XAVIER KNIGHT

Buildability and Construction Methodology Report

210223 – 42 North Steyne, Manly

Contents

QUALITY CONTROL REGISTER
This report has been prepared and checked as per below.

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Authorised by:	Andy Yuen		27.10.2021

1 Document Summary

Project Number:	210223
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XK Project Director:	Andy Yuen

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2 Introduction

Xavier Knight Consulting has been commissioned by IRIS Capital to prepare a Buildability and Construction Methodology Report for the proposed development at 42 North Steyne / 75 The Corso, Manly.

2.1 REVIEWED DOCUMENTS

IRIS Capital has provided a number of historical documents relating to IRIS Capital which have been utilised to inform this report. We understand that the majority of documents were sourced from Northern Beaches Council via either GIPA or via reference to documents publicly accessible via Northern beaches Council DA Tracker website. These documents include:

- Steyne Hotel historical Architectural drawings titled "Steyne Hotel, Manly, Plan of Rebuilding", referenced A.O. Plan 71109, 71110 and 71111prepared by Copeman Lemont and Keesing Architects and dated March 1935. This includes Cellar Plan, Ground Floor Plan and First Floor Plan.
- Steyne Hotel historical Architectural drawings titled "Steyne Hotel, Manly, Proposed Alterations", referenced A.O. Plan No. 71112, 71113, 71114 and 71115 prepared by Copeman Lemont and Keesing Architects and dated 5/08/1939.
- Steyne Hotel historical structural engineering plans prepared by Hughes Trueman Consulting Engineers and dated August 2003
- Pre-lodgement Meeting Notes addressed "75 The Corso (The Steyne Hotel) and 42 North Steyne, Manly", referenced application No. PLM2021/0173, prepared by Northern Beaches Council and dated 29/07/2021.
- Desktop Geotechnical Report prepared by FES dated October 2021 and referencing neighbouring site geotechnical reports:
- Architectural drawings addressed "42 North Steyne, Manly, NSW", prepared by Baka Organic Design and dated November – December 2000. This includes the drawing nos NDA 1/10, 2/10, 3/10, 4/10, 5/10, 6/10, 7/10, 8/10, 9/10, 10/10 and C/D/1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22
- Architectural drawings addressed "42 North Steyne, Manly, NSW", prepared by Baka Organic Design and Assoc and dated 23/04/2001. This includes the drawing no.'s BC-1/5, 2/5, 3/5, 4/5 and 5/5.
- Structural drawings project tilted "Proposed Development, 42 North Steyne, Manly", referenced project No 6515, prepared by Tierney and Partners Pty Ltd and dated October 2000. This includes the drawing no's S01, S02, S03, S04, S05, S06, S07, S08, S09, S10, S11, S12, S13,

In addition to the historical documents referred to above, the proposed development is described by Architectural drawings project tilted "42 North Steyne Manly NSW 2095", prepared by Squillace Architects and dated October 2021.

3 The Development

3.1 SUMMARY DESCRIPTION

The proposed development is for substantial alterations and additions (new building) to the site known as 75 The Corso and 42 North Steyne Manly, legally described as Lots 100, 101 and 102 in Deposited Plan 1069144 and Lot 1, DP 1034722. The works allow for the adaptive reuse of the existing buildings, with demolition of existing facade elements and internal elements, building services and amenities; construction of retail/office premises at the ground floor facing both the eastern and western exterior of the site, as well as construction of seven (7) apartments across four building levels, each containing four bedrooms, replacement of plant and installation of new plant on the rooftop.

The proposal includes the retention of both the existing 42 North Steyne vehicular access driveway and majority of existing basement car park together with the extension of the existing basement generally into part of 75 The Corso (beneath the Steyne Cafe building), for the purpose of creating augmented car parking and amenities.

Stratum and strata subdivision will be required.

Note that at the time of writing, Northern Beaches Council is currently in the final stages of arranging consolidation of Lot 1, DP 1034722 with Lots 1, 2 and 3 DP 1042657. NBC Ref : DA2021/0532.

3.2 DETAILED DESCRIPTION

A detailed description of the scope is as follows:

3.2.1 Demolition

- Demolition of existing services located within the basement of 42 North Steyne and removal of part of the existing basement retention wall between 42 North Steyne and 75 The Corso, to allow for excavation for an extended basement
- Demolition of existing elements contained within part of 75 The Corso, being that portion of the site that is separate to the existing Steyne Hotel (the Steyne Cafe building), through all building levels.
- Demolition of existing internal walls, along with the eastern, southern and western wall of 42 (aside from the existing stair and lift walls in the centre of the building), noting the northern wall is to remain
- Minor demolition to existing lifts (2 of) and for creation of a new lift. Demolition of a minor portion within the Steyne Hotel for the purpose of accommodating new services
- Demolition of existing plant and equipment on the roof top level of both 42 North Steyne and the Steyne Cafe building
- Required temporary and staging works to maintain the structural integrity of Steyne Hotel, 42 North Steyne and neighbouring 46 North Steyne throughout the demolition phase
- Required temporary protection and staging works to maintain Steyne Hotel operational throughout the demolition phase

3.2.2 Construction

- Construction of a new lift pit and commercial bathrooms on the lower basement level
- Construction of a new wall below part of 75 The Corso, basement parking to accommodate __ vehicles, including one disabled space, fire stairs, services, lift and accessible bathroom
- Construction of a new retail space (café) including Steyne hotel reception on the eastern side, with lobby adjacent on the northern side; office/retail on the western side, adjacent the northern boundary, to ensure activated presentation to both street frontages
- Construction of bathrooms to service ground floor uses (including the existing pub component of 75 The Corso), storage, garbage, lifts, back of house facilities, services and fire stairs
- Construction of a new lift within 75 the pub component of the Steyne Hotel, contained within 75 The Corso. Modifications to 2 other Steyne Hotel existing lifts
- Construction of two apartments per level, containing four bedrooms, on Levels 1-3
- Construction of one apartment of Level 4, containing four bedrooms, and building services
- Construction of lift overrun, minor services and air conditioning plant.
- Construction of new private open space areas to the eastern and western building elevations to service each apartment, as well as a green wall to the western elevation of No. 41 to improve the visual presentation of the existing form to the laneway
- Construction of a Green Wall on Henrietta Lane
- Required temporary and staging works to maintain the structural integrity of Steyne Hotel, 42 North Steyne and neighbouring 46 North Steyne throughout the basement excavation and subsequent construction phase
- Required temporary protection and staging works to maintain Steyne Hotel operational throughout the basement excavation and subsequent construction phase

3.2.3 Subdivision

- Stratum and strata subdivision as required.

4 Structural Design Summary

For the purposes of this report, the proposed development can be generally divided into three sections, identified as site A, site B and site C, as described below:

4.1 SITE A – STEYNE HOTEL, 75 THE CORSO

The site is identified as Steyne Hotel, 75 The Corso, Manly NSW 2095. The site is Heritage listed, with Heritage protected walls along the majority of the boundaries facing The Corso and North Steyne. Within this portion of the site, the proposed development is summarised as follows:

- The site is to remain largely as is and operational throughout the redevelopment;
- A new Level 1 landing to Lift 4 is proposed. The landing will be constructed of light weight prefabricated framing and floor plate supported from the existing lift shaft structure and building fabric at Level 1.
- Goods Lift 5 will be modified to add an additional door opening at ground floor to face north into the new loading bay.
- The boundary wall to the North, which abuts Site B is proposed to be retained at the front (east) and rear (west) wings of the building. Underpinning and temporary and/or permanent shoring will be coincident with the installation of the Site B, basement perimeter retention wall. Refer to Section 4.4 and Section 4.5 for further details.
- The boundary wall within the external Hotel courtyard is to be demolished. Therefore, no underpinning and temporary and/or permanent shoring is required.
- A new passenger lift Lift 3 is proposed including a new lift pit. Refer to Section 4.6 for further details.

4.2 SITE B – STEYNE CAFÉ, 75 THE CORSO

This is currently part of the property 75 The Corso, Manly NSW 2095 and identified as Cafe Steyne. The site is proposed to be amalgamated with the site C (42 North Steyne) during the redevelopment and will become part of the proposed new property 42 North Steyne. The existing structure is a three-storey building with no basement level.

