E6: Civil and Structural Engineering Report

Prepared by SCP Consulting Pty Ltd

CHRIS O'BRIEN LIFEHOUSE AT RPA

PART 3A REPORT: 2922 DB1

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1.0 THE PROPOSED DEVELOPMENT – STAGE A and B LEVELS – BACKGROUND

The project consists of 3 levels of basement car park, and 11 over with research, procedure rooms and retail / integrated medicine (wellness centre) and plant room (Stage A and B1 Combined).

All the floor slabs are proposed to be post-tensioned and / or reinforced concrete, supported on reinforced concrete columns and lift cores. SCP will incorporate a Hybrid system where possible, as requested by Capital Insight.

The location of the concrete columns for the typical floors has been dictated by and co-ordinated with the internal layout of the functional spaces and the ancillary areas. Generally these columns suit the car parking arrangement at B2 and B3. The slab and beam sizes will be optimised to give structural efficiencies in the floor slab system. Some minor transfer of columns will occur at L1, ground and B1. The building was planned so that the columns grid is continuous throughout the building height, thereby minimizing costs associated with transfer structures.

The excavation for the basement shall occur concurrently with the installation of a shoring wall system that will be subject to the site conditions outlined in the geotech report. The shoring wall system shall be capable of supporting the surrounding ground and associated surcharges but will be independent from and not provide vertical support for the building structure.

The concrete floor slab and associated columns will support the building façade, the building façade not intending to be loadbearing. The floor slabs will need to be independently checked for the effect of earthquake loads and floor vibrations.

The lateral stability of the building is to be provided by a combination of frame action between the floor slabs, the building columns and the concrete walls surrounding the stair and lift shafts.

The existing services tunnels traversing the site will need to remain operational for the duration of the Construction. It is proposed to divert the tunnel outside the site as part of separate works package to separate the tunnel from the main building works.

2.0 DESIGN STANDARDS

The structural design shall be in accordance with the latest issue of all relevant Australian Design Standards, Codes and other statutory requirements. As a minimum requirement, the design shall be based on, but not limited to

AS1170.0 (2002)	Structural Design Actions Part 0 General Principles
AS1170.1 (2002)	Structural Design Actions Part 1 Permanent, Imposed and Other Actions
AS1170.2 (2002)	Structural Design Actions Part 2 Wind Loads
AS1170.4 (2007)	Earthquake Loads
AS3600	Concrete Structures
AS3700	Masonry Code
AS4100	Steel Structures
AS4600	Cold-Formed Steel Structures

Building Code of Australia
BS 6472 : 1992 Evaluation to Human exposure to vibration in buildings
AS 2670.1 – 2001 Whole Body Vibration
AS 2670.2 – 1990 Continuous and shock induced vibration
A Design Guide for Footfall induced vibration of structures – M. Wilford and P. Young (2006)
Predicting footfall – Induced Vibrations – Ungar et al (2004)

3.0 DESIGN LIFE

The structure elements of the building shall be designed to provide adequate performance for a minimum period of 50 years.

The structural design shall take into consideration the possible changing building uses and the local environmental conditions during the proposed design life.

Material selection, specifications, and detailing of the structural elements shall be such as to provide optimum durability of the structure.

4.0 MATERIAL PROPERTIES FOR DESIGN

As a guide the following minimum material grades shall be used:

Concrete Strength Grades:	
Bored piers, footings	25 MPa
Reinforced floors, columns, walls	32 MPa, 40 MPa, 50 MPa, 65 MPa
Post-tensioned floors	32 MPa and 22 MPa at 5 days
Structural Steel Grades:	
Rolled sections	300 MPa
Plate and Connection Components	250 MPa
Hollow Sections	350 MPa

5.0 DESIGN DEAD LOAD

5.1 Unit Weights

Design dead load shall include all self-weight and dead loads of elements. Unit weights shall be in accordance with Appendix A of AS 1170.1 (2002)

5.2 Superimposed Dead Load

Due consideration shall be given to superimposed dead loads due to: partitions, floor finishes and toppings, ceilings and services, racking systems, plant and equipment, hobs and kerbing, perimeter screens and walling, escalators and stair flights, planters and landscaped areas, and any imposed dead loads from roof framing, glazing and linings. Reference shall be made to the architectural drawings for the extent and location of these loadings.

5.3 Roof Loads

Roof loads shall be evaluated in a systematic fashion as set out in the Pro-Forma at Appendix A of this Design Brief. Services and Acoustic Consultants are to be requested to supply the necessary loadings to allow completion of the Pro-Forma. A copy of the Pro-Forma shall be included in all calculations and shall be summarised on the roof-marking plan.

Suspended ceilings, major service ducts and pipe work required to be supported by purlins shall be designed and specified to be attached to the webs of the purlins.

6.0 DESIGN LIVE LOAD

The floor slabs in the specifically designated areas shall be designed for the live loads nominated in Appendix B of this Design Brief.

Design loads shall be clearly designated on all structural floor plans.
Live Load reductions shall be applied in accordance with AS 1170.1.

SCP will require equipment weights for all areas supporting heavy equipment such as laboratories, imaging and plant rooms. The weights will need to be submitted by the respective services consultants prior to structural design.

7.0 DESIGN WIND LOAD

Design shall be in accordance with AS1170.2 – 2002 using the parameters set out in the Site Wind Analysis in Appendix C.

Design event for wind shall be 1/500 for ultimate wind and 1/25 for serviceability wind.

The design of façade elements and their connections to the structure shall make provision for all local peak wind pressures effects, calculated using AS 1170.2 local pressure factors.

Projecting canopies and awnings, particularly at street level shall be designed to resist the wind forces caused by deflected pressure flows from the surrounding buildings, using the method nominated in AS1170.2 (2002).

8.0 EARTHQUAKE

Design shall be in accordance with AS1170.4 – Part 4 "Earthquake Loads" (2007) using the following parameters:-

Structure Importance Level	:	3	
Earthquake Design Category	:	III (dynamic analysis)	
Annual Probability of Exceedance	:	1/500	
kp	:	1.0 (ultimate design) 1.0 (service design)	
Z	:	.08	
Site Sub-soil Class	:	A	
Structure Ductility Factor and Performance Factor	:	$\mu = 2$ Sp = .77	ordinary moment-resisting frames with limited ductile sheer walls

- Design for lateral loads in accordance with Section 7
- Design for vertical loads in accordance with Section 7
- Accidental Tension in accordance Clause 6.6

- Design Load Cases

Case 1 DL+.3LL +1.0+Feqh(x)+.3Feqh(y)+1.0Feqv(x)+.3Feqv(y)+/-.1btorsion(x)+.3(+/-.lb torsion(y))

Case 2 DL+.3LL +.30Feqh(x)+1.0Feqh(y) +.30Feqv(x)+1.0 Feqv(y)+/-.3(.lb torsion(x))+/-.lb torsion(y)

Case 3 DL+.3LL +1.0 Feqh (x) +.30 Feqh(y)-1.0Feqv(x)-.3Feqv(y) +/- .lbtorsion(x) +.3(+/-.lbtorsion (y))

Case 4 DL+.3LL +.30Feqh(x) +1.0Feqh(y) - .30Feqv(y) -1.0 Feqv(y) +/-3(.lbtorsion(x)) +/- .lbtorsion(y)

Case 5 DL+.3LL +1.0 Feqh(x) +.30 Feqh(y) +/- .lbtorsion(x) +/- .3(.lbtorsion(y))

Case 6 DL.3LL +.30 Feqh(x) +_1.0Feqh(y) +/- .3(.lbtorsion (x)) +/- .lbtorsion (y)

Case 7 DL+.3LL +1.0+Feqh(x)-.3Feqh(y)+1.0Feqv(x)+.3Feqv(y)+/-.1btorsion(x)+.3(+/-.lb torsion(y))

Case 8 DL+.3LL +.30Feqh(x)-1.0Feqh(y) +.30Feqv(x)+1.0 Feqv(y)+/-.3(.lb torsion(x))+/-.lb torsion(y)

Case 9 DL+.3LL +1.0 Feqh (x) -.30 Feqh(y)-1.0Feqv(x)-.3Feqv(y) +/- .lbtorsion(x) +.3(+/-.lbtorsion (y))

Case 10 DL+.3LL +.30Feqh(x) -1.0Feqh(y) - .30Feqv(y) -1.0 Feqv(y) +/-3(.lbtorsion(x)) +/- .lbtorsion(y)

Case 11 DL+.3LL +1.0 Feqh(x) -.30 Feqh(y) +/- .lbtorsion(x) +/- .3(.lbtorsion(y))

Case 12 DL+.3LL +.30 Feqh(x) -1.0Feqh(y) +/- .3(.lbtorsion (x)) +/- .lbtorsion (y)

- Allowable interstorey drift : .015H
- Pounding to be calculated based on deflections determined in accordance with Clause 6.7.2
- $\Delta eq = \Delta$ elastic x μ /Sp
- The structure will need to be designed for ultimate eg forces and elastic eg forces
- All walls and components shall be designed for Earthquake pressures and loads in accordance with Section 8
- Structure will need to be detailed as on intermediate moment resisting frame.

