
APPENDIX 4

HYDROLOGICAL REPORT

Mr Rob Sklarski
RPS Koltasz Smith
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Burswood WA 6100

7 August 2009

Dear Rob

East Baldivis District Structure Plan – reconciliation of the preferred layout with District Water Management Strategies

Further to your email of 23 July 2009, to Onn Chan of our office, Emerson Stewart provides the following information with regards to the reconciliation of the East Baldivis District Structure Plan (Indicative Concept Plan) with the East Baldivis DWMS and North-East Baldivis DWMS.

SOUTHERN LANDHOLDINGS (SOUTH OF ZIGZAG ROAD)

The East Baldivis DWMS (PB, 2007) contains some general advice regarding urban water management principles to be considered during planning, and incorporated into structure plans for the site. The DWMS also includes a preliminary estimate of area that will be required within POS, to provide flood storage and attenuate flows to allowable levels.

The overarching drainage concept presented in the DWMS is based on the provision of a central multiple-use corridor to convey flow through the development to a single main drainage outlet which crosses the Kwinana Freeway. Offline storage areas in the form of basins integrated with POS are also required, which will be distributed through the development to provide flood attenuation on a subcatchment basis and ensure that post-development flows from each development do not exceed pre-development values.

The DWMS specifies that a maximum of 80% of the overall POS area is permitted to be inundated during the peak 100year ARI event; however this is conservative when compared with the provisions in the recent Liveable Neighbourhoods for integrating drainage with POS. The DWMS also specifies that 5year ARI inundated areas are required to be contained within 'passive' recreation zones, which is comparable to the Liveable Neighbourhoods requirement for runoff from events up to 5year ARI to be attenuated within 'restricted' POS.

The table below summarises the 100year ARI storage requirements outlined in the DWMS – for both offline storage and central drainage swale in the multiple use corridor – along with the POS areas provided in the East Baldivis District Structure Plan Indicative Concept Plan. Figure 1 (attached) shows the landholding boundaries for the area south of ZigZag Road which have been adopted in the DWMS.

Table 1 – Southern landholdings (south of ZigZag Road) – DWMS requirements vs DSP provision

Landholding	Peet	Australand	Private	Watson	TOTAL
DWMS requirement - Area required for drainage [central swale + basin] (ha)	0.6 + 2.2	0.9 + 2.6	0.6 + 1.4	0.6 + 1.4	2.7 + 7.6
DSP provision - POS available for drainage – i.e. central corridor only (ha)	2.4	3.6	-	-	6.0
Shortfall in POS	0.4	-	2.0	2.0	4.4

The above table assumes that the active POS and primary school POS areas will not be utilised for drainage purposes. The 'active POS' area is located on the upstream side of the DSP which is inefficient for incorporating drainage. The primary school POS is not likely to be permitted to include a large proportion of drainage function, except for major storm events.

The provision of a ~40m wide central multiple-use/drainage corridor through the southern two landholdings (private landowners and Watson Property Group), similar to that shown through Peet and Australand's landholdings, will ensure compliance with the DWMS and provide sufficient POS for drainage management.

NORTHERN LANDHOLDINGS (NORTH OF ZIGZAG ROAD)

The North-East Baldivis DWMS (PB, 2008) contains general advice regarding urban water management principles to be considered during planning, and incorporated into structure plans and subdivision designs for the site. The DWMS also includes a preliminary estimate of area that will be required within POS to provide flood storage and attenuate flows to allowable levels.

The drainage concept presented in the North-East Baldivis DWMS differs from the East Baldivis DWMS, in that it is based on the provision of a series of discrete storage basins which will each outflow to a culvert outlet crossing the Kwinana Freeway. These storage areas, in the form of basins integrated with POS, are to be provided within each subcatchment to provide flood attenuation and ensure that post-development flow from the development does not exceed pre-development values.

The table below summarises the 100year ARI storage requirements outlined in the DWMS along with the POS areas provided in the East Baldivis District Structure Plan Indicative Concept Plan. Figure 2 (attached) shows the subcatchment boundaries assumed in the DWMS.

Table 2 – Northern landholdings (north of ZigZag Road) – DWMS requirements vs DSP provision

Subcatchment	1	2	3	4	5	6	7	8	9	10	11	TOTAL
DWMS requirement - Storage basin area (ha)	0.9	1.2	1.3	1.5	1.2	1.2	1.4	2.2	1.0	1.7	1.3	14.9
DSP provision - POS available for drainage (ha)	-	-	-	-	-	-	4.9	-	-	-	-	4.9
Shortfall in POS	0.9	1.2	1.3	1.5	1.2	1.2	-	2.2	1.0	1.7	1.3	13.5

The above table assumes that the passive POS and primary school POS areas will not be utilised for drainage purposes, as they are both located on the upstream side of the DSP which is inefficient for incorporating drainage. The primary school POS is also not likely to be permitted to include a large proportion of drainage function, except for major storm events.

