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10 October 2016

Frasers Property Australia
Level 3, 1C Homebush Bay Drive
RHODES NSW 2138

Attention: Mr Paul Solomon

Dear Sir,

RE: PROPOSED INDUSTRIAL DEVELOPMENT
LOT 3 IN LOT 5 DP1212087, BURILDA CLOSE, WETHRILL PARK NSW
STORM WATER ISSUES AND DESIGN

It is proposed to develop an existing Greenfield site of approximately 4.4 hectares to an industrial site that will comprise two separate warehouse tenancies that includes car parking, loading docks and two driveway crossovers (one to the southern office carpark and one to the combined industrial loading areas). A new access road that connects the site to Cowpasture Road, known as Burlida Close, is in place and provides adequate vehicular access as well as access to essential services, described later in this report. The site lies within the local government precinct of Fairfield City Council. Figure 1 shows the location of the site in relation to its surrounds.

The site has been graded and stripped of vegetation to achieve a level earthworks pad. The current level of this pad is generally at RL72.20. It is proposed to fill the site to an earthworks level of RL72.60 in order to accommodate excess spoil from surrounding sites. Retaining walls and permanent batters surrounding the site have been constructed in order to facilitate the current site levels. These walls and batter slopes have been detailed and documented on the overall subdivision drawings *Co11492.05-C30-C34 and Co11492.05-C61-C67* and should be read in conjunction with this report and Development Application (DA) Drawings. There will be some minor adjustments/augmentations to the existing walls located on the western boundary of the site and this has been documented on the submitted plan drawings for this site 16875_DA_C101-C104.

In terms of stormwater measures, it is proposed to discharge the site drainage to the existing and approved connection point located at the North East corner of the site. The approved subdivision drawings *Co11492.05-C41-C48* show this connection point and how the site fits with the overall subdivision stormwater strategy. After the site discharges into the approved and existing connection stub, it will be directed to the existing Detention and Water Quality Basin. This basin has been designed to accommodate this site's water quality and detention requirements. The subdivision report prepared by Costin Roe titled *Civil Engineering Report – Horsley Drive Business Park, S96 Application* (Rev A December 2014) details the stormwater strategy for Detention and Water Quality.

The following sections of this report describe various Civil Engineering items related to the site.

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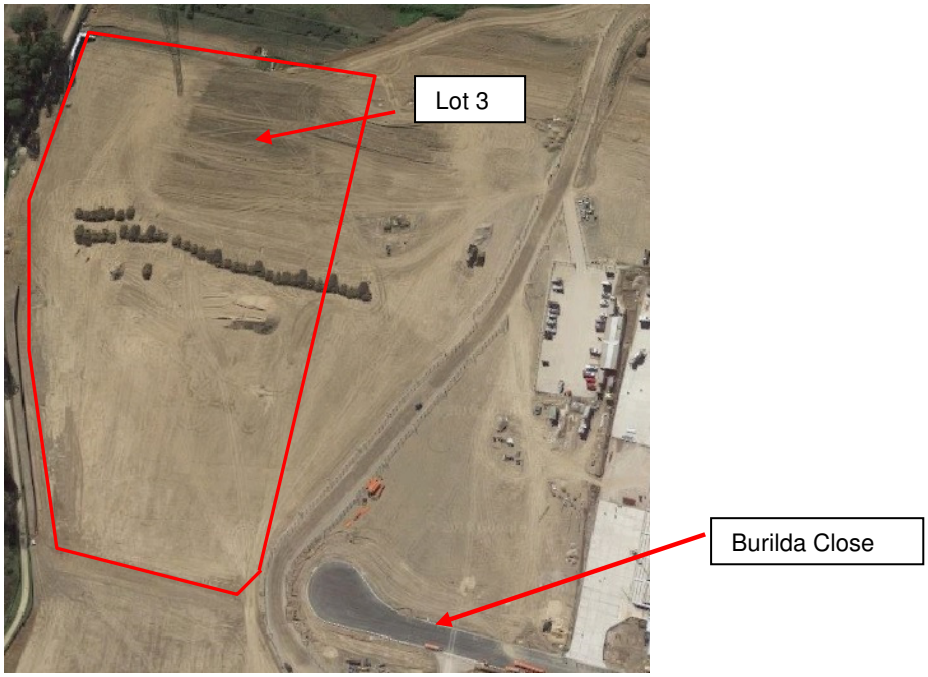

Figure 1: Location of proposed site

DETENTION

As mentioned above, the site's detention requirements are catered for by the existing communal subdivision basin located downstream and to the north east of the site. The site discharges through an 825mm concrete stormwater pipe that connects directly into the basin. As the basin has been designed and approved to reduce the post development flows from the subdivision to pre-development rates, there is no requirement for any detention on the site of Lot 3.

