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20 February 2019

Job Number: 18010

Northern Beaches Council
C/- DreamBuild
6/37A King Road
HORSNBY NSW 2077

Re: 91-93 McINTOSH STREET, NARRAWEENA
EASEMENT REPORT

Dawes Consulting Engineers has prepared the Civil/Stormwater engineering design and document to support the proposed development at 91-93 McIntosh Street, Narraweena. This report has been prepared to support the proposed easement arrangement through the site.

Existing Site and Proposed Development

There is an existing DN750mm stormwater pipe that traverses the subject site in a west to east direction, before increasing to a DN825mm directly downstream. Currently there is no easement associated with the existing stormwater pipe. It is also noted that no overland flow currently runs through the subject site. A CCTV investigation has also been undertaken to verify the existing stormwater infrastructure presented in *Figure 1.*

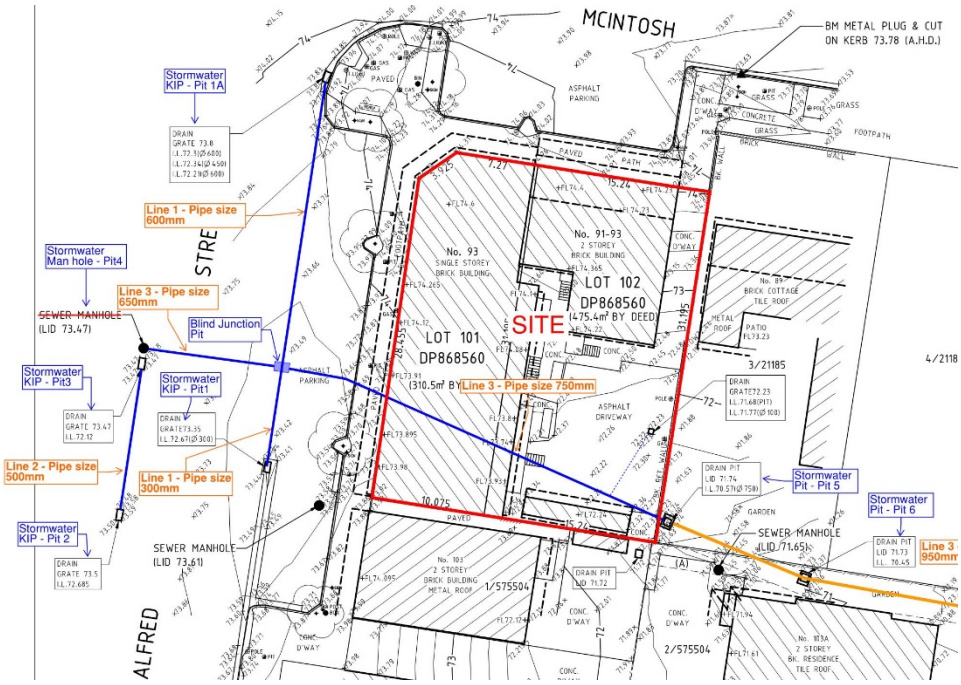

Figure 1 - Existing Stormwater Network (Pre-Developed)

As part of the future development, the existing drainage pipe is proposed to be diverted along the southern boundary of the subject site including new stormwater pits and a designated drainage easement as shown on 18010-DA-C3.01 and 18010-DA-C3.02.

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Easement Consideration

Council's "Building Over or Adjacent to Constructed Stormwater Drainage Systems and Easement Technical Specifications – Part 5" notes that the minimum width of a stormwater easement is to be the pipe width plus 1m either side or 3m minimum, whichever is the greater – in this case a 3m easement is required, however we have applied a 1.5m easement to the proposed stormwater alignment. We provide the following justifications:

1. Overland Flow

Councils policy states the following:

> An overland flowpath through the property is to be provided for all storms in excess of the 1 in 20 year AEP, up to and including the 1 in 100 year AEP. The width of any drainage easement shall be governed by the extent of the predicted 1 in 100 year AEP flowpath and also minimum easement width requirements listed below.

In this case there is no overland flow path associated with the drainage easement. It was discussed and agreed with Council engineer Sean Khoo on the 5th September 2018 to match the existing flooding and overland flow conditions – i.e. no over land flow through the site. The introduction of overland flow through the easement would result in a significant increase in overland flow for downstream properties. To restrict overland flow at the easement interface with Alfred Street a structural gate will be installed which will also maintain maintenance access.

2. Maintenance Free Stormwater Pipe and Easement

Due to the proximity of the pipe trench to the neighbouring building, any excavation within 1.75m of the boundary would encroach into the zone of influence (ZOI) of existing or future structures and risk undermining building foundations (as depth of trench excavation is approx. 1.75m). To mitigate this risk there are two options:

a) Create an easement minimum 3.95m wide (1.75m to avoid ZOI, 1.5m for pipe trench, 0.7m to provide 1m clearance to the proposed basement) – refer *Figure 2*; or