The design and construction methodology is summarised as follows:

- Isolate the retained facades and building structure of Site A – Hotel Steyne Building and Site C – 42 Steyne Building from the Site B building to be demolished utilising saw cutting and other suitable detailed demolition methods. Refer to Section 6 for further detail regarding isolation prior to demolition and vibration limits and control. Refer to Section 4.4 and 4.5 for further details regarding retained Site A boundary walls and façade.;
- Demolish the Site B Building, facade and boundary walls, to the extent indicated on the proposed development drawings;
- Install new retention wall system along boundary to south, east and west. The retention wall system will be engineered to:
    - Underpin or temporarily and permanently shore the existing shallow footings for Site A – Hotel Steyne building. Refer to Section 4.4 for further details.
    - Act as the shoring wall for the new excavation for Site B basement. Refer to Section 4.5 for further details.

- Undertake excavation for a single basement level with bulk excavation levels to suit the new basement carpark. Staging of excavation and temporary lateral support of retention wall is required. Refer to Section 4.4 and 4.5 for further details.

- Construct the new building structure including footings, verticals, laterals and floorplates, using conventional bottom-up methods. This includes the new temporary and permanent transfer structure at the boundary between Site B and C. New footings or augmentation of the existing footings are required to suit the amended basement column layout. Refer to Section 4.7 for further details. At each level the floorplate of the new building extension will be structurally tied to the existing level with drill and epoxy dowels, or similar, to the structural engineer's requirements.

- Following completion of the new structure at Site B including the installation and activation of the transfer structure system, small machine rigs can commence demolition works of the existing, now redundant, geocast wall and demolition of the now redundant whole columns or parts of the columns that are no longer required for structural adequacy, at the boundary between Site B and Site C. Access for the rigs and for removal of spoil will be via the existing basement ramp of Site C. Careful detailing, including a methodology and appropriate engineering supervision and quality control is necessary. Demolition will be facilitated using debonding materials, as described in Section 4.7. This can be supplemented using other techniques such as shallow saw-cutting and core holing. Demolition should be done with predominately hand-held tools to mitigate the risk of damage to the retained permanent structure.

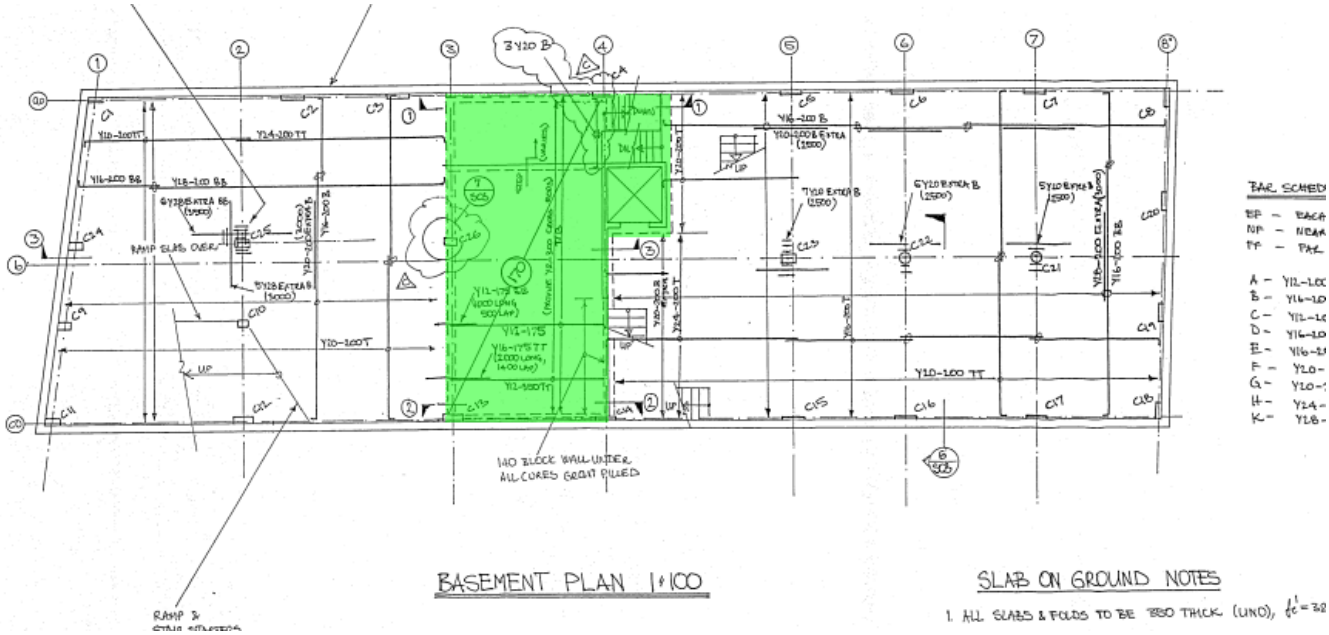
- Construct new RAFT slab extension, from Site C into Site B. There will be a step between the level of the existing structural RAFT slab of Site C and the new RAFT slab in Site B, as the existing RAFT slab was tiered with a lower and upper basement level. A structural connection with a fold-beam at the interface will be implemented to connect into the existing raft slab at Site C. Refer to Section 4.3 for further details. The new RAFT slab will be appropriately keyed into the retention wall at all edges. At all joints, consideration will be given for waterproofing requirements (noting that the existing raft is above the groundwater table level). Refer to Section 4.5 for further detail regarding the existing water table level and waterproofing requirements.

4.3 SITE C – EXISTING 42 NORTH STEYNE

A significant project initiative is the retention and adaptive reuse of the majority of the existing concrete structure of Site C – 42 North Steyne, as part of the proposed redevelopment scheme. The benefits of this approach include:

- Elimination of approximately 540 m3 of demolished concrete structure, which would otherwise be taken to landfill.
- Elimination of the associated social impacts on the local community including noise, vibration, dust and pollutants, and traffic disruptions caused by the equivalent of 108 truckloads of rubble and debris;
- Elimination of the embodied CO_2 gasses from the atmosphere which would otherwise arise from the replacement of this existing structure with a new structure;
- A reduction in construction traffic and construction traffic noise and disruption within Henrietta lane, arising from new construction works, which equates to approximately 150 truck deliveries of concrete and steel and the operation of concrete pumps;
- An estimated 2-3 month reduction in the overall construction program including the impacts on Henrietta Lane and the surrounding community as described above.

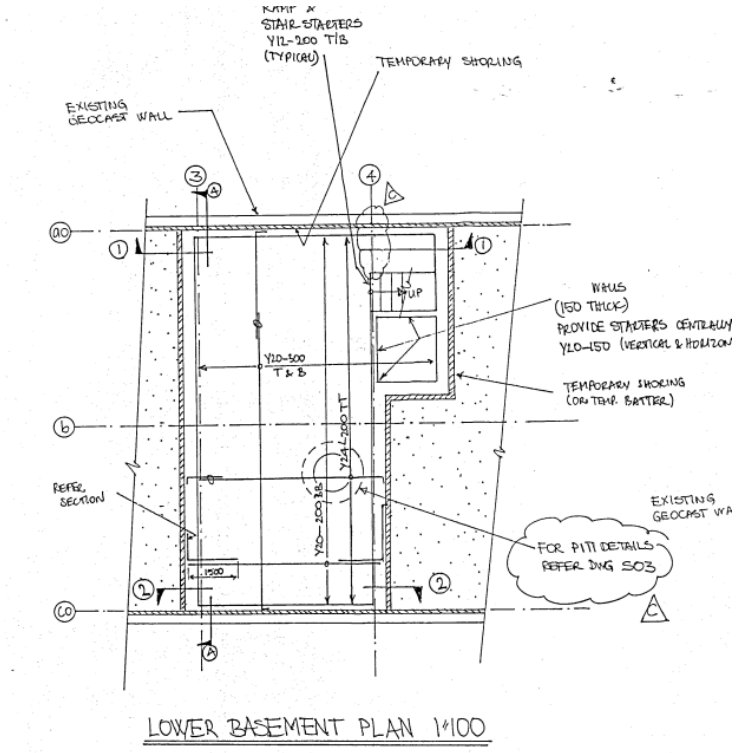
SITE C is proposed to be amalgamated with site B during the development and will become part of the new property 42 North Steyne. The existing structure is a five-storey building with two basement levels. The existing upper basement level extends to the site boundary. However, the lower basement level extends to small portion of the site as shown in the figure below.

