

1<sup>st</sup> August 2018

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Dear Mr Taylor

### **RE-MODELLING OF NOISE IMPACT ASSESSMENT – WITBERG WIND ENERGY PROJECT**

As per our recent correspondence, please find attached the re-modelling report for the Witberg Wind Energy Project near Laingsburg in the Western Cape Province.

This report is to be viewed as an addendum to the main Noise Impact Report that was issued by Jongens Keet Associates (March 2011). The methodologies used to conduct the remodelling, identification of noise sensitive areas and the project description is described in the main report and is not repeated here.

The purpose of this report is to determine if the 27 turbine project layout with proposed amended turbine layout and specifications will comply with the noise emission limits as contained in the Department of Environmental Affairs - Environmental Authorisation (12/12/20/1966) issued in 2011. The wind turbine specifications as authorised, are proposed to be amended, however. The proposed amendments include the following:

- Increase in output capacity per wind turbine between 3MW and up to 5MW;
- Increase in the hub height from 92m to a range between 92m up to 120m; and
- Increase in rotor diameter from 116m to, a range between 116m up to 136m.

This has necessitated a remodelling of the layout. The results of the modelling are presented below.

Yours sincerely



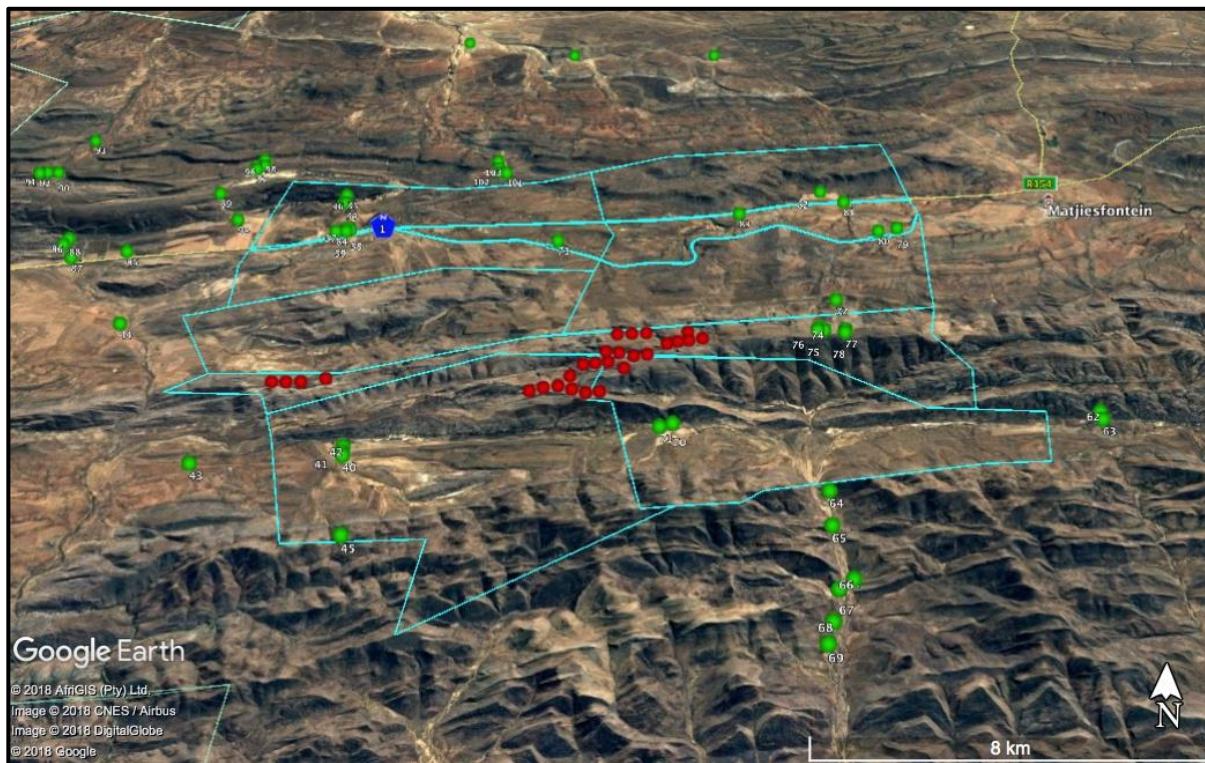
Dr Brett Williams

## 1. Noise Sensitive Areas (NSA)

The following noise sensitive areas have been used in the remodelling as identified in the Table 1 and Figure 1:

**Figure 1 – Noise Sensitive Areas**

WTG in Red, NSA in Green, Wind Farm Boundary in Blue



**Table 1 – Noise Sensitive Areas**

The text in **red** indicates where an NSA is within the project boundary.

| Description | East         | South        | Within Project Boundary | Type     |
|-------------|--------------|--------------|-------------------------|----------|
| NSA 1       | 20°32'52.95" | 32°59'17.09" | No                      | Dwelling |
| NSA 2       | 20°33'46.32" | 32°59'14.37" | No                      | Dwelling |
| NSA 3       | 20°32'50.35" | 32°57'02.29" | No                      | Dwelling |
| NSA 4       | 20°35'33.02" | 33°04'25.19" | No                      | Dwelling |
| NSA 5       | 20°32'05.41" | 33°06'21.26" | No                      | Dwelling |
| NSA 6       | 20°28'42.37" | 33°05'39.22" | No                      | Dwelling |
| NSA 7       | 20°25'16.20" | 33°04'42.77" | No                      | Dwelling |
| NSA 8       | 20°25'12.34" | 33°04'05.64" | No                      | Dwelling |

| Description | East         | South        | Within Project Boundary | Type     |
|-------------|--------------|--------------|-------------------------|----------|
| NSA 9       | 20°27'42.38" | 33°02'14.52" | No                      | Dwelling |
| NSA 10      | 20°29'22.70" | 33°03'29.97" | No                      | Dwelling |
| NSA 11      | 20°25'51.25" | 33°06'16.52" | No                      | Dwelling |
| NSA 12      | 20°30'17.98" | 32°57'10.36" | No                      | Dwelling |
| NSA 13      | 20°26'46.16" | 33°00'14.09" | No                      | Dwelling |
| NSA 14      | 20°21'25.27" | 32°57'21.97" | No                      | Dwelling |
| NSA 15      | 20°22'07.75" | 32°58'30.41" | No                      | Dwelling |
| NSA 16      | 20°27'23.33" | 32°52'42.15" | No                      | Dwelling |
| NSA 17      | 20°19'04.30" | 33°00'15.86" | No                      | Dwelling |
| NSA 18      | 20°28'03.61" | 32°49'35.63" | No                      | Dwelling |
| NSA 19      | 20°16'15.80" | 32°57'29.91" | No                      | Dwelling |
| NSA 20      | 20°25'54.64" | 33°10'25.14" | No                      | Dwelling |
| NSA 21      | 20°19'48.45" | 32°53'44.67" | No                      | Dwelling |
| NSA 22      | 20°28'51.50" | 33°10'20.42" | No                      | Dwelling |
| NSA 23      | 20°22'49.16" | 33°07'02.69" | No                      | Dwelling |
| NSA 24      | 20°33'09.67" | 32°54'52.62" | No                      | Dwelling |
| NSA 25      | 20°23'36.35" | 33°04'12.21" | No                      | Dwelling |
| NSA 26      | 20°23'36.68" | 33°05'09.54" | No                      | Dwelling |
| NSA 27      | 20°21'09.93" | 33°08'30.26" | No                      | Dwelling |
| NSA 28      | 20°36'03.35" | 32°58'22.39" | No                      | Dwelling |
| NSA 29      | 20°23'38.50" | 33°10'03.51" | No                      | Dwelling |
| NSA 30      | 20°24'54.14" | 32°52'02.62" | No                      | Dwelling |
| NSA 31      | 20°32'07.95" | 32°49'19.83" | No                      | Dwelling |
| NSA 32      | 20°28'41.48" | 32°45'52.81" | No                      | Dwelling |
| NSA 33      | 20°21'48.77" | 32°45'14.37" | No                      | Dwelling |
| NSA 34      | 20°21'55.77" | 33°14'22.80" | No                      | Dwelling |
| NSA 35      | 20°21'54.96" | 33°14'13.17" | Yes                     | Dwelling |
| NSA 36      | 20°21'53.27" | 33°14'21.97" | Yes                     | Dwelling |
| NSA 37      | 20°22'05.21" | 33°14'54.95" | Yes                     | Dwelling |
| NSA 38      | 20°22'07.88" | 33°14'57.39" | Yes                     | Dwelling |
| NSA 39      | 20°22'03.70" | 33°14'58.84" | Yes                     | Dwelling |
| NSA 40      | 20°22'52.26" | 33°18'59.87" | Yes                     | Dwelling |
| NSA 41      | 20°22'51.42" | 33°18'57.20" | Yes                     | Dwelling |
| NSA 42      | 20°22'51.21" | 33°18'52.03" | Yes                     | Dwelling |
| NSA 43      | 20°20'34.15" | 33°19'09.45" | No                      | Dwelling |
| NSA 44      | 20°18'39.92" | 33°16'52.91" | No                      | Dwelling |
| NSA 45      | 20°23'07.81" | 33°20'11.41" | Yes                     | Dwelling |
| NSA 46      | 20°17'05.46" | 33°24'37.04" | No                      | Dwelling |
| NSA 47      | 20°16'55.17" | 33°24'38.30" | No                      | Dwelling |

