

Appendix 1. Glossary of terms

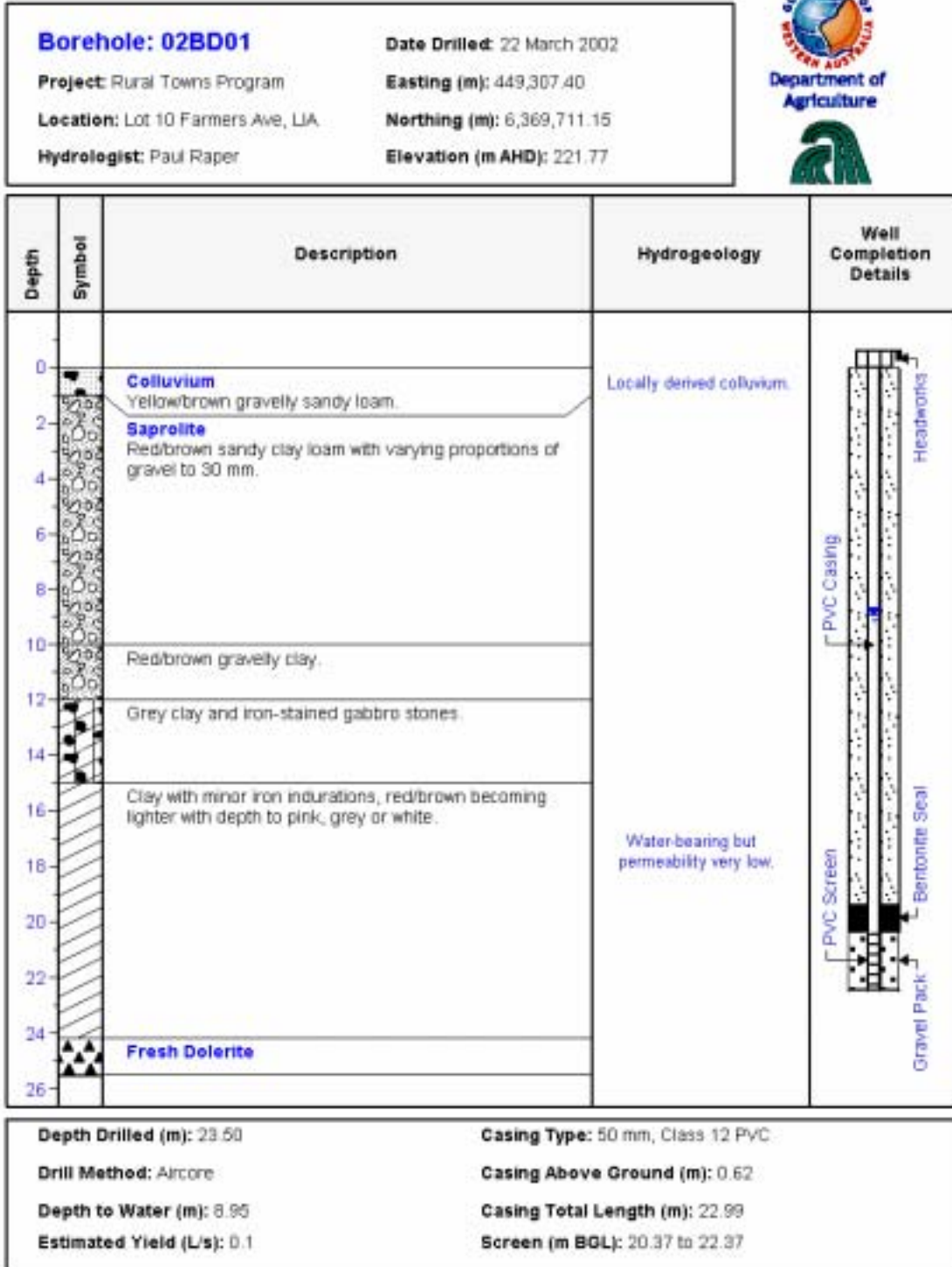
adamellite	A variety of granite containing calcium and potassium-based minerals, in roughly equal amounts.
alluvial	Of or relating to weathered material transported by water.
aplite	A fine-grained, light coloured rock of the same mineralogy as granite.
aquifer	A material that absorbs and transmits water in sufficient quantities to be of use.
artesian	The condition of a confined aquifer in which the piezometric head sits above the ground surface so that pressure causes water to flow freely from a bore drilled into the aquifer.
basement	Consolidated rock at the bottom of a profile, underlying soil and regolith material. Basement may be exposed at the surface as outcrop. Also referred to as bedrock.
colluvium	Weathered material transported by gravity.
craton	A major unit of the Earth's crust, consisting of a large stable mass of rock, sometimes with a thin veneer of sediments.
dolerite	A medium-grained mafic igneous rock which occurs mainly as dykes, sills or small plugs.
duricrust	A hard surficial crust formed in a semi-arid environment as a result of deep chemical weathering.
dyke	An intrusive body of igneous rock which cuts across the bedding or structure of the host rock.
fault	A fracture in the earth's crust where movement has taken place.
ferricrete	Surficial sand and gravel cemented by iron oxide.
ferruginous	Of or containing iron as a chemical constituent.
mafic	Minerals consisting mainly of iron and magnesium. The term is used to describe rocks such as dolerite that are dominated by these minerals. Mafic rocks are typically heavy and dark coloured.
metamorphosed	Altered by the forces of heat, pressure and chemically active fluids within the Earth's crust.
migmatite	A rock resulting from the mixing of two different rocks, one injected into the other in a liquid or molten state.
outcrop	The total area over which a particular rock unit occurs at the surface, whether visibly exposed or not. The term exposure is sometimes used as a synonym.
pegmatite	A very coarse-grained rock with a grain size of 30 mm or greater.
piezometer	A borehole cased and completed with a seal adjacent to the slotted section to observe groundwater pressure over the slotted interval rather than the elevation of the watertable.
porphyritic	The texture of igneous rocks containing relatively large crystals set in fine-grained material.
regolith	All unconsolidated earth materials occurring above solid bedrock. Regolith includes soil, unconsolidated sediments and weathered bedrock. Scientists regard soil as being only that part of the regolith that is modified by organisms. Most engineers describe the whole regolith, even to great depth, as soil.
saprock	Partially weathered rock consisting of gritty material retaining the fabric of the underlying bedrock. Lies directly above basement.
saprolite	The weathering product of bedrock that remains <i>in situ</i> , literally 'rotten rock'. It forms part of the regolith.
stratigraphy	The study or description of stratified or bedded rocks based on their sequence in time, their character and the correlation of beds in different localities.

Appendix 2. Groundwater data collected by Boddington Gold Mine Staff

Site	Comment	Date	Cl (mg/L)	Depth to water (m)	EC (mS/m)	pH	NaCl (mg/L)	TDS (mg/L)	Vol (kL)
TWBR10	Old school bore, installed Feb 2002, by P Crabb. Hole covered New location	22/02/02		2.95	320	6.75		2,200	
		12/04/02		4.39	518	6.20		2,848	
TWBR3	Private bore, Club Drive Local health authorities for SOB BGM commenced monitoring	30/05/91	1,600		518	5.90		3,160	
		11/08/00					2,805	3,030	
		6/09/00					2,570	2,780	
		5/10/00					2,450	3,160	
TWBR4	Shire bore, ex-bowling club near sports Oval, Club Drive Local health authorities for SOB BGM commenced monitoring	6/04/00	1,760		554	6.40		3,320	
		7/07/00					3,040	3,440	
		11/08/00					3,390	4,510	
		6/09/00					1,320	3,980	
		5/10/00					3,160	4,050	
		8/08/01	4.17	502	6.64		2,753		
		31/10/01		562	6.02		3,107		
		22/01/02	5.73						
		23/02/02		596	6.12		3,307		
TWBR5	New school bore Local health authorities for SOB BGM commenced monitoring	5/10/00					2,920	3,970	
		31/05/01					2,340	3,160	
		8/08/01							9,570
		19/09/01		486	5.78		2,659		
		31/10/01		463	5.73		2,524		
		9/11/01							9,880
		22/01/02							11,266
		23/02/02		460	5.75		2,506		
12/04/02							14,079		
TWBR7	Private bore, corner Williams and Johnstone Streets	24/08/01			238	6.99		1,217	
TWBR8	Private bore, Hakea Road	24/08/01			684	5.72		3,236	
TWDM1	Shire Dam, back of Football oval Monitored by BGM	7/07/00					1,750	2,010	
		11/08/00					1,230	2,150	
		6/09/00					935	1,320	
		5/10/00					1,170	1,450	
		31/05/01					1,990	2,440	
TWPZ1	Blocked soon after installation, air-lifted early 2002	12/04/02		3.36	69	5.92		358	
TWPZ2	Reported EC values considered questionable see Section 2.4 for discussion	8/08/01		1.10	69	7.65		358	
		19/09/01		0.77	69	6.90		360	

Site	Comment	Date	Cl (mg/L)	Depth to water (m)	EC (mS/m)	pH	NaCl (mg/L)	TDS (mg/L)	Vol (kL)
TWPZ2		9/11/01		0.91	103	7.06		533	
		22/01/02		1.16	117	7.24		604	
		23/02/02		1.39	109	7.70		563	
		12/04/02		1.78	97	7.33		502	
TWPZ4		19/09/01		2.00	771	5.96		4,337	
		9/11/01		2.04	836	5.74		4,720	
		22/01/02		2.16	621	6.33		3,545	
		23/02/02		2.36	828	6.86		4,673	
		12/04/02		1.97	877	6.48		4,962	
TWPZ5		8/08/01		0.1	123.1	6.85		635	
		19/09/01		0.04	232	6.11		1,187	
		9/11/01		0.03	827	4.22		4,667	
		22/01/02		0.05	1190	4.25		6,805	
		23/02/02		0.1	865	4.55		4,891	
		18/04/02		0.6	809	5.06		4,561	
TWSE1	Foreshore seepage at old school, monitored by BGM	19/09/01			234	6.19		1,197	
TWTP1	Town Hall Standpipe Monitored by BGM	5/02/97	64		27	7.03		147	
		12/02/97	60		27	7.13		147	
		10/01/01	76		30	7.55		200	
		7/02/01	70		28	6.70		180	
		16/07/01	94		36	7.55		230	
		17/07/01	92		37	7.50		240	
TWWE1	Old Gov't potable well, monitored by BGM	19/09/01		3.50	904	6.48		5,121	

