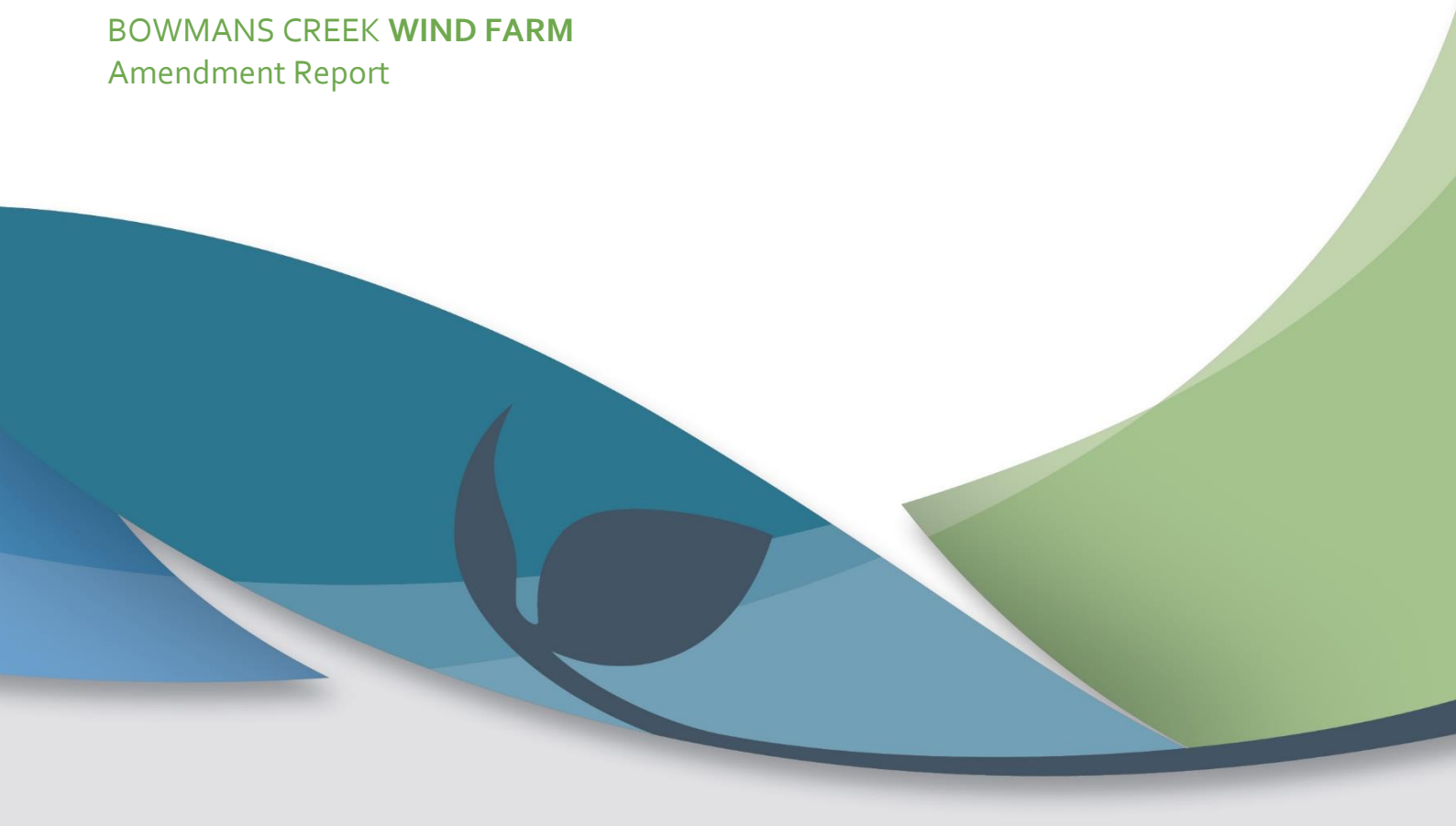
EPURON

JAMES BAILEY & ASSOCIATES
Environmental and Planning Consultants

APPENDIX D2

AMENDMENT REPORT NOISE ASSESSMENT

BOWMANS CREEK **WIND FARM**
Amendment Report



Bowmans Creek Wind Farm

Noise Assessment - Additional Information

S6150C12

September 2021

sonus.

Sonus Pty Ltd
17 Ruthven Avenue
Adelaide 5000 SA
+61 (8) 8231 2100
www.sonus.com.au

BACKGROUND

A noise and vibration assessment was made for the proposed Bowmans Creek wind farm, which is summarised in Sonus report with reference "S6150C9" dated February 2021 (**the Sonus Assessment**). The Sonus Assessment was included as part of the *Environmental Impact Statement* (EIS) prepared for the development application.

This report provides comment on the likely change to the noise from the Bowmans Creek wind farm from the Wind Turbine Generator (WTG) layout modification and provides additional information on the construction noise.

