consist of load bearing perimeter and internal walls supporting steel beams with timber joist floors and potentially a concrete slab at roof level. The structural proposals considered in this report take account of the various floor constructions, details are to be confirmed following opening up works in the future stages of design.

The new architectural design requires the ground floor space to be opened up requiring the removal of the rear elevation at ground floor level and the internal party wall between 36 and 37 Henry Street at ground floor and basement level.

Perimeter walls are also to be removed to provide the new shop frontages onto Henry Street and the new passageway into the site.

A system of back propping and temporary works will be required to enable the structure to be supported during the removal of the walls. A method statement will be developed to consider the best sequence of work wall by wall, re-supporting the wall above at each location before proceeding to the next wall.

Steel transfer structures will be designed with limits on vertical deflections to reduce movement of the structure. The transfer structures may also be preloaded by jacking or precambered to further control structural movement at the time the load is transferred to the new supporting structure.

This temporary works will need to be designed by the contractor undertaking the work in accordance with their construction sequence and method statement. The temporary works may also need to consider the introduction of some pre-stress in the props to minimise the movement during the demolition stage which will form part of the structural specification.

As with any alteration of an existing structure where elements are being removed and re-supported to create clear spans, there will be movement and stresses induced in the masonry walls. Once the new steel transfer structures have been incorporated and the loads re-supported any movement related cracking can then be made good.

There is also a possibility that existing cracking may be found upon opening up the structures, if this is severe some pre-commencement repairs may be required prior to the above work commencing.

Generally, the proposed buildings within Site 3 will have limited areas of basement, however where existing buildings have basements such as at 36-37 Henry Street, these will be retained and incorporated into the scheme.

The following figures provide further detail of the above.

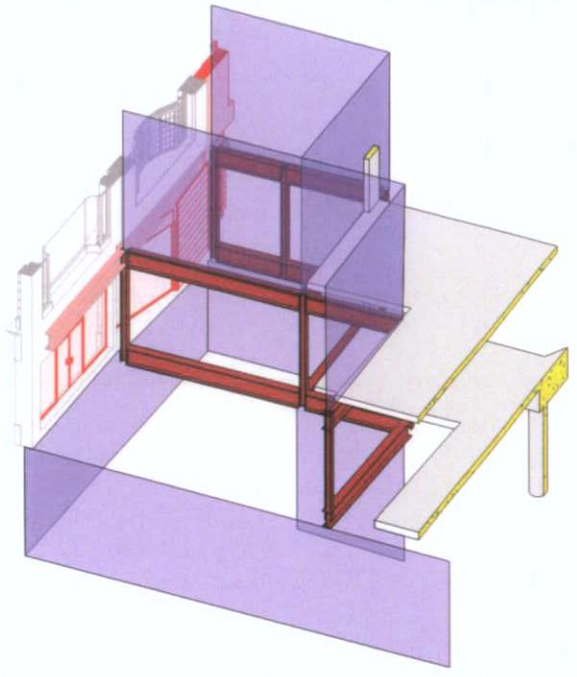

Figure 18 36-37 Henry Street New Transfer Structures

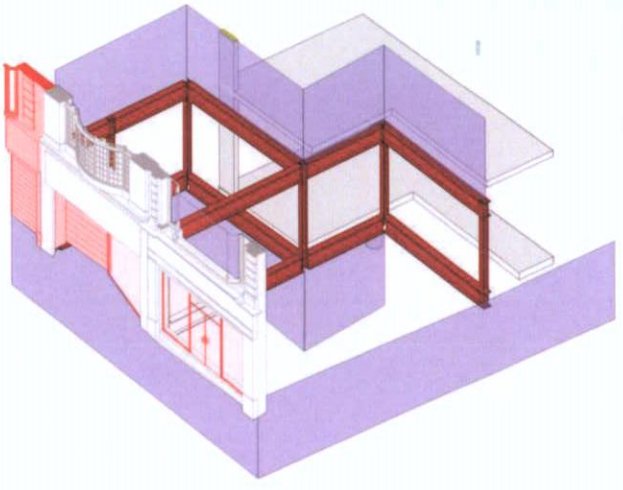

Figure 19 36-37 Henry Street Transfer Structures

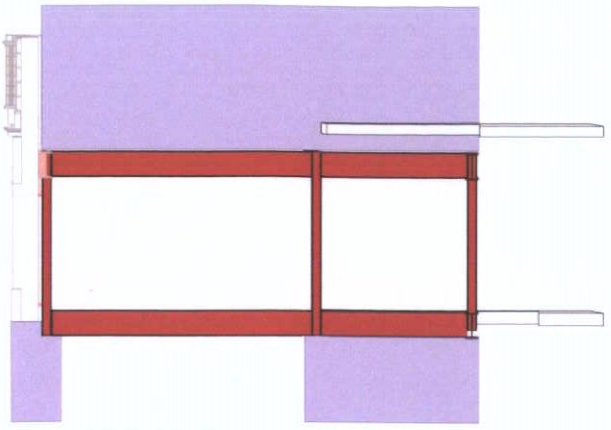

Figure 20 36-37 Henry Street New Transfer Structures

The following sequence of works is proposed. This is to be reviewed following site investigations to confirm the existing construction and condition and following discussions with the contractor. By staging the installation sequence of the new 1st floor frame stresses and movement within the retained building can be minimised.

Frame numbers relate to those shown in Figure 21 and Figure 22.

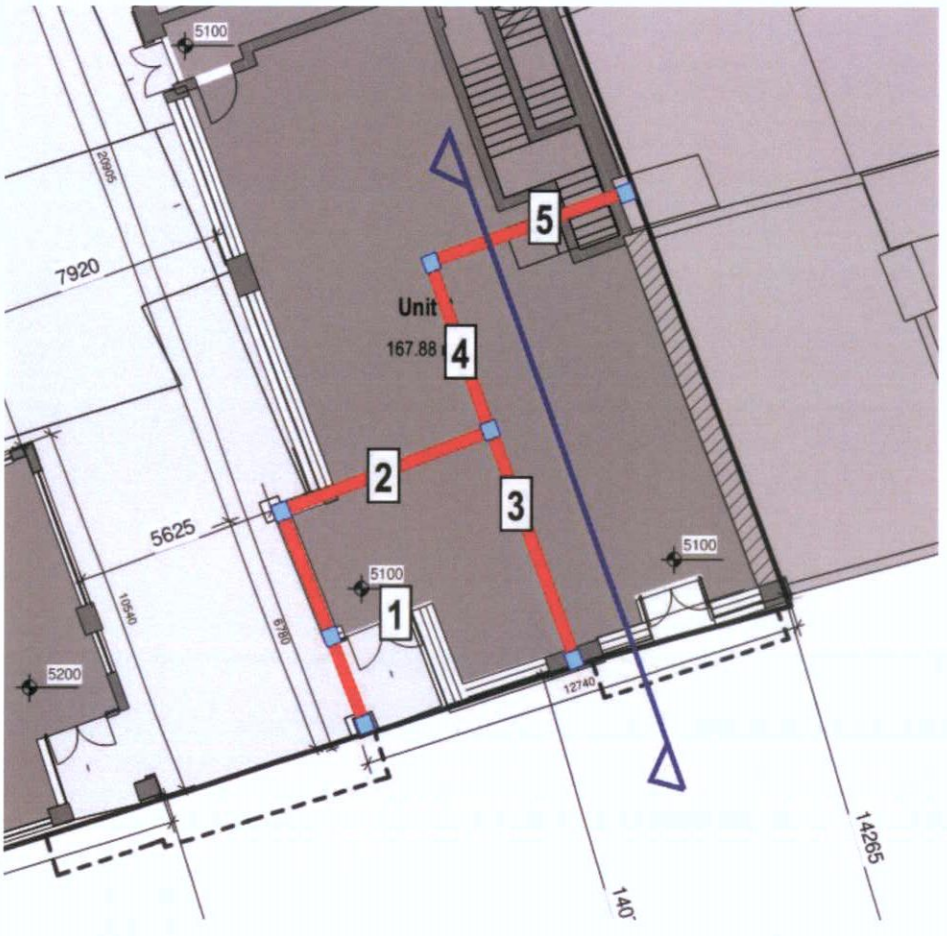

Figure 21 36-37 Henry Street New Steel Layout Ground Floor

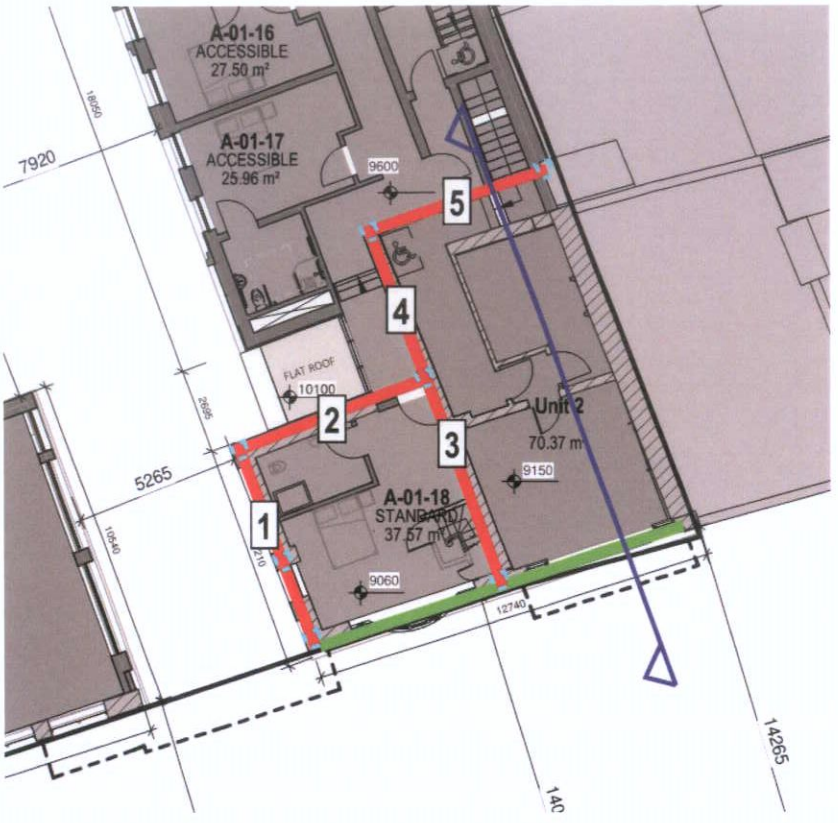

Figure 22 - 36-37 Henry Street New Steelwork Layout 1st Floor

Sequencing for installation of new steelwork

The following is to be provided to the main contractor and is to be developed with the specialist sub-contractors into a fully detailed method statement taking into account the movement monitoring and other requirements for the safe and controlled completion of this work.

1. Temporary support of 37/38 Henry Street party wall at 1st floor.
2. Demolition of 37/38 Henry Street party wall ground to 1st floor.
3. Installation of box frame (1) in 37/38Hnery Street party wall between ground and 1st floor.
4. Temporary support of rear wall 37 Henry Street at 1st floor.
5. Demolition of 37 Henry Street rear wall between ground and 1st floor.
6. Installation of box frame (2) in 37 Henry Street rear wall between ground and 1st floor.
7. Temporary support of 36/37 Henry Street party wall at 1st floor.
8. Temporary support of existing façade beam at 1st floor.
9. Demolition of 36/37 Henry Street party wall in location of frame (4) between basement and 1st floor.
10. Installation of box frame (4) in 36/37 Henry Street party wall.
11. Demolition of 36/37 Henry Street party wall in location of frame (3) between basement and 1st floor.

