



29th April 2008

Auckland Regional Council  
Private Bag 92 012  
Auckland.

**Attention: Naveen Kumar**

**Re: Three Kings Quarry - Results of Precise Level Survey**

Dear Naveen

As required by condition 12 of the consent to dewater Three Kings Quarry (Permit No 12977), please find enclosed the results of the recently completed precise level survey. Please note that this is the annual survey of all precise level survey benchmarks as defined in condition 12 given that dewatering has not been undertaken for more than 2 years (last undertaken in 2002) and there has been a cessation of settlement (recorded in September 2005).

All marks with the exception of four were within 5mm of the previous reading. Benchmark RM 3887 was -6mm of its previous reading, SS 7702B was +6mm of its previous reading and SS 3313 and SS 7701B were +7mm of their previous readings. All these benchmarks were however within 5mm of levels recorded in the March 06 survey.

Replacement marks were installed for AP47, AP48, AP49A, AP50A and AP51A (all on Landscape Road), and AP126 (Carr Road). All these marks were destroyed during footpath upgrading.

Differential settlement alarm values were recorded between AP92 and AP93, and AP92 and AP80 on Mt Albert Road, AP110 and AP111 on Hillsborough Road, and between OCP68 and AP114 on Budock Road. These differential settlement alarms are detailed on the following table.

Marks	Location	Mar-07 Differential Settlement	Mar-08 Differential Settlement	Distance between Marks	Adjusted Difference in Levels between Marks
AP92 and AP93	Mt Albert Road	1 in 4660	1 in 3642	16.7m	4.6mm
AP92 and AP80	Mt Albert Road	1 in 5815	1 in 4379	17.7m	4.1mm
AP110 and AP111	Hillsbrough Road	1 in 2827	1 in 2827	17.7m	6.3mm
OCP68 and AP114	Budock Road	1 in 3308	1 in 3308	23.0m	7.0mm

Settlement alarm values were recorded between AP92 and AP93, AP110 and AP111, and OCP68 and AP114 following the March 2007 survey.

The action required for these Differential Settlement Alarms Values is to report these to the ARC and Quarry Manager, and to install additional survey marks at 50 metre centres between existing survey marks. Please note that the spacing between these marks is already less than 50 metres.

As required by condition 12 of the Dewatering Consent, these results will be forwarded to Three Kings United.

I trust all is in order. Please contact the undersigned if any further information or clarification is required.

Yours faithfully  
for **Winstone Aggregates**



Michael Harris  
Engineering Geologist.

Cc Tony Carpenter, Three Kings Quarry Manager.

### Three Kings Precise Level Survey Results - March 08

Station ID	Location	Averaged Level	Mar 08 Level	Mar 08 to Averaged Level	Mar 08 cf Mar 07
SS 3136	Mt Eden Rd	63.047	63.030	-17	0
SS 3137	Mt Eden Rd	63.343	63.339	-4	1
M 212A	Mt Albert Rd	86.127	86.112	-15	1
SM 4163	Mt Albert Rd	74.142	74.142	0	1
SM 4164	Mt Albert Rd	75.851	75.845	-6	1
SM 4165	Mt Albert Rd	83.632	83.624	-8	1
SM 3882	Parau St	63.302	63.300	-2	-1
RM 3898	McCullough Ave	76.078	76.065	-13	0
RM 3899	McCullough Ave	77.811	77.802	-9	1
RM 3900	McCullough Ave	76.657	76.643	-14	1
RM 3901	Smallfield Ave	78.931	78.914	-17	-1
RM 3902	Smallfield Ave	80.177	80.165	-12	0
RM 3903	Smallfield Ave	82.524	82.516	-8	1
RM 3904	Smallfield Ave	82.708	82.699	-9	0
RM 3907	Fyvie Ave	80.321	80.316	-5	1
RM 3910	Scout Ave	83.414	83.405	-9	1
RM 3925	Bremner Ave	65.423	65.425	2	-1
RM 3926	Bremner Ave	59.088	59.092	4	0
RM 3933	Milliken Rd	71.049	71.055	6	1
RM 3934	Milliken Rd	66.303	66.307	4	0
RM 3935	Simmonds Ave	91.755	91.746	-9	1
RM 3936	Simmonds Ave	90.869	90.857	-12	1
RM 7440	Hayr Rd	84.033	84.026	-7	1
RM 7457	Mt Albert Rd	85.707	85.692	-15	1
AP 1	Plaza, Mt Albert Rd	81.269	81.251	-18	1
AP 2	Plaza, Mt Albert Rd	76.290	76.275	-15	1
AP 2A	Plaza, Mt Albert Rd	77.582	77.570	-12	2
AP 3	Plaza, Mt Albert Rd	77.367	77.355	-12	0
AP 4	Plaza, Mt Albert Rd	83.366	83.347	-19	0
AP 13	Barrister Ave	79.867	79.860	-7	-1
AP 20	Grahame Breed Dr	76.792	76.784	-8	0
SM 3123	Mt Eden Rd	75.676	75.658	-18	0
SM 3124	Landscape Rd	77.724	77.705	-19	0
SM 3125	Landscape Rd	69.440	69.429	-11	0
SM 3126	Landscape Rd	63.015	63.009	-6	0
SS 3127	Landscape Rd	59.724	59.721	-3	-1
SS 3132	Waitomo St	61.689	61.687	-2	0
SM 3883	Parau St	64.371	64.367	-4	-1
RM 3884	Parau St	62.539	62.535	-4	-2
SM 3885	Duke St	61.857	61.848	-9	-2
RM 3886	Fearon Ave	55.236	55.235	-1	-2
RM 3887	Fearon Ave	51.548	51.539	-9	-6
OCP 3888	Parau St	62.513	62.504	-9	-1
RM 3889	Duke St	69.233	69.213	-20	-1
RM 3891	Duke St	77.575	77.561	-14	1
RM 3892	Duke St	78.012	77.998	-14	0
RM 3893	Duke St	79.146	79.125	-21	0
RM 3894	Fulljames Ave	72.082	72.064	-18	1
RM 3895	Hamon Ave	65.188	65.170	-18	-4
RM 3896	McCullough Ave	69.820	69.800	-20	-1
RM 3897	McCullough Ave	75.084	75.070	-14	0
RM 3905	Fyvie Ave	75.813	75.807	-6	1