Appendix 3. Descriptive bore logs



Borehole: 02BD02
Date Drilled: 22 March 2002
Project: Rural Towns Program
Easting (m): 449,333.10
Location: upslope of 02BD01
Northing (m): 6,369,559.04
Hydrologist: Paul Raper
Elevation (m AHD): 236.7



Depth	Symbol	Description	Hydrogeology	Well Completion Details
0		Colluvium Red/brown sandy loam, very gravelly.		
2		Red/brown gravelly sandy clay, indurated in places.		
4				
6		Doleritic Saprolite Red/brown to yellow/brown clay with minor coarse sand.		
8		Red/brown clay, stoney.		
10		Red/brown clay loam, clay increasing markedly over the last metre.		
12			Water bearing but permeability very low.	
14				
16				
18				
20				
22				
24		Fresh Dolerite		
26				

Depth Drilled (m): 24.00 **Casing Type:** 50 mm, Class 12 PVC
Drill Method: Aircore **Casing Above Ground (m):** 0.67
Depth to Water (m): 19.22 **Casing Total Length (m):** 23.78
Estimated Yield (L/s): > 0.1 **Screen (m BGL):** 21.11 to 23.11



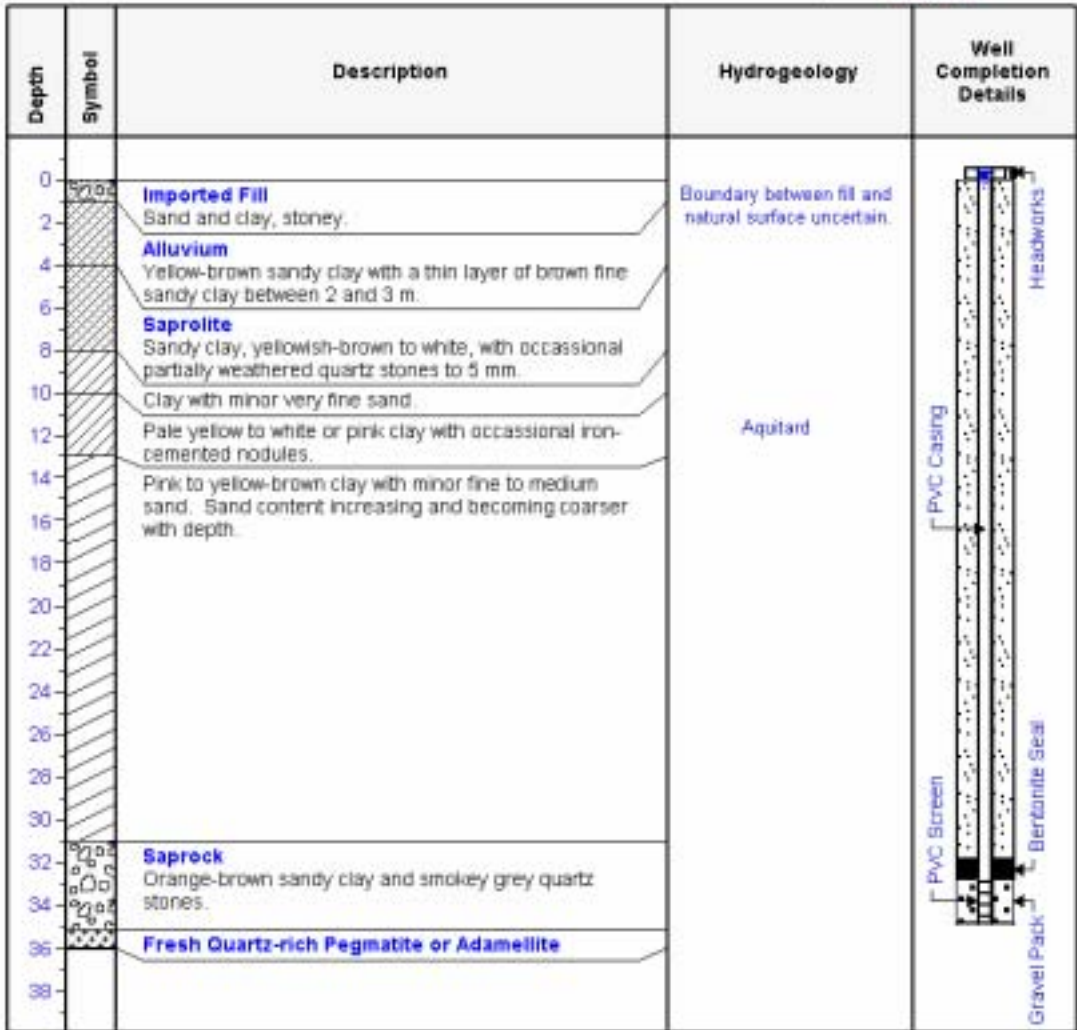
Borehole: 02BD03	Date Drilled: 22 March 2002
Project: Rural Towns Program	Easting (m): 450,531.17
Location: Opposite Shire Depot	Northing (m): 6,370,162.41
Hydrologist: Paul Raper	Elevation (m AHD): 215.14

Depth	Symbol	Description	Hydrogeology	Well Completion Details
0		Alluvium Very shallow fine pale grey sand.	Aquitard	
2		Yellow-brown clay with minor coarse sand.		
4		Saprolite White fine sandy clay.		
6		Fine sandy clay, grey, reddish-pink or orange with occasional weakly indurated iron-stone gravel, massive structure in places.		
8			Aquifer	
10				
12			Aquifer	
14				
16			Aquifer	
18				
20		Clay, yellow-brown with some angular quartz gravel to 4 mm.	Aquifer	
22				
24			Aquifer	
26				
28			Aquifer	
30				
32			Aquifer	
34				
36		Saprock Partially weathered granite, quartz rich.	Aquifer	
38		Quartz-rich Granitic Basement		

Depth Drilled (m): 35.00	Casing Type: 50 mm, Class 12 PVC.
Drill Method: Aircore	Casing Above Ground (m): 0.60
Depth to Water (m): 0.61	Casing Total Length (m): 34.95
Estimated Yield (L/s): 0.1	Screen (m BGL): 32.35 to 34.35



Borehole: 02BD04	Date Drilled: 22 March 2002
Project: Rural Towns Program	Easting (m): 450,674.67
Location: Prussian Park	Northing (m): 6,370,136.56
Hydrologist: Paul Raper	Elevation (m AHD): 219.18



Depth Drilled (m): 35.00	Casing Type: 50 mm, Class 12 PVC
Drill Method: Aircore	Casing Above Ground (m): 0.60
Depth to Water (m): 0.01	Casing Total Length (m): 35.4
Estimated Yield (L/s): 0.1	Screen (m BGL): 32.80 to 34.80



Borehole: 02BD05 **Date Drilled:** 23 March 2002
Project: Rural Towns Program **Easting (m):** 449,927.87
Location: School oval, north-west crr **Northing (m):** 6,370,648.09
Hydrologist: Paul Raper **Elevation (m AHD):** 209.71

Depth	Symbol	Description	Hydrogeology	Well Completion Details
0		Imported Fill Grey to grey-brown sand.	Aquitard	
2		Alluvium Grey to white clay with minor sand, poor to massive structure.	Origin uncertain, possibly sedimentary.	
4		Yellow to red clay with minor sand fraction increasing with depth.		
6		Saprolite Red-pink to yellow-brown sandy clay.		
8		Yellow-brown sandy clay, occasionally indurated with iron.		
10		Red clay and iron-stone gravel with quartz sand to 2 mm.		
12		Red-brown to yellow-brown coarse sandy clay with regular stringers of quartz sand and gravel to 15 mm.	Aquifer	
14				
16				
18				
20				
22				
24				
26				
28				
30				
32				
34				
36				
38				
40				
42				
44				
46				
48				
50				
52				
54				
56				
58				
60				
62				
64		Fresh Quartz-rich Granite		

Depth Drilled (m): 62.50	Casing Type: 50 mm, Class 12 PVC.
Drill Method: Aircore	Casing Above Ground (m): 0.64
Depth to Water (m): 5.26	Casing Total Length (m): 54.38
Estimated Yield (L/s): 0.5	Screen (m BGL): 51.74 to 53.74



Borehole: 02BD06	Date Drilled:
Project: Rural Towns Program	Easting (m): 449,999.13
Location: Club Drive, south end	Northing (m): 6,370,247.53
Hydrologist: Paul Raper	Elevation (m AHD): 212.26

Depth	Symbol	Description	Hydrogeology	Well Completion Details
0		Soil Very coarse sandy clay loam with ironstone gravel content increasing with depth.		
2		Mixed Sediments Red-brown to pale yellow sandy clay.	Possible Aquitard	
4		Banded red clay and massive yellow clay with rounded to angular coarse quartz sand.		
6		Saprolite Pale grey, white or pink clay, minor fine to medium sand.		
8		Red to white clay to clay loam with minor fine to medium sand.		
10		Red sandy clay loam, quartz sand sub-rounded to angular.		
12		Massive pink clay, with minor fine to coarse, angular quartz sand.	Possible Aquitard	
14		Massive pale grey clay with yellow and red mottles and minor quartz sand and gravel.		
16		Red-brown sandy clay, iron-indurated in places with occasional very coarse quartz sand.		
18		Saprock Yellow clayey sand to silty sand, sand is very coarse quartz.	Aquifer	
20				
22				
24				
26				
28		Fresh Quartz-rich Granite		
30				

Depth Drilled (m): 28.00	Casing Type: 50 mm, Class 12 PVC
Drill Method: Aircore	Casing Above Ground (m): 0.70
Depth to Water (m): 7.27	Casing Total Length (m): 27.26
Estimated Yield (L/s): 0.3	Screen (m BGL): 24.56 to 26.56

Borehole: 02BD07	Date Drilled: 25 March 2002
Project: Rural Towns Program	Easting (m): 449,710.01
Location: Golf Course	Northing (m): 6,370,513.60
Hydrologist: Paul Raper	Elevation (m AHD): 221.07



