APPENDIX 2

Groundwater Quality Data

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2.6.4 Groundwater Chemistry

Samples were collected from three boreholes, BH4, RC3 and RC7 (Figure 2.4.3). These boreholes were chosen in order to get a distribution of data across the extent of the site and to sample both overburden and bedrock groundwater. BH4 represents overburden groundwater and RC3 and RC7 represent bedrock groundwater. BH4 and RC3 were both pumped to purge three times the volume of the borehole, using 50mm MPI monitoring pumps, to remove any stagnant water from the standing column. RC7 is artesian and had been flowing freely for a few days before the samples were taken. The samples were forwarded to Enterprise Ireland, Glasnevin, Dublin, for laboratory analysis. The results are presented in Table 2.6.3.

The relative proportions of major ions found in the groundwater samples are similar to those found in the surface water samples taken at various locations along the length of the Three Mile Water River (Table 2.5.1 in Section 2.5). This indicates that the groundwater discharge is feeding into the surface waters. The groundwater is not very mineralised reflected by the low levels of the major ions, conductivity, hardness and alkalinity, this is likely to be a reflection of the geology of the area, i.e. the insolubility of the underlying bedrock.

The water was generally of good quality in all three samples. The parameters complied with the Maximum Admissible Concentrations (MAC) for Irish drinking waters (S.I. No. 81 of 1988) with the exception of an elevated manganese level in RC3. The elevated manganese level is most likely due to the geology rather than contamination. However, this level renders the water non-potable. Nitrate levels in RC3 and BH4, although not above the MAC, were elevated suggesting contamination. Agricultural or domestic activities could account for these levels with potential sources from fertilisers, farmyard effluents and septic tanks.

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Table 2.6.3: Groundwater Quality at Ballynagran, 10/07/01

Parameters	Units	M.A.C	Sampling Location		
			RC3	RC7	BH4
pH	pH Units	6 to 9	7.1	7.4	7.4
Conductivity µS/cm @ 20°C	µs/cm	1500	245	205	230
Total Hardness as CaCO3	mg/l	-	114	85	87
Total Alkalinity as CaCO3	mg/l	-	62	75	60
Non-Carbonate Hardness as CaCO3	mg/l	-	52	10	27
Calcium as Ca	mg/l	200	26	22	21
Magnesium as Mg	mg/l	50	12	7.4	8.3
Sodium as Na	mg/l	150	7.6	12	15
Potassium as K	mg/l	12	1.1	0.7	1
Iron as Fe	mg/l	0.2	0.05	<0.01	0.02
Manganese as Mn	mg/l	0.05	0.08	<0.01	<0.01
Copper as Cu	mg/l	0.5	<0.01	<0.01	<0.01
Aluminium as Al	mg/l	0.2	0.09	<0.05	<0.05
Nitrate as NO3	mg/l	50	45	16	49
Nitrite as NO2	mg/l	0.1	<0.01	<0.01	<0.01
Chloride as Cl	mg/l	250	24	21	22
Sulphate as SO4	mg/l	250	13	3.4	4.2
Total Ammonia as NH4	mg/l	0.3	<0.1	<0.1	<0.1
Non-Purgeable Organic Carbon as C	mg/l	-	1.2	<0.5	0.8
Arsenic as As	mg/l	0.05	<0.05	<0.05	<0.05
Tin as Sn	mg/l	-	<0.05	<0.05	<0.05
Mercury as Hg	mg/l	0.001	<0.5	<0.5	<0.5
Chromium as Cr	mg/l	0.05	<0.01	<0.01	<0.01
Phosphorus as P	mg/l	-	<0.05	<0.05	<0.05
Zinc as Zn	mg/l	1	0.05	<0.01	0.03
Cadmium as Cd	mg/l	0.005	<0.005	<0.005	<0.005
Lead as Pb	mg/l	0.05	<0.05	<0.05	<0.05
Cobalt as Co	mg/l	-	<0.01	<0.01	<0.01
Nickel as Ni	mg/l	0.05	0.01	0.01	<0.01
Boron as B	mg/l	2	<0.1	<0.1	<0.1
Strontium as Sr	mg/l	-	0.1	<0.1	<0.1
Barium as Ba	mg/l	0.5	<0.1	<0.1	<0.1

Note :

M.A.C - Maximum Admissible Concentration under S.I. No. 81 of 1988 (Drinking Water)

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