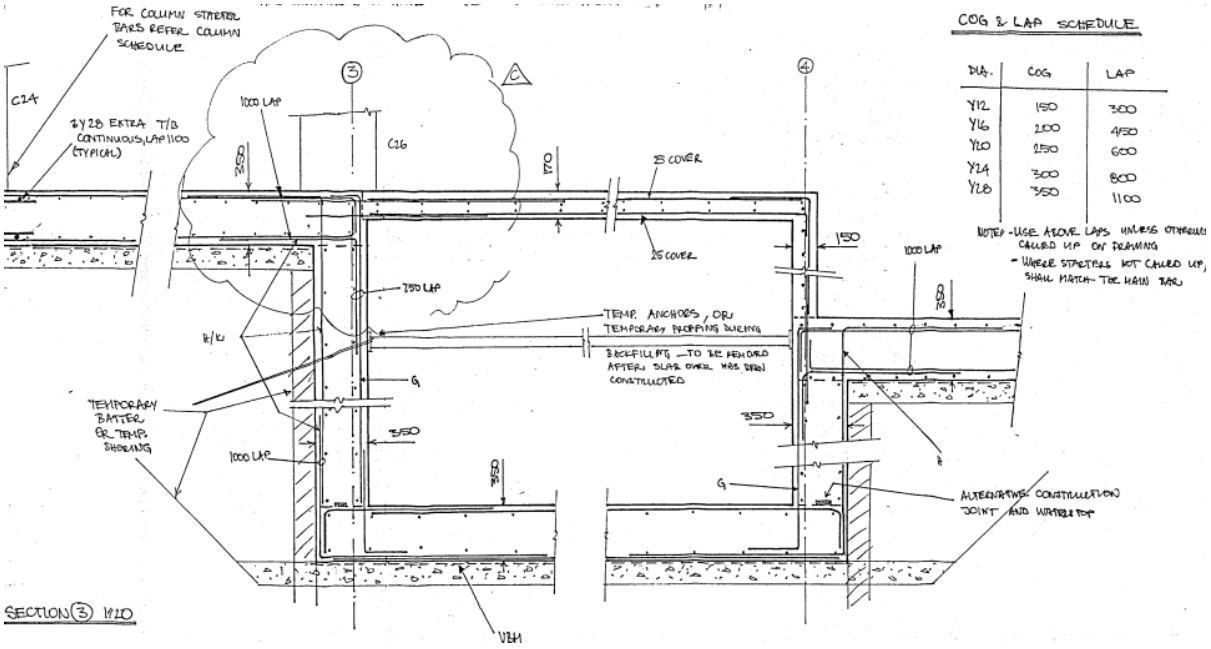


The proposed development within the site is to extend the floor plate areas and the upper basement level across to site B.

4.3.1 Construction of new lift pit for Lift 1 in lower basement

The level of the existing lower basement level is at approximate RL of 0.15 in the proposed commercial bathroom and 0.35 in the former amenities area. Preliminary desktop studies of the groundwater conditions, as per the geotechnical report, indicate that the standing water table level is at approximate RL of between 0m AHD and 1.0m AHD. Therefore, the existing lower basement should have been designed as a tanked basement. This is indicated by the historical structural engineering documentation (extract below).





During site inspections undertaken by XK, there was no evidence of water ingress issues. A drain was also observed. Refer to the photo below.

The new Lift 1 does not service the existing lower basement level. It only services the upper basement and requires a relatively shallow lift pit of approximately 1.2m. The RL of the lift at carparking basement level is approximately 2.85m AHD. Therefore, the RL of the top of the lift pit is approximately 1.65m AHD, with the soffit at approximately 1.25m to 1.35m AHD, for a 300mm to 400mm deep lift pit slab. Therefore, the soffit of the new lift is above the predicted upper bound of the standing ground water level.

The new lift structure can be designed and constructed, without needing to demolish the tanked lower basement structure. The new Lift 1 pit and lift walls are proposed to be constructed on top of the existing lift walls. The existing lift walls will be cut and demolished at the soffit level of the new lift pit base. The new structure will be structurally connected to the existing structure. Suitable engineering will be undertaken to ensure that this is structurally satisfactory, with details to be developed during the CC Stage.

4.3.2 Demolition to existing basement suspended slab over lower basement

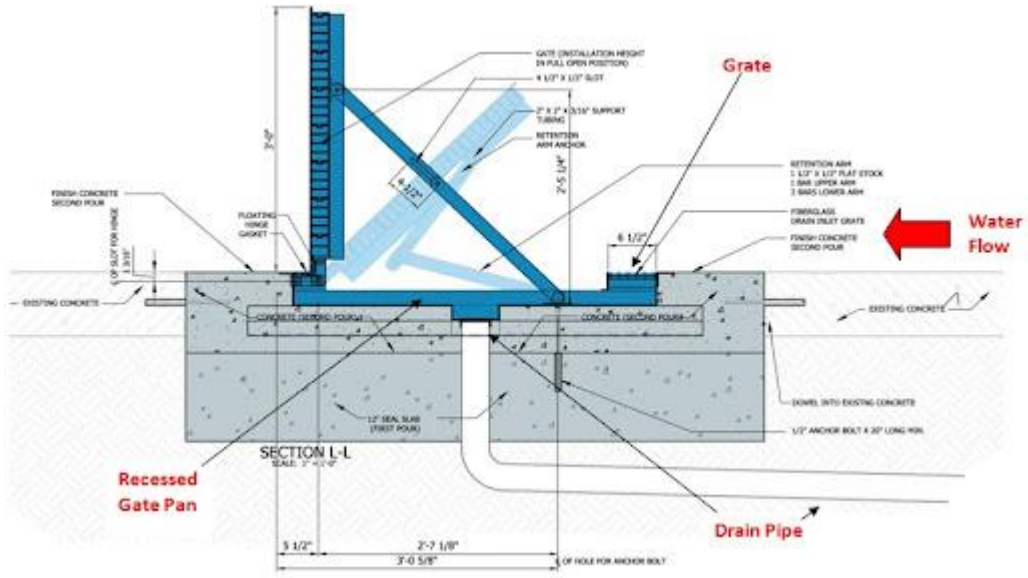
For the new basement level, demolition of the small existing suspended slab above the lower basement tanked pit is required to suit the new carpark levels. This slab is currently providing localised lateral support to the existing geocast wall. Prior to demolition, temporary lateral bracing will be suitably engineered and installed, until the new suspended slab is re-constructed and the lateral support is thus permanently reinstated. Alternatively, the demolition/construction can be staged such that this scope of work is undertaken after the excavation has taken place for site B. In this scenario, the soil surcharge load is reduced and therefore, lateral stability may be sufficient without the need for additional temporary bracing.

Another separate smaller demolition is proposed for new Lift 2. As this penetration is not adjacent to a boundary wall and is relatively small, its impact upon lateral support of the shoring wall is not significant. Care must be taken not to damage the existing steelwork lateral bracing structures around the existing stair to the lower basement, until separate new temporary or permanent structure is installed. Refer to the photo below.

4.3.3 Requirement for Flood Barrier at Basement Ramp Entry/Exit

Northern Beaches Council advise that the site is affected by flooding with a design PMF of 5.52m AHD at Henrietta Lane. A self-activating flood barrier system will be constructed at the basement entry, as shown on the architectural drawings, to protect against public realm flooding waters from entering the basement. The existing ramp will be locally modified to accommodate the new flood barrier. The flood barrier type proposed is a self-activating pivot barrier. The final flood barrier arrangements will be developed at the CC stage. Refer to this link for an example of a self-activating pivot flood barrier:
https://www.floodfree.com.au/project/springvale-underground-car-park-entry

An image is also shown below.



