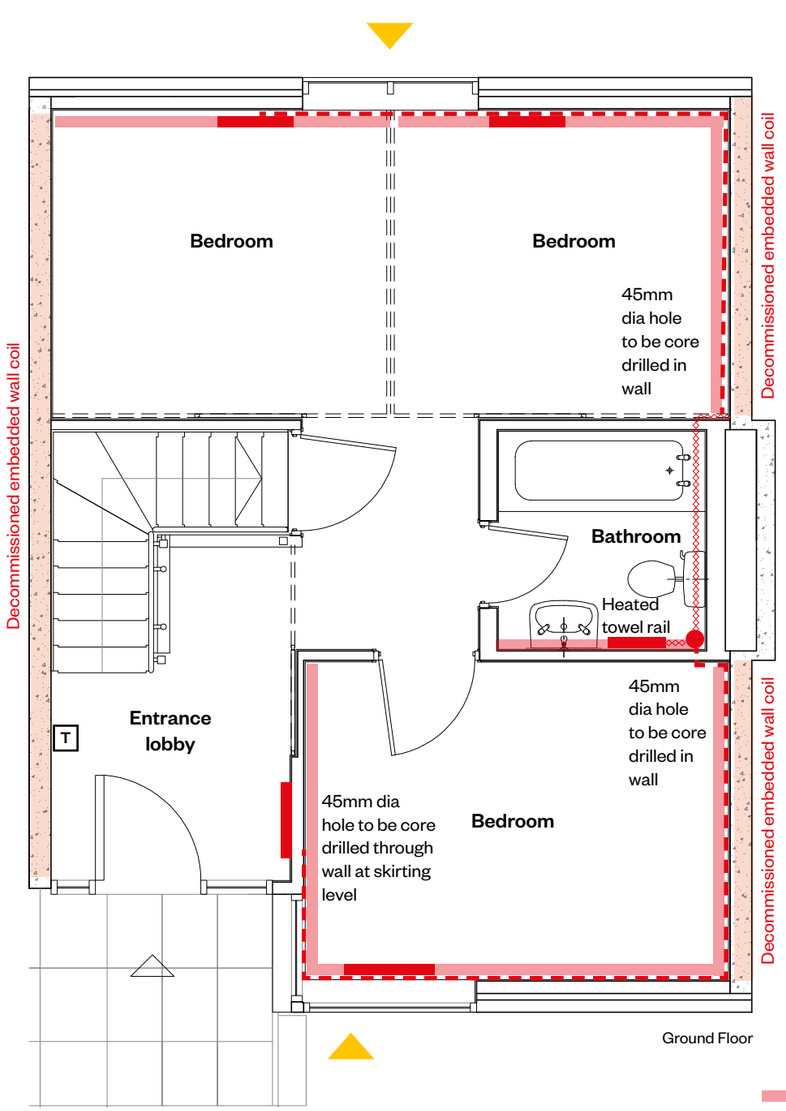
Upper Level

From the HIU, heating pipes will be horizontally distributed and concealed within skirting boards, cupboard plinths and behind bath panels into the specified emitter locations in the various rooms in the lower level.

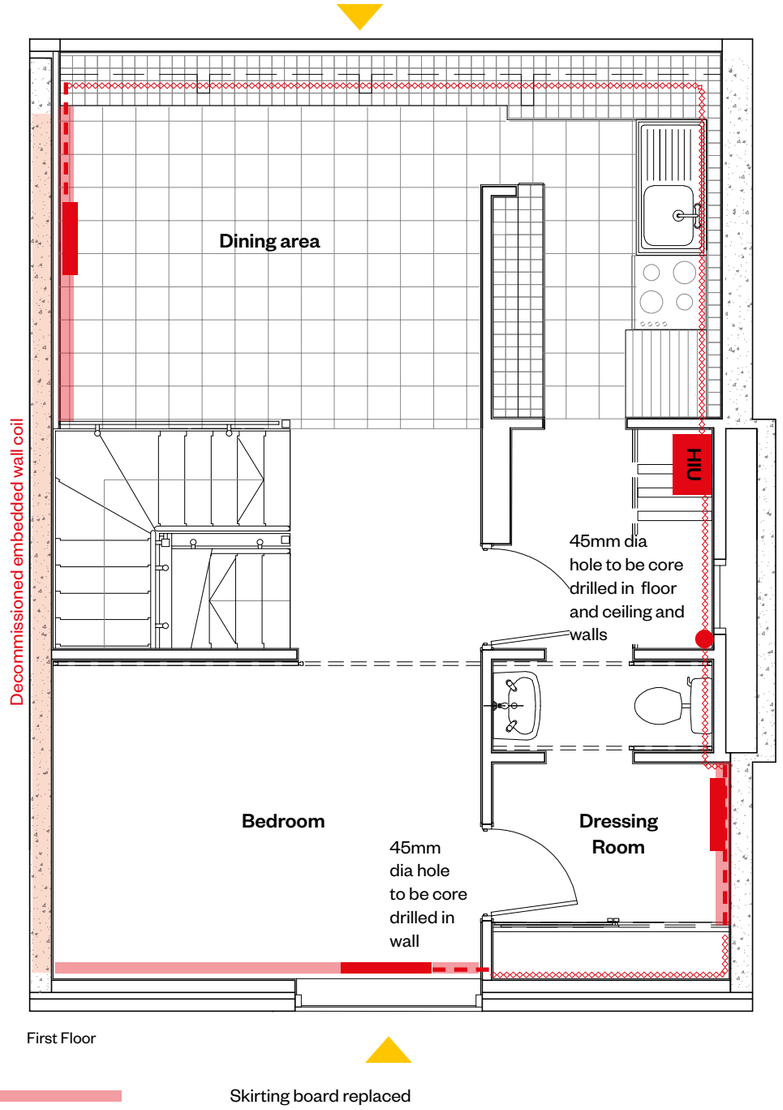
The living room and kitchen/dining in the upper floor level will be serviced through the heating pipework vertically travelling up from the cupboard location in the bedroom below into the living room plinth above where the trench heater will be installed. The heating pipes will then continue to be distributed behind skirting boards into the specified location in the dining room.

- Skirting board replaced
- Concealed uninsulated heating pipework in skirting
- Insulated pipework route (supply + return)
- Insulated pipework vertical riser (supply + return)
- T — Wireless wall mounted thermostat
- Plinth integrated heater with grille top and thermostatic radiator valve (TRV)
- Wall mounted flat panel emitter with TRV
- HIU — Heat Interface Unit
- Refer to Section 4.3 / page 36 for proposed works to windows

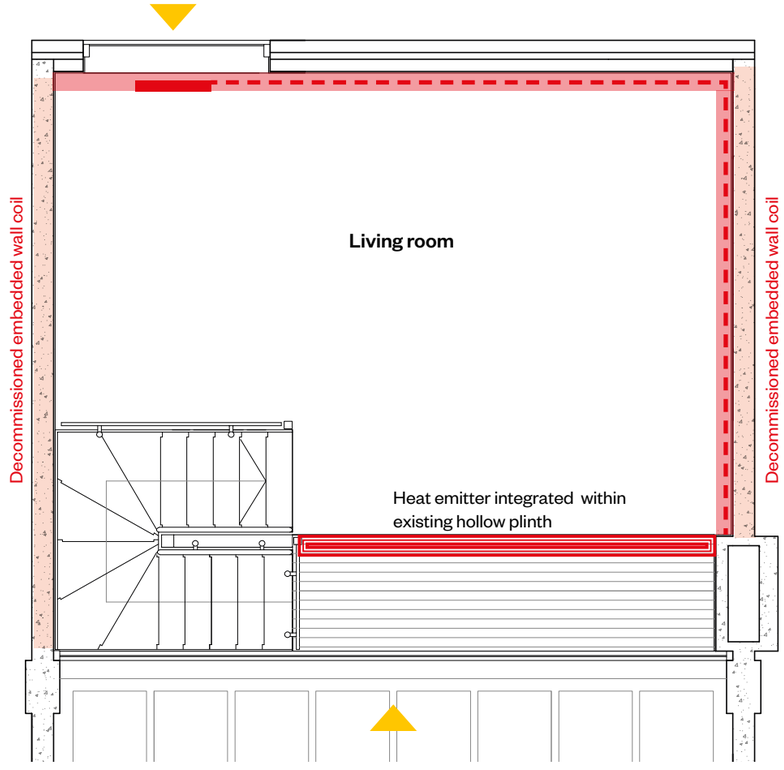
Dwelling type C4



Ground Floor



First Floor



Second Floor

Skirting board replaced

Concealed uninsulated heating pipework in skirting

Insulated pipework route (supply + return)