| Description | East         | South        | Within Project Boundary | Type     |
|-------------|--------------|--------------|-------------------------|----------|
| NSA 48      | 20°16'50.26" | 33°24'27.63" | No                      | Dwelling |
| NSA 49      | 20°16'47.86" | 33°24'36.69" | No                      | Dwelling |
| NSA 50      | 20°18'53.00" | 33°24'06.83" | No                      | Dwelling |
| NSA 51      | 20°28'43.33" | 33°24'43.75" | No                      | Dwelling |
| NSA 52      | 20°28'41.91" | 33°24'46.19" | No                      | Dwelling |
| NSA 53      | 20°30'23.63" | 33°24'42.99" | No                      | Dwelling |
| NSA 54      | 20°34'30.42" | 33°23'51.50" | No                      | Dwelling |
| NSA 55      | 20°34'22.09" | 33°23'50.41" | No                      | Dwelling |
| NSA 56      | 20°34'19.63" | 33°23'49.13" | No                      | Dwelling |
| NSA 57      | 20°34'19.55" | 33°23'43.04" | No                      | Dwelling |
| NSA 58      | 20°34'16.84" | 33°23'50.61" | No                      | Dwelling |
| NSA 59      | 20°38'23.94" | 33°22'29.47" | No                      | Dwelling |
| NSA 60      | 20°38'43.01" | 33°22'28.48" | No                      | Dwelling |
| NSA 61      | 20°38'46.68" | 33°22'26.64" | No                      | Dwelling |
| NSA 62      | 20°34'36.70" | 33°18'02.42" | No                      | Dwelling |
| NSA 63      | 20°34'37.48" | 33°18'09.41" | No                      | Dwelling |
| NSA 64      | 20°30'13.98" | 33°19'19.98" | No                      | Dwelling |
| NSA 65      | 20°30'13.26" | 33°19'48.70" | No                      | Dwelling |
| NSA 66      | 20°30'26.76" | 33°20'31.43" | No                      | Dwelling |
| NSA 67      | 20°30'13.33" | 33°20'39.17" | No                      | Dwelling |
| NSA 68      | 20°30'05.66" | 33°21'03.67" | No                      | Dwelling |
| NSA 69      | 20°29'59.70" | 33°21'20.04" | No                      | Dwelling |
| NSA 70      | 20°27'54.06" | 33°18'23.33" | Yes                     | Dwelling |
| NSA 71      | 20°27'41.72" | 33°18'26.90" | Yes                     | Dwelling |
| NSA 72      | 20°30'42.16" | 33°16'10.92" | Yes                     | Dwelling |
| NSA 73      | 20°25'53.21" | 33°15'07.23" | Yes                     | Dwelling |
| NSA 74      | 20°30'23.17" | 33°16'54.02" | Yes                     | Dwelling |
| NSA 75      | 20°30'19.23" | 33°16'51.54" | Yes                     | Dwelling |
| NSA 76      | 20°30'16.66" | 33°16'54.07" | Yes                     | Dwelling |
| NSA 77      | 20°30'43.48" | 33°16'55.41" | Yes                     | Dwelling |
| NSA 78      | 20°30'44.24" | 33°16'52.59" | Yes                     | Dwelling |
| NSA 79      | 20°32'00.43" | 33°14'37.85" | Yes                     | Dwelling |
| NSA 80      | 20°31'39.47" | 33°14'42.26" | Yes                     | Dwelling |
| NSA 81      | 20°31'06.82" | 33°14'04.72" | Yes                     | Dwelling |
| NSA 82      | 20°30'42.09" | 33°13'51.76" | Yes                     | Dwelling |
| NSA 83      | 20°29'09.33" | 33°14'26.02" | Yes                     | Dwelling |
| NSA 84      | 20°21'52.66" | 33°14'59.27" | Yes                     | Dwelling |
| NSA 85      | 20°18'17.04" | 33°15'30.14" | No                      | Dwelling |
| NSA 86      | 20°17'05.84" | 33°15'22.64" | No                      | Dwelling |

| Description | East         | South        | Within Project Boundary | Type     |
|-------------|--------------|--------------|-------------------------|----------|
| NSA 87      | 20°17'20.37" | 33°15'38.44" | No                      | Dwelling |
| NSA 88      | 20°17'09.02" | 33°15'15.26" | No                      | Dwelling |
| NSA 89      | 20°19'34.32" | 33°14'14.77" | No                      | Dwelling |
| NSA 90      | 20°16'20.60" | 33°13'47.59" | No                      | Dwelling |
| NSA 91      | 20°16'09.05" | 33°13'48.26" | No                      | Dwelling |
| NSA 92      | 20°16'01.45" | 33°13'50.90" | No                      | Dwelling |
| NSA 93      | 20°16'42.49" | 33°12'58.05" | No                      | Dwelling |
| NSA 94      | 20°20'03.20" | 33°14'47.84" | No                      | Dwelling |
| NSA 95      | 20°20'13.24" | 33°13'35.60" | No                      | Dwelling |
| NSA 96      | 20°20'03.86" | 33°13'38.81" | No                      | Dwelling |
| NSA 97      | 20°20'06.13" | 33°13'40.99" | No                      | Dwelling |
| NSA 98      | 20°20'10.81" | 33°13'26.18" | No                      | Dwelling |
| NSA 99      | 20°14'02.56" | 33°12'15.00" | No                      | Dwelling |
| NSA 100     | 20°14'08.63" | 33°12'15.80" | No                      | Dwelling |
| NSA 101     | 20°24'48.60" | 33°13'36.92" | No                      | Dwelling |
| NSA 102     | 20°24'42.12" | 33°13'36.18" | No                      | Dwelling |
| NSA 103     | 20°24'39.49" | 33°13'29.96" | No                      | Dwelling |
| NSA 104     | 20°24'37.29" | 33°13'19.61" | No                      | Dwelling |

## 2. Wind Turbine Generators (WTG)

The wind turbine generator that was modelled is described in Table 2 below. This turbine was chosen to closely represent the proposed amended turbine specifications for a wind turbine up to 5 MW and up to 120m hub height. This model of turbine was chosen as it has published noise data in the WindPro catalogue of wind turbines. Furthermore, the noise data has been tested according to the methods described in IEC 61400-11 and are thus traceable. The modelled hub height (125m) is slightly higher than the hub height amendment proposed by the developer (120m), however for the purpose of the assessment, considered comparable as a higher hub height, would reduce the noise impacts.

Furthermore, if the final turbine that is chosen has a maximum sound power level that is similar or lower than the turbine modelled in this report, it can be assumed that the noise impacts will be similar or lower, irrespective of the turbine manufacturer.

**Table 2 - Proposed Turbine Specifications**

|                           |              |
|---------------------------|--------------|
| Manufacturer              | Nordex       |
| Type / Version            | N149/4.0-4.5 |
| Rated Power               | 4.5 MW       |
| Rotor Diameter            | 149m         |
| Tower                     | Tubular      |
| Grid Connection           | 50 Hz        |
| Maximum Sound Power Level | 108.1 dB     |
| Hub Height                | 125m         |

Sound Power Level dB(A) reference to 1pW from WindPro 3.2 Catalogue

\*The specifications of this turbine model were used as the data is available in WindPro. This does not bind the applicant to this specific model, and any turbine model with similar turbine specifications. An equal or lower maximum sound power level would be acceptable for the site.

The sound power levels at lower and higher wind speeds as stated above were interpolated from the published data. **The actual sound power levels may thus be less than those stated when the final turbine is selected. The levels used in the re-modelling are thus a worst-case scenario.**

### 3. Cumulative Impacts

The proposed windfarm is located adjacent to several other windfarms. The details are as follows:

- Rietkloof – 60 wind turbines
- Karreebosch – 65 wind turbines
- Brandvalley – 58 wind turbines
- Esizayo – 55 wind turbines
- Roggeveld – 47 wind turbines
- Soetwater – 43 wind turbines
- Karusa – 43 wind turbines

The locations of these turbines are recorded in Annexure A. The turbine positions that are recorded in Annexure A, are purely as a record of what informed the cumulative noise modelling assessment. The same turbine data (as described in Table 2) was used to model the cumulative impacts from all the adjacent windfarms. This is thus a worst-case scenario, as it is unlikely that all 398 turbines will be operational simultaneously and if all the sites obtain the required regulatory approval.