The following subdivision drawings, prepared by Costin Roe, document the communal basin and site discharge to the basin.

- Co11492.05-FC41 (Overall site discharge location)
- Co11492.05-FC48 (825mm Connection line to Basin – Longsections)
- Co11492.05-FC43 (Communal Basin plan and details)

IN-GROUND DRAINAGE SYSTEM

An in-ground piped drainage system has been designed for the entire site that includes the capture and conveyance of flows from all hardstand areas including roofs, loading docks and carparking areas. The piped system has been checked and designed to convey up to the 100ARI flows without excessive overflows through the site. The system has been modelled using the DRAINS software. In modelling the pipes, the most important factor to consider is the receiving water level.

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For the site stormwater, we have modelled the existing 825mm discharge line up until the existing pit C4, which is the first junction pit upstream of the communal basin on this line. We have used the *As-Built* survey levels of this line for our model. Based on the hydraulic design and documentation by Costin Roe, we have established the appropriate receiving water level to use for pit C4 is *freely discharging* as the designed hydraulic grade line at this location is significantly below the obvert of the outgoing pipe.

Outlet Location	100ARI (WL)	20ARI (WL)
Existing Pit C4	Freely Discharging	Freely Discharging

A hydraulic assessment has been carried out and the in-ground piped system has been sized to ensure that the 20 ARI Hydraulic Grade Line (HGL) is never higher than 300mm below the floor level of RL72.90. Pipe sizes are detailed on the drawings 16875_DA_C101-C104 and the HGL's can be viewed by assessing the provided DRAINS model.

In addition to designing the in-ground drainage to cater for the 100ARI event, the site grading has been designed to ensure safe overland flow routes are available in the event of a total system blockage/failure. A 10m wide emergency spillway along the kerb located in the north eastern corner of the site has been provided to ensure that the maximum overflow spill level will not be higher than RL72.60 (300mm below the proposed floor level). Any overland flow at this point will be directed to the external overland flow channel as indicated on the subdivision works drawing, Co11492.05-FC41. Refer to detail plans 16875_DA_C101-C104 for details of the site emergency spillway point.

For the site, piped stormwater system, the DRAINS software program was used. The IFD data used for the rainfall generation is;

	2ARI	50ARI		
1hr	31.9(mm/hr)	59.8(mm/hr)	**G**	0.04
12hr	6.69(mm/hr)	12.8(mm/hr)	**F2**	4.30
72hr	1.95(mm/hr)	4.3(mm/hr)	**F50**	15.80

The standard parameters used in the DRAINS model are as follows;

Description	Value
Model for Design and Analysis Run	Rational Method
Rational Method Procedure	ARR87
Soil Type - Normal	3.0
Paved (Impervious) Are Depression Storage	1mm
Supplementary Area Depression Storage	1mm
Grassed (Pervious) Area Depression Storage	5mm
Antecedent Moisture Condition (ARI = 1-5 years)	2.5
Antecedent Moisture Condition (ARI = 10-20 years)	3.0
Antecedent Moisture Condition (ARI = 50-100 years)	3.5
Sag Pit Blocking Factor	0.5
On Grade Pit Blocking Factor	0.2

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The DRAINS model used to assess the internal site piped drainage is provided and named;

- *16875_DA_drains rev2 – for submission.drn*

WATER QUALITY

As mentioned previously, all water quality pollutant removal targets for the site will be dealt with at a subdivision level. The downstream communal basin will incorporate a bio filtration area that will treat stormwater to the levels as required by Fairfield City Council's Water Sensitive Urban Design (WSUD) policy. Refer to section 6, page 18 of the *Civil Engineering Report – Horsley Drive Business Park, S96 Application* (Rev A December 2014) prepared by Costin Roe.

In addition to the pollution reduction targets, the site itself will provide the following treatment devices in order to contribute to the overall water quality strategy and help to prevent sediment and gross pollutant overload to the downstream communal basin.