Insulated pipework vertical riser (supply + return)

T — Wireless wall mounted thermostat

Plinth integrated heater with grille top and thermostatic radiator valve (TRV)

HIU — Wall mounted flat panel emitter with TRV

Heat Interface Unit

Refer to Section 4.3 / page 37&38 for proposed works to windows

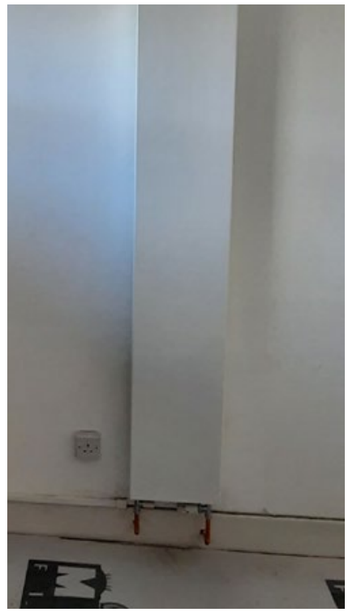
From the HIU, heating pipes will be horizontally distributed and concealed within skirting boards, cupboard plinths into the specified emitter locations in the first floor habitable rooms.

Pipes will travel vertically in the HIU cupboard into the living room above and the floor below. The heating pipes will directly enter the floor above in the plinth location where the trench heater will be installed. Pipes will also be horizontally distributed around the living room to service another heating emitter where one of the window openings is located.

The heating pipes from the first floor will enter the ground floor below from the HIU cupboard and into the bathroom below. The heating pipes will be concealed and distributed around the ground floor into the specified emitter locations in the bedrooms, bathroom, and lobby.

7.0 Pilot Flats

26A (A3 Pilot Flat)



As part of the development and learning process, two flats have been chosen to become pilot flats to test the heating option chosen before proceeding any work to the rest of the estate. Over a 10 week period, 26A (A3 Flat Type) and 46A (B3 Flat Type) had refurbishment works including heating improvement and replacing the single glazing to triple glazed windows.

To provide better comparison and assess the heating emitters proposed, 26A was also fitted out with the Stelrad heating emitters and 46A with the Zehnder-radia panels.

The installation of the concealed pipes and skirting boards in 26A was generally succesful. Heating pipes were broadly concealed throughout the habitable rooms as intended and were only visible when they rise out of the skirting board to connect to the heating emitters.

The only other location where the heating pipes are exposed in 26A is in the lower ground floor WC whereby the heating pipes cannot be concealed at skirting level due to clashes with the WC drainage pipes.

It was originally intended for the flats in Block A to receive a trench heater.This requires breaking out a section of the concrete plinth in the living room in order to accomodate the trench heater. Although, a trench heater was installed in the pilot flat 26A, this process was too disruptive even in an unoccupied flat due to the noise disruption and dust it created from breaking out of the concrete.

Moving forward, it is then proposed that a wall emitter is installed in place of a trench heater in the A3 flats living room as it is not possible to extend the plinth to fit a trench heater due to a clash with an existing door. Residents in type A1 and A2 flats will be given the option to extend the plinths or to have a wall mounted emitter.

Acoustic tests were carried out on the 26th of July 2022 in the pilot flat to assess the noise produced by the HIU at full duty. The results from the tests were that the HIU were quiet. More detailed information can be found on the acoustic report which forms part of the submission.

46A (B3 Pilot Flat)

Like 26A, The installation of the concealed pipes and skirting boards in 46A was generally succesful. Heating pipes were generally concealed throughout the habitable rooms as intended.

As the existing living room plinth in 46A and Block B is made out of timber, the process of modifying the plinths to install a trench heater has been more straightforward and succesful.

Acoustic tests were carried out on the 26th of July 2022 in the pilot flat to assess the noise produced by the HIU at full duty. The results from the tests were that the HIU were quiet. More detailed information can be found on the acoustic report which forms part of the submission.

8.0 CONSULTATION

Public Consultations

The works within the two pilot works were undertaken in two stages. In the first stage (completed August 2021), the refurbishment and re-glazing of the fenestration was completed. In the second stage (completed June 2022), the heating systems were installed, along with the completion of “Better Homes” upgrades in flat 46a (these works were already complete in the other pilot flat).

Following the completion of the upgrades to windows, viewings were held on the 9th August 2021 to present the window improvements to the pilot flats to the Tenants and Residents Association (TRA).

Their feedback on the work was positive, and the TRA were generally happy with the quality of the work and the improved thermal and acoustic performance to the windows.

Once the pilot flats were completed, further viewings to show the completed pilot flats to residents were held on June 16th 2022 with the TRA and during the week of 4th - 9th July 2022 with viewings open to all residents. The feedback from these viewings and the accompanying questionnaire results was also broadly positive, although more mixed than for the windows upgrades.

Positive feedback was received regarding the improvements to the windows and the ability to receive unlimited hot water on demand. The new heating system which lets residents set different temperatures in different rooms in their homes was also well received. This is in contrast to the negative feedback that the majority of residents had over the current heating system, and in particular the current lack of control on temperature and the timing in which the existing heating system turns on and off.

More critical feedback was made by some residents regarding the space that could be lost to radiators and the possible disruption to residents during the construction works. There were also some suggestions for heated towel rails in bathrooms in place for the two emitter options currently proposed.

Some residents raised concerns that these proposals do not maintain the existing heating system and do not include additional wall insulation. However, as detailed in sections 3 and 4 of this report, and also in the accompanying Zero Carbon report, it is not practical to connect new pipework to the existing coils in the structural walls, and insulation cannot be provided without affecting the appearance of the buildings, which is not acceptable within the heritage constraints.

9.0 Appendix

9.1 Heating Infastructure route to HIU

The following pages illustrate the route of the heating mains and cold water supply from the external of the building into the HIU in each dwelling type.

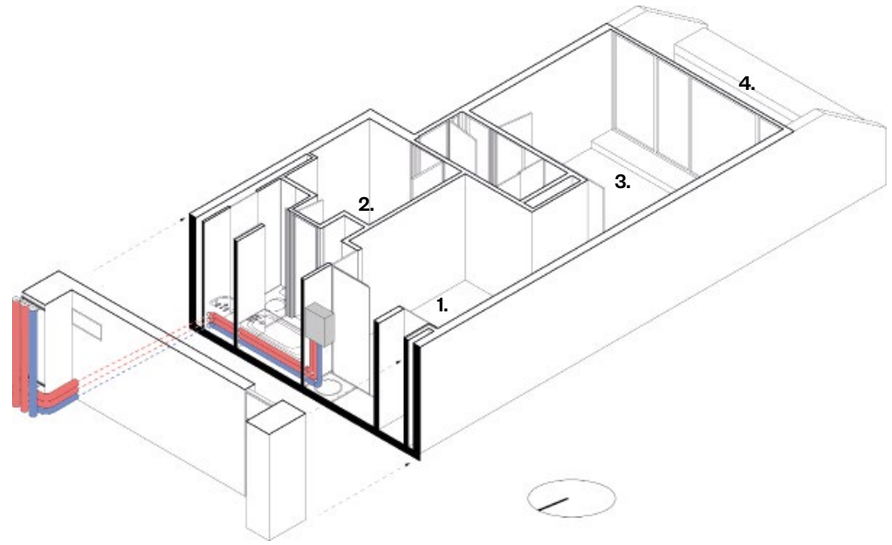
For more detailed information on the heating infrastructure route from the boiler room to dwellings refer to the Alexandra Road Heating Infrastructure Design Access Statement which forms part of a separate planning and listed building applications.