WTG LAYOUT MODIFICATION

New Turbine Locations

It is understood that since the Sonus Assessment was made, the WTG layout has been modified to reduce the number of turbines and for micro siting purposes.

The amended WTG locations are summarised in Table 1 below.

Table 1: *WTG Co-ordinates*

Turbine ID	Easting	Northing
6	326637	6425835
7	327122	6426040
8	326623	6426357
9	325506	6424701
12	326127	6437085
13	325784	6434734
14	325902	6435079
15	325699	6435805
16	325821	6436292
17	325985	6436708
18	326167	6425180
19	325701	6424256
20	326457	6425481
21	325602	6434402
22	324400	6422259
23	324448	6422692
24	324468	6423318
25	324556	6423809
26	320942	6429703

Turbine ID	Easting	Northing
27	320789	6428853
28	320877	6429281
29	320903	6430132
30	321193	6430445
31	321564	6430681
32	318148	6426977
34	318639	6432574
35	317972	6430942
36	317607	6431408
37	318268	6431638
38	319396	6432485
39	319094	6432130
40	318485	6432174
41	317652	6428942
42	317341	6429767
43	317872	6429637
44	318747	6430296
45	318812	6430696
46	317729	6430189

Turbine ID	Easting	Northing
47	317937	6430494
48	316689	6426659
49	318063	6427359
50	318791	6427627
51	317846	6433652
52	318208	6432995
57	317749	6434174
58	316718	6429096
59	316307	6427954
63	316770	6429613
64	315658	6426711
66	315104	6425568
67	315328	6425925
68	315493	6426309
69	315907	6427046
70	316003	6427443
71	325384	6434068
72	325676	6425133

Closest WTG to residences in the immediate vicinity

The separation distance to the closest WTG from the residence in the immediate vicinity of the wind farm is provided in Table 2 below for the EIS and for the amended WTG locations; along with the predicted noise level from the EIS.

Table 2: *Separations Distances*

Residence ID	EIS			Amended WTG Locations		
	Closest WTG to Residence	Distance to closest WTG (m)	Highest Predicted Noise Level (dB(A))	Closest WTG to Residence	Distance to closest WTG (m)	Change in distance to closest WTG when compared to EIS
P22-1	23	1,381	36	23	1,388	7m Further away
T6-1*	12	1,533	32	12	1,536	3m Further away
P22-4	23	1,569	34	23	1,575	6m Further away
S17-2	9	1,705	34	8	2,042	337m Further away
G17-1	64	2,041	34	64	2,042	1m Further away
V20-2*	7	2,148	31	7	2,122	26m Closer
R17-1*	8	1,942	32	8	2,139	197m Further away
U6-1*	12	2,197	28	12	2,199	2m Further away
V20-1	7	2,246	31	7	2,221	25m Closer
W20-1*	7	2,279	30	7	2,248	31m Closer
T6-9	12	2,256	28	12	2,262	6m Further away
S17-1*	8	2,116	32	8	2,331	215m Further away
H12-3	57	2,570	29	57	2,570	No Change
H11-1	57	2,574	29	57	2,574	No Change
F18-1	68	2,580	31	68	2,580	No Change
T6-2	12	2,582	26	12	2,587	5m Further away
G15-1*	60	1,696	34	63	2,606	910m Further away
H10-2*	57	2,616	25	57	2,617	1m Further away
F19-1	66	2,626	28	66	2,626	No Change
H12-2	51	2,672	29	51	2,672	No Change
F17-1	60	2,827	30	64	2,845	18m Further away
H10-1*	57	2,898	25	57	2,898	No Change
G15-3	60	1,958	32	63	2,929	971m Further away
T5-1	12	2,954	24	12	2,962	8m Further away

*Note *: Associated dwelling*

Based on the above table, the closest WTG will remain the same or move further away from the residences in the immediate vicinity of the wind farm; except for residences *V20-1*, *V20-2* and *W20-1*, where the closest WTG will move between 25 and 31m closer.

Noise from the Amended Wind Farm Layout

The noise from the WTGs depends on a range of factors, including the separation distance between the WTGs and the receiver.

Where all of the assessment assumptions of the Sonus Assessment remain unchanged (with the exception of the WTG locations), the noise from the wind farm will likely reduce where the closest WTG is moved further from the residence.

For residences *V20-1*, *V20-2* and *W20-1*, there is a marginal reduction in distance to the closest WTG (no more than 31m closer to the residences), but the change to the noise from this reduction in distance will be insignificant (less than 1 dB(A)).

When considering the above in combination with the noise predictions made as part of the EIS, the amended WTG locations are not expected to change the outcomes of the Sonus Assessment. That is, the noise levels generated by the WTGs under conditions most conducive to noise propagation will comply with the relevant noise criteria at all locations, except for *P22-1* which marginally exceeds the criteria.

