

Ku-ring-gai Council: flooding/stormwater, biodiversity and bushfire comments on Lindfield Learning Village Stages 2 and 3

Flooding and Stormwater –

Detailed mainstream and overland flow flood mapping has not been completed by Council for this area. As the site is situated near the ridge line mainstream flow flooding is not a concern, however overland flow is a potential issue which should be addressed through the stormwater.

The proposed works are located outside of Council mapped Riparian zones. However impacts upon the surrounding environment must be minimised through appropriate, well maintained sediment erosion control during construction activities.

WSUD (as shown on Drawing LA-2-0007) proposes a series of WSUD features, which is encouraging to see.

However, it is unclear how the proposed features will operate in practice. Drawing LA – 2-0007 shows bioretention swales along the perimeter road along with a series of bioretention basins connected by vegetated swales.

The following issues have been identified:

- The diagram shows the bioretention basins, approx. 1m deep with “outflow to stormwater” at the base (as indicated by the typical drawing) connected by the vegetated swales, which are designed to convey water via surface flows;
- Additional bioretention basin details required include:
 - If the basins will be lined or not. Depending on the grade some depths may not be possible without excavating into sandstone and as such some may be required to be partially or fully constructed as a “planter box” or raised above the ground surface;
 - Discharge points and method needs to be clearly shown – there are no stormwater systems for the basins to discharge to. The gardens may potentially be unlined and simply infiltrate to the surrounding soil, however shallow sandstone is likely to prevent this;
 - Basins on the boundary – those indicating discharge to bushland will need to be some sort of infiltration or dispersal system to minimise scour impacts on bushland;
 - Depth of ponding is required as this is potentially an important safety issue in a school environment will signage or barriers be required?;
- Some sections of vegetated swales are shown to have “switchbacks” or “hairpin” bends which would be prone to blockage with debris and unlikely to operate properly – steeper areas may benefit from having steeper, straighter rock lined swales instead;
- There appears to be a sewer main in the vicinity of the bioretention basins connected via the “switchbacks” – this may limit design options in this area – DBYD or service location needed;
- It is unclear what the catchment for the treatment train is (is it just ring road and playgrounds?) and if the combination of Bioretention swales and Bioretention basins is sufficient to provide adequate treatment. Also, has the proposed system been modelled in a system such as MUSIC?;
- How will maintenance be undertaken, will there be a positive covenant or other mechanism to ensure the system is maintained as required?

It is also unclear how the indicative treatment train connects to the wider school stormwater system and if it is part of a larger re-use scheme (e.g. rainwater tanks for landscaping or toilet flushing).

It is unlikely that the proposed treatment train including 2 long bioretention swales and 14 smaller bioretention gardens connected by vegetated swales will be effective in the short term and it is highly unlikely that such a complex system (if modelled and designed to appropriate detail) would be maintained to provide benefits in the long term.

Contamination - This site is not recorded as contaminated within Councils GIS

Indigenous heritage - No items of Aboriginal heritage have been identified within the site.

Biodiversity and Tree impacts –

Concern is raised regarding the impact of extensive recreational structures within areas marked as managed bushland (as shown on Drawing LA-2-0005), including the proposed Parkour Trail. Consideration should include impact from building the structure as well as maintaining appropriate ground covers under the structure. Should this design be adopted, design, construction and management of such assets should minimise impact through appropriate footing design and location, as well as consideration of future ground maintenance requirements [including accessibility], eg. Mulch vs vegetation management. Should mulch be used, weed free native mulch is preferred.

Design, construction and management of proposed sedimentation works (as shown on Drawing DA-2-101) and Security Fences (as shown on Drawing LA-2-1005) should minimise impacts upon existing vegetation and onsite habitat features.

Concern is raised regarding the additional impacts to local biodiversity and vegetation, from the proposed perimeter road, including the likely removal of a number of trees.

Whilst the local plant community is not mapped as a threatened ecological community, this area provides important habitat and directly adjoin core bushland areas. As such any additional impact to trees or habitat (such as hollows) should be offset.

Bushfire –

The Bushfire Emergency Management and Evacuation Plan is robust and the inclusion of the proposed perimeter road is strongly supported from a bushfire protection point of view.

Issues are raised with the Bushfire Radiation Assessment (Stephen Grubits & Associates) and those aspects of the Bushfire Hazard Assessment (Blackash Bushfire Consulting) it informs.

- Concern over the reliance on APZs imposed on NPWS land. APZs should ideally be contained entirely within the development site and not on adjoining lands. It is recognised, however, that this may be considered as a performance-based solution and will be assessed on its merits when RFS is determining whether or not to issue a Bush Fire Safety Authority.
- The Bushfire Radiation Assessment has been carried out by a consultant with expertise in engineering and structure fires, but who does not appear to have expertise in bushfire behaviour or bushfire protection measures.
 - A2.7 of PBP 2019 states *“given the complexity of performance based solutions, it is recommended that they are undertaken and fully justified by qualified consultants.”* Is the consultant BPAD accredited?
- The methodology used to determine radiant heat exposure is not the generally accepted method described in *AS 3959:2018*, but one apparently developed by the consultant. I am uncertain of the suitability of this methodology, although according to the Bushfire Hazard Assessment it has been agreed to by the RFS.
- I remain concerned about the reliance on radiant heat shielding provided by escarpments downslope of the development site to reduce required APZ widths, despite the statement within the Bushfire Hazard Assessment that the approach has been agreed to by the RFS. This approach is not supported by the generally accepted methods of assessing radiant heat flux and little information is provided by the consultant to support their position.
- Modelling of radiant heat alone is generally not sufficient where the effective slope exceeds 18 degrees, as canopy fuels become much more involved in fire behaviour and convective heat starts to become a substantial factor. Due to the very steep slopes an increased flame height and the effects of convective heat on this development should be considered when determining requirements for bushfire protection measures.
- Further discussion with the RFS are advised regarding the proposed Security Fences and vehicular and pedestrian gates (as shown on Drawing LA-2-1005) and the need for gates / appropriate locks etc.