Block A -
Dwelling Type A1

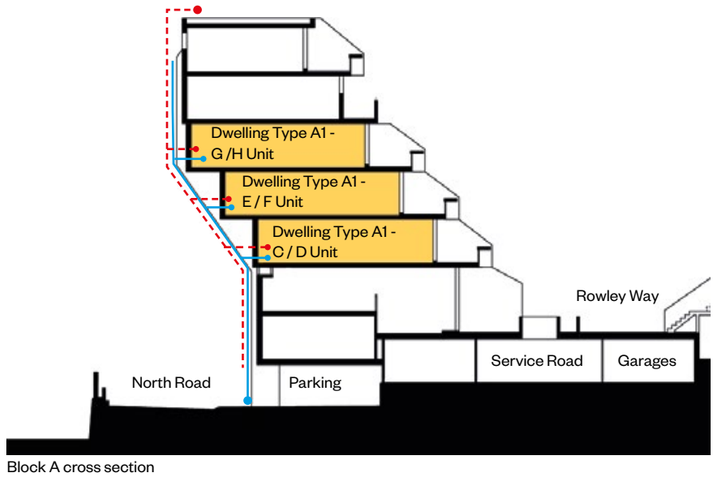
The heating infrastructure accesses the A1 dwelling type on block A via core drilled holes in the northern facade. The proposed pipes come into the dwelling underneath the sink in the toilet area, then passing underneath the bath, which has the least visible intrusion internally. The HIU is kept in the cupboard where the existing gas cylinder is currently stored.

Homes which currently have individual heating systems will be reconnected to the communal network heating as part of these works.

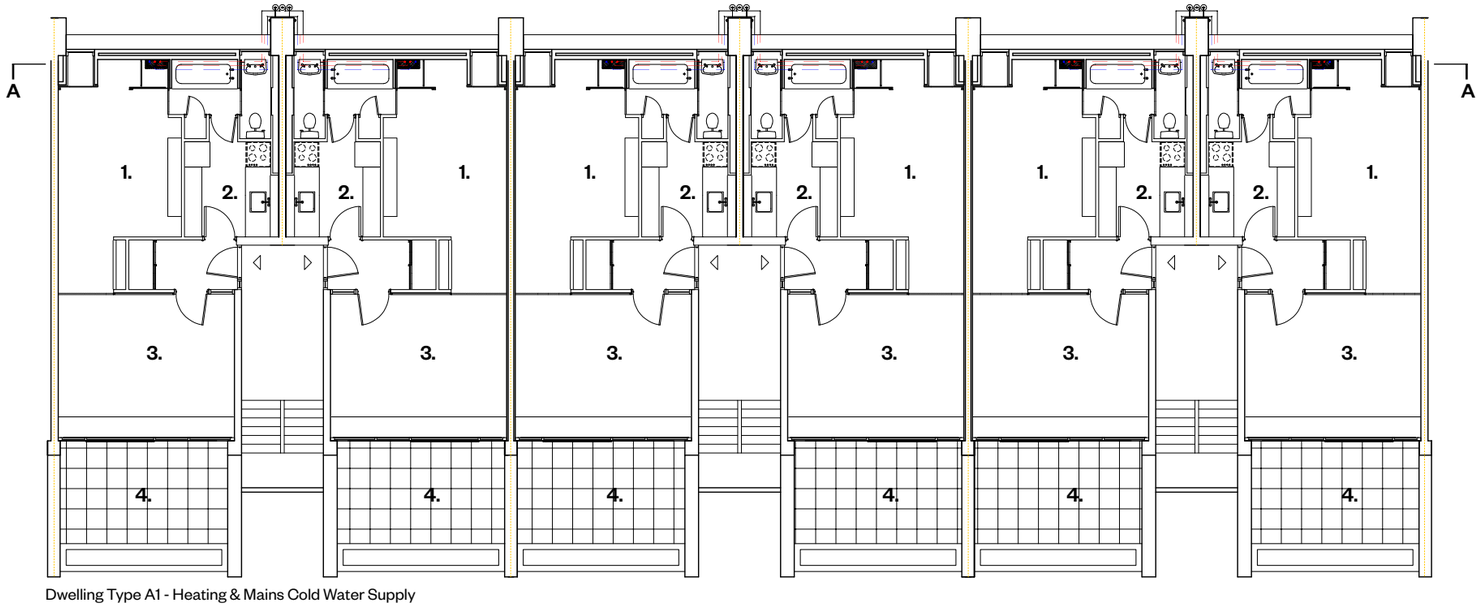
Risers which currently connect dwellings will be fire stopped as part of these works.



Dwelling Type A1 - 3D sectional View A



Block A cross section



Dwelling Type A1 - Heating & Mains Cold Water Supply

1. Bedroom
2. Kitchen
3. Living room
4. External terrace

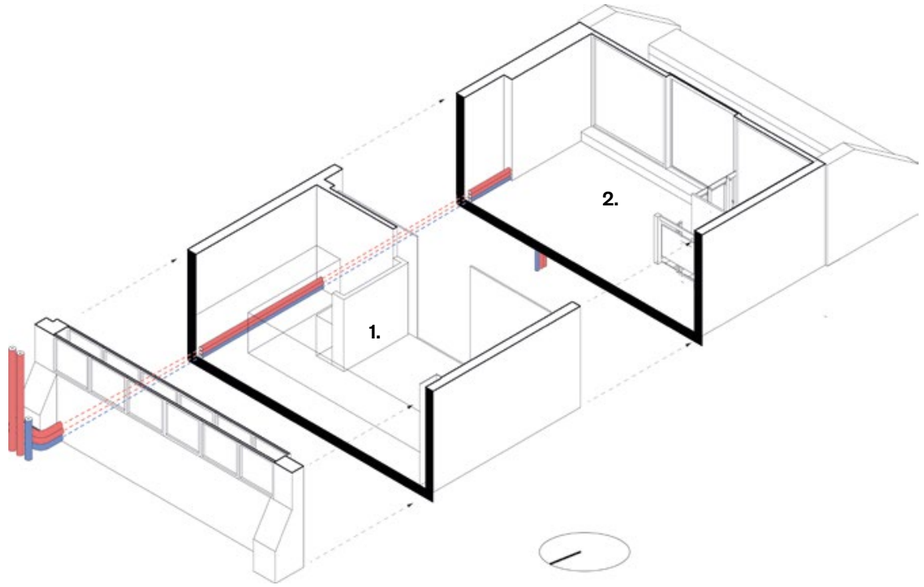
Heat interface unit
Mains cold water supply
Heating pipes
Party Wall

Block A - Dwelling Type A2

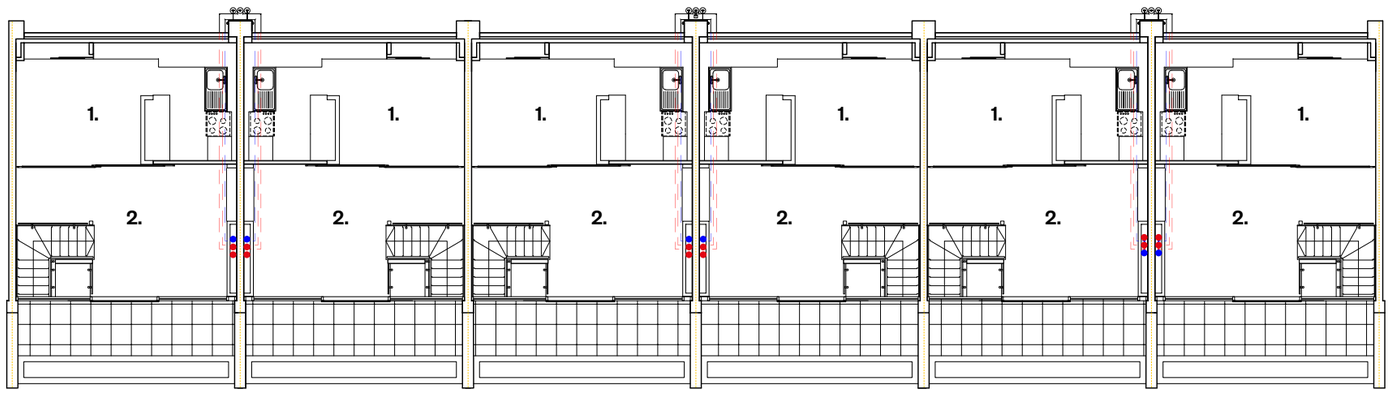
The heating infrastructure accesses the A2 dwelling type on block A via core drilled holes in the northern facade. The proposed pipes come into the dwelling on the upper floor and are hidden by the kitchen base units, then passing through the internal partition and into the existing riser.

