

SYDNEY MELANOMA UNIT
JUSTINIAN HOUSE REDEVELOPMENT

GENERAL STRUCTURE

DESIGN BRIEF: 2836 DB1

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REVISION	DATE	ORIGINATOR	CHECKED	APPROVED	REMARKS
A	Sept 2007	PS	TH		For D.A.

THE PROPOSED DEVELOPMENT – SITE A – BACKGROUND

The project consists of two storey basement and three levels of consultation and administration services, with upper level plant rooms.

All the floor slabs are proposed to be post-tensioned reinforced concrete, supported on reinforced concrete columns and lift cores.

The location of the concrete columns for the typical floors has been dictated by and co-ordinated with the internal layout and the carpark. The slab and beam sizes will be optimised to give structural efficiencies in the floor slab system.

A main transfer slab is proposed at Level 1, where the column layout alters between the occupied floors and the column locations that best suit the basement carpark. The building was planned so that the columns were offset in one direction (beam transfer only), thereby minimizing costs associated with transfer floors.

The excavation for the basement shall occur with surrounding vertical cuts in rock and temporary batters. The basement retaining 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 will not 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.

1.0 SCOPE OF WORK – STRUCTURAL

1.1 Design, Documentation and Advise on the following items.

- i) footings and shoring / retaining walls.
- ii) internal pavements within the site boundary.
- iii) suspended concrete floor slabs, columns, stairs and walls, including a suspended concrete roof.
- iv) structural steelwork items
- v) prepare specifications for structural components.

2.0 CODES

2.1 The structure and pavements will be designed in accordance with the following codes:

- i) Building Code of Australia
- ii) AS 1170 Loading Codes
- iii) AS 3600 Concrete Structures Codes
- iv) AS 4100 Steel Structures Code
- v) AS 3798 Guidelines on Earthworks for Commercial and Residential Developments
- vi) AS 3700 Masonry Code

3.0 LOADS

3.1 SLAB LOADS

The suspended slabs are to be designed for the following loads:

Basement B2, B1	Car parking & Ramp	2.5 kPa live load
		0.25 kPa super imposed dead load
Level 1 to L4	Offices / Consultation Rooms	3.0 kPa live load
		1.0 kPa super imposed dead load (partitions, ceilings and service)
	Dining Areas & Lounge Areas	3.0 kPa live load
		1.0 kPa dead load
	Corridors and Waiting Areas	4.0 kPa live load
		1.0 kPa dead load
	Auditorium	4.0 kPa live load
		1.5 kPa dead load
	Plantrooms	7.5 kPa live load
		2.0 kPa superimposed dead load
	External Courtyards	4.0 kPa live load
		2.0 kPa dead load

All external beams will be designed for 150 precast panels and internal studwork (4.25 kPa self weight).

3.2 WIND

Wind loads will be assessed in accordance with AS 1170.2 – 2002 using the following parameters –

Terrain Category:	3
Region:	A2, $V_u = 46$ m/sec
M_t =	1.0
Shielding Multiplier	NE $M_s = 1.0$
	NW $M_s = 1.0$
	SW $M_s = 1.0$
	SE $M_s = 1.0$

3.3 EARTHQUAKE

Earthquake loads will be assessed in accordance with AS 1170.4 – 1993.

Structural type	=	2
Accel. Coefficient, a	=	0.08
Site Factor, S	=	0.67
Importance Factor	=	1.0
Structure Classification	=	B

All structural elements will be designed for Earthquake forces. The design requirement of AS1170.4 are based on a probabilistic earthquake event. The structure will be designed and detailed to resist this earthquake event and not collapse. However, some damage to the structure will generally occur. Repair or demolition of the structure may be required.

3.4 LOAD COMBINATIONS

Load combinations shall be those specified in AS 1170.1-2002.

For the strength limit state, the relevant combinations are:

1.2 Dead + 1.5 Live

1.2 Dead + Ultimate wind (pressure)

0.8 Dead + Ultimate wind (suction)

Internal pressure for this structure will be taken as -0.2 (sealed building)

For stability under wind uplift.

Ultimate wind $< 0.8 \times$ Dead Load Resisting.

3.5 HANDRAILS

All handrails, balustrades and carpark barriers shall be designed in accordance with AS 1170.1. Where applicable the design shall include for the effects of crowd loading or car impact.

4.0 STRUCTURAL STEELWORK

4.1 DESIGN

The structural steel framing to be designed to conform to the requirements of AS 4100-1996.

4.2 BUILDING DIMENSIONS

Building dimensions and column set-out will be as shown on the Architectural drawings.

4.3 CORROSION PROTECTION

All structural steel is to be protected in accordance with the Structural Steelwork Specification.

All bolts and anchor bolts shall be galvanized.

4.4 PURLINS AND GIRTS

Light gauge steel, galvanized to give Z350 coating (350 gm/m²).

5.0 CONCRETE SLABS

5.1 SUSPENDED SLABS

Concrete strength to be 32 MPa and 22 MPa at 5 days for suspended slabs with a minimum cement content of 285 kg/m³, and having river gravel or crushed basalt aggregate (no slag aggregate permitted), water cement ratio to give 80mm max slump.

Reinforcement to have concrete cover to suit exposure as per AS 3600 Concrete Structures Code.

All slabs to be cured with applied curing compounds compatible with floor finishes.

External ground floor slabs and roof slabs are to be designed as waterproof slabs.

5.2 CARPARK AREAS

Subject to ground water level testing, carpark pavements shall be constructed of asphaltic concrete, or concrete slab on grade.

6.0 FOOTINGS AND RETAINING WALLS

All footings and retaining walls are to be designed in accordance with recommendations contained in the geotechnical investigation report prepared by Douglas Partners (Ref. No. 28225E). This report also provides recommendations and advice on excavation methods, the presence of groundwater and rock face support, which will be considered and acted on accordingly.

7.0 SERVICEABILITY OF SUSPENDED SLABS

General	)	
Open areas	)	Total deflection < span/250
and car parks	)	

Slab area containing brittle finishes or partitions	Incremental Deflection <span/500
	Total deflection <span/250

All slabs and slab bands/beams to have a natural frequency less than 5 hertz. (This will provide a floor with no perceived vibrations).

Internal Brittle Walls will need to have control joints at regular centres.