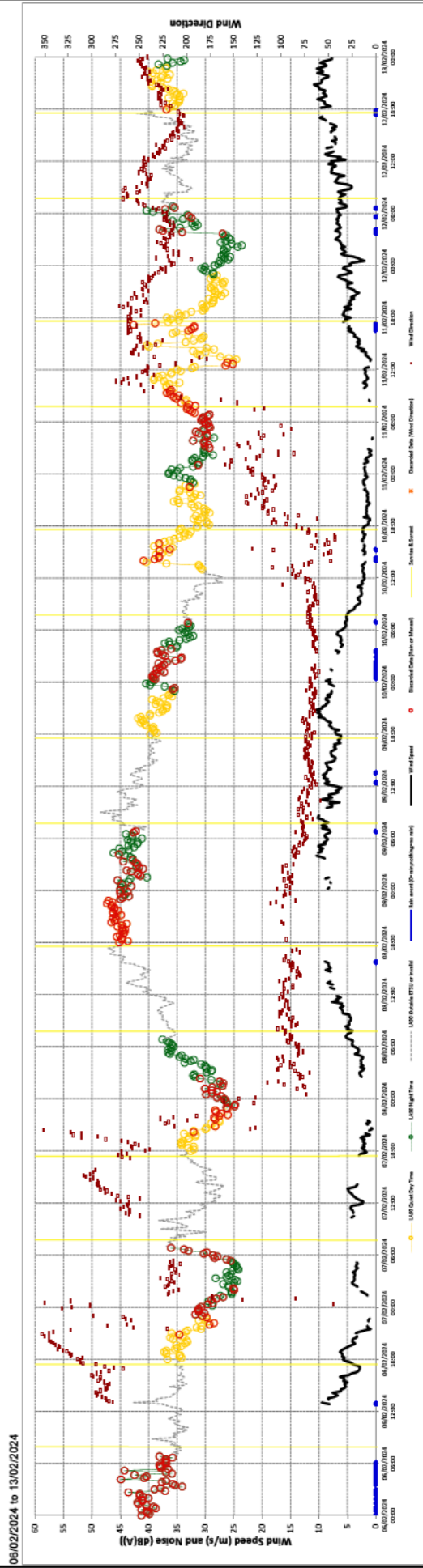
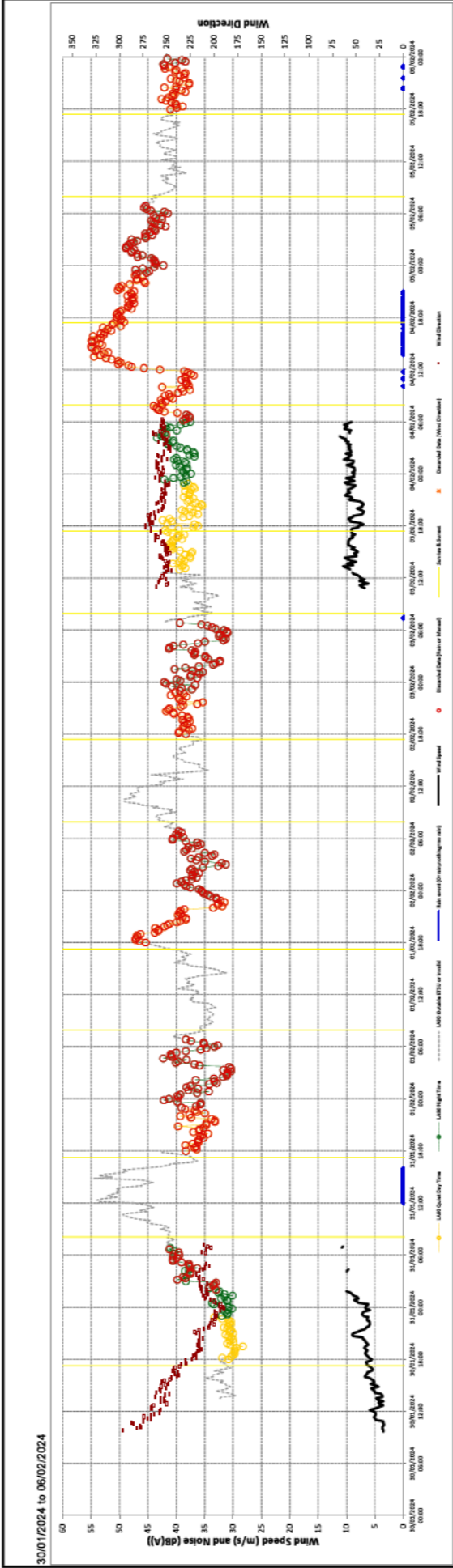


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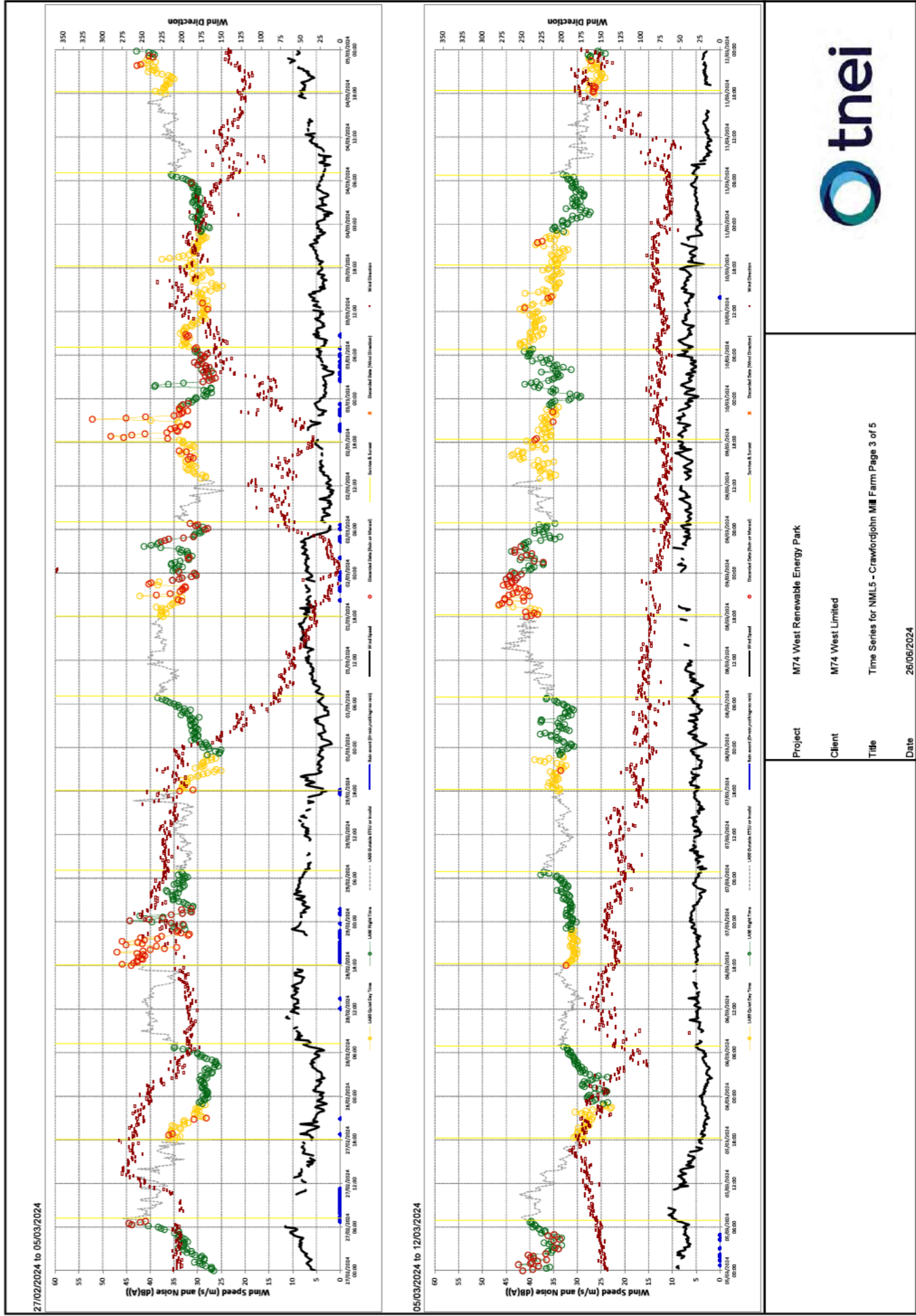
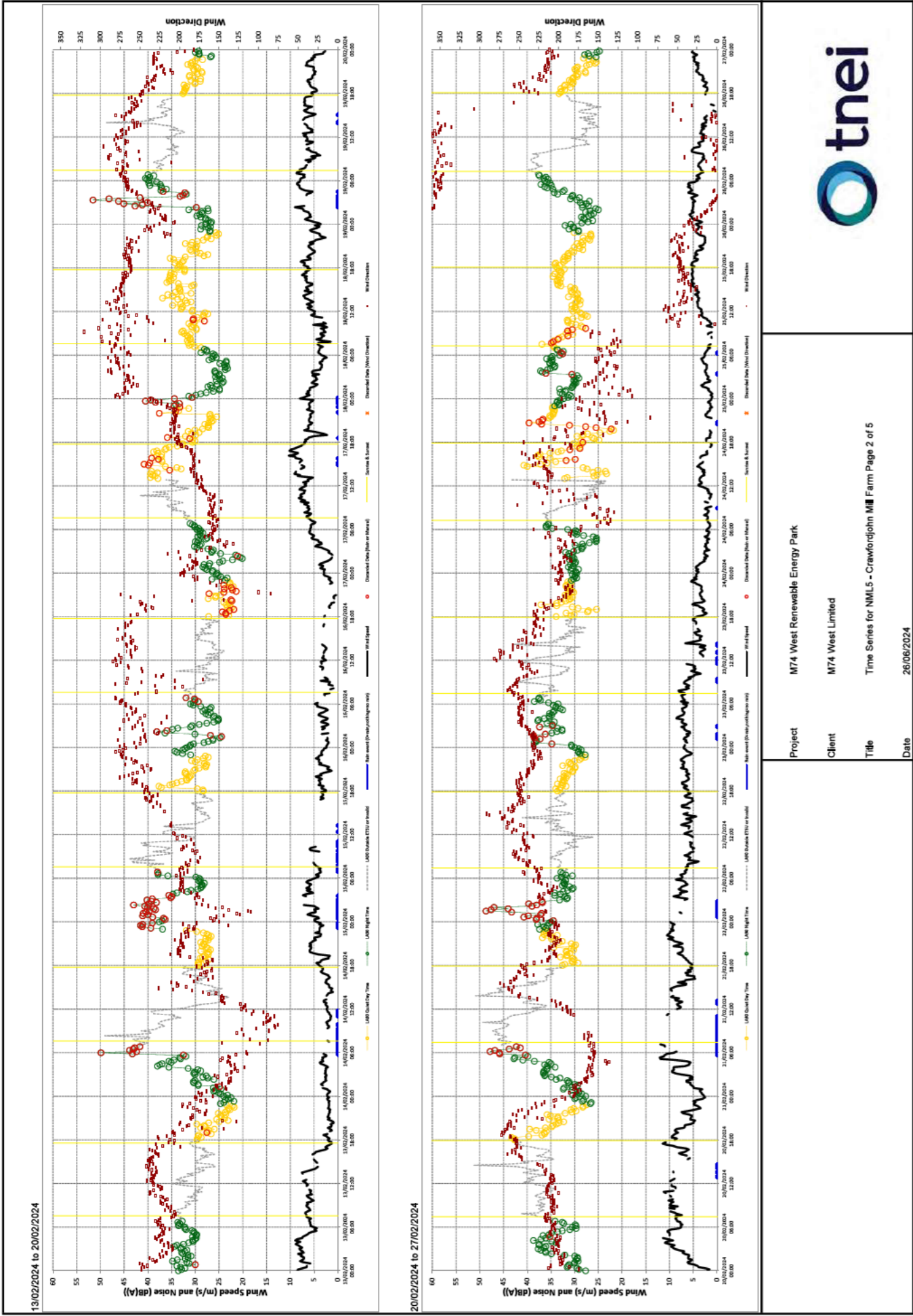