#### 4. Modelling Results

The masking effect of the wind noise will mitigate the noise impact. The results are based on NO wind noise masking, which in reality rarely occurs when the turbines are operational. The maximum noise rating limit (24 hour day/night) for rural areas in SANS 10103:2008 is 45 dB(A). The noise impacts were modelled in WindPro Version 3.2.669 using the above data. The results area as follows:

**Table 3 - Modelling Results**

SANS 10103:2008 Limit = 45dB(A)

| Receiver | Wind speed [m/s] | Only Witberg WTG Operational [dB(A)] | Cumulative From All WTGs on 8 Windfarms [dB(A)] |
|----------|------------------|--------------------------------------|---|
| NSA 1    | 2                | 0.0                                  | 20.9  |
|          | 4                | 0.0                                  | 23.7  |
|          | 6                | 0.0                                  | 33.1  |
|          | 8                | 0.0                                  | 34.4  |
|          | 10               | 0.0                                  | 34.4  |
|          | 12               | 0.0                                  | 34.4  |
| NSA 2    | 2                | 0.0                                  | 21.2  |
|          | 4                | 0.0                                  | 24.0  |
|          | 6                | 0.0                                  | 33.4  |
|          | 8                | 0.0                                  | 34.7  |
|          | 10               | 0.0                                  | 34.7  |
|          | 12               | 0.0                                  | 34.7  |
| NSA 3    | 2                | 0.0                                  | 23.5  |
|          | 4                | 0.0                                  | 26.3  |
|          | 6                | 0.0                                  | 35.7  |
|          | 8                | 0.0                                  | 37.0  |
|          | 10               | 0.0                                  | 37.0  |
|          | 12               | 0.0                                  | 37.0  |
| NSA 4    | 2                | 0.0                                  | 11.2  |
|          | 4                | 0.0                                  | 14.0  |
|          | 6                | 0.0                                  | 23.4  |
|          | 8                | 0.0                                  | 24.6  |
|          | 10               | 0.0                                  | 24.6  |
|          | 12               | 0.0                                  | 24.6  |
| NSA 5    | 2                | 0.0                                  | 14.5  |
|          | 4                | 0.0                                  | 17.3  |

| Receiver | Wind speed [m/s] | Only Witberg WTG Operational [dB(A)] | Cumulative From All WTGs on 8 Windfarms [dB(A)] |
|----------|------------------|--------------------------------------|---|
|          | 6                | 0.0                                  | 26.7  |
|          | 8                | 0.0                                  | 27.9  |
|          | 10               | 0.0                                  | 27.9  |
|          | 12               | 0.0                                  | 27.9  |
| NSA 6    | 2                | 0.0                                  | 20.6  |
|          | 4                | 0.0                                  | 23.4  |
|          | 6                | 0.0                                  | 32.8  |
|          | 8                | 0.0                                  | 34.0  |
|          | 10               | 0.0                                  | 34.0  |
|          | 12               | 0.0                                  | 34.0  |
| NSA 7    | 2                | 0.0                                  | 20.1  |
|          | 4                | 0.0                                  | 22.9  |
|          | 6                | 0.0                                  | 32.3  |
|          | 8                | 0.0                                  | 33.6  |
|          | 10               | 0.0                                  | 33.6  |
|          | 12               | 0.0                                  | 33.6  |
| NSA 8    | 2                | 0.0                                  | 20.5  |
|          | 4                | 0.0                                  | 23.3  |
|          | 6                | 0.0                                  | 32.7  |
|          | 8                | 0.0                                  | 33.9  |
|          | 10               | 0.0                                  | 33.9  |
|          | 12               | 0.0                                  | 33.9  |
| NSA 9    | 2                | 0.0                                  | 21.8  |
|          | 4                | 0.0                                  | 24.6  |
|          | 6                | 0.0                                  | 34.0  |
|          | 8                | 0.0                                  | 35.3  |
|          | 10               | 0.0                                  | 35.3  |
|          | 12               | 0.0                                  | 35.3  |
| NSA 10   | 2                | 0.0                                  | 22.0  |
|          | 4                | 0.0                                  | 24.8  |
|          | 6                | 0.0                                  | 34.2  |
|          | 8                | 0.0                                  | 35.5  |
|          | 10               | 0.0                                  | 35.5  |
|          | 12               | 0.0                                  | 35.5  |
| NSA 11   | 2                | 0.0                                  | 15.2  |
|          | 4                | 0.0                                  | 18.0  |
|          | 6                | 0.0                                  | 27.4  |
|          | 8                | 0.0                                  | 28.7  |



| Receiver | Wind speed [m/s] | Only Witberg WTG Operational [dB(A)] | Cumulative From All WTGs on 8 Windfarms [dB(A)] |
|----------|------------------|--------------------------------------|---|
|          | 10               | 0.0                                  | 28.7  |
|          | 12               | 0.0                                  | 28.7  |
| NSA 12   | 2                | 0.0                                  | 28.1  |
|          | 4                | 0.0                                  | 30.9  |
|          | 6                | 0.0                                  | 40.3  |
|          | 8                | 0.0                                  | 41.6  |
|          | 10               | 0.0                                  | 41.6  |
|          | 12               | 0.0                                  | 41.6  |
| NSA 13   | 2                | 0.0                                  | 22.9  |
|          | 4                | 0.0                                  | 25.7  |
|          | 6                | 0.0                                  | 35.1  |
|          | 8                | 0.0                                  | 36.4  |
|          | 10               | 0.0                                  | 36.4  |
|          | 12               | 0.0                                  | 36.4  |
| NSA 14   | 2                | 0.0                                  | 13.5  |
|          | 4                | 0.0                                  | 16.3  |
|          | 6                | 0.0                                  | 25.7  |
|          | 8                | 0.0                                  | 26.7  |
|          | 10               | 0.0                                  | 26.7  |
|          | 12               | 0.0                                  | 26.7  |
| NSA 15   | 2                | 0.0                                  | 16.5  |
|          | 4                | 0.0                                  | 19.3  |
|          | 6                | 0.0                                  | 28.7  |
|          | 8                | 0.0                                  | 30.0  |
|          | 10               | 0.0                                  | 30.0  |
|          | 12               | 0.0                                  | 30.0  |
| NSA 16   | 2                | 0.0                                  | 23.4  |
|          | 4                | 0.0                                  | 26.2  |
|          | 6                | 0.0                                  | 35.6  |
|          | 8                | 0.0                                  | 36.9  |
|          | 10               | 0.0                                  | 36.9  |
|          | 12               | 0.0                                  | 36.9  |
| NSA 17   | 2                | 0.0                                  | 2.4   |
|          | 4                | 0.0                                  | 5.2   |
|          | 6                | 0.0                                  | 14.6  |
|          | 8                | 0.0                                  | 15.7  |
|          | 10               | 0.0                                  | 15.7  |
|          | 12               | 0.0                                  | 15.7  |

| Receiver | Wind speed [m/s] | Only Witberg WTG Operational [dB(A)] | Cumulative From All WTGs on 8 Windfarms [dB(A)] |
|----------|------------------|--------------------------------------|---|
| NSA 18   | 2                | 0.0                                  | 30.1  |
|          | 4                | 0.0                                  | 32.9  |
|          | 6                | 0.0                                  | 42.3  |
|          | 8                | 0.0                                  | 43.6  |
|          | 10               | 0.0                                  | 43.6  |
|          | 12               | 0.0                                  | 43.6  |
| NSA 19   | 2                | 0.0                                  | 10.2  |
|          | 4                | 0.0                                  | 13.0  |
|          | 6                | 0.0                                  | 22.3  |
|          | 8                | 0.0                                  | 23.0  |
|          | 10               | 0.0                                  | 23.0  |
|          | 12               | 0.0                                  | 23.0  |
| NSA 20   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.9                                  | 5.4   |
|          | 8                | 2.2                                  | 6.5   |
|          | 10               | 2.2                                  | 6.5   |
|          | 12               | 2.2                                  | 6.5   |
| NSA 21   | 2                | 0.0                                  | 20.9  |
|          | 4                | 0.0                                  | 23.7  |
|          | 6                | 0.0                                  | 33.1  |
|          | 8                | 0.0                                  | 33.8  |
|          | 10               | 0.0                                  | 33.8  |
|          | 12               | 0.0                                  | 33.8  |
| NSA 22   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.8                                  | 7.1   |
|          | 8                | 2.1                                  | 8.3   |
|          | 10               | 2.1                                  | 8.3   |
|          | 12               | 2.1                                  | 8.3   |
| NSA 23   | 2                | 0.0                                  | 0.2   |
|          | 4                | 0.0                                  | 3.0   |
|          | 6                | 0.0                                  | 12.4  |
|          | 8                | 0.0                                  | 13.7  |
|          | 10               | 0.0                                  | 13.7  |
|          | 12               | 0.0                                  | 13.7  |
| NSA 24   | 2                | 0.0                                  | 19.7  |
|          | 4                | 0.0                                  | 22.5  |

| Receiver | Wind speed [m/s] | Only Witberg WTG Operational [dB(A)] | Cumulative From All WTGs on 8 Windfarms [dB(A)] |
|----------|------------------|--------------------------------------|---|
|          | 6                | 0.0                                  | 31.9  |
|          | 8                | 0.0                                  | 33.1  |
|          | 10               | 0.0                                  | 33.1  |
|          | 12               | 0.0                                  | 33.1  |
| NSA 25   | 2                | 0.0                                  | 10.4  |
|          | 4                | 0.0                                  | 13.2  |
|          | 6                | 0.0                                  | 22.6  |
|          | 8                | 0.0                                  | 23.9  |
|          | 10               | 0.0                                  | 23.9  |
|          | 12               | 0.0                                  | 23.9  |
| NSA 26   | 2                | 0.0                                  | 8.4   |
|          | 4                | 0.0                                  | 11.2  |
|          | 6                | 0.0                                  | 20.6  |
|          | 8                | 0.0                                  | 21.9  |
|          | 10               | 0.0                                  | 21.9  |
|          | 12               | 0.0                                  | 21.9  |
| NSA 27   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 2.0   |
|          | 8                | 0.0                                  | 3.2   |
|          | 10               | 0.0                                  | 3.2   |
|          | 12               | 0.0                                  | 3.2   |
| NSA 28   | 2                | 0.0                                  | 27.2  |
|          | 4                | 0.0                                  | 30.0  |
|          | 6                | 0.0                                  | 39.4  |
|          | 8                | 0.0                                  | 40.7  |
|          | 10               | 0.0                                  | 40.7  |
|          | 12               | 0.0                                  | 40.7  |
| NSA 29   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 3.7   |
|          | 8                | 0.0                                  | 4.8   |
|          | 10               | 0.0                                  | 4.8   |
|          | 12               | 0.0                                  | 4.8   |
| NSA 30   | 2                | 0.0                                  | 22.2  |
|          | 4                | 0.0                                  | 25.0  |
|          | 6                | 0.0                                  | 34.4  |
|          | 8                | 0.0                                  | 35.6  |