12. Installation of steel transfer beam at first floor and steel ground floor support beam (3) in location of 36/37 Henry Street party wall.
13. Connection of existing façade beam to new steel beams (3).
14. Temporary support of 36 Henry Street rear wall at 1st floor.
15. Demolition of 36 rear wall between ground and 1st floor.
16. Installation of support beam (5) at t Ground floor.
17. Installation of transfer beam (5) beneath 36 Henry Street rear wall at 1st floor.

The existing staircases in no.36 Henry Street from 2nd to 3rd floor, and no. 37 Henry Street from 1st to 3rd floor are to be retained in the proposed layouts. Fire compartmentation and fire protection of the steel and timber floor structure is to be specified by the Architect.

The existing staircase ground floor in no. 36 Henry Street is to be infilled to provide the hotel layouts at each level. It is assumed the staircase has been trimmed within the existing building by additional timber joists and/or steel beams. The stairs will be removed, and the void infilled with timber joists typical to the existing floors (provided they are suitable for the proposed loads). The existing structure trimming the stair void will be validated for the infill.

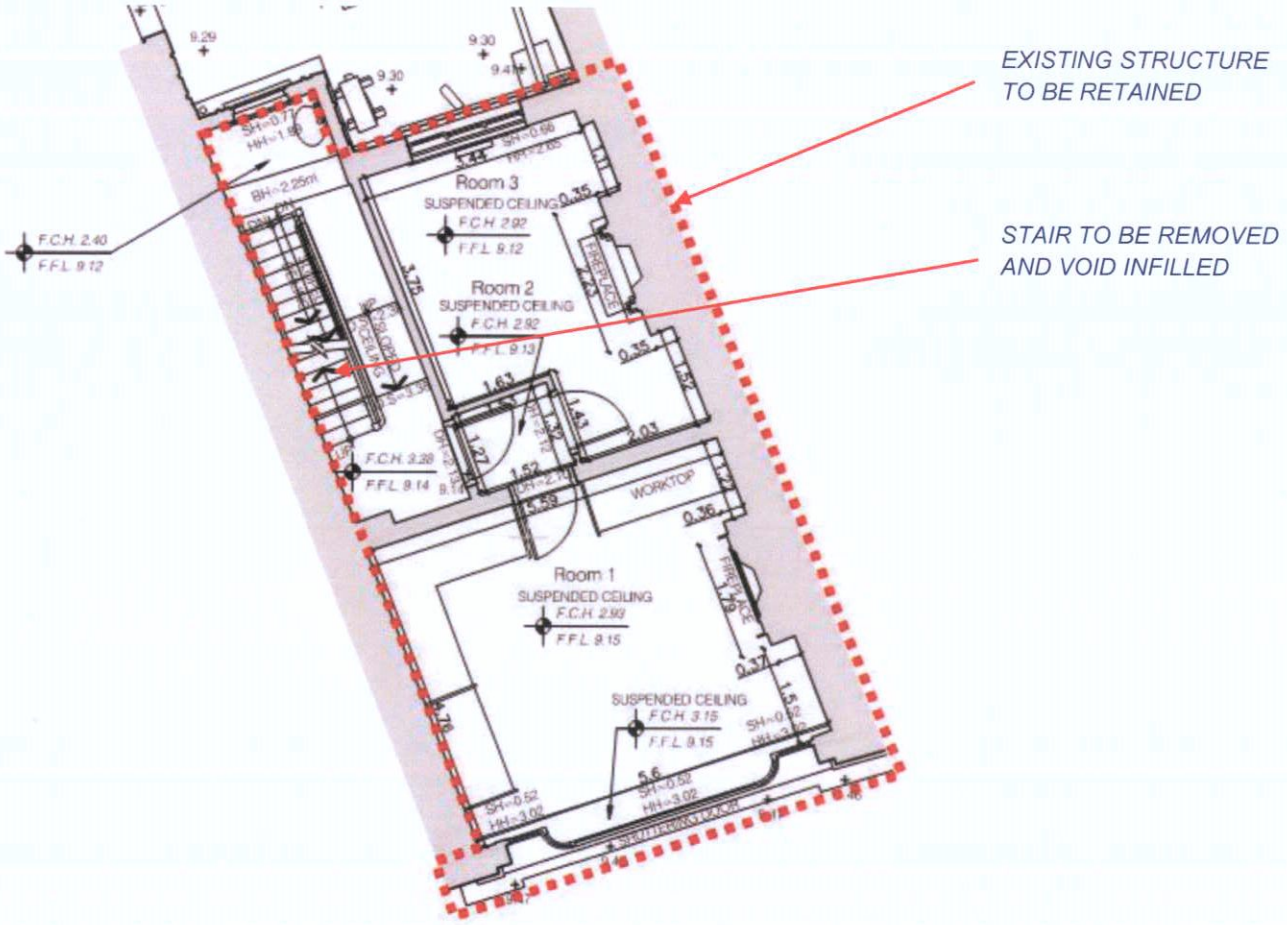

Figure 23 – No. 36 Henry Street - Stair to be Removed – Murphy's Survey Drawing DC-MUR-3X-01-FP-G-00-1216.

It is proposed to add an additional storey to the existing buildings at 36 and 37 Henry Street.

A new lightweight metal structural framing system (SFS), such as Metsec Load Bearing SFS, is to be constructed above the roof level of the existing building to provide an additional 5th storey. It is understood the existing roof is a concrete slab and this is to be retained. Investigation works are to be undertaken at the next stage to confirm the construction and condition of the roof structure. The lightweight SFS system will limit the additional loads to be supported by the existing slab, walls and foundations under.

The extension increases the overall building to 5 stories. As such, this falls into category 2B with regard to disproportionate collapse. It is assumed that there are unlikely to be ties within the existing masonry, such as an embedded steel frame or other measures. Therefore, vertical ties will be retrofitted to the existing building. The location and detailing of these ties will require careful consideration as this is naturally quite intrusive work. The solutions will need to be assessed once the finishes have bene removed with each location potentially requiring a bespoke solution.

The roof top extension is to be supported from the existing masonry walls below where wall lines are coincidental. Along the Henry Street elevation, where the building steps back from the façade, the new lightweight SFS structure will be supported on the existing concrete roof slab. The capacity of this slab requires further investigation and if necessary a new steel or concrete beam may also need to be introduced.

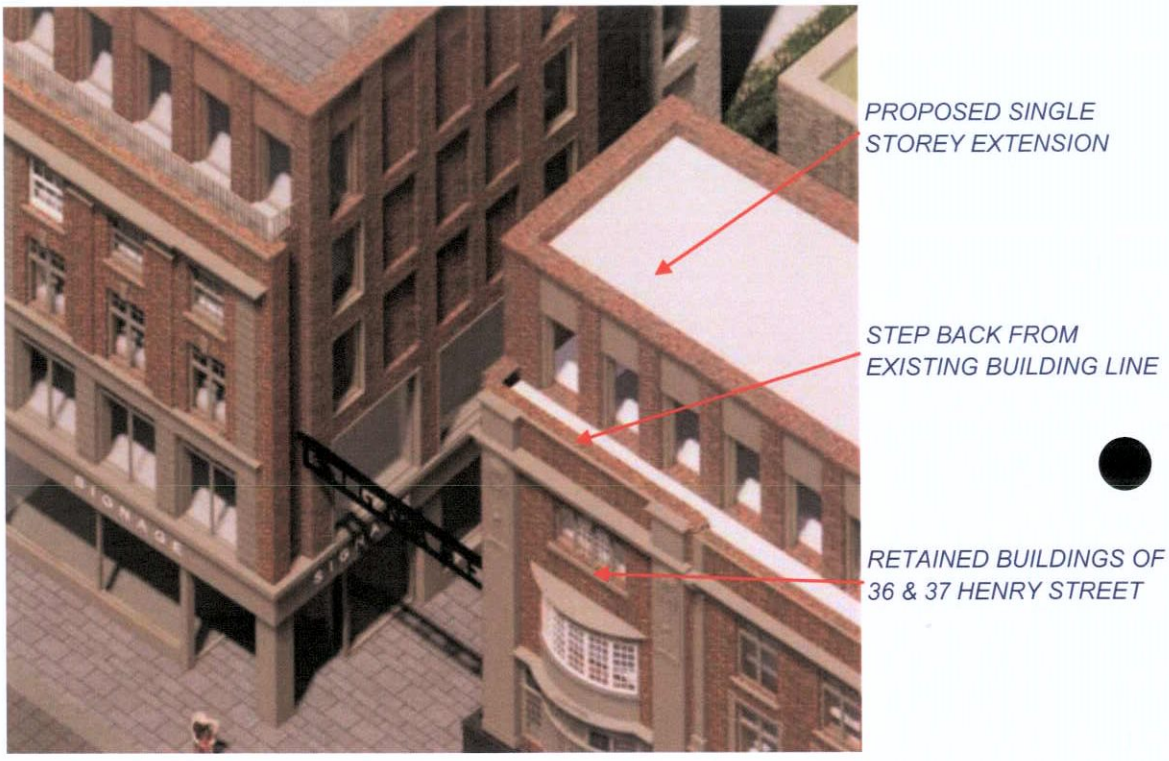

Figure 24 – Proposed Single Storey Extension of Retained Buildings at 36 and 37 Henry Street

At the next stage of the project, intrusive structural investigations will be undertaken on the structural elements. This will include sampling and testing to test for strength and material properties. Where the structural capacity is insufficient, the materials will be replaced with a suitable structural material. Where steelwork bears onto the masonry walls concrete padstones will be installed to distribute the load.

Figure 25 – Typical Metsec SFS System

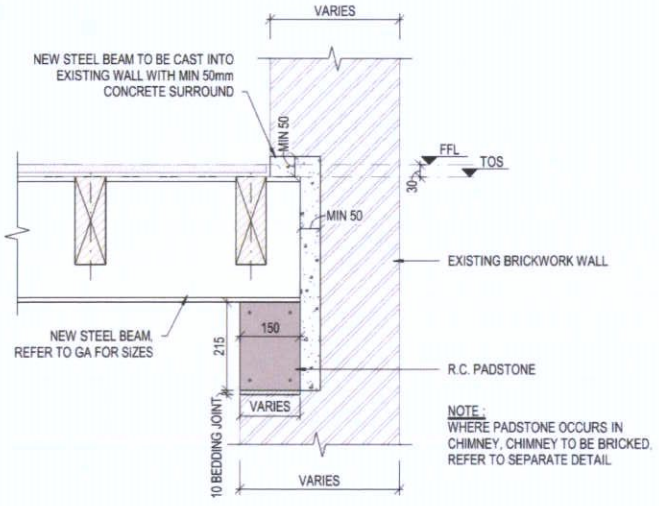

Figure 26 – Typical Padstone Detail for Steel to Masonry Wall

The 1st floor frame to support the retained walls will be supported on pad foundations at the existing basement level. These will need to be installed as part of an initial works package to enable the site wide construction phasing, alongside the retention structures for the existing basement infill where sections of basement are being retained.