Homes which currently have individual heating systems will be reconnected to the communal network heating as part of these works.

Risers which currently connect dwellings will be fire stopped as part of these works.



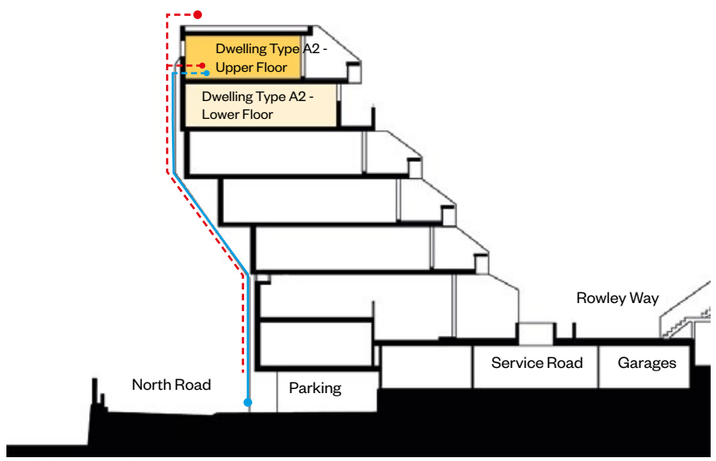
Dwelling Type A2 upper plan - 3D sectional View



Dwelling Type A2 - Heating & Mains Cold Water Supply - Upper Floor

Heat interface unit
Mains cold water supply
Heating pipes
Party Wall

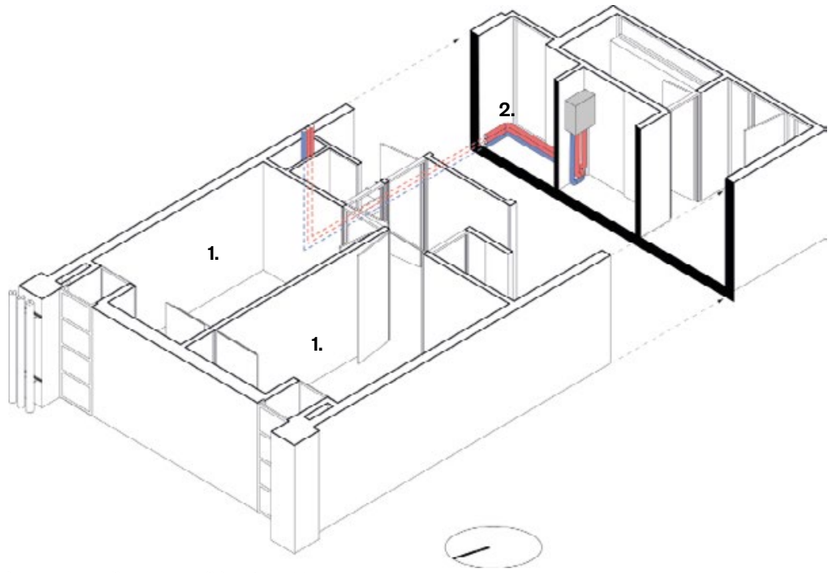
1. Kitchen
2. Living room



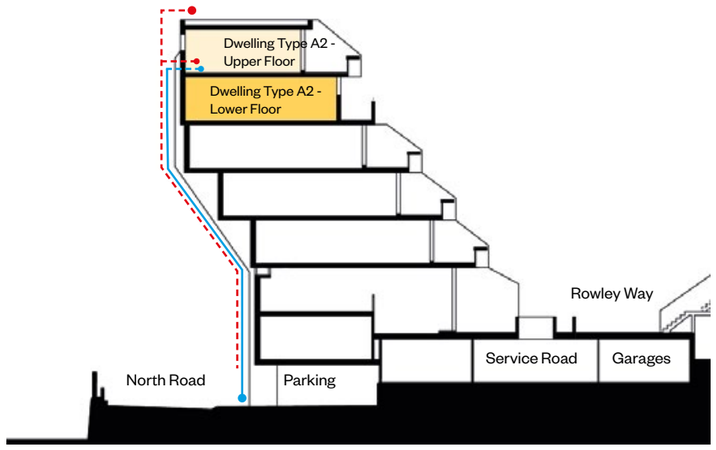
Block A cross section

Block A -
Dwelling Type A2

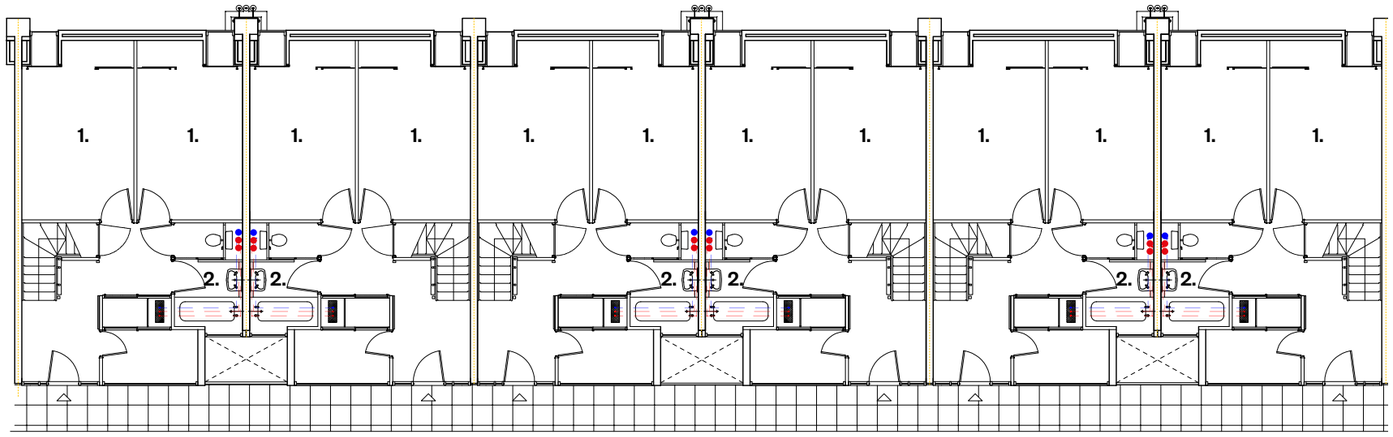
Having passed through the existing riser from the upper floor, the proposed pipes then pass through the bathroom, underneath the existing bath and into the HIU, located in the cupboard with the existing hot water cylinder.



Dwelling Type A2 lower plan - 3D sectional View



Block A cross section



Dwelling Type A2 - Lower Plan

1. Bedroom
2. Bathroom

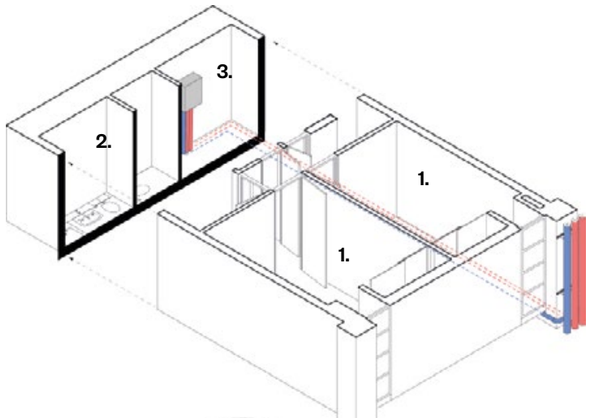
Heat interface unit
Mains cold water supply
Heating pipes
Party Wall

Block A - Dwelling Type A3

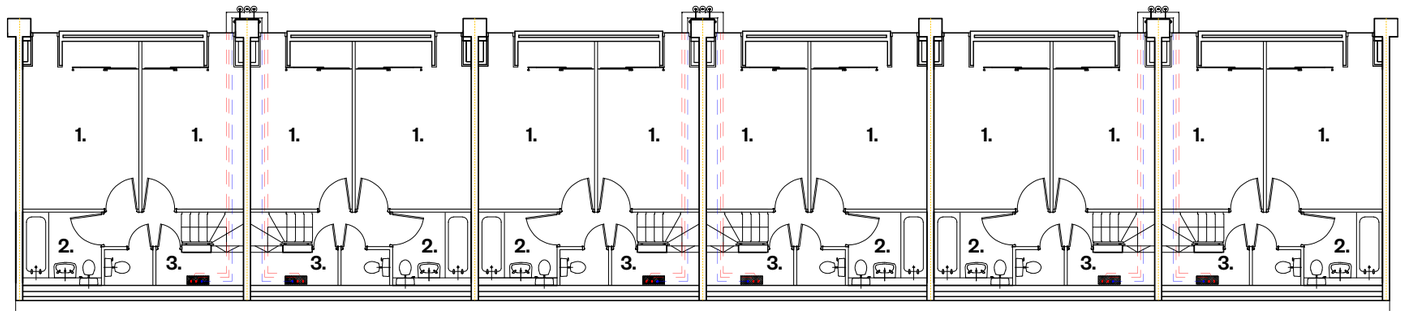
The heating pipes for dwelling type A3 are fixed to the car park soffit and run to the centre of the dwelling, where they come up through the floor and into the cupboard located beneath the internal stairs, where the HIU is located.

