Aargus
AUSTRALIA

Environmental - Remediation - Engineering - Laboratories - Drilling

1st April 2011

Re: Groundwater at Majors Bay Project

In assessing the groundwater impacts, Aargus have reviewed the Concept Plan layout and overlain that with the proposed location of building and basements. Aargus identified the following:

- A rock shelf spans the Majors Bay boundary and generally sits around 20m in from the seawall embankment;
- The catchment for groundwater is relatively small. The attached diagram shows that Tennysone Road is the apex of the hill and groundwater would flow from that point in a westerly direction down to the site and easterly away from the site;
- All current areas downgradient from Tennyson Road is generally sealed with limited grassed and recreational areas due to its historical commercial nature;
- Any groundwater would be considered perched groundwater and boreholes from all investigations show that shallow rock is encountered across most of the proposed development area;
- With the exception of 3 locations, groundwater was not encountered;

- Building 5A is the only building that has a basement that sits below the watertable. It is expected that the water in this area is tidal and most likely due to water within Majors Bay rather than groundwater. This is further bolstered by the fact that the groundwater level sits at a similar level to Majors Bay water plus the salinity within groundwater is relatively higher than groundwater (i.e. seawater);
- Building 4A whilst sitting on rock is situated at the boundary of groundwater found generally indicating that the rock shelf would tend to move more inwards in this area. Appropriate water management would be required to restrict water ingress;
- Buildings 1A, 1B and 3A are also situated near the Majors Bay foreshore and would require similar water ingress management techniques;
- Other than piling there is no other interference with groundwater;
- Given the small catchment area for groundwater, this precludes any dependency on groundwater as the only influence of water. The primary influence of water is within water bearing zones originating from tidal influences of Majors Bay and its subsequent saturation zone of influence;
- There are therefore no beneficial ecosystems to be potentially impacted from water entering Majors Bay from groundwater on the site;
- Groundwater resources must be managed in ways that are consistent with the principles of conservation of biological diversity, namely:
    - conservation of biodiversity should take place *in situ*;
    - action to conserve biodiversity must not be postponed in the absence of full knowledge;
    - the establishment of a comprehensive, representative and adequate system of ecologically viable protected areas;
    - sympathetic management of other landscapes, including those in which agricultural and other resource production systems operate.
- Groundwater Dependent Ecosystems at the site would rely on the following:
    - Be dependent on water recovery/recharge rates coming out from the site;
    - Interuption of groundwater flow to downgradient sources – i.e. Majors Bay; and
    - Majors Bay receiving water quality

Given the minimal likelihood of the above occurrences for impact on Groundwater Dependent Ecosystems, there is minimal to no potential for interaction with groundwater and any Groundwater Dependent Ecosystems. Furthermore, the small catchment area precludes any dependency to groundwater as a major ongoing source in the proposed development area.

For further information, please contact me on the details provided.

For and on behalf of

Aargus Pty Ltd

Nick Kariotoglou

Managing Director

Encl: Site Map overlay

Expect tidal influence off rock shelf

GW 1.8m (off rockshelf interacts with Majors Bay)

~2.5m GW (no rock)

Basement Extent

Rainwater Harvesting
(indicative location)

MAJORS BAY

EDWIN STREET

1 Basement Level
Basement FFL 0.3 AHD
5A

SITE 2 RAINWATER TANK

32 Parking Spaces

5B

Shallow Rock
No GW

BENNETT STREET

NORTHCOTE STREET

1 Basement Level
Basement FFL 0.3 AHD
1A

1B

SITE 3 - WEST RAINWATER TANK

47 Parking Spaces

SITE 3 - SOUTH RAINWATER TANK

2 Basement Levels
Lowest Basement
FFL -0.5 AHD
3A

SITE 3 - NORTH RAINWATER TANK

4A

72 Parking Spaces

Shallow Rock
No GW

4D

2 Basement Levels
Lowest Basement
FFL -0.5 AHD

130 Parking Spaces

4C

4B

2 Basement Levels
Lowest Basement FFL -0.5 AHD

3B

2 Basement Levels
Lowest Basement
FFL -0.5 AHD

SITE 1 - SOUTH RAINWATER TANK

6A

1 Basement Level
Basement FFL 6.5 AHD

1 Basement Level
Basement FFL 6.5 AHD
2A

SITE 1 - NORTH RAINWATER TANK

1N-B

1N-C

Shallow Rock
No GW

162 Parking Spaces

6D

1 Basement Level
Basement FFL 0.3 AHD

210 Parking Spaces

1 Basement Level
Basement FFL 0.3 AHD

3 Basement Levels
Lowest Basement FFL -0.2 AHD

2B

6B

3 Basement Levels
Lowest Basement FFL 0.3 AHD

6C

HILLY STREET

HILLY STREET

HILLY STREET

WHITTAKER STREET

PALACE LN

NORTHCOTE STREET

GW flow direction

Catchment Area (all sealed)

Apex of Hill

TENNYSON ROAD

BREAKFAST POINT

0 10 20 30 40m

Majors Bay Development for Aust-Equity Properties Pty Ltd

COX mecone

BASEMENT EXTENTS

Drawing Number_REV
DA_02_08_00

Date
November 2010