9.0 OTHER DESIGN LOADINGS

9.1 Minimum Lateral Loads to Interior Walls

Interior walls and permanent partitions and their fixings and supports, shall be designed to resist all loads to which they are subjected, but not less than a lateral force of 0.25 kPa (working), 0.40 kPa (ultimate) shall be applied perpendicular to the walls.

All walls should be designed for Earthquake forces as per AS 1170.4 – 2007.

9.2 Temporary and Construction Loads

The building structures shall be designed to resist all loads imposed during construction. In all instances, the building components in their temporary partly constructed state shall remain structurally stable.

A minimum construction live load of 2.0 kPa shall be adopted.

The selected contractor shall advise the extent of all areas which they require to be designed for additional loads from construction and material storage to suit construction arrangements.

9.3 Horizontal Loads to Handrails and Balustrades

All handrails and balustrades shall be designed in accordance with AS1170 Part 1. Where applicable, the design shall include for the effects of crowd loading or impact. Under maximum load conditions, these elements shall deform by following a plastic deformation mechanism.

Carpark walls and barriers shall be designed for low speed impact loads specified in AS 1170 Part 1.

10.0 SERVICEABILITY

10.1 Vibration Effects

Vibration due to plant should not be structurally critical or unacceptable to occupants. SCP assumes all plant to be base isolated on spring and damper mounts.

Floors shall be designed to ensure that they comply with the recommended acceleration and velocity limits in the relevant Standards. SCP will use the R factor method outlined in Annex A of AS 2670.2 and Appendix A of BS 6472.

SCP proposes to subdivide the floor usage into four (4) separate areas for dynamic assessment and design.

Zone 1 – High Sensitive Equipment – Imaging and Electron microscopes, operating theatres etc
Max accelerations and velocities to be supplied by the equipment specifier, nominal R factor = 1.0

Zone 2 – Low Sensitive Equipment – Laboratory Spaces
R factor = 1.4

Zone 3 – Normal office areas, public space, waiting areas, consultation rooms (without critical equipment)
R factor = 4 to 7

Generally, the vibration zoning can be described as follows:

Zone 1 – Areas for sensitive equipment, this should include any areas where there will be MRI's, CT scans, electron microscopes and operating theatres etc that are usually affected by floor vibration.

Zone 2 – Areas such as theatres and dry research where important procedures are taking place and vibration is limited so that it cannot be sensed by staff.

Zone 3 – Normal / General areas where admin, consultation, waiting room and any other normal activity takes place where some vibration can be felt and tolerated. These floors are to be designed like normal office type floors where vibration is not super critical to everyday function. Most likely, vibration will not even be felt at all unless someone is sitting still and there is a large group of people walking around near them.

From a flexibility view point, Zone 1 and Zone 2 are interchangeable, with some relaxation of the vibration limits.

All dynamic assessment for Zone 3 will be made based on 2 people walking moderately, each weighing 70 kg and walking out of phase.

For Zone 1, the assessment will be made on 1 person walking slowly and the accelerations will be measured 2 m away from the footfall load location.

For Zone 2, the assessment will be made on 1 person walking moderately and the accelerations will be measured 2 m away from the footfall location.

10.2 Deflection Limits

The following floor deflection limits shall apply unless more stringent deflection limits are required for special conditions:

Car park Areas		
Total long term deflection	<span/250, or 25mm	Maximum
General Floors		
Incremental deflection	<span/500	
Total long term deflection	<span/250, or 25mm	Maximum
Roof Structures (Concrete)		
Total long term deflection	<span/250, or 25mm	Maximum
Compactus Areas (Concrete)		
Incremental long term deflection	<span/500	Maximum
Façade		
Supporting steelwork	<span / 290	Maximum

10.3 Lateral Drift

Serviceability levels shall be designed and constructed to limit inter-storey lateral drift of the storey height such that the integrity of all connected building elements are maintained.

In particular the effects of lateral drift needs to be addressed in the performance of the façade system.

Maximum allowable lateral and interstorey drift to be .015H.

11.0 Durability

The structure shall be designed giving due consideration to durability and the functionality of the building and its components. All concrete elements shall be designed for the following exposure classifications in accordance with AS3600.
Interior: A1
Exterior : A2

12.0 BUILDING JOINTS

Differential displacement and movements between building joints shall be evaluated and joint detailed shall be such as to accommodate the movement.

As a minimum calculations shall allow for combinations for the following:

- Axial shortening
- Concrete creep
- Concrete shrinkage
- Loading Differentials
- Thermal differentials and temperature gradients
- Building sway effects
- Seismic movements and pounding

Joints in tiling, terrazzo and granolithic topping floor finishes shall be coordinated with slab construction joint locations to be determined in consultation with project design team.

13.0 PENETRATIONS AND SERVICES RISERS

The design of the structure shall, as far as practicable, avoid the need for post construction penetrations. Known services and mechanical penetrations are to be coordinated with the relevant services consultants and the architect and clearly indicated on the structural drawings.

The structure will be designed to incorporate known penetrations at the columns plus additional future 150 mm diameter max size penetrations. The location of permitted future penetrations are shown on the concrete outline plan and shall also be marked on the slab surface.

Where an existing penetration occurs at a column location, the allowable future 150 mm diameter penetration will be at the opposite column face only.

All future penetrations and fixings for surface mounted equipment in both the slab and the slab bands shall be approved by SCP Consulting before installation.

14.0 FORMWORK FINISH

Refer to architectural finishes specifications for all formwork class requirements and surface patterns. This is applicable to all exposed concrete surfaces internally and externally.

APPENDIX A – ROOF LOADING

	ALLOWANCE		
ELEMENT DESCRIPTION	**UNIFORM (KG/SQ.M.)**	**CONCENTRATED (KGS)**	**LINE (KG/M)**
ROOF SHEETING	5		
PURLINS	5		
INSULATION	3		
NORMAL CEILING 2 Layers 13mm Gyprok and to suit acoustic requirements	20		
ELECTRICAL CABLING	TBA		TBA
LIGHTING	TBA	TBA	
AUDIO		TBA	
MONITORS		TBA	
A/C DUCTING	20 kg/m² Purlins 10 kg/m² Rafters		TBA
FAN COIL UNITS		TBA	
EXHAUST UNITS TO ROOF		TBA	
GAS PIPES (including AIR)			TBA
HYDRAULICS PIPES			TBA
SPRINKLERS	5		TBA
CATWALKS/WALKWAYS			TBA
ROOF ACCESS SYSTEM ANCHOR LOADS		TBA	
OTHER	TBA	TBA	TBA
ROOF LIVE LOAD (In accordance with AS1170.1)	25 MAX 50 kN	110	

TBA – TO BE ADVISED BY RELEVANT CONSULTANT

APPENDIX B -FLOOR LOADS

BUILDING COMPONENT	DEAD LOADS	LIVE LOAD
Carparking	1.25 kPa	2.5 kPa
External Public Space	2.15 kPa	5.0 kPa
Public Space	1.25 kPa	5.0 kPa
Laboratory / Office Floors	1.5 kPa	4.0 kPa
Toilets	2.5 kPa	3.0 kPa
Balconies	1.25 kPa	4.0 kPa
Roof Slab & Plant Rooms	.60 kPa	7.5 kPa
Landscape Planter Boxes	20 kPa	4.0 kPa
Landscape Area	12 kPa	4.0 kPa
Storage Areas & Compactus	1.5 kPa	10 kPa
Level L10 Slab	1.5 kPa	10 kPa strength 4.0 kPa service

Note: Assumes Lightweight partitions throughout

- Services allowance = .5 kPa at underside of all slabs
- All toppings no greater than 50 mm thick

* Denotes all equipment loads shall be submitted to SCP for assessment.

An acoustic vibration assessment shall also be undertaken.

- Truck Loading Docks to be designed for unlimited repetitions of medium rigid trucks.
- Lightweight Façade Load – 3 kN / m. Screens=0.5kPa
- Incremental deflection under all façade support structure to be less than 15 mm.