Homes which currently have individual heating systems will be reconnected to the communal network heating as part of these works.

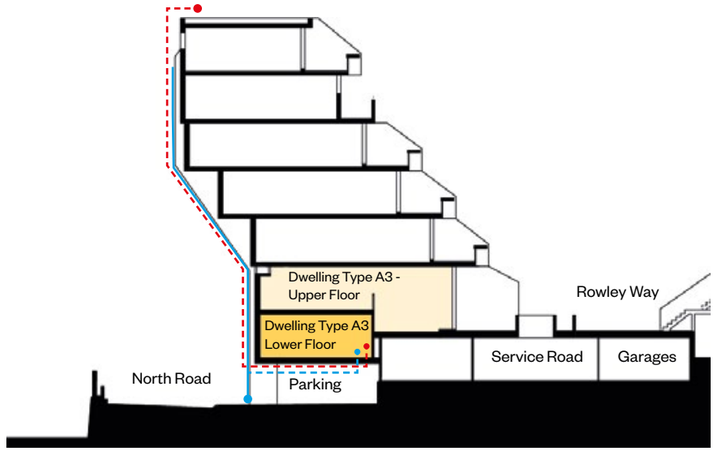
Risers which currently connect dwellings will be fire stopped as part of these works.



Dwelling Type A3 lower plan - 3D sectional View



Dwelling Type A3 - Lower Plan



Block A cross section

Heat interface unit
Mains cold water supply
Heating pipes
Party Wall

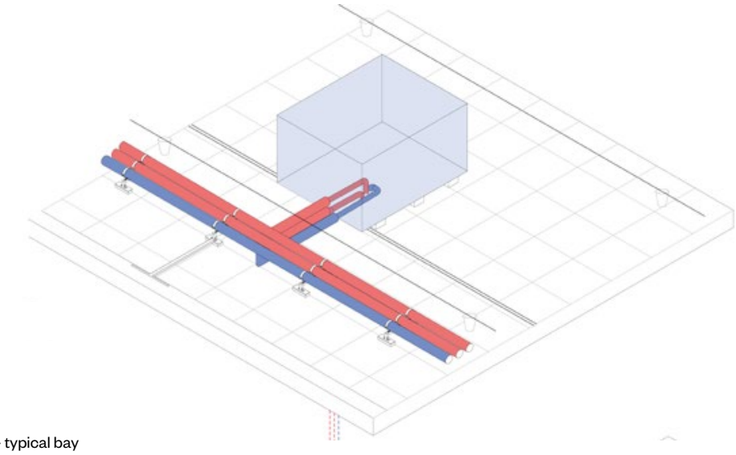
1. Bedroom
2. Bathroom
3. Cupboard (underneath stairs)

Block B -
Dwelling Type B2

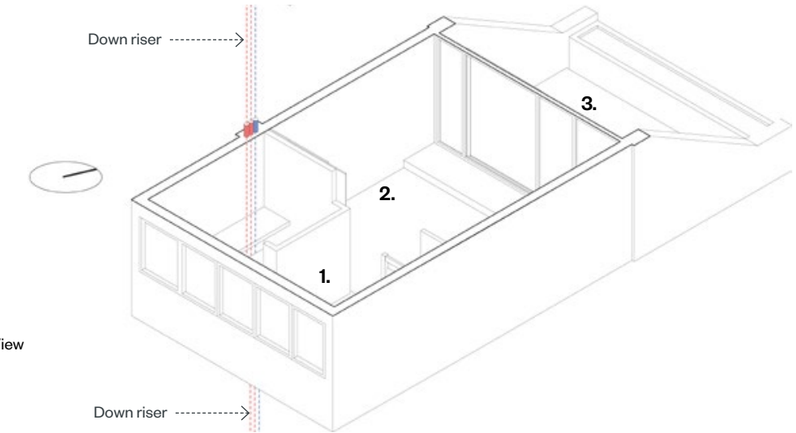
Dwelling type B2's proposed heating pipes and mains cold water come through the existing water tank on the roof of block B and down through the existing riser on the upper floor.

Homes which currently have individual heating systems will be reconnected to the communal network heating as part of these works.

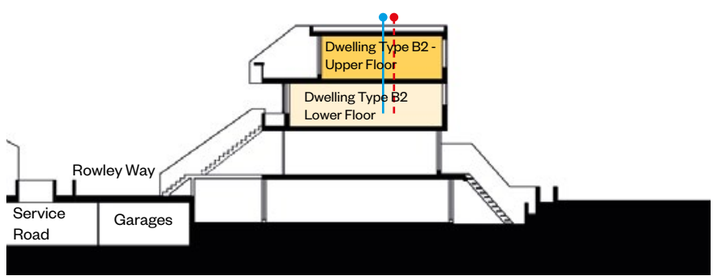
Risers which currently connect dwellings will be fire stopped as part of these works.



