

REGIONAL ENVIRONMENTAL STUDY

ADI SITE, ST MARYS

**Department of Urban Affairs and Planning
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3.3.2 Flooding of the Site

The site is drained by South Creek, Ropes Creek and several unnamed tributaries. Ropes Creek follows a concrete lined channel which was built to limit flooding on the site, while the other creeks are mostly in their natural condition. Ropes Creek discharges into South Creek just north (downstream) of the site. The majority of the site drains naturally to a central flood plain (figure 5).

The site is subject to flooding from a number of sources. These are:

- backwater from the Hawkesbury - Nepean River system
- flows in South Creek and Ropes Creek
- localised site discharges (including flows from adjoining local areas).

There is a lack of observed flood data that relates flooding near the ADI site to the historic flood information observed in Windsor. The largest recorded flood in the Hawkesbury-Nepean River recorded at Windsor Bridge occurred in 1867 and is estimated to have had a magnitude of about 1 in 200 AEP (Annual Exceedance Probability or chance per year). In 1961 a flood of a 1 in 40 AEP was recorded at Windsor Bridge whilst the most recent was a 1 in 20 AEP flood in 1990. Floods in 1986 and 1988 correspond to only the 1 in 5 AEP and 1 in 10 AEP event respectively, but they were particularly large in South and Ropes Creek at the Great Western Highway with levels almost equaling those for the 1867 flood. It is likely that backwater flooding would be critical for the ADI site rather than flooding resulting from local run-off, particularly for large floods. It is however, necessary to consider both possibilities when assessing flood behaviour on the site.

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Backwater flooding from the Hawkesbury River is predominantly restricted to less frequent flood events than 1 in 100 AEP. At smaller flood events (in the Hawkesbury River) the flooding on the site is dominated by flows in both South Creek and Ropes Creek.

About 468 ha, or 30% of the site is expected to become flooded during a 1 in 100 AEP flood event. In the event of a Probable Maximum Flood (PMF) water depths would be some 10 metres above the 1 in 100 AEP flood level and would inundate 944 ha or 61% of the site. (The PMF is the greatest flood that could potentially occur in the catchment. The limited statistical data of the factors determining the PMF means it is very difficult to determine the probability of occurrence. The likelihood of a PMF in the Hawkesbury Nepean Valley is estimated to be between 1 in 10,000 and 1 in 100,000 years). Table 2 below gives the relevant flood levels affecting the site.

TABLE 2 FLOOD LEVELS IN METRES ABOVE AUSTRALIAN HEIGHT DATUM (ABD)		
LOCATION	FLOOD EVENT	
	1%	PMF
Windsor	17.3	28.9
Downstream of site	19.0	29.0
Upstream end of site South Creek	20.7	29.8
Great Western Highway at South Creek	24.6	30.3
Upstream end of site Ropes Creek	24.6	29.5

Note: 1% Flood: a flood which has a 1% chance of occurring each and every year.

PMF: Probable Maximum Flood

During moderate storm events, South Creek and Ropes Creek are generally characterised by flow velocities in the order of 1 metre per second (m/s) with some areas of backwater that are slower.

The flows, the extent and the depth of water in the full range of flood events resulting from the local catchment, South Creek and the Hawkesbury River will impact on

development on land up to the PMF. The range of potential flood risks has been examined for a range of development scenarios. In existing urban areas in the catchment, the Hawkesbury Nepean Flood Awareness Committee is preparing a Floodplain Management Plan to manage the risks to development on land between the 1 in 100 AEP and the PMF levels from potential flooding. A Floodplain Management Plan needs to be developed for this site if it is to be developed. This is examined in section 4.15.

Section 4.15

Principle 4 To permit no urban development in areas affected by 1% AEP flood events of South Creek and Ropes Creek. (Flows within the tributaries of these creeks within the site could be incorporated within the overall urban development zone, but specific localised planning controls will need to be applied.). To develop specific land-use and design controls that respond to the potential flood risks in areas affected by the PMF.

The flooding effects on this site are severe for the extreme events, i.e. up to the Probable Maximum Flood (PMF). These events could inundate the site by up to 10 metres depth above the 1% AEP flood level. The effects of the 1% AEP flood event cover approximately 460 ha and the PMF could result in excess of 940 ha of land being inundated.

Both the range of flood levels and the extent of inundation impose substantial constraints on the urban capability of the site. A further impact of flooding is the risk it poses to future land uses and any new community on the site. Should the site be developed, strategies need to be in place for each potential flood event to manage the range of threats, ensuring protection for the community economically, socially and physically. This is particularly

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important when planning land uses and designing roads and buildings in the areas below the PMF level.

The current planning standard for flood prone lands, including land in the South Creek catchment adjacent to the site, in Penrith and Blacktown LGAs, is the 1% AEP. This effectively limits new urban development, and especially residential development, on land that has a 1% chance of being flooded each and every year. It is considered that this standard should apply to the ADI site with only flood-compatible land uses occurring on land with the highest risk i.e. below the 1% level.

It must be recognised that flooding can pose a major threat to the achievement of the goals in "Cities for the 21st Century" which provide for a framework to create a secure prosperous future for the community. To minimise this threat, effective site specific strategies are needed. Any development of land affected by flooding would have to have regard to the Government's Floodplain Development Manual (1986).