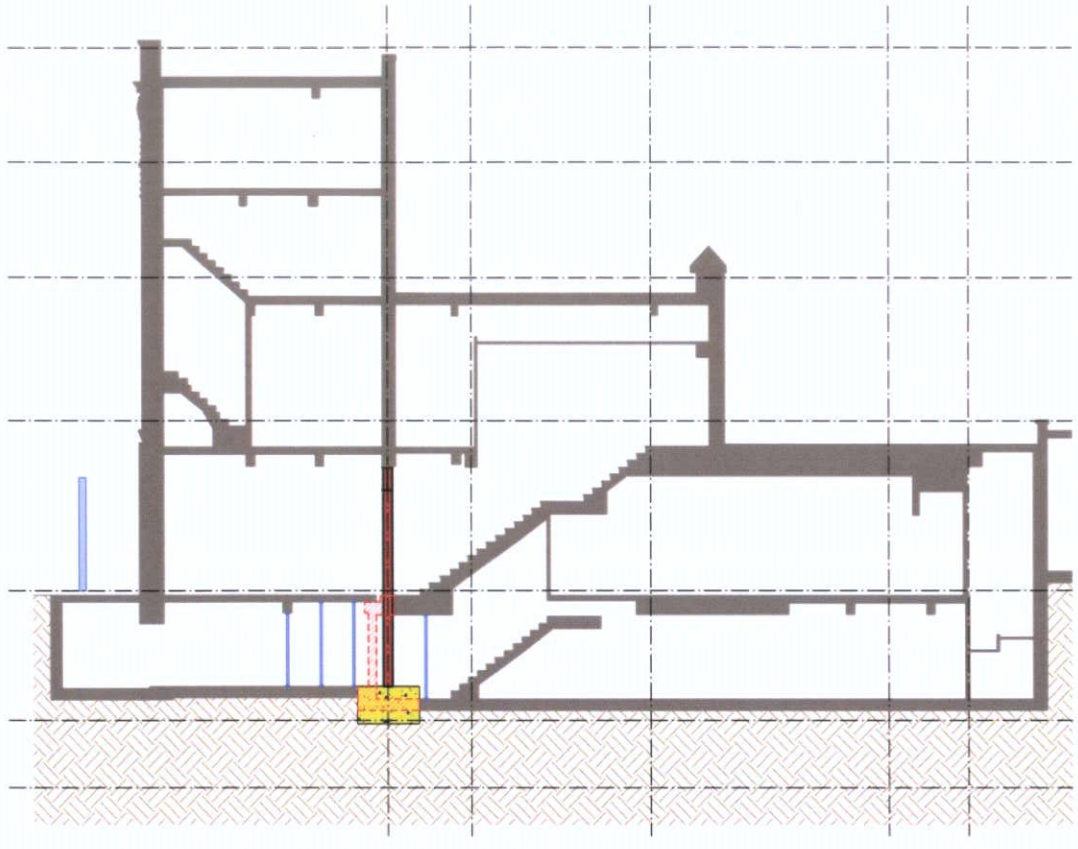

Figure 27 – New Pad Foundations for Support Frame.

4.6.2 8-9 Moore Street / 11-13 Henry Place (Retained)

Part of Block B includes a 4-storey residential unit to the north west corner of the site in the location of the existing 3 storey 8-9 Moore Street and the 2 storey 11-13 Henry Place to the rear. The existing buildings are to be retained and incorporated into the scheme.

A new single storey extension will be added over each part of the retained building, constructed from a lightweight steel frame supported on steel beams spanning between the existing load bearing masonry walls. Due to degradation of the waterproofing and likely damage to the timber construction, the existing roof structures are to be replaced as part of the single storey extension over each of 8-9 Moore Street and 11-13 Henry Place.

A new lift shaft installed within the existing stair void will be constructed from a steel frame or load bearing blockwork, to be confirmed at the next stage, allowing for installation within the existing fabric. An existing staircase to the rear of 8-9 Moore Street, currently serving ground and 1st floors will be extended to provide access to the upper floors. The extension will be formed via a continuation of the existing masonry walls. Existing masonry is to be surveyed and validated for the proposed works.

As above, the existing buildings are supported on ground bearing foundations and adjacent new building on pile foundations. Therefore, to avoid differential settlement creating stresses within the building, an isolation joint between the two constructions is to be installed.

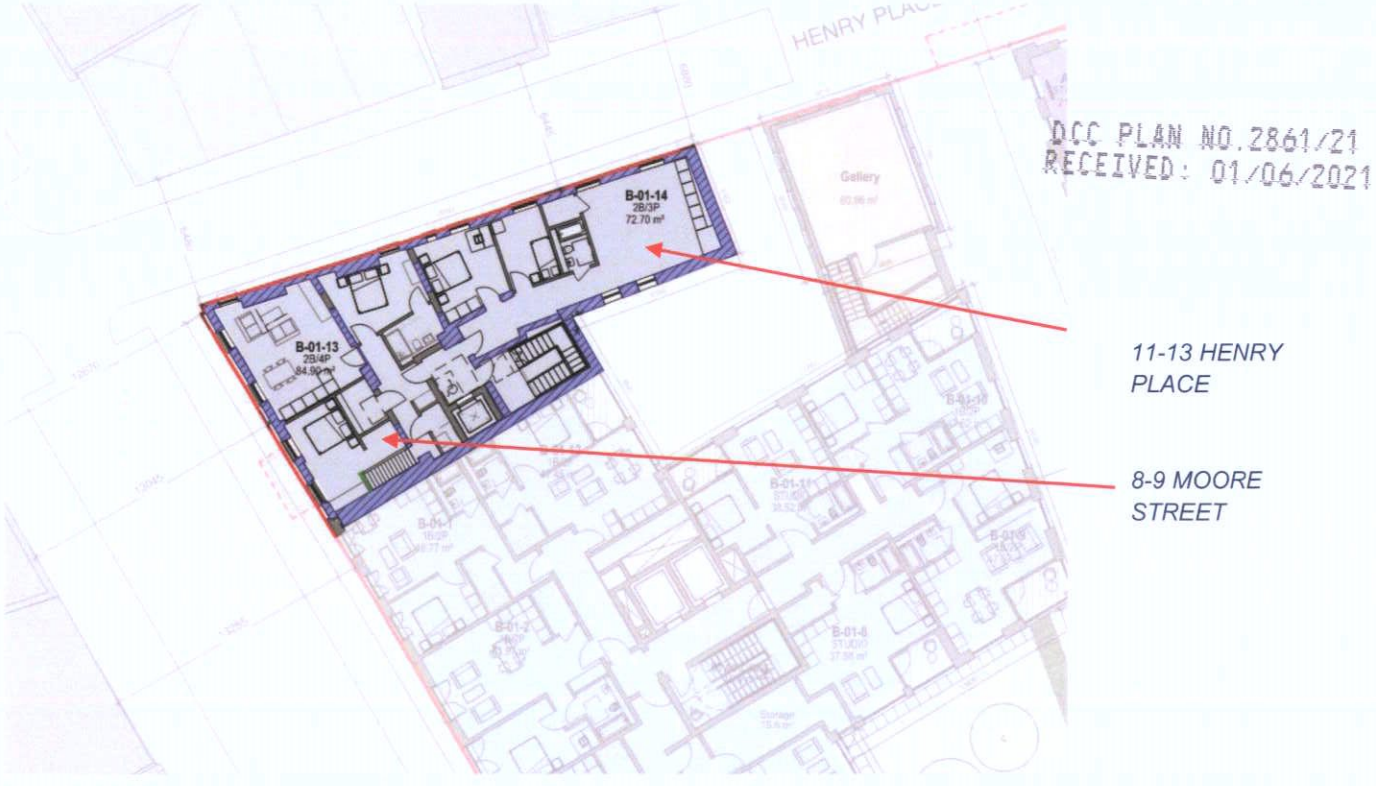

Figure 28 – Location of Masonry-Timber Structure at 8-9 Moore Street.

Existing layouts are to be retained within the new scheme, with minor alterations to facilitate the lift and stairs. The existing ground floor layout provides a semi-open plan space. It is assumed there is structure within the 1st floor to support the load bearing wall lines at the centre and rear of the building from 1st floor. These will need to be retained within the proposed scheme, to provide the architectural layouts and support for the proposed extension over. The existing support structure will need to be investigated for

the proposed loads. The existing concrete ground floor slab within 11-13 Henry Place is to be removed and a new floor installed to create level access between existing footpath and the residential lobby.

The construction of a new concrete ground floor slab would require new supports and breaking out of the existing walls. To minimise the works to the existing structure, new floors are to be constructed from 75mm x 300mm deep C24 timber joints at 300mm c/c supported on joists hangers and spanning between the existing loading bearing masonry walls. Steel straps are to be used to tie the joists to the masonry. Spans are to be limited to 6m and 38mm thick and 225mm deep solid timber strutting (noggins) are to be installed at the mid-span of joist.

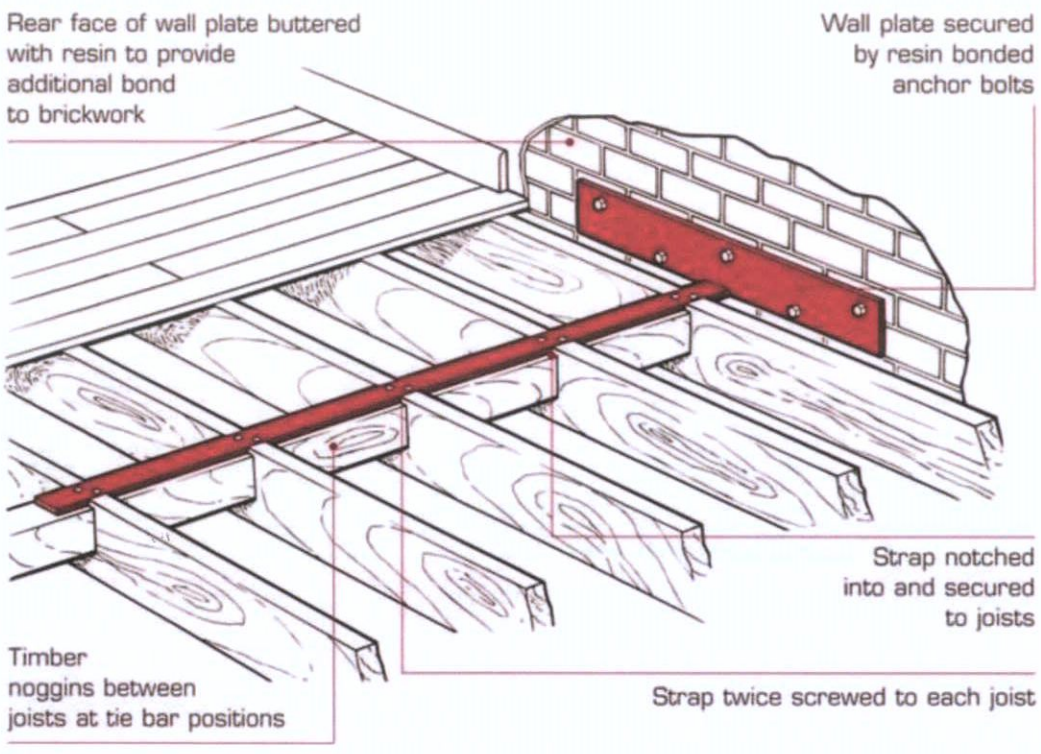

Figure 29 – Typical Remedial Timber to Masonry Detail.

Additionally, the replacement of an existing concrete slab with a timber floor balances the structural loading against the increase in loading from the proposed extension. Therefore, loads to the existing foundations are unchanged and risks of damage to the existing building are mitigated.

The roofs of the proposed single storey extensions are to be formed in the structural frame system with steel purlins to support the finishes over. No plant has been allowed for at the roof level and there will be a waterproofing finish with access for maintenance only.

The new build single storey extensions over the existing building steps back from the existing façade lines to Moore Street and Henry Place. Therefore, structure at the existing roof levels of each building will be required to support the building lines above.

It is proposed that the new walls are supported on steelwork spanning between the existing masonry walls. The extensions will be formed from a light-weight load bearing steel frame, such as Metsec Load Bearing SFS, in order to minimise the load to the existing masonry and foundations.

