# TECHNICAL REPORT NO 2

# FLOOD STUDY

# CARDNO

Our Ref: W4841:BCP/bcp
Contact: Dr Brett C. Phillips

20th December 2010

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Dear David,

**FLOODING ASSESSMENT OF PROPOSED INTEGRATED RECYCLING PARK, LOT 1B GRAND AVE, CAMELLIA**

In response to your request of 10 February 2010, we are pleased to provide the following advice regarding the impact of the proposed construction of an Integrated Recycling Facility at Grand Avenue, Camellia.

## 1. BACKGROUND

### 1.1 Planned Development

It is proposed to construct and operate of Integrated Recycling Park at Lot 1B, Camellia. The location of the site is indicated in **Figure 1**. It is located on the floodplain of the lower Parramattta River.

It is proposed that the facility be able to process up to 100,000 tonnes per annum of commercial and industrial waste and 50,000 tonnes per annum of food and source separated organic material collected kerbside in the Metropolitan Sydney area with the objective of maximising resource recovery and minimising landfill disposal.

**Figure 3** shows a layout of the planned facility. An area to the west of the site, as shown on **Figure 3** will not be used for the proposed development and will be reserved for future use.

The development includes ancillary facilities such as a weighbridge, administration offices, parking, workshops and associated facilities.

The overarching objective for the platform design is to avoid the penetration of the capping for the construction of the main buildings and structures of the resource recovery facilities once all services have been provided by the developer to the requirements for the project.

The existing concrete capping is at approx. 5.3 m AHD which forms the base for the lowest structure of the planned development being the humidifier pit. Working off this datum establishes the finished floor levels (FFLs) for the integrated structures such as the Bio-filter basement (FFL= 6.1 m AHD), the tunnel rear (FFL-= 7.0 m AHD and the main building floor level (FFL=7.2 m AHD). The main building concrete apron falls off in order to connect between the main building FFL and the circular road (FFL around 6.3 m AHD). The fall accommodates for a controlled stormwater drainage and collection and desired minimal falls for operation requirements (heavy vehicular traffic).

The FFL of the ground floor of the two storey office building is RL 5.5 m.

### 1.2 Design Flood Levels

The Lower Parramatta River Floodplain Risk Management Study/Plan was completed in 2005 in accordance with the provisions of the Floodplain Development Manual applicable at that time.

The location of cross sections in the floodplain model in relation to Lot 1B, Camellia is given in **Figure 2**. This Figure also shows the estimated extent of the 1% AEP Flood.

Design flood levels were obtained at Cross Sections Parramatta R 4987 and Parramatta R 4823 from Appendix B of the 2005 Flood Study Review report. The 100 yr ARI flood level varies from 4.33 m AHD – 4.52 m AHD. The PMF level varies from 7.99 m AHD – 8.36 m AHD.

### 1.3 Planning Context

In relation to the Draft LEP 2010 the site is classified in Zone IN3. The definition of uses does not state directly that a Waste or Resource Transfer Station or a Waste of Resource Management Facility are Permitted with Consent. Neither is these industries prohibited. Rather either of these industries could be permitted with consent under the category "*Any development not specified in item 2 or 4*". Item 2 identifies uses which are "Permitted without Consent" while Item 4 identifies uses that are "Prohibited".

In relation to Clause 6.5 of the Draft LEP 2010 this clause applies if:

(a) land subject to the discharge of a 1:100 ARI (average recurrent interval) flood event, and
(b) land within 500 millimetres in height above (a).

If it applies then Consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that six criterion are met.

In relation to Lot 1B Grand Ave, Camellia while the proposed development is on land that may is higher than 500 mm above the 100 yr ARI flood levels there is adjoining land reserved for future use which is inundated in a 100 yr ARI event. It is therefore likely that Council would consider the clause would apply to the development.