Depth	Symbol	Description	Hydrogeology	Well Completion Details
0		Colluvium		
2		Pale grey sand over yellow sand.		
4				
6		Duricrust		
8		Massive lateritic duricrust.		
10		Saprolite		
12		Pale pink coarse sandy clay.		
14		Yellow gravelly clayey sand, iron-indurated in places.		
16		Red and white indurated clay, minor coarse angular quartz sand.		
18		Red, pink or white clay and silt, very little sand.		
20		Red, pink or white clay and silt, very little sand.		
22		Pink and white talcy clay and silt.		
24		Clay, red, pink or white, occasionally yellow with occasional medium to coarse quartz sand.		
26				
28				
30				
32				
34				
36		Yellowish silty clay, silt increasing with depth.		
38				
40				
42				
44				
46		Yellowish silty clay with increasing quartz, coarse sand to gravel.		
48				
50				
52		Saprock	Low permeability aquifer.	
54		Pale coarse sandy clay, occasional quartz gravel to 5 mm.		
56				
58				
60				
62		Porphyritic Granite		
64		Contains large quartz crystals.		
66				
68				
70				

Depth Drilled (m): 63.00	Casing Type: 50 mm, Class 12 PVC.
Drill Method: Aircore	Casing Above Ground (m): 0.60
Depth to Water (m): 12.59	Casing Total Length (m): 62.11
Estimated Yield (L/s): > 0.1	Screen (m BGL): 59.51 to 61.51



Borehole: 02BD08 **Date Drilled:** 26 March 2002
Project: Rural Towns Program **Easting (m):** 450,294.32
Location: Pony Club grounds **Northing (m):** 6,370,422.53
Hydrologist: Paul Raper **Elevation (m AHD):** 211

Depth	Symbol	Description	Hydrogeology	Well Completion Details
0		Mixed Sediments or Imported Fill	Origin unknown, possibly colluvium.	
2		Pale grey sand over yellowish clay with minor quartz sand.		
4		Yellow, yellow-brown or grey clay.		
6		Saprolite		
8		White, reddish-brown or yellowish clay and fine to very coarse quartz sand and ironstone gravel, indurated in places.		
10		Fine white clay with medium to very coarse quartz sand.		
12		Red-brown sandy clay to clayey sand, sand very coarse, indurated in places.		
14		Red coarse sandy clay, occasional angular quartz stones.		
16		White to red sandy clay and occasional ironstone gravel, iron-indurated in places.		
18		Red-yellow to reddish-brown medium sandy clay with minor indurations and occasional medium to very coarse quartz sand.		
20		Yellow to yellow-orange sandy clay with minor quartz sand and gravel.	Aquifer, main water-bearing layers.	
22		Pale yellowish to yellow-orange clayey sand with stringers of quartz stones at regular intervals.		
24		Quartz-rich Pegmatite or Adamellite		
26		Smokey grey.		
28				
30				
32				
34				
36				
38				
40				
42				
44				
46				
48				
50				
52				

Depth Drilled (m): 47.00 **Casing Type:** 50 mm, Class 12 PVC
Drill Method: Aircore **Casing Above Ground (m):** 0.64
Depth to Water (m): 6.04 **Casing Total Length (m):** 46.71
Estimated Yield (L/s): 0.2 **Screen (m BGL):** 44.07 to 46.07



Borehole: 02BD09 **Date Drilled:** 27 March 2002
Project: Rural Towns Program **Easting (m):** 449,952.96
Location: adjacent to 02BD05 **Northing (m):** 6,370,650.13
Hydrologist: Paul Raper **Elevation (m AHD):** 209.74

Depth	Symbol	Description	Hydrogeology	Well Completion Details
0		Imported Fill		
2		Very fine to coarse sand with minor clay.	Aquitard	
4		Alluvium		
6		Massive grey clay.		
8		Grey to yellow sand.		
10		Orange to yellowish clay with minor fine sand.		
12		Massive grey to red clay with minor fine to coarse sand.		
14		Red sandy clay with coarse quartz sand and occasional ironstone gravel, indurated in places.		
16		Orange to reddish-orange or yellow silty sand and clay with varying proportions of quartz gravel, iron-indurated in places.		
18		Red to pinkish-orange sandy clay, occasionally white. Quartz sand fraction variable, occasional quartz stones.		
20		White to greenish-grey sandy clay.		
22		Orange-brown clayey silt and sand with varying proportions of very coarse quartz sand and occasional quartz stones.		
24				
26				
28				
30				
32				
34				
36				
38				
40				
42				
44				
46				
48				
50		Saprock	Aquifer	
52		Abundant quartz stones in a matrix of silty clay.		
54		Even-grained granitoid basement.		
56				

Depth Drilled (m): 51.50	Casing Type: 50 mm, Class 12 PVC.
Drill Method: Aircore	Casing Above Ground (m): 0.65
Depth to Water (m): 5.32	Casing Total Length (m): 49.54
Estimated Yield (L/s): 0.4	Screen (m BGL): 46.89 to 48.89

Borehole: 02BD10	Date Drilled: 27 March 2002
Project: Rural Towns Program	Easting (m): 450,762.62
Location: old school site	Northing (m): 6,370,782.48
Hydrologist: Paul Raper	Elevation (m AHD): 211.15

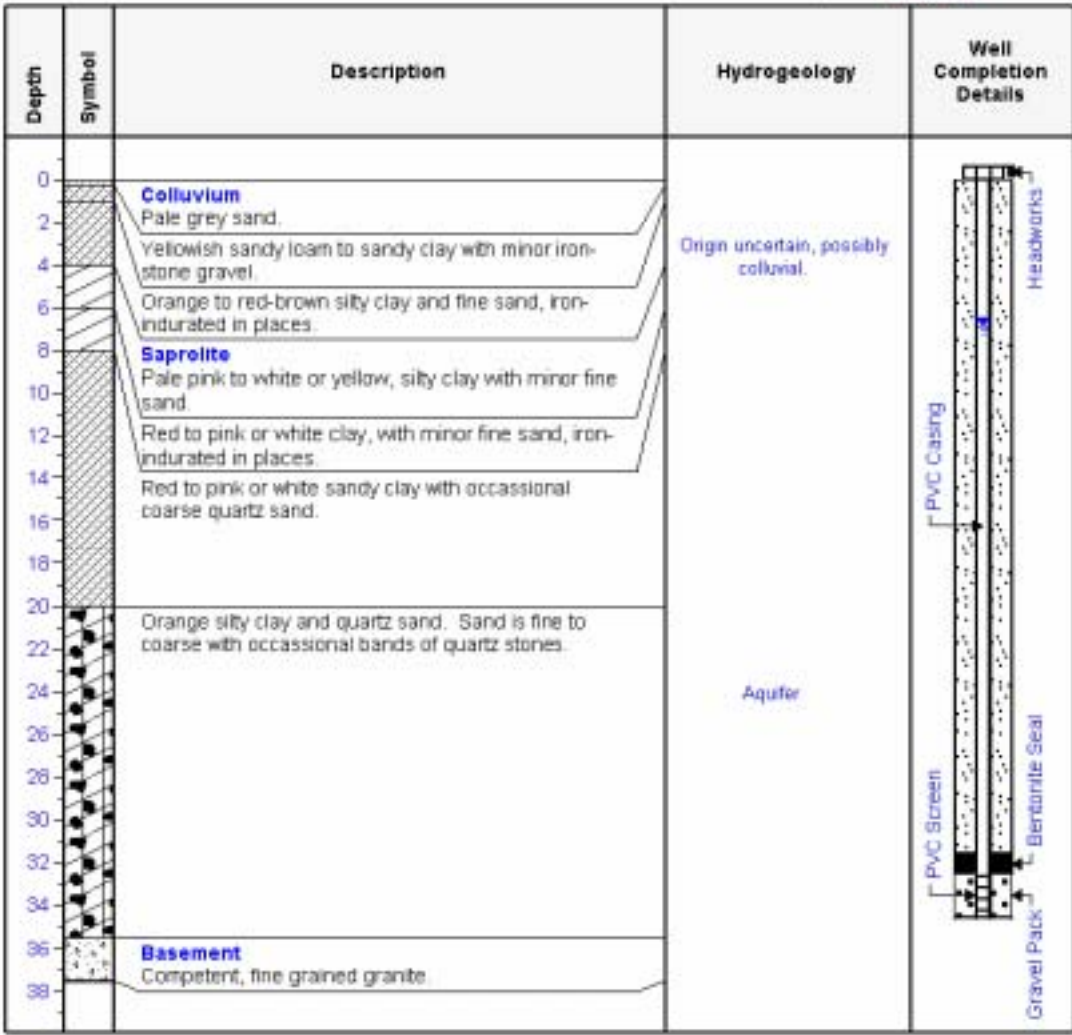


Depth	Symbol	Description	Hydrogeology	Well Completion Details
0		Colluvium Pale red loamy sand and ironstone gravel.	Aquifer	
2		Red-brown silt and fine sand.		
4		Saprolite Red or brown sandy loam to sandy clay, silty in places, occasional white to pale grey, some iron-indurated layers.		
6				
8				
10				
12				
14				
16				
18				
20				
22				
24				
26				
28		Brown to pale pink silty clay and quartz sand with occasional bands of quartz stones.		
30				
32				
34				
36				
38		Saprock Pink to red silt and sandy clay and quartz stones, some partially weathered.		
40				
42		Even grained granitoid basement.		
44				
46				

Depth Drilled (m): 40.60	Casing Type: 60 mm, Class 12 PVC
Drill Method: Aircore	Casing Above Ground (m): 0.61
Depth to Water (m): 4.66	Casing Total Length (m): 41.21
Estimated Yield (L/s): 0.1	Screen (m BGL): 38.60 to 40.60



Borehole: 02BD11	Date Drilled: 27 March 2002
Project: Rural Towns Program	Easting (m): 451,063.27
Location: shire land behind hospital	Northing (m): 6,370,256.01
Hydrologist: Paul Raper	Elevation (m AHD): 233.25



Depth Drilled (m): 35.5	Casing Type: 50 mm, Class 12 PVC.
Drill Method: Aircore	Casing Above Ground (m): 0.63
Depth to Water (m): 6.89	Casing Total Length (m): 35.16
Estimated Yield (L/s): > 0.1	Screen (m BGL): 32.53 to 34.53