APPENDIX C - SITE WIND ANALYSIS

Importance Level = 3 (Buildings designed to contain large number of people)

Annual Probability Exceedence : 1 in 1000 – ultimate

Region : A2 1 in 25 – serviceability

V1000	–	ultimate limit state	=	46 m/s
V25	–	serviceability limit state	=	37 m/s

Wind Direction Multipliers	N NE E	0.95
	S SE	0.95
	SW W NW	1.00
Terrain Categories	faces of buildings	3
Shielding Multipliers	– 1.00	

APPENDIX D

Lifehouse at RPA – Chris O'Brien Cancer Centre

SCHEDULE OF CONCRETE MIXES – NO GREEN STAR

Mix Design	Location	Grade MPa	Cement Type	Fly Ash Allowable 25% Maximum	Silica Fume	Max. Shrinkage At 56 Days Micro Strain	Max. Aggregate Size (mm)	Super Plasticiser	F'cat 4 Days (MPa)	Max. Slump At Batching mm	Low Heat Character -istics	Water Proof Agent
1	• Mass Concrete (Pads) • Blinding Concrete	S15	GP	25%	Nil	750	20	Nil	N/A	80	N/A	N/A
2a	• Bored Piers	S32	GP	25%	Nil	750	20	Nil	N/A	80	N/A	N/A
2b	• Pad Footings • Strip Footings	S25	GP GP	25%	Nil	750	20	Nil	N/A	80	N/A	N/A
3	• Slab on Ground – Light Duty	S25	SL	25%	Nil	550	20	Yes	N/A	40	N/A	N/A
4	Post-tensioned Slabs Summer & Winter mixes to be Submitted Separately	4a S32 4b S40	SL	10%	Nil	650	20	Nil	22	80	N/A	N/A
5	• Reinforced Slabs / Stairs • Retaining Walls	S32	SL	25%	Nil	650	20	Nil	N/A	80	N/A	N/A
6	Core Walls / Lift Walls	S32	SL	25%	Nil	750	20	Yes	N/A	80	N/A	N/A
7	Slab on Ground – Heavy Duty	S32	SL	25%	Nil	550	20	Yes	N/A	40	N/A	N/A
8	Columns (Normal)	S40	GP	25%	Nil	750	20	Nil	N/A	80	N/A	N/A
9	Carpark Ramps/Pile Caps	S40	SL	25%	Nil	650	20	Nil	N/A	80	N/A	N/A
10a	Columns (High Strength)	S50	GP	25%	Nil	750	20	Nil	N/A	80	N/A	N/A
10b	Columns (High Strength)	S65	GP	20%	Nil	750	20	Nil	N/A	80	N/A	N/A
10c	Columns (High Strength)	S80	GP	20%	Nil	750	20	Nil	N/A	80	N/A	N/A
11	Blockwork Core Fill	S20	GP	25%	Nil	N/A	10	Nil	N/A	230	N/A	N/A
12	Shotcrete	S32	GP	25%	Yes	750	10	Nil	N/A	60	N/A	N/A
13	Lift Overrun Pit	S32	SL	25%	Nil	750	20	Nil	N/A	80	N/A	N/A
14	Roadway Slabs	S40	SL	10%	Nil	600	20	Nil	22	80	N/A	N/A
15	Loading Docks	S40	SL	10%	Nil	600	20	Nil	22	80	N/A	Xypex

Concrete will need to be adjusted to suit "Green Stair" requirements as required.

APPENDIX E – FIRE RATINGS

SUMMARY OF BUILDING USE AND CLASSIFICATION

Building Use	Health-Care Building
Building Classification	Class 9a
Type of Construction required	A

FIRE RESISTANCE OF BUILDING ELEMENTS

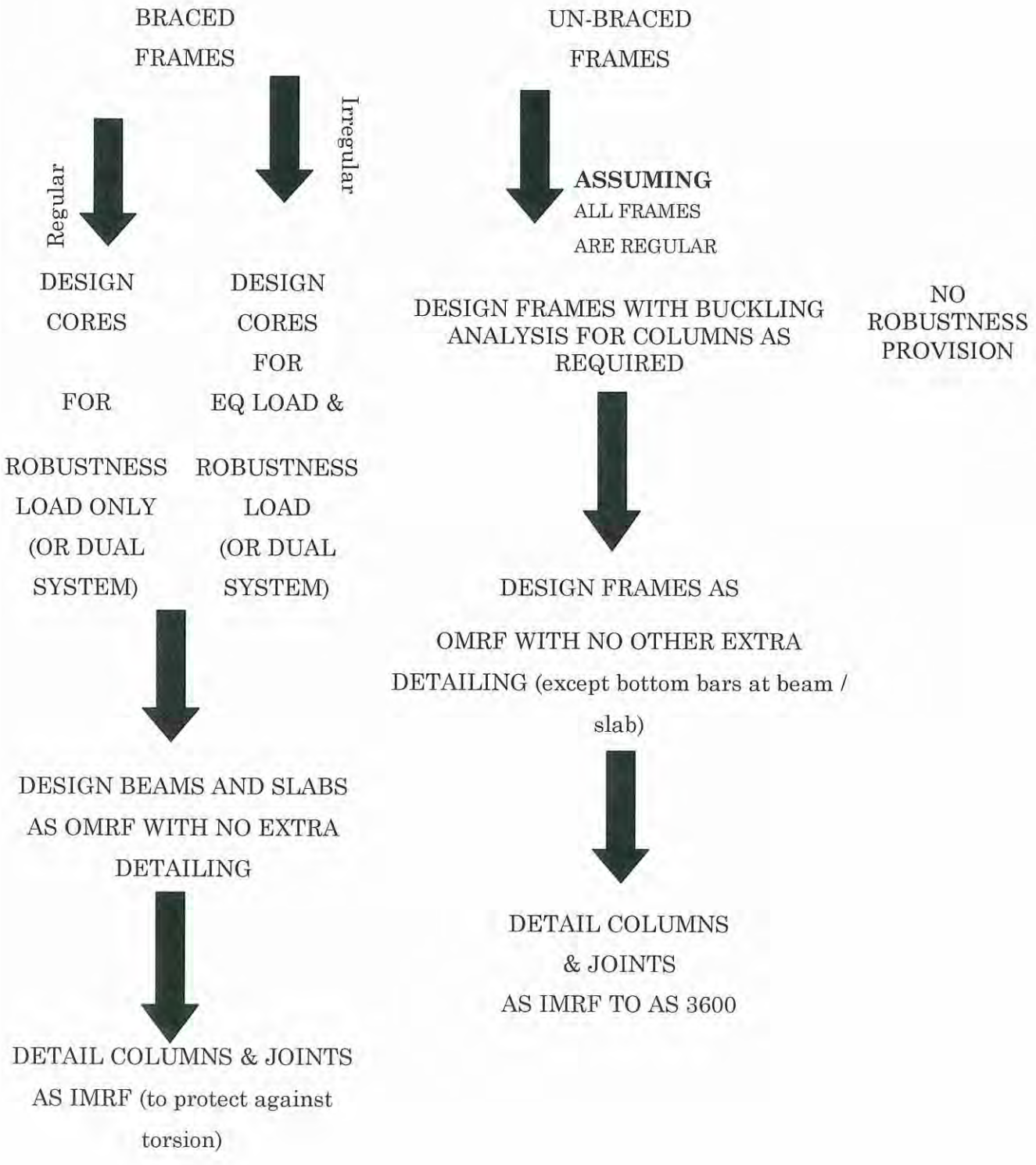
- Fire Isolated Passageways discharging from fire isolated stairs or ramps : FRL 120/120/120
- Concrete slabs between all levels : FRL 120/120/120
- Stairs connecting all levels : FRL 120/120/120
- Lift and stair shafts : FRL 120/120/120
- Columns : FRL 120/120/120
- Plantroom Roof : FRL 120/120/120