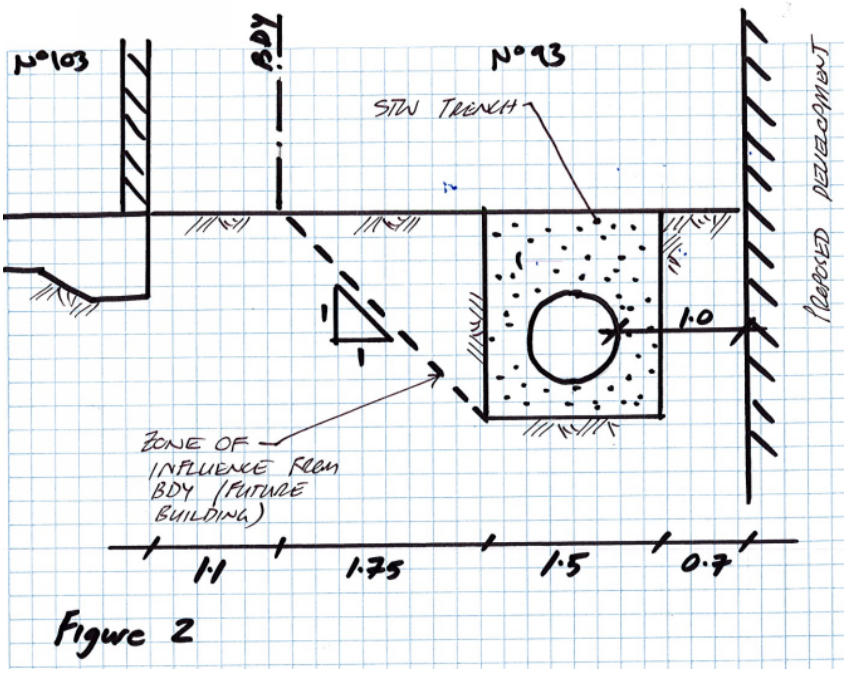

Figure 2 – 3.95m Easement

b) Concrete encase the pipe to ensure maintenance free – refer *Figure 3*;

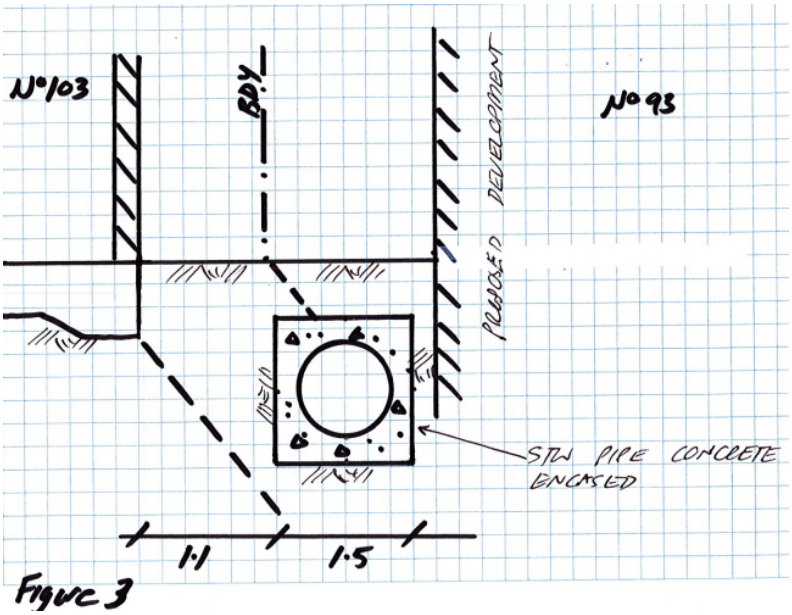

Figure 3 – 1.5m Easement

Based on the above, the 3m width requirement from Council is not suitable to remove the risk of future maintenance excavation undermining the neighbouring property, therefore constructing the pipe as maintenance free is required. Council policy requires a minimum 1m offset either side of the pipe for future excavation however in a maintenance free option this is not required, the easement only needs to allow for min 150mm of concrete. Therefore a 1.5m easement is suitable.

Concrete encasement is a typical detail adopted by most Council's as well as Sydney Water Corporation (SWC) to provide maintenance fee assets and/or for shallow assets. Figure 4 presents a Sydney Water Corporation detail for a standard concrete encasement detail for comparison.

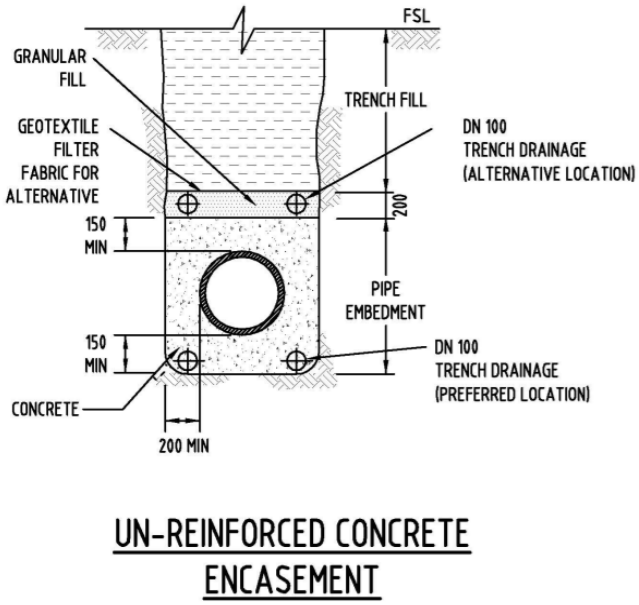

Figure 4 – Sydney Water Corporation Un-Reinforced Concrete Encasement Detail

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To ensure no structural issues during construction, the pipe will need to be installed and concrete encased in small sections under the supervision of a structural engineer.

3. Loss of Site Area

This site underwent a land deal between the previous owners and Council which essentially handed land back to Council for dispensation in planning controls for future development. Part of the dispensation related to site area and Floor Space Ratio (FSR) to ensure the site was not significantly burdened by the outcome of the reduction in land.

A 3m wide easement results in a loss of 75m^2 and a 1.5m easement results in a loss of 37.5m^2. By enforcing the 3m wide easement, the site is further burdened by a loss of 37.5m^2. Given the previous agreement we are proposing to reduce the amount of land loss by adopting the 1.5m easement.

Based on the above, we propose a 1.5m easement is suitable from a engineering, maintenance and development perspective

If you should require further information or clarification, please do not hesitate to contact me.

Yours faithfully,

Andrew Dawes
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