Borehole: 02BD12
Date Drilled: 28 March 2002
Project: Rural Towns Program
Easting (m): 449,953.42
Location: railway reserve, Hakea Rd
Northing (m): 6,369,994.38
Hydrologist: Paul Raper
Elevation (m AHD): 218.61



Depth	Symbol	Description	Hydrogeology	Well Completion Details
0		Colluvium Fine, pale grey sand.		
2		Orange silty clay and fine to medium sand.		
4		Saprolite White grey or yellow sandy clay and silt, moderately indurated.		
6		White to pale yellow or orange sandy clay, silty in places, very occasionally iron-indurated.		
8				
10				
12				
14		Orange-brown silt, clay and quartz sand, occasionally iron-stained.	Low to moderate permeability aquifer	
16				
18				
20				
22				
24				
26		Orange-brown silt, clay with quartz sand and stones.	Aquifer	
28		Orange-brown silt, clay and quartz sand.		
30		Saprock Orange-brown silt, clay and abundant quartz sand.		
32		Basement Competent granite basement.		
34				
36				

Depth Drilled (m): 30.06	Casing Type: 60 mm, Class 12 PVC
Drill Method: Aircore	Casing Above Ground (m): 0.68
Depth to Water (m): 2.44	Casing Total Length (m): 30.74
Estimated Yield (L/s): 0.5	Screen (m BGL): 28.06 to 30.06



Borehole: 02BD13	Date Drilled: 02 April 2002
Project: Rural Towns Program	Easting (m): 450,266.04
Location: Blue Gum Park	Northing (m): 6,369,825.64
Hydrologist: Paul Raper	Elevation (m AHD): 217.19

Depth	Symbol	Description	Hydrogeology	Well Completion Details
0	[Dotted pattern]	Alluvium Fine white silty sand, fines increasing with depth.		
2	[Diagonal hatching]	Saprolite Yellow-brown to grey sandy clay and silt.		
4	[Dotted pattern with black dots]	Red-brown sandy clay with iron stone increasing and becoming more spherical with depth.		
8	[Diagonal hatching]	Olive to white silty clay and minor fine to coarse sand.	Possible Aquifer	
10	[Diagonal hatching]	White to pale yellow silt and clay with fine to medium quartz sand and occasional bands of quartz stones.		
14	[Diagonal hatching]		Aquifer	
18	[Diagonal hatching]			
20	[Dotted pattern with black dots]	Saprock Pale yellow silt and clay with angular quartz stones increasing with depth.		
22	[Dotted pattern with black dots]	Quartz-rich granite.		

Depth Drilled (m): 19.95	Casing Type: 50 mm, Class 12 PVC.
Drill Method: Aircore	Casing Above Ground (m): 0.59
Depth to Water (m): 0.53	Casing Total Length (m): 20.54
Estimated Yield (L/s): 0.5	Screen (m BGL): 17.95 to 19.95

Borehole: 02BD14
Project: Rural Towns Program
Location: Murradong Road
Hydrologist: Paul Raper
Date Drilled: 02 April 2002
Easting (m): 450,596.19
Northing (m): 6,369,510.97
Elevation (m AHD): 226.89



Depth	Symbol	Description	Hydrogeology	Well Completion Details
0		Colluvium White gravelly sand.	Always dry to 3 m	
		Massive orange-brown clay.		
2		Saprolite Pale yellow to yellow-orange silty clay with minor sand and iron-stone gravel, indurated in places.		
4		White to pale yellow silt, clay and quartz sand becoming orange-brown with depth.	Water bearing but permeability very low.	
6				
8		Saprock White to grey silty clay with quartz sand and stones.		
		Competent granite		

Depth Drilled (m): 7.94	Casing Type: 50 mm, Class 12 PVC
Drill Method: Aircore	Casing Above Ground (m): 0.60
Depth to Water (m): 0.53	Casing Total Length (m): 8.54
Estimated Yield (L/s): > 0.1	Screen (m BGL): 5.94 to 7.94

Appendix 4. Bore hydrographs

Hydrographs have been prepared for 18 drill sites in the Boddington townsite, those drilled for the Community Bores Project and earlier sites.