4.3.4 New topping slab towards eastern side of basement

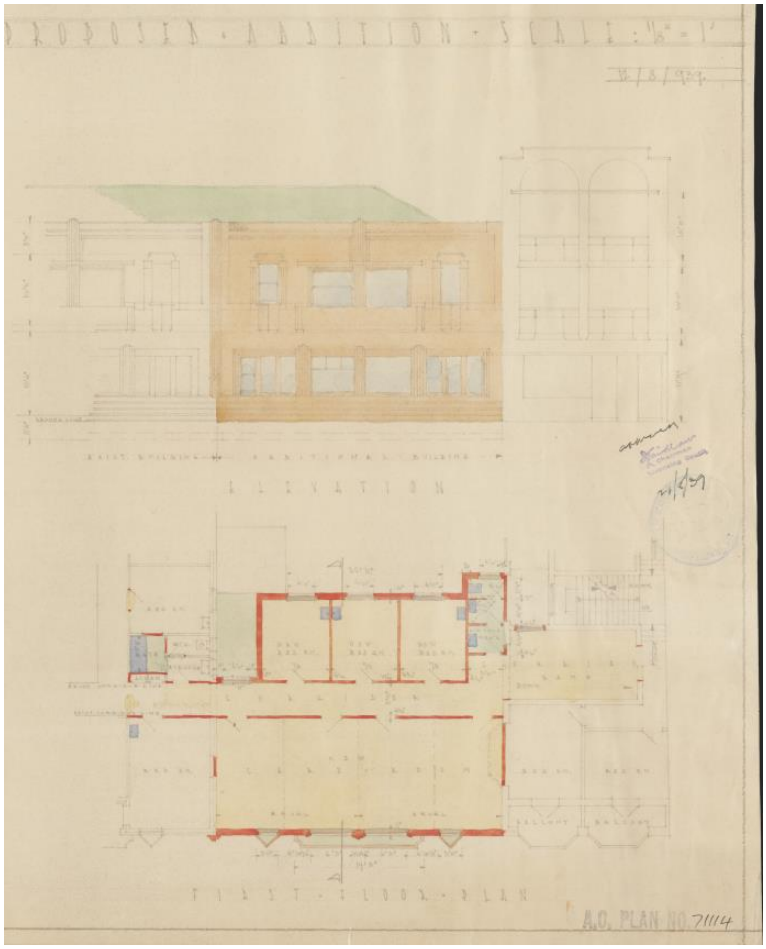
The existing basement of Site C is currently tiered at two main levels, one level for basement carparking and the other for the former nightclub. The level is higher at the west and lower at the east with a step and stairs in between. To achieve the required basement RLs for the carparking, the lower eastern side of the basement must be raised. Typically, a new suspended concrete slab will be constructed, supported on dwarf walls or stub columns. If walls are adopted then holes will be required at the base to allow for drainage of water to the basement slab drainage system. The existing slab will need to be investigated to identify if there are falls in the surface. If existing falls are not present or are inadequate, a bonded topping slab will be constructed to provide falls to drain locations.

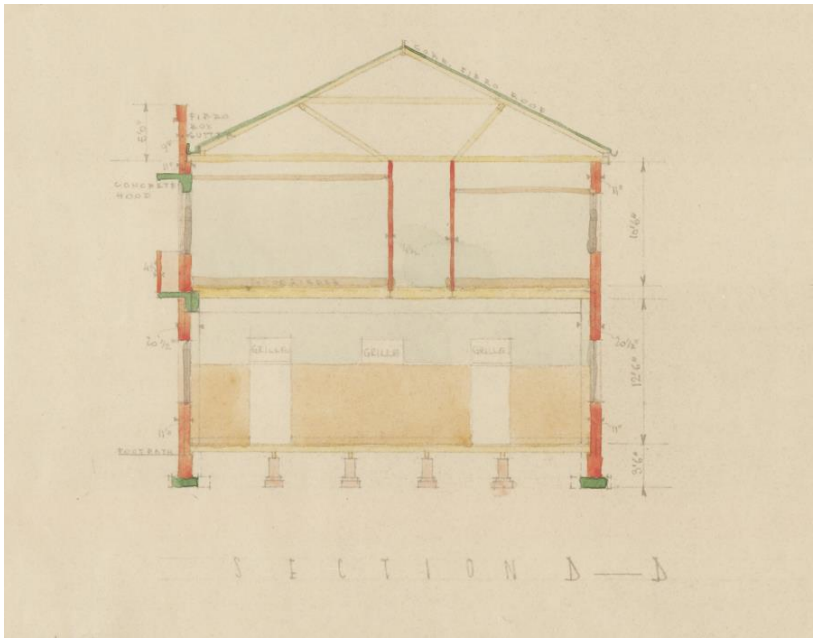
4.3.5 Changes to existing vertical support locations

Adjustment of existing columns will be undertaken as generally described in Section 4.6

4.4 UNDERPINNING AND TEMPORARY OR PERMANENT SHORING OF EXISTING STRUCTURES

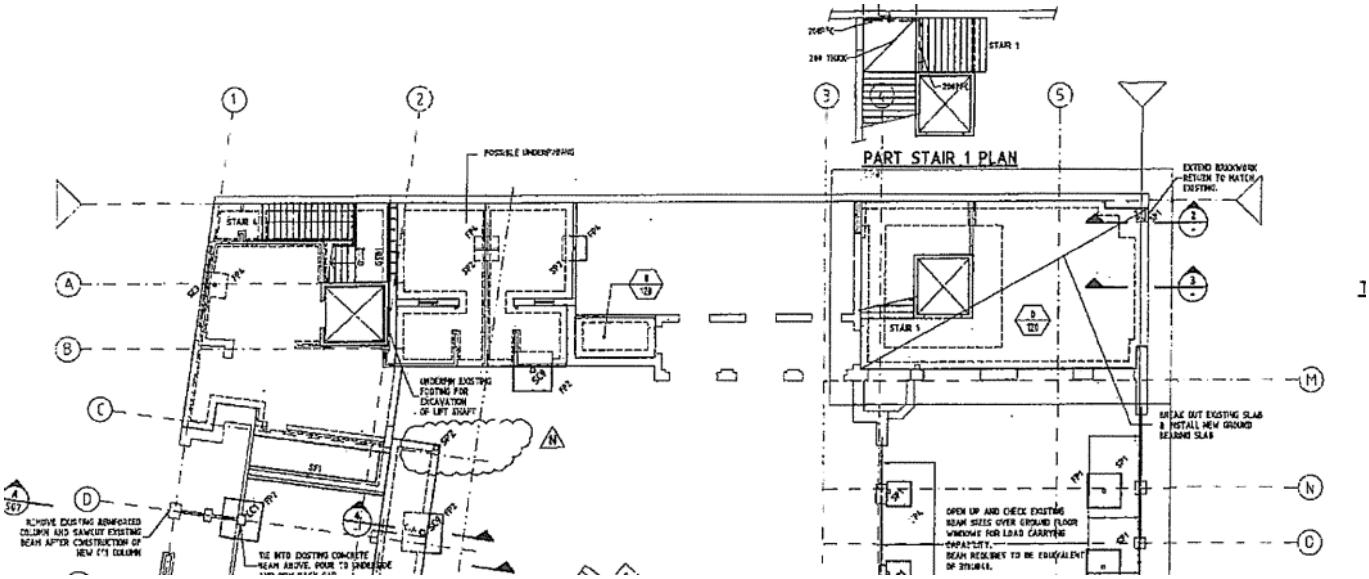
Underpinning is required to maintain and protect the Site A – Steyne Hotel against any damage during the redevelopment works. Predominately it is required for the retained portions of the façade and structures adjacent to the Site A and Site B boundary, the general arrangements for which are as indicated on the historical 1939 and 1941 plans extracted below. The historical 1939 and 1941 plans indicate that the structure consists of load-bearing masonry walls supported on shallow strip footings, founded at approximately 1m below the ground level of the hotel.