Fire Resistance of Building Elements

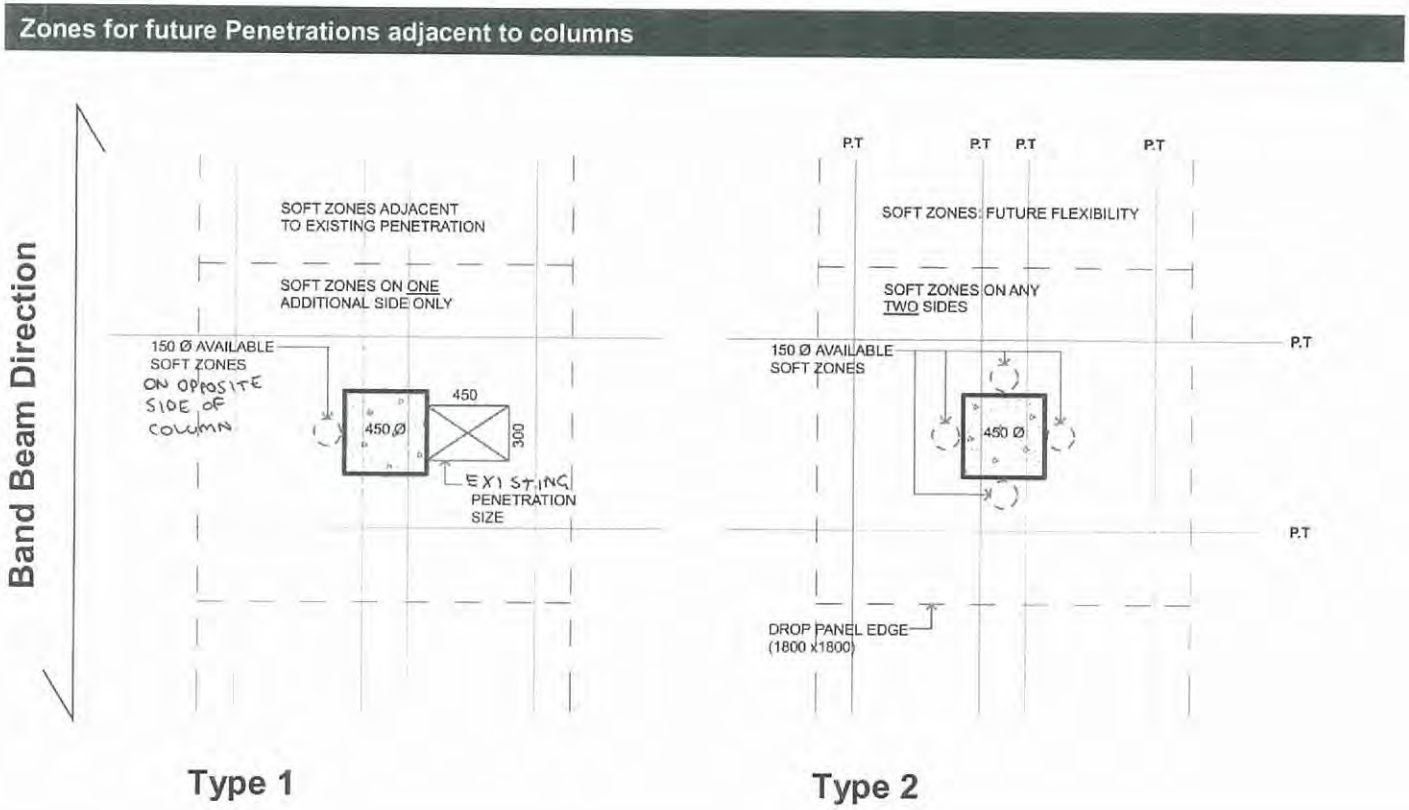
FRL OF BUILDING ELEMENTS		
Building Element	Class of Building – FRL: (in minutes) Structural adequacy/integrity/insulation	
	5, 9 or 7 (carpark)	6
EXTERNAL WALL (including any column and other building element incorporated therein) or other external building element where the distance from any fire-source feature to which it is exposed is -		
For loadbearing parts-		
Less than 1.5m	120/120/120	120/120/120
1.5m to less than 3m	120/90/90	120/120/120
3m or more	120/60/30	120/120/90
For Non-loadbearing parts-		
Less than 1.5m	-/120/120	-/120/120
1.5m to less than 3m	-/90/90	-/120/120
3m or more	-/-/-	-/-/-
EXTERNAL COLUMN not incorporated in an external wall where the distance from any fire source feature to which it is exposed-		
Less than 3m	120/-/-	120/-/-
3m or more	-/-/-	-/-/-
COMMON WALLS and FIRE WALLS	120/120/120	120/120/120
INTERNAL WALLS		
Fire-resisting lift and stair shafts-		
Loadbearing	120/120/120	120/120/120
Non-loadbearing	-/120/120	-/120/120
Bounding public corridors, public lobbies and the like-		
Loadbearing	120/-/-	120/-/-
Non-loadbearing	-/-/-	-/-/-
Between or bounding sole-occupancy units-		
Loadbearing	120/-/-	120/-/-
Non-loadbearing	-/-/-	-/-/-
Ventilating, pipe, garbage, and the like shafts not used for the discharge of hot products of combustion-		
Loadbearing	120/90/90	120/120/120
Non-loadbearing	-/90/90	-/120/120
OTHER LOADBEARING INTERNAL WALLS, INTERNAL BEAMS, TRUSSES and COLUMNS	120/-/-	120/-/-
FLOORS	120/120/120	120/120/120
ROOFS	120/60/30	120/60/30

APPENDIX F

DESIGN APPROACH FOR AS1170.4



APPENDIX G



Services Penetrations Perpendicular with Strut Band Beam

APPENDIX H – POST TENSIONED REINFORCEMENT DESIGN BRIEF

CHRIS O'BRIEN LIFEHOUSE AT RPA

POST TENSIONED FLOOR SLABS

PART 3A REPORT: 2922 DB1

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1. Design Loads

The post-tensioned floors are to be designed for the following design loads:

i) Live Loads: As shown on drawings

ii) Dead Loads: As shown on drawings

iii) Earthquake Loads: The structure is a braced system.
All Earthquake loads are carried by the core and the shear walls.

2. Code Compliance

All floor slabs and beams are to be designed for strength and serviceability in accordance with the requirements of AS3600 – Concrete Structures.

All floors carrying masonry walls are to be designed to comply with the deflection and vibration criteria nominated on the drawings.

All frame analysis shall use 100% of the equivalent column stiffness.

3. Crack Control

Sufficient post-tensioning and reinforcement shall be provided in both directions so as to satisfy crack control provisions for moderate degree of cracking as per AS3600 Clause 9.4.3.4.

If post-tensioning alone is to provide crack control, a minimum level of 1.4MPa after final losses shall be maintained.

Where restraint by piers, core walls and other vertical elements is likely to reduce the level of prestress below the minimum level, adequate reinforcement is to be provided to properly control shrinkage cracking in the slabs and bands.

4. Concrete Strength

Project assessment is required for all concrete placed.

All concrete is to have a characteristic compressive strength F'c=32 MPa at 28 days, and f'cm = 22 MPa at 5 days.

Concrete in all post-tensioned slabs and beams to have a maximum drying shrinkage of 600 microstrain at 56 days.

Initial (25%) prestress is to be applied when the concrete compressive strength reaches 9 MPa.

Final (100%) prestress is to be applied after a minimum of 5 days, when the concrete has reached a compressive strength of at least 22 MPa.

5. Shop Drawings

The prestressing sub-contractor shall prepare shop drawings showing the cable layout, all cable profiles, jacking loads and theoretical extensions and details of all required anchorages and couplers, including all anti-burst anchorage reinforcement required additional to the flexural reinforcement shown on the structural drawings.

The two (2) copies of the Shop Drawings are to be submitted to the engineer for approval at least 10 working days prior to installation of cables on site.

6. Post Tension Specification

i) Workmanship, materials and stressing shall comply with the Australian Standard AS3600 – Concrete Structures.

ii) Design Assumptions are:

a) Minimum level of prestress in concrete slabs and slab bands after final losses shall be sufficient to satisfy Part 3.

b) Fire rating of floors - Refer to architects drawings.

c) All strands shall be 12.7 or 15.2 diameter 7 wire-super-grade, stress relieved, low relaxation strands to AS1311 with a minimum breaking load of 184 kN. Maximum tendon force prior to transfer (behind anchorage) – 156 kN per strand.

1. Co-efficient of friction in Duct u=0.2
   Estimated angular deviation B = .025 RAD/M
   Anchorage draw-in 6mm assumed

d) All concrete outlines have been based on 100% column stiffness. Final Post Tensioning Design shall use 100% column stiffness.

7. Tension ducts shall be fitted to smooth curves between positions shown. Ducts shall be semi-rigid steel sheeting (galvanised). The design assumes that 4 & 5 strand tendons are contained with 70 x 19 flat ducts. Duct profiles are measured from the soffit of the concrete slab or band to the underside of the duct. Except the anchorages where dimensions are to the centreline of the anchor.

8. Contractor shall submit calculations of assumed friction losses and total tendon elongations for approval of a minimum of 7 working days prior to commencement of stressing.

9. All ducts to be fully grouted within 5 days of stressing and after approval of elongations by the engineer.

10. Anchorages and splices shall be capable of developing the ultimate strength of tendons without excessive deformation. When required, satisfactory test data confirming the adequacy of the proposed devices shall be submitted.

11. Ducts, tendons and anchorages shall be firmly supported to prevent displacement during subsequent operations. They shall be placed with a tolerance of plus or minus 3 mm in concrete dimensions of 200 mm of less, plus or minus 5 mm in concrete dimensions between 200 mm and 600 mm, and plus or minus 15 mm in concrete dimensions over 600 mm.

12. Stressing

Calibrate stressing jacks to an accuracy of 2% pressure gauge readings shall be based on instruments having a calibrated accuracy of ± 0.5%. Calibration curves for the equipment to be used shall be made available to the engineer prior to stressing. The initial cable load between jack and anchorage shall not exceed 85% of the specified minimum ultimate cable load.

Stressing Sequence

Initial Stress: Jack each strand to 40 kN when concrete compressive strength reaches 9 MPa.
Final Stress: Apply full jacking load of 156 kN after a minimum of 5 days, when concrete has reached a compressive strength of at least 22 MPa.