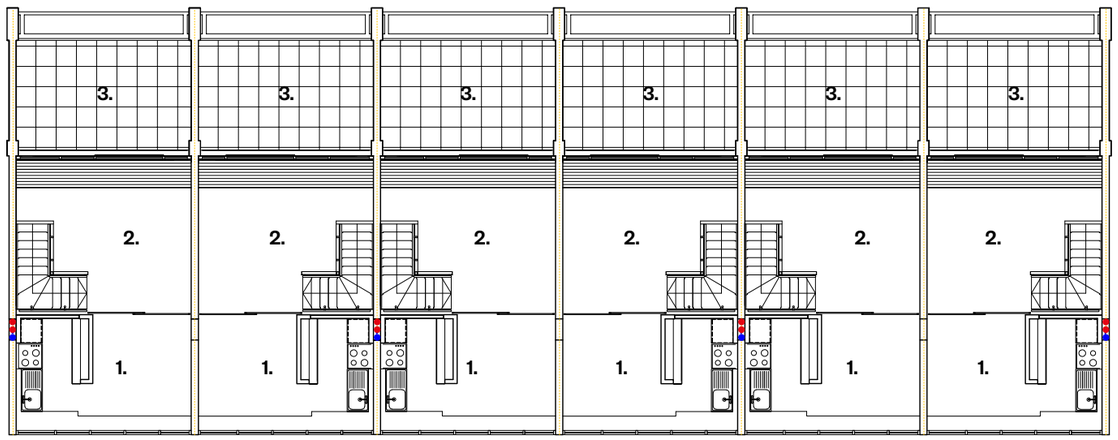
Block B 3D view of roof - typical bay



Dwelling Type B2 upper plan- 3D View



Block B cross section



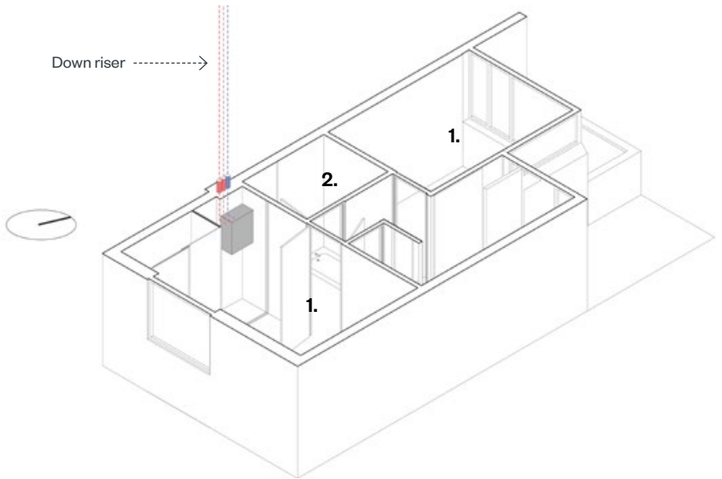
Dwelling Type B2 - Upper Plan

1. Kitchen
2. Living room
3. Terrace

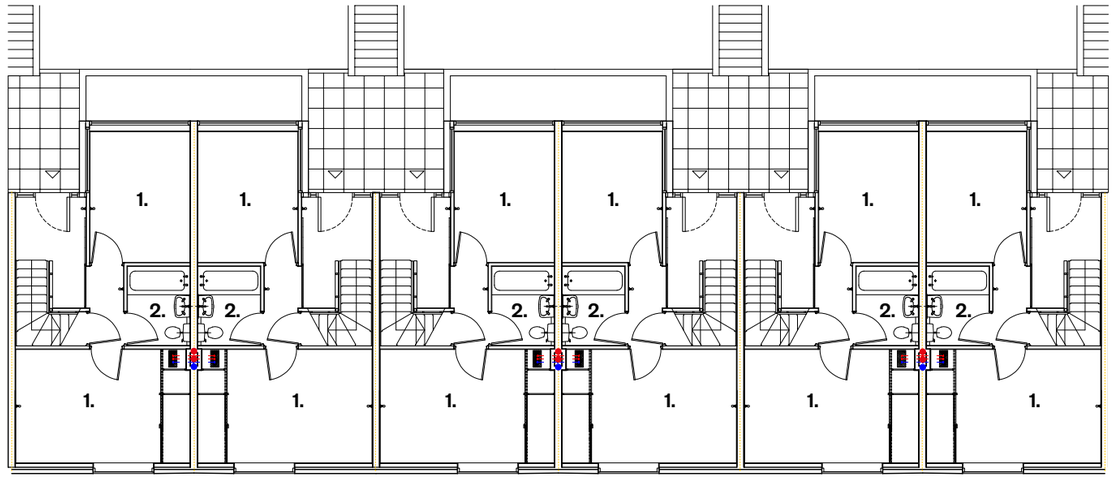
Heating pipes
Mains cold water
Party Wall

Block B - Dwelling Type B2

The proposed heating and cold water pipes are fed through the riser from roof level and directly access the Heat Interface Unit in the cupboard on the lower floor.



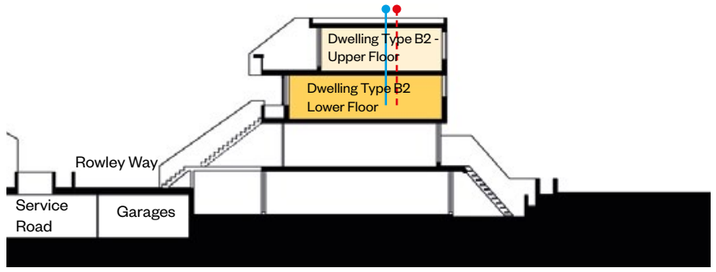
Dwelling Type B2 lower plan- 3D View



Dwelling Type B2 - Lower Plan

1. Bedroom
2. Bathroom

Heat interface unit
Mains cold water
Heating pipes
Party Wall



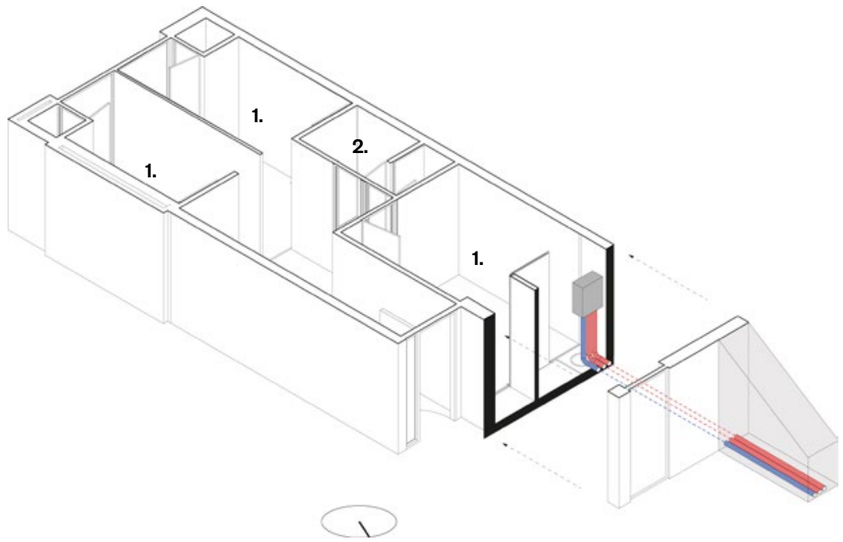
Block B cross section

Block B -
Dwelling Type B3

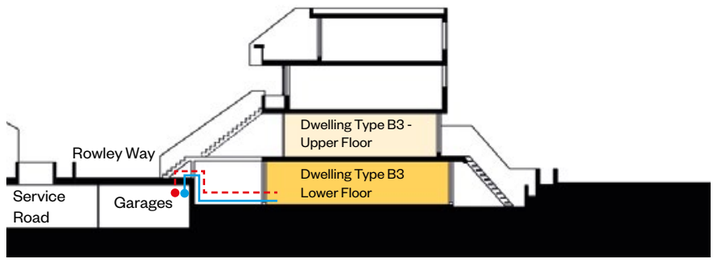
Dwelling type B3's proposed heating and cold water pipes pass through the void below the stairs into dwelling type B2 above. The Heat Interface Unit is then directly located where the existing hot water supply cylinder is located, and served by the new incoming heating and Main Cold Water Supply.

Homes which currently have individual heating systems will be reconnected to the communal network heating as part of these works.

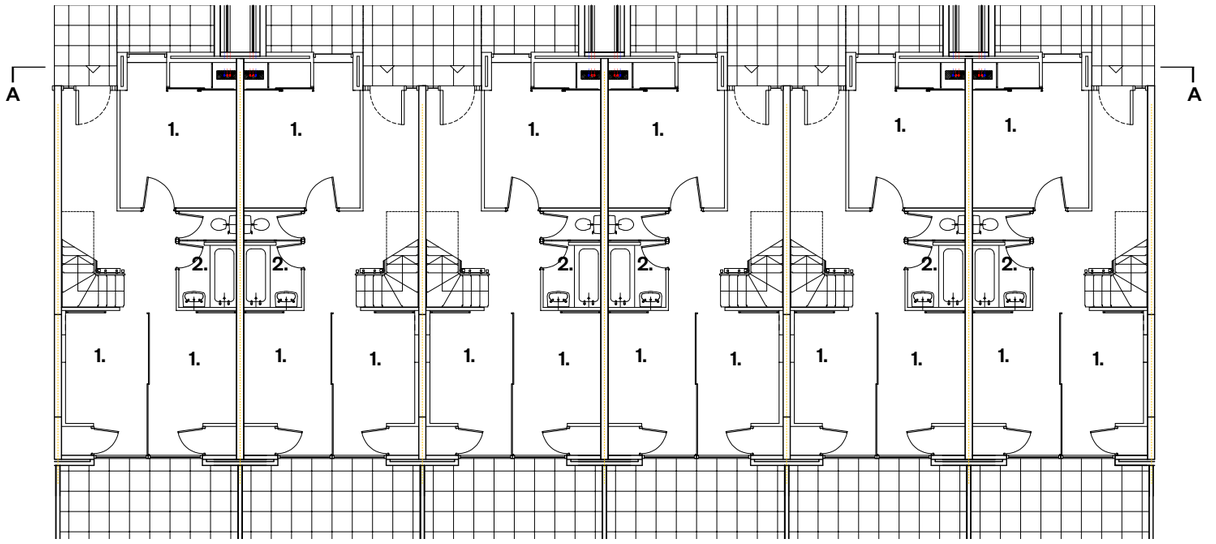
Risers which currently connect dwellings will be fire stopped as part of these works.