As noted in the Sonus Assessment, the noise criteria could be achieved at *P22-1* where the status is changed to be an *Associated Residence* (if an agreement is reached), or a curtailment strategy is developed.

To provide full predictions of the noise from the amended wind farm, the noise model would need to be updated for each of the operating wind speeds of the final WTG selection and layout.

CONSTRUCTION NOISE

The Sonus Assessment considered construction activity at the turbine sites and batching plants.

The New South Wales Department of Environment & Climate Change *Interim Construction Noise Guideline* (**Construction Noise Guideline**) provides an emphasis on implementing "feasible" and "reasonable" noise reduction measures and does not establish mandatory objective criteria. However, the Construction Noise Guideline does establish different "management levels" based on the existing Rating Background Level (**RBL**).

The minimum RBL is 30 dB(A) for the evening and night and 35 dB(A) for the day.

Based on the above, the Construction Noise Guideline provides the following "management levels":

Time of Day	**Management level** $L_{Aeq\ (15\ min)}$
Recommended standard hours: Monday to Friday 7 am to 6 pm	Noise affected **RBL + 10 dB = 45dB(A)**
Saturday 8 am to 1 pm No work on Sundays or public holidays	Highly noise affected **75 dB(A)**
Outside recommended standard hours	Noise affected **RBL + 5 dB = 35dB(A)**

This report provides further predictions of noise from construction activity at the closest sensitive location and other locations that are expected to exceed the "noise affected" management level.

The predictions have been made based on the assumptions and activity provided in the Sonus Assessment and at all residences understood to be non-associated with the project.

In addition to the construction at the turbines sites and batching plants, it is understood that there will be works associated with the construction compound, access tracks to the turbines and upgrades of Bowmans Creek Road, Marshals Road, Albano Road, Hebden Road and Scrumlo Road. Noise levels have been predicted for the residences (as identified in the Sonus Report) that may be "noise affected".

Construction During Standard Hours

Construction at Wind Turbine Generator Sites

Table 1: *Predicted construction noise levels for the closest non-associated location, and locations > 45 dB(A)*

Phase	Main Plant and Equipment	Separation to Achieve 45 dB(A)	Residence	Approximate Distance to Activity	Predicted Noise Level (dB(A)
Site Set-Up and Civil Works	Generator Transport truck Excavator Low loader	1100m	P22.1	1390	43
Hard Stand Construction	Mobile crushing and screening plant Dozer Roller Low loader Tipper truck Excavator Scraper Transport truck	1800m	P22.1	1390	49
			P22-4	1575	47
Excavation and foundation construction	Excavator Front end loader Mobile crushing and screening plant Truck-mounted concrete pump Concrete mixer truck Mobile crane Transport truck Tipper truck	1700m	P22.1	1390	48
			P22-4	1575	46
Electrical Installation	Rock trencher Concrete mixer truck Low loader Tipper truck Mobile crane	1800	P22.1	1390	49
			P22-4	1575	47
Turbine Delivery and Erection	Extendable trailer truck Low loader Mobile crane Support crane Grinder Rattle Gun	1100	P22.1	1390	43

Road upgrades, Track Construction and Compound Works

Table 2: *Predicted construction noise levels for the non-associated locations > 45 dB(A)*

Phase	Main Plant and Equipment	Separation to Achieve 45 dB(A)	Residence	Approximate Distance to Activity	Predicted Noise Level (dB(A)
Road upgrades, Track Construction and Compound Works	Mobile crushing and screening plant Dozer Roller Tipper truck Excavator Scraper Transport truck	1800m	S17-2	45	75
			I24-2	100	68
			I23-1	180	64
			Q17-1	350	58
			Q17-3	470	56
			Q17-2	580	55
			K23-1	1300	49

In addition to the locations identified above, there are also residential locations in the vicinity of the road upgrades on Hebden and Scrumlo Roads; but given the separation from the wind farm these locations had not been identified in the Sonus Assessment. Notwithstanding, the noise at these locations will be no greater than the levels identified in Table 2 above. That is, they will be "noise affected" (with 1800m of the works) but not "highly noise affected" (less than 40m from the works)

Construction Outside Standard Hours

Batching Plant and Concrete Pours at Wind Turbine Generator Sites

Table 3: *Predicted construction noise levels for the non-associated locations > 35 dB(A)*

Phase	Main Plant and Equipment	Separation to Achieve 40 dB(A)	Residence	Approximate Distance to Activity	Predicted Noise Level (dB(A)
Batching	Front end loader Truck	2400m	G17-1	2200	37
Concrete Pour	Generator Truck Concrete pump	1900m	P22.1	1390	39
			P22-4	1575	38

Construction Noise Recommendation

For construction with noise levels as detailed above, the Construction Noise Guideline requires the developer to apply all feasible and reasonable work practices, and to inform the residents of the proposed construction work, as recommended in the Sonus Assessment.