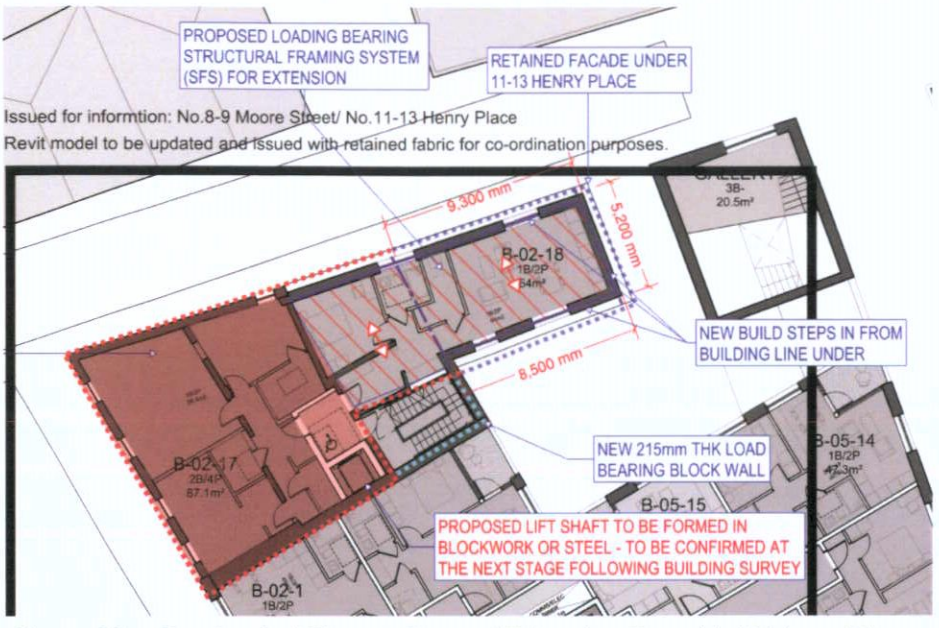

Figure 30 – Steel at 2nd Floor to Support Extension Over 11-13 Henry Place.

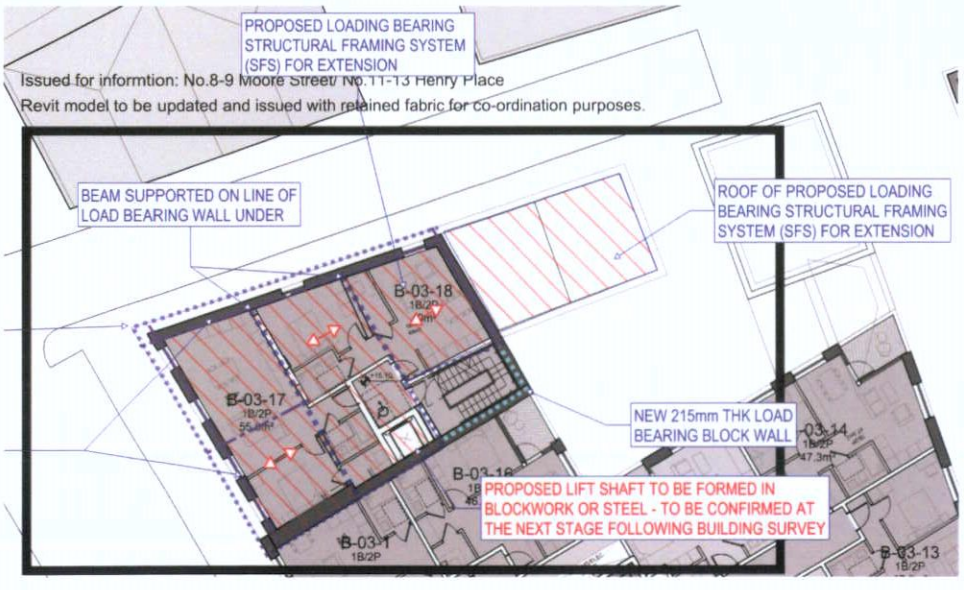

Figure 31 – Steel at 3rd Floor to Support Extension Over 8-9 Moore Street.

At the next stage, investigations for the masonry will be required to establish compressive strength. Steel beams will be supported on concrete padstones within the existing masonry to distribute the concentrated load and reduce stresses within the existing masonry walls.

4.7 Existing Basements

There are a number of existing basements across the site. Where not beneath retained structures, it is proposed that these are filled to provide a level piling platform, from which the proposed reinforcement concrete frame can be constructed.

Figure 32 – Site 3 Existing Basements

The existing building at 8-9 Moore Street, including the basement is to be retained. The existing 4 storey elements to the Henry Street frontage of 36 and 37 Henry Street, including the basement area beneath, are to be retained. The 1 and 2 storey elements to the rear of 36 and 37 Henry Street are to be demolished and the basements beneath these areas infilled.

Additionally, it is assumed there are existing basements beneath 34 and 35 Henry Street, these structures occupy the boundary with Site 3 and the buildings are connected to 36 Henry Street and the Site 3 boundary wraps around the rear of these structures.

There are currently no records to show the existence of basements adjacent to the existing basements at 8-9 Moore Street and to the rear of 34 and 35 Henry Street. Therefore, these buildings basement walls are currently supporting the retained earth/fill and the ground floor loading of the adjacent buildings. In the proposed design this condition is unchanged, and as there will be no increase in lateral load on the basement walls of 34,35 Henry Street and 8-9 Moore Street no structural strengthening works are required. Additionally, the new basement secant wall is to be constructed to the rear of 34 and 35 Henry Street and therefore there will be a reduction in surcharge loading on the wall. The effect of this unloading will be examined in more detail as the design progresses. In the temporary condition during construction, vehicular loading from construction works may increase the surcharge loading on the retained basement walls. Therefore, to protect these walls, temporary works will be required during the construction phase.

As 34 and 35 Henry Street are outside of the site boundary, temporary pre-cast concrete units will be installed adjacent to the basement wall, within the site, to retain the backfill/piling mat and avoid surcharge loading being applied to the basement wall. As the basement at 8-9 Moore Street is within the site, temporary raking props can be installed within the basement to brace the existing basement wall.

Where existing basements are being infilled to provide a level piling platform around the basements at 36 and 37 Henry Street and to the west side of 35 Henry Street, new permanent retaining walls are to be constructed adjacent to the retained/existing basements to avoid surcharging the existing walls from the retained soil. Additionally, the retaining structure will protect the basement wall beneath 37 Moore Street from vehicle surcharge loading where the new permanent vehicular access is to be created in the location of 38 Henry Street, which become part of the servicing strategy to the new development. The retaining walls will be pre-cast concrete units, placed on the existing ground at basement level adjacent to the basement wall following demolition of the structure above, these below ground structures will then become part of the permanent works. Temporary weather protection in the form of felt and battening will be fastened to all exposed walls as demolition proceeds, and this will be left in place until the new permanent works progress.

To the front of the existing building, basement vaults are located beneath the pavement outside of the building line. The vaults are to be retained but are not accessible from the proposed scheme. The strategy for the retention is to be developed at the next stage following site investigations to confirm the condition of the existing structure. Structural intervention will be limited to the essential works required to enable the buildings to provide the required performance and long-term durability.

Figure 33 – Location of Existing Historical Pavement Vaults

The basement vault at No. 38 will need to be backfilled to allow for vehicle loading as the proposed passageway is part of the servicing strategy to the new development.

Where retained, existing basements will need to be investigated at the next stage. Any structural defects will be examined and remedial works will be developed and considered according to the heritage status of these buildings.

Where repairs are required, these will be in accordance with the typical procedures for retained buildings where the materials will be replaced with a suitable structural material.

4.8 Building Envelope

Current proposals are for a primarily brick façade. It is assumed the façade will be a cavity wall system with an external skin of brickwork supported on thermally broken brackets at the face of the slab edge and laterally restrained to an inner skin of blockwork or framing system such as Metsec, supported on the slab edge. In accordance with structural codes, masonry can be supported at every 3rd storey or 12m, whichever is lower. However, the levels at which vertical support of the outer skin is provided will be dictated by the loading from the façade and deflection criteria for the slab edge.

To the Henry Street, Moore Street, and Henry Place elevations, where the building line steps back at upper floors proposed cladding includes Corten steel. The cladding system will be designed by the specialist, but it is assumed to be supported on the slab and laterally restrained to the primary frame.

Figure 34 – Henry Street Façade Treatment

The White Building at 10 Henry Place is to provide gallery space. It is proposed to construct the primary structure for the white building in timber.

5. Construction and Demolition Waste Management

AWN Consulting Ltd. has prepared a Site-specific Construction & Demolition Waste Management Plan (C&D WMP) on behalf of Dublin Central GP Limited and is submitted as part of this planning application [document reference CB/20/11784WMR01].

The C&D WMP provides information necessary to ensure that the management of C&D waste at the site is undertaken in accordance with the current legal and industry standards including the Waste Management Acts 1996 - 2011 and associated Regulations, Protection of the Environment Act 2003 as amended, Litter Pollution Act 1997 as amended and the Eastern-Midlands Region Waste Management Plan 2015 – 2021.

In particular, the C&D WMP aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. It also seeks to provide guidance on the appropriate collection and transport of waste from the site to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil and/or water).

The C&D WMP includes information on the legal and policy framework for C&D waste management in Ireland, estimates of the type and quantity of waste to be generated by the proposed development and makes recommendations for management of different waste streams.

5.1 Non-Hazardous Construction Waste

There will be waste materials generated from the demolition and renovation of the existing buildings, hardstanding areas on site, as well as from the further excavation of the building foundations. The volume of waste generated from demolition will be more difficult to segregate than waste generated from the construction phase, as many of the building materials will be bonded together or integrated i.e. plasterboard on timber ceiling joists, steel embedded in concrete etc.

There will be soil, stones, clay and made ground excavated to facilitate construction of new foundations, underground services, and the installation of the proposed basements. The preliminary estimated 163,490m^3 of material will need to be excavated to do so. There is limited chance for reuse of material onsite and it is envisaged that all material, will need to be removed offsite due to the limited opportunities for reuse on site. This will be taken for appropriate offsite reuse, recovery, recycling and/or disposal.

During the construction phase there may be a surplus of building materials, such as timber off-cuts, broken concrete blocks, cladding, plastics, metals and tiles generated. There may also be excess concrete during construction which will need to be disposed of. Plastic and cardboard waste from packaging and supply of materials will also be generated. The contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

Waste will also be generated from construction workers e.g. organic/food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided on site during the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

5.2 Potential Hazardous Wastes Arising

5.2.1 Contaminated Soil

In 2008 an initial joint geotechnical and environmental site investigation was undertaken (by O' Callaghan Moran & Associates) comprising the excavation of trial pits, the installation of boreholes in the subsoils and bedrock and the collection and testing of soil and groundwater samples. The intrusive investigations were confined to open areas in the middle of the site and around the site parameter. It is envisaged that further site investigations and environmental soil analysis will be undertaken post demolition and prior to any excavated material being removed from site.