It should be noted that the clause does not set out any specific planning and development controls however the Draft DCP Clause 2.4.2.1 Flooding incorporates the Category Definitions and Planning & Development Controls from Council's 2006 Local Floodplain Risk Management Policy. There appears to have been some slight re-wording of the Category definitions.

Under "Commercial or Industrial" the use "Materials recycling depots" have changed to "Materials recycling or recovery centres".

## 2. OBJECTIVE

The objective of the study is to undertake an assessment of the site and the proposed development in relation to flooding in accordance with the requirements of the Draft DCP Clause 2.4.2.1 Flooding which incorporates the Category Definitions and Planning & Development Controls from Council's 2006 Local Floodplain Risk Management Policy.

## 3. ASSESSMENT OF FLOODING AND FLOOD CONTROLS

The Draft DCP Clause 2.4.2.1 Flooding identifies the following three steps to determine which design standards apply to proposed development:

**Step 1: identify the land use category of the development from Table 2.6**

It is proposed to develop resource recovery facility on Lot 1B Grand Avenue, Camellia. This fits under the definition of "Materials recycling or recovery centres". From Table 2.6 the land use is classified as "Commercial or Industrial".

**Step 2: determine which flood risk category applies to the land**

In accordance with the definitions given in Council's 2006 Local Floodplain Risk Management Policy and based on the 1% AEP flood extents given in **Figure 2** and the area of proposed development given in **Figure 3** it was assessed that the development is located within a **Low Flood Risk Precinct**

**Step 3: apply the objectives and design principles as outlined in this section and then the design standards in the planning matrix at Figure 2.7 as applicable to the floodplain and land use category.**

The various Planning Considerations for Commercial & industrial land use in a Low Flood Risk precinct are assessed as follows:

### 3.1 Floor Levels

The applicable considerations are:

2 Habitable floor levels to be equal to or greater than the 100 year ARI flood level plus freeboard.

5 A restriction is to be placed on the title of the land, pursuant to S.88B of the Conveyancing Act, where the lowest habitable floor area is elevated more than 1.5m above finished ground level, confirming that the subfloor space is not to be enclosed.

Table 2.7 Floodplain Matrix in the Draft DCP Clause 2.4.2.1 Flooding states that "Freeboard equals an additional height of 500 mm".

The calculated freeboards to the access road and finished floor levels of the office building and the resource recovery facilities are summarised in **Table 1**. It was found that the freeboard to the access road and finished floor levels of the office building and the resource recovery facilities all exceed Council's requirement of at least 0.5 m freeboard.

**Table 1 Freeboard to Road Level and Finished Floor levels**

| | | Parramatta R 4987 | | Parramatta R 4823 | |
|---|---|---|---|---|---|
| **Facility** | **Floor Level** (m AHD) | **100 yr ARI Flood Level** (m AHD) | **Freeboard** (m) | **100 yr ARI Flood Level** (m AHD) | **Freeboard** (m) |
| Office Building Ground Floor | 5.5 | 4.33 | 1.17 | 4.52 | 0.98 |
| Biofilter basement | 6.1 | 4.33 | 1.77 | 4.52 | 1.58 |
| Tunnel | 7.0 | 4.33 | 2.67 | 4.52 | 2.48 |
| Main Building | 7.2 | 4.33 | 2.87 | 4.52 | 2.68 |
| Access Road | 6.3 | 4.33 | 1.97 | 4.52 | 1.78 |

### 3.2 Flood Affectation

1 An engineers report is required to certify that the development will not increase flood affectation elsewhere, having regard to: (i) loss of flood storage; (ii) changes in flood levels, flows and velocities caused by alterations to flood flows; and (iii) the cumulate impact of multiple potential developments in the vicinity.
2 The impact of the development on flooding elsewhere to be considered having regard to the three factors listed in consideration 1 above.

The 100 yr ARI flood level varies from 4.33 m AHD – 4.52 m AHD. The area subject to development is capped with a concrete slab. This existing concrete capping is at approx. 5.3 m AHD.