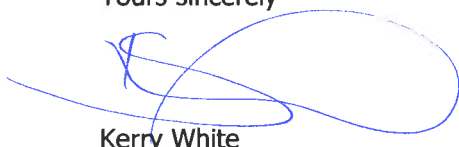
The above table assumes that the Resource Enhancement Wetland shown on the Indicative Concept Plan will be permitted to be used as a drainage attenuation area, and that all drainage from subcatchment 7 will be incorporated into the REW area.

Efficiencies to reduce the required storage areas may be achieved by designing the drainage system in a similar manner to the landholdings south of ZigZag Road, with a central drainage corridor to convey flows and smaller offline storage areas in each subcatchment. Furthermore, it is recommended to complete pre-development modelling to determine peak flow rates, rather than assuming an overall 'per-hectare' allowable flow rate.

Given that the North-East Baldivis DWMS has been approved by the DoW, any redesign of the drainage concept and additional drainage modelling would generally be completed as part of a Local Water Management Strategy for each local structure plan within the DSP.

If you have any queries or would like further information regarding the East Baldivis project, please do not hesitate to contact me on the number below.

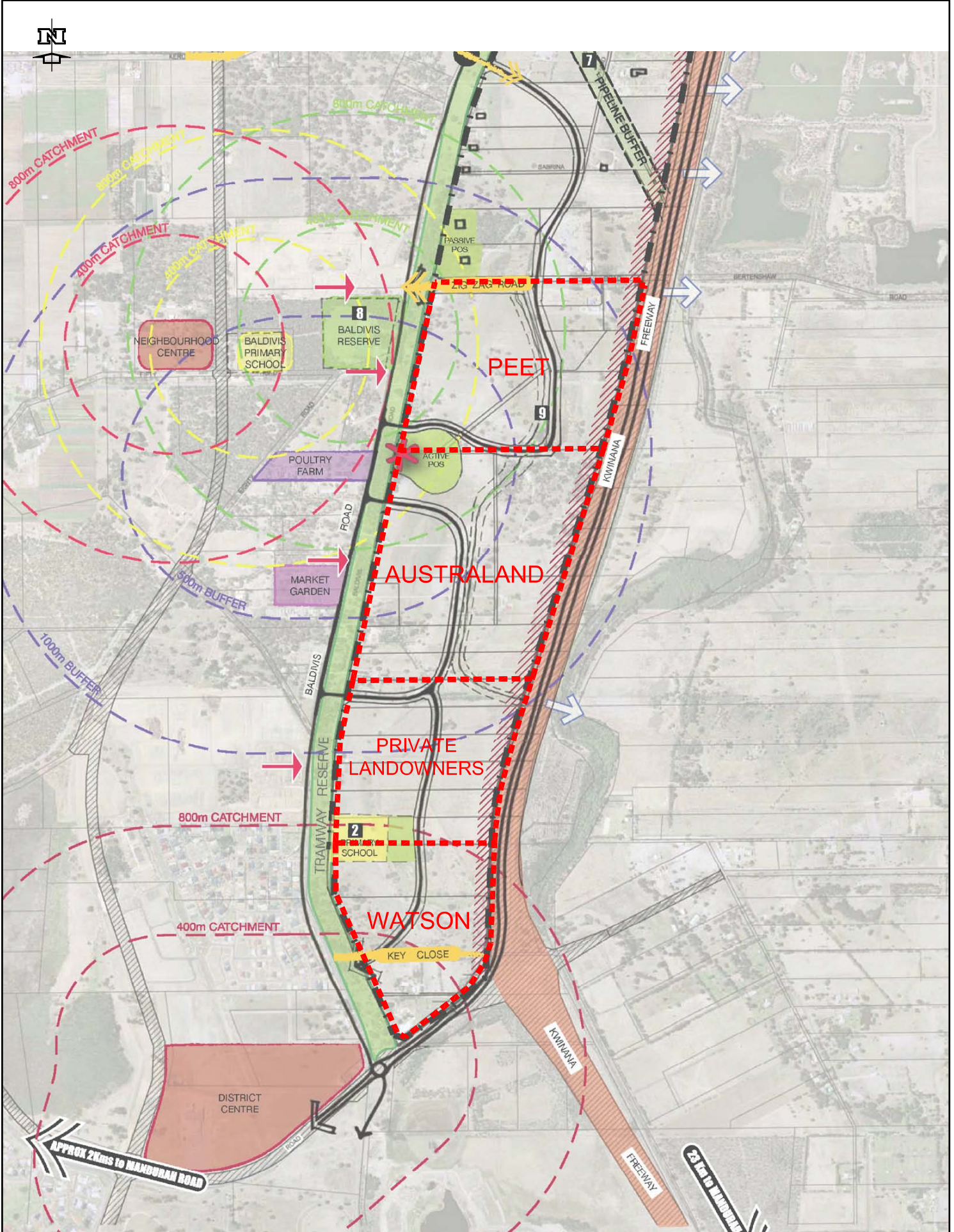
Yours sincerely



Kerry White

CIVIL ENGINEER

EMERSON STEWART

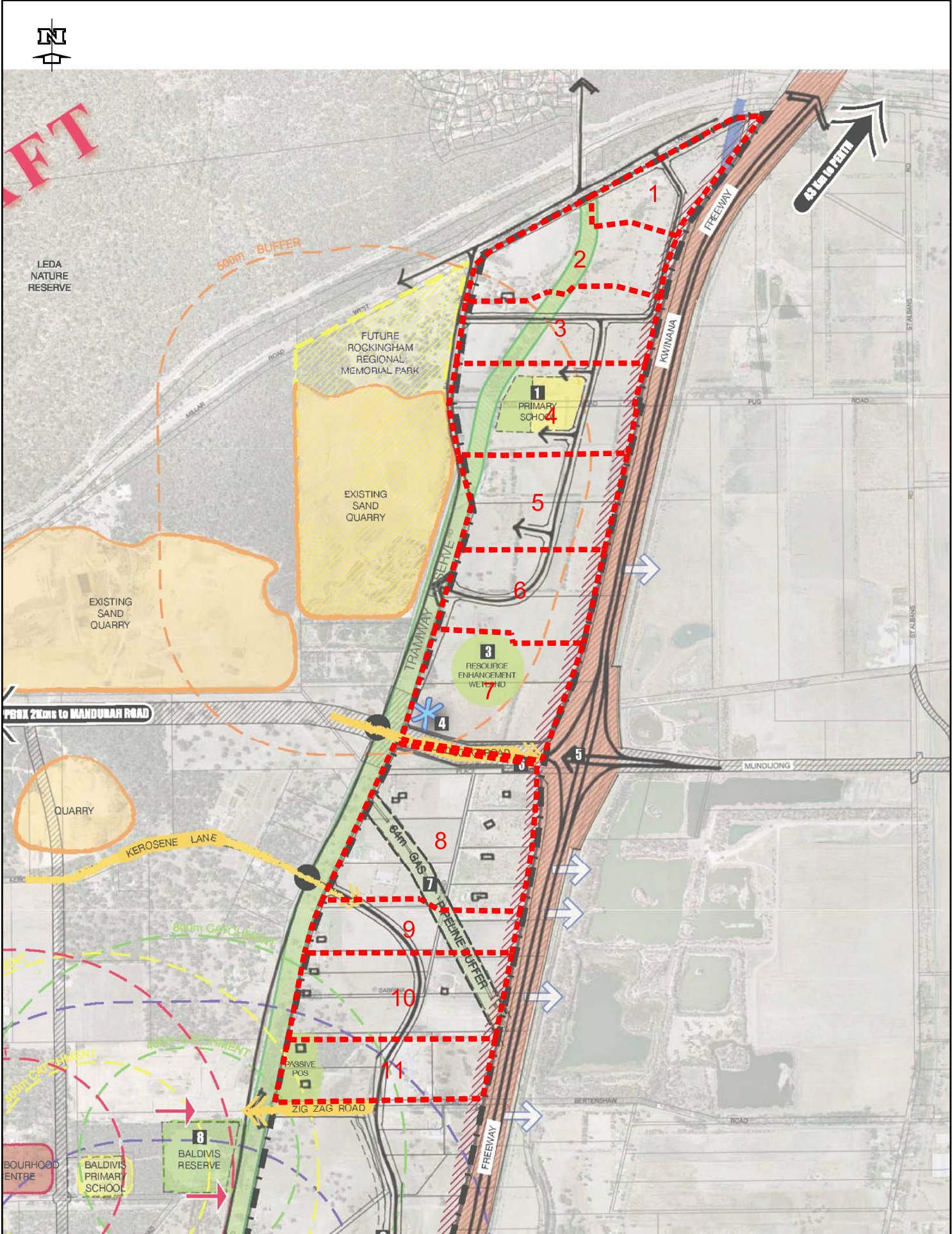


OWNERSHIP BOUNDARIES - EAST BALDIVIS

FIGURE: 1
REVISION: A

1074

SCALE: 1:12500
CO-ORDS: MGA94
DRWN: T.STEDMAN
CHKD: K.WHITE
EMERSON
STEWART



CATCHMENT BOUNDARIES - NORTH EAST BALDIVIS

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Full Size 1:12500 A3;
SCALE (m)