All test cylinders used for early age strength determination are to be site cured under similar temperature and exposure conditions to the concrete floor slabs. Keep complete stressing record for each stressing operation for each cable as follows:

iii) Identification particulars of tendons.

iv) Initial force or pressure when tendons are marked for measurement of elongation.

v) Final force or pressures before anchoring tendons.

vi) Elongation at final force.

vii) Elongation remaining after anchoring tendon and release jacks.

Submit these records to the engineer for acceptance within 48 hours of completing each stressing operation.

13. Grouting

Grout shall consist of a mixture of cement and water.

Fly ash conforming to AS1129 and 1130, for use in concrete may be used. Fly ash shall not exceed 14kg per bag of cement.

Aluminium powder of the proper fines and quantity or other approved materials may be added to obtain a maximum of 10% expansion of the grout when measured unconfirmed.

Mix grout in a high-speed mechanical mixer and pass through a strainer into pluming equipment, which has provision for recirculation. Pumping of grout shall begin as soon as possible after mixing and may be continued as long as the grout retains the proper consistency.

APPENDIX G

SCP CONSULTING
CHECKLIST OF DOCUMENTATION
REQUIRED BEFORE CERTIFICATION

PROJECT: _____ **DATE:** _____

BUILDING: _____

GENERAL **COMPLETED**

- Engineering Inspection Reports not signed off

Concrete Footings

- Copies of all inspection reports by geotechnical engineer _____
- Copies of certification of bearing pressures by geotechnical engineer _____
- Copy of concrete mix design _____
- Copies of all concrete cylinder test results _____
- Certificate for reinforcement stating grade _____

Concrete Slabs on Ground

- Copy of Sub-Base Compaction Tests and Reports _____
- Copy of Mix Design for Approval _____
- Copy of All Concrete Cylinder Test Results _____
- Copy of Shrinkage Test Results _____
- Details of Curing Compound applied including Compliance with Standards _____
- Details of Jointing Material used in Expansion Joints, Key Joints _____
- Copy of Results of Tolerance Check _____
- Certificate for any reinforcement stating grade _____
- Details of Post-Tensioning Extensions _____
- Details of grout used around tendons _____
- Grouting Records _____

Structural Steelwork

- Copies of Fabrication Inspection Reports including extent of NDE _____
- Copy of Paint Records and Testing/Galvanizing Records _____
- Copy of Applicators Warranty on Paint System/Galvanizing _____
- Copy of Inspection Reports of Paint System _____
- Copy of check on Fabrication and Erection Tolerances/Survey Certificate _____
- Copy of Certificates of steel grade and bolts _____
- Details of grout used _____

Suspended Concrete Work

- Copy of Mix Design for Approval _____
- Copy of all Concrete Cylinder Test Results _____
- Copy of any Shrinkage Test Results _____
- Details of Curing Compound used _____
- Certificate for any Reinforcement Stating Grade _____
- Details of Post-Tensioning Extensions _____
- Details of grout used around tendons _____
- Grouting Records _____

APPENDIX G

SCP CONSULTING
CHECKLIST OF DOCUMENTATION
REQUIRED BEFORE CERTIFICATION

PROJECT: _____ **DATE:** _____

BUILDING: _____

COMPLETED

Precast Concrete

- Copy of Certification from Practising Structural Engineer that Design and Construction Complies with Specification _____
- Copy of Certification as to Fire Rating and Copy of Supporting Documentation _____
- Copy of Construction Proposal Regarding
  - Concrete Mix Design
  - Curing Method
  - Joint Sealant _____
- Copy of Check of Tolerances after manufacture _____

APPENDIX H – POST TENSIONED REINFORCEMENT DESIGN BRIEF

CHRIS O'BRIEN LIFEHOUSE AT RPA

POST TENSIONED FLOOR SLABS

PART 3A REPORT: 2922 DB1

PREPARED BY:

SCP CONSULTING PTY LTD
LEVEL 2 , 507 KENT STREET
SYDNEY NSW 2000
A.B.N. NO: 80 003 076 024
SCP JOB NO: 2922
TEL: (02) 9267 9312
FAX: (02) 9261 5871

ISSUE : A:

REVISION	DATE	ORIGINATOR	CHECKED	APPROVED	REMARKS
A	May 2010	PS	PS		For Approval

1. Design Loads

The post-tensioned floors are to be designed for the following design loads:

i) Live Loads: As shown on drawings

ii) Dead Loads: As shown on drawings

iii) Earthquake Loads: The structure is a braced system.
All Earthquake loads are carried by the core and the shear walls.

2. Code Compliance

All floor slabs and beams are to be designed for strength and serviceability in accordance with the requirements of AS3600 – Concrete Structures.

All floors carrying masonry walls are to be designed to comply with the deflection and vibration criteria nominated on the drawings.

All frame analysis shall use 100% of the equivalent column stiffness.

3. Crack Control

Sufficient post-tensioning and reinforcement shall be provided in both directions so as to satisfy crack control provisions for moderate degree of cracking as per AS3600 Clause 9.4.3.4.

If post-tensioning alone is to provide crack control, a minimum level of 1.4MPa after final losses shall be maintained.

Where restraint by piers, core walls and other vertical elements is likely to reduce the level of prestress below the minimum level, adequate reinforcement is to be provided to properly control shrinkage cracking in the slabs and bands.

4. Concrete Strength

Project assessment is required for all concrete placed.

All concrete is to have a characteristic compressive strength F'c=32 MPa at 28 days, and f'cm = 22 MPa at 5 days.

Concrete in all post-tensioned slabs and beams to have a maximum drying shrinkage of 600 microstrain at 56 days.

Initial (25%) prestress is to be applied when the concrete compressive strength reaches 9 MPa.

Final (100%) prestress is to be applied after a minimum of 5 days, when the concrete has reached a compressive strength of at least 22 MPa.

5. Shop Drawings

The prestressing sub-contractor shall prepare shop drawings showing the cable layout, all cable profiles, jacking loads and theoretical extensions and details of all required anchorages and couplers, including all anti-burst anchorage reinforcement required additional to the flexural reinforcement shown on the structural drawings.

The two (2) copies of the Shop Drawings are to be submitted to the engineer for approval at least 10 working days prior to installation of cables on site.

6. Post Tension Specification

i) Workmanship, materials and stressing shall comply with the Australian Standard AS3600 – Concrete Structures.

ii) Design Assumptions are:

a) Minimum level of prestress in concrete slabs and slab bands after final losses shall be sufficient to satisfy Part 3.

b) Fire rating of floors - Refer to architects drawings.

c) All strands shall be 12.7 or 15.2 diameter 7 wire-super-grade, stress relieved, low relaxation strands to AS1311 with a minimum breaking load of 184 kN. Maximum tendon force prior to transfer (behind anchorage) – 156 kN per strand.

1. Co-efficient of friction in Duct u=0.2
   Estimated angular deviation B = .025 RAD/M
   Anchorage draw-in 6mm assumed

d) All concrete outlines have been based on 100% column stiffness. Final Post Tensioning Design shall use 100% column stiffness.

7. Tension ducts shall be fitted to smooth curves between positions shown. Ducts shall be semi-rigid steel sheeting (galvanised). The design assumes that 4 & 5 strand tendons are contained with 70 x 19 flat ducts. Duct profiles are measured from the soffit of the concrete slab or band to the underside of the duct. Except the anchorages where dimensions are to the centreline of the anchor.

8. Contractor shall submit calculations of assumed friction losses and total tendon elongations for approval of a minimum of 7 working days prior to commencement of stressing.

9. All ducts to be fully grouted within 5 days of stressing and after approval of elongations by the engineer.

10. Anchorages and splices shall be capable of developing the ultimate strength of tendons without excessive deformation. When required, satisfactory test data confirming the adequacy of the proposed devices shall be submitted.

11. Ducts, tendons and anchorages shall be firmly supported to prevent displacement during subsequent operations. They shall be placed with a tolerance of plus or minus 3 mm in concrete dimensions of 200 mm of less, plus or minus 5 mm in concrete dimensions between 200 mm and 600 mm, and plus or minus 15 mm in concrete dimensions over 600 mm.

12. Stressing

Calibrate stressing jacks to an accuracy of 2% pressure gauge readings shall be based on instruments having a calibrated accuracy of ± 0.5%. Calibration curves for the equipment to be used shall be made available to the engineer prior to stressing. The initial cable load between jack and anchorage shall not exceed 85% of the specified minimum ultimate cable load.

Stressing Sequence

Initial Stress: Jack each strand to 40 kN when concrete compressive strength reaches 9 MPa.
Final Stress: Apply full jacking load of 156 kN after a minimum of 5 days, when concrete has reached a compressive strength of at least 22 MPa.

