Bewsher Consulting Pty Ltd

WESTERN SYDNEY PARKLANDS PROJECT

BUNGARRIBEE PRECINCT AND DOONSIDE RESIDENTIAL PRECINCT

RESPONSE TO BLACKTOWN CITY COUNCIL'S 28 FEBRUARY 2008 ISSUES LISTED UNDER "4a. Flooding"

1. INTRODUCTION

This report responds to the following four 'dot points' which were listed under Item 4a of Council's submission of 28 February 2008 to the Department of Planning:

- *The hydraulic report prepared by Bewsher Consulting models flood behaviour for existing conditions on the floodplain. The Concept Plan details significant changes to landforms, vegetation, and with the Sports Zone in particular, extensive buildings and car parking areas. These may have a significant affect on flood behaviour of the Eastern Creek floodplain, which has not been assessed.*

- *The Sports Zone is significantly affected by flooding in the critical 1% Annual Exceedance Probability (AEP) storm event. In these situations, conditions on development would require a freeboard to the floor level of structures and a maximum depth of flow over the car parking areas, generally a 500mm freeboard for the floor level and a maximum flow depth of 200mm over the parking areas (preferably zero).*

- *The impact of construction within the Sports Zone would have to be modelled hydraulically to ensure that there was no adverse impact on adjoining areas, particularly the Doonside Residential Precinct. Under current Government conditions, this should be assessed for all floods including the Probable Maximum Flood although planning levels would be set to the 1% AEP flood.*

- *In this regard, the playing fields should be designed to provide compensatory storage within the floodplain. It is also considered that this compensatory storage should incorporate additional storage to compensate for the proposed stadiums on the northern side of Eastern Road. This will provide a major*

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benefit to the community as the proposed compensatory works for Charlie Bali Reserve would not be required, allowing it to remain in operation. The extent of storage requirement has not been fully investigated.

It is noted that the first dot point relates to potential flood impacts associated with proposed works which are located within the floodplain in both precincts. Hence it is therefore related to such potential developments as the Doonside Residential Precinct and the Sports Zone, etc. However the last three dot points only relate to the Sports Zone.

With regard to all four dot points it is noted that the scope of works associated with the Sports Zone will be resolved at a future date and therefore those details — and the associated flood modelling to show that the works have no adverse impact on adjoining area flood levels — will be fully addressed at a later date.

The following paragraphs address the first dot point and therefore document the flood modelling tasks associated with (a) development of the Doonside Residential precinct and (b) completion of the 'ultimate' Parklands corridor vegetation plan. Since they will be addressed at a later date, none of the potential elements associated with the Sports Zone have been considered.

2. FLOOD MODELLING TO ADDRESS 'FIRST DOT POINT'

2.1 Outline

This section of the report documents the results of modelling the 100 year average recurrence interval (ARI) and probable maximum flood (PMF) regimes for the portion of the Eastern Creek floodplain between the Main Western Railway line and the M4 motorway (including Bungarribee Creek between the confluence and Doonside Road).

It involves the use and modification of an earlier MIKE-11 flood model which is described in Western Sydney Parklands reports dated April and May 2007 (**References 1** and **2**). The model modifications were made to reflect (a) proposed water quality ponds associated with the Doonside Residential Precinct (since they represent the only elements of the Precinct which will be located within the fringe of the 100 year ARI floodplain), and (b) all the proposed vegetation zones within the study area's portion of the parklands corridor.

2.2 Methodology

Landcom provided Bewsher Consulting with details of the locations of the Doonside water quality ponds plus the new vegetation areas throughout the study area.

Since the majority of the ponds will be sitting just above the 100 year flood level, the Doonside water quality ponds have been reflected in the 100 year event model by truncating each MIKE-11 cross section at the local embankment alignment. The same approach was also adopted for nearby Precinct roadways.

The new vegetation patterns were reflected in the model by:

- Overlaying the series of vegetation zones (as defined in the Vegetation Plan prepared by Eco Logical, **Reference 3**) onto the floodplain map as shown in **Figure 1A**,

- Assigning vegetation zone specific Mannings 'n' roughness coefficients (as determined jointly by the Parklands project team) to the respective zones,

- Modifying the roughness terms along each MIKE-11 cross section in accordance with the various vegetation zones that each model cross section passes through.

