15 July 2010

Mr Simon Healy
Senior Development Manager
Mirvac
Level 26, 60 Margaret Street
SYDNEY NSW 2000

T-12565-00

Dear Sir,

RE: PROPOSED RESIDENTIAL & COMMERCIAL DEVELOPMENT.
7 RAILWAY STREET, CHATSWOOD.
STRUCTURAL DESIGN STATEMENT.
Our Ref T-12565-00

We, Opus International Consultants, being Structural Engineers within the meaning of the Building Code of Australia, hereby confirm that this office is responsible for the structural design of the building work for the above project. The building work comprises footings, columns, load bearing walls including lift walls and stair walls, floor slabs and roof slabs, and this work will be designed in accordance with relevant provisions of the standard building codes and SAA Codes current at the time of design and in accordance with accepted engineering practice and principles. In particular, we confirm that the design will be in accordance with the following:

- The relevant clauses of the Building Code of Australia
- AS 1170.1 2002 Structural design actions Parts 0, 1, 2 and 4: Minimum Design Loads On Structures
- AS 3600 2009 Concrete Structures
- AS 4100 1998 Steel Structures
- AS 3700 2001 Masonry Structures
- Recommendations of Geotechnical Engineers based on investigations carried out by them on the site.

The general structural layout and framing system for the building will be as follows:

- Structural Framing System – Full concrete frame incorporating reinforced concrete slabs, prestressed concrete slabs, concrete columns and concrete walls.
- Fire Rating – The structure will be designed to have a fire rating capacity not less than required by the relevant clauses of the Building Code of Australia, as advised by the Principal Certifying Authority.
- Footings – Pad footings and strip footings on medium strength sand stone will be used to support building loads. Footing design will be based on recommendations of Geotechnical Engineers based on investigations carried out by them on the site.
- Lateral stability – Lateral building stability will be provided by interaction between the concrete lift cores, stair cores, concrete shear walls, with all the columns and floor plates. The columns are elongated in the narrower direction of the building to enhance their effectiveness in this regard.

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- Basement levels – The basement parking levels will consist of reinforced concrete slabs, slab bands and drop panels, supported on concrete columns, lift cores and stair cores. The basement structure will be independent of the RES and will not rely on the Railway Enclosure Structure for structural support. Shoring in the form of piles and shotcrete will be required to enable the excavation for the basement along the street boundaries. Existing shoring along the Railway Enclosure Structure will also be extended to enable additional excavation adjacent to the RES.
- Typical residential floors – The floors will be a 200 mm thick prestressed flat plate system, supported by the core walls and a combination of insitu and precast concrete walls and columns.
- Transfer structures – a number of concrete transfer walls on the commercial levels will be utilised to transfer tower column loads to the basement columns.
- Exposure Condition – Exposure B1 externally in accordance with AS 3600 2009 Concrete Structures.

In addition, we have carried out an assessment of the proposed building structure on the western side of the Railway Enclosure Structure with respect to the relevant requirements of RailCorp's and Australian Standards. RailCorp's requirements are set out in the Brief for Review of Geotechnical & Structural Design for Developments Adjacent to or above Rail Corridor for External Third Party Works.

Our findings are as set out below. We believe that collision protection is not necessary for proposed new building structure.

A. RailCorp Infrastructure Engineering Standards - Structures

The Railway Enclosure Structure is a stand-alone concrete structure, designed and constructed in accordance with RailCorp requirements, including all loading requirements. The perimeter and roof of Railway Enclosure Structure were designed by Tierney and Partners in accordance with RailCorp's collision and impact requirements.

1. Miscellaneous Structures Standard ESC 360

With reference to Section 6 Collision Protection, the proposed new building is located outside and to the West of the Railway Enclosure Structure, and collision protection to the new building has already been provided by the Railway Enclosure Structure, therefore the loading requirements of ESC 360 do not apply to the structure of the new building.

2. Air Space Developments Standard ESC 370

With reference to Section 5.1 Design Standards and Section 6 Design requirements, as all vertical support elements of the proposed new building structure are completely outside the Railway Enclosure Structure, with only some limited cantilever portions of the balcony slabs projecting into the airspace over the Railway Enclosure Structure to a maximum of 2400 mm, we propose that the requirements of ESC 370 are not applicable to the structural design of the new building.

Collision protection to the new building has already been provided by the perimeter and roof of the Railway Enclosure Structure, therefore the loading requirements of Section 7 of ESC 370, Collision protection do not apply to the structure of the new building.

3. External Developments Standard ESC 380

With reference to Section 6 Design requirements, as the proposed development involves excavation within 25 metres of the centreline of the Railway Enclosure Structure, adequate structural design will be carried out to ensure that the structural stability and integrity of RailCorp's facilities are not adversely affected. Footings for the proposed new building will not protrude into the rail corridor. Other relevant structural requirements of ESC 380 will be complied with.

4. Derailment protection

Derailment protection incorporating deflection walls is not required, as collision protection to the proposed new building has already been provided by the perimeter and roof of the Railway Enclosure Structure.

B. AS 5100 Bridge Design Code

The requirements of AS 5100 Bridge Design Code do not apply, as the proposed new building structure

1. is not required to provide vertical support nor lateral support to train loading;
2. is located outside and to the West of the Railway Enclosure Structure, and collision protection has already been provided by the perimeter and roof of the Railway Enclosure Structure.

C. Other general comments

1. Additional excavation adjacent to the West of Railway Enclosure Structure for the proposed basement levels 5 to 7 will require additional shotcrete shoring and additional anchors to be installed on the western wall of the Railway Enclosure Structure. The proposed shoring and corresponding ground anchors are shown on the attached structural drawings 11768-2004-H, 11768-2005-E and 2008-G, prepared by Opus.
2. The proposed new building footings adjacent to the Railway Enclosure Structure will be pad footings and strip footings on class II or Class III competent rock, with an allowable bearing pressure in excess of 3500 kPa. The footings will be completely outside the Railway Enclosure Structure and will be assessed and certified by the geotechnical engineer that they will not adversely impact on structural stability and integrity of RailCorp's facilities and infrastructure.
3. The structure of the proposed new building, including footing elements, does not exert any loads or pressures on the Railway Enclosure Structure.

We trust this is sufficient for your submission to the relevant authorities including RailCorp. Please do not hesitate to contact the undersigned if you have any queries regarding this submission.

Yours faithfully,

OPUS INTERNATIONAL CONSULTANTS

Don Le- Huu
Principal Structural Engineer & Partner
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Encl: Opus structural drawings 11768-2004-H, 11768-2005-E and 2008-G.