All test cylinders used for early age strength determination are to be site cured under similar temperature and exposure conditions to the concrete floor slabs. Keep complete stressing record for each stressing operation for each cable as follows:

iii) Identification particulars of tendons.

iv) Initial force or pressure when tendons are marked for measurement of elongation.

v) Final force or pressures before anchoring tendons.

vi) Elongation at final force.

vii) Elongation remaining after anchoring tendon and release jacks.

Submit these records to the engineer for acceptance within 48 hours of completing each stressing operation.

13. Grouting

Grout shall consist of a mixture of cement and water.

Fly ash conforming to AS1129 and 1130, for use in concrete may be used. Fly ash shall not exceed 14kg per bag of cement.

Aluminium powder of the proper fines and quantity or other approved materials may be added to obtain a maximum of 10% expansion of the grout when measured unconfirmed.

Mix grout in a high-speed mechanical mixer and pass through a strainer into pluming equipment, which has provision for recirculation. Pumping of grout shall begin as soon as possible after mixing and may be continued as long as the grout retains the proper consistency.

E7: Site Audit Interim Advice

Prepared by S&N Environmental Engineers & Contractors

ENVIRONMENTAL ENGINEERS
& CONTRACTORS
ACN 002 601 087 ABN 16 002 601 087

Capital Insight Pty Ltd
77 Berry Street
NORTH SYDNEY NSW 2060

31 May 2010

Interim Advice 310510
Site Audit 170

Attention: Ms Elisabeth Wallace (Project Manager)

Dear Ms Wallace

INTERIM ADVICE FOR STATUTORY SITE AUDIT No. 170 BY DR IAN SWANE REVIEW OF ESA FOR THE PROPOSED ROYAL PRINCE ALFRED HOSPITAL 'LIFEHOUSE' CANCER CENTRE AT 119-143 MISSENDEN ROAD, CAMPERDOWN

Introduction

This letter provides Capital Insight Pty Ltd with interim advice as part of Statutory Site Audit No. 170 being undertaken by Dr Ian Swane, a NSW DECCW Site Auditor accredited under the Contaminated Land Management (CLM) Act. The advice concerns the review of an environmental site assessment (ESA) prepared for the proposed Royal Prince Alfred (RPA) Hospital 'Lifehouse' Cancer Centre at 119-143 Missenden Road, Camperdown[1].

The Statutory Site Audit was commenced in response to a recommendation made by the City of Sydney in a letter to Capital Insight dated 4 May 2010. The recommendation was that a Site Audit Statement be submitted with the Part 3A application certifying that the site is suitable for the intended use. The advice given in this letter has been provided to support Capital Insights Part 3A application.

Review of Environmental Assessment

The ESA was undertaken by Aargus Australia (Aargus), a firm of professional environmental consultants, with the results documented in a report issued in October 2009 titled *"Phase II Environmental Site Assessment, 119-143 Missenden Road, Camperdown NSW"*.

The assessment involved:

- Collecting background site information and historical data;
- Site inspection;
- Development of a conceptual site contamination model;
- The drilling of 6 boreholes (BH1-BH6) and the collection and chemical testing of selected soil samples;
- Interpretation of the results and findings; and

[1] Legally described as Auto Consul 4916-151

- Reporting of the data and the provision of conclusions and recommendations.

A plan showing the site layout at the time of the investigation and the location of the boreholes is provided in **Figure 1** at the end of this letter report.

The Site Auditor considers the background information on site history and conditions provided in the ESA generally meet DECCW guidelines. Identified data gaps mainly consisted of a copy of the source information reportedly provided in other planning and building assessment reports. This information comprised:

- Historical information that was summarized in Section 5 of the Aargus report (eg. historic land titles, aerial photographs & historical studies)
- Certificate of title and survey plan for Auto Consul 4916-151
- Hazardous building materials assessment
- Certification that all hazardous building materials, materials/equipment used in radiological treatments, and bio-waste had been removed from the Site prior to the commencement of demolition work.

The Site Auditor considers these data gaps can readily be addressed by copies of the relevant assessments being provided to the Auditor for review as part of this audit work.

The ESA used the background information to develop a conceptual site contamination model for the property[2]. The model identified three potential laydown mechanisms (ie. sources) for contamination at the site, these being:

- Fill of unknown origin that may be contaminated
- Spills/leakage of chemicals used at the site
- Spraying of organochlorine pesticides/herbicides near building foundations and pavements.

The Site Auditor considers the selection of these laydown mechanisms is supported by the available information. The risk of other laydown mechanisms being present is considered to be low, provided certification is supplied that indicates all hazardous building materials, radioactive materials used in treatments, and bio-waste had been removed from the Site prior to the commencement of demolition work.

The Site Auditor considers the data obtained by the fieldwork and laboratory testing program generally meets most of Data Quality Objectives (DQOs) recommended in DECCW guidelines. However, the investigation was not able to meet the DQOs for data completeness and data representativeness. This is because the old buildings had not been removed at the time the investigation was conducted in October 2009, which placed major restrictions on site access. This resulted in:

- Only 6 boreholes being drilled compared to a minimum of 12 sampling locations required by the DECCW guidelines for a 4,400m^2 property
- It was not possible to spread the 6 boreholes across the site. Only 2 of the boreholes were actually drilled within the site, with the other 4 boreholes located just outside the site boundaries

[2] Refer Section 7.5 in Aargus (October 2009)

The investigation data provided by the ESA found no evidence of significant soil contamination. The main findings of the investigation were:

- Only a thin layer of fill is likely to cover the site. The boreholes found the fill thickness to range between 0 and 0.7m
- Most potential contaminants of concern were measured at concentrations below the soil acceptance criteria appropriate for hospital land use[3]
- Elevated levels of petroleum hydrocarbons and PAHs were found in some of the fill materials that contained ash and/or bitumen.
- No evidence of contamination was found in the underlying natural clay soils.

Conclusions and Recommendations

The ESA[4] concluded that the soil contamination risks at the site are low and that the site is suitable for the proposed hospital land use. The ESA also considered the old roadbase and ash material in the fill layer could be recycled as roadbase material.

The Site Auditor considers that the site will be suitable for the proposed hospital land use when all fill material has been excavated and removed from the site, and the Site Auditor has confirmed the completion of this work by a site inspection. The architectural plans of the proposed development indicate this work will occur as part of the bulk earthworks required for the construction of basements. The removal of the fill layer needs to be completed prior to the issuing of the site audit statement because:

- Some of the fill material has been found to have elevated concentrations of petroleum hydrocarbons and PAHs that exceed the soil acceptance criteria
- There is a risk of other unknown fill material being found at the site, since the number and location of boreholes drilled by the ESA did not meet DECCW standards
- The removal of the fill layer should address any data gaps in background information that may not be provided for review by the Site Auditor.

Upon completion of this work, the Site Auditor plans to issue a site audit statement similar to the draft statement that is attached to this letter. By delaying the release of the site audit statement to after the fill layer has been removed from the site, it is expected that the site audit statement will not require any conditions. It is also considered that this timing for the release of the site audit statement should not impact the construction and building program given the large amount of excavation work required to be completed at the site and the relatively small amount of additional work that is needed to be undertaken by the Site Auditor.

The Site Auditor also considers that the old roadbase and ash material in the fill layer should not be recycled as roadbase material, since it contains elevated PAH concentrations[5] that are much higher than modern bitumen mixes and which significantly exceed NEPM 'D" criteria. The Site Auditor considers that the presence of these elevated PAH concentrations suggests that coal tar

[3] The Site Auditor considers the appropriate NEPM land use category for the site was "D" (residential with minimum access to soils) rather than "F" (commercial/industrial).

[4] Refer Section 14, Aargus (October 2009)

[5] In the three fill samples containing bitumen roadbase and ash, total PAHs ranged between 190 and 330mg/kg (NEPM 'D' = 80mg/kg), while benzo(a)pyrene concentrations ranged between 13 and 26mg/kg (NEPM 'D' = 4mg/kg)

may have been used in the old bitumen. The Site Auditor recommends this material be disposed at a suitably licensed landfill in accordance with DECCW requirements.

I trust this recommended approach is acceptable to Capital Insight and regulatory authorities, and will allow the Department of Planning to issue a Part 3A approval for the development. Please confirm that the recommended approach is acceptable and the likely timing of when the fill layer may be removed from the site. It is also requested that Capital Insight provide me with a copy of the relevant information from planning and building assessment reports, as previously discussed.

In the interim, please don't hesitate to contact me should any further information concerning my site audit work on this project be required.