2.3 Model Results

2.3.1 100 year ARI Event

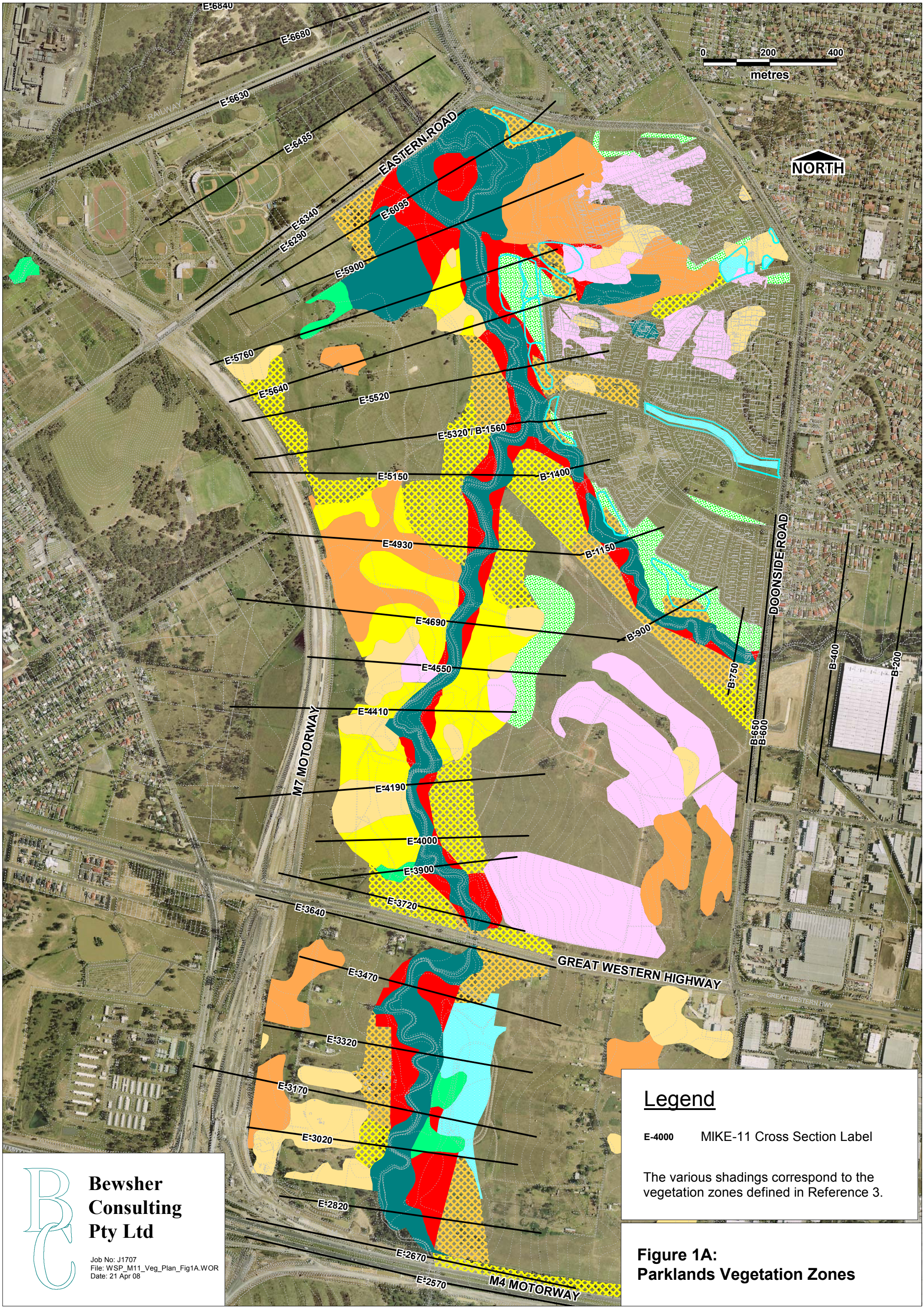
The 100 year model was amended as detailed in **Section 2.2** and re-run. The resultant flood levels are presented in **Table 1** while **Figure 1** defines the corresponding extent of inundation.