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## Annex 6 – Turbine Coordinates, Topographical Corrections and Cumulative Predictions

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Table A6.1: Topographical (concave ground/ barrier) Noise Prediction Adjustment Table

Notes/comments

Requirement to include a concave ground profile correction of +3dB has been calculated in accordance with section 4.3.9 of the IOA GPG (July 2011)

A barrier correction of -2dB is included where the landform completely obscures a turbine at the noise assessment location

Where analysis indicates that both are required the barrier correction take precedence and a correction of -2dB is applied

Wind Farm	Hub	T ID	Noise Assessment Locations							
			1	2	3	4	5	6	7	8
Clyde	80	1	3	-2	3	3	-2	-2	-2	-2
Clyde	80	2	3	-2	3	3	-2	-2	3	3
Clyde	80	3	3	-2	3	3	-2	-2	3	3
Clyde	80	4	3	-2	3	3	-2	-2	-2	3
Clyde	80	5	3	-2	3	3	-2	-2	3	3
Clyde	80	6	3	-2	3	3	-2	-2	-2	3
Clyde	80	7	3	-2	3	3	-2	-2	3	3
Clyde	80	8	3	-2	3	3	-2	-2	3	3
Clyde	80	9	3	-2	3	3	-2	-2	-2	-2
Clyde	80	10	3	-2	3	3	-2	-2	3	3
Clyde	80	11	3	-2	3	3	-2	-2	-2	3
Clyde	80	12	3	3	3	3	-2	-2	-2	3
Clyde	80	13	3	-2	3	3	-2	-2	-2	3
Clyde	80	14	3	-2	3	3	-2	-2	-2	3
Clyde	80	15	3	-2	3	3	-2	-2	-2	3
Clyde	80	16	3	-2	3	3	-2	-2	-2	3
Clyde	80	17	3	-2	3	3	-2	-2	-2	3
Clyde	80	18	3	-2	3	3	-2	-2	-2	3
Clyde	80	19	3	-2	3	3	-2	-2	-2	3
Clyde	80	20	3	-2	3	3	-2	-2	-2	-2
Clyde	80	21	3	-2	3	0	-2	-2	-2	-2
Clyde	80	22	3	-2	3	0	-2	-2	-2	-2
Clyde	80	23	-2	-2	3	0	-2	-2	-2	-2
Clyde	80	24	3	-2	3	3	-2	-2	-2	-2
Clyde	80	25	3	-2	3	3	-2	-2	-2	-2
Clyde	80	26	3	-2	3	3	-2	-2	-2	3
Clyde	80	27	3	-2	3	3	-2	-2	-2	3
Clyde	80	28	-2	-2	3	-2	-2	-2	-2	-2
Clyde	80	29	-2	-2	-2	-2	-2	-2	-2	-2
Clyde	80	30	-2	-2	-2	-2	-2	-2	-2	-2
Clyde	80	31	-2	-2	-2	-2	-2	-2	-2	-2
Clyde	80	32	-2	-2	-2	-2	-2	-2	-2	3
Clyde	80	33	-2	-2	-2	-2	-2	-2	-2	-2
Clyde	80	34	-2	-2	-2	-2	-2	-2	-2	-2
Clyde	80	35	-2	-2	-2	-2	-2	-2	-2	-2
Clyde	80	36	3	-2	3	-2	-2	-2	-2	3
Clyde	80	37	-2	-2	3	-2	-2	-2	-2	-2
Clyde	80	38	-2	-2	3	-2	-2	-2	-2	-2
Clyde	80	39	-2	-2	3	-2	-2	-2	-2	-2
Clyde	80	40	-2	-2	-2	-2	-2	-2	-2	-2
Clyde	80	41	-2	-2	3	-2	-2	-2	-2	-2
Clyde	80	42	-2	-2	3	-2	-2	-2	-2	-2
Clyde	80	43	-2	-2	3	-2	-2	-2	-2	-2
Clyde	80	44	-2	-2	-2	-2	-2	-2	-2	-2
Clyde	80	45	-2	-2	-2	-2	-2	-2	-2	-2
Clyde	80	46	-2	-2	-2	-2	-2	-2	-2	-2
Clyde	80	47	-2	-2	-2	-2	-2	-2	-2	3
Clyde	80	48	-2	-2	-2	-2	-2	-2	-2	3
Clyde	80	49	-2	-2	-2	-2	-2	-2	-2	3
Clyde	80	50	-2	-2	-2	-2	-2	-2	-2	-2
Clyde	80	51	-2	-2	-2	-2	-2	-2	-2	-2
Clyde	80	52	-2	-2	-2	-2	-2	-2	-2	-2
Clyde	80	53	-2	-2	-2	-2	-2	-2	-2	-2
Clyde	80	54	-2	-2	-2	-2	-2	-2	-2	-2
Clyde	80	55	-2	-2	-2	-2	-2	-2	-2	-2