| Receiver | Wind speed [m/s] | Only Witberg WTG Operational [dB(A)] | Cumulative From All WTGs on 8 Windfarms [dB(A)] |
|----------|------------------|--------------------------------------|---|
|          | 10               | 0.0                                  | 35.6  |
|          | 12               | 0.0                                  | 35.6  |
| NSA 31   | 2                | 0.0                                  | 24.5  |
|          | 4                | 0.0                                  | 27.3  |
|          | 6                | 0.0                                  | 36.7  |
|          | 8                | 0.0                                  | 38.0  |
|          | 10               | 0.0                                  | 38.0  |
|          | 12               | 0.0                                  | 38.0  |
| NSA 32   | 2                | 0.0                                  | 17.3  |
|          | 4                | 0.0                                  | 20.1  |
|          | 6                | 0.0                                  | 29.5  |
|          | 8                | 0.0                                  | 30.8  |
|          | 10               | 0.0                                  | 30.8  |
|          | 12               | 0.0                                  | 30.8  |
| NSA 33   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.5   |
|          | 6                | 0.0                                  | 9.9   |
|          | 8                | 0.0                                  | 10.8  |
|          | 10               | 0.0                                  | 10.8  |
|          | 12               | 0.0                                  | 10.8  |
| NSA 34   | 2                | 1.6                                  | 1.7   |
|          | 4                | 4.4                                  | 4.5   |
|          | 6                | 13.8                                 | 13.9  |
|          | 8                | 15.1                                 | 14.6  |
|          | 10               | 15.1                                 | 14.6  |
|          | 12               | 15.1                                 | 14.6  |
| NSA 35   | 2                | 0.8                                  | 1.0   |
|          | 4                | 3.6                                  | 3.8   |
|          | 6                | 13.0                                 | 13.2  |
|          | 8                | 14.3                                 | 13.9  |
|          | 10               | 14.3                                 | 13.9  |
|          | 12               | 14.3                                 | 13.9  |
| NSA 36   | 2                | 1.5                                  | 1.6   |
|          | 4                | 4.3                                  | 4.4   |
|          | 6                | 13.7                                 | 13.8  |
|          | 8                | 15.0                                 | 14.5  |
|          | 10               | 15.0                                 | 14.5  |
|          | 12               | 15.0                                 | 14.5  |

| Receiver | Wind speed [m/s] | Only Witberg WTG Operational [dB(A)] | Cumulative From All WTGs on 8 Windfarms [dB(A)] |
|----------|------------------|--------------------------------------|---|
| NSA 37   | 2                | 4.2                                  | 4.3   |
|          | 4                | 7.0                                  | 7.1   |
|          | 6                | 16.4                                 | 16.5  |
|          | 8                | 17.7                                 | 17.2  |
|          | 10               | 17.7                                 | 17.2  |
|          | 12               | 17.7                                 | 17.2  |
| NSA 38   | 2                | 4.5                                  | 4.6   |
|          | 4                | 7.3                                  | 7.4   |
|          | 6                | 16.7                                 | 16.8  |
|          | 8                | 17.9                                 | 17.5  |
|          | 10               | 17.9                                 | 17.5  |
|          | 12               | 17.9                                 | 17.5  |
| NSA 39   | 2                | 4.5                                  | 4.6   |
|          | 4                | 7.3                                  | 7.4   |
|          | 6                | 16.7                                 | 16.8  |
|          | 8                | 18.0                                 | 17.5  |
|          | 10               | 18.0                                 | 17.5  |
|          | 12               | 18.0                                 | 17.5  |
| NSA 40   | 2                | 17.0                                 | 17.1  |
|          | 4                | 19.8                                 | 19.9  |
|          | 6                | 29.2                                 | 29.3  |
|          | 8                | 30.4                                 | 30.0  |
|          | 10               | 30.4                                 | 30.0  |
|          | 12               | 30.4                                 | 30.0  |
| NSA 41   | 2                | 17.4                                 | 17.5  |
|          | 4                | 20.2                                 | 20.3  |
|          | 6                | 29.6                                 | 29.7  |
|          | 8                | 30.8                                 | 30.3  |
|          | 10               | 30.8                                 | 30.3  |
|          | 12               | 30.8                                 | 30.3  |
| NSA 42   | 2                | 18.1                                 | 18.2  |
|          | 4                | 20.9                                 | 21.0  |
|          | 6                | 30.3                                 | 30.4  |
|          | 8                | 31.6                                 | 31.1  |
|          | 10               | 31.6                                 | 31.1  |
|          | 12               | 31.6                                 | 31.1  |
| NSA 43   | 2                | 13.6                                 | 13.6  |
|          | 4                | 16.4                                 | 16.4  |

| Receiver | Wind speed [m/s] | Only Witberg WTG Operational [dB(A)] | Cumulative From All WTGs on 8 Windfarms [dB(A)] |
|----------|------------------|--------------------------------------|---|
|          | 6                | 25.8                                 | 25.8  |
|          | 8                | 27.1                                 | 26.5  |
|          | 10               | 27.1                                 | 26.5  |
|          | 12               | 27.1                                 | 26.5  |
| NSA 44   | 2                | 4.3                                  | 4.3   |
|          | 4                | 7.1                                  | 7.1   |
|          | 6                | 16.5                                 | 16.5  |
|          | 8                | 17.7                                 | 17.2  |
|          | 10               | 17.7                                 | 17.2  |
|          | 12               | 17.7                                 | 17.2  |
| NSA 45   | 2                | 7.7                                  | 8.0   |
|          | 4                | 10.5                                 | 10.8  |
|          | 6                | 19.9                                 | 20.2  |
|          | 8                | 21.1                                 | 20.9  |
|          | 10               | 21.1                                 | 20.9  |
|          | 12               | 21.1                                 | 20.9  |
| NSA 46   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.0                                  | 0.0   |
|          | 10               | 0.0                                  | 0.0   |
|          | 12               | 0.0                                  | 0.0   |
| NSA 47   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.0                                  | 0.0   |
|          | 10               | 0.0                                  | 0.0   |
|          | 12               | 0.0                                  | 0.0   |
| NSA 48   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.0                                  | 0.0   |
|          | 10               | 0.0                                  | 0.0   |
|          | 12               | 0.0                                  | 0.0   |
| NSA 49   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.0                                  | 0.0   |

| Receiver | Wind speed [m/s] | Only Witberg WTG Operational [dB(A)] | Cumulative From All WTGs on 8 Windfarms [dB(A)] |
|----------|------------------|--------------------------------------|---|
|          | 10               | 0.0                                  | 0.0   |
|          | 12               | 0.0                                  | 0.0   |
| NSA 50   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.0                                  | 0.0   |
|          | 10               | 0.0                                  | 0.0   |
|          | 12               | 0.0                                  | 0.0   |
| NSA 51   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.3                                  | 0.0   |
|          | 10               | 0.3                                  | 0.0   |
|          | 12               | 0.3                                  | 0.0   |
| NSA 52   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.2                                  | 0.0   |
|          | 10               | 0.2                                  | 0.0   |
|          | 12               | 0.2                                  | 0.0   |
| NSA 53   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.0                                  | 0.0   |
|          | 10               | 0.0                                  | 0.0   |
|          | 12               | 0.0                                  | 0.0   |
| NSA 54   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.0                                  | 0.0   |
|          | 10               | 0.0                                  | 0.0   |
|          | 12               | 0.0                                  | 0.0   |
| NSA 55   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.0                                  | 0.0   |
|          | 10               | 0.0                                  | 0.0   |
|          | 12               | 0.0                                  | 0.0   |

| Receiver | Wind speed [m/s] | Only Witberg WTG Operational [dB(A)] | Cumulative From All WTGs on 8 Windfarms [dB(A)] |
|----------|------------------|--------------------------------------|---|
| NSA 56   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.0                                  | 0.0   |
|          | 10               | 0.0                                  | 0.0   |
|          | 12               | 0.0                                  | 0.0   |
| NSA 57   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.0                                  | 0.0   |
|          | 10               | 0.0                                  | 0.0   |
|          | 12               | 0.0                                  | 0.0   |
| NSA 58   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.0                                  | 0.0   |
|          | 10               | 0.0                                  | 0.0   |
|          | 12               | 0.0                                  | 0.0   |
| NSA 59   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.0                                  | 0.0   |
|          | 10               | 0.0                                  | 0.0   |
|          | 12               | 0.0                                  | 0.0   |
| NSA 60   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.0                                  | 0.0   |
|          | 10               | 0.0                                  | 0.0   |
|          | 12               | 0.0                                  | 0.0   |
| NSA 61   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.0                                  | 0.0   |
|          | 10               | 0.0                                  | 0.0   |
|          | 12               | 0.0                                  | 0.0   |
| NSA 62   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |



| Receiver | Wind speed [m/s] | Only Witberg WTG Operational [dB(A)] | Cumulative From All WTGs on 8 Windfarms [dB(A)] |
|----------|------------------|--------------------------------------|---|
|          | 6                | 6.3                                  | 4.7   |
|          | 8                | 7.5                                  | 5.3   |
|          | 10               | 7.5                                  | 5.3   |
|          | 12               | 7.5                                  | 5.3   |
| NSA 63   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 6.1                                  | 4.6   |
|          | 8                | 7.4                                  | 5.3   |
|          | 10               | 7.4                                  | 5.3   |
|          | 12               | 7.4                                  | 5.3   |
| NSA 64   | 2                | 10.1                                 | 9.1   |
|          | 4                | 12.9                                 | 11.9  |
|          | 6                | 22.3                                 | 21.3  |
|          | 8                | 23.6                                 | 22.0  |
|          | 10               | 23.6                                 | 22.0  |
|          | 12               | 23.6                                 | 22.0  |
| NSA 65   | 2                | 7.4                                  | 6.5   |
|          | 4                | 10.2                                 | 9.3   |
|          | 6                | 19.6                                 | 18.7  |
|          | 8                | 20.8                                 | 19.4  |
|          | 10               | 20.8                                 | 19.4  |
|          | 12               | 20.8                                 | 19.4  |
| NSA 66   | 2                | 3.7                                  | 2.8   |
|          | 4                | 6.5                                  | 5.6   |
|          | 6                | 15.9                                 | 15.0  |
|          | 8                | 17.2                                 | 15.7  |
|          | 10               | 17.2                                 | 15.7  |
|          | 12               | 17.2                                 | 15.7  |
| NSA 67   | 2                | 3.5                                  | 2.9   |
|          | 4                | 6.3                                  | 5.7   |
|          | 6                | 15.7                                 | 15.1  |
|          | 8                | 17.0                                 | 15.8  |
|          | 10               | 17.0                                 | 15.8  |
|          | 12               | 17.0                                 | 15.8  |
| NSA 68   | 2                | 2.0                                  | 1.5   |
|          | 4                | 4.8                                  | 4.3   |
|          | 6                | 14.1                                 | 13.7  |
|          | 8                | 15.4                                 | 14.4  |

| Receiver | Wind speed [m/s] | Only Witberg WTG Operational [dB(A)] | Cumulative From All WTGs on 8 Windfarms [dB(A)] |
|----------|------------------|--------------------------------------|---|
|          | 10               | 15.4                                 | 14.4  |
|          | 12               | 15.4                                 | 14.4  |
| NSA 69   | 2                | 0.9                                  | 0.5   |
|          | 4                | 3.7                                  | 3.3   |
|          | 6                | 13.1                                 | 12.7  |
|          | 8                | 14.4                                 | 13.4  |
|          | 10               | 14.4                                 | 13.4  |
|          | 12               | 14.4                                 | 13.4  |
| NSA 70   | 2                | 24.2                                 | 23.8  |
|          | 4                | 27.0                                 | 26.6  |
|          | 6                | 36.3                                 | 36.0  |
|          | 8                | 37.6                                 | 36.7  |
|          | 10               | 37.6                                 | 36.7  |
|          | 12               | 37.6                                 | 36.7  |
| NSA 71   | 2                | 24.5                                 | 24.5  |
|          | 4                | 27.3                                 | 27.3  |
|          | 6                | 36.7                                 | 36.7  |
|          | 8                | 38.0                                 | 37.4  |
|          | 10               | 38.0                                 | 37.4  |
|          | 12               | 38.0                                 | 37.4  |
| NSA 72   | 2                | 12.7                                 | 10.1  |
|          | 4                | 15.5                                 | 12.9  |
|          | 6                | 24.8                                 | 22.3  |
|          | 8                | 26.1                                 | 22.9  |
|          | 10               | 26.1                                 | 22.9  |
|          | 12               | 26.1                                 | 22.9  |
| NSA 73   | 2                | 13.7                                 | 13.7  |
|          | 4                | 16.5                                 | 16.5  |
|          | 6                | 25.9                                 | 25.9  |
|          | 8                | 27.2                                 | 26.5  |
|          | 10               | 27.2                                 | 26.5  |
|          | 12               | 27.2                                 | 26.5  |
| NSA 74   | 2                | 16.3                                 | 13.2  |
|          | 4                | 19.1                                 | 16.0  |
|          | 6                | 28.5                                 | 25.4  |
|          | 8                | 29.8                                 | 26.1  |
|          | 10               | 29.8                                 | 26.1  |
|          | 12               | 29.8                                 | 26.1  |

| Receiver | Wind speed [m/s] | Only Witberg WTG Operational [dB(A)] | Cumulative From All WTGs on 8 Windfarms [dB(A)] |
|----------|------------------|--------------------------------------|---|
| NSA 75   | 2                | 16.7                                 | 13.6  |
|          | 4                | 19.5                                 | 16.4  |
|          | 6                | 28.9                                 | 25.8  |
|          | 8                | 30.2                                 | 26.5  |
|          | 10               | 30.2                                 | 26.5  |
|          | 12               | 30.2                                 | 26.5  |
| NSA 76   | 2                | 18.2                                 | 14.9  |
|          | 4                | 21.0                                 | 17.7  |
|          | 6                | 30.4                                 | 27.1  |
|          | 8                | 31.7                                 | 27.8  |
|          | 10               | 31.7                                 | 27.8  |
|          | 12               | 31.7                                 | 27.8  |
| NSA 77   | 2                | 14.8                                 | 12.0  |
|          | 4                | 17.6                                 | 14.8  |
|          | 6                | 27.0                                 | 24.2  |
|          | 8                | 28.3                                 | 24.9  |
|          | 10               | 28.3                                 | 24.9  |
|          | 12               | 28.3                                 | 24.9  |
| NSA 78   | 2                | 14.5                                 | 11.8  |
|          | 4                | 17.3                                 | 14.6  |
|          | 6                | 26.7                                 | 24.0  |
|          | 8                | 28.0                                 | 24.6  |
|          | 10               | 28.0                                 | 24.6  |
|          | 12               | 28.0                                 | 24.6  |
| NSA 79   | 2                | 2.0                                  | 0.2   |
|          | 4                | 4.8                                  | 3.0   |
|          | 6                | 14.2                                 | 12.4  |
|          | 8                | 15.4                                 | 13.0  |
|          | 10               | 15.4                                 | 13.0  |
|          | 12               | 15.4                                 | 13.0  |
| NSA 80   | 2                | 3.5                                  | 1.7   |
|          | 4                | 6.3                                  | 4.5   |
|          | 6                | 15.7                                 | 13.9  |
|          | 8                | 17.0                                 | 14.6  |
|          | 10               | 17.0                                 | 14.6  |
|          | 12               | 17.0                                 | 14.6  |
| NSA 81   | 2                | 2.8                                  | 1.3   |
|          | 4                | 5.6                                  | 4.1   |

| Receiver | Wind speed [m/s] | Only Witberg WTG Operational [dB(A)] | Cumulative From All WTGs on 8 Windfarms [dB(A)] |
|----------|------------------|--------------------------------------|---|
|          | 6                | 15.0                                 | 13.5  |
|          | 8                | 16.3                                 | 14.2  |
|          | 10               | 16.3                                 | 14.2  |
|          | 12               | 16.3                                 | 14.2  |
| NSA 82   | 2                | 3.1                                  | 1.7   |
|          | 4                | 5.9                                  | 4.5   |
|          | 6                | 15.3                                 | 13.9  |
|          | 8                | 16.6                                 | 14.6  |
|          | 10               | 16.6                                 | 14.6  |
|          | 12               | 16.6                                 | 14.6  |
| NSA 83   | 2                | 9.8                                  | 8.7   |
|          | 4                | 12.6                                 | 11.5  |
|          | 6                | 22.0                                 | 20.9  |
|          | 8                | 23.3                                 | 21.5  |
|          | 10               | 23.3                                 | 21.5  |
|          | 12               | 23.3                                 | 21.5  |
| NSA 84   | 2                | 4.4                                  | 4.5   |
|          | 4                | 7.2                                  | 7.3   |
|          | 6                | 16.6                                 | 16.7  |
|          | 8                | 17.8                                 | 17.4  |
|          | 10               | 17.8                                 | 17.4  |
|          | 12               | 17.8                                 | 17.4  |
| NSA 85   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.4                                  | 0.4   |
|          | 6                | 9.8                                  | 9.8   |
|          | 8                | 11.0                                 | 10.5  |
|          | 10               | 11.0                                 | 10.5  |
|          | 12               | 11.0                                 | 10.5  |
| NSA 86   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 5.1                                  | 5.1   |
|          | 8                | 6.4                                  | 5.8   |
|          | 10               | 6.4                                  | 5.8   |
|          | 12               | 6.4                                  | 5.8   |
| NSA 87   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 6.8                                  | 6.8   |
|          | 8                | 8.0                                  | 7.5   |