### Three Kings Precise Level Survey Results - March 08

Station ID	Location	Averaged Level	Mar 08 Level	Mar 08 to Averaged Level	Mar 08 of Mar 07
RM 3906	Fyvie Ave	77.447	77.436	-11	0
RM 3908	Fyvie Ave	82.069	82.067	-2	2
RM 3909	Scout Ave	80.056	80.048	-8	1
RM 3911	Dally Tce	88.894	88.882	-12	1
RM 3912	Fearon Ave	51.652	51.653	1	-2
RM 3913	Fearon Ave	49.238	49.244	6	-2
RM 3921	Duncumb St	50.034	50.037	3	-2
RM 3923	Connelly Ave	74.293	74.278	-15	-1
RM 3924	Connelly Ave	73.034	73.021	-13	0
SM 4354	Mt Eden Rd	80.155	80.132	-23	0
SM 6241	Duke St	70.012	69.988	-24	-1
OCP 90B	Duke St	71.805	71.788	-17	1
AP 10	Roskill Way	82.673	82.661	-12	0
AP 14	Churches Ave	91.334	91.324	-10	2
AP 15	Dally Terrace	90.821	90.813	-8	2
AP 17C	Hunters Park Dr	74.602	74.596	-6	0
AP 29A	Duke St	49.542	49.538	-4	-5
M 220	Mt Eden Rd	81.700	81.666	-34	0
M 221	Mt Eden Rd	83.449	83.435	-14	0
SS 1555	Selwyn Rd	99.584	99.584	0	2
SS 1556	Selwyn Rd	102.373	102.372	-1	2
SS 1617	St Andrews Rd	81.442	81.443	1	0
SS 1618	St Leonards Rd	78.478	78.474	-4	-1
SS 1619	St Leonards Rd	66.617	66.613	-4	-1
SS 1623	St Andrews Rd	107.522	107.518	-4	3
SS 3306	Mt Eden Rd	60.565	60.555	-10	0
SS 3307	St Leonards Rd	59.661	59.653	-8	0
SS 3308	St Leonards Rd	63.275	63.270	-5	-1
SS 3311	Rahiri Rd	95.306	95.294	-12	2
SS 3312	Rahiri Rd	95.929	95.918	-11	1
SS 3313	Landscape Rd	112.633	112.622	-11	7
SS 3315	Rewa Rd	80.938	80.916	-22	0
SS 3316	Rewa Rd	98.902	98.885	-17	2
RM 6807	St Andrews Rd	102.487	102.476	-11	3
RM 6812	St Andrews Rd	108.907	108.897	-10	3
SM 6826	Buckley Rd	74.710	74.707	-3	-1
RM 6827	Buckley Rd	83.332	83.333	1	-1
SM 6828	Buckley Rd	87.952	87.953	1	-1
SS 7701B	Landscape Rd	115.509	115.513	4	7
SS 7702B	Landscape Rd	110.538	110.541	3	6
RM 7703	Landscape Rd	100.149	100.137	-12	2
SM 7704	St Andrews Rd	97.816	97.812	-4	2
RM 7705	St Andrews Rd	88.086	88.084	-2	-1
AP 9	St Andrews Rd	92.802	92.785	-17	1
AP 11	Mt Eden Rd	80.191	80.184	-7	1
AP 16	Queens Way	83.646	83.633	-13	2
AP 18B	Mt Eden Rd	81.641	81.641	0	0
M 205	Mt Albert Rd	59.305	59.304	-1	-1
AP 206A	Mt Albert Rd	59.997	59.996	-1	-2
M 210	Mt Albert Rd	83.050	83.032	-18	0
SM 1979	Hillsborough Rd	61.241	61.214	-27	-3
BP 1977B	Hillsborough Rd	71.993	71.983	-10	-5

