

4 May 2015

Our reference: 10104.AS.04_05_15

Jamie Boswell
Vincent St Holdings Pty Ltd
PO Box 42
Thornton NSW 2322

Dear Sir,

**Re: Proposed Amendment to Cessnock Local Environmental Plan
James St, Cessnock
Clarification of past flood assessments**

We refer to the proposed amendment to Cessnock Local Environment Plan associated with land off James Street Cessnock, in which the land use zone would change from RU2 (Rural) to R3 (Medium Density Residential).

At your request we provide clarification on the likely extent of fill that will be required to reasonably facilitate development consistent with the proposed R3 land use zone along with relevant flooding considerations based on historical flood assessments for the site.

Potential Future Development

A potential layout for development within the R3 zone is indicated on the attached plan (GCA Ref: 10104L L01, Rev 16, 7 April 2015). Also shown on the plan is the estimated extent of flooding associated with the 1% Annual Exceedance Probability (AEP) flood extent for the current site landform.

Based on the proposed land use zone and minimum lot sizes permissible under Cessnock LEP it is anticipated that future development could take the form of individual allotments of minimum 450m² area and/or some form of multi-dwelling configuration (eg. units). Any development will need to be provided with access and from site topography it is logical that the access would be provided by extension of James Street into the site, interconnecting with Michael Street on the southern end. It is also logical that the access road would be provided along the eastern interface with the 1% AEP flood envelope, providing a 'buffer' between potential flood waters and development during these rare events.

Noting above and allowing for minimum road turning radius into James and Michael Streets, it follows that some filling will be required along the flood fringe areas and permit flood free access up to the 1% AEP flood event. The attached plan shows that the filling areas will be contained generally within the footprint of the logical perimeter road.

Previous Flood Assessments

Various flood studies have been prepared for the wider 'Cessnock Civic' development site (formerly Lots 23 DP845896 and Lot 1 DP1036300). They were based on the developer's ultimate vision for the precinct to include a mixture of Business Park, Rural, Residential and Environmental land use zones. The majority of the precinct has since been rezoned.

The report titled *Cessnock Civic, Flood Study for Rezoning* was prepared by GCA in September 2011. It included background information on flood studies by Parsons Brinckerhoff (2004 & 2010), DHI Water and Environment (2010) and an earlier GCA study prepared in 2010.

GCA's September 2011 report was included with the planning proposal that rezoned a large proportion of flood affected land within the Cessnock Civic precinct to B7 (Business Park) in December 2011. A copy of the report would be held by Cessnock City Council but can be provided by GCA on request. Individual figures have not been attached to this letter as they should be read in conjunction with the originating report.

GCA's September 2011 report identified the portion of land off James Street as "Land with residential potential". It assessed potential changes in flood levels that may occur due to filling that may be required within the site to facilitate residential land use zone. It also concurrently assessed potential changes in flood levels due to filling of the adjacent 'B7' land. Surface contours for the hypothetical consolidated future landform were included in the report and comprised the basis for the flood assessment.

Note that the footprint of the area proposed for R3 residential zone under the current James Street Planning Proposal is less than half of the area originally identified as being 'land with residential potential' in the 2011 GCA report. Accordingly, it is anticipated that the extent of filling in this part of the site will be substantially less than assessed in the September 2011 study.

The flood modelling indicated that peak flood levels in the Cessnock Civic precinct were controlled by a backwater profile that develops from water levels in the downstream channel forming Black Creek through the main Cessnock township. As a result, flood levels within the Cessnock Civic site are not particularly sensitive to changes in landform within the extent of filling that was assessed.

The model results predicted that there would be no material increase in flood levels for the 1% AEP event at the boundaries adjoining with existing development and throughout the majority of the Cessnock Civic Precinct. A minor increase in flood levels may occur in a central portion of the Cessnock Civic precinct only where the hypothetical future landform created the narrowest point in the revised Black Creek cross section which could be dealt with simply as part of more detailed work for future development proposals in the R3 zone.

Storage of Flood Water

In respect to potential reduction in floodplain storage volume that may occur as a result of future filling activities, the following extract is reproduced in entirety from Section 4.3 (page 29) of the September 2011 GCA report:

"The PB study provided a discussion of floodplain storage, which is reproduced as follows:

Preliminary volumetric analysis indicates that there could be around 300,000m³ of flood water stored within the site between the existing natural surface level and the peak 1% AEP flood level. The floodplain storage volume between the concept earthworks model and the peak developed 1% AEP flood level is approximately 245,000m³. This corresponds to a reduction in flood storage of approximately 55,000m³.

Assuming a runoff coefficient of 0.2 (typical for undeveloped natural catchments), a runoff volume of 9.33x10⁸ m³ could be generated from the 2,940ha upstream catchment during the 1% AEP (720 min duration) design rainfall event [design rainfall depth 156.6mm]. The volume of flood storage within the site represents only 0.03% of this estimated event runoff volume. Since the flood storage is an insignificant part of the total event volume, the site is unlikely to provide any temporary storage for flood flow rate attenuation. This means that the flood levels within the site and upstream are directly related to the hydraulic head required to convey flood flow rates. It is therefore highly unlikely that the reduction in flood storage would have an adverse impact on flow rates or flood levels on surrounding properties, upstream, or downstream. (PB, June 2010)

Although the figures quoted by PB will vary slightly to that resulting from the engineering solution presented in this report, the orders of magnitude are equivalent and the overall conclusions in respect to floodplain storage are still appropriate."

We trust this clarifies flooding considerations associated with filling within the proposed residential zone off James Street, Cessnock.

Please do not hesitate to call if you have any queries.

Yours faithfully,



Adam Shaw MIEAust CPEng
Senior Civil / Environmental Engineer
for and on behalf of GCA Engineering Solutions

LEGEND

 1% Adopted Flood Envelope

 Existing Sewer Main

 Existing water Main