Yours sincerely

Dr Ian C Swane (CPEng)
NSW DECCW& WA DEC Site Auditor and QLD DERM TPR
Phone: (02) 0418 867 112
E-mail: Iswane@bigpond.com

Attachment: Draft Site Audit Statement (7 pages)

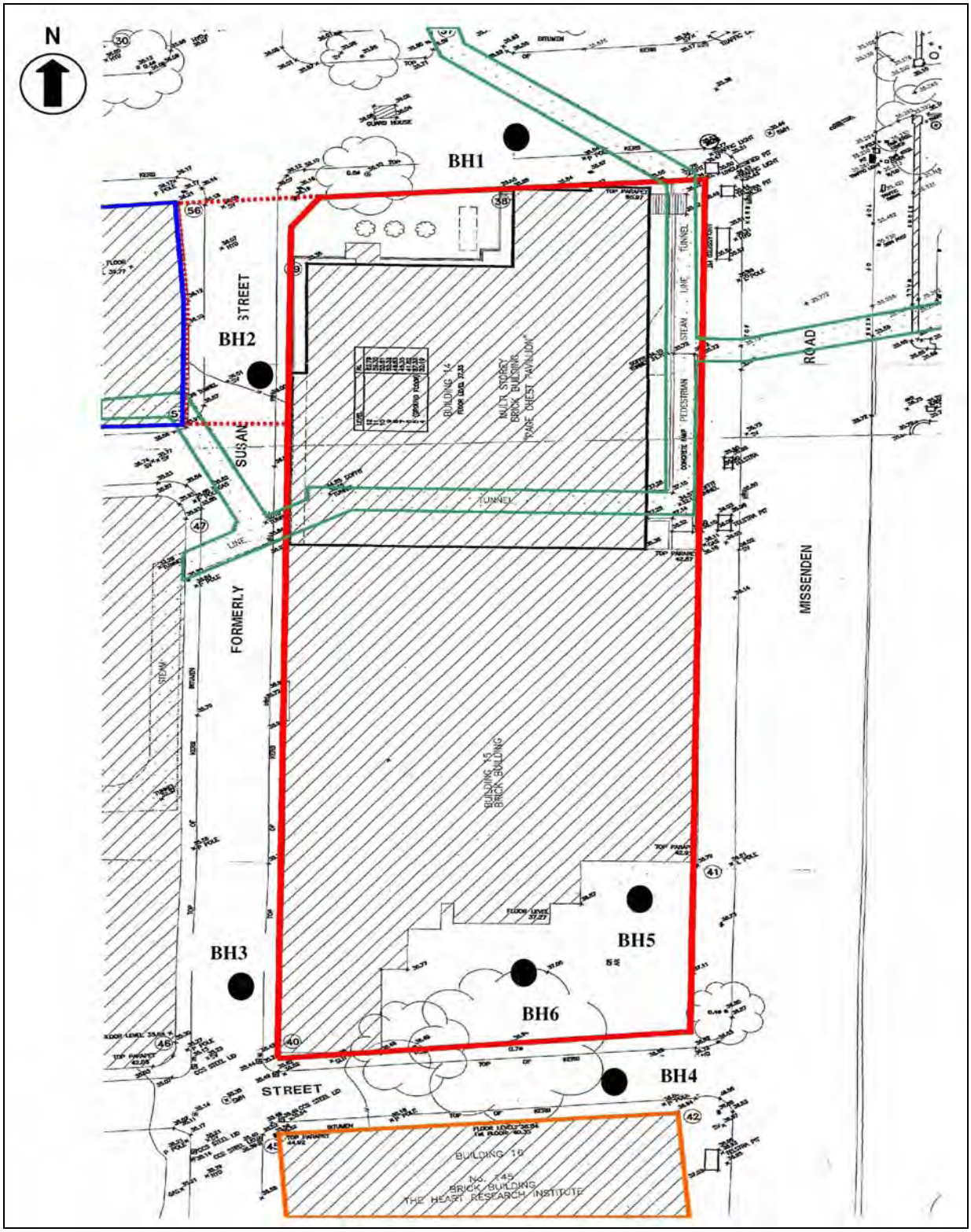

Figure 1 Site Plan (pre-demolition & clearing)

NSW Site Auditor Scheme
SITE AUDIT STATEMENT

A site audit statement summarises the findings of a site audit. For full details of the site auditor's findings, evaluations and conclusions, refer to the associated site audit report.

This form was approved under the* Contaminated Land Management Act 1997 *on 26 March 2009. For more information about completing this form, go to Part IV.

PART I: Site audit identification

Site audit statement no. 170 ……

This site audit is a **statutory audit/~~non-statutory audit~~*** within the meaning of the *Contaminated Land Management Act 1997*.

Site auditor details (as accredited under the *Contaminated Land Management Act 1997*)

Name **Dr Ian C Swane** …… Company **S&N Environmental** ……

Address **PO Box 685, Merrylands NSW** ……
…… Postcode **2160** ……..

Phone **02 9687 6413** …… Fax **02 9687 6415** ……

Site details

Address **119-143 Missenden Road, Camperdown NSW (refer attached Site Plan – Figure 1)** …… Postcode **2050** ……..

Property description *(attach a list if several properties are included in the site audit)*

Part of Auto Consul 4916-151 ……

Local Government Area **City of Sydney** ……

Area of site (e.g. hectares) **4,400m^2 (0.44 ha)**……. Current zoning **Zone No. 5 Special Uses - Hospital**

To the best of my knowledge, the site **~~is~~/is not*** the subject of a declaration, order, agreement, proposal or notice under the *Contaminated Land Management Act 1997* or the *Environmentally Hazardous Chemicals Act 1985*.

~~Declaration/Order/Agreement/Proposal/Notice* no(s)~~ ……
……

Site audit commissioned by

Name **Elisabeth Wallace** …… Company **Capital Insight Pty Ltd** ……

Address **77 Berry Street, North Sydney NSW** ……..
……. Postcode **2060** ……...

Phone **(02) 9959 2638** …… Fax **(02) 9955 5574** ……

Name and phone number of contact person (if different from above)

Not applicable ……

Purpose of site audit

☑ A. To determine land use suitability *(please specify intended use[s])*

Hospital uses (Equivalent to residential with minimal soil access [NEPM D]) …

~~**OR**~~

~~☐ B(i) To determine the nature and extent of contamination, and/or~~

~~☐ B(ii) To determine the appropriateness of an **investigation/remedial action/management plan***, and/or~~

~~☐ B(iii) To determine if the land can be made suitable for a particular use or uses by implementation of a specified **remedial action plan/management plan*** *(please specify intended use[s])*~~

……..

Information sources for site audit

Consultancy(ies) which conducted the site investigation(s) and/or remediation

Environmental Investigations, GeoEnviro Consultancy Pty Ltd, Martens Consulting Engineers & Consulting Earth Scientists ……

Title(s) of report(s) reviewed ……..

1. **Aargus Australia (October 2009) *"Phase II Environmental Site Assessment, 119-143 Missenden Road, Camperdown NSW"*, Prepared for Capital Insight Pty Ltd**

Other information reviewed (including previous site audit reports and statements relating to the site)

2. **City of Sydney (June 2004) *"City of Sydney Contaminated Land Development Control Plan 2004"*, 34 pages**
3. **City of Sydney (September 2002) *"South Sydney Local Environment Plan 1998 (as amended), Zoning"*, Sheet 2 of 2**
4. **City of Sydney (4 May 2010) Letter *"Chris O'Brien Cancer Centre – 'Lifehouse' – Royal Prince Alfred Hospital 119-143 Missenden Rd, Camperdown"*, 3 pages**
5. **Rice Daubney (March 2010) Architectural plans for proposed development at 119-143 Missenden Rd, Camperdown. Plan numbers SK 0049, SK101 & SK 104**

Site audit report

Title **Site Audit Report, Site Audit 170 by Dr Ian Swane, Proposed Lifehouse Cancer Centre at 119-143 Missenden Road, Camperdown, NSW 2050** ……

Report no. **170** …….. Date **XX June 2010** ……

PART II: Auditor's findings

Please complete either Section A or Section B, **not** both. *(Strike out the irrelevant section.)*

Use Section A where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land use(s).

Use Section B where the audit is to determine the nature and extent of contamination and/or the appropriateness of an investigation or remedial action or management plan and/or whether the site can be made suitable for a specified land use or uses subject to the successful implementation of a remedial action or management plan.

Section A

☑ **I certify that, in my opinion, the site is SUITABLE for the following use(s)** *(tick all appropriate uses and strike out those not applicable)*:

- ~~☐ Residential, including substantial vegetable garden and poultry~~
- ~~☐ Residential, including substantial vegetable garden, excluding poultry~~
- ~~☐ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry~~
- ~~☐ Day care centre, preschool, primary school~~
- ☑ Residential with minimal opportunity for soil access, including units
- ☑ Secondary school
- ~~☐ Park, recreational open space, playing field~~
- ☑ Commercial/industrial
- ☑ Other *(please specify)* **Hospital uses** ……

~~**subject to compliance with the following environmental management plan** *(insert title, date and author of plan)* **in light of contamination remaining on the site:**~~

~~……~~

~~**OR**~~

~~☐ **I certify that, in my opinion, the site is NOT SUITABLE for any use due to the risk of harm from contamination.**~~

Overall comments

1. **This site audit statement should be read in conjunction with the site audit report.** ……

Section B

Purpose of the plan[1] which is the subject of the audit .....