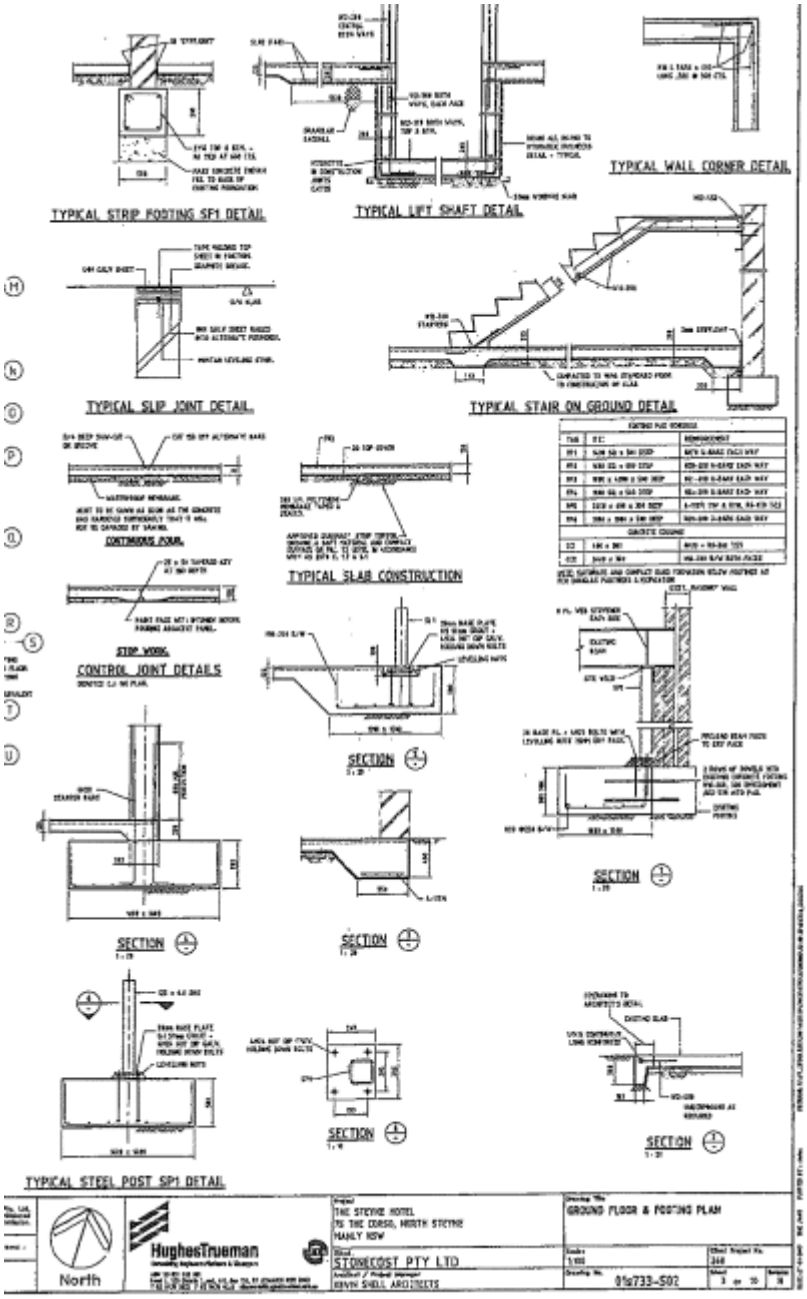

A.C. PLAN NO. 71114



Structural modifications were subsequently undertaken in 2003, according to the historical structural drawings (extract below). For these modifications the existing original strip footings were retained for structural support and the load-bearing masonry walls were also retained in parts.

For the detailed design stage, investigations including test pits along the boundary should be undertaken to confirm the founding levels of the footings, with respect to the new basement level of Site B. However, at this stage, adopting a value of 1m below external ground level for the footing level, as indicated on the 1939 and 1941 plans, means that the new basement excavation for Site B, which varies between 1.9m AHD and 3.0m AHD, will be approximately 1.0 to 2.0m below the existing strip footings. Therefore, underpinning will be required.





Subject to detailed design, underpinning is proposed to be done utilising the new shoring wall as a bending element to resist lateral deflection of the soil and shallow strip footings, to within suitable limits, consistent with heritage requirements of the retained walls. In the permanent state, the restraint to the top and bottom of the shoring wall is achieved via the ground floor slab and basement RAFT slab, respectively. In the temporary state, as the suspended ground slab doesn't not yet exist, additional lateral support to brace the wall will be achieved using one or a combination of the following:

- temporary soil anchoring beneath the Steyne Hotel. Survey of existing services should be done prior to anchoring.
- Internal bracing with temporary buttress walls (refer below for a photo of a similar wall constructed at a different site)

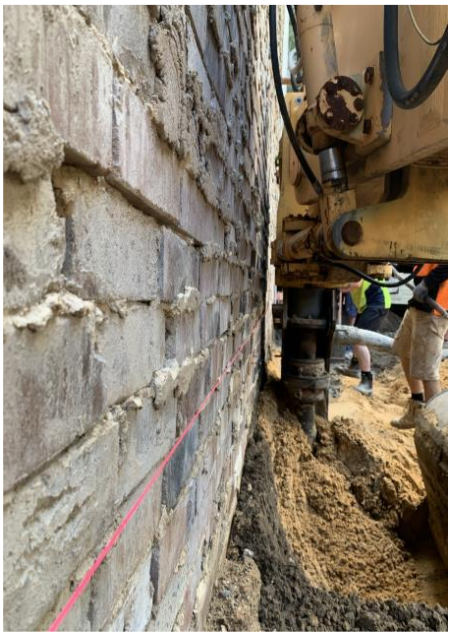
It is anticipated that the permanent case will govern the design of the retention wall. If deflection limits cannot be achieved for the heritage protected walls, by the geocast wall alone, a staged underpinning method could be undertaken. If necessary, this involves, initially vertically underpinning the shallow footings to a lower level using permeation grouting or conventional mass concrete underpinning, followed by the construction of the retention wall, as described above.

The final retention wall design will be addressed at the CC stage.

4.5 NEW RETENTION WALL AND BASEMENT EXCAVATION

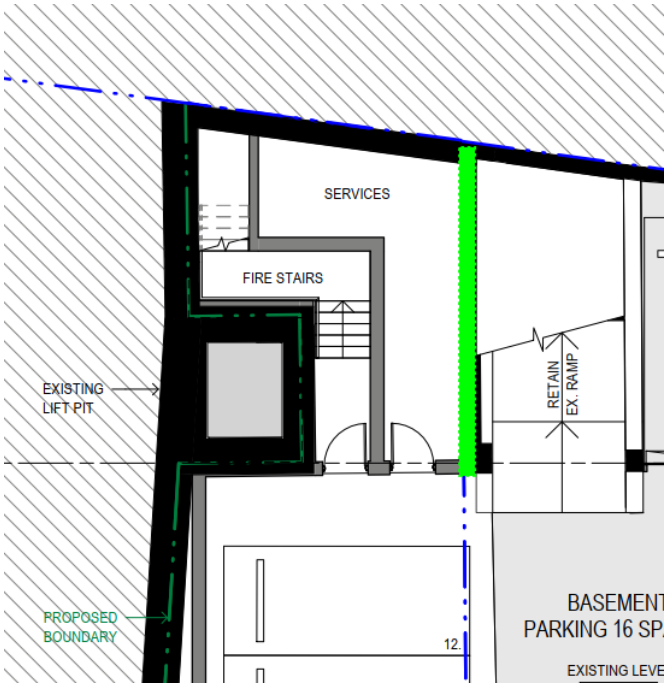
A Shoring and Bulk Excavation Plan is attached for reference. This should be reviewed in conjunction with this document.

The new retention wall should be of a type which is compatible with the existing wall being retained and connected into. A geocast wall of similar size and properties is considered suitable, subject to detailed design checks. Refer below for a geocast wall recently constructed at 26 Whistler Street, Manly. As depicted, geocast walls can be installed in close proximity to existing sensitive structures. Other options which could be considered include a CSM wall or contiguous pile wall, subject to further design development at the CC Stage.