Galawhistle	65.2	304	-2	3	-2	-2	-2	-2	-2	3
Galawhistle	65.2	305	-2	-2	-2	-2	-2	-2	-2	-2
Galawhistle	65.2	306	-2	-2	-2	-2	-2	-2	-2	-2
Galawhistle	65.2	307	-2	-2	-2	-2	-2	-2	-2	-2
Galawhistle	65.2	308	-2	-2	-2	-2	-2	-2	-2	-2
Galawhistle	76.2	309	-2	-2	-2	-2	-2	-2	-2	-2
Galawhistle	76.2	310	-2	-2	-2	-2	-2	-2	-2	-2
Galawhistle	76.2	311	-2	-2	-2	-2	-2	-2	-2	-2
Galawhistle	65.2	312	-2	-2	-2	-2	-2	-2	-2	-2
Galawhistle	76.2	313	-2	-2	-2	-2	-2	-2	-2	-2
Galawhistle	65.2	314	-2	-2	-2	-2	-2	-2	-2	-2
Little Gala	83.4	315	3	-2	-2	-2	3	-2	3	3
Little Gala	83.4	316	3	-2	-2	-2	0	-2	3	3
Little Gala	83.4	317	3	-2	-2	-2	0	-2	3	3
Little Gala	83.4	318	3	-2	-2	-2	0	-2	3	3
Little Gala	83.4	319	0	-2	-2	-2	-2	-2	0	0
Little Gala	83.4	320	0	-2	-2	-2	-2	-2	0	0
Bodinglee	151	321	-2	0	-2	-2	-2	-2	0	0
Bodinglee	171	322	-2	0	-2	-2	-2	-2	0	0
Bodinglee	151	323	-2	0	-2	-2	0	0	0	0
Bodinglee	151	324	0	0	0	-2	0	0	0	0
Bodinglee	171	325	-2	0	-2	-2	-2	-2	0	0
Bodinglee	171	326	-2	0	-2	-2	-2	0	0	0
Bodinglee	151	327	-2	0	-2	-2	0	0	0	0
Bodinglee	151	328	3	0	0	-2	0	0	0	0
Bodinglee	171	329	-2	0	-2	-2	-2	-2	0	0
Bodinglee	151	330	-2	0	-2	-2	-2	0	0	0
Bodinglee	171	331	-2	0	-2	-2	-2	0	0	0
Bodinglee	151	332	0	0	-2	-2	-2	0	0	0
Bodinglee	151	333	0	0	-2	-2	-2	0	0	0
Bodinglee	151	334	0	0	-2	-2	-2	0	0	0
Bodinglee	151	335	0	0	-2	-2	0	-2	0	0
Bodinglee	151	336	0	0	0	0	-2	-2	0	0
Bodinglee	171	337	0	0	-2	-2	-2	0	0	0
Bodinglee	171	338	0	0	-2	-2	-2	0	0	0
Bodinglee	171	339	0	0	0	-2	-2	0	0	0
Bodinglee	171	340	0	0	-2	-2	-2	0	0	0
Bodinglee	171	341	0	0	-2	-2	0	0	0	0
Bodinglee	171	342	0	0	-2	-2	0	-2	0	0
Bodinglee	151	343	0	0	0	0	-2	-2	0	0
Bodinglee	171	344	0	0	0	-2	-2	0	0	0
Bodinglee	171	345	0	0	0	-2	-2	0	0	0
Bodinglee	171	346	0	0	-2	-2	0	0	0	0
Bodinglee	171	347	0	0	0	-2	0	0	0	0
Bodinglee	171	348	0	0	0	-2	0	0	0	0
Bodinglee	171	349	0	0	0	-2	-2	0	0	0
Bodinglee	171	350	0	0	0	-2	0	0	0	0
Bodinglee	171	351	0	0	0	-2	0	0	0	0
Bodinglee	171	352	0	0	0	-2	-2	0	0	0
Bodinglee	151	353	0	0	0	-2	-2	0	0	0
Bodinglee	151	354	0	0	-2	-2	0	-2	0	0
Bodinglee	171	355	0	0	0	-2	0	0	0	0
Bodinglee	151	356	0	0	0	-2	0	0	0	0
Bodinglee	151	357	0	0	-2	-2	0	-2	0	0
Priestgill	105	363	3	-2	3	3	-2	-2	-2	3
Priestgill	125	364	3	-2	3	3	-2	-2	-2	3
Priestgill	125	365	3	-2	3	3	-2	-2	-2	3
Priestgill	125	366	3	-2	3	3	-2	-2	-2	3
Priestgill	125	367	3	3	3	3	-2	-2	-2	3
Priestgill	125	368	3	3	3	3	-2	-2	-2	3
Priestgill	105	369	3	-2	3	3	-2	-2	-2	3
Dalquhandy	75	370	-2	-2	-2	-2	-2	-2	-2	-2

Dalquhandy	75	371	-2	-2	-2	-2	-2	-2	-2	-2
Dalquhandy	75	372	-2	-2	-2	-2	-2	-2	-2	-2
Dalquhandy	93.9	373	-2	-2	-2	-2	-2	-2	-2	-2
Dalquhandy	93.9	374	-2	-2	-2	-2	-2	-2	-2	-2
Dalquhandy	93.9	375	-2	-2	-2	-2	-2	-2	-2	-2
Dalquhandy	93.9	376	-2	-2	-2	-2	-2	-2	-2	-2
Dalquhandy	75	377	-2	-2	-2	-2	-2	-2	-2	-2
Dalquhandy	93.9	378	-2	-2	-2	-2	-2	-2	-2	-2
Dalquhandy	93.9	379	-2	-2	-2	-2	-2	-2	-2	-2
Dalquhandy	93.9	380	-2	-2	-2	-2	-2	-2	-2	-2
Dalquhandy	93.9	381	-2	-2	-2	-2	-2	-2	-2	-2
Dalquhandy	93.9	382	-2	-2	-2	-2	-2	-2	-2	-2
Dalquhandy	93.9	383	-2	-2	-2	-2	-2	-2	-2	-2
Dalquhandy	93.9	384	-2	-2	-2	-2	-2	-2	-2	-2
Broken Cross	82	385	-2	-2	-2	-2	-2	-2	-2	-2
Broken Cross	82	386	-2	-2	-2	-2	-2	-2	-2	-2
Broken Cross	82	387	-2	-2	-2	-2	-2	-2	-2	-2
Broken Cross	82	388	-2	-2	-2	-2	-2	-2	-2	-2
Broken Cross	82	389	-2	-2	-2	-2	-2	-2	-2	-2
Broken Cross	82	390	-2	-2	-2	-2	-2	-2	-2	-2
Broken Cross	82	391	-2	-2	-2	-2	-2	-2	-2	-2
Broken Cross	82	392	-2	-2	-2	-2	-2	-2	-2	-2
Broken Cross	82	393	-2	-2	-2	-2	-2	-2	-2	-2
Broken Cross	82	394	-2	-2	-2	-2	-2	-2	-2	-2
M74 West	122.5	406	0	0	0	-2	0	0	0	0
M74 West	122.5	407	0	0	0	-2	0	0	0	0
M74 West	122.5	408	0	0	0	-2	0	0	0	0
M74 West	122.5	409	3	0	0	-2	0	0	0	3
M74 West	122.5	410	0	0	0	-2	0	0	0	3
M74 West	122.5	411	0	0	0	-2	0	0	0	0
M74 West	122.5	412	0	0	0	-2	0	0	0	0
M74 West	122.5	413	0	0	0	0	0	0	0	0
M74 West	122.5	414	0	0	0	0	0	-2	-2	0
M74 West	122.5	415	0	0	0	-2	0	0	0	0
M74 West	122.5	416	0	0	0	0	0	0	0	0
M74 West	122.5	417	0	0	0	0	0	0	0	0
M74 West	122.5	418	0	0	0	0	0	0	0	0
M74 West	122.5	419	0	0	0	0	0	0	0	0
M74 West	122.5	420	0	0	0	0	0	0	0	0
M74 West	122.5	421	0	0	0	0	0	-2	-2	0
M74 West	122.5	422	0	0	0	0	0	0	0	0
M74 West	122.5	423	0	0	0	0	0	0	0	0
M74 West	122.5	424	0	0	0	0	0	0	0	0
M74 West	122.5	425	0	0	0	0	0	0	0	0
M74 West	122.5	426	0	0	0	0	0	0	0	0
M74 West	122.5	427	0	0	0	0	0	0	0	0

Table A6.2 Wind Farms/ Turbines Modelled

Wind Farm	Easting	Northing	Height	Hub Height Modelled
Clyde	297691	626377	408.15	80
Clyde	297934	626531	460	80
Clyde	298199	626660	480	80
Clyde	298477	626809	460	80
Clyde	298776	626751	480	80
Clyde	299077	626820	475.07	80
Clyde	299384	626885	518.36	80
Clyde	299416	626531	485.82	80
Clyde	299138	626307	442.54	80
Clyde	299677	626740	549.51	80
Clyde	296570	623951	509.8	80
Clyde	296794	624099	534.6	80
Clyde	297039	624258	527.02	80
Clyde	297294	624294	490.6	80
Clyde	297584	624416	510	80
Clyde	297819	624318	526.08	80
Clyde	298071	624148	555.19	80
Clyde	298366	624242	526.32	80
Clyde	298761	624443	536.19	80
Clyde	299147	624509	496.16	80
Clyde	298492	623957	500	80
Clyde	298906	624085	505.96	80
Clyde	299289	624153	478.23	80
Clyde	299333	624897	461.56	80
Clyde	299591	624618	484.33	80
Clyde	299908	624812	528.43	80
Clyde	299877	625196	550.1	80
Clyde	299083	621196	433.3	80
Clyde	299396	621151	427.23	80
Clyde	299677	621026	431.31	80
Clyde	299966	620945	457.71	80
Clyde	300277	620945	498.03	80
Clyde	300616	620999	500.65	80
Clyde	300815	620682	474.96	80
Clyde	301010	620457	494.58	80
Clyde	301336	620315	542.38	80
Clyde	301261	619932	526.54	80
Clyde	300885	619828	471.61	80
Clyde	300523	619837	453.87	80
Clyde	300140	619904	470	80
Clyde	301646	619801	500	80
Clyde	302626	618823	484.83	80
Clyde	302863	618609	498.95	80
Clyde	302797	618232	506.5	80