Table 1 also lists the 2007 levels and it can be seen that:

1. The Eastern Creek flood level between Eastern Road and the confluence with Bungarribee Creek increases slightly. The increase is variable depending on the cross section and varies between 0.0m and 0.13m;

2. The Eastern Creek flood level between the confluence with Bungarribee Creek and the Great Western Highway also increases slightly, by between 0.0m and 0.09m. And upstream of the Great Western Highway the flood levels converge such that there is effectively no change at the M4 motorway; and

3. Along Bungarribee Creek between the confluence with Eastern Creek and Doonside Road, the flood level increases slightly by between 0.10m and 0.27m.



Legend

E-4000 MIKE-11 Cross Section Label

The various shadings correspond to the vegetation zones defined in Reference 3.

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Figure 1A:
Parklands Vegetation Zones

TABLE 1: MIKE 11 MODELLING 100 year RESULTS

	2007 Study	April 2008 Study
Cross Section ID	Flood Level (m AHD)	Flood Level (m AHD)
EASTERN CK 1750.00	45.80	45.80
EASTERN CK 1925.00	44.73	44.73
EASTERN CK 2100.00	44.26	44.26
EASTERN CK 2335.00	43.50	43.50
EASTERN CK 2570.00	43.06	43.04
M4 Bridge (2620)		
EASTERN CK 2670.00	42.99	42.97
EASTERN CK 2820.00	42.48	42.45
EASTERN CK 3020.00	41.96	41.85
EASTERN CK 3170.00	41.37	41.23
EASTERN CK 3320.00	40.60	40.53
EASTERN CK 3470.00	40.17	40.18
EASTERN CK 3640.00	39.36	39.45
GWH Bridge (3690)		
EASTERN CK 3720.00	39.31	39.40
EASTERN CK 3900.00	38.99	39.06
EASTERN CK 4000.00	38.74	38.82
EASTERN CK 4190.00	38.31	38.34
EASTERN CK 4410.00	37.64	37.67
EASTERN CK 4550.00	37.28	37.27
EASTERN CK 4690.00	37.05	37.05
EASTERN CK 4930.00	36.56	36.59
EASTERN CK 5150.00	35.95	36.04
EASTERN CK 5320.00	35.72	35.82
EASTERN CK 5520.00	34.98	35.00
EASTERN CK 5640.00	34.56	34.63
EASTERN CK 5760.00	34.13	34.26
EASTERN CK 5900.00	33.97	34.02
EASTERN CK 6095.00	33.93	33.93
EASTERN CK 6290.00	33.89	33.89
Eastern Rd (6320)		
EASTERN CK 6340.00	33.58	33.58
EASTERN CK 6485.00	32.52	32.52
EASTERN CK 6630.00	32.22	32.22
Western Railway (6660)		
EASTERN CK 6680.00	32.08	32.08
EASTERN CK 6840.00	31.92	31.92
EASTERN CK 7000.00	31.76	31.76
EASTERN CK 7200.00	31.52	31.52
EASTERN CK 7400.00	31.24	31.24
EASTERN CK 7600.00	30.84	30.84
EASTERN CK 7800.00	30.22	30.22
EASTERN CK 8000.00	29.40	29.40
EASTERN CK 8160.00	28.96	28.96
EASTERN CK 8320.00	28.85	28.85
EASTERN CK 8370.00	28.81	28.81
BUNG CK 400.00	39.08	39.28
BUNG CK 600.00	38.89	39.11
Doonside Rd (625)		
BUNG CK 650.00	38.87	39.09
BUNG CK 750.00	38.56	38.83
BUNG CK 900.00	37.61	37.86
BUNG CK 1150.00	36.47	36.57
BUNG CK 1400.00	35.76	35.88
BUNG CK 1560.00	35.72	35.82

Legend

E-4000 MIKE-11 Cross Section Label

100 Year Extent

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Figure 1:
Parklands 100 Year Flood Line

2.3. PMF Event

New PMF flood levels were also generated using the same set of hydraulic roughness values which were adopted to generate the 100 year flood levels. Since the Doonside precinct water quality basins and nearby roadways may be overtopped in floods exceeding the 100 year ARI event, the PMF model cross sections were not truncated at those features.

The resultant flood levels are presented in **Table 2** while **Figure 2** defines the corresponding extent of inundation.