| Receiver | Wind speed [m/s] | Only Witberg WTG Operational [dB(A)] | Cumulative From All WTGs on 8 Windfarms [dB(A)] |
|----------|------------------|--------------------------------------|---|
|          | 10               | 8.0                                  | 7.5   |
|          | 12               | 8.0                                  | 7.5   |
| NSA 88   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 4.9                                  | 4.9   |
|          | 8                | 6.1                                  | 5.6   |
|          | 10               | 6.1                                  | 5.6   |
|          | 12               | 6.1                                  | 5.6   |
| NSA 89   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 9.3                                  | 9.3   |
|          | 8                | 10.5                                 | 10.0  |
|          | 10               | 10.5                                 | 10.0  |
|          | 12               | 10.5                                 | 10.0  |
| NSA 90   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.0                                  | 0.0   |
|          | 10               | 0.0                                  | 0.0   |
|          | 12               | 0.0                                  | 0.0   |
| NSA 91   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.0                                  | 0.0   |
|          | 10               | 0.0                                  | 0.0   |
|          | 12               | 0.0                                  | 0.0   |
| NSA 92   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.0                                  | 0.0   |
|          | 10               | 0.0                                  | 0.0   |
|          | 12               | 0.0                                  | 0.0   |
| NSA 93   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.0                                  | 0.0   |
|          | 10               | 0.0                                  | 0.0   |
|          | 12               | 0.0                                  | 0.0   |

| Receiver | Wind speed [m/s] | Only Witberg WTG Operational [dB(A)] | Cumulative From All WTGs on 8 Windfarms [dB(A)] |
|----------|------------------|--------------------------------------|---|
| NSA 94   | 2                | 0.9                                  | 0.9   |
|          | 4                | 3.7                                  | 3.7   |
|          | 6                | 13.1                                 | 13.1  |
|          | 8                | 14.4                                 | 13.8  |
|          | 10               | 14.4                                 | 13.8  |
|          | 12               | 14.4                                 | 13.8  |
| NSA 95   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 7.0                                  | 7.1   |
|          | 8                | 8.3                                  | 7.8   |
|          | 10               | 8.3                                  | 7.8   |
|          | 12               | 8.3                                  | 7.8   |
| NSA 96   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 6.9                                  | 7.0   |
|          | 8                | 8.2                                  | 7.7   |
|          | 10               | 8.2                                  | 7.7   |
|          | 12               | 8.2                                  | 7.7   |
| NSA 97   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 7.2                                  | 7.3   |
|          | 8                | 8.4                                  | 7.9   |
|          | 10               | 8.4                                  | 7.9   |
|          | 12               | 8.4                                  | 7.9   |
| NSA 98   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 6.2                                  | 6.3   |
|          | 8                | 7.5                                  | 7.0   |
|          | 10               | 7.5                                  | 7.0   |
|          | 12               | 7.5                                  | 7.0   |
| NSA 99   | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.0                                  | 0.0   |
|          | 10               | 0.0                                  | 0.0   |
|          | 12               | 0.0                                  | 0.0   |
| NSA 100  | 2                | 0.0                                  | 0.0   |
|          | 4                | 0.0                                  | 0.0   |

| Receiver | Wind speed [m/s] | Only Witberg WTG Operational [dB(A)] | Cumulative From All WTGs on 8 Windfarms [dB(A)] |
|----------|------------------|--------------------------------------|---|
|          | 6                | 0.0                                  | 0.0   |
|          | 8                | 0.0                                  | 0.0   |
|          | 10               | 0.0                                  | 0.0   |
|          | 12               | 0.0                                  | 0.0   |
| NSA 101  | 2                | 2.6                                  | 2.6   |
|          | 4                | 5.4                                  | 5.4   |
|          | 6                | 14.8                                 | 14.8  |
|          | 8                | 16.1                                 | 15.5  |
|          | 10               | 16.1                                 | 15.5  |
|          | 12               | 16.1                                 | 15.5  |
| NSA 102  | 2                | 2.4                                  | 2.4   |
|          | 4                | 5.2                                  | 5.2   |
|          | 6                | 14.6                                 | 14.6  |
|          | 8                | 15.9                                 | 15.3  |
|          | 10               | 15.9                                 | 15.3  |
|          | 12               | 15.9                                 | 15.3  |
| NSA 103  | 2                | 1.8                                  | 1.8   |
|          | 4                | 4.6                                  | 4.6   |
|          | 6                | 14.0                                 | 14.0  |
|          | 8                | 15.3                                 | 14.7  |
|          | 10               | 15.3                                 | 14.7  |
|          | 12               | 15.3                                 | 14.7  |
| NSA 104  | 2                | 0.9                                  | 0.9   |
|          | 4                | 3.7                                  | 3.7   |
|          | 6                | 13.1                                 | 13.1  |
|          | 8                | 14.4                                 | 13.8  |
|          | 10               | 14.4                                 | 13.8  |
|          | 12               | 14.4                                 | 13.8  |

## 5. Discussion & Summary

### Witberg Wind Energy Farm

The modelling results indicate that the SANS 10103:2008 limit of 45 dB(A) will not be exceeded at any of the noise sensitive areas. This includes the cumulative impacts from the other windfarms. **The Witberg Wind Farm along with any of the alternatives currently proposed may therefore proceed and the proposed amendment is acceptable and can be authorised by the Competent Authority.**

### **Cumulative Impacts**

The cumulative impact modelling results indicate that the SANS 10103:2008 limit of 45 dB(A) will not be exceeded at any of the noise sensitive areas. This includes the cumulative impacts from the other seven windfarms that were modelled.

### **Summary**

It is highly likely that the wind noise will provide a masking effect. Furthermore, the modelling assumes the receiver is outdoors at all times.

If the final number of turbines is reduced or the layout changed such that no turbine is moved closer to a noise sensitive area, then remodelling will not be required, provided the final turbine choice sound power level is not greater than that that was used in this report (108.1 dBA).

### **6. Impact Statement**

The overall environmental impact of the changes made to the project scope is rated as low and has not changed from the original noise impact assessment. No additional mitigation measures are required. In addition, there are no additional advantages or disadvantages in relation to the project impacts. The entire site as proposed may be developed with no constraints.

### **7. Conclusion**

The overall environmental noise impact significance remains low taking into account the changes to the turbine specifications and layout. The amended project description does not exceed the SANS 10103:2008 limit of 45 dB(A) at any of the noise sensitive receptors using the data that was modelled. It is my recommendation that based on the results presented here, the granting of an Amended Environmental Authorisation with respect to the noise impacts is deemed acceptable and recommended.



Please feel free to contact us should you have any further requirements. Assuring you of our best attention at all times.