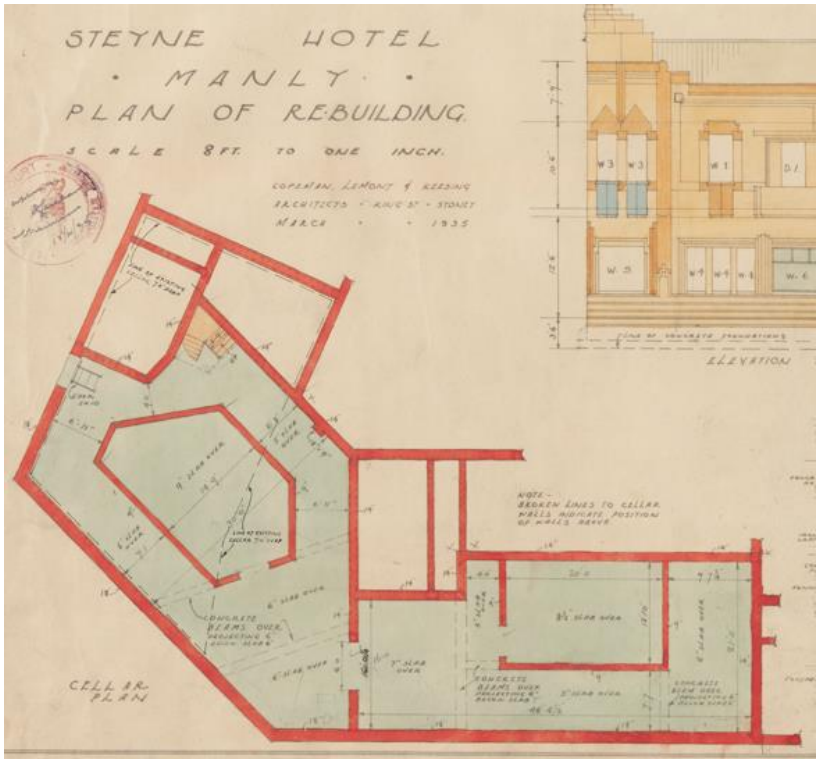


At the east and west sides, the new retention wall must structurally connect to the existing geocast retention wall. Based on the geotechnical report by Foundation Earth Sciences, dated October 2021, the "inferred standing ground water" level (WTL) is between 4.5m to 5.5m below ground level. Assuming a ground level of 5.5m AHD (also taken from the report) the WTL is at approximately 0 to 1m AHD. As the upper basement level is 1.908m RL at the lowest point, the new upper basement should not be required to be a "tanked" basement.

During construction, temporary stability of the retention wall is required. To the west is Henrietta Lane. As the existing ramp and the wall adjacent the ramp (shown in green in figure below) is being retained, this will assist to provide temporary lateral stability. Hence additional temporary lateral bracing is anticipated to be minimal.



To the south is Hotel Steyne. Hotel Steyne contains a basement cellar. However, the cellar only extends to part of the site and is located towards the Corso. Therefore, temporary post-tensioned soil anchors is a viable solution. Refer to Section 4.4 for discussion of other options. See below for diagram showing the cellar.



To the east is North Steyne. Although there is no buttress wall, as there is for the west, a similar bracing effect is provided by the retained structure of Site C, 42 North Steyne structure. Therefore, minimal additional temporary support is anticipated. If required, this could be done using the same methods discussed in prior sections. Survey of existing services should be done prior to anchoring.

4.6 LIFT 3 LIFT PIT EXCAVATION AND SHORING

Shallow excavation of approximately 1.5m deep, is required on Site A, adjacent to the Site B boundary for the new Lift 3 lift pit. This scope of work will be undertaken after the demolition of the boundary brickwork wall, as described in Section 4.1. The works are in close proximity to the heritage protected and retained structures of the Steyne Hotel. Furthermore a design initiative is to maintain the usage of the hotel including the external courtyard during the works. Therefore, careful consideration is required for the construction and temporary shoring.

Isolation and preparation works, as described in Section 6, is to be undertaken followed by local demolition of the existing ground level external floor of the Hotel courtyard using suitable machinery to minimise vibrations.

There are several options for the temporary and permanent shoring to excavate and construct this new pit. The new retention wall proposed for Site B could be extended into Site A to enclose the new lift pit, thereby temporarily and permanently shoring the excavation. To minimise impact on Site A and the Hotel operations, the works can be done with the machine rig planted on the Site B side, extending the arm over approximately 3m into Site A to install the shoring wall. This could be done with a geocast wall or a secant pile wall.

Alternatively, a temporary shoring box with trench steel sheets can be used for temporary shoring, until a new reinforced concrete pit lift pit is constructed and permanently laterally restrained by and connected to surrounding structure.

The final design is to be determined at the CC Stage.

4.7 RELOCATION OF COLUMNS IN SITE B AND SITE C BASEMENT

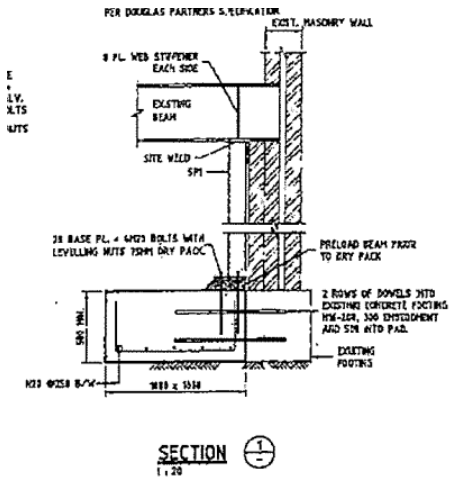
At the boundary between Site B and Site C, there are changes to the existing column locations in the basement only. The existing columns along the boundary are being maintained in their existing locations above ground floor. However, the columns are modified/demolished and offset in plan position in the basement. As a result, a new transfer beam structure will be required to be designed and will be located at the underside of the existing/new ground floor slab structure.

The transfer structure is required to be "active" during the construction phase of the development, prior to the demolition of the existing columns in the basement and the geocast wall. Therefore, the transfer structure should be designed using steelwork, restrained by the existing and new concrete slabs, and designed with depth to suit architectural requirements for headroom in the basement. To install the steel beams in the existing basement of Site C, the steel beams can be rigged up and installed using block and chain systems without the need for heavy machinery or hoists.

The transfer beams are required to be installed and then pre-jacked to "activate" the beams, prior to the demolition of the existing columns and geocast wall in the basement. This is to avoid movement and possible plastic deformation of the structure (damage) when the load redistributes to the new transfer structure and new columns. The existing columns are to be retained during this phase to act as temporary supports. Where the new columns abut the existing columns, a debonding material should be installed between the new and existing concrete to isolate the elements and facilitate demolition, which occurs in the subsequent phase. New footings or augmentation of the existing footings is required to suit the new basement column layout and this also occurs during this phase of the works.

4.8 LATERAL SUPPORT AND RESTRAINT TO EXISTING BOUNDARY WALLS

From review of the historical structural drawings, the original masonry walls at the boundary of Site A and Site B, were used as load-bearing structures. Refer to the snapshots below, which show the internal skin as a loadbearing wall. These details indicate that the internal wall is suitably braced by the floor structures. However further consideration is required for the external wall of the cavity wall.