### Three Kings Precise Level Survey Results - March 08

Station ID	Location	Averaged Level	Mar 08 Level	Mar 08 to Averaged Level	Mar 08 of Mar 07
SM 6809	St Andrews Rd	81.800	81.781	-19	0
SM 6810	St Andrews Rd	76.956	76.939	-17	-1
RM 6811	St Andrews Rd	76.526	76.506	-20	-3
RM 6813	St Andrews Rd	80.905	80.882	-23	0
RM 6816	Rowan Rd	78.908	78.888	-20	-1
SM 6817	Rowan Rd	80.995	80.980	-15	-1
RM 6818	Rowan Rd	81.966	81.948	-18	-1
RM 6819	Buckley Rd	65.620	65.608	-12	-2
SM 6820	Buckley Rd	71.955	71.948	-7	-1
SM 6821	Buckley Rd	71.114	71.109	-5	-1
SM 6822	Gorrie Ave	81.874	81.859	-15	0
SM 6823	Buckley Rd	70.593	70.587	-6	-1
RM 6824	Buckley Rd	71.084	71.080	-4	-1
RM 6825	Quentin Ave	81.386	81.374	-12	-1
SM 6835	Torrance St	70.784	70.785	1	-1
SM 6836	Torrance St	65.955	65.957	2	0
RM 6838	Fernleigh Ave	70.304	70.299	-5	0
SM 6839	Fernleigh Ave	67.487	67.486	-1	-1
SM 6840	Fernleigh Ave	63.278	63.278	0	-1
SM 6841	Peet Ave	65.698	65.695	-3	-2
AP 6843A	Kings Way	75.223	75.222	-1	-1
RM 7647	Mt Albert Rd	67.601	67.577	-24	-2
ORM.I	Weaver Street	63.578	63.580	2	0
AP 5	Mt Eden Rd	75.746	75.736	-10	0
AP 6	Queens Way	75.306	75.289	-17	0
AP 7A	St Andrews Rd	76.820	76.819	-1	-2
AP 8B	Mt Albert Rd	75.740	75.727	-13	-1
AP 12	Warren Ave	94.357	94.342	-15	1
OAP 19	St Andrews Rd	77.508	77.485	-23	-1
AP 21A	Mt Eden Rd	77.288	77.287	-1	-1
AP 22	Queens Way	78.352	78.342	-10	0
AP 23	Queens Way	74.402	74.392	-10	-1
AP 30	Mt Eden Rd	77.329	77.321	-8	1
AP 31	Mt Eden Rd	76.857	76.854	-3	1
AP 32	Mt Eden Rd	76.203	76.194	-9	0
AP 33	Mt Eden Rd	75.121	75.113	-8	0
AP 34	Mt Eden Rd	74.937	74.925	-12	-1
SM 5387	Erson Ave	56.747	56.748	1	-1
SM 5386	Symonds St	55.184	55.185	1	-2
M 638	Manukau Rd	54.690	54.691	1	-1
CA 55	Manukau Rd	65.141	65.141	0	0
CA 53	Akarana Ave	70.594	70.594	0	0
M 216	Mt Albert Rd	72.658	72.658	0	0
SS 1977	Hillsborough Rd	74.453	74.448	-5	-3
RM 3927	Bremner Ave	62.651	62.652	1	1
RM 3928	Bremner Ave	56.144	56.146	2	0
AP 139	Bremner Ave	56.225	56.224	-1	-1
RM 3931	Milliken Ave	62.500	62.501	1	0
RM 3932	Milliken Ave	71.719	71.720	1	2
SS 3004	Dominion Rd	51.812	51.810	-2	-1
SS 3131	Shackleton Rd	59.419	59.417	-2	0
SS 3133	Shackleton Rd	59.554	59.550	-4	-1