.....

I certify that, in my opinion:

- ☐ **the nature and extent of the contamination HAS/HAS NOT* been appropriately determined**

AND/OR

- ☐ **the investigation/remedial action plan/management plan* IS/IS NOT* appropriate for the purpose stated above**

AND/OR

- ☐ **the site CAN BE MADE SUITABLE for the following uses** *(tick all appropriate uses and strike out those not applicable):*
  - ☐ Residential, including substantial vegetable garden and poultry
  - ☐ Residential, including substantial vegetable garden, excluding poultry
  - ☐ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry
  - ☐ Day care centre, preschool, primary school
  - ☐ Residential with minimal opportunity for soil access, including units
  - ☐ Secondary school
  - ☐ Park, recreational open space, playing field
  - ☐ Commercial/industrial
  - ☐ Other *(please specify)* .....

if the site is remediated/managed* in accordance with the following remedial action plan/management plan* *(insert title, date and author of plan)*

.....

subject to compliance with the following condition(s):

.....

Overall comments

.....

[1] For simplicity, this statement uses the term 'plan' to refer to both plans and reports.

PART III: Auditor's declaration

I am accredited as a site auditor by the NSW Environment Protection Authority under the *Contaminated Land Management Act 1997* (**Accreditation No. 9821**).

I certify that:

- I have completed the site audit free of any conflicts of interest as defined in the *Contaminated Land Management Act 1997,* and
- with due regard to relevant laws and guidelines, I have examined and am familiar with the reports and information referred to in Part I of this site audit, and
- on the basis of inquiries I have made of those individuals immediately responsible for making those reports and obtaining the information referred to in this statement, those reports and that information are, to the best of my knowledge, true, accurate and complete, and
- this statement is, to the best of my knowledge, true, accurate and complete.

I am aware that there are penalties under the *Contaminated Land Management Act 1997* for wilfully making false or misleading statements.

Signed ……DRAFT…… Date **XX June 2010** ……

PART IV: Explanatory notes

To be complete, a site audit statement form must be issued with all four parts.

How to complete this form

Part I identifies the auditor, the site, the purpose of the audit and the information used by the auditor in making the site audit findings.

Part II contains the auditor's opinion of the suitability of the site for specified uses or of the appropriateness of an investigation, or remedial action or management plan which may enable a particular use. It sets out succinct and definitive information to assist decision-making about the use(s) of the site or a plan or proposal to manage or remediate the site.

The auditor is to complete either Section A or Section B of Part II, **not** both.

In **Section A** the auditor may conclude that the land is *suitable* for a specified use(s) OR *not suitable* for any beneficial use due to the risk of harm from contamination.

By certifying that the site is *suitable*, an auditor declares that, at the time of completion of the site audit, no further remediation or investigation of the site was needed to render the site fit for the specified use(s). Any **condition** imposed should be limited to implementation of an environmental management plan to help ensure the site remains safe for the specified use(s). The plan should be legally enforceable: for example a requirement of a notice under the *Contaminated Land Management Act 1997* (CLM Act) or a development consent condition issued by a planning authority. There should also be appropriate public notification of the plan, e.g. on a certificate issued under s.149 of the *Environmental Planning and Assessment Act 1979*.

Auditors may also include **comments** which are key observations in light of the audit which are not directly related to the suitability of the site for the use(s). These observations may cover aspects relating to the broader environmental context to aid decision-making in relation to the site.

In **Section B** the auditor draws conclusions on the nature and extent of contamination, and/or suitability of plans relating to the investigation, remediation or management of the land, and/or whether land can be made suitable for a particular land use or uses upon implementation of a remedial action or management plan.

By certifying that a site *can be made suitable* for a use or uses if remediated or managed in accordance with a specified plan, the auditor declares that, at the time the audit was completed, there was sufficient information satisfying guidelines made or approved under the CLM Act to determine that implementation of the plan was feasible and would enable the specified use(s) of the site in the future.

For a site that *can be made suitable*, any **conditions** specified by the auditor in Section B should be limited to minor modifications or additions to the specified plan. However, if the auditor considers that further audits of the site (e.g. to validate remediation) are required, the auditor must note this as a condition in the site audit statement.

Auditors may also include **comments** which are observations in light of the audit which provide a more complete understanding of the environmental context to aid decision-making in relation to the site.

In **Part III** the auditor certifies his/her standing as an accredited auditor under the CLM Act and makes other relevant declarations.

Where to send completed forms

In addition to furnishing a copy of the audit statement to the person(s) who commissioned the site audit, statutory site audit statements must be sent to:

Department of Environment and Climate Change (NSW)
Contaminated Sites Section
PO Box A290, SYDNEY SOUTH NSW 1232
Fax: (02) 9995 5930

AND

the **local council** for the land which is the subject of the audit.

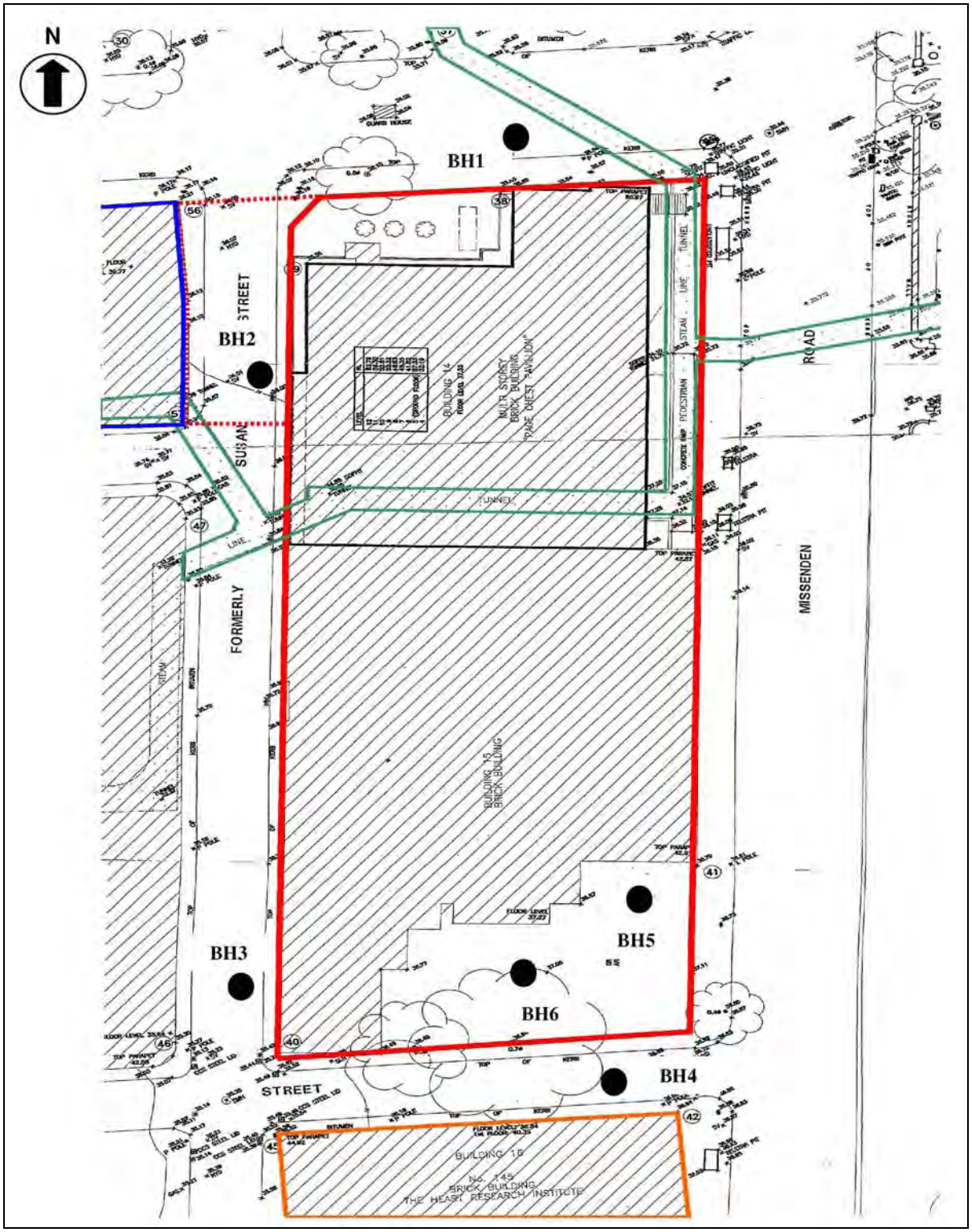

Figure 1 Site Plan