An area to the west of the site will not be used for the proposed development.

It is therefore concluded that the planned development will have nil effect on the assessed 100 yr ARI flood levels and velocities in the Parramatta River and on any adjacent properties because the imperviousness of the site remains unchanged and the area subject to development is at a level higher than the 100 yr ARI flood level.

While the site is subject to inundation in a PMF event it is noted from Figure 4 that the extent of cross sections used to assess the PMF levels do not extend into the area to be developed. That is, in a PMF event the site to date has been assumed to be hydraulically ineffective in a PMF event. It is therefore concluded that the planned development will have nil effect on the assessed PMF flood levels and velocities in the Parramatta River and on any adjacent properties because the area subject to development has already been assumed to be hydraulically ineffective.

### 3.3 Car Parking and Driveway Access

1 The minimum surface level of open spaces or carports shall be as high as practical, but no lower than 0.1m below the 100 year ARI flood level. In the case of garages, the minimum surface level shall be as high as practical, but no lower than the 100 year ARI flood level
3 Garages capable of accommodating more than 3 motor vehicles on land zones for urban purposes, or enclosed car parking, must be protected from inundation by floods equal to or greater than the 100 year ARI flood. Ramp levels to be no lower than 0.5m above the 100 year ARI flood level.

5 The level of the driveway providing access between the road and parking spaces shall be no lower than 0.2m below the 100 year ARI flood level.
6 Enclosed car parking and car parking areas accommodating more than 3 vehicles, with a floor below the 100 year ARI flood level, shall have adequate warning systems, signage, exits and evacuation routes.

The proposed level of open car parks is no lower than 6.0 m AHD. This provides a freeboard above the 100 yr ARI flood level of 1.48 – 1.67 m (Consideration No. 1).

The proposed driveway levels between the access road and the car parks is no lower than 6.0 m AHD which is 1.48 – 1.67 m above the 100 yr ARI flood level (Consideration No. 5)

Considerations Nos. 3 and 6 do not apply to the propose development because the land use is Commercial and Industrial and no car parks are proposed to have a floor level below the 100 yr ARI flood level.

### 3.4 Evacuation

4 Applicant is to demonstrate the development is consistent with any relevant flood evacuation strategy or similar plan.

In Section 4.6.4.6 of Volume 2 Planning of the 2005 Lower Parramatta River Floodplain Risk Management Study and Plan evacuation is discussed as follows:

> "Having regard to the short warning time and the relatively narrow floodplain corridors throughout the study area, regional evacuation is not a major issue. Notwithstanding, the structure of the DCP provides for this issue to be addressed within other floodplains as appropriate and general matters associated with access are addressed within appropriate controls."

A search of the SES website found no occurrences of an evacuation plan for Camellia. It would be proposed to demonstrate consistency with a relevant flood evacuation strategy if Council and /or the SES identifies that such a strategy already exists for commercial and industrial properties in Camellia.

## 4. CONCLUSIONS

It is concluded that the proposed development of an Integrated Recycling Facility at Grand Avenue, Camellia will have will have nil effect on the assessed 100 yr ARI and PMF flood levels and velocities in the Parramatta River and on any adjacent properties. It is also concluded that the planned development complies with the relevant requirements of the Parramatta City Council's Draft DCP Clause 2.4.2.1 Flooding.

Yours faithfully

Brett C. Phillips

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*Dr Brett C. Phillips*
*Director, Water Engineering*
*for* **Cardno**

