HEYWOOD
TOWN REPORT

March 2009

HEYWOOD PREFERRED MANAGEMENT OPTIONS

Table 2: Climatic Regime (mm) – Meteorological Stations: Heywood for rainfall, Mount Gambier and Hamilton for evaporation.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean Rainfall	35.6	28.8	40.1	62.5	77.7	89.4	99.7	106.9	85.6	70.9	57.4	49.3	814.4
Mean Pan Evap'n	208.9	187.5	150.5	87.9	52.2	35.8	42.3	58.5	77.7	110.0	135.6	176.6	1322.4
Crop Factor	0.7	0.7	0.7	0.6	0.5	0.45	0.4	0.45	0.55	0.65	0.7	0.7	
Mean Pot'l Evapotrans'n	146.2	131.2	105.4	61.5	36.5	25.1	29.6	41.0	54.4	77.0	94.9	123.6	926.2
Water Deficit	110.6	102.4	65.3							6.1	37.5	74.3	396.2
Water Excess				1.0	41.2	64.3	70.1	66.0	31.2	-6.1			267.7
90-Percentile Rainfall	76.6	61.1	60.8	112.5	135.7	137.3	148.3	168.4	126	114.5	98.9	84.5	1016

The 90-Percentile annual rainfall[1] is the higher than normal yearly rainfall that on average occurs only once in ten years, and it is made up by some parts of the year having sufficiently higher than average rainfall. It is based on a long historical period of rainfall measurements. This index is used in EPA publications on irrigation of large scale industrial and municipal wastewater and also for grey water re-use schemes. In Heywood the 90-percentile high rainfall is about 25% higher than the mean annual rainfall.

During an average rainfall and evaporation year, there will be six months that have more rainfall than will be transpired by a grassed surface. The excess rainfall in these months is about 270 mm. The excess rainfall water will infiltrate into the soil and in part it will be stored in the soil profile, becoming available for use during the six drier summer months when the total deficit amounts to approximately 400 mm. The potential for irrigated vegetation to use up water and hence take up nutrients is significant only in the period from November to April. Effluent contact time with the biologically active upper soil layers should be maximised to increase its purification by the soil.

Most of the township has heavy dark to black silt loam to silty clay loam soils with high levels of weathering scoria, mapped geologically as Qvs (Drummond land system) and appear to be reasonably well drained. These soils are classed as Category 4b soils. The northern part of the township extends onto basalt derived heavy cracking clay soils, generally with poor drainage and also including some weathering scoria, mapped as Qrm (Basalt alluvium land system). The heavy clay soils are classed as Category 6b soils.

[1] The 90-Percentile annual rainfall is very much less than the sum of the 90-Percentile monthly rainfalls because the chance of having twelve months in succession each with the 90-Percentile high rainfall is vanishingly small. The chance of any one month having a 1 in 10 month high rainfall is 1:10 or 0.1 per definition. This is true for each month in the year. The chance that in one year two months will each have a 1 in 10 high rainfall therefore is 1:100, or 0.01 or 1 in 10^2. Thus for all twelve months in the year to have a 1 in 10 high rainfall is 1 in 10^{12} or 1 in a trillion years.

For the scoria-rich silt loam – silty clay loam soils and the heavy clay soils of the Heywood area the final treatment of the effluent can be achieved by trenches as well as irrigation, but the latter enables a better distribution of water and nutrients over the full application area.

The ground water in a basalt-scoria aquifer in the Heywood area may be potable in which case it is a valuable resource and hence should be protected. It may be too saline to be potable and for other uses.

REFERENCES

Australian / New Zealand Standard, On-site domestic-wastewater management – AS/NZS 1547:2000, 2000

EPA, Guidelines for Environmental Management – Septic Tanks Code of Practice, Publication 891, March 2003

van de Graaff & Associates Pty Ltd, Geocode Mapping & Analysis Pty Ltd and Patterson Rural Business Management Pty Ltd, 2006, Glenelg Hopkins Catchment Regional Soil Health Action Plan

ACKNOWLEDGEMENT

Extensive use has been made of an earlier wastewater report produced by Mr Larry White.