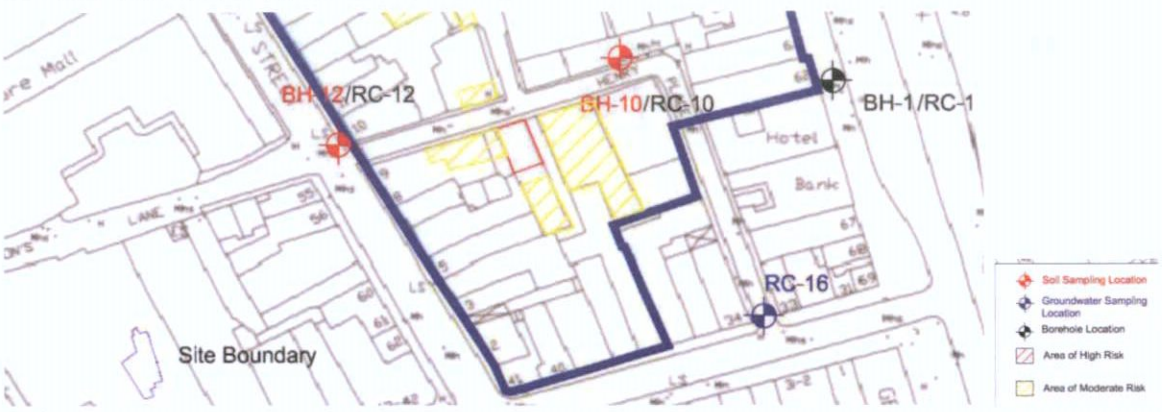

Figure 35 – Site 3 areas of Potential Contaminated Material

Three (3) samples of the fill material from BH-7, 9 and 10 were analysed for Total Petroleum Hydrocarbons (TPH), BETX (benzene, toluene, ethylbenzene and xylene), PAH (polycyclic aromatic hydrocarbons) and metals (arsenic, barium, cadmium, chromium, copper, mercury, molybdenum, nickel, lead, tin, selenium and zinc).

Nineteen (19) samples, of the fill and natural ground from, BH-7, 9, 10, 12, 14, 15, RC-8 and W-2, were tested for the WAC, which included Total Organic Carbon (TOC), BETX, PCBs (polychlorinated biphenyls, 7 congeners), Mineral Oil (C10 to C40) and PAH sum of 17. They were also subjected to leach testing at a liquid to solid ratio of 10:1 and the leachate analysed for arsenic, barium, cadmium, chromium, copper, mercury, molybdenum, nickel, lead, tin, selenium, zinc, chloride, fluoride, sulphate, phenols, dissolved organic carbon and total dissolved solids.

If any potentially contaminated material is encountered, it will need to be segregated from clean/inert material, tested and classified as either non-hazardous or hazardous in accordance with the EPA publication entitled 'Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-Hazardous' using the HazWasteOnline application (or similar approved classification method). The material will then need to be classified as clean, inert, non-hazardous or hazardous in accordance with the EC Council Decision 2003/33/EC, which establishes the criteria for the acceptance of waste at landfills.

In the event that Asbestos containing materials (ACMs) are found, the removal will only be carried out by a suitably permitted waste contractor, in accordance with S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010. All asbestos will be taken to a suitably licensed or permitted facility.

In the event that hazardous soil, or historically deposited waste is encountered during the construction phase, the contractor will notify DCC and provide a Hazardous/Contaminated Soil Management Plan, to include estimated tonnages, description of location, any relevant mitigation, destination for disposal/treatment, in addition to information on the authorised waste collector(s).

5.2.2 Fuel/Oils

Fuels and oils are classed as hazardous materials; any on-site storage of fuel/oil, and all storage tanks and all draw-off points will be bunded and located in a dedicated, secure area of the site. Provided that these requirements are adhered to and the site crew are trained in the appropriate refuelling techniques, it is not expected that there will be any fuel/oil waste generated at the site.

5.2.3 Invasive Plant Species

An ecological site survey was undertaken by Scott Cawley Ecology in June 2020. This included a site walkover survey of the entire site, and around part of the outside perimeter to search for any schedule 3 invasive species. Japanese Knotweed Fallopia japonica, which is listed on the Third Schedule of the Birds and Habitats Regulations, was not recorded on the site.
Japanese Knotweed (Fallopia japonica) is an alien invasive species listed under schedule 3 of Regulations SI No. 355/2015. SCE's report concludes that it is not present on this site and there was no indication that it is growing in the immediate vicinity.

5.2.4 Asbestos

Multiple asbestos refurbishment/demolition survey were undertaken by About Safety Ltd in September and October 2020. The scope of the survey's were confined to all accessible areas of the existing buildings which are due for demolition and/or refurbishment in the future.

Asbestos Containing Materials (ACM) were detected in several locations within some of the buildings including but not limited to floor tiling, roof slates, roof felt, rope seals, bitumen and woven rope.

Removal of asbestos or ACMs will be carried out by a suitably qualified contractor and ACM's will only be removed from site by a suitably permitted/licenced waste contractor. in accordance with S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010. All material will be taken to a suitably licensed or permitted facility.

5.2.5 Other known Hazardous Substances

Paints, glues, adhesives and other known hazardous substances will be stored in designated areas. They will generally be present in small volumes only and associated waste volumes generated will be kept to a minimum. Wastes will be stored in appropriate receptacles pending collection by an authorised waste contractor.

In addition, WEEE (containing hazardous components), printer toner/cartridges, batteries (Lead, Ni-Cd or Mercury) and/or fluorescent tubes and other mercury containing waste may be generated from during C&D activities or temporary site offices. These wastes, if generated, will be stored in appropriate receptacles in designated areas of the site pending collection by an authorised waste contractor.

5.3 Main Construction and Demolition Waste Categories

AWN Consulting Ltd. has prepared Site-specific Construction & Demolition Waste Management Plan submitted as part of this planning application [document reference CB/20/11784WMR01] and is summarized below.

The main non-hazardous and hazardous waste streams that could be generated by the demolition and construction activities at a typical site are shown in. The List of Waste (LoW) code (as effected from 1 June 2015) (also referred to as the European Waste Code or EWC) for each waste stream is also shown.

Waste Material	LoW/EWC Code
Concrete, bricks, tiles, ceramics	17 01 01-03 & 07
Wood, glass and plastic	17 02 01-03
Treated wood, glass, plastic, containing hazardous substances	17-02-04*
Bituminous mixtures, coal tar and tarred products	17 03 01*, 02 & 03*
Metals (including their alloys) and cable	17 04 01-11
Soil and stones	17 05 03* & 04
Gypsum-based construction material	17 08 01* & 02
Paper and cardboard	20 01 01
Mixed C&D waste	17 09 04
Green waste	20 02 01
Electrical and electronic components	20 01 35 & 36
Batteries and accumulators	20 01 33 & 34
Liquid fuels	13 07 01-10
Chemicals (solvents, pesticides, paints, adhesives, detergents etc.)	20 01 13, 19, 27-30
Insulation materials	17 06 04
Organic (food) waste	20 01 08
Mixed Municipal Waste	20 03 01

* individual waste type may contain hazardous substances

Table 1. Typical waste types generated and LoW codes (individual waste types may contain hazardous substances)

5.4 Demolition Waste Generation

The demolition stage will involve the demolition of multiple brick buildings onsite. The demolition areas are identified in the planning drawings provided with this application. The anticipated demolition waste and rates of reuse, recycling/recovery and disposal is shown in Table 2 and 3.

Waste Type	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	361.8	0	0.0	85	307.6	15	54.3
Concrete, Bricks, Tiles, Ceramics	2050.5	30	615.1	65	1332.8	5	102.5
Plasterboard	160.8	30	48.2	60	96.5	10	16.1
Asphalts	40.2	0	0.0	25	10.1	75	30.2
Metals	603.1	5	30.2	80	482.5	15	90.5
Slate	321.6	0	0.0	85	273.4	15	48.2
Timber	482.5	10	48.2	60	289.5	30	144.7
Asbestos	1.0	0	0.0	0	0.0	100	1.0
Total	**4021.5**		**741.8**		**2792.3**		**487.5**

Table 2. Estimated off-site reuse, recycle and disposal rates for demolition waste from the Site 3 [extract AWN document ref. CB/20/11784WMR01]

Waste Type	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	308.4	10	30.8	80	246.7	10	30.8
Timber	261.7	40	104.7	55	143.9	5	13.1
Plasterboard	93.5	30	28.0	60	56.1	10	9.3
Metals	74.8	5	3.7	90	67.3	5	3.7
Concrete	56.1	30	16.8	65	36.5	5	2.8
Other	140.2	20	28.0	60	84.1	20	28.0
Total	**934.7**		**212.2**		**634.6**		**87.9**

Table 3. Estimated off-site reuse, recycle and disposal rates for construction waste from the Site 3 [extract AWN document ref. CB/20/11784WMR01]

5.5 Appointment of C&D Waste Manager

The Main Contractor/Contractors will appoint a C&D Waste Manager. The C&D Waste Manager will have overall responsibility for the implementation of the project Waste Management Plan (WMP) during the construction phase.

Copies of the Waste Management Plan will be made available to all relevant personnel on site. All site personnel and sub-contractors will be instructed regarding the objectives of the Waste Management Plan and informed of the responsibilities which fall upon them as a consequence of its provisions. Where source segregation, selective demolition and material reuse techniques apply, each member of staff will be given instructions on how to comply with the Waste Management Plan. Posters will be designed to reinforce the key messages within the Waste Management Plan and will be displayed prominently for the benefit of site staff.

6. Protection of Buildings during Construction

Of particular importance to the Site 3 development are the retained facades and buildings of historical importance and the adjoining buildings to the site.

Retained facades within Site 3 include:

- 5 Henry Place
- 39-40 Henry Street

Other retained buildings of historical importance (in-part/whole) currently proposed within the site development include:

- 36-37 Henry Street
- 8-9 Moore Street
- 11-13 Henry Place

Buildings Adjacent to Site 3 include:

- 34-35 Henry Street

Nearby Building to Site 3 include:

- General Post Office (National Monument)
- 14-17 Moore Street (National Monument)

The redevelopment of Site 3 incorporates the retention of existing buildings on Henry Street and Moore Street, specifically buildings a Nos. 36 and 37 Henry Street and 8-9 Moore Street. These buildings are not Protected Structures and therefore do not fall under the same limitations for change although there is an ambition to maintain as much of the original structural fabric as practically possible. This will be dependent on the condition and structural integrity of the materials found when the buildings are investigated.

At the next stage of the project, intrusive structural investigations will be undertaken on the structural fabric. This will include a visual structural inspection with the finishes removed and sampling and testing of the structural fabric to test for strength and material properties. Structural works will be limited to essential works required to enable the buildings to provide the required performance and long-term durability. As the approach for these particular buildings is refurbishment rather than replacement, consideration will also be given to the need for ongoing and potentially increasing maintenance given the age of the existing structures.

6.1 Site 3: Basement Impact Assessment

The Basement Impact Assessment (BIA) including a Ground Movement Analysis is included as part of the planning documents.

The Ground Movement Analysis considered each stage of the development including demolition, piling, bulk excavation and construction of the each phase of the development. Predicted ground movements resulting from the works shall be monitored against baseline readings prior to commencing the works. Monitoring of noise and vibration shall be undertaken to all protected structures during the works.

The overall aim of the Ground Movement Analysis included the predicted potential impact of the proposed development to the adjacent buildings and retained structures within the site. A building damage assessment was used in accordance with CIRIA C760 'Criteria of building damage assessment'.

The maximum predicted results predict that the potential damage for all retained buildings and structures within Site 3 remains at categories ranging of Category 0 'Negligible' to Category 1 'Very Slight' damage

during all construction and demolition stages. A full schedule of the predicted ground movement and the associated damage category for all nearby buildings and retained elements is shown in the Basement Impact Assessment.

According to the Site 3 Subterranean Construction Method Statement and in accordance with the DCC guidance, the damage to the existing buildings should not exceed Category 2 generally and Category 1 for protected buildings.