### Three Kings Precise Level Survey Results - March 08

Station ID	Location	Averaged Level	Mar 08 Level	Mar 08 to Averaged Level	Mar 08 of Mar 07
SS 3134	Shackleton Rd	61.479	61.473	-6	0
SS 3135	Shackleton Rd	61.684	61.680	-4	0
SS 3151	Mt Eden Rd	67.987	67.987	0	2
SS 1905	St Andrews Rd	88.810	88.807	-3	0
RM 7707	St Andrews Rd	81.206	81.203	-3	-1
SS 1558	Empire Rd	92.169	92.166	-3	-1
SS 1559	Empire Rd	96.024	96.022	-2	0
SS 1549	The Drive	85.871	85.870	-1	0
SS 1550	The Drive	84.432	84.432	0	-1
RM 6830	The Drive	81.638	81.637	-1	-1
SS 1551	The Drive	77.481	77.478	-3	-2
RM 6829	Selwyn Rd	79.864	79.858	-6	-3
RM 6832	Selwyn Rd	80.190	80.189	-1	0
SM 5912	Pah Rd	74.285	74.284	-1	-1
AP 35	Mt Albert Rd	54.190	54.193	3	-1
AP 37	Hillsborough Rd	59.335	59.324	-11	-3
AP 38	Budock Rd	69.274	69.268	-5	-1
AP 39	Hillsborough Bowling	56.297	56.292	-5	-3
AP 40	Hillsborough Bowling	55.757	55.752	-5	-2
IS 41	Hillsborough Bowling	56.336	56.330	-6	-3
AP 42	Dornwell Rd	76.373	76.364	-9	-1
AP 43	Dornwell Rd	66.002	65.994	-8	-1
AP 44	Dornwell Rd	58.493	58.486	-7	-1
AP 45	Frost Rd	64.920	64.912	-8	0
AP 54	Frost Rd	57.855	57.844	-11	-1
AP 46	Dominion Rd	50.443	50.441	-2	-1
AP 47	DESTROYED			Refer AP 47A	
AP 47A	Landscape Rd	52.564	52.564		
AP 48	DESTROYED			Refer AP 48A	
AP 48A	Landscape Rd	57.064	57.064		
AP 49A	DESTROYED			Refer AP 49B	
AP 49B	Landscape Rd	70.341	70.341		
AP 50A	DESTROYED			Refer AP 50B	
AP 50B	Landscape Rd	71.660	71.660		
AP 51A	DESTROYED			Refer AP 51B	
AP 51B	Landscape Rd	74.121	74.121		
AP 55	Mt Eden Rd	68.263	68.263	0	3
AP 56	Mt Albert Rd	58.409	58.410	1	-1
AP 60	Rowan Rd	76.276	76.268	-8	0
AP 61	Rowan Rd	71.310	71.301	-9	-2
AP 62	Mt Albert Rd	63.068	63.060	-8	-3
AP 63A	Mt Albert Rd	61.370	61.369	-1	-2
AP 64	Hillsborough Rd	60.579	60.572	-7	-3
AP 65	Hillsborough Rd	59.546	59.537	-9	-3
OAP 66	Hillsborough Rd	59.987	59.980	-7	-4
AP 67	Hillsborough Rd	63.871	63.864	-7	-3
OCP 68	Budock Rd	66.304	66.299	-5	-1
AP 69	Budock Rd	65.977	65.972	-5	-2
AP 70	Budock Rd	71.208	71.204	-4	-1
OAP 71	Hillsborough Rd	67.651	67.646	-5	-4
AP 72	Hillsborough Rd	74.077	74.072	-5	-4
AP 73	Marie Ave	70.874	70.867	-7	-2