Table 3.1 Management for vacant allotments					
Soil Category	Soil, Geology & Topography	Indicative permeability (Ksat)	Waste water management system	Design Loading rate	Area required for waste water management system
4b	Qvs (Drummond land system)	0.12 – 0.5 m/day	Absorption trenches & beds Standard 0.5 m wide; unit length 10 m; spacing 3 m + 2 m envelope	6 L/m^2.day	1 br: 230 L/day – 77m, 434 m^2 2 br: 345 L/day – 115m, 630 m^2 3 br: 460 L/day – 153m, 777 m^2 4 br: 575 L/day – 192m, 973 m^2
			Evapo-Transpiration Absorption – Seepage Trenches & Beds EPA CA 01.2/3 for annual rainfall 800 mm AS/NZS 1547:2000 Annual rainfall is not a factor for sizing in AS/NZS.		Customise to local conditions
			Mounds AS/NZS 1547:2000		Customise to local conditions
			Irrigation Systems AS/NZS 1547:2000 Secondary treated effluent only 2 m envelope	Irrig'n area DIR = 3.57 L/m^2.day but preferably less	1 br: 230 L/day – 146 m^2 2 br: 345 L/day – 191 m^2 3 br: 460 L/day – 236 m^2 4 br: 575 L/day – 281 m^2
			Irrigation Systems MAV Model for Sensitive Sites Secondary treated effluent only		MAV Spreadsheet; Parameters: Crop N Uptake 150 kg/ha; Crop P Uptake 40 kg/ha; P sorption 400 mg/kg soil; Bulk Density 1.5 c/cm^3; Depth of soil allowing for rock 2.0 m

Comments – Soil and other terrain features:

Table 3.1 Management for vacant allotments					
Soil Category	Soil, Geology & Topography	Indicative permeability (Ksat)	Waste water management system	Design Loading rate	Area required for waste water management system
6b	QrmB, Basalt alluvium land system	<0.06 m/day	Absorption trenches & beds Standard 0.5 m wide; unit length 10 m; spacing 3 m + 2 m envelope	4 L/m^2.day	1 br: 230 L/day – 115 m trench, 630 m^2 2 br: 345 L/day – 173 m trench, 875 m^2 3 br: 460 L/day – 230 m trench, 1169 m^2 4 br: 575 L/day – 288 m trench, 1463m^2
			Evapo-Transpiration Absorption – Seepage Trenches & Beds EPA CA 01.2/3 for annual rainfall 800 mm AS/NZS 1547:2000 Annual rainfall is not a factor for sizing in AS/NZS.		Customise to local conditions
			Mounds AS/NZS 1547:2000		Customise to local conditions
			Irrigation Systems AS/NZS 1547:2000 Secondary treated effluent only 2 m envelope	Irrig'n area DIR = 2.14 L/m^2.day but preferably less	1 br: 230 L/day – 206 m^2 2 br: 345 L/day – 282 m^2 3 br: 460 L/day – 357 m^2 4 br: 575 L/day – 432 m^2
			Irrigation Systems MAV Model for Sensitive Sites Secondary treated effluent only		MAV Spreadsheet; Parameters: Crop N Uptake 150 kg/ha; Crop P Uptake 40 kg/ha; P sorption 400 mg/kg soil; Bulk Density 1.5 c/cm^3; Depth of soil allowing for rock 2.0 m