Table 2 also lists the 2007 levels and it can be seen that:

1. Between Eastern Road and the confluence with Bungarribee Creek, the Eastern reek flood levels have increased by between 0.01m and 0.17m,

2. Between the confluence and the Great Western Highway the flood level difference reduces to the point of being non-existent,

3. Between the Great Western Highway and the M4 Motorway, there is effectively no change in the flood levels, and

4. Along Bungarribee Creek, from the confluence to Doonside Road, the flood level increase is between 0.06m and 0.16m.

3. CONCLUSIONS

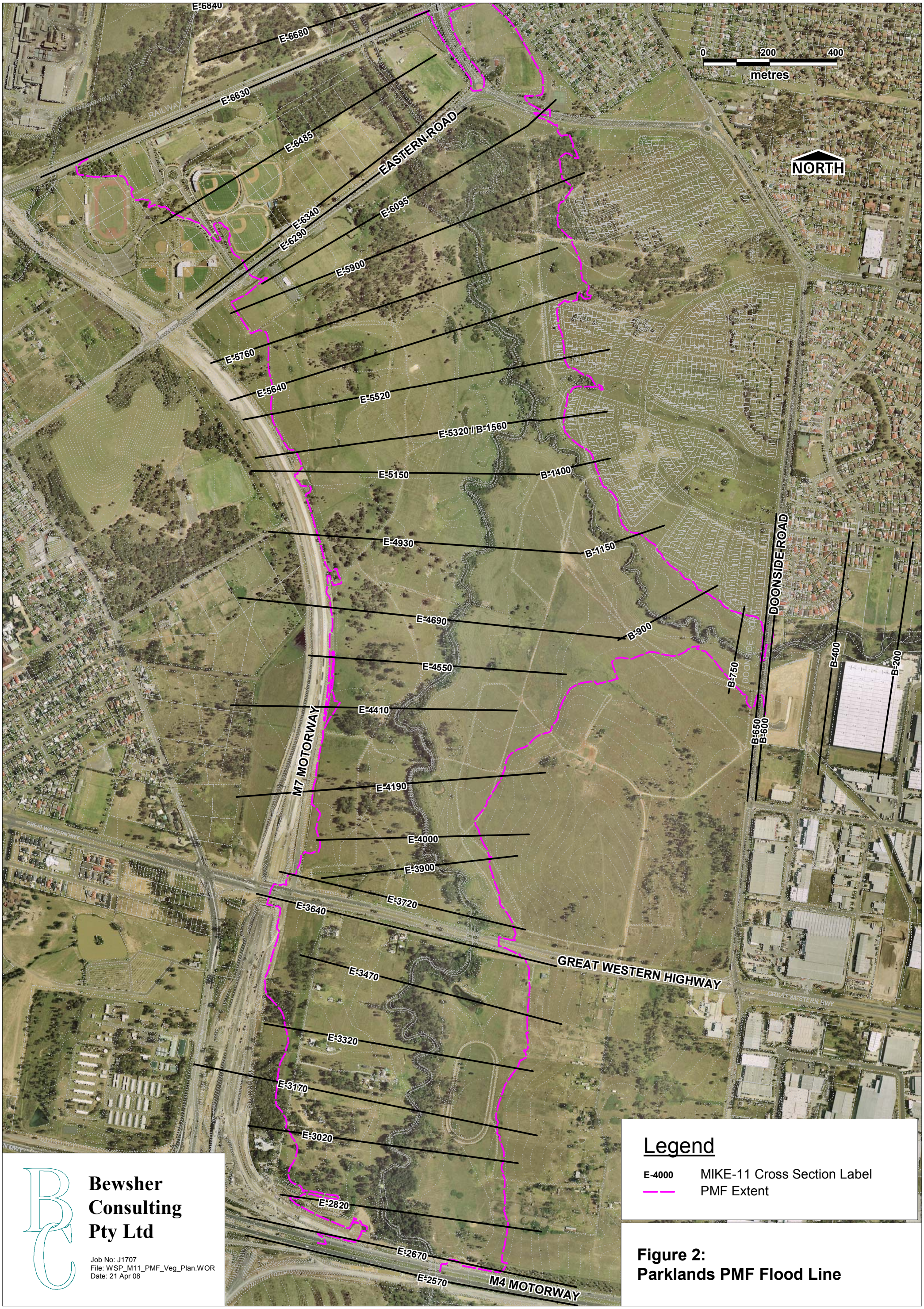
As detailed in this report:

- the flood-related matters associated with the Sports Zone and other Parklands corridor recreational uses will be addressed at a later stage as part of the preparation of detailed plans;

- revisions to the flood model to reflect floodplain issues associated with both the Doonside Residential Precinct and the 'ultimate' Parklands corridor vegetation plan show that typically there are only minor impacts on the 100 year ARI and PMF flood levels and associated extents. Hence there are no major floodplain impacts.