Clyde	302685	617848	522.57	80
Clyde	302595	617461	523.64	80
Clyde	297205	618278	480	80
Clyde	297464	618019	489.5	80
Clyde	297766	617893	499.95	80
Clyde	298210	617950	510	80
Clyde	297925	618456	470	80
Clyde	298214	618698	464.09	80
Clyde	298625	618403	506.65	80
Clyde	299031	618737	493.23	80
Clyde	298700	618942	463.29	80
Clyde	298900	618259	506.66	80
Clyde	298606	617966	512.67	80
Clyde	298988	617912	480	80
Clyde	299329	617736	480	80
Clyde	299419	618053	453.01	80
Clyde	299687	617708	484.75	80
Clyde	300019	617766	509.58	80
Clyde	300364	617607	493.62	80
Clyde	300801	617151	472.47	80
Clyde	300393	617252	540	80
Clyde	300032	617387	530	80
Clyde	300501	616854	499.44	80
Clyde	300171	616600	465.53	80
Clyde	299799	616675	425.01	80
Clyde	300136	617000	478.91	80
Clyde	299723	617155	462.26	80
Clyde	299309	617232	453.15	80
Clyde	299012	617440	431.02	80
Clyde	298615	617563	436.07	80
Clyde	298199	617528	446.58	80
Clyde	297782	617650	464.48	80
Clyde	297166	617777	473.97	80
Clyde	301225	617328	437.09	80
Clyde	301605	617403	422.72	80
Clyde	301106	616849	466.51	80
Clyde	301313	616572	438.61	80
Clyde	301638	616382	420.17	80
Clyde	301379	617023	477.14	80
Clyde	301693	616783	510	80
Clyde	301992	616992	486.73	80
Clyde	302321	617055	498.47	80
Clyde	302694	616997	540	80
Clyde	302050	616620	470.44	80
Clyde	302759	616643	497.46	80
Clyde	303101	616507	479.13	80
Clyde	303503	616472	502.25	80
Clyde	303499	616075	452.27	80
Clyde	301850	615905	426.84	80
Clyde	302209	616071	430.37	80

Clyde	302506	616329	450	80
Clyde	302881	616175	420.71	80
Clyde	298490	614567	418.18	80
Clyde	298743	614265	427.78	80
Clyde	298559	613910	452.4	80
Clyde	298180	613839	461.57	80
Clyde	298252	614261	490	80
Clyde	298106	614655	463.47	80
Clyde	298201	615156	408.64	80
Clyde	297738	614903	430	80
Clyde	297727	614561	432.22	80
Clyde	297886	614190	398.55	80
Clyde	297927	613530	379.69	80
Clyde	298395	613499	434.64	80
Clyde	298127	613134	409.59	80
Clyde	297590	613232	380.53	80
Clyde	297264	613543	383.17	80
Clyde	297602	613826	376.59	80
Clyde	297316	614173	367.72	80
Clyde	297002	613892	375.17	80
Clyde	297776	612862	412.8	80
Clyde	297227	613014	364.28	80
Clyde	297437	612613	364.11	80
Clyde	297725	612283	405.42	80
Clyde	297651	611881	410	80
Clyde	297337	612207	361.68	80
Clyde	298062	612028	425.01	80
Clyde	298047	612524	500	80
Clyde	298428	612677	455.78	80
Clyde	298402	612274	450.58	80
Clyde	298815	612584	438.17	80
Clyde	298798	612188	429.65	80
Clyde	299098	612422	425.75	80
Clyde	298478	613156	370	80
Clyde	299317	612124	417.86	80
Clyde	299590	611865	447.9	80
Clyde	299547	612404	430.68	80
Clyde	299944	612370	436.21	80
Clyde	300336	612394	439.18	80
Clyde	300724	612268	428.89	80
Clyde	300942	611933	440	80
Clyde	300340	612006	461.87	80
Clyde	300720	611609	416.04	80
Clyde	301133	612289	405.68	80
Clyde	301123	611603	404.92	80
Clyde	299947	611946	475.53	80
Clyde	300210	611624	450.65	80
Clyde	299805	611584	440	80
Clyde	299781	610907	523.07	80
Clyde	299382	611005	526.9	80

Clyde	299189	611320	486.52	80
Clyde	299015	611686	488.73	80
Clyde	298844	611171	512.31	80
Clyde	298668	611531	488.34	80
Clyde	299032	610800	512.99	80
Clyde	298714	610621	446.83	80
Clyde	298542	610993	423.17	80
Clyde	298344	611332	391.02	80
Clyde Extension	299875	624325	481.85	90
Clyde Extension	300286	624702	542.96	90
Clyde Extension	300837	624848	545.64	90
Clyde Extension	300701	625233	535.8	90
Clyde Extension	300800	625611	557.55	90
Clyde Extension	301544	625492	507.73	90
Clyde Extension	301297	625766	523.86	90
Clyde Extension	301123	626099	569.66	90
Clyde Extension	301661	626366	523.15	90
Clyde Extension	302550	626413	572.16	90
Clyde Extension	302819	626163	552.78	90
Clyde Extension	302542	625735	486.69	90
Clyde Extension	303070	625899	525.21	90
Clyde Extension	303482	625821	523.04	90
Clyde Extension	303067	625443	497.75	90
Clyde Extension	303600	625422	504.8	90
Clyde Extension	304004	625525	537.95	75
Clyde Extension	303778	625057	512.28	90
Clyde Extension	304609	624351	612.86	90
Clyde Extension	302183	624833	436.27	90
Clyde Extension	302426	624487	465.56	90
Clyde Extension	302592	624146	475.9	90
Clyde Extension	302990	624380	489.05	90
Clyde Extension	303280	624162	491.16	90
Clyde Extension	303726	623894	561.73	75
Clyde Extension	304075	623749	591.82	90
Clyde Extension	304456	623835	619.47	90
Clyde Extension	304579	623227	566.47	75
Clyde Extension	302300	622970	522.63	75
Clyde Extension	302734	623188	521.09	75
Clyde Extension	303262	623113	529	90
Clyde Extension	303570	622962	523.82	90
Clyde Extension	303906	622802	540	90
Clyde Extension	303301	622422	520	90
Clyde Extension	302750	621777	495.34	90
Clyde Extension	303163	621969	487.59	90
Clyde Extension	303584	622138	499.99	90
Clyde Extension	304002	622356	506.79	90
Clyde Extension	304094	621971	500	90
Clyde Extension	303779	621538	496.34	90
Clyde Extension	303975	621217	524.6	75
Clyde Extension	303732	620729	524.24	75

Clyde Extension	303604	620323	493.94	75
Clyde Extension	302848	620585	530	90
Clyde Extension	301728	620279	513.61	90
Clyde Extension	302116	619933	448.15	90
Clyde Extension	302794	620141	524.55	90
Clyde Extension	303134	619988	530	90
Clyde Extension	303183	619622	540	75
Clyde Extension	303571	619352	530	75
Clyde Extension	301903	619522	486.67	90
Clyde Extension	302161	619243	503.15	90
Clyde Extension	302599	619252	492.01	90
Clyde Extension	303090	619151	505.39	90
Andershaw	284470	626302	300.82	81.5
Andershaw	284857	626201	296.48	81.5
Andershaw	284223	625865	310	81.5
Andershaw	284235	625443	306.46	81.5
Andershaw	285019	625772	315.01	81.5
Andershaw	285027	625396	335.58	81.5
Andershaw	284672	624987	335.92	81.5
Andershaw	284822	624690	345.67	81.5
Andershaw	283900	625025	310.16	81.5
Andershaw	284311	624515	347.64	81.5
Andershaw	284550	624175	352.05	81.5
Middle Muir	286124	626586	278.7	100
Middle Muir	285336	626157	292.95	100
Middle Muir	285821	626181	290	100
Middle Muir	286212	626024	283.99	100
Middle Muir	285467	625745	298.11	100
Middle Muir	285567	625402	304.21	100
Middle Muir	286069	625454	286.25	100
Middle Muir	286535	625441	277.04	100
Middle Muir	285286	624994	347.02	100
Middle Muir	285789	625001	325.78	100
Middle Muir	286257	625037	286.43	100
Middle Muir	285214	624550	334.96	100
Middle Muir	285505	624323	345.44	100
Middle Muir	285398	623912	330.82	100
Middle Muir	284983	624029	323.95	100
Douglas West	280332	633205	280	81.9
Douglas West	280691	633125	270.15	81.9
Douglas West	281111	633045	263.75	81.9
Douglas West	281579	633144	267.28	81.9
Douglas West	281788	632754	270	81.9
Douglas West	282273	632926	250.54	81.9
Douglas West	282429	632167	260	81.9
Douglas West	282118	631854	269.47	81.9
Douglas West	282570	632685	245.09	81.9
Douglas West	282069	632422	270	81.9
Douglas West	281771	631965	283.04	81.9
Douglas West	281399	631680	318.21	81.9