Dwelling Type B3 lower plan- 3D Sectional View A



Block B cross section

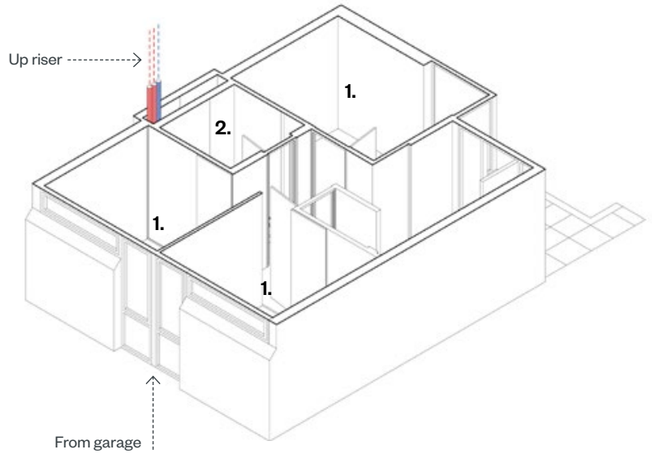


Dwelling Type B3 - Lower Plan

1. Bedroom
2. Bathroom

Heat interface unit
Mains cold water supply
Heating pipes
Party Wall

Block C
Dwelling Type C4

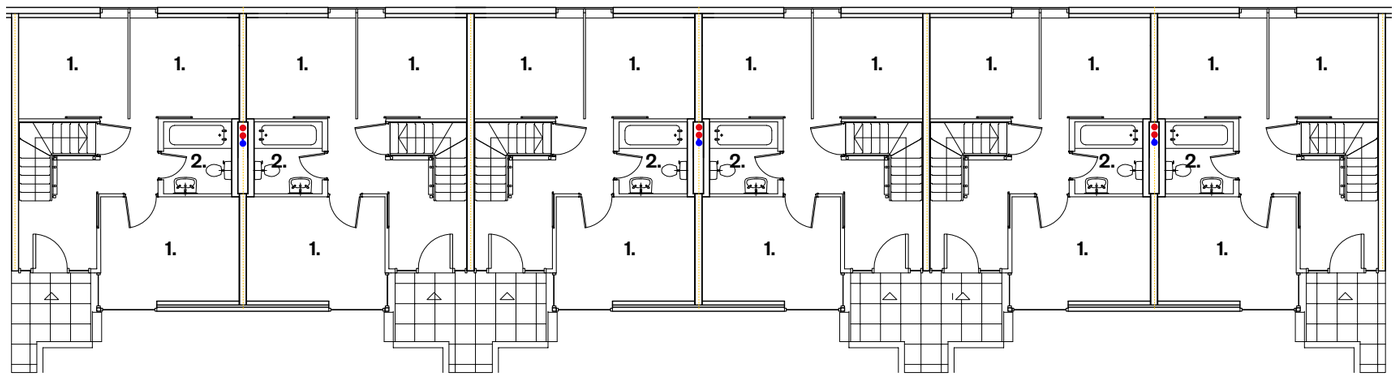


Dwelling Type C4 lower plan- 3D View

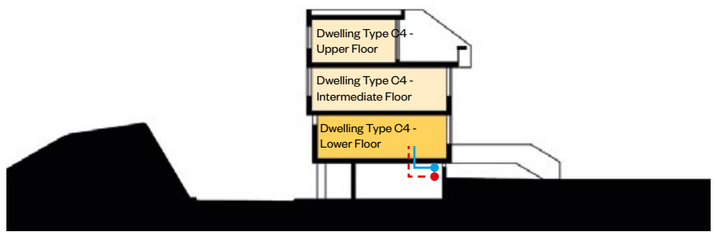
The proposed heating pipes and cold water supply rise up through the existing riser from the soffit of the garage below in Block C.

Homes which currently have individual heating systems will be reconnected to the communal network heating as part of these works.

Risers which currently connect dwellings will be fire stopped as part of these works.



Dwelling Type C4 - Ground Floor Plan



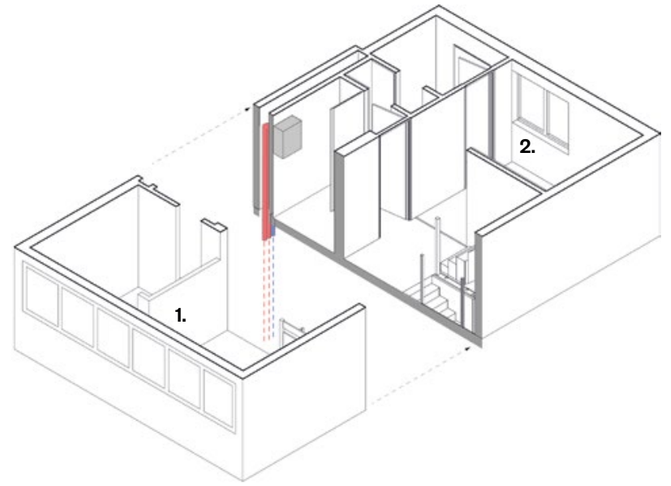
Block C cross section

1. Bedroom
2. Bathroom

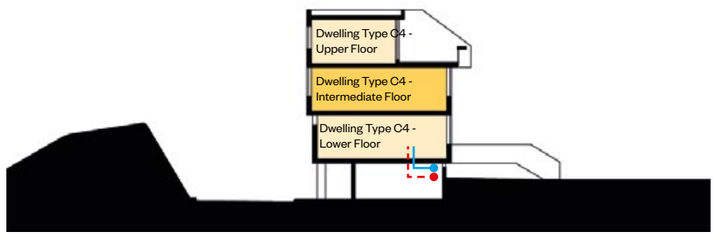
Mains cold water supply
Heating pipes
Party Wall

Block C
Dwelling Type C4

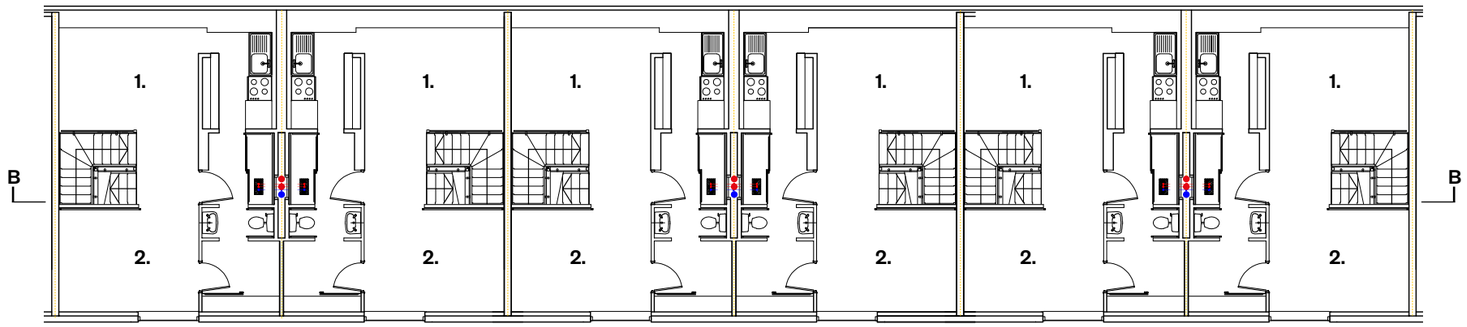
The proposed pipes rise up through the riser and connect into the HIU, located in the cupboard opposite the stairs on the first floor.