Yours sincerely



Dr Brett Williams

## Annexure A – WTG Positions

| Rietkloof    |              |               | Brandvalley  |              |               | Karreebosch  |              |               |
|--------------|--------------|---------------|--------------|--------------|---------------|--------------|--------------|---------------|
| Longitude    | Latitude     | Elevation [m] | Longitude    | Latitude     | Elevation [m] | Longitude    | Latitude     | Elevation [m] |
| 20°26'24.18" | 33°04'57.38" | 1198          | 20°23'36.20" | 33°01'11.11" | 1322          | 20°30'33.18" | 32°47'27.95" | 938           |
| 20°26'47.81" | 33°04'48.70" | 1200          | 20°23'37.82" | 33°00'58.26" | 1321          | 20°30'30.35" | 32°47'39.93" | 970           |
| 20°26'44.27" | 33°04'27.49" | 1180          | 20°23'45.84" | 33°00'47.17" | 1289          | 20°30'25.50" | 32°46'06.06" | 970           |
| 20°27'13.28" | 33°04'47.13" | 1240          | 20°23'50.44" | 32°58'20.63" | 1190          | 20°30'37.28" | 32°45'58.37" | 940           |
| 20°27'23.56" | 33°04'38.07" | 1211          | 20°24'00.40" | 32°59'35.37" | 1280          | 20°30'37.67" | 32°47'08.43" | 930           |
| 20°27'42.27" | 33°04'52.59" | 1210          | 20°24'11.92" | 33°01'09.07" | 1309          | 20°30'16.42" | 32°48'01.50" | 1026          |
| 20°28'06.39" | 33°04'55.28" | 1182          | 20°24'25.27" | 32°58'16.83" | 1210          | 20°30'18.08" | 32°46'16.71" | 998           |
| 20°26'12.35" | 33°03'50.84" | 1203          | 20°24'24.81" | 33°01'01.27" | 1300          | 20°30'30.19" | 32°49'30.59" | 1120          |
| 20°26'23.02" | 33°03'41.61" | 1230          | 20°24'33.36" | 32°57'59.95" | 1308          | 20°29'33.58" | 32°48'06.46" | 1010          |
| 20°26'31.96" | 33°03'31.15" | 1216          | 20°24'33.87" | 32°57'47.06" | 1320          | 20°30'21.79" | 32°47'49.92" | 989           |
| 20°27'16.77" | 33°03'36.50" | 1180          | 20°24'35.10" | 32°57'21.60" | 1369          | 20°30'14.51" | 32°46'29.04" | 990           |
| 20°30'05.02" | 33°05'08.34" | 1205          | 20°24'37.58" | 32°57'34.56" | 1320          | 20°32'33.58" | 32°50'59.29" | 1058          |
| 20°30'29.33" | 33°05'02.09" | 1219          | 20°24'42.25" | 32°57'10.20" | 1345          | 20°30'42.55" | 32°49'08.53" | 1060          |
| 20°30'38.06" | 33°04'37.14" | 1211          | 20°24'57.51" | 32°55'29.35" | 1420          | 20°30'36.72" | 32°49'19.68" | 1110          |
| 20°30'43.65" | 33°04'50.27" | 1258          | 20°24'59.69" | 32°55'51.45" | 1378          | 20°29'34.59" | 32°47'53.21" | 1030          |
| 20°31'30.21" | 33°04'31.37" | 1228          | 20°25'19.74" | 33°01'12.67" | 1220          | 20°32'41.00" | 32°50'08.37" | 1076          |
| 20°31'27.45" | 33°03'35.42" | 1226          | 20°25'23.79" | 32°55'32.32" | 1400          | 20°30'39.56" | 32°49'47.42" | 1110          |
| 20°31'19.84" | 33°03'19.55" | 1250          | 20°25'33.17" | 33°01'04.80" | 1210          | 20°32'35.96" | 32°50'46.60" | 1062          |
| 20°31'30.90" | 33°03'02.63" | 1220          | 20°25'44.10" | 32°59'03.38" | 1280          | 20°30'44.22" | 32°50'01.99" | 1128          |
| 20°31'38.99" | 33°02'51.75" | 1240          | 20°26'03.36" | 32°56'43.86" | 1340          | 20°30'40.19" | 32°50'14.05" | 1110          |
| 20°31'50.02" | 33°02'42.32" | 1210          | 20°26'17.05" | 32°56'23.90" | 1390          | 20°29'21.94" | 32°48'13.97" | 983           |
| 20°31'45.25" | 33°02'25.62" | 1210          | 20°26'43.07" | 32°55'44.03" | 1405          | 20°30'28.72" | 32°50'36.44" | 1187          |
| 20°31'41.31" | 33°02'13.06" | 1238          | 20°26'46.09" | 32°56'11.32" | 1410          | 20°30'30.87" | 32°50'50.87" | 1147          |
| 20°31'53.12" | 33°02'04.89" | 1250          | 20°27'06.33" | 32°55'54.69" | 1416          | 20°30'18.28" | 32°51'13.52" | 1200          |
| 20°32'03.71" | 33°01'55.61" | 1260          | 20°27'24.88" | 32°59'06.20" | 1290          | 20°30'23.77" | 32°51'02.14" | 1176          |
| 20°32'17.02" | 33°01'49.29" | 1290          | 20°27'50.99" | 32°58'55.95" | 1363          | 20°32'38.21" | 32°50'20.89" | 1070          |
| 20°32'25.08" | 33°01'38.36" | 1320          | 20°28'03.52" | 32°58'48.59" | 1386          | 20°32'40.22" | 32°50'34.94" | 1091          |
| 20°32'20.27" | 33°01'21.93" | 1320          | 20°28'24.33" | 32°59'27.91" | 1308          | 20°28'35.49" | 32°49'52.89" | 1020          |
| 20°32'19.90" | 33°01'09.03" | 1330          | 20°28'24.15" | 32°59'49.80" | 1288          | 20°28'39.78" | 32°50'17.15" | 1113          |
| 20°32'31.75" | 33°01'00.93" | 1318          | 20°28'39.12" | 32°58'36.92" | 1427          | 20°28'40.92" | 32°50'40.74" | 1040          |
| 20°31'58.05" | 33°00'40.83" | 1328          | 20°28'54.42" | 32°58'01.90" | 1510          | 20°28'45.91" | 32°50'53.34" | 1040          |
| 20°32'08.84" | 33°00'31.66" | 1316          | 20°29'05.61" | 32°58'50.45" | 1409          | 20°28'45.03" | 32°51'06.00" | 1058          |
| 20°31'11.16" | 32°59'46.78" | 1351          | 20°29'06.72" | 32°57'54.29" | 1478          | 20°28'30.52" | 32°49'28.62" | 980           |
| 20°30'45.54" | 32°59'46.97" | 1380          | 20°29'11.42" | 32°58'17.90" | 1455          | 20°29'39.51" | 32°47'39.85" | 980           |
| 20°30'20.05" | 32°59'45.72" | 1369          | 20°29'32.94" | 32°57'53.95" | 1409          | 20°25'45.28" | 32°54'17.49" | 1160          |
| 20°29'46.43" | 32°59'42.49" | 1350          | 20°30'20.44" | 32°57'48.80" | 1380          | 20°25'54.12" | 32°54'07.72" | 1160          |
| 20°30'08.70" | 33°00'14.48" | 1288          | 20°30'41.46" | 32°58'10.73" | 1394          | 20°25'56.55" | 32°53'55.13" | 1204          |
| 20°30'01.91" | 33°00'26.02" | 1297          | 20°30'54.18" | 32°58'03.59" | 1369          | 20°26'00.52" | 32°53'43.07" | 1239          |
| 20°29'55.99" | 33°00'38.00" | 1260          | 20°31'44.49" | 32°57'55.13" | 1355          | 20°25'59.73" | 32°53'29.83" | 1230          |
| 20°29'50.86" | 33°00'50.12" | 1260          | 20°31'56.28" | 32°57'46.89" | 1400          | 20°26'15.92" | 32°52'41.15" | 1140          |
| 20°29'53.20" | 33°01'02.82" | 1246          | 20°32'08.84" | 32°57'39.50" | 1366          | 20°26'18.04" | 32°52'28.99" | 1135          |
| 20°29'57.14" | 33°01'15.29" | 1221          | 20°24'24.73" | 32°59'41.10" | 1270          | 20°26'08.04" | 32°51'44.25" | 1051          |
| 20°30'04.93" | 33°01'37.92" | 1200          | 20°24'29.38" | 32°59'28.86" | 1280          | 20°26'09.70" | 32°51'31.34" | 1077          |

| Rietkloof    |              |               | Brandvalley  |              |               | Karreebosch  |              |               |
|--------------|--------------|---------------|--------------|--------------|---------------|--------------|--------------|---------------|
| Longitude    | Latitude     | Elevation [m] | Longitude    | Latitude     | Elevation [m] | Longitude    | Latitude     | Elevation [m] |
| 20°30'11.58" | 33°02'15.16" | 1170          | 20°24'41.92" | 32°59'21.55" | 1270          | 20°26'11.71" | 32°51'18.42" | 1110          |
| 20°30'11.14" | 33°02'33.92" | 1147          | 20°24'53.56" | 32°59'11.12" | 1266          | 20°26'20.20" | 32°51'08.49" | 1114          |
| 20°29'01.92" | 33°02'22.86" | 1156          | 20°25'17.86" | 32°59'04.74" | 1286          | 20°26'26.39" | 32°50'57.28" | 1081          |
| 20°28'23.90" | 33°01'15.40" | 1280          | 20°28'30.60" | 32°58'47.67" | 1420          | 20°26'52.78" | 32°49'30.37" | 940           |
| 20°28'29.59" | 33°01'03.43" | 1231          | 20°28'46.68" | 32°58'13.03" | 1453          | 20°26'59.04" | 32°49'19.29" | 950           |
| 20°28'23.60" | 33°00'44.44" | 1280          | 20°28'51.75" | 32°58'29.66" | 1450          | 20°27'03.74" | 32°49'04.99" | 943           |
| 20°28'32.36" | 33°00'33.88" | 1260          | 20°24'36.81" | 33°00'53.24" | 1243          | 20°27'00.48" | 32°48'50.66" | 960           |
| 20°29'00.01" | 33°02'42.77" | 1120          | 20°23'48.07" | 32°59'42.92" | 1282          | 20°27'03.92" | 32°48'38.36" | 979           |
| 20°33'02.47" | 33°03'28.28" | 1205          | 20°24'06.86" | 32°59'23.72" | 1240          | 20°27'12.12" | 32°48'28.27" | 966           |
| 20°33'05.59" | 33°03'15.57" | 1199          | 20°25'19.90" | 32°58'21.05" | 1270          | 20°30'57.15" | 32°49'02.99" | 1028          |
| 20°33'01.45" | 33°03'01.41" | 1209          | 20°28'21.75" | 32°58'17.34" | 1394          | 20°30'15.51" | 32°49'36.06" | 1081          |
| 20°32'59.88" | 33°02'48.54" | 1204          | 20°29'27.48" | 32°58'07.75" | 1423          | 20°32'42.30" | 32°49'55.32" | 1010          |
| 20°33'03.34" | 33°02'35.90" | 1215          | 20°28'50.03" | 32°59'24.72" | 1336          | 20°25'37.40" | 32°54'27.75" | 1145          |
| 20°27'57.12" | 33°00'36.62" | 1242          | 20°28'36.43" | 32°59'06.60" | 1370          | 20°26'17.47" | 32°52'09.33" | 1080          |
| 20°32'19.70" | 33°00'21.35" | 1290          | 20°25'44.81" | 33°00'55.98" | 1184          | 20°26'48.20" | 32°49'42.23" | 937           |
| 20°31'28.69" | 33°04'54.31" | 1184          |              |              |               | 20°27'11.87" | 32°48'13.14" | 1000          |
| 20°28'27.72" | 33°01'27.87" | 1226          |              |              |               | 20°28'34.86" | 32°50'05.16" | 1086          |
|              |              |               |              |              |               | 20°30'33.63" | 32°50'24.87" | 1147          |
|              |              |               |              |              |               | 20°26'10.75" | 32°52'54.62" | 1150          |
|              |              |               |              |              |               | 20°28'49.93" | 32°49'43.05" | 972           |
|              |              |               |              |              |               | 20°28'45.93" | 32°51'19.95" | 1053          |
|              |              |               |              |              |               | 20°26'00.02" | 32°53'11.41" | 1210          |