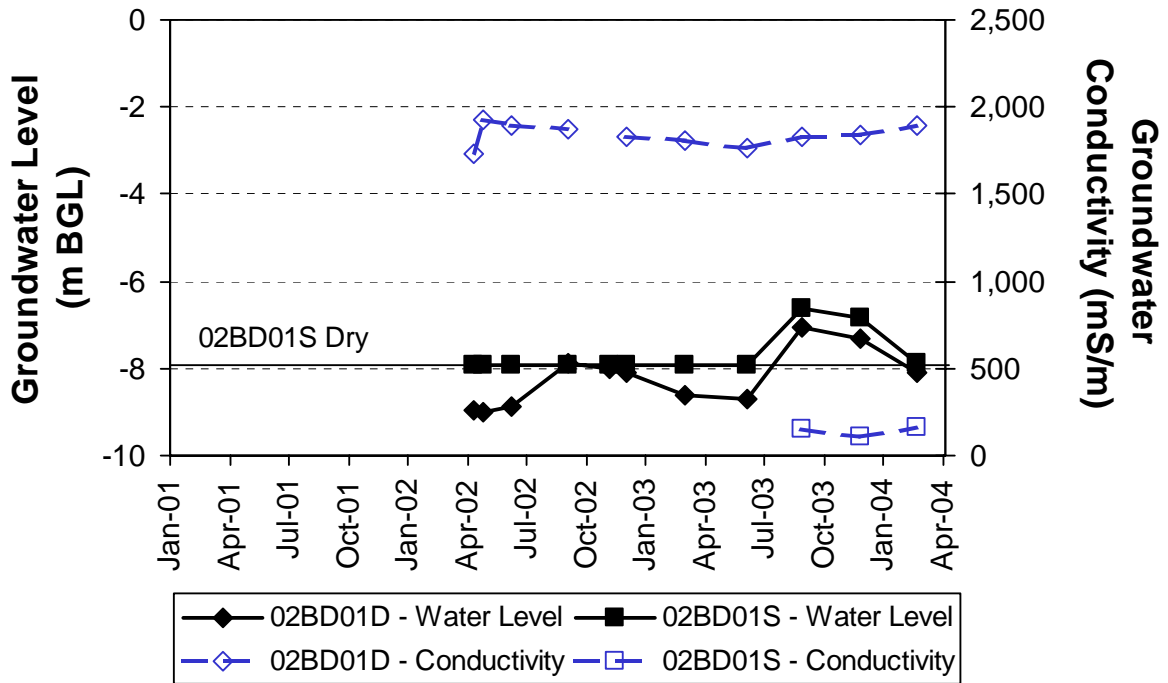


Figure A1

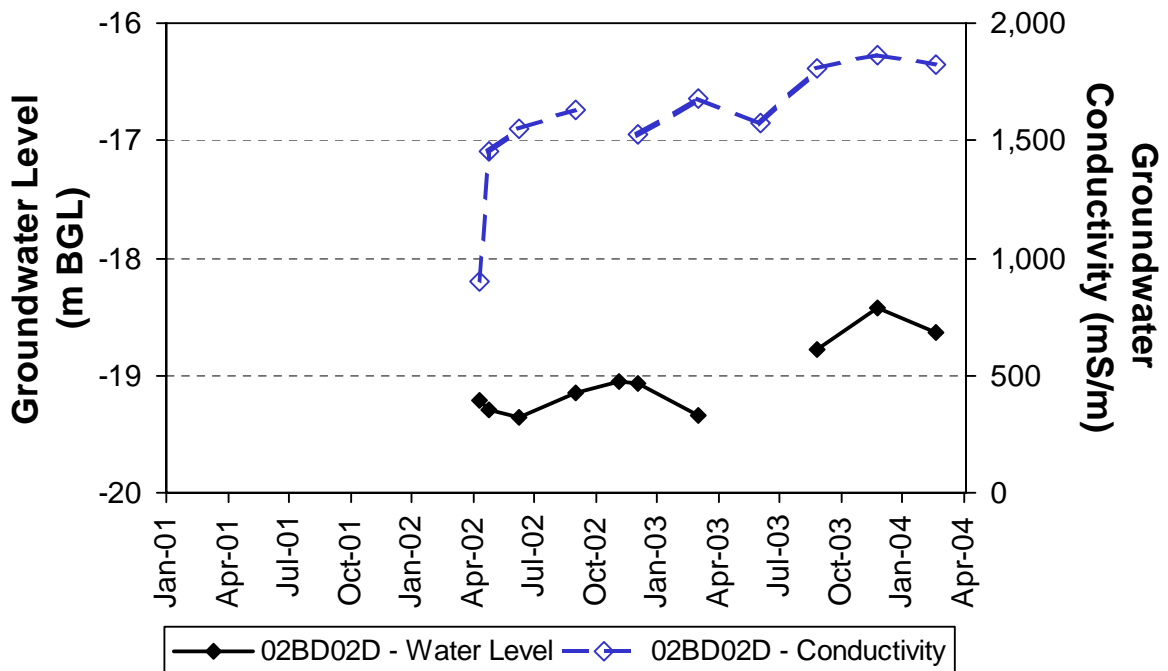


Figure A2

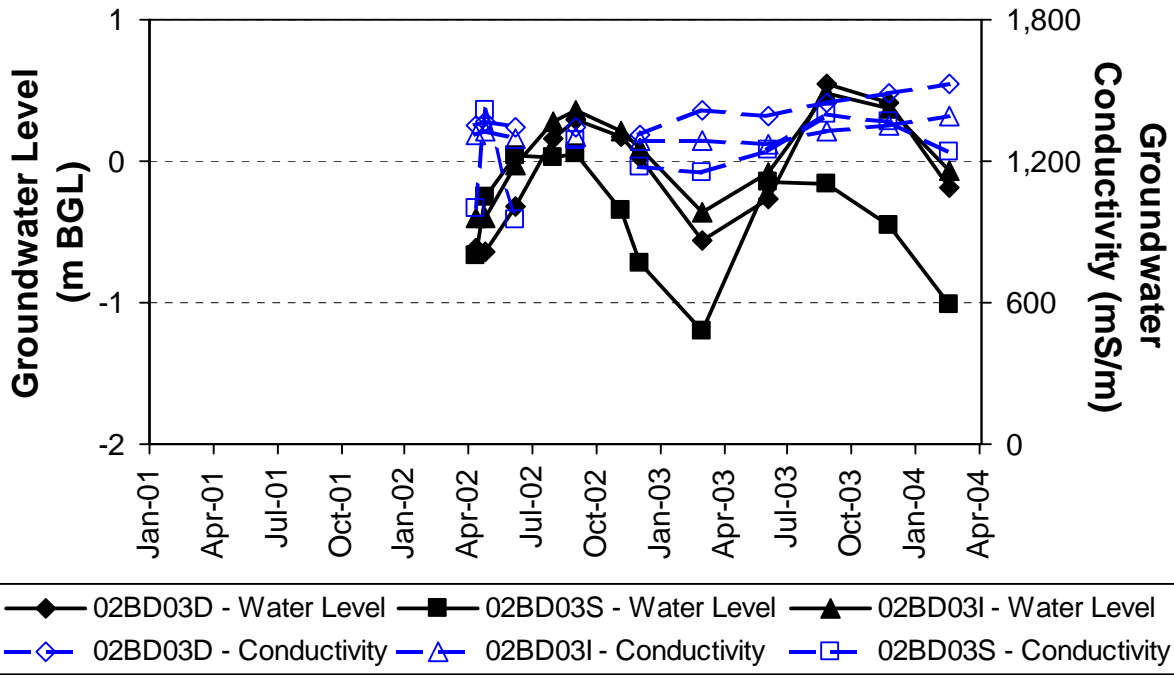


Figure A3

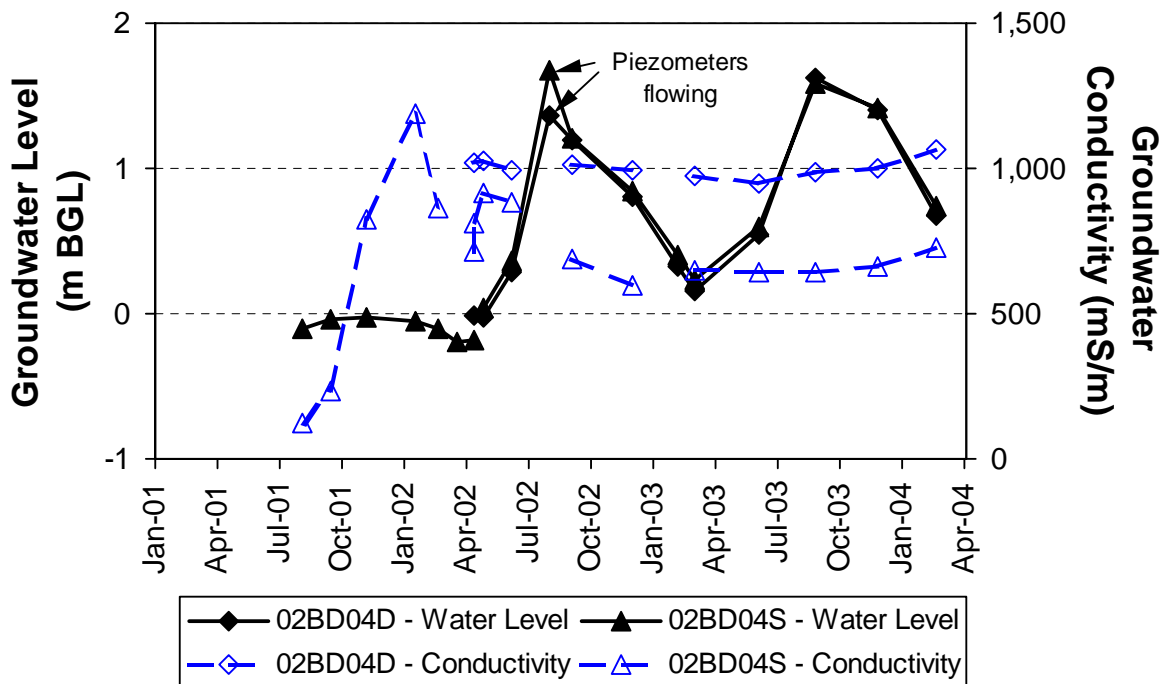


Figure A4

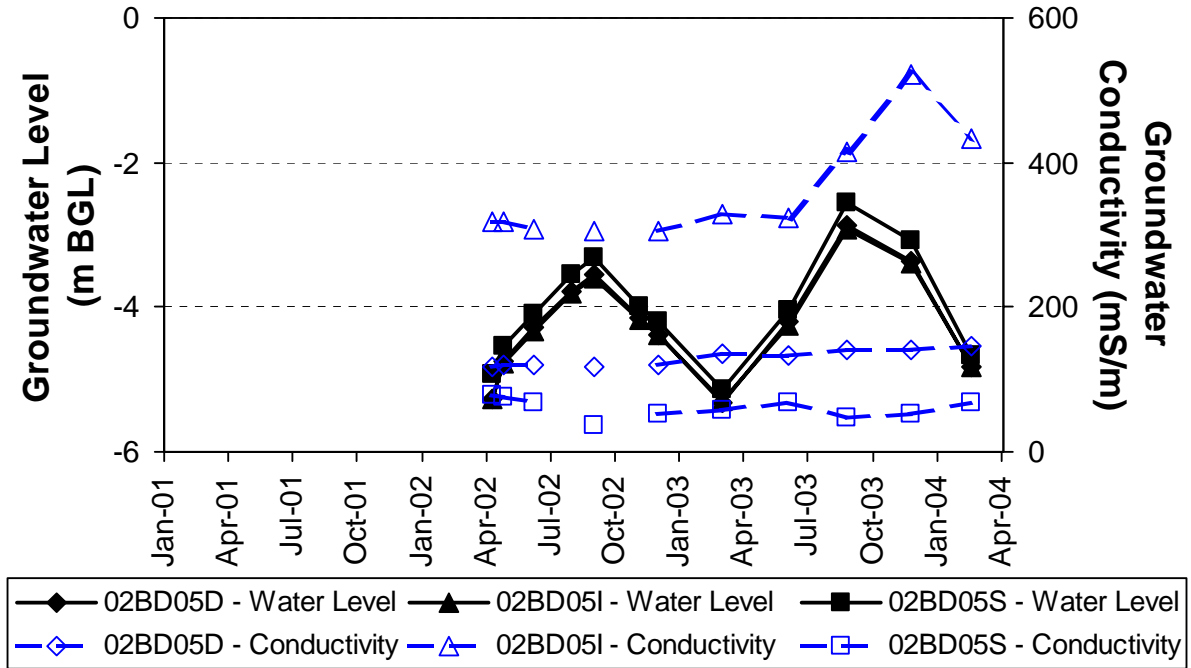