6.2 Site 3 - Temporary Works & Exclusion Zones

Particular consideration has been given to the retained and/or protected structures on or adjacent to the site. These shall be protected during demolition and construction via extensive temporary works required throughout the development that will be coordinated and incorporated into the permanent works. The following proposed retention systems outlined in this report are for guidance purposes only and will be subject to site investigations of the existing conditions and design by the Temporary Works Specialists.

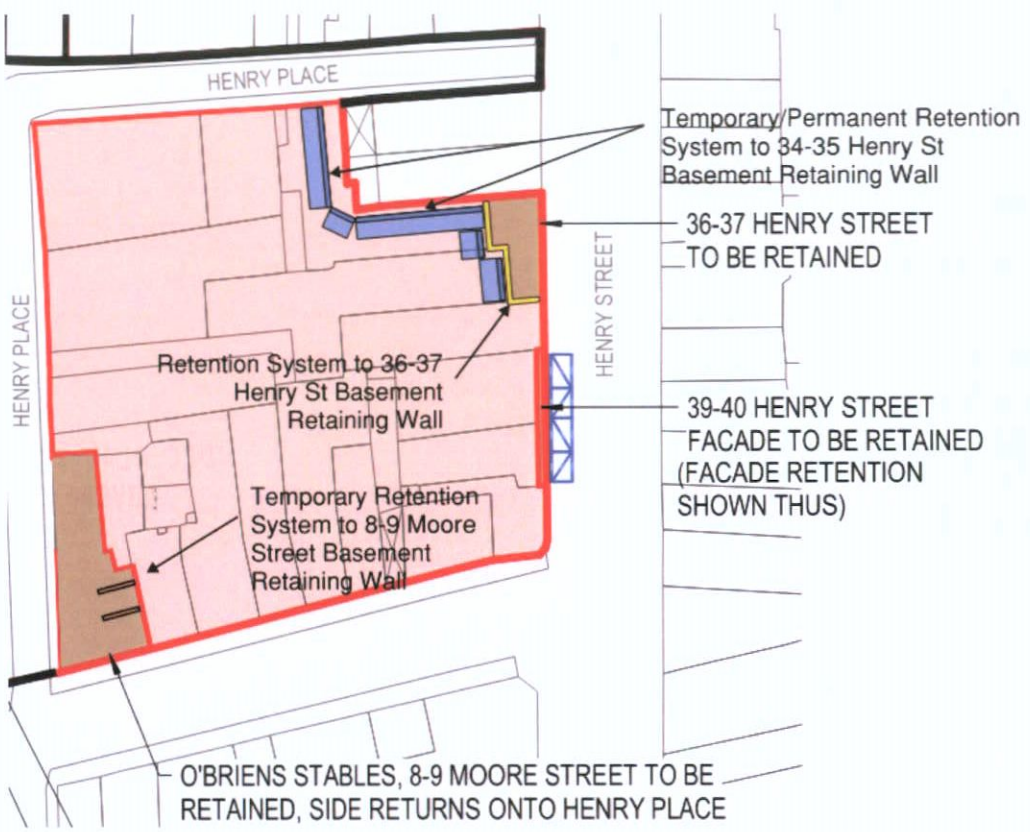

Figure 36 – Site 3 - Extent of Preliminary Temporary Works

As part of the temporary works, great care will be taken during the works to protect the retained structures and exposed boundary/party wall from exposure to weather and general construction activities. This is particularly relevant to the flank wall surfaces of the retained structures which will become exposed.

Typical temporary measures will include the application of felt and battening to the exposed walls as demolition proceeds from top down, or to erect a covering scaffold. This strategy will be developed further during the detailed design stages and will be set out to the main contractors at tender and into construction stages.

6.3 Adjoining & Retained Buildings

The boundary and party walls of the adjoining and retained buildings that rely on the existing buildings for lateral restraint will require a temporary retention system to restrain the existing buildings during demolition and construction stages. This condition potentially exists at the rear of 35 Henry Street and a temporary restraint structure may be required to provide lateral support to this structure during demolition and reconstruction of the new Block A.

This will likely comprise of temporary raking props between the boundary/party walls and thrust blocks located a ground level. The thrust blocks may form part of the foundations to the new development. The temporary raking props will be designed to provide lateral restraint at every existing floor level in addition to lateral wind loads applied to the building.

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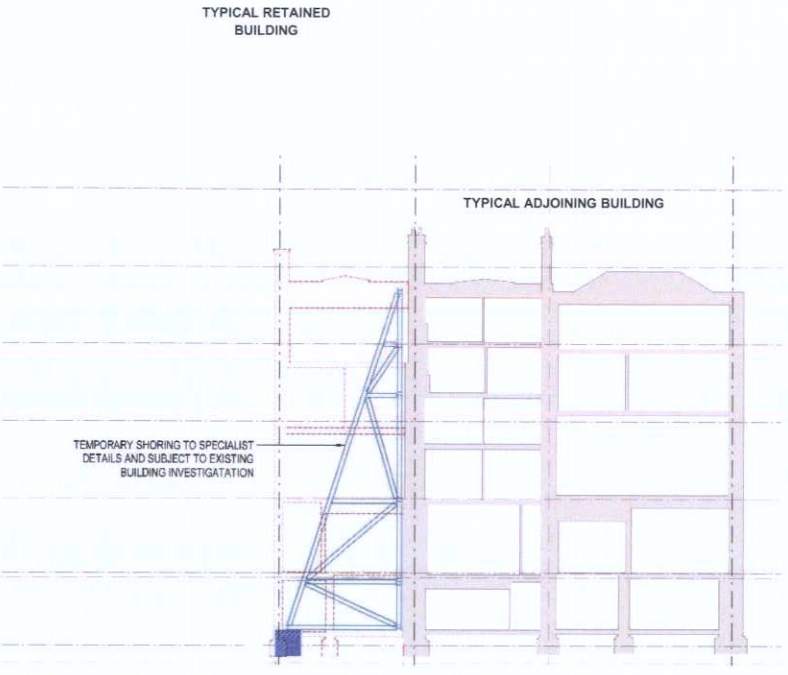


Figure 37 – 34 Henry Street Temporary Boundary/Adjoining Retention System

Once the temporary raking props have been installed the exposed party/boundary walls will be protected from the weather using felt and battens (or as agreed with the neighbouring property owner). The boundary walls and retained structure within the site will be continuously monitored for movement and vibration during demolition and construction.

On completion of the adjoining structural frame, the new development may restrain the existing boundary/party walls via lateral restraint fixings. Typically, these are fixed into the existing masonry walls at every floor level.

Considerations are to be made by the contractor during demolition and construction where the existing building are to be temporarily exposed to external elements, such as new openings for stair connections or where roof structures are being removed. The contractor is to ensure suitable protection is provided through the use of external scaffolding and building sheeting to avoid the ingress of water.

6.4 Retained Façades

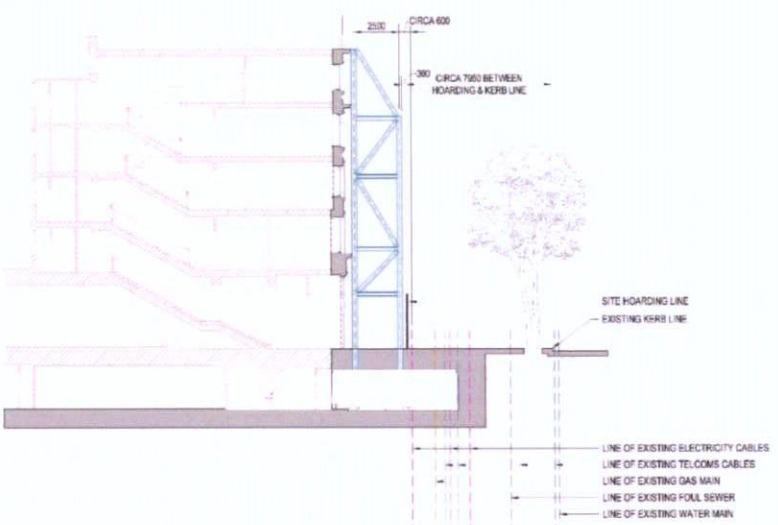
The retained façade at 39-40 Henry Street will require a temporary retention system. The system will be designed by the temporary works specialist but will typically involve a cantilevered steel frame from pavement level, supported on concrete kentledge and laterally restraining the existing retained façade at the existing floor levels. The retained facades will be continuously monitored for movement and vibration through all stages of the project.

Typically, the façade retention system will be located externally to the building envelope to allow for unobstructed for the new construction. However, in certain circumstances where there is not sufficient space or safe access along the pavements or roads, the retention system will be installed on the internal face of the façade. This will need to be factored into the design of the façade retention system, access strategy and construction sequencing. Existing vaults beneath the pavement will also need to be factored into the construction phasing and the design of the façade retention system.

façade retention system will include:

Stage 1 – Installation

- Back-propping of basement vaults where necessary.
- Erection of a cantilevered steel frame on kentledge blocks or piled footings.
- Façade restrained at existing floor or mid-floor levels via steel waling beams either side of the facade fixed using through-bolts located at existing openings or site drilled to locations agreed with the Conservation Architect.
- Timber framing and bracing to the existing window and door openings within the façade via timber bracing/blockwork.

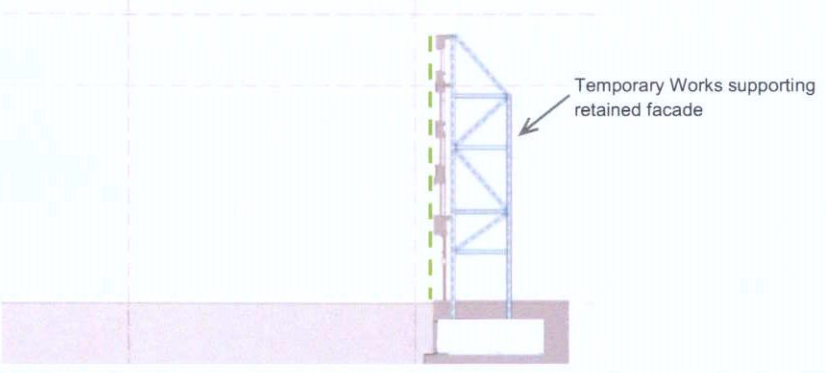


Notes

1. *The temporary façade retention system will be designed later by the Temporary Works Specialist to performance criteria agreed with Waterman.*
2. *The extent of the façade retention system on the pavements and will need to be agreed and approved with Dublin City Council.*

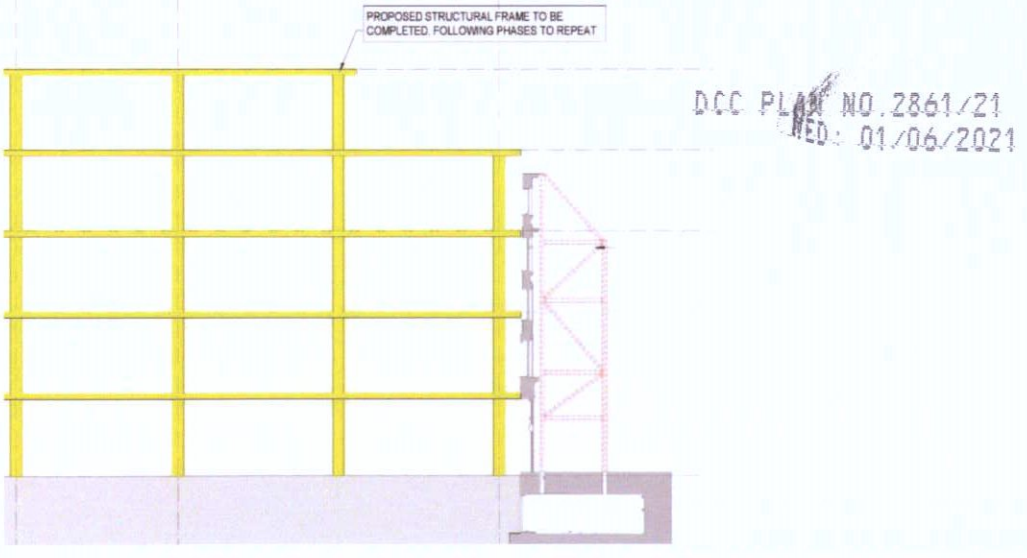
Stage 2 – Demolition

- Demolished adjacent to the retained facades will be undertaken top-down using low vibration demolition techniques. It may be necessary to first saw cut connected elements and isolate the façade from the main demolition works that may cause vibration.
- Temporary weather protection measures (felt and battens) will be applied to the rear of the retained façade to ensure the façade is protected during the works.