TABLE 2: MIKE 11 MODELLING PMF RESULTS

	2007 Study	April 2008 Study
Section ID	Flood Level (m AHD)	Flood Level m (AHD)
EASTERN CK 1750.00	46.32	46.32
EASTERN CK 1925.00	45.53	45.53
EASTERN CK 2100.00	45.40	45.40
EASTERN CK 2335.00	45.14	45.14
EASTERN CK 2570.00	45.02	45.02
M4 Bridge (2620)		
EASTERN CK 2670.00	44.15	44.16
EASTERN CK 2820.00	43.76	43.80
EASTERN CK 3020.00	43.29	43.32
EASTERN CK 3170.00	42.81	42.81
EASTERN CK 3320.00	42.24	42.24
EASTERN CK 3470.00	41.93	41.93
EASTERN CK 3640.00	41.75	41.75
GWH Bridge (3690)		
EASTERN CK 3720.00	40.42	40.41
EASTERN CK 3900.00	40.02	40.00
EASTERN CK 4000.00	39.73	39.72
EASTERN CK 4190.00	39.33	39.34
EASTERN CK 4410.00	38.65	38.68
EASTERN CK 4550.00	38.20	38.23
EASTERN CK 4690.00	37.97	37.99
EASTERN CK 4930.00	37.49	37.53
EASTERN CK 5150.00	36.89	36.95
EASTERN CK 5320.00	36.66	36.72
EASTERN CK 5520.00	36.15	36.28
EASTERN CK 5640.00	36.05	36.22
EASTERN CK 5760.00	36.00	36.16
EASTERN CK 5900.00	35.96	36.10
EASTERN CK 6095.00	35.91	36.00
EASTERN CK 6290.00	35.78	35.79
Eastern Rd (6320)		
EASTERN CK 6340.00	35.77	35.78
EASTERN CK 6485.00	35.72	35.73
EASTERN CK 6630.00	35.70	35.71
Western Railway (6660)		
EASTERN CK 6680.00	33.61	33.62
EASTERN CK 6840.00	33.43	33.43
EASTERN CK 7000.00	33.24	33.25
EASTERN CK 7200.00	32.95	32.95
EASTERN CK 7400.00	32.64	32.64
EASTERN CK 7600.00	32.30	32.30
EASTERN CK 7800.00	31.90	31.90
EASTERN CK 8000.00	31.36	31.36
EASTERN CK 8160.00	31.00	31.00
EASTERN CK 8320.00	30.86	30.86
EASTERN CK 8370.00	30.81	30.81
BUNG CK 400.00	40.72	40.77
BUNG CK 600.00	40.64	40.71
Doonside Rd (625)		
BUNG CK 650.00	40.10	40.19
BUNG CK 750.00	39.46	39.62
BUNG CK 900.00	38.15	38.22
BUNG CK 1150.00	37.03	37.11
BUNG CK 1400.00	36.69	36.75
BUNG CK 1560.00	36.66	36.72



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E-4000 MIKE-11 Cross Section Label

PMF Extent

Figure 2:
Parklands PMF Flood Line

4. REFERENCES

1. Bewsher Consulting Pty Ltd. (2007). *Western Sydney Parklands Project Huntingwood West Precinct Flood Modelling Summary.* 2 April. Bewsher Consulting Job No. 1502.

2. Bewsher Consulting Pty Ltd. (2007). *Western Sydney Parklands Project Doonside Precinct Flood Modelling Summary*. 8 May. Bewsher Consulting Job No. 1502.

3. Eco Logical. (2007). (Draft). Figure 11a. *Proposed Bungarribee Parklands Restoration Plan*. 7 August.

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21 April 2008