SECTION 1
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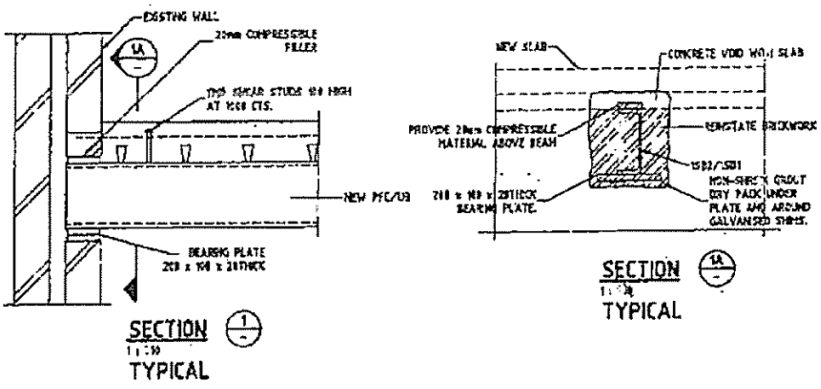
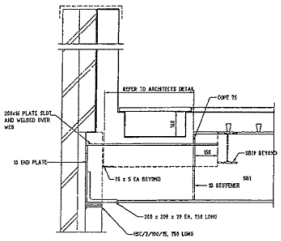


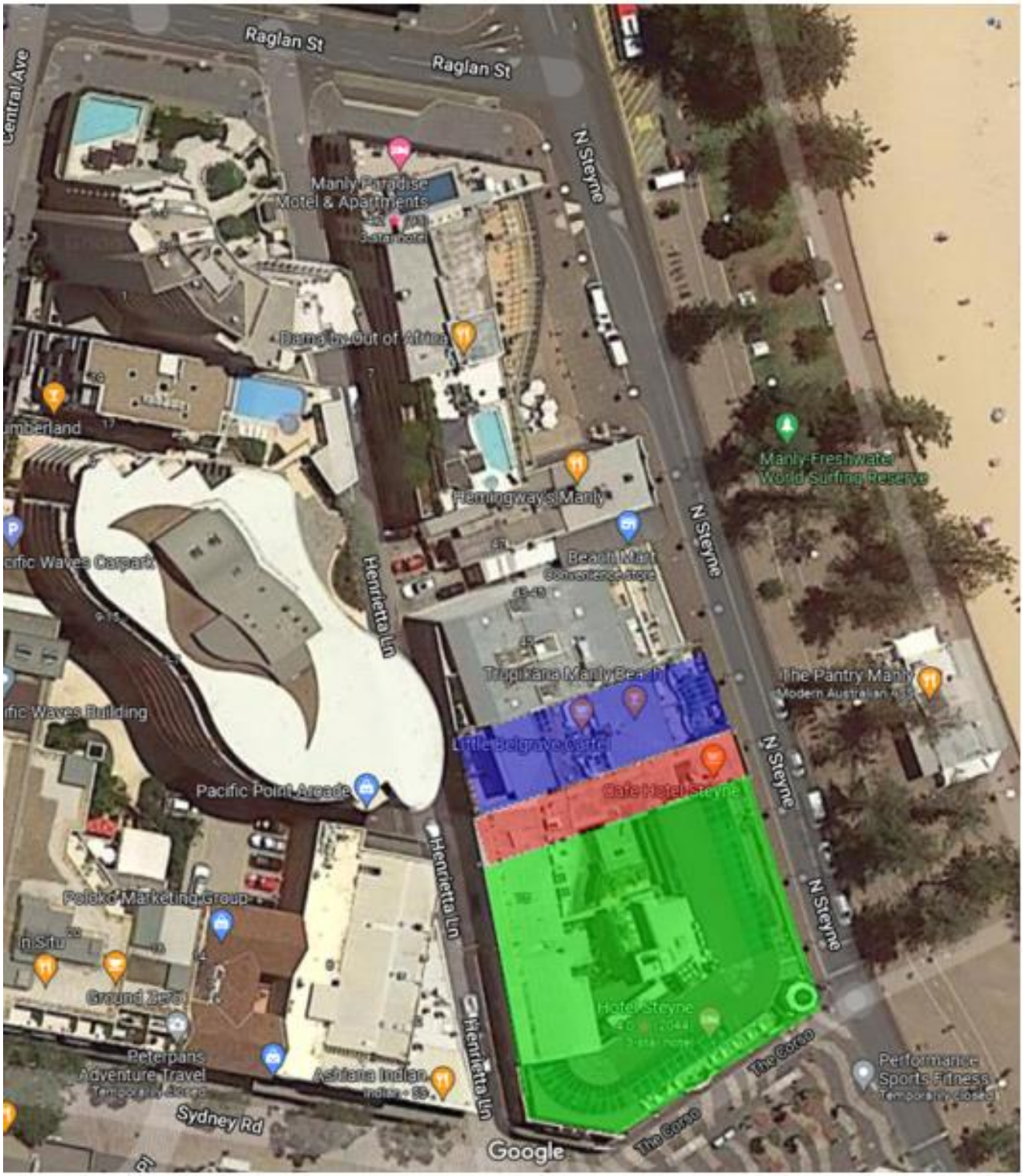


SECTION
TYPICAL BEARING DETAIL ON EXTERNAL WALLS SB1-6

Standard practice in circa. 1940 was to provide brick ties for external double skin cavity walls. However, the condition of these brick ties is unknown. Prior to demolition, we recommend that a survey inside the cavity be undertaken of the retained boundary walls to observe type, condition and spacing. If the cavity ties are not adequate, then post-fixed brick ties should be installed as the demolition proceeds from top down in Site B. This can be coupled with temporary support framing as needed.

5 Constructability and Site Constraints

5.1 GENERAL SITE DESCRIPTION



GREEN – SITE A – HOTEL STEYNE
RED – SITE B – STEYNE CAFÉ
BLUE – SITE C – EXISTING 42 NORTH STEYNE

The above is a plan view of the site showing surrounding roads and infrastructure. The site is restricted in terms of access for construction vehicles and lifting.

The predominate works are happening within Site B and Site C. Refer to Section 4.2 and 4.3. Site A is required to be retained and operational so disturbance must be minimised. It is highly beneficial for the development that Site C structure is retained, as discussed in Section 4.3, There are significant environmental and social benefits to retaining the existing structure. In terms of constructability and planning, the existing concrete shell is proposed to be used for general construction activities, site sheds, storage and handling of materials and can be used as a hardstand for concrete pours.

Site A and B are bounded by existing building structures to the north and south. To the east is North Steyne, which is not a major arterial road. To the west is Henrietta Lane. Given the nature of the roadways it is anticipated that the majority of the access to and from the site will be executed via Henrietta Lane.

5.2 HENRIETTA LANE

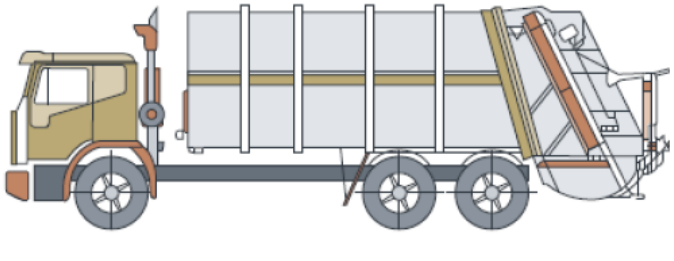
Henrietta Lane is already utilised predominately as a service lane servicing:

- Pacific Waves Loading dock
- Pacific Waves basement carparking access
- Northern Beaches Council Sydney Road markets
- Steyne Hotel loading including both the cellar keg chute and the loading/goods lift
- Various loading and parking to various properties fronting North Steyne.

Henrietta lane has at least 2 loading zones and there is potential for 3-point turning adjacent the boom gate of Pacific Waves Apartments, subject to assessment of turning circles, which is directly opposite the Site.

Minutes of PLM2021/0173, prepared by Northern Beaches Council and dated 29/07/2021, indicates that access for construction vehicles at the south of Henrietta Lane, via the Corso, could be obtained between 5am and 8am, each morning. Northern Beaches Council collect residential waste from Henrietta Lane utilising the rigid waste vehicle below:

Collection Vehicle Specifications



Heavy rigid rear loader compaction vehicle

Vehicle	Length	Width	Service height	Travel height	Weight	Turning Circle
Council's waste vehicle	10.5m	2.5m	4.5m	3.7m	22.5t	19m