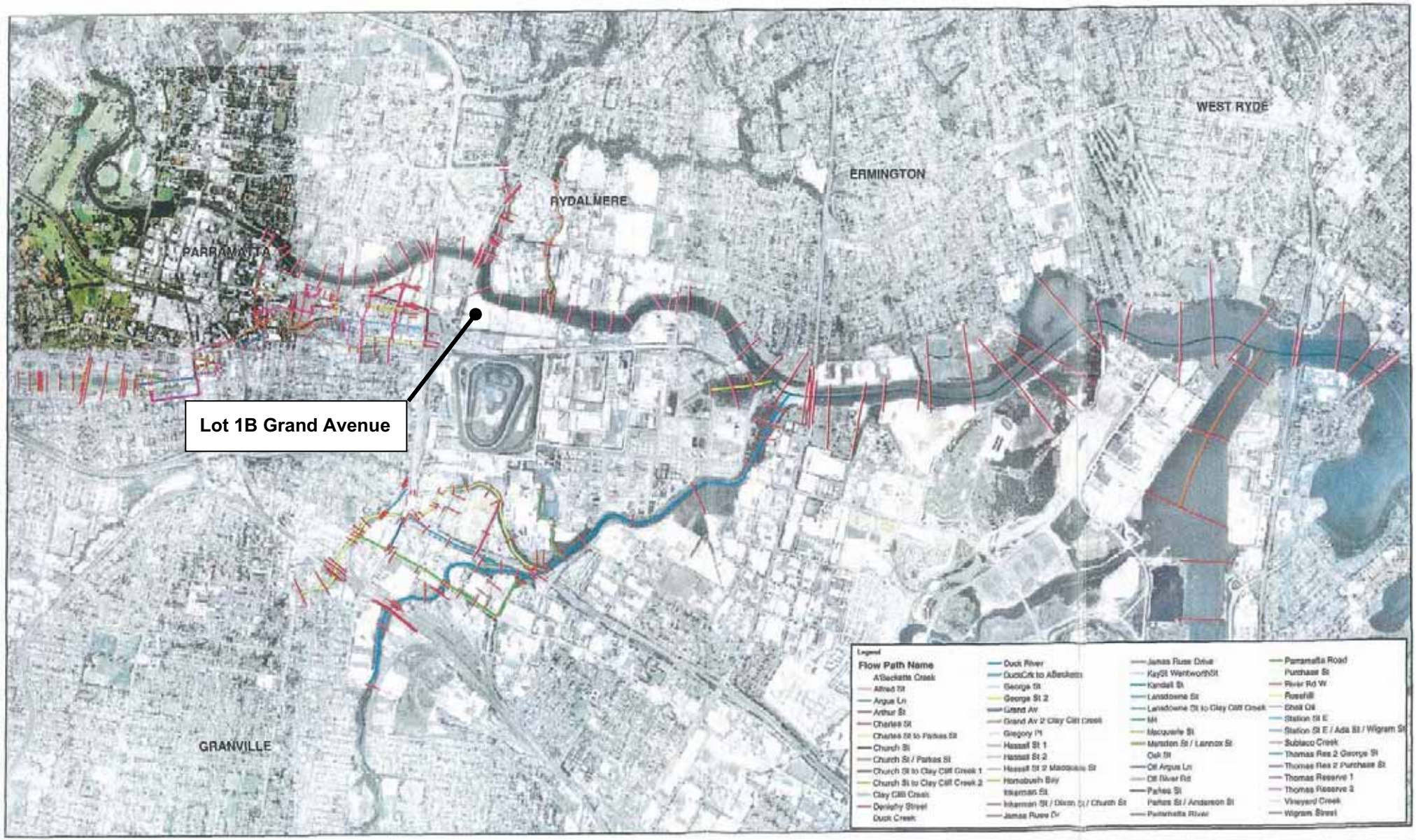


**Figure 1 Lower Parramatta Model Cross Sections and Flow Paths** (after Figure 4.1, SKM, 2005)


**Figure 2 Lower Parramatta