Figure A5

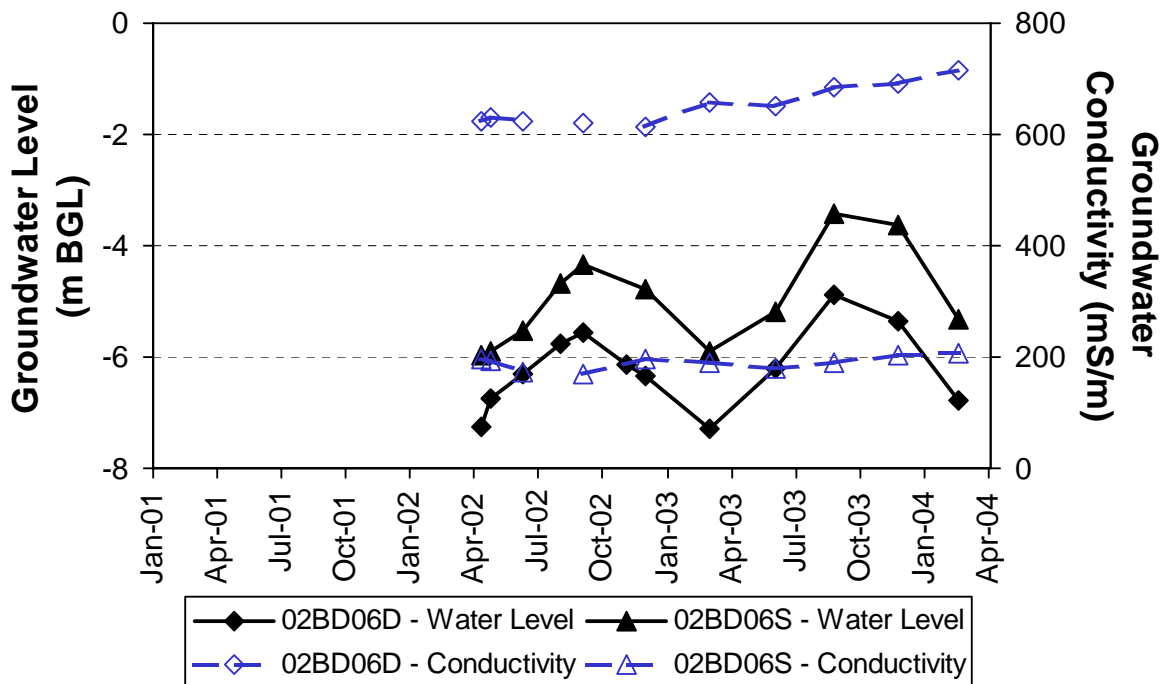


Figure A6

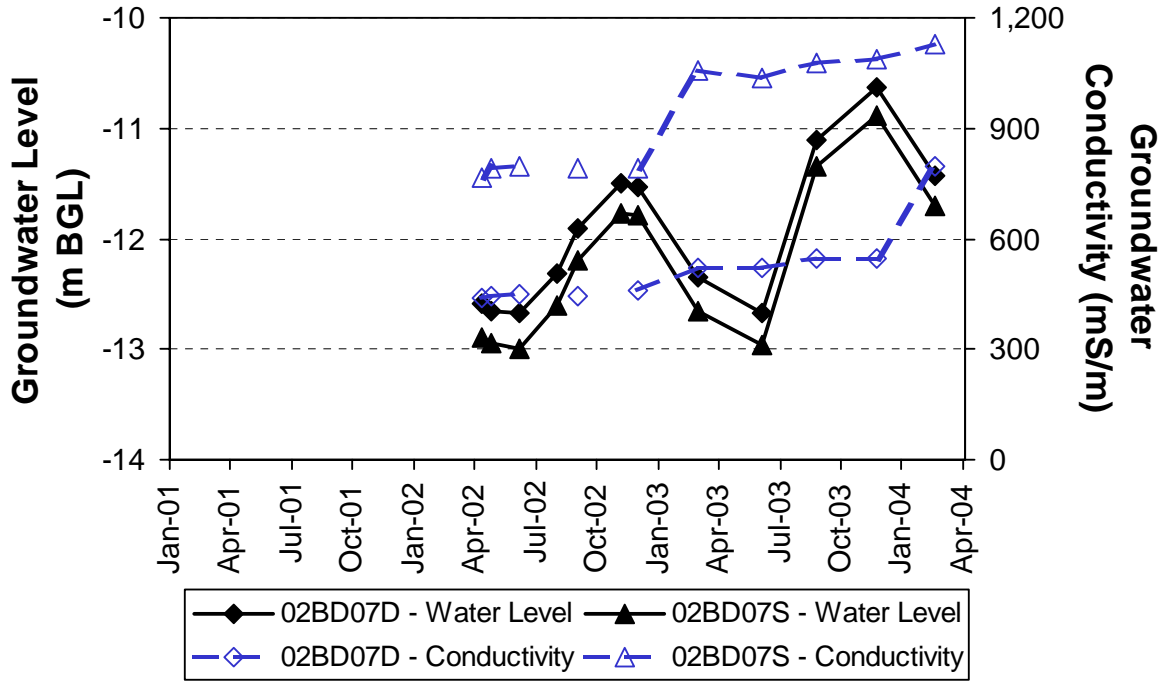


Figure A7

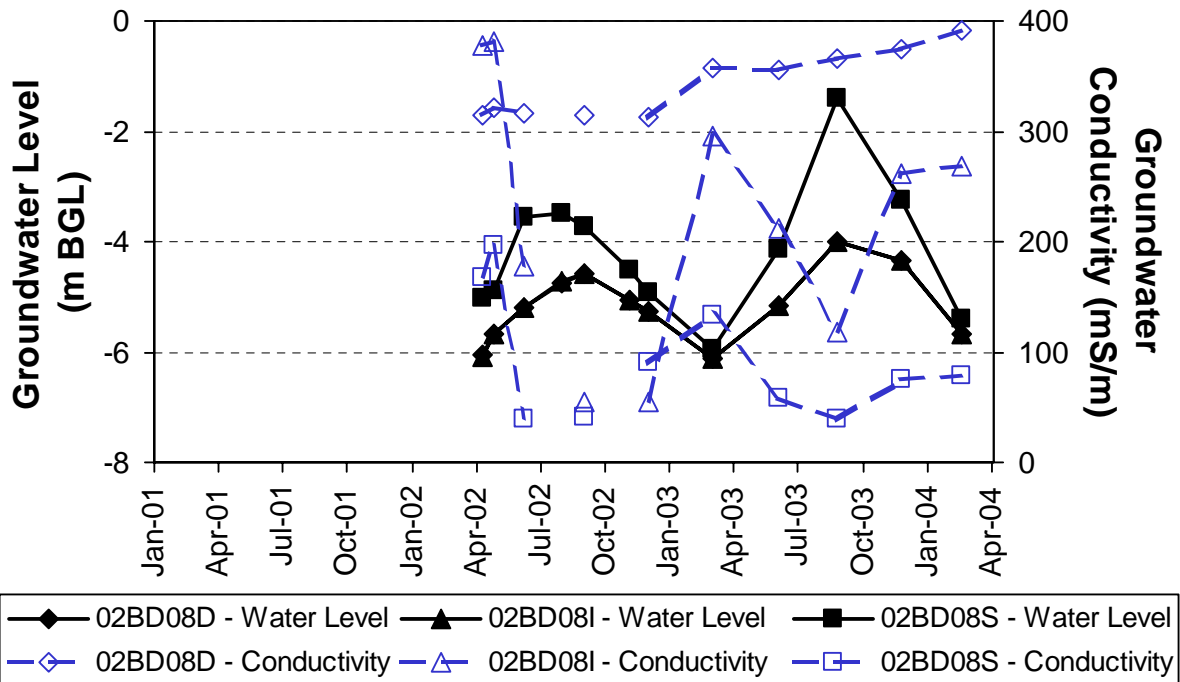


Figure A8

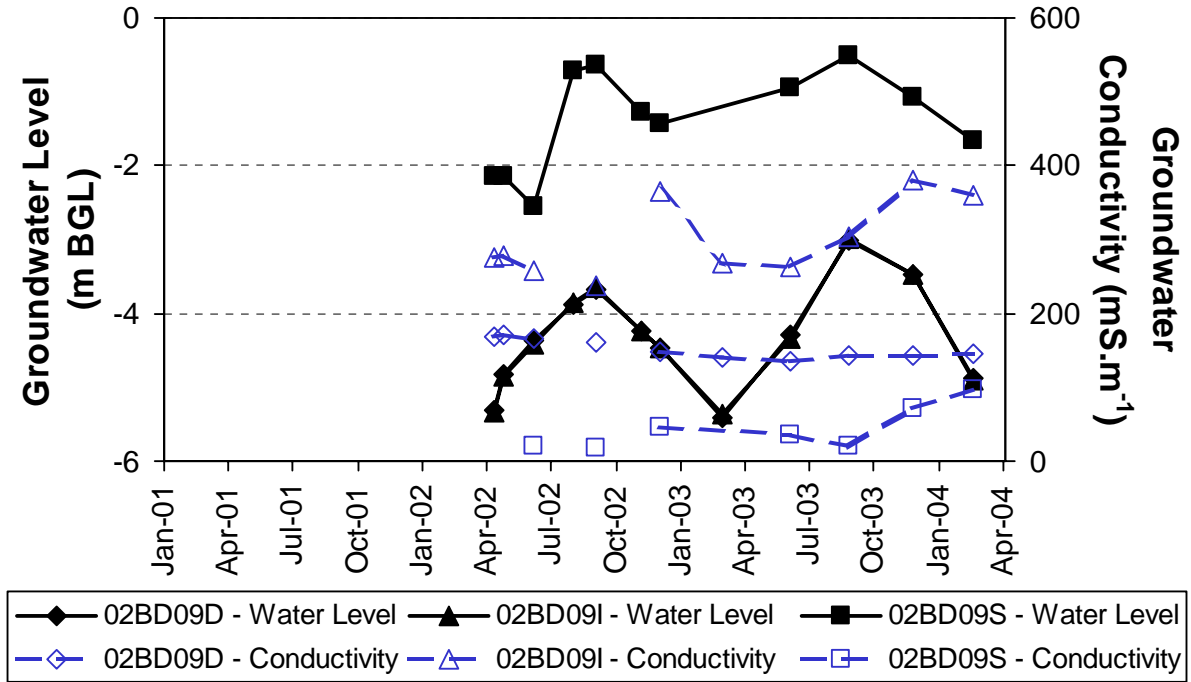


Figure A9