To enable the goal and the principles for flooding to be achieved, it is necessary for any masterplan for the site to include a Floodplain Management Plan which should include the staging of components that are dependent on the availability of funds and adoption of interim measures.

Principle 5 To prepare and implement a Total Water Cycle Management Plan

To ensure that the goals and all the principles for total water cycle management can be achieved it is necessary for a Total Water Cycle Management Plan (TWCM) to be prepared.

This plan should quantify the potential impact of development on water quality and quantity and ensure that development on the site achieves the following objectives:

1. Stormwater

All surface run-off water generated from the site during the construction stage and following development should lead to no change in downstream peak flood levels for all storm events and should not increase the total loads of nutrients, bacteria or sediments generated from the existing site.

2. Wastewater

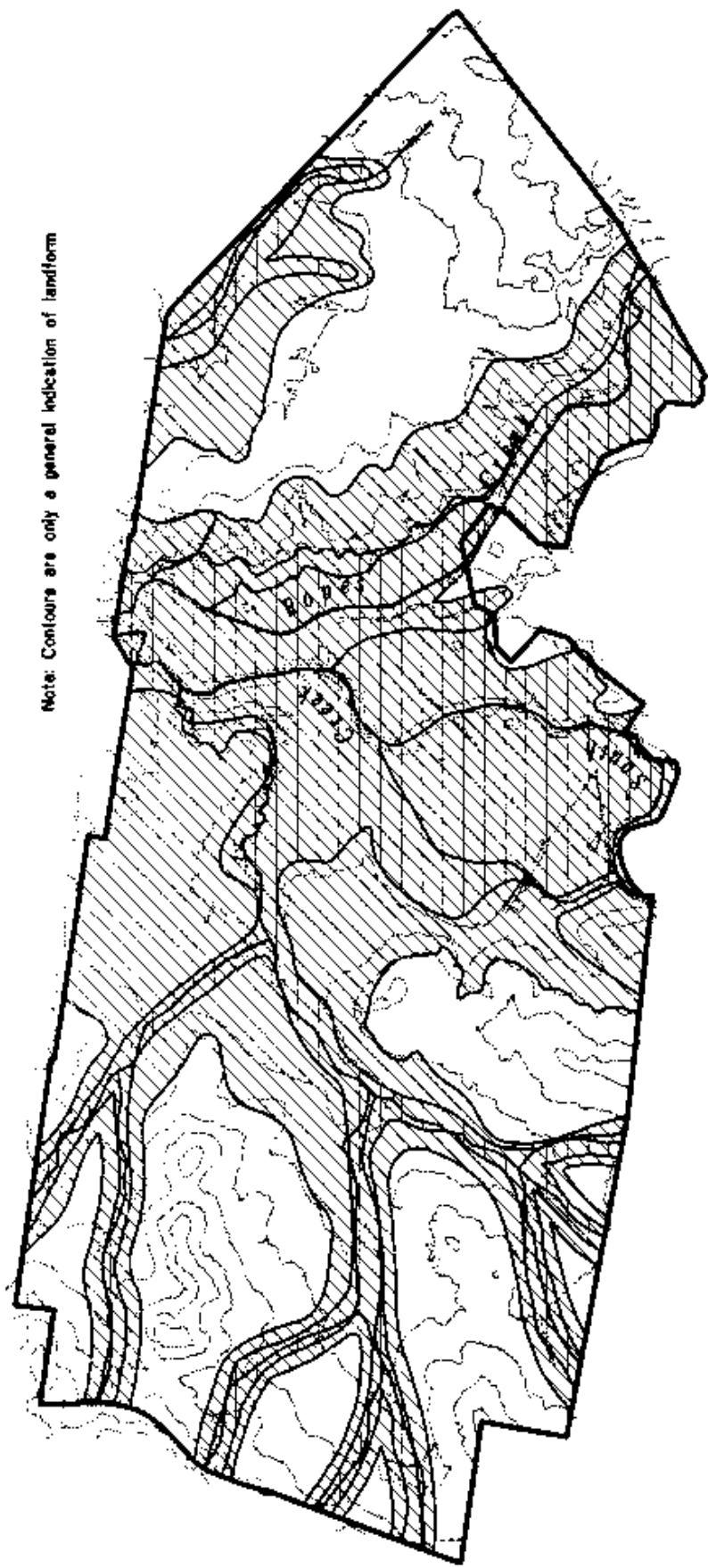
Any wastewater generated from the development shall not increase the total nutrient load in South Creek downstream of the site (measurement to be based on total load discharged at the effluent discharge point minus any water quality enhancements achieved by the development.)

3. Water Supply

Bulk water supply used by the development shall achieve by 2010 a 30% reduction on current headworks demand for an equivalent population.



4. Flooding

No urban development should occur in areas affected by 1% AEP flood events of South Creek and Ropes Creek. Specific land-use and design controls shall be developed that respond to the potential flood risks in areas affected by the PMF.



Note: Contours are only a general indication of landform

Figure 5 FLOODING IMPACTS

- LEGEND**
-  Probable Maximum Flood (PMF)
 -  100 Year Annual Exceedance Probability (AEP) Flood