Douglas West	281579	631486	301.61	81.9
Douglas West Extension	279277	631335	411.47	135
Douglas West Extension	279356	631993	334.28	135
Douglas West Extension	279649	631800	362.72	135
Douglas West Extension	280129	631515	359.98	135
Douglas West Extension	279793	632368	314.5	135
Douglas West Extension	280077	632065	327.16	135
Douglas West Extension	280551	631615	357.77	135
Douglas West Extension	280290	632711	295.1	135
Douglas West Extension	280607	632496	288	135
Douglas West Extension	280920	632244	298.42	135
Douglas West Extension	280975	631781	335.49	135
Douglas West Extension	281354	632708	280.91	135
Douglas West Extension	281508	632328	291.88	135
Hagshaw Repowering	278749	629561	337.65	135
Hagshaw Repowering	279149	629586	316.81	135
Hagshaw Repowering	279760	629664	334.13	135
Hagshaw Repowering	279042	629950	353.03	135
Hagshaw Repowering	279595	630026	348.12	135
Hagshaw Repowering	280015	630194	330	135
Hagshaw Repowering	279831	630506	390	135
Hagshaw Repowering	279327	630246	416.83	135
Hagshaw Repowering	278976	630329	453.46	135
Hagshaw Repowering	279546	630730	459.7	135
Hagshaw Repowering	279242	630900	472.14	135
Hagshaw Repowering	278864	630881	470	135
Hagshaw Repowering	278604	631053	468.35	135
Hagshaw Repowering	279590	631291	440	135
Hagshaw Extension	280632	631205	396.88	49
Hagshaw Extension	280711	631009	390	49
Hagshaw Extension	280347	631109	407.54	49
Hagshaw Extension	280479	630925	406.74	49
Hagshaw Extension	279842	631185	421.11	49
Hagshaw Extension	280004	631084	435.84	49
Hagshaw Extension	280118	630953	437.63	49
Hagshaw Extension	280246	630824	430	49
Hagshaw Extension	280301	630634	413.66	49
Hagshaw Extension	278693	629927	374.71	49
Hagshaw Extension	278313	630790	413.56	49
Hagshaw Extension	278444	630648	423.79	49
Hagshaw Extension	278579	630518	433.98	49
Hagshaw Extension	278683	630364	418.36	49
Hagshaw Extension	278223	630533	392.23	49
Hagshaw Extension	278315	630353	398.74	49
Hagshaw Extension	278453	630250	422.41	49
Hagshaw Extension	278584	630120	423.24	49
Hagshaw Extension	280360	630481	402.31	49
Hagshaw Extension	280522	630732	402.25	49
Galawhistle	278383	629245	347.61	65.2
Galawhistle	278100	629566	396.23	65.2

Galawhistle	277886	629794	417.78	65.2
Galawhistle	277765	630124	397.55	65.2
Galawhistle	277804	630483	400	65.2
Galawhistle	277754	630799	405.26	65.2
Galawhistle	278059	631367	381.39	65.2
Galawhistle	277680	631614	325.3	65.2
Galawhistle	277333	630878	326.15	65.2
Galawhistle	276623	629429	427.45	65.2
Galawhistle	276409	629649	460	65.2
Galawhistle	276502	629991	420	65.2
Galawhistle	276318	630346	373.64	65.2
Galawhistle	276762	630497	356.19	65.2
Galawhistle	276374	630713	334.92	65.2
Galawhistle	276468	631448	383.82	65.2
Galawhistle	277176	631515	334.76	76.2
Galawhistle	277453	631816	332.14	76.2
Galawhistle	276763	631233	333.98	76.2
Galawhistle	277606	631208	342.96	65.2
Galawhistle	276878	630867	311.34	76.2
Galawhistle	278173	631037	430	65.2
Little Gala	289709	632171	387.46	83.4
Little Gala	290039	632002	371.04	83.4
Little Gala	290393	631807	370	83.4
Little Gala	290825	631591	363.4	83.4
Little Gala	289750	632605	361.44	83.4
Little Gala	290115	632533	349.88	83.4
Bodinglee	282905	628032	293.25	151
Bodinglee	283617	628345	276.79	171
Bodinglee	284441	628782	359.63	151
Bodinglee	285076	629297	347.81	151
Bodinglee	283107	627541	301.45	171
Bodinglee	283809	627837	300.31	171
Bodinglee	284505	628136	341.98	151
Bodinglee	285005	628711	366.77	151
Bodinglee	283435	627149	300	171
Bodinglee	284137	627441	321.14	151
Bodinglee	284161	626841	314.09	171
Bodinglee	287328	631909	343.96	151
Bodinglee	288016	632326	386.66	151
Bodinglee	288601	632300	400	151
Bodinglee	289274	632526	390	151
Bodinglee	287450	631369	359.46	151
Bodinglee	288123	631620	354.02	171
Bodinglee	288921	631876	367.72	171
Bodinglee	287758	630945	346.65	171
Bodinglee	288459	631253	342.56	171
Bodinglee	289281	631562	323.25	171
Bodinglee	289961	631723	356.06	171
Bodinglee	287386	630308	320.12	151
Bodinglee	288061	630399	344.52	171

Bodinglee	288754	630822	335.62	171
Bodinglee	289334	630821	306.55	171
Bodinglee	287431	629697	320	171
Bodinglee	288093	629807	325.89	171
Bodinglee	288765	630198	339.4	171
Bodinglee	289377	630211	306.36	171
Bodinglee	287861	629119	327.45	171
Bodinglee	288634	629541	316.92	171
Bodinglee	289239	629524	301.25	151
Bodinglee	290201	630121	272.99	151
Bodinglee	287984	628572	342.28	171
Bodinglee	288640	628938	323.62	151
Bodinglee	290061	629476	308.89	151
Priestgill	295854	625399	408.47	105
Priestgill	295757	625932	359.76	125
Priestgill	296038	625692	389.97	125
Priestgill	296220	625302	408.8	125
Priestgill	295861	625187	407.64	125
Priestgill	295587	625462	388.23	125
Priestgill	295534	624974	379.55	105
Dalquhandy	278674	634793	274.25	75
Dalquhandy	279808	634499	287.01	75
Dalquhandy	280025	634175	280	75
Dalquhandy	279988	633262	290	93.9
Dalquhandy	279635	633381	290	93.9
Dalquhandy	279513	633732	283.78	93.9
Dalquhandy	279308	634083	304.79	93.9
Dalquhandy	279255	634454	295.68	75
Dalquhandy	279037	633681	280	93.9
Dalquhandy	278802	633276	300	93.9
Dalquhandy	278448	633295	320	93.9
Dalquhandy	278908	632553	300	93.9
Dalquhandy	279320	632770	297.94	93.9
Dalquhandy	279794	632839	293.94	93.9
Dalquhandy	279162	632358	316.28	93.9
Broken Cross	284911	636403	280	82
Broken Cross	284316	637132	260	82
Broken Cross	283831	637462	236.71	82
Broken Cross	284114	638188	244.03	82
Broken Cross	284767	637520	290	82
Broken Cross	285162	637191	290	82
Broken Cross	285144	636784	290	82
Broken Cross	285094	637877	280	82
Broken Cross	285430	638231	240	82
Broken Cross	284250	637784	246.11	82
M74 West	289226	628279	326.52	122.5
M74 West	289653	628010	310.19	122.5
M74 West	289983	627700	298.38	122.5
M74 West	288602	627840	349.22	122.5
M74 West	289004	627578	330	122.5

M74 West	289398	627296	316.95	122.5
M74 West	289907	627124	280	122.5
M74 West	290496.1	626904.5	280	122.5
M74 West	291023.8	626883	261.55	122.5
M74 West	287981	627375	297.34	122.5
M74 West	288776	626791	295.49	122.5
M74 West	289303.3	626583	287.69	122.5
M74 West	289747	626380	291.87	122.5
M74 West	290183	626235	300	122.5
M74 West	290787	626292	308.3	122.5
M74 West	291256	626117	284.41	122.5
M74 West	287557	626728	268.07	122.5
M74 West	287965	626424	264.75	122.5
M74 West	288535	626071	263.22	122.5
M74 West	289421	625632	283.72	122.5
M74 West	290002.3	625678.2	291.38	122.5
M74 West	290089.2	625121.5	301.67	122.5