River 1% AEP Flood Inundation** (after Map 2 of 9, SKM, 2005)

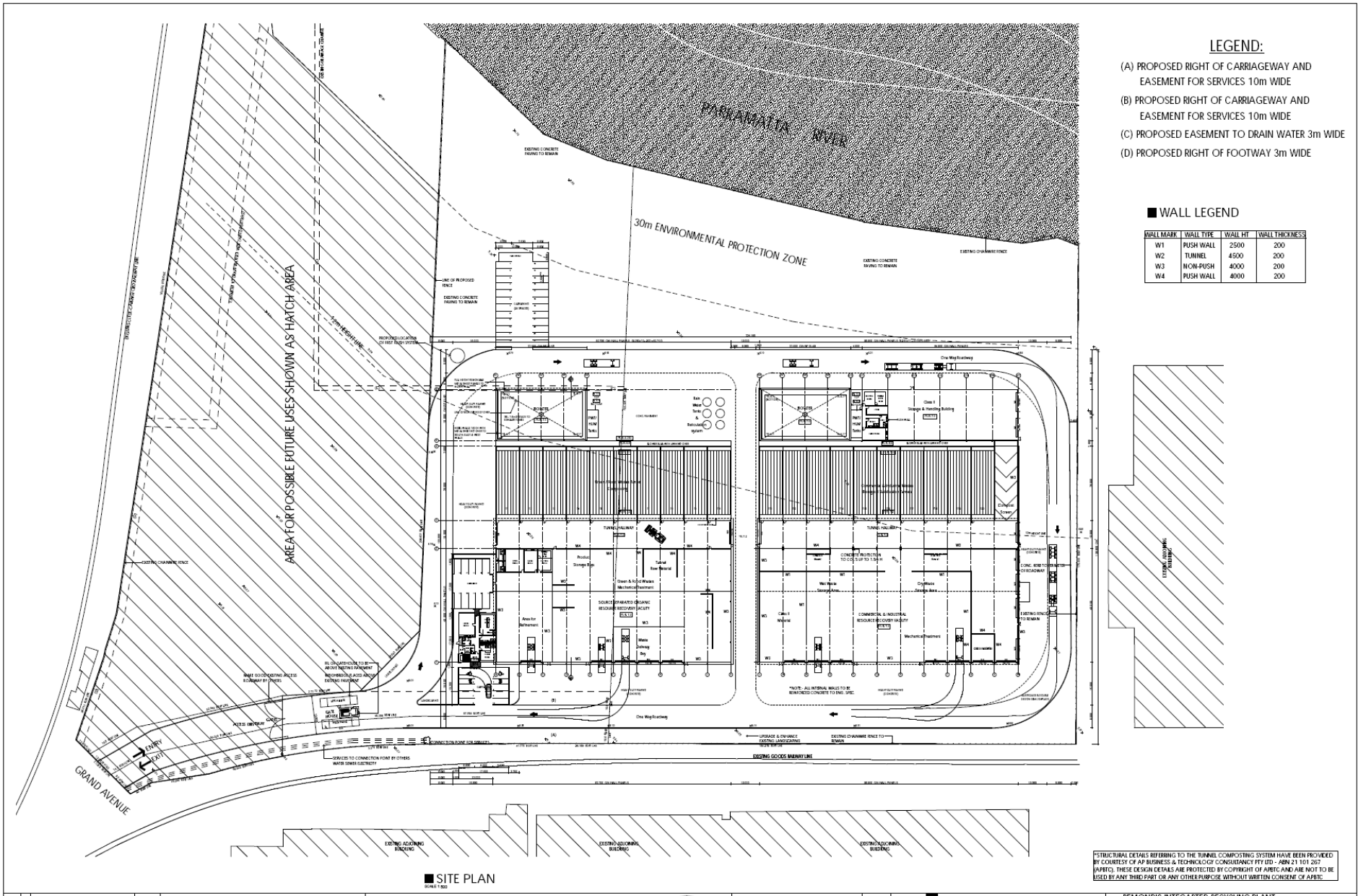


**Figure 3 Site Layout Plan** (prepared 10 November 2010)