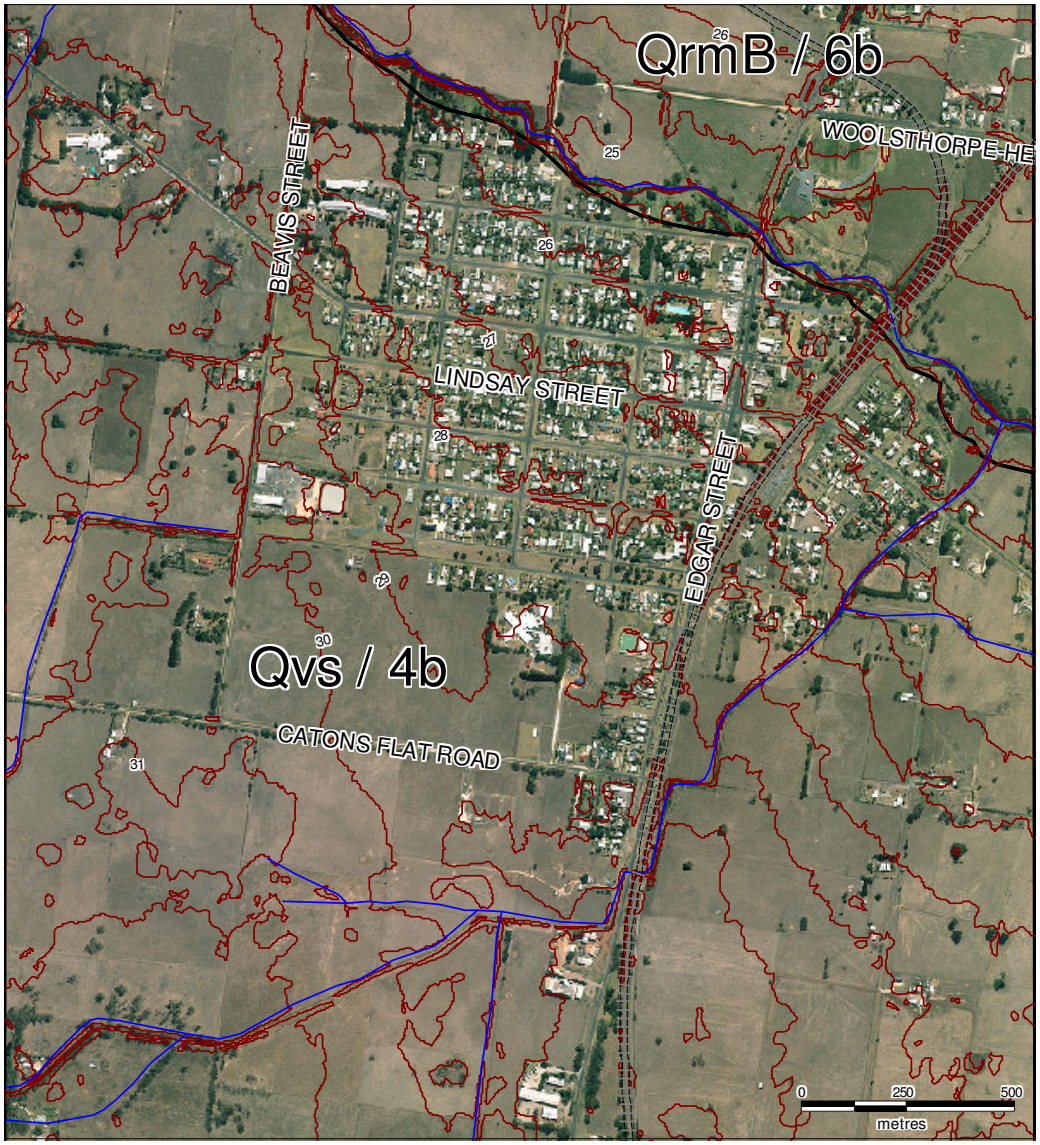
Comments – Soil and other terrain features:

Table 3.2 Management for existing premises					
Soil Category	Soil, Geology & Topography	Indicative permeability (Ksat)	Waste water management system	Design Loading rate	Area required for waste water management system
4b	Qvs (Drummond land system)	0.12 – 0.5 m/day	Absorption trenches & beds Standard 0.5 m wide; unit length 10 m; spacing 2 m + 2 m envelope		Upgrade by installing an AWTS, and extend trenches to maximum possible, install pressurised dose loading and install water saving appliances
			Evapo-Transpiration Absorption – Seepage Trenches & Beds EPA CA 01.2/3 for annual rainfall 800 mm ---------- AS/NZS 1547:2000 Annual rainfall is not a factor for sizing in AS/NZS.	Loading Rate as per EPA CA 01.2/3. ---------- Calculate Water Balance as per AS/NZS Appendix 4.2D for each month and full year.	Upgrade by installing an AWTS, and extend trenches to maximum possible, install pressurised dose loading and install water saving appliances
			Mounds AS/NZS 1547:2000	5 L/m^2.day	Upgrade by installing an AWTS, and extend trenches to maximum possible, install pressurised dose loading and install water saving appliances
			Irrigation Systems AS/NZS 1547:2000 Secondary treated effluent only	Irrig'n area DIR = 5 L/m^2.day or less	Extend irrigation area where possible and reduce loading rate; install water saving appliances
			Irrigation Systems MAV Model for Sensitive Sites Secondary treated effluent only		