Stage 3 – Construction & Completion

- Once the structural frame is completed and new façade and the new restraint fixing have been installed, tested and approved by all parties, the temporary works can be removed.



In the permanent condition the façade will be laterally restrained to the primary structure.

Coordination is to be undertaken with the masonry specialist alongside further investigative works however typical principles involve brackets fixed to the slab edge with a fixing detail to the internal face of the existing façade. Due to the different ground bearing strips and pads and piled foundations solutions for the existing and proposed structures respectively, to avoid stresses in the structure and connections created by differential settlement, vertically slotted holes are provided within the fixing detail. Brackets are to be provided at regular centres and anchor fixings resin bonded into the masonry.

In order to inform the number and type of fixings brick and mortar strength tests will be required to be undertaken on the existing facades. Fixing pull out tests will also be required to confirm capacity of fixings.

The following sections provide typical details for fixings from both a concrete and steel primary frame into a solid masonry wall or embedded steelwork within the masonry. They type of connection to be used on the development will be confirmed following site investigations to confirm the existing construction.

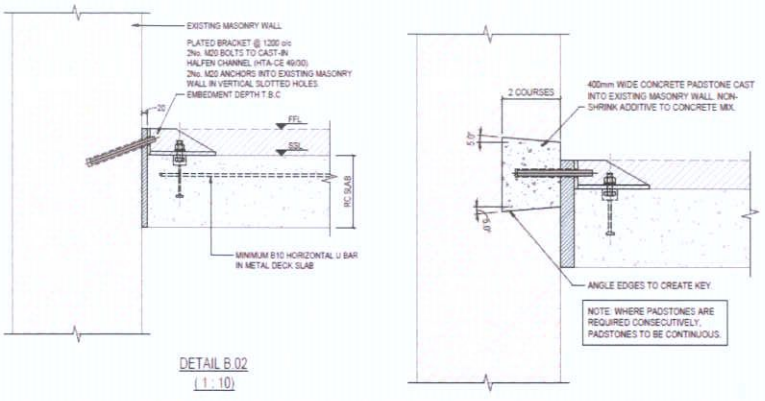


Figure 37 – Typical Permanent Façade Restraint Fixing (RC Frame)

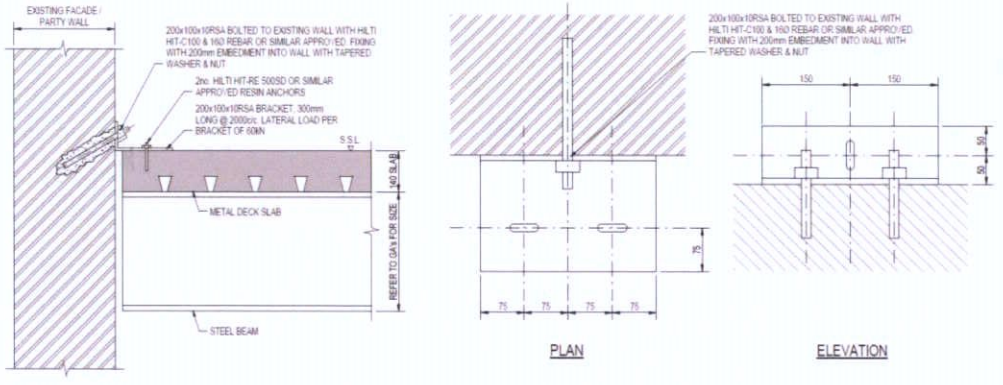


Figure 38 – Typical Permanent Façade Restraint Fixing (Steel Frame)

6.5 Movement Monitoring of Retained and Existing Structures

6.5.1 Overview

Prior to demolition of the existing building, an external survey control system is to be established around the site, including all protected structures, retained buildings, retained facades and the National Monument.

This will be carried out using either traditional closed traverse surveying techniques or continuous automated total station (AMTS) monitoring of movement, depending on the sensitivity of the existing buildings and proposed method of construction/demolition. The form of monitoring will be subject to the condition of the existing structures following site surveys. The Contractor will ensure there are sufficient external control stations to allow for the continuous monitoring of the structures during and after demolition and throughout the construction stage.

The monitoring regime shall have co-ordinates which are directly correlated to the building grids and datum levels related to those shown on the Land Survey drawings, issued by the Architect. An initial control survey is to be carried out by the Contractor and may be independently checked and verified by the appointed survey contractor.

The targets will consist of reflective optical survey targets (typically prisms) that shall be adhered to the external surface of the retained structures and neighbouring buildings. The target locations shall be agreed with the relevant parties and the target adhesive shall be tested to demonstrate that no damage will be caused to the existing building fabric surface upon removal of the targets.

6.5.2 Proposed Monitoring Regime

The retained structures and neighbouring buildings shall be continuously monitored for changes in vertical and lateral movement with real-time data available. The monitoring of movement will be measured against trigger levels with direct alerts (via email/SMS text) sent from the system to nominated persons.

The results shall be measured with co-ordinates in eastings, northings and elevation (E, N, Z) established. A minimum number of baseline co-ordinates shall to be recorded and checked for control purposes 2 weeks prior to commencement of the demolition works. The results are to be recorded and the directional change and quantum movement from the controls and previous readings calculated.

Proposed Trigger Level	Movement (mm)
Green	Less than 12
Amber	Between 12 and 15
Red	Greater than 15

Table 4 – Proposed Movement Trigger Levels

Unless otherwise agreed, movements of any target position equal to or greater than 12mm from baseline readings shall trigger 'amber' and shall be addressed by the Contractor. The Contractor shall advise the Engineer on the reason for the movement and advise his proposals to control further movement.

Movements of any target equal to or greater than 15mm from baseline readings shall trigger 'red' where immediate action is required by the Contractor. The Engineer and Contract Administrator shall be notified immediately.

7. Control and Monitoring of Noise, Vibration and Dust on site

7.1 Condition Surveys

It will be necessary to carry out a detailed condition survey of all adjoining lands and properties prior to any works commencing on site, with particular attention paid to the protected structures noted previously in this report. In addition, baseline movement monitoring will be carried out in line with best practice.

7.2 Noise Monitoring

The contractor will deal with the immediate dangers to hearing etc. associated with high noise levels and the impact of same on construction operatives by means of risk assessment and mitigation / precautionary measures and equipment, all in full compliance with the current Health and Safety legislation.

Noise on site shall comply with Safety, Health and Welfare at work (construction) Regulations 2006 to 2013, Safety, Health and Welfare at Work Act 2005, BS 6187:2011 - Code of Practice for full and partial demolition, BS 5228:2009+A1:2014 Parts 1 & 2 - Code of Practice for noise and vibration control on construction and open sites – Vibration, Environmental Protection Agency Act 1992 Sections 106-108, including all Local Authority specific requirements for this specific site.

A survey of baseline noise and vibration will be undertaken to gain an understanding of the typical range of the existing conditions in the surrounding area. Methods of minimising construction noise and vibration will be implemented where possible. The Main Contractor is to implement these recommendations and utilise the most efficient construction methods to reduce the impact on the neighbouring environment.

The nature of construction activities means that a certain level of noise is inevitable, but the appointed Main Contractor must endeavour to minimise this as far as practically possible and reduce the effect and any nuisance to the surrounding environment and neighbours.

Work methods are to be reviewed to ensure minimal noise and vibration are created; methods should include:

- Each item of plant used on site complies with the noise limits quoted in the relevant European Commission Directive 2000/14/EC/ [S.I. No. 632 of 2001].
- All plant and equipment liable to create noise whilst in operation will, as far as reasonably practicable, be located away from sensitive receptors and neighbouring occupied buildings.
- The use of barriers and hoarding to absorb and/or deflect noise away from noise sensitive areas will be employed where required and reasonably practicable.
- All plant, equipment and noise control measures applied to plant and equipment shall be maintained in good and efficient working order and operated such that noise emissions are minimised as far as reasonably practicable. Any plant, equipment or items fitted with noise control equipment found to be defective shall not be operated until repaired.
- Fixed items of construction plant shall be electrically powered in preference to diesel or petrol driven. The Main Contractor shall ensure that vehicles and mechanical plant employed for any activity associated with the construction works will, where reasonably practicable, be fitted with effective exhaust silencers.
- Machines in intermittent use shall be shut down or throttled down to a minimum during periods between works. Static noise emitting equipment operating continuously will be housed within suitable acoustic enclosures, where appropriate.
- Tower cranes will be utilized instead of crawler cranes as these are electrically powered and quieter in operation.
- Noise suppression hammers and shields will be used on rock breaking equipment.

- Working hours will be confined to those stipulated in the grant of planning permission.
- Noise emitting processes such as rock breaking can be suspended during sensitive hours, to be agreed in consultation with DCC and neighbours.
- Alternative work practices will be investigated where the noise emitted is reduced (for example prefabricating building components off site).
- Site deliveries will be confined to working hours and allocated offloading location will be utilized for all deliveries.
- The Site Manager will also continually review and monitor the noise / dust / vibration levels / risk throughout the duration of the project and if necessary, adjust / add to the control measures to be employed to reduce nuisance.

7.2.1 Measures to Mitigate Noise

Of particular consideration is the noise from construction activities adjacent to the public footpaths and commercial areas (Moore Street, Henry Street and O'Connell Street Upper). Noise mitigation measure will be proposed by the Contractor and may include:

1. The installation of a solid timber hoarding to provide noise insulation.
2. A high-level acoustic wrap applied to the scaffolding to provide some degree of noise barrier.
3. Particularly noisy works can have an acoustic noise control barrier put around them when the works are being carried out.
4. When jack hammers are used a "no racket" jacket will be applied which reduced the noise by up to 10db when 50ft away.

Figure 39 – Typical Noise Mitigation Measures

7.3 Vibration

During the course of the work proposed at Site 3 Ground borne vibrations from the proposed works could give rise to adverse effects to the Heritage Structures / Protected Structures / National Monument and these control measures are to be put in place during the works to ensure protection of the structures and finishes.

7.3.1 Proposed works and potential risks

The proposed works involve excavations; piling works and general construction works of basements, multi-storey framed building and repairs to the historic structures / protected structures themselves immediately adjoining.

Potential risks arising from Demolition and Construction Works identified:

(a) Vibration induced damage from demolition, piling and excavation works.

(b) Physical impact from machinery and /or swing of material deliveries

(c) General implementation of works such as landing shutters / reinforcement / steelwork deliveries in close proximity to the historic / protected structures.

(d) Works to the historic / protected structures themselves.