Table A6.3 - Likely Effects Calculations

Location		Wind Speed (ms <sup>-1</sup> ) as standardised to 10m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL1 - Greenfield	Predicted Wind Turbine Noise L <sub>A90</sub>	-	-	24.8	30.0	34.7	36.6	36.6	36.6	36.6	36.6	36.6	36.6
	Proposed Development	-	-	-	-	32.0	34.8	35.2	35.2	35.2	35.2	35.2	35.2
	Predicted Wind Turbine Noise L <sub>A90</sub>	-	-	-	-	32.0	34.8	35.2	35.2	35.2	35.2	35.2	35.2
	Other Schemes	-	-	-	-	-	1.8	1.4	1.4	1.4	1.4	1.4	1.4
NAL2 - Blackburn	Predicted Wind Turbine Noise L <sub>A90</sub>	-	-	30.7	35.9	40.7	42.5	42.5	42.5	42.5	42.5	42.5	42.5
	Proposed Development	-	-	-	-	29.9	32.7	33.1	33.2	33.2	33.2	33.2	33.2
	Predicted Wind Turbine Noise L <sub>A90</sub>	-	-	-	-	29.9	32.7	33.1	33.2	33.2	33.2	33.2	33.2
	Other Schemes	-	-	-	-	-	9.8	9.4	9.3	9.3	9.3	9.3	9.3
NAL3 - Netherton Farm	Predicted Wind Turbine Noise L <sub>A90</sub>	-	-	30.3	35.5	40.3	42.1	42.1	42.1	42.1	42.1	42.1	42.1
	Proposed Development	-	-	-	-	26.4	30.0	30.9	31.0	31.0	31.0	31.0	31.0
	Predicted Wind Turbine Noise L <sub>A90</sub>	-	-	-	-	26.4	30.0	30.9	31.0	31.0	31.0	31.0	31.0
	Other Schemes	-	-	-	-	-	12.1	11.2	11.1	11.1	11.1	11.1	11.1
NAL4 – Maledencots Cottage	Predicted Wind Turbine Noise L <sub>A90</sub>	-	-	21.8	27.0	31.8	33.6	33.6	33.6	33.6	33.6	33.6	33.6
	Proposed Development	-	-	-	-	27.2	31.1	32.4	32.5	32.5	32.5	32.5	32.5
	Predicted Wind Turbine Noise L <sub>A90</sub>	-	-	-	-	27.2	31.1	32.4	32.5	32.5	32.5	32.5	32.5
	Other Schemes	-	-	-	-	-	2.5	1.2	1.1	1.1	1.1	1.1	1.1
NAL5 - Duneaton Bridge House	Predicted Wind Turbine Noise L <sub>A90</sub>	-	-	22.2	27.4	32.2	34.0	34.0	34.0	34.0	34.0	34.0	34.0
	Proposed Development	-	-	-	-	24.5	28.0	28.9	28.9	28.9	29.0	29.0	29.0
	Predicted Wind Turbine Noise L <sub>A90</sub>	-	-	-	-	24.5	28.0	28.9	28.9	28.9	29.0	29.0	29.0
	Other Schemes	-	-	-	-	-	6.0	5.1	5.1	5.1	5.0	5.0	5.0
NAL6 - Crawfordjohn Mill Farm	Predicted Wind Turbine Noise L <sub>A90</sub>	-	-	24.1	29.3	34.0	35.9	35.9	35.9	35.9	35.9	35.9	35.9
	Proposed Development	-	-	-	-	26.5	29.5	30.0	30.0	30.0	30.1	30.1	30.1
	Predicted Wind Turbine Noise L <sub>A90</sub>	-	-	-	-	26.5	29.5	30.0	30.0	30.0	30.1	30.1	30.1
	Other Schemes	-	-	-	-	-	6.4	5.9	5.9	5.9	5.8	5.8	5.8
NAL7 - Redshaw	Predicted Wind Turbine Noise L <sub>A90</sub>	-	-	18.0	23.2	27.9	29.8	29.8	29.8	29.8	29.8	29.8	29.8
	Proposed Development	-	-	-	-	35.4	38.5	38.7	38.7	38.7	38.8	38.8	38.8
	Predicted Wind Turbine Noise L <sub>A90</sub>	-	-	-	-	35.4	38.5	38.7	38.7	38.7	38.8	38.8	38.8
	Other Schemes	-	-	-	-	-	-8.7	-8.9	-8.9	-8.9	-9.0	-9.0	-9.0
NAL8 - Over Balgray	Predicted Wind Turbine Noise L <sub>A90</sub>	-	-	22.9	28.1	32.9	34.7	34.7	34.7	34.7	34.7	34.7	34.7
	Proposed Development	-	-	-	-	32.4	35.2	35.6	35.6	35.6	35.7	35.7	35.7
	Predicted Wind Turbine Noise L <sub>A90</sub>	-	-	-	-	32.4	35.2	35.6	35.6	35.6	35.7	35.7	35.7
	Other Schemes	-	-	-	-	-	-0.5	-0.9	-0.9	-0.9	-1.0	-1.0	-1.0

## Annex 7 – Turbine Data

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Wind Turbine Noise Data assumptions

Table A7.1: Sound Power Level Data

Wind Farm	Turbine	Hub height	Added Uncertainty	Reference Wind Speed (ms <sup>-1</sup> ) Standardised to 10m Height									
				3	4	5	6	7	8	9	10	11	12
M74	Siemens Gamesa SG 6.6-155 6.6 NA Blades 122.5 m hub AM0	122.5	2	Restricted / NDA - data available on request									
Andershaw	Vestas V112 3.3 MW Standard Blades 84 m hub Mode 0	81.5	2	Restricted / NDA - data available on request									
Dalquhundy	Vestas V112 3.3 MW Standard Blades 84 m hub Mode 0	93.9/82	2	Restricted / NDA - data available on request									
Broken cross	Vestas V136 4.0/4.2 MW Normal Blades 77 m hub Mode 0-0S	77	2	Restricted / NDA - data available on request									
Douglas West extension	Siemens Gamesa SG 6.0-155 6.6MW Standard Blades 142.5 m hub AM 0	135	2	Restricted / NDA - data available on request									
Clyde Extension	Siemens SWT-3.2-101 3.2 MW Standard Blades 74.5 m hub Standard Mode	90/75	2	92.9	97.1	101.6	106.3	108.5	109.0	109.0	109.0	109.0	109.0
Clyde	Siemens SWT-2.3-93 2.3 MW Non-serrated Blades 80 m hub Standard Setting	80	2	107.4	94.5	101.5	105.8	107.4	107.4	107.4	107.4	107.4	107.4
Prestigill	Vestas V150 6.0 MW Serrated Blades 155 m hub PO6000	125	2	Restricted / NDA - data available on request									
Hagshaw Extension	Siemens 1.3-62 1.3MW Standard Blades 60 m hub Full	49	2	Restricted / NDA - data available on request									
Middle Muir	Senivon 3.4M-114 3.4MW Generic Blades 91 m hub Full	100	2	97.4	99.8	103.5	106.1	106.2	106.2	106.2	106.2	106.2	106.2
Little Gala	Nordex N133 4.8MW Standard Blades 83 m hub Mode 0	83.4	2	96.5	97.7	103.2	107.4	108.0	108.0	108.0	108.0	108.0	108.0
Douglas West	Vestas V136 4.2 MW Standard Blades 81.5 m hub Mode P-01-0S	81.9	2	96.1	100.5	105.1	108.3	108.9	108.9	108.9	108.9	108.9	108.9
Hagshaw Repowering	Siemens Gamesa SG-3.4MW-132 3.4MW Standard Blades 94 m hub Basic Mode	135	2	106.0	97.7	102.3	105.6	106.0	106.0	106.0	106.0	106.0	106.0
Gala whistie	Vestas V90 3MW Standard Blades 80 m hub Mode 0	65.2/76.2	2	109.0	99.9	102.9	106.2	108.1	109.0	109.0	109.0	109.0	109.0
Bodinglee	GE 5.3-158 5.3MW - 5.5MW Generic Blades 156 m hub Normal Mode	151/171	2	96.2	99.9	104.7	108.0	108.0	108.0	108.0	108.0	108.0	108.0

Table A7.2: Octave Band Data

Wind Farm	Turbine	Reference Wind Speed	Octave Band (Hz)										Overall
			63	125	250	500	1000	2000	4000	8000			
M74	Siemens Gamesa SG 6.6-155 6.6 NA Blades 122.5 m hub AM0		Restricted / NDA - data available on request										
	Vestas V112 3.3 MW Standard Blades 84 m hub Mode 0		Restricted / NDA - data available on request										
	Vestas V112 3.3 MW Standard Blades 84 m hub Mode 0		Restricted / NDA - data available on request										
	Vestas V136 4.0/4.2 MW Normal Blades 77 m hub Mode 0-0S		Restricted / NDA - data available on request										
Douglas West extension	Siemens Gamesa SG 6.0-155 6.6MW Standard Blades 142.5 m hub AM 0		Restricted / NDA - data available on request										
	Siemens SWT-3.2-101 3.2 MW Standard Blades 74.5 m hub Standard Mode	8	89.4	95.8	99.7	101.5	104.5	102.6	96.5	82.9	109.0		
	Siemens SWT-2.3-93 2.3 MW Non-serrated Blades 80 m hub Standard Setting	8	87.4	95.8	102.3	102.7	99.8	96.3	91	87.3	107.4		
	Clyde Extension		Restricted / NDA - data available on request										
Prestigill	Vestas V150 6.0 MW Serrated Blades 155 m hub PO6000		Restricted / NDA - data available on request										
	Siemens 1.3-62 1.3MW Standard Blades 60 m hub Full		Restricted / NDA - data available on request										
	Hagshaw Extension		Restricted / NDA - data available on request										
	Middle Muir	Senivon 3.4M-114 3.4MW Generic Blades 91 m hub Full	7	87.2	94.8	98.7	100.6	101.5	96.3	87.6	76.7	106.2	
Douglas West	Nordex N133 4.8MW Standard Blades 83 m hub Mode 0	8	88	95.1	99.9	102.3	102.9	100.4	92.9	80.6	108.0		
	Vestas V136 4.2 MW Standard Blades 81.5 m hub Mode P-01-0S	7	87.3	94.6	99.8	102.7	103.4	101.9	98.1	92.1	108.9		
	Siemens Gamesa SG-3.4MW-132 3.4MW Standard Blades 94 m hub Basic Mode	8	87.8	94.2	98.9	99.4	100.2	98.7	93	82.3	106.0		
	Hagshaw Repowering	Vestas V90 3MW Standard Blades 80 m hub Mode 0	8	93.9	96	99.3	101.6	103.8	102.5	98.7	88.7	109.0	
Gala whistie			Restricted / NDA - data available on request										
Bodinglee	GE 5.3-158 5.3MW - 5.5MW Generic Blades 156 m hub Normal Mode	7	89.2	94.6	99.2	101.7	103.3	101.1	93.7	78	108.0		