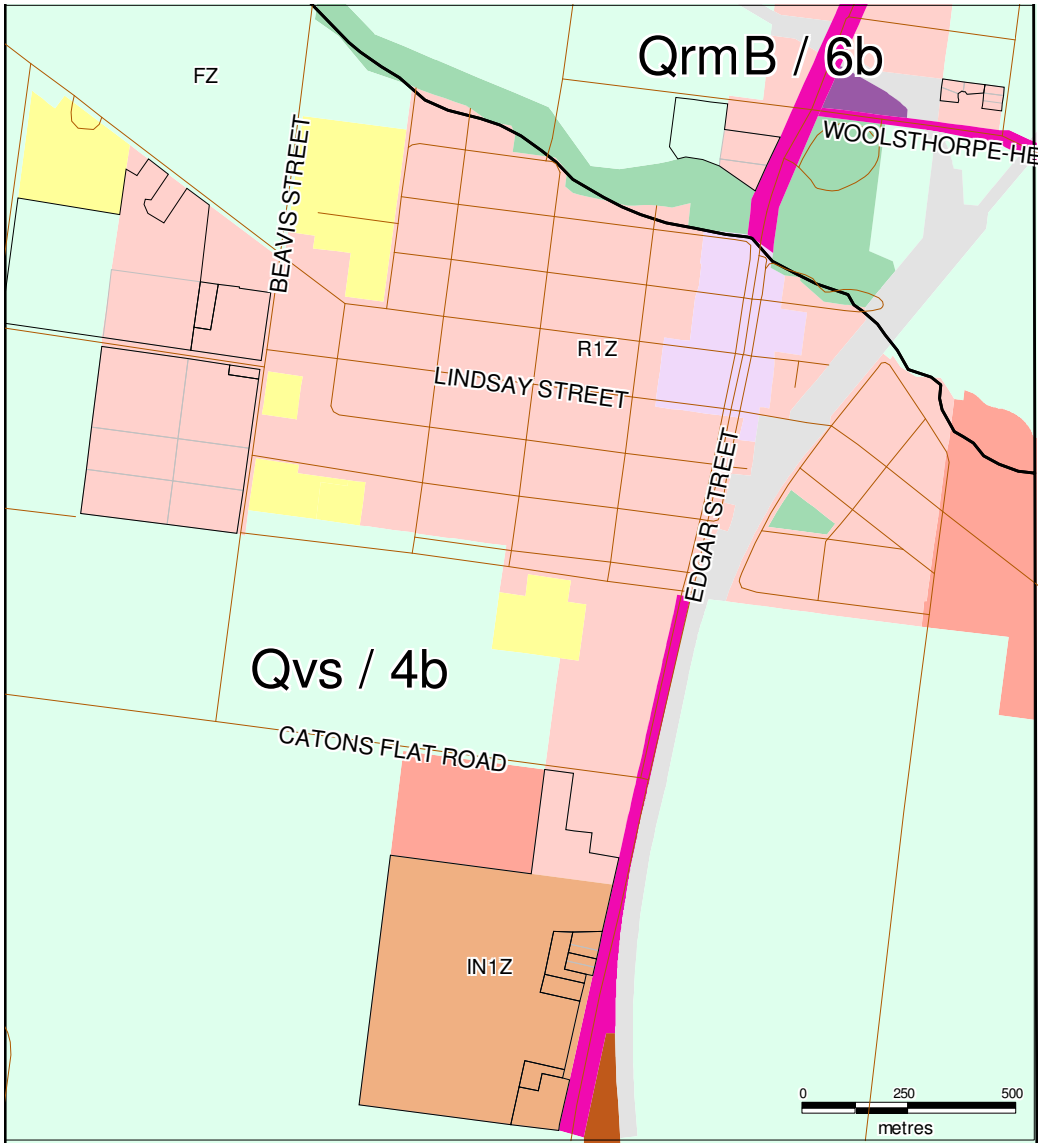
Comments – Soil and other terrain features:

Table 3.1 Management for existing allotments					
Soil Category	Soil, Geology & Topography	Indicative permeability (Ksat)	Waste water management system	Design Loading rate	Area required for waste water management system
6b	QrmB, Basalt alluvium land system	0.12 – 0.5 m/day	Absorption trenches & beds Standard 0.5 m wide; unit length 10 m; spacing 3 m + 2 m envelope	4 L/m^2.day	Improve effluent treatment system, consider installing aerated wastewater treatment, improve surface drainage to divert storm water and runoff from application area, install water saving devices
			Evapo-Transpiration Absorption – Seepage Trenches & Beds EPA CA 01.2/3 for annual rainfall 800 mm AS/NZS 1547:2000 Annual rainfall is not a factor for sizing in AS/NZS.		As above
			Mounds AS/NZS 1547:2000		
			Irrigation Systems AS/NZS 1547:2000 Secondary treated effluent only 2 m envelope	Irrig'n area DIR = 2.14 L/m^2.day but preferably less	Extend irrigation area, improve surface drainage to divert storm water and runoff from application area, install water saving devices
			Irrigation Systems MAV Model for Sensitive Sites Secondary treated effluent only		MAV Spreadsheet; Parameters: Crop N Uptake 150 kg/ha; Crop P Uptake 40 kg/ha; P sorption 400 mg/kg soil; Bulk Density 1.5 c/cm^3; Depth of soil allowing for rock 2.0 m

Comments – Soil and other terrain features:



Map 1: Air photo of Heywood overlayed with 1m contours. Soils are based on QrmB and Qvs geology (AS/NZS category 6b and 4bsoils, respectively). Unsewered blocks are crosshatched.



Map2: Planning zones with unsewered properties in the area are the Residential 1 Zone (R1Z), Industrial 1 Zone (IN1Z) and Farming Zone (FZ). Unsewered properties are outlined in black, and parcels in grey.