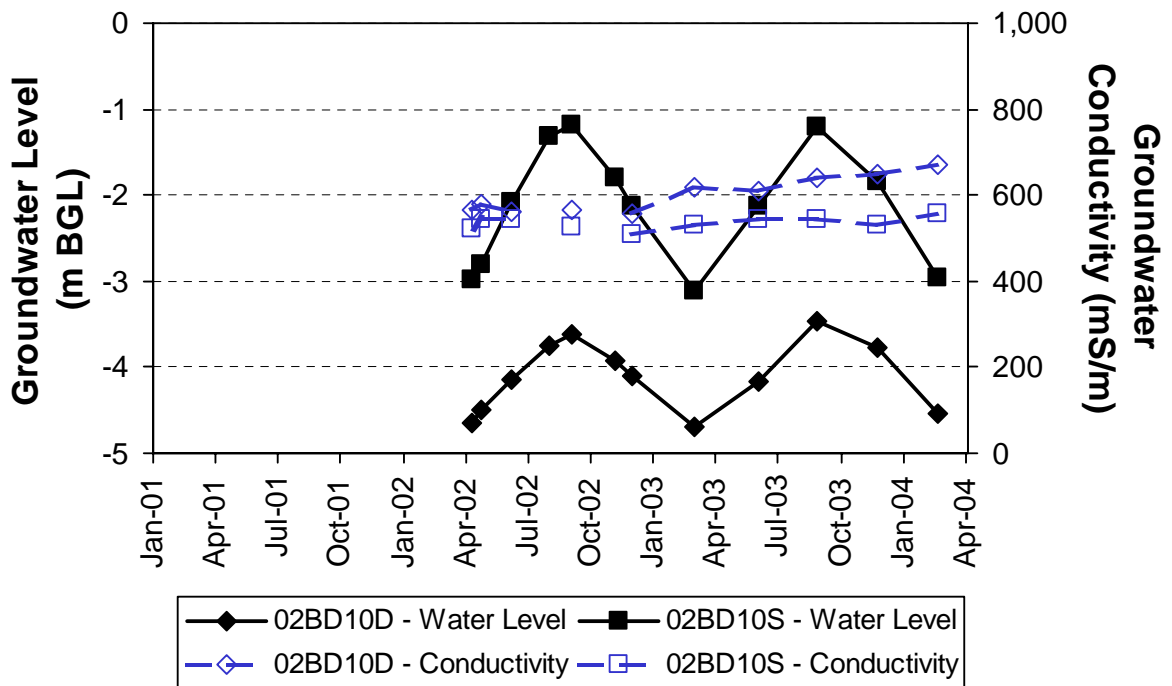


Figure A10

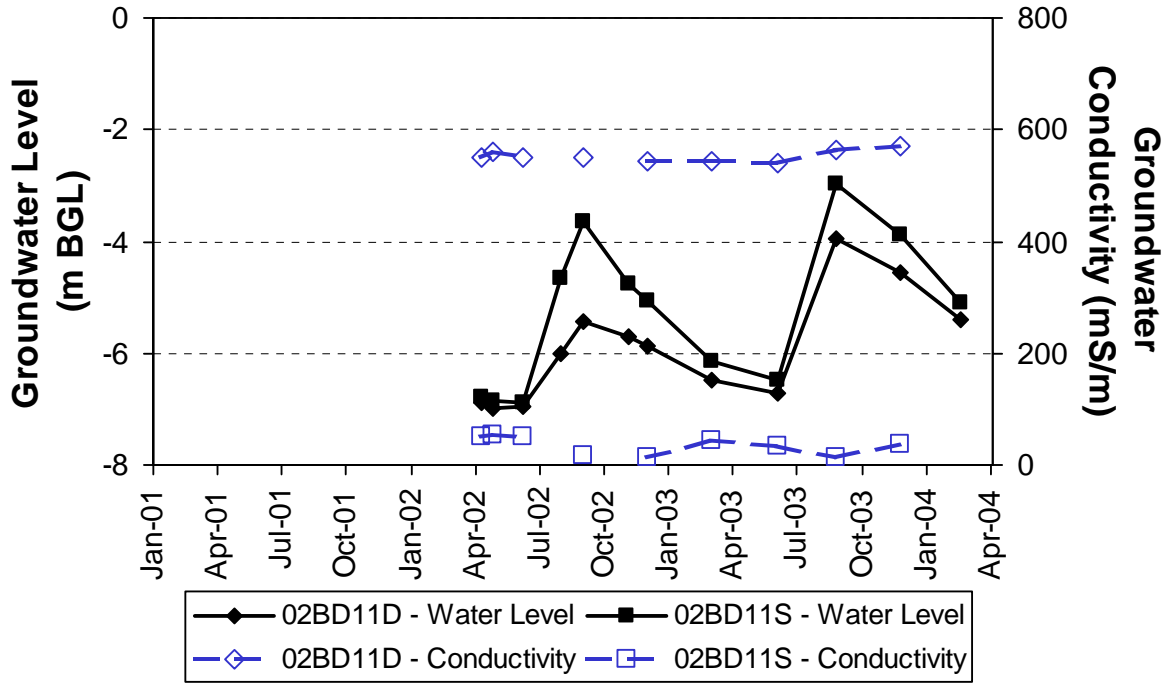


Figure A11

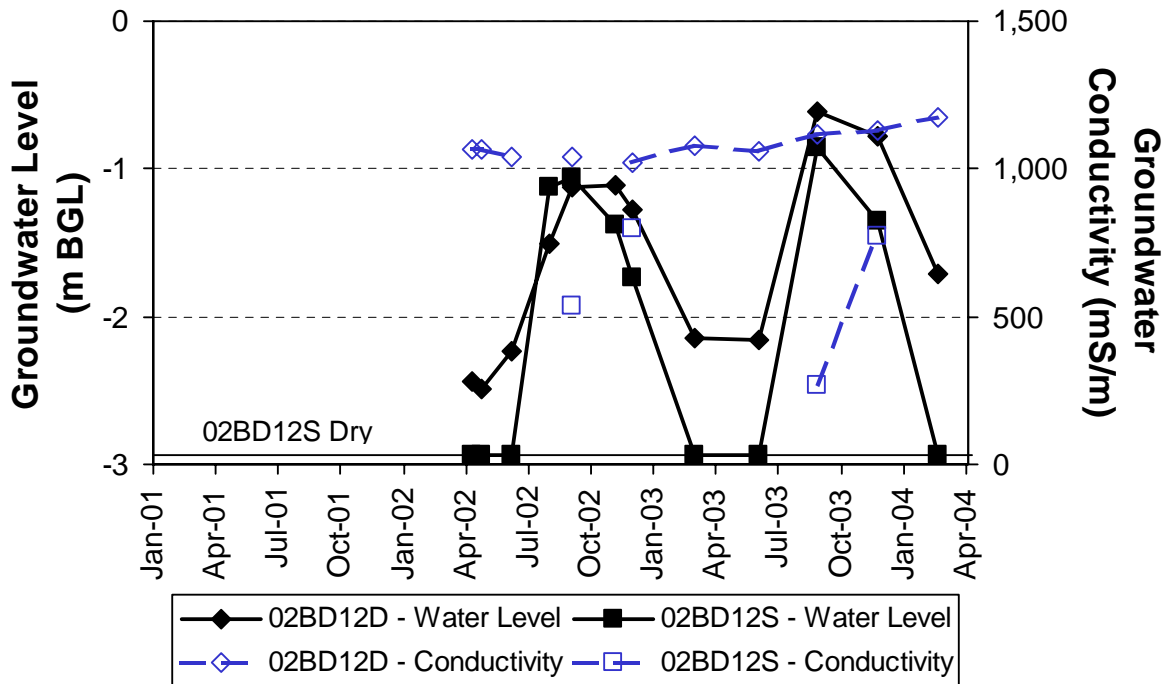


Figure A12

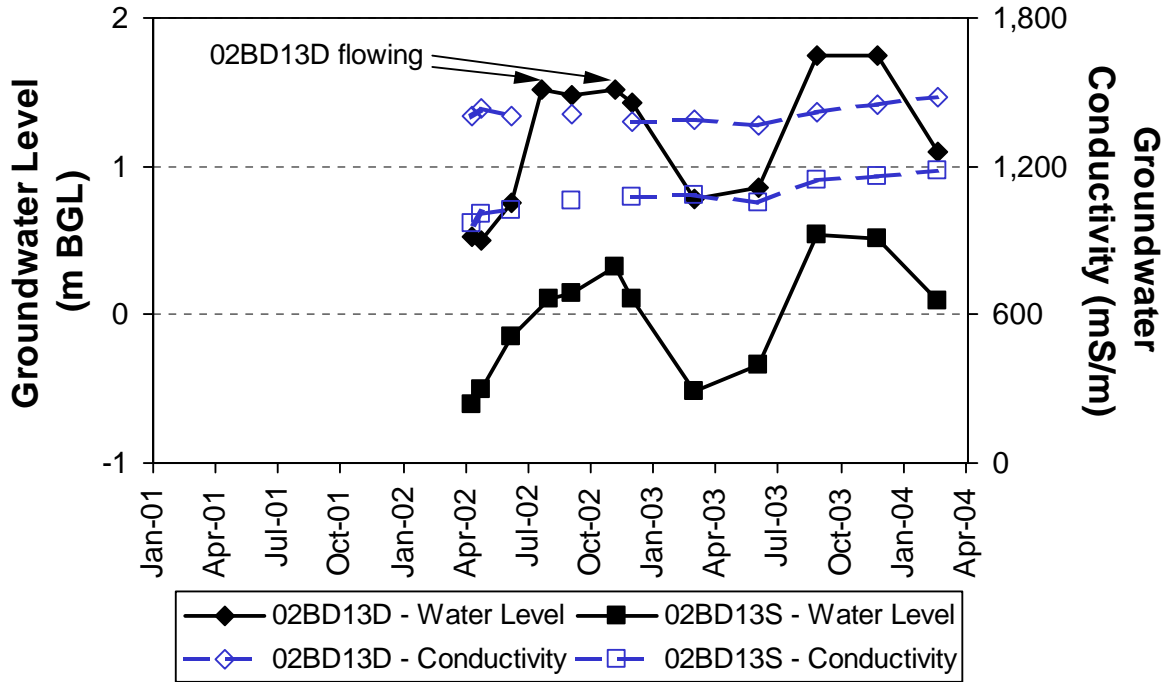


Figure A13

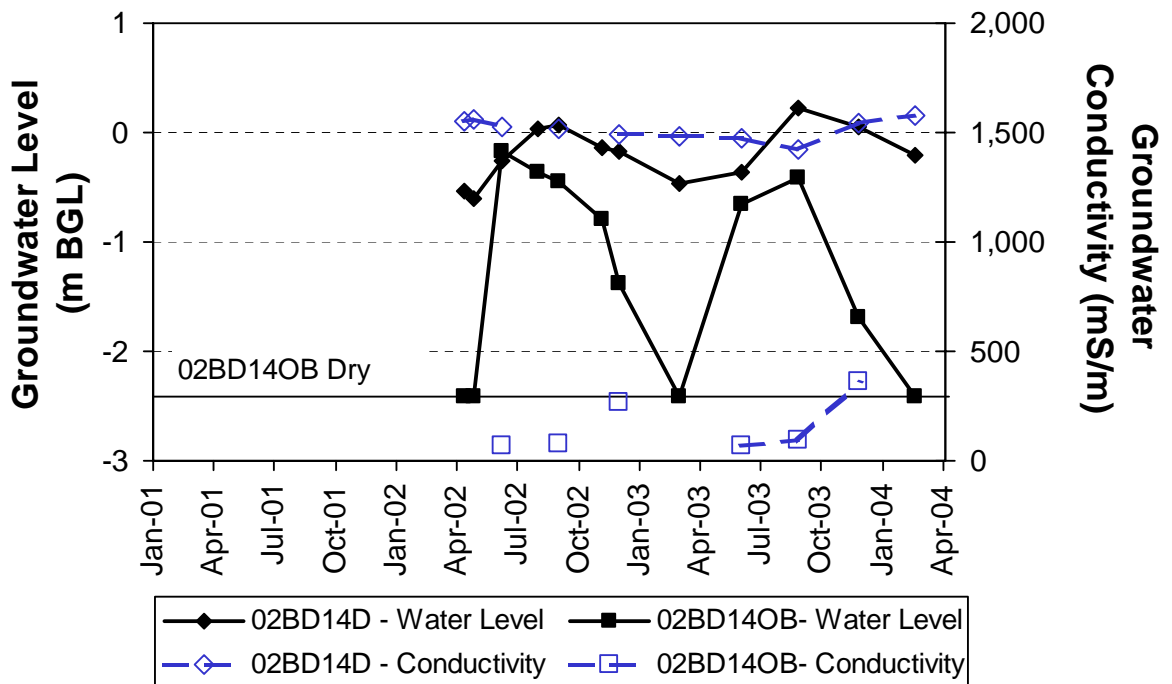