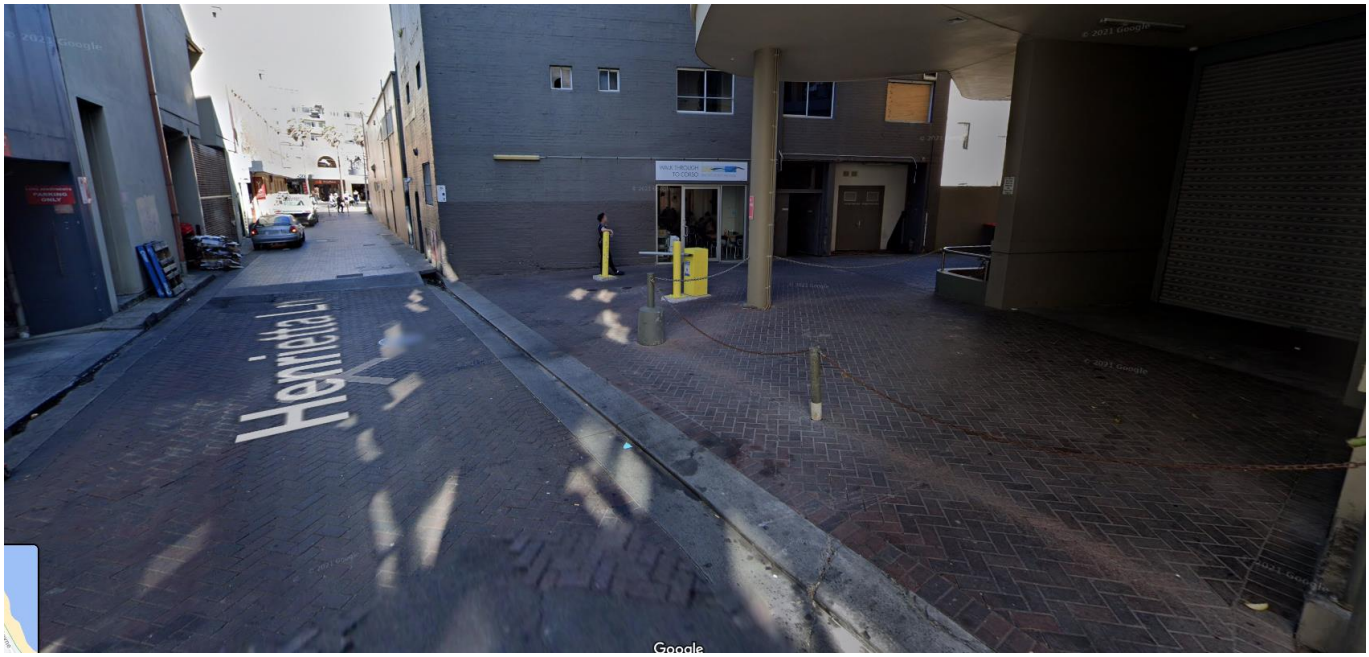
On Saturday October 16, 2021, the applicant consulted the waste operator URM in Henrietta Lane during waste collection activities. URM confirmed that for the purpose of waste collection, the URM heavy rigid rear loader reverses to the Pacific Waves apartment loading dock from Raglan Street for the purpose of collections, and thereafter travels north in a forward direction to exit Henrietta Lane via Raglan Street.

5.3 CONSTRUCTION VEHICULAR ACCESS

Two access points into Henrietta Lane, is highly beneficial. There are currently two possible access points. Typical access into Henrietta Lane is via Raglan St at the northern end. See snapshot below. However, access can also be obtained at the southern end via The Corso, between 5 am and 8 am and we understand this access is used for activities such as waste collection and disposal, NBC's market vendors and Steyne Hotel keg deliveries.

View from Raglan St intersection into Henrietta Ln on the right side.

Existing buildings are built tight to boundaries



Rear driveway of hotel property directly west of Site C existing basement ramp shown on right side could potentially be used as a standing or turn-around bay for construction vehicles, including concrete trucks or flat-bed trucks in conjunction with at-grade access to loading dock of the existing 42 North Steyne building. This is subject to confirmation.

View off Henrietta Ln towards North, with existing ramp access into Site C on right side and hotel driveway access on left side.

Existing loading zones can be used to stand smaller construction vehicles and to direct construction traffic.

View of Henrietta Ln at south towards The Corso.

As evidenced by the above, small construction vehicles can be easily accommodated. However, strategies should be implemented for major activities such as concrete pours for the floor slabs and access for the associated vehicles. On these occasions, the most favourable option is to utilise access via The Corso between 5 am and 8a am daily, for through access of construction vehicles along Henrietta Lane and thereafter, obtain approval for this access outside of this period.

The benefits of this dual access to Henrietta Lane include:

- vastly improved flow of vehicles;
- reduced concrete pour times;
- reduced disturbance to the surrounding public;
- reduced congestion on the surrounding roads caused by concrete trucks being present on the roads.

On general days, instead of major slab pours, of which there are only 5-6, this would not be required.

If approval for access into Henrietta Lane cannot be obtained, then the alternative options are described as follows:

1. Similar to the operation of the rigid garbage disposal trucks, as described in Section 5.3 above, reverse large construction vehicles (such as concrete trucks) from Raglan St, to the site and egress in forward direction via Raglan St. Associated traffic management will be implemented.
2. Utilise smaller vehicles, such as mini concrete trucks, which can execute 3 point turns within Henrietta Lane. This will allow for forward entry and exit via Raglan St.
3. A combination of 1 and 2.

Final access and traffic arrangements will be determined at the CC stage.

A loading zone permit will be required, towards the south at the rear of the site.

5.4 CRANE LOCATION

A permanent site crane can be provided and would likely be positioned in the existing lift core of 42 North Steyne. Altrnatively, a mobile crane from Henrietta Lane is proposed.

5.5 CONCRETE POURS

Refer to Section 5.3 for construction vehicle access.

Pours should be done using a line-pump, with the pump located on the existing GF structure of Site C, adjacent to Henrietta Lane for direct access into the hopper from concrete trucks. Penetrations should be made into the slabs to run a hard-line up the building for the pours on each level.

The basement pours can be done using a line pump. A hard-line can be run down the side of the existing geocast retention wall, connected to a rubber line to do footing pours.

6 Vibration

German Standard DIN 4150 - Part 3 'Structural vibration in buildings - Effects on Structure' (DIN 4150-3), provides recommended maximum levels of vibration that reduce the likelihood of building damage caused by vibration. DIN 4150-3 presents the recommended maximum limits over a range of frequencies (Hz), measured in any direction, and at the foundation or in the plane of the uppermost floor of a building or structure. The vibration limits increase as the frequency content of the vibration increases.

The structural damage vibration criteria adopted for this project is presented below. For heritage buildings, it is recommended that vibration sensitive heritage buildings be assessed with reference to the Group 3 criteria, at least during initial monitoring (this being the more stringent of the criteria in BS7385 and DIN4150-3). This threshold may be revisited on further advice from Heritage/Structural consultant.

As described in previous sections, structure to be demolished should be isolated from surrounding structure using saw-cuts, isolation materials or other similar techniques prior to casting.

Table: DIN 4150-3 Structural Damage Criteria

Group	Type of Structure	Vibration Velocity, mm/s			
		At Foundation at Frequency of			Plane of Floor Uppermost Storey
		1Hz to 10Hz	10Hz to 50Hz	50Hz to 100Hz	All Frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15

Group	Type of Structure	Vibration Velocity, mm/s			
		At Foundation at Frequency of			Plane of Floor Uppermost Storey
		1Hz to 10Hz	10Hz to 50Hz	50Hz to 100Hz	All Frequencies
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Group 1 or 2 and have intrinsic value (eg buildings under a preservation order)	3	3 to 8	8 to 10	8

7 Conclusion

Xavier Knight Consulting has been commissioned by IRIS Capital to prepare a Buildability and Construction Methodology Report for the proposed development at 42 North Steyne / 75 The Corso, Manly.

The assessment above indicates that the project can be successfully delivered utilising industry standard design and construction techniques.

The most significant project initiative to minimise disruption to neighbouring stakeholders is the retention and adaptive reuse of the majority of the existing concrete structure of SITE C (42 North Steyne) as part of the proposed redevelopment scheme. The benefits of this approach include

- A reduction in construction traffic and construction traffic noise and disruption within Henrietta lane to and from the project during the construction phase resulting in circa 108 concrete truck deliveries and circa 20 steel reinforcement deliveries being eliminated from the construction schedule
- As estimated 2-3 month reduction in the overall construction program (and commensurate reduction in construction noise, vibration, traffic impacts etc within Henrietta Lane)
- Commensurate reductions in noise, vibration, emissions and the like arising from typical concrete structure construction
- A diversion of circa 540 m3 of demolished concrete structure to landfill and the commensurate noise, vibration, disruptions and truck movements
- Significant diversion of embodied CO2 gasses from the atmosphere arising from the replacement of this existing structure with a new concrete structure.