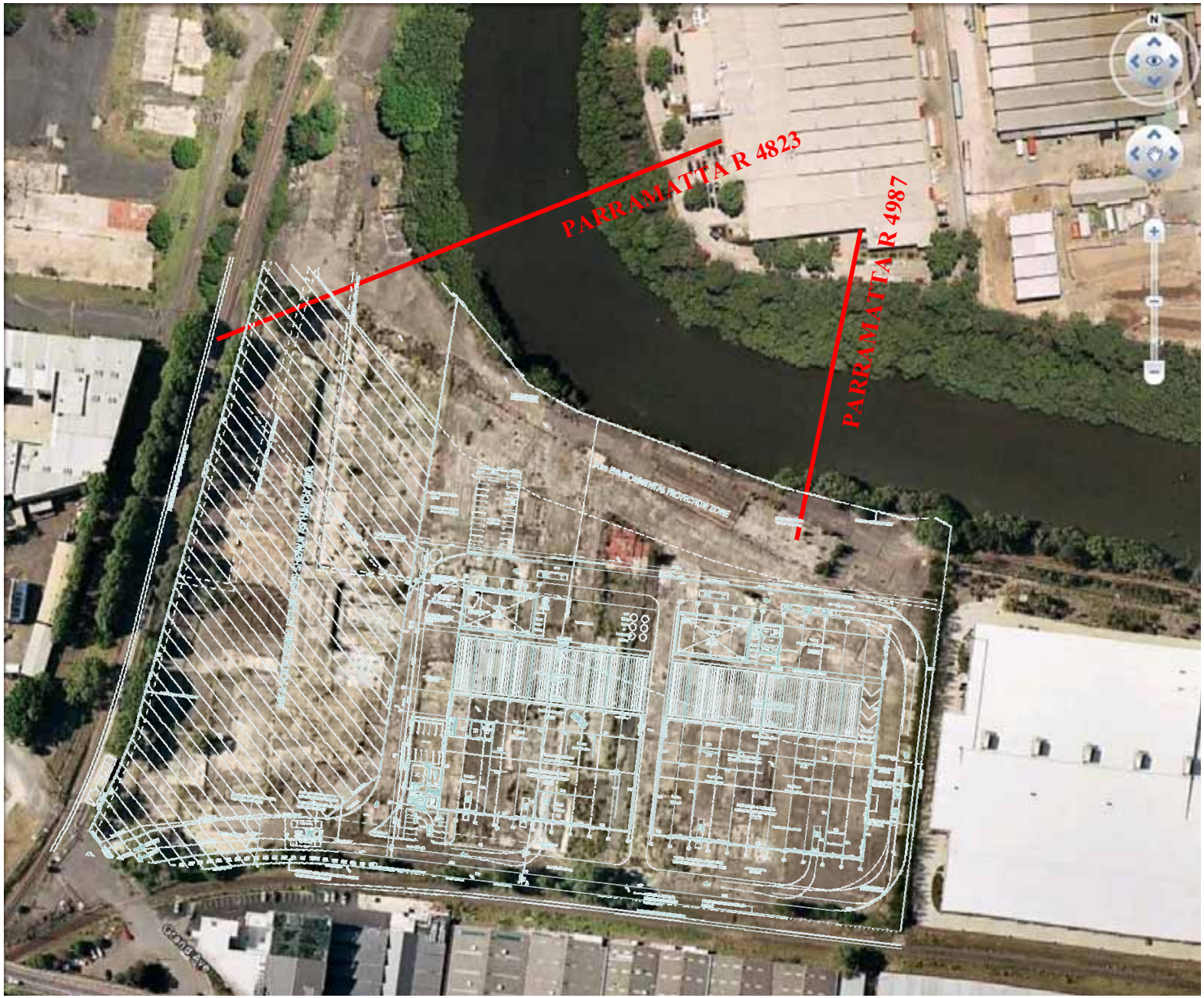


**Figure 4 Layout of Proposed Site Layout overlaid on an Aerial Image** (Source: Google Earth Pro, Accessed 20 April 2010)