Figure A14

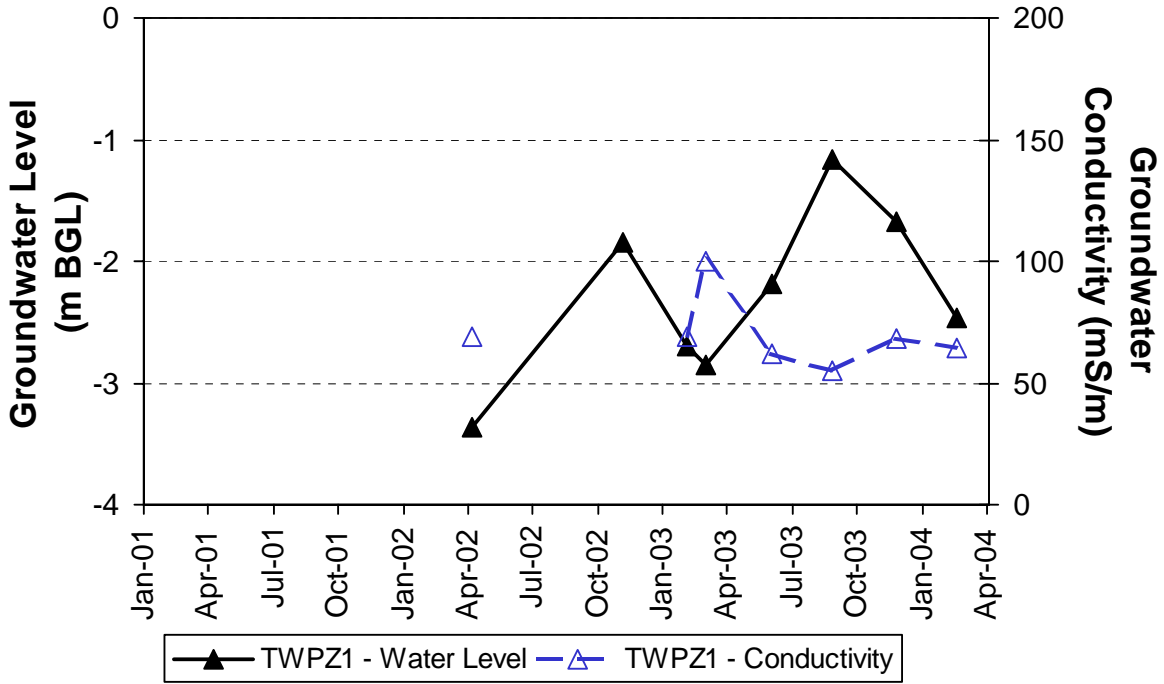


Figure A15

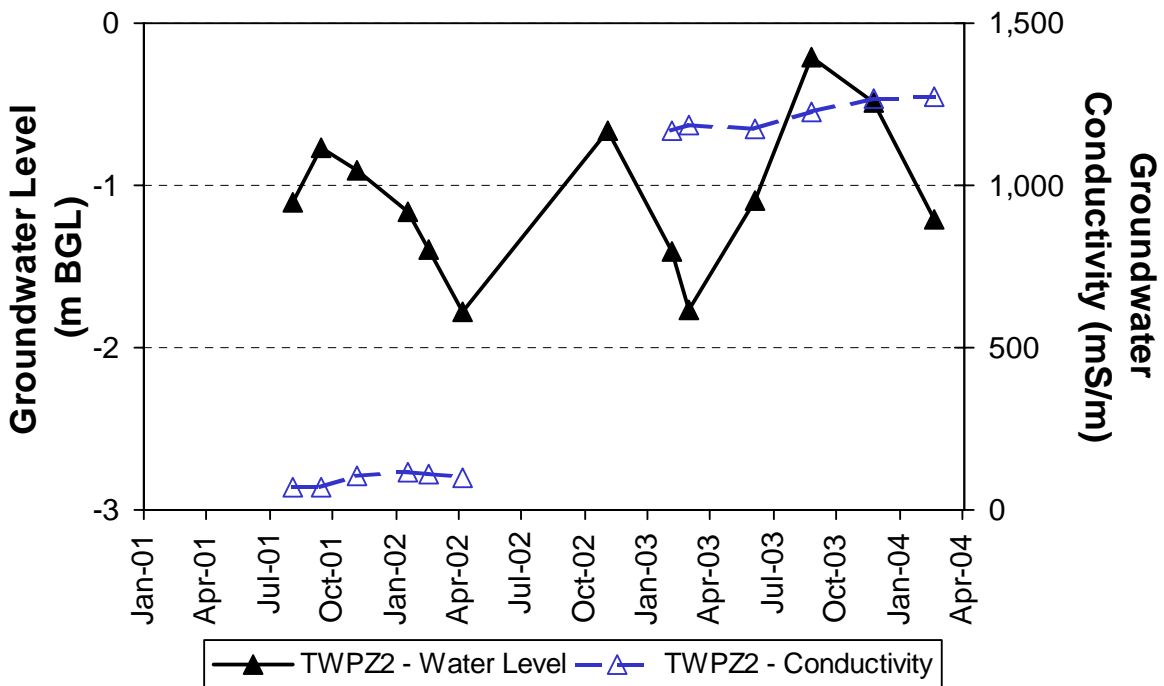


Figure A16

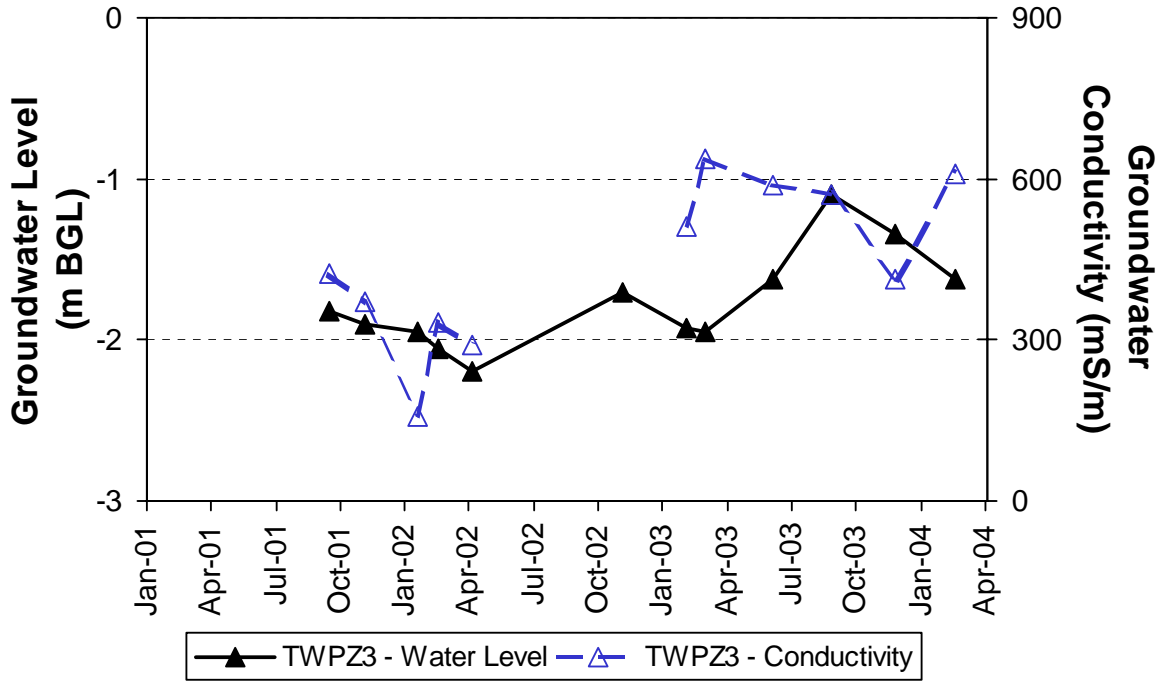


Figure A17

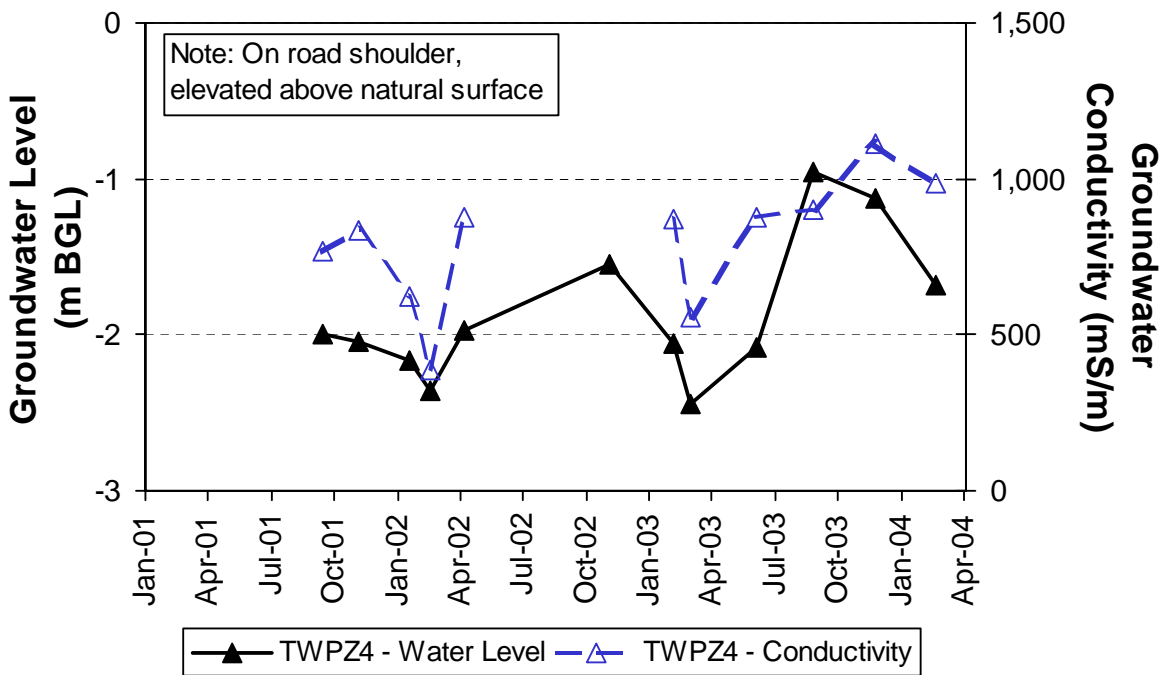


Figure A18