Dwelling Type C4 first floor plan- 3D sectional view



Block C cross section



Dwelling Type C4 - first floor Plan

Heat interface unit
Mains cold water supply
Heating pipes
Party Wall

1. Kitchen/Dining
2. Living Room

9.2 Drawing Register

Existing Drawings

London
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Drawing register/Drawing issue slip

Project name: Alexandra Road Heating Infrastructure
Project number: 3467
Slip number: 1
Revision: P3
Date: 17.11.2023

		Date of issue	
Subject: Existing Drawings	**Day**	08	17
	Month	04	11
	Year	22	23

Drawing Number	Drawing Title	Size	Revision (P1, T1, C1)	
3467_LB_102000	Block A - South Elevation Typical Bay	A1	P2	P3
3467_LB_102001	Block A - North Elevation Typical Bay	A1	P2	P3
3467_LB_102002	Block B - North Elevation Typical Bay	A1	P2	P3
3467_LB_102003	Block B - South Elevation Typical Bay	A1	P2	P3
3467_LB_102004	Block C - North and South Elevation Typical Bay	A1	P2	P3
3467_LB_103000	Window Type A1 - Timber Frame South Elevation	A1	P2	P3
3467_LB_103001	Window Type A2 - Timber Frame South Elevation	A1	P2	P3
3467_LB_103002	Window Type A3 - Timber Frame South Elevation	A1	P2	P3
3467_LB_103003	Window Types A - Aluminum Frame North Elevation	A1	P2	P3
3467_LB_103004	Window Type B2 - Timber Frame North Elevation	A1	P2	P3
3467_LB_103005	Window Type B3 - Timber Frame North Elevation	A1	P2	P3
3467_LB_103006	Window Type B2 - Timber Frame South Elevation	A1	P2	P3
3467_LB_103007	Window Type B3 - Timber Frame South Elevation	A1	P2	P3
3467_LB_103008	Window Type C4 - Timber Frame North Elevation	A1	P2	P3
3467_LB_103009	Window Type C4 - Timber Frame South Elevation	A1	P2	P3
3467_LB_104000	Window Details - Fixed Timber Window Details	A1	P1	P2
3467_LB_104001	Window Details - Casement Timber Window Details	A1	P1	P2
3467_LB_104002	Window Details - Sliding Timber Window Details	A1	P1	P2
3467_LB_104006	Window Details - Plywood Opening Vent Details	A1	P1	P2
3467_LB_104008	Window Details - Louvered Vent	A1	P1	P2
3467_LB_104009	Window Details - Window by the front door	A1	P1	P2
3467_LB_105000	Existing Dwelling Type A1 Plan	A1	P1	P2
3467_LB_105001	Existing Dwelling Type A2 Plan	A1	P1	P2
3467_LB_105002	Existing Dwelling Type A3 Plan	A1	P1	P2
3467_LB_105003	Existing Dwelling Type B2 Plan	A1	P1	P2
3467_LB_105004	Existing Dwelling Type B3 Plan	A1	P1	P2
3467_LB_105005	Existing Dwelling Type C4 Plan 1/2	A1	P1	P2
3467_LB_105006	Existing Dwelling Type C4 Plan 2/2	A1	P1	P2
3467_LB_106000	Dwelling Type A1 - Internal Elevations	A1	P1	P2
3467_LB_106001	Dwelling Type A2 - Internal Elevations 1/2	A1	P1	P2
3467_LB_106002	Dwelling Type A2 - Internal Elevations 2/2	A1	P1	P2
3467_LB_106003	Dwelling Type A3 - Internal Elevations	A1	P1	P2
3467_LB_106004	Dwelling Type B2 - Internal Elevations	A1	P1	P2
3467_LB_106005	Dwelling Type B3 - Internal Elevations	A1	P1	P2
3467_LB_106006	Dwelling Type C4 - Internal Elevations 1/2	A1	P1	P2
3467_LB_106007	Dwelling Type C4 - Internal Elevations 2/2	A1	P1	P2
3467_LB_106015	Plinth Details - Existing	A1	P1	P2

Drawing Register

Proposed Drawings

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Manchester M3 4LZ
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Drawing register/Drawing issue slip

Project name: Alexandra Road Heating Infrastructure
Project number: 3467
Slip number: 2
Revision: P3
Date: 17.11.2023

Subject: Proposed Drawings	Date of issue								
	Day	08	17						
	Month	04	11						
	Year	22	23						

Drawing Number	Drawing Title	Size	Revision (P1, T1, C1)							
3467_LB_332000	Block A - South Elevation Typical Bay	A1	P2	P3						
3467_LB_332001	Block A - North Elevation Typical Bay	A1	P2	P3						
3467_LB_332002	Block B - North Elevation Typical Bay	A1	P2	P3						
3467_LB_332003	Block B - South Elevation Typical Bay	A1	P2	P3						
3467_LB_332004	Block C - North and South Elevation Typical Bay	A1	P2	P3						
3467_LB_333000	Window Type A1 - Timber Frame South Elevation	A1	P2	P3						
3467_LB_333001	Window Type A2 - Timber Frame South Elevation	A1	P2	P3						
3467_LB_333002	Window Type A3 - Timber Frame South Elevation	A1	P2	P3						
3467_LB_333003	Window Types A - Aluminum Frame North Elevation	A1	P2	P3						
3467_LB_333004	Window Type B2 - Timber Frame North Elevation	A1	P2	P3						
3467_LB_333005	Window Type B3 - Timber Frame North Elevation	A1	P2	P3						
3467_LB_333006	Window Type B2 - Timber Frame South Elevation	A1	P2	P3						
3467_LB_333007	Window Type B3 - Timber Frame South Elevation	A1	P2	P3						
3467_LB_333008	Window Type C4 - Timber Frame North Elevation	A1	P2	P3						
3467_LB_333009	Window Type C4 - Timber Frame South Elevation	A1	P2	P3						
3467_LB_334000	Window Details - Fixed Timber Window Details	A1	P2	P3						
3467_LB_334001	Window Details - Casement Timber Window Details	A1	P2	P3						
3467_LB_334002	Window Details - Sliding Timber Window Details	A1	P2	P3						
3467_LB_334006	Window Details - Plywood Opening Vent Details	A1	P2	P3						
3467_LB_334008	Window Details - Bottom Hung Opening Window	A1	P2	P3						
3467_LB_334009	Window Details - Window by the front door	A1	P2	P3						
3467_LB_334010	Window Details - Window assembly details-proposed fixing principles	A1	P2	P3						
3467_LB_335000	Proposed Dwelling Type A1 Plan	A1	P1	P2						
3467_LB_335001	Proposed Dwelling Type A2 Plan	A1	P1	P2						
3467_LB_335002	Proposed Dwelling Type A3 Plan	A1	P1	P2						
3467_LB_335003	Proposed Dwelling Type B2 Plan	A1	P1	P2						
3467_LB_335004	Proposed Dwelling Type B3 Plan	A1	P1	P2						
3467_LB_335005	Proposed Dwelling Type C4 Plan 1/2	A1	P1	P2						
3467_LB_335006	Proposed Dwelling Type C4 Plan 2/2	A1	P1	P2						
3467_LB_336000	Dwelling Type A1 - Internal Elevations	A1	P1	P2						
3467_LB_336001	Dwelling Type A2 - Internal Elevations 1/2	A1	P1	P2						
3467_LB_336002	Dwelling Type A2 - Internal Elevations 2/2	A1	P1	P2						
3467_LB_336003	Dwelling Type A3 - Internal Elevations	A1	P1	P2						
3467_LB_336004	Dwelling Type B2 - Internal Elevations	A1	P1	P2						

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3467_LB_336005	Dwelling Type B3 - Internal Elevations	A1	P1	P2						
3467_LB_336006	Dwelling Type C4 - Internal Elevations 1/2	A1	P1	P2						
3467_LB_336007	Dwelling Type C4 - Internal Elevations 2/2	A1	P1	P2						
3467_LB_336010	Radiator - Setting Out	A1	P1	P2						
3467_LB_336011	Typical Junction Details	A1	P1	P2						
3467_LB_336012	Skirting - Junction Details	A1	P1	P2						
3467_LB_336013	Skirting - Junction Details	A1	P1	P2						
3467_LB_336014	Skirting - Junction Details	A1	P1	P2						
3467_LB_336015	Plinth Details - Proposed	A1	P1	P2						
3467_LB_336016	A3 Dining Room Plinth Detail + Junction Detail	A1	P1	P2						
Status codes (if applicable)										

S0 WIP **S1** Co-ordination **S2** Information **S3** Comment **S4** Stage approval **S5** Manufacture **S6** PIM authorization **S7** AIM authorization

D1 For costing **D2** For tender **D3** For contractor design **D4** For manufacture/procurement **A** Approved/Contractual **B** Partial sign off **OR** Construction Record

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Structural Engineer								
Building Services Engineer	E							
Principal Designer								
Main Contractor								
Planning		U						
Building Control								
Warranty Provider								
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