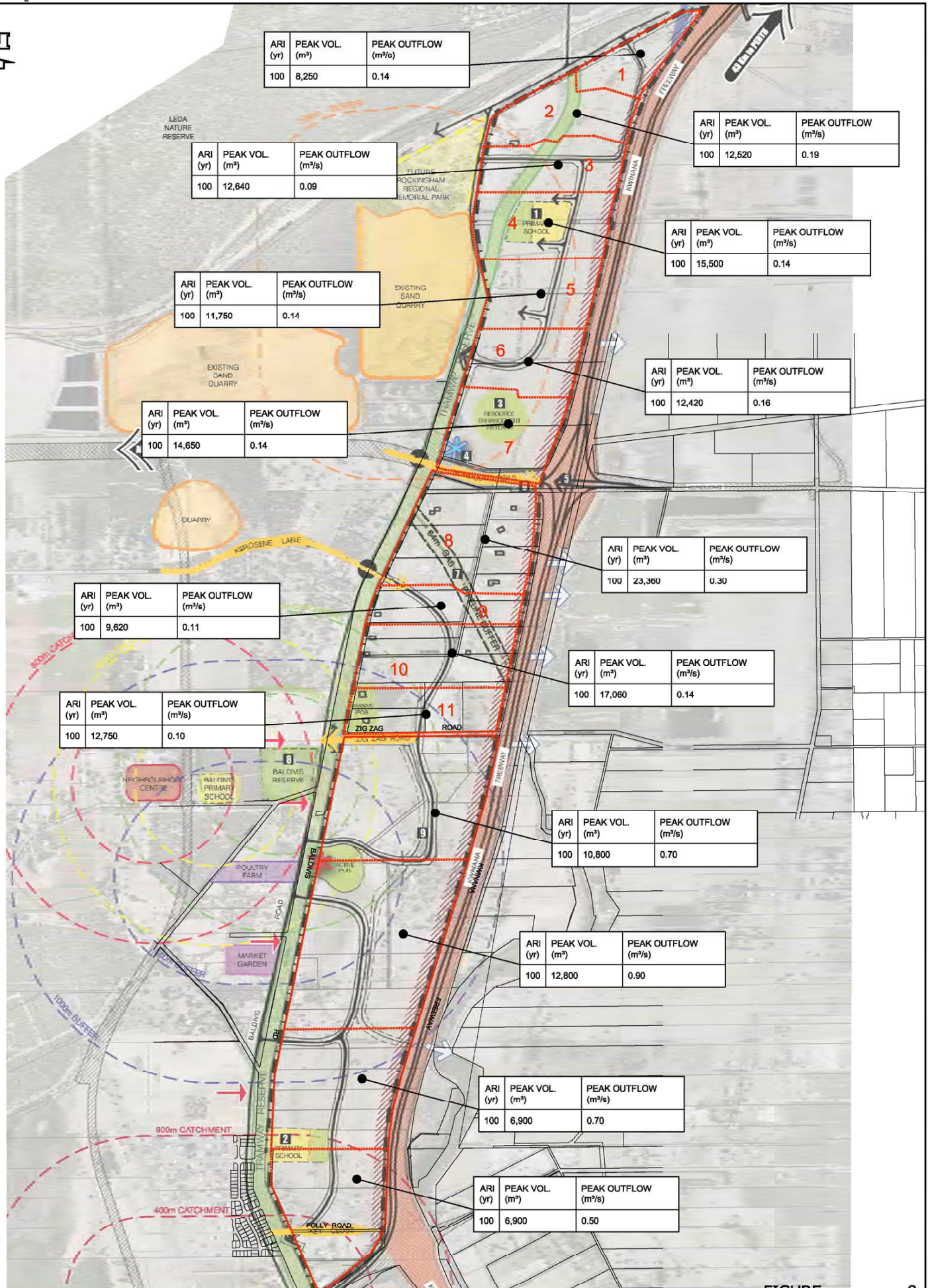
FIGURE:
REVISION:

2
A

1074

SCALE: 1:12500
CO-ORDS: MGA94
DRWN: T.STEDMAN
CHKD: K.WHITE

EMERSON
IMPLEMENTERS
STEWART



DRAINAGE CATCHMENTS PLAN

FIGURE:
REVISION:

8
A