## Annex 8 – Suggested Planning Condition

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## Noise

- 1) The rating level of noise immission from the combined effects of the wind turbines hereby permitted (including the application of any tonal penalty), when determined in accordance with the attached Guidance Notes, shall not exceed the values for the relevant integer wind speeds set out in or derived from Tables 1 and 2 attached to these conditions and:
  - A) Prior to the First Export Date, the wind farm operator shall submit to the Local Authority for written approval a list of proposed independent consultants who may undertake compliance measurements in accordance with this condition. Amendments to the list of approved consultants shall be made only with the prior written approval of the Local Authority.
  - B) Within 21 days from receipt of a written request of the Local Authority, following a complaint to it alleging noise disturbance at a dwelling, the wind farm operator shall, at its expense, employ an independent consultant approved by the Local Authority to assess the level of noise immission from the wind farm at the complainant's property (or a suitable alternative location agreed in writing with the Local Authority) in accordance with the procedures described in the attached Guidance Notes. The written request from the Local Authority shall set out at least the date, time and location that the complaint relates to. Within 14 days of receipt of the written request of the Local Authority made under this paragraph (B), the wind farm operator shall provide the information relevant to the complaint logged in accordance with paragraph (H) to the Local Authority in the format set out in Guidance Note 1(e).
  - C) Where there is more than one property at a location specified in Tables 1 and 2 attached to this condition, the noise limits set for that location shall apply to all dwellings at that location. Where a dwelling to which a complaint is related is not identified by name or location in the Tables attached to these conditions, the wind farm operator shall submit to the Local Authority for written approval proposed noise limits selected from those listed in the Tables to be adopted at the complainant's dwelling for compliance checking purposes. The proposed noise limits are to be those limits selected from the Tables specified for a listed location which the independent consultant considers as being likely to experience the most similar background noise environment to that experienced at the complainant's dwelling. The submission of the proposed noise limits to the Local Authority shall include a written justification of the choice of the representative background noise environment provided by the independent consultant. The rating level of noise immission resulting from the combined effects of the wind turbines when determined in accordance with the attached Guidance Notes shall not exceed the noise limits approved in writing by the Local Authority for the complainant's dwelling.
  - D) Prior to the commencement of any measurements by the independent consultant to be undertaken in accordance with these conditions, the wind farm operator shall submit to the Local Authority for written approval the proposed measurement location identified in accordance with the Guidance Notes where measurements for compliance checking purposes shall be undertaken. Where the proposed measurement location is close to the wind turbines, rather than at the complainants property (to improve the signal to noise ratio), then the operators submission shall include a method to calculate the noise level from the wind turbines at the complainants property based on the noise levels measured at the agreed location (the alternative method). Details of the alternative method together with any associated guidance notes deemed necessary, shall be submitted to and agreed in writing by the Local Authority prior to the commencement of any measurements. Measurements to assess compliance with the noise limits set out in the Tables attached to these conditions or approved by the Local

Authority pursuant to paragraph (C) of this condition shall be undertaken at the measurement location approved in writing by the Local Authority.

- E) Prior to the submission of the independent consultant's assessment of the rating level of noise immission pursuant to paragraph (F) of this condition, the wind farm operator shall submit to the Local Authority for written approval a proposed assessment protocol setting out the following:
  - i) the range of meteorological and operational conditions (the range of wind speeds, wind directions, power generation and times of day) to determine the assessment of rating level of noise immission.
  - ii) a reasoned assessment as to whether the noise giving rise to the complaint contains or is likely to contain a tonal component.

The proposed range of conditions shall be those which prevailed during times when the complainant alleges there was disturbance due to noise, having regard to the information provided in the written request of the Local Authority under paragraph (B), and such others as the independent consultant considers necessary to fully assess the noise at the complainant's property. The assessment of the rating level of noise immission shall be undertaken in accordance with the assessment protocol approved in writing by the Local Authority and the attached Guidance Notes.

- F) The wind farm operator shall provide to the Local Authority the independent consultant's assessment of the rating level of noise immission undertaken in accordance with the Guidance Notes within 2 months of the date of the written request of the Local Authority made under paragraph (B) of this condition unless the time limit is extended in writing by the Local Authority. The assessment shall include all data collected for the purposes of undertaking the compliance measurements, such data to be provided in the format set out in Guidance Note 1(e) of the Guidance Notes. The instrumentation used to undertake the measurements shall be calibrated in accordance with Guidance Note 1(a) and certificates of calibration shall be submitted to the Local Authority with the independent consultant's assessment of the rating level of noise immission.
- G) Where a further assessment of the rating level of noise immission from the wind farm is required pursuant to Guidance Note 4(c) of the attached Guidance Notes, the wind farm operator shall submit a copy of the further assessment within 21 days of submission of the independent consultant's assessment pursuant to paragraph (F) above unless the time limit for the submission of the further assessment has been extended in writing by the Local Authority.
- H) The wind farm operator shall continuously log power production, wind speed and wind direction, all in accordance with Guidance Note 1(d) of the attached Guidance Notes. The data shall be retained for a period of not less than 24 months. The wind farm operator shall provide this information in the format set out in Guidance Note 1(e) of the attached Guidance Notes to the Local Authority on its request within 14 days of receipt in writing of such a request.

**Note:** For the purposes of this condition, a "dwelling" is a building within Use Classes 7, 8 and 9 of the Town and Country Planning (Use Classes) (Scotland) Order 1997 which lawfully exists or had planning permission at the date of this permission.

**Table 1 - Between 07:00 and 23:00 - Noise level dB LA90, 10-minute**

Location (easting, northing grid coordinates)	Standardised wind speed at 10 metres height (m/s) within the site averaged over 10-minute periods											
	1	2	3	4	5	6	7	8	9	10	11	12
LA90 Decibel Levels												
Greenfield (288097, 624999)	35	35	35	35	36	37	40	44	49	54	59	65
Blackburn (289013, 625359)	45	45	45	45	45	45	45	45	49	54	59	65
Netherton Farm (290783, 625537)	45	45	45	46	46	47	49	51	54	57	60	64
Maidencots Cottage (292636, 626346)	52	52	52	52	53	53	53	54	54	55	56	57
Duneaton Bridge House (291590, 624581)	38	38	39	40	41	43	44	46	48	50	53	55
Crawfordjohn Mill Farm (289660, 624172)	35	35	35	36	37	38	40	41	43	45	46	47
Redshaw (286042, 628519)	43	43	43	43	42	33	34	41	43	44	46	48
Over Balgray (288054, 624662)	35	35	35	35	36	37	39	44	49	54	59	65
Red Moss Hotel (287458, 627018)	43	43	43	43	42	41	41	42	43	45	46	49

**Table 2 - Between 23:00 and 07:00 - Noise level dB LA90, 10-minute**

Location (easting, northing grid coordinates)	Standardised wind speed at 10 metres height (m/s) within the site averaged over 10-minute periods											
	1	2	3	4	5	6	7	8	9	10	11	12
LA90 Decibel Levels												
Greenfield (288097, 624999)	43	43	43	43	42	42	42	42	47	51	56	62
Blackburn (289013, 625359)	45	45	45	45	45	45	45	45	47	51	56	62
Netherton Farm (290783, 625537)	45	45	45	45	45	45	47	50	52	55	59	63
Maidencots Cottage (292684, 626359)	48	48	48	48	48	49	50	51	52	54	57	59
Duneaton Bridge House (291590, 624581)	43	43	43	43	43	43	43	45	47	50	52	55
Crawfordjohn Mill Farm (289660, 624172)	43	43	43	43	43	43	43	43	43	43	45	46
Redshaw (286042, 628519)	43	43	43	43	42	33	33	33	33	33	33	33
Over Balgray (288054, 624662)	43	43	43	43	43	42	42	42	47	51	56	62
Red Moss Hotel (287458, 627018)	43	43	43	43	42	40	40	40	40	40	40	40

Note to Tables 1 and 2: The geographical coordinates references set out in these tables are provided for the purpose of identifying the general location of dwellings to which a given set of noise limits applies. The standardised wind speed at 10 metres height within the site refers to wind speed at 10 metres height derived from those measured at hub height, calculated in accordance with the method given in the Guidance Notes.

Note 2 to Tables 1 and 2: Any update to the noise limits shall be submitted to and approved in writing by, the Planning Authority. The development shall operate in accordance with the limits contained in this Condition unless the Planning Authority gives it written consent to an updated set of noise limits.

Note 3 to Tables 1 and 2: The limits detailed in Tables 1 and 2 for the property known as Red Moss Hotel shall only apply for the purposes of this condition in the event that the property is lawfully occupied as a dwelling and at all other times there shall be no noise limits applying to this property, which shall not be regarded as a noise sensitive property.

#### Guidance Notes for Noise Condition

These notes are to be read with and form part of the noise condition. They further explain the condition and specify the methods to be employed in the assessment of complaints about noise immission from the wind farm. The rating level at each integer wind speed is the arithmetic sum of the wind farm noise level as determined from the best-fit curve described in Note 2 of these Guidance Notes and any tonal penalty applied in accordance with Note 3 with any necessary correction for residual background noise levels in accordance with Note 4. Reference to ETSU-R-97 refers to the publication entitled “The Assessment and Rating of Noise from Wind Farms” (1997) published by the Energy Technology Support unit (ETSU) for the Department of Trade and Industry (DTI).