50kL Rainwater tank

As shown on the submitted DA drawings, a nominal 50kl rainwater tank has been included. This rainwater tank will help the site achieve non potable water use reductions. The rainwater tank will also be effective in removing sediment (by way of settlement) from the stormwater discharge, which will help reduce the eventual load to the communal basin.

Detailed water balancing can be carried out at the Construction Certificate (CC) stage to calculate the optimal tank and roof collection size to meet the site's water conservation targets.

Pit Baskets

As part of an effective treatment train for the site system, the hardstand and roof areas will be pre-treated via pit baskets. The pit basket proposed to be used is the "enviropod". All surface inlet pits and downpipe connection pits have been nominated to have these inserted. In the case of the hardstand areas, pit baskets will be required to be fitted with an oil baffle (known as "oilsorbs") to remove hydrocarbons originating from the car parking and truck manoeuvring areas. As with the media filtration, an appropriate maintenance schedule will be required to be detailed at the CC stage.

FLOODING

Based on the proposed floor level of (RL72.90), the site is more than 500mm above the flood planning level.

EXTERNAL CATCHMENTS

For this site, there are external catchments to the west of the site that could potentially impact the site. However, there has been an allowance made to intercept and divert any external catchment runoff at the top of the proposed batters on the western boundary of the site. The proposal is to

divert external flows by a swale/channel and 750mm pipe and then to be directed to the existing overland flow channel to the north of the site. This approved strategy is described in section 5.4 (page 14) of the *Civil Engineering Report – Horsley Drive Business Park, S96 Application* (Rev A December 2014) prepared by Costin Roe.

SITE ACCESS TO ESSENTIAL SERVICES (S.E.A.R.S. ITEMS)

Water supply to the proposed site is to be provided from Burilda Close that connects to the existing water main in Cowpasture Road. Waste water is to discharge to the sewer site connection point provided to the north east of the site as shown on the submitted detail plan 16875_DA_C104.

Infrastructure upgrades have been undertaken along Burilda Close for both electricity and telecommunications which will serve the Lot 3 site.

OTHER ENVIRONMENTAL IMPACTS

The construction of the proposed warehouse has potential environmental impacts that are addressed as follows;

Groundwater:

The site will not be drawing from or discharging to any existing groundwater supply during construction or the operational phase.

Heavy vehicular/construction machinery re-fueling:

There will be no petrol/fuel kept on site during construction. Also, there will be no re-fueling of any machinery or vehicle during the construction stages.

Sediment and Erosion Control:

During construction, appropriate sediment and erosion control measures should be implemented in accordance with the requirements of Landcom – Managing Urban Stormwater - Soils and Construction, Volume 1, 4th Edition March 2004 Details of these measures are submitted as part of the DA drawing submission.

Site stormwater isolation:

During the site's operational phase, an allowance to be able to isolate the site stormwater has been made. Prior to the site connection point, isolation valves have been nominated in pit A-0 and B-1. These are the furthest downstream pits that will allow all of the site stormwater to be isolated in the event of a chemical. For DA purposes, these valves have been nominated indicatively with further details to be provided at the Construction Certificate (CC) stage.

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DRAWING LIST

The Civil DA drawings provided for submission and to be read in conjunction with this report are;

Drawing No.	Drawing Name
16875_DA_C000	COVER SHEET, DRAWING SCHEDULE, NOTES & LOCALITY SKETCH
16875_DA_C100	GENERAL ARRANGEMENT PLAN
16875_DA_C101	DETAIL PLAN, SHEET 1 OF 4
16875_DA_C102	DETAIL PLAN, SHEET 2 OF 4
16875_DA_C103	DETAIL PLAN, SHEET 3 OF 4
16875_DA_C104	DETAIL PLAN, SHEET 4 OF 4
16875_DA_C200	STORMWATER MISCELLANEOUS DETAILS & PIT LID SCHEDULE
16875_DA_C250	STORMWATER CATCHMENT PLAN
16875_DA_SE01	SEDIMENT AND EROSION CONTROL PLAN
16875_DA_SE02	SEDIMENT AND EROSION COTROL TYPICAL SECTIONS AND DETAILS

We trust this serves as an adequate summary and explanation of the storm water issues related to this site.

Yours faithfully,

TOM DEMPSEY (Senior Civil Engineer)
For, and on behalf of,
H & H Consulting Engineers Pty Ltd