7.3.2 Vibrations Standards

Vibration standards come in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. In both instances, it is appropriate to consider the magnitude of vibration in terms of Peak Particle Velocity (PPV). Guidance relevant to acceptable vibration within buildings is contained in the following documents:

- British Standard *BS7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration* (hereinafter referred to as BS7385:1993).
- British Standard *BS5228-2: 2009 + A1: 2014: Code of practice for noise and vibration control on construction and open sites – Vibration* (hereinafter referred to as BS 5228-2 2009+A1:2014).

7.3.3 Impact of ground borne vibrations arising from Proposed works

Peak particle velocity (PPV) is commonly used to assess the structural response of buildings to vibration. Reference to the following documents has been made for the purposes of this assessment in order to discuss appropriate PPV limit values:

- British Standard *BS7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration*.
- British Standard *BS5228-2: 2009 + A1: 2014: Code of practice for noise and vibration control on construction and open sites – Vibration*
-

BS7385-2:1993 and BS5228-2:2009+A1:2014 advise that, for soundly constructed residential property and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15mm/s at 4Hz increasing to 20mm/s at 15Hz and 50mm/s at 40Hz and above for transient vibration. Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in Table B.2 might need to be reduced by up to 50%. On a cautious basis, therefore, continuous vibration limits are set as 50% of those for transient vibration across all frequency ranges.

The documents note that minor structural damage can occur at vibration magnitudes which are greater than twice those presented in Table 5. Major damage to a building structure is possible at vibration magnitudes greater than four times the values set out in the Table. It should be noted that these values refer to the vibration at base of the building.

Historically important buildings, that are difficult to repair might require special consideration on a case by case basis, but buildings of historical importance should not be assumed to be more sensitive unless they

are structurally unsound. If a building, is in an unstable state, then it will tend to be more vulnerable to the possibility of damage arising from vibration or any other groundborne disturbance.

The vibration limit range for protected and historical buildings are equal to or up to 50% of those for light framed, depending on their structural integrity. Where no structural defects are noted, the same limit to those for light framed buildings apply. For other structures and buildings that are determined to be potentially vulnerable to vibration due to significant structural defects, a further stringent criteria has been applied for transient vibration. It is assumed that known buildings and structures of this kind, will be subject to condition surveys well in advance of the works, and any defects identified repaired. The results of conditions surveys will determine whether a building or structure is classed as "vulnerable".

Table 5 sets out the limits as they apply to vibration frequencies below 4Hz where the most conservative limits are required. At higher frequencies, the limit values for transient vibration within Table B.2 of BS5228-2:2009+A1:2014 will apply, with similar reductions applied for continuous vibration and those for protected structures.

Structure Type	Allowable Vibration (in terms of PPV) at the Closest Part of Sensitive Property to the Source of Vibration, at a Frequency of 4Hz and less:	
	Transient Vibration	**Continuous Vibration**
Reinforced or framed structures. Industrial and heavy commercial buildings	50mm/s	25mm/s
Unreinforced or light framed structures. Residential or light commercial-type buildings	15mm/s	7.5mm/s
Protected and Historic Buildings *Note 1	6mm/s – 15mm/s	3 mm/s – 7.5mm/s
Identified Potentially Vulnerable Structures and Buildings with Low Vibration Threshold	3mm/s	

- *Note 1: The relevant threshold value to be determined on a case by case basis. Where sufficient structural information is unavailable at the time of assessment, the lower value within the range will be used.*

Table 5 – Thresholds relating to the Transient and Continuous Vibrations in buildings and structures

7.3.4 Mitigation Measures to be put in place prior to works

For controlling vibration reference should be made to BS 5228:2009+A1:2014 which offers detailed guidance on the control of vibration from demolition and construction activities. In general BS5228:2009+A1:2014 advises the following:

- Use rubber linings in, for example, chutes and dumpers to reduce impact noise.
- Minimize drop height of materials.
- Regular and effective maintenance by trained personnel should be carried out to reduce vibration from plant and machinery.

- Hand demolition, cutting of the separation joints of the buildings in advance and small robotic breakers and 'munchers'

Level of protection and procedure put in place will be dictated by potential risk resulting from work to be carried out.

The proposed construction methodology for the structures directly adjacent to upstanding historic structures will be designed by the contractor to ensure that all protection measures are adhered to and that all new works are undertaken in such a way as to limit vibration.

All works within the sensitivity zones of the historic structures will be carried out using piling and excavation and assembly techniques to ensure vibration levels are kept below the threshold level.

7.3.5 Monitoring and Mitigation for Ground borne Vibrations during Construction Works

Detailed monitoring will be used to control the proposed works and to ensure compliance with the proposed control limit to protect the Historic Structures / Protected Structures / National Monument.

Vibrations movements will be actively measured during the works with a pre-determined plan of action ready to be put in place should actual measurements vary from the expected levels.

The works will have appropriate level of site management, on site monitoring and supervision. A site representative will be present during the works to ensure the levels are as expected and to supervise any measures should the levels be exceeded.

A real-time response remote monitoring system with warning system will be adopted to monitor vibration. This is to be continuously monitored by on site personnel during demolition; excavation; piling and general construction works. Review of the monitoring data will happen concurrently with the works to ensure that corrective action is undertaken if a limit is breached, or if the developing trend in measurements indicates a limit may be breached if works continue. This real time review and response of the monitoring data is critical to ensuring no limit is exceeded.

In the event that control limit is approached the contractor for the works will explore a revised approach for completion of the works.

Monitoring will include vibration monitoring carried out at the historic structures along with survey points installed on the walls of the historic structures to monitor any movement during the works.

Tell-tale crack monitors will also be installed on existing defects on the historic structures and or its boundary wall where appropriate.

In accordance with established good practice, baseline monitoring will be undertaken in advance of the proposed works in order to establish the existing environment around the historic structures and to verify the correct operation of the proposed instruments.

A series of trigger limits will be set for the works following what is commonly called a 'traffic light' system.

- For measurements below an 'amber limit' works can continue.
- For measurements between an 'amber/red limit' and below the 'red limit' operations will be suspended immediately. The construction methodology will be reviewed and adjusted as required to allow works to proceed on a manner that maintains the integrity of the historic structures.
- Works can continue between the amber and maximum red limit but only when methodologies have been revised to attempt to bring vibrations back below the amber level and also with a greater level of monitoring and control.

Should vibrations go above the red limit works will be suspended for a full review of the exceedance event(s); revision of works procedures and approval by the clients' representatives / OPW before operations can proceed again.

7.3.6 Limits for Ground Borne Vibrations

Vibration monitoring and controls are required to be installed prior to the works commencing and for the full duration of the works to ensure the proposed control limit is not exceeded thus avoiding adverse impacts on the historic structure.

A warning threshold shall be implemented as per the limits outlined in Tables 5 above.

Baseline vibration monitoring will be undertaken prior to commencement. The baseline readings should be referenced and incorporated into any Agreement with neighbouring properties and DCC on maximum vibration limits permissible when working nearby.

Toolbox talks should also be carried out with personnel in respect to managing vibration on site. Exposure limits as set out in Regulation 4 of BS 5228:2009+A1:2014 will be reviewed, risk assessments carried out, detecting signs of injury, safe working practices and suppression techniques will all be incorporated. Methods of construction should be adopted to omit and or control vibration at the source, utilize lower levels of vibration; use vibration pads and gloves where possible. Any activity which will generate vibration should as far as practicable be isolated from sensitive receptors.

7.4 Air & Dust Management

A dust management plan will be compiled by the Main Contractor for the development.

The following precautions to minimise nuisance to the public and neighbouring occupiers caused by dust and dirt will be carried out by the contractor.

- Vehicle and wheel washing facilities shall be provided at site exit where practicable. If necessary, vehicles are to be washed down before exiting the site.
- Netting is to be provided to enclose scaffolding to mitigate escape of air borne dust from the existing buildings.
- Shroud piling machinery as shown below when operating near to boundaries.
- Engines and exhaust systems should be maintained so that exhaust emissions do not breach stationary emission limits set for the vehicle / equipment type and mode of operation.
- Dust emission over the site boundary should be minimised using static sprinklers or other watering methods as necessary.
- No burning of materials to be permitted on site.
- Water sprays for dust suppression should be affixed to mechanical excavators/munchers involved in demolition works.
- Demolition waste should be removed from site as quickly as possible to minimise risk of dust generation and any fine material should be covered with a tarpaulin or similar material and tied down.
- Water sprays and cannons should be used where possible during cutting, with protective measures applied to retained finishes local to the cutting.
- Prior to commencement, the Main Contractor should identify the construction operations which are likely to generate dust and to draw up action plans to minimise emissions.
- In areas of poor natural ventilation, dust capture/extraction methods should be employed by the Main Contractor.
- The Main Contractor should allocate suitably qualified and experienced personnel to be responsible for ensuring the generation of dust is minimised and effectively controlled.
- The Main Contractor will be required to appoint a senior member of its site management team to act as the liaison with third parties in respect of complaints regarding dust and or site activities.
- Monitoring of dust deposition should be undertaken at nominated boundary locations to ensure that dust levels comply with the TA Lift limit value of 350mg/(m²/day) based on a 30-day average using Bergerhoff gauges (Limits to be agreed with local authority).

Figure 40 – Typical Dust Mitigation Measures

8. Archaeology

Archaeological monitoring will take place where any preparatory ground reduction works are required including site investigation works and opening up works at basement or ground levels. Post-demolition archaeological investigation will be carried out in areas across the site without basements. This is required to establish the nature of below ground structures, foundation remnants and features of archaeological and historical importance and to establish the presence or otherwise of archaeological remains. Further resolution may involve the recording of historic features and full archaeological excavation (i.e., preservation of the archaeology in record form, of all archaeological soils or features encountered). The resolution will occur during this post demolition phase in the area of the find spot in advance of the main construction phase.

9. Building Control Amendment Regulations

9.1 Quality Assurance during Construction and BC(A)R Compliance

The Main Contractor/Contractors will need to demonstrate how they will be providing quality in construction. They shall comply fully with all requirements of the Amended Building Control regulations to the satisfaction of the Ancillary and Assigned certifiers.

The Main Contractor/Contractors will be responsible for the preparation of benchmark samples of each new element of the works to the satisfaction of the Assigned and Ancillary Certifiers under the Building Control regulations (BCAR). Each benchmark sample will be considered a 'hold point' under the Preliminary Inspection Plan (PIP) and will be required to be offered up to the Certifiers involved ahead of the works starting - with a minimum of two days' notice (in writing).

The Main Contractor/Contractors will be required to keep pre- and post-pour check sheets for submission to the assigned and ancillary certifiers where required.

Written acceptance will be required from the Certifiers after inspection of the benchmark samples before the rest of the works proceed.

Where 'specialist' suppliers are noted by the design team to have design responsibility, they will be required to provide Certificates of Design (Sd), Certificates of Inspection (Si) and Certificates of Completion (Sc). Ahead of appointment of the 'specialist' suppliers / designers - evidence of competency and Professional Indemnity insurance cover will be required for the approval of the Contract Administrator and Waterman Moylan.

This is to be confirmed by the Main Contractor/Contractors once appointed and will include a quality check regime.

10. Liaison with Third Parties

It is imperative that the Main Contractor/Contractors engages in discussions with local residents, businesses and the general public well in advance of work commencing on site. Formal communication should be provided to immediate neighbours regarding activities or possible disruptions.

The appointed contractor will be required to adopt the practices covered under the 'Considerate Constructors Scheme' for establishing a good neighbour strategy and maintaining good relationships with neighbouring communities. The ideas described within this scheme will be implemented on site where applicable to minimize negative impact on local community and the environment.

Handling of any complaints must be logged and actioned quickly by the Main Contractor/Contractors.

APPENDIX A

Site 3 – Site Setup