#### Note 1

- Values of the LA90,10-minute noise statistic should be measured at the complainant’s property (or an approved alternative representative location as detailed in Note 1(b)), using a sound level meter of EN 60651/BS EN 60804 Type 1, or BS EN 61672 Class 1 quality (or the equivalent UK adopted standard in force at the time of the measurements) set to measure using the fast time weighted response as specified in BS EN 60651/BS EN 60804 or BS EN 61672-1 (or the equivalent UK adopted standard in force at the time of the measurements). This should be calibrated before and after each set of measurements, using a calibrator meeting BS EN 60945:2003 “Electroacoustics – sound calibrators” Class 1 with PTB Type Approval (or the equivalent UK adopted standard in force at the time of the measurements) and the results shall be recorded. Measurements shall be undertaken in such a manner to enable a tonal penalty to be calculated and applied in accordance with Guidance Note 3.
- The microphone shall be mounted at 1.2 - 1.5 metres above ground level, fitted with a two-layer windshield or suitable equivalent approved in writing by the Local Authority, and placed outside the complainant’s dwelling. Measurements should be made in “free field” conditions. To achieve this, the microphone shall be placed at least 3.5 metres away from the building facade or any reflecting surface except the ground at the approved measurement location. In the event that the consent of the complainant for access to his or her property to undertake compliance measurements is withheld, the wind farm operator shall submit for the written approval of the Local Authority details of the proposed alternative representative measurement location prior to the commencement of measurements and the measurements shall be undertaken at the approved alternative representative measurement location.
- The LA90,10-minute measurements should be synchronised with measurements of the 10-minute arithmetic mean wind speed and wind direction data and with operational data logged in accordance with Guidance Note 1(d) and rain data logged in accordance with Note 1(f).
- To enable compliance with the conditions to be evaluated, the wind farm operator shall continuously log arithmetic mean wind speed in metres per second (m/s) and arithmetic mean wind direction in degrees from north in each successive 10-minutes period in a manner to be agreed in writing with the planning authority. Each 10 minute arithmetic average mean wind speed data as measured or calculated at turbine hub height shall be ‘standardised’ to a reference height of 10 metres as described

in ETSU-R-97 at page 120 using a reference roughness length of 0.05 metres. It is this standardised 10 metre height wind speed data which is correlated with the noise measurements determined as valid in accordance with Note 2(b), such correlation to be undertaken in the manner described in Note 2(c). All 10-minute periods shall commence on the hour and in 10-minute increments thereafter synchronised with Greenwich Mean Time and adjusted to British Summer Time where necessary.

- (e) Data provided to the Local Authority in accordance with paragraphs (E) (F) (G) and (H) of the noise condition shall be provided in comma separated values in electronic format with the exception of data collected to assess tonal noise (if required) which shall be provided in a format to be agreed in writing with the Local Authority.
- (f) A data logging rain gauge shall be installed in the course of the independent consultant undertaking an assessment of the level of noise immission. The gauge shall record over successive 10-minute periods synchronised with the periods of data recorded in accordance with Note 1(d).

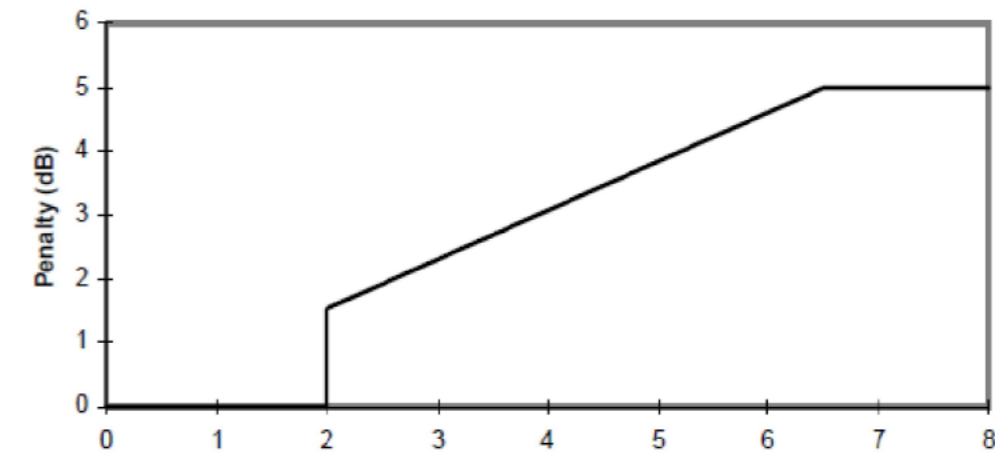
#### Note 2

- (a) The noise measurements should be made so as to provide not less than 20 valid data points as defined in Note 2 paragraph (b).
- (b) Valid data points are those measured during the conditions set out in the assessment protocol approved by the Local Authority under paragraph (E) of the noise condition but excluding any periods of rainfall measured in accordance with Note 1(f).
- (c) Values of the  $L_{A90,10\text{-minute}}$  noise measurements and corresponding values of the 10-minute standardised ten metre height wind speed for those data points considered valid in accordance with Note 2(b) shall be plotted on an XY chart with noise level on the Y-axis and wind speed on the X-axis. A least squares, "best fit" curve of an order deemed appropriate by the independent consultant (but which may not be higher than a fourth order) shall be fitted to the data points to define the wind farm noise level at each integer speed.

#### Note 3

- (a) Where, in accordance with the approved assessment protocol under paragraph (E) of the noise condition, noise immission at the location or locations where compliance measurements are being undertaken contain or are likely to contain a tonal component, a tonal penalty shall be calculated and applied using the following rating procedure.
- (b) For each 10-minute interval for which  $L_{A90,10\text{-minute}}$  data have been determined as valid in accordance with Note 2, a tonal assessment shall be performed on noise immission during 2-minutes of each 10-minute period. The 2-minute periods should be spaced at 10-minute intervals provided that uninterrupted uncorrupted data are available ("the standard procedure"). Where uncorrupted data are not available, the first available uninterrupted clean 2-minute period out of the affected overall 10-minute period shall be selected. Any such deviations from the standard procedure shall be reported.
- (c) For each of the 2-minute samples the tone level above audibility shall be calculated by comparison with the audibility criterion given in Section 2.1 on pages 104 -109 of ETSU-R-97.
- (d) The tone level above audibility shall be plotted against wind speed for each of the 2-minute samples. Samples for which the tones were below the audibility criterion or no tone was identified, a value of zero audibility shall be substituted.
- (e) A least squares "best fit" linear regression shall then be performed to establish the average tone level above audibility for each integer wind speed derived from the value of the "best fit" line fitted to values within  $\pm 0.5\text{m/s}$  of each integer wind speed. If there is no apparent trend with wind speed then a simple arithmetic mean shall be used. This process shall be repeated for each integer wind speed for which there is an assessment of overall levels in Note 2.

- (f) The tonal penalty is derived from the margin above audibility of the tone according to the figure below derived from the average tone level above audibility for each integer wind speed.



#### Note 4

- (a) If a tonal penalty is to be applied in accordance with Note 3 the rating level of the turbine noise at each wind speed is the arithmetic sum of the measured noise level as determined from the best fit curve described in Note 2 and the penalty for tonal noise as derived in accordance with Note 3 at each integer wind speed within the range set out in the approved assessment protocol under paragraph (E) of the noise condition.
- (b) If no tonal penalty is to be applied then the rating level of the turbine noise at each wind speed is equal to the measured noise level as determined from the best fit curve described in Note 2.
- (c) If the rating level at any integer wind speed lies at or below the values set out in the Tables attached to the conditions or at or below the noise limits approved by the Local Authority for a complainant's dwelling in accordance with paragraph (C) of the noise condition then no further action is necessary. In the event that the rating level is above the limit(s) set out in the Tables attached to the noise conditions or the noise limits for a complainant's dwelling approved in accordance with paragraph (C) of the noise condition, the independent consultant shall undertake a further assessment of the rating level to correct for background noise so that the rating level relates to wind turbine noise immission only.
- (d) The wind farm operator shall ensure that all the wind turbines in the development are turned off for such period as the independent consultant requires to undertake the further assessment. The further assessment shall be undertaken in accordance with the following steps:
  - i. Repeating the steps in Note 2, with the wind farm switched off, and determining the background noise ( $L_3$ ) at each integer wind speed within the range set out in the approved noise assessment protocol under paragraph (E) of this condition.
  - ii. The wind farm noise ( $L_1$ ) at this speed shall then be calculated as follows where  $L_2$  is the measured level with turbines running but without the addition of any tonal penalty:

$$L_1 = 10 \log \left[ 10^{L_2/10} - 10^{L_3/10} \right]$$

- iii. The rating level shall be re-calculated by adding the tonal penalty (if any is applied in accordance with Note 3) to the derived wind farm noise  $L_1$  at that integer wind speed.
- iv. If the rating level after adjustment for background noise contribution and adjustment for tonal penalty (if required in accordance with note (iii) above) at any integer wind speed lies at or

below the values set out in the Tables attached to the conditions or at or below the noise limits approved by the Local Authority for a complainant’s dwelling in accordance with paragraph (C) of the noise condition then no further action is necessary. If the rating level at any integer wind speed exceeds the values set out in the Tables attached to the conditions or the noise limits approved by the Local Authority for a complainant’s dwelling in accordance with paragraph (C) of the noise condition then the development fails to comply with the conditions.