### Three Kings Precise Level Survey Results - March 08

Station ID	Location	Averaged Level	Mar 08 Level	Mar 08 to Averaged Level	Mar 08 of Mar 07
AP 74	Marie Ave	80.330	80.323	-7	-2
AP 75	Marie Ave	86.876	86.872	-4	1
AP 77	Mt Albert Rd	82.751	82.743	-8	-1
AP 78	Mt Albert Rd	81.022	81.014	-8	-1
AP 79	Mt Albert Rd	78.663	78.656	-7	0
AP 80	Mt Albert Rd	71.414	71.405	-9	-2
AP 81A	Mt Albert Rd	58.551	58.550	-1	-2
AP 82A	Mt Albert Rd	58.575	58.574	-1	-2
AP 83	Mt Albert Rd	58.863	58.861	-2	-2
AP 84	Mt Albert Rd	59.350	59.347	-3	-2
AP 85	Mt Albert Rd	60.619	60.615	-4	-2
AP 86	Mt Albert Rd	62.051	62.047	-4	-3
AP 87	Mt Albert Rd	62.733	62.729	-4	-2
AP 88	Mt Albert Rd	64.828	64.821	-7	-3
AP 89	Mt Albert Rd	65.939	65.932	-7	-3
AP 90	Mt Albert Rd	68.687	68.681	-6	-3
AP 91	Mt Albert Rd	70.075	70.070	-5	-2
AP 92	Mt Albert Rd	72.613	72.612	-1	-1
AP 93	Mt Albert Rd	73.864	73.859	-5	-2
AP 94	Mt Albert Rd	77.101	77.096	-5	-1
AP 95	Mt Albert Rd	79.957	79.951	-6	-1
AP 96	St Andrews Rd	77.897	77.892	-5	-1
AP 97	St Andrews Rd	80.321	80.316	-5	-1
AP 98	Rowan Rd	68.501	68.497	-4	-1
AP 99	Rowan Rd	69.478	69.474	-4	-1
AP 100	Hillsborough Rd	62.966	62.960	-6	-3
AP 101	Hillsborough Rd	61.359	61.352	-7	-4
AP 102	Hillsborough Rd	60.006	60.000	-6	-3
AP 103	Hillsborough Rd	59.404	59.397	-7	-3
AP 104A	Hillsborough Rd	59.554	59.550	-4	-3
AP 105	Hillsborough Rd	59.711	59.706	-5	-3
AP 106	Hillsborough Rd	60.458	60.454	-4	-3
AP 107	Hillsborough Rd	60.881	60.876	-5	-4
AP 108	Hillsborough Rd	62.060	62.055	-5	-4
AP 109	Hillsborough Rd	62.806	62.802	-4	-3
AP 110	Hillsborough Rd	64.997	64.989	-8	-3
AP 111	Hillsborough Rd	66.322	66.318	-4	-3
AP 112	Budock Rd	63.699	63.695	-4	-3
AP 113	Budock Rd	65.546	65.544	-2	-2
AP 114	Budock Rd	65.879	65.882	3	-1
AP 115	Budock Rd	67.579	67.576	-3	-1
AP 116	Budock Rd	69.485	69.483	-2	-1
AP 117	Budock Rd	70.833	70.832	-1	-2
OAP 118	Mt Albert Rd	59.895	59.890	-5	-1
AP 119A	Haughey Ave	72.896	72.895	-1	-2
AP 120	Haughey Ave	67.450	67.447	-3	-2
AP 121	Haughey Ave	66.666	66.662	-4	-3
AP 122	Haughey Ave	66.032	66.028	-4	-3
AP 123	Haughey Ave	73.227	73.220	-7	-4
OAP 125	Hillsborough Rd	69.958	69.953	-5	-4
SS 1976	Hillsborough Rd	71.137	71.129	-8	-3
AP 126	DESTROYED			Refer AP 126A	

### Three Kings Precise Level Survey Results - March 08

Station ID	Location	Averaged Level	Mar 08 Level	Mar 08 to Averaged Level	Mar 08 of Mar 07
AP 126A	Carr Rd	65.244	65.244		
OAP 127	Carr Rd	61.441	61.438	-3	-3
RM 7441	Carr Rd	58.499	58.496	-3	-2
AP 129A	Carr Rd	58.155	58.154	-1	-2
OAP 130	Dornwell Rd	60.670	60.668	-2	-1
OAP 131	Hayr Rd	63.120	63.119	-1	-1
OCP 41B	Carr/Hayr Rds	58.362	58.357	-5	-3
AP 132	Carr Rd	58.403	58.401	-2	-2
AP 133	Carr Rd	58.156	58.155	-1	-1
AP 134	Carr Rd	58.033	58.032	-1	-1
AP 135	Frost Rd	57.399	57.399	0	-1
AP 136	Frost Rd	59.265	59.263	-2	0



Diagrams removed – see link  
“Survey Monitoring Points – Sheets 1 & 2”  
on previous web page