| Witberg      |              |               | Esizayo      |              |               | Roggeveld    |              |               |
|--------------|--------------|---------------|--------------|--------------|---------------|--------------|--------------|---------------|
| Longitude    | Latitude     | Elevation [m] | Longitude    | Latitude     | Elevation [m] | Longitude    | Latitude     | Elevation [m] |
| 20°28'08.82" | 33°16'59.07" | 1442.7        | 20°33'40.64" | 32°57'30.35" | 1380          | 20°29'48.80" | 32°56'31.84" | 1392          |
| 20°28'09.84" | 33°17'07.88" | 1450          | 20°35'09.27" | 32°57'22.54" | 1335          | 20°29'59.40" | 32°56'24.35" | 1423          |
| 20°27'58.98" | 33°17'09.71" | 1450          | 20°33'59.92" | 32°57'25.55" | 1370          | 20°30'12.40" | 32°56'18.53" | 1410          |
| 20°27'48.42" | 33°17'11.90" | 1437.6        | 20°38'07.36" | 33°01'29.88" | 1200          | 20°30'19.68" | 32°56'08.68" | 1383          |
| 20°27'29.38" | 33°17'22.74" | 1412.8        | 20°37'22.97" | 33°01'44.37" | 1201          | 20°30'26.37" | 32°55'58.45" | 1370          |
| 20°27'16.41" | 33°17'24.43" | 1410          | 20°38'24.73" | 33°01'23.44" | 1180          | 20°30'20.28" | 32°55'44.74" | 1401          |
| 20°27'02.33" | 33°17'21.48" | 1400          | 20°34'50.00" | 32°57'24.09" | 1333          | 20°30'25.43" | 32°55'34.16" | 1420          |
| 20°26'49.53" | 33°17'19.94" | 1381.7        | 20°38'28.65" | 33°01'07.22" | 1140          | 20°30'30.49" | 32°55'23.53" | 1418          |
| 20°26'51.87" | 33°17'30.93" | 1400          | 20°38'47.93" | 33°01'05.65" | 1120          | 20°30'34.79" | 32°55'12.02" | 1387          |
| 20°26'39.57" | 33°17'31.76" | 1380.9        | 20°38'52.28" | 32°59'00.64" | 1218          | 20°30'49.65" | 32°55'24.78" | 1375          |
| 20°27'07.29" | 33°17'36.05" | 1380          | 20°35'28.53" | 32°57'22.60" | 1294          | 20°31'00.62" | 32°55'17.37" | 1350          |
| 20°26'28.02" | 33°17'32.85" | 1352.2        | 20°36'31.06" | 33°01'13.36" | 1222          | 20°31'08.87" | 32°55'08.31" | 1310          |
| 20°26'15.98" | 33°17'45.06" | 1346.2        | 20°37'48.06" | 33°01'36.33" | 1190          | 20°30'31.77" | 32°54'58.90" | 1328          |
| 20°26'31.76" | 33°18'00.94" | 1340          | 20°34'28.82" | 32°57'22.40" | 1328          | 20°30'33.25" | 32°54'45.24" | 1340          |
| 20°26'18.51" | 33°17'58.18" | 1353.5        | 20°38'34.92" | 32°59'07.08" | 1205          | 20°30'47.32" | 32°54'40.94" | 1340          |
| 20°26'05.34" | 33°17'55.46" | 1370          | 20°36'17.80" | 33°00'21.36" | 1170          | 20°30'59.89" | 32°54'34.73" | 1320          |
| 20°25'51.44" | 33°17'57.28" | 1343.1        | 20°35'08.37" | 33°00'34.12" | 1199          | 20°31'07.55" | 32°54'25.18" | 1320          |

| Witberg      |              |               | Esizayo      |              |               | Roggeveld    |              |               |
|--------------|--------------|---------------|--------------|--------------|---------------|--------------|--------------|---------------|
| Longitude    | Latitude     | Elevation [m] | Longitude    | Latitude     | Elevation [m] | Longitude    | Latitude     | Elevation [m] |
| 20°27'28.41" | 33°16'59.33" | 1378.8        | 20°36'54.18" | 33°01'16.68" | 1199          | 20°31'20.88" | 32°54'19.25" | 1301          |
| 20°27'14.18" | 33°17'00.46" | 1387.1        | 20°38'07.45" | 33°01'08.78" | 1139          | 20°31'29.89" | 32°54'10.58" | 1291          |
| 20°26'59.96" | 33°17'00.88" | 1369.3        | 20°39'15.22" | 32°59'47.79" | 1120          | 20°31'30.66" | 32°53'56.88" | 1260          |
| 20°22'22.34" | 33°17'49.96" | 1230          | 20°35'41.12" | 33°00'37.48" | 1180          | 20°31'35.77" | 32°53'45.18" | 1230          |
| 20°21'59.66" | 33°17'54.29" | 1220          | 20°38'32.57" | 33°00'50.99" | 1077          | 20°31'41.21" | 32°53'34.61" | 1194          |
| 20°21'45.50" | 33°17'54.78" | 1220          | 20°35'58.51" | 33°00'26.17" | 1160          | 20°31'47.35" | 32°53'24.44" | 1200          |
| 20°21'31.88" | 33°17'54.92" | 1220          | 20°37'46.52" | 33°00'03.77" | 1100          | 20°31'55.36" | 32°53'15.25" | 1230          |
| 20°28'23.16" | 33°17'04.97" | 1424.4        | 20°37'03.75" | 33°01'31.32" | 1190          | 20°32'04.80" | 32°53'06.84" | 1218          |
| 20°25'38.42" | 33°17'59.93" | 1320.1        | 20°38'09.70" | 32°59'49.23" | 1120          | 20°32'14.43" | 32°52'57.72" | 1173          |
| 20°26'44.72" | 33°17'59.29" | 1340          | 20°39'11.54" | 32°59'02.32" | 1200          | 20°32'23.56" | 32°52'49.13" | 1180          |
|              |              |               | 20°38'21.34" | 32°59'29.78" | 1128          | 20°32'29.26" | 32°52'38.65" | 1188          |
|              |              |               | 20°37'05.80" | 33°01'03.72" | 1145          | 20°32'48.91" | 32°52'22.79" | 1230          |
|              |              |               | 20°38'32.85" | 32°59'42.80" | 1119          | 20°32'57.06" | 32°52'13.58" | 1205          |
|              |              |               | 20°39'48.11" | 32°59'12.16" | 1180          | 20°32'36.70" | 32°52'27.87" | 1240          |
|              |              |               | 20°36'45.10" | 32°59'08.38" | 1165          | 20°30'05.26" | 32°54'21.85" | 1304          |
|              |              |               | 20°40'51.63" | 32°59'26.94" | 1174          | 20°29'51.83" | 32°54'06.01" | 1298          |
|              |              |               | 20°35'08.94" | 32°58'32.35" | 1196          | 20°30'03.85" | 32°54'00.56" | 1313          |
|              |              |               | 20°38'15.65" | 32°59'07.03" | 1179          | 20°30'10.80" | 32°53'50.33" | 1286          |
|              |              |               | 20°37'19.56" | 32°59'58.82" | 1105          | 20°30'13.89" | 32°53'38.86" | 1270          |
|              |              |               | 20°35'05.32" | 32°57'42.00" | 1251          | 20°30'21.01" | 32°53'26.18" | 1270          |
|              |              |               | 20°37'21.71" | 32°59'06.87" | 1158          | 20°30'25.68" | 32°53'15.42" | 1261          |
|              |              |               | 20°36'35.18" | 33°00'14.92" | 1120          | 20°30'24.66" | 32°53'04.04" | 1236          |
|              |              |               | 20°35'40.16" | 32°57'06.40" | 1197          | 20°30'18.27" | 32°52'44.60" | 1270          |
|              |              |               | 20°35'24.40" | 32°58'22.66" | 1210          | 20°32'25.36" | 32°51'34.69" | 1100          |
|              |              |               | 20°36'56.46" | 32°59'53.88" | 1111          | 20°32'28.27" | 32°51'23.15" | 1089          |
|              |              |               | 20°35'07.17" | 32°57'58.25" | 1221          | 20°32'33.48" | 32°51'12.61" | 1087          |
|              |              |               | 20°35'21.92" | 33°00'22.80" | 1161          | 20°30'34.11" | 32°52'41.54" | 1240          |
|              |              |               | 20°36'40.63" | 33°01'28.00" | 1160          | 20°30'05.02" | 32°52'46.81" | 1230          |
|              |              |               | 20°39'40.12" | 33°00'25.20" | 1060          | 20°29'29.70" | 32°56'43.50" | 1410          |
|              |              |               | 20°39'28.85" | 32°59'08.86" | 1182          | 20°29'30.70" | 32°56'58.59" | 1419          |
|              |              |               | 20°37'21.56" | 32°59'42.59" | 1118          |              |              |               |
|              |              |               | 20°36'58.31" | 33°00'11.74" | 1104          |              |              |               |
|              |              |               | 20°34'53.49" | 32°58'42.04" | 1171          |              |              |               |
|              |              |               | 20°38'11.37" | 33°00'52.55" | 1083          |              |              |               |
|              |              |               | 20°36'27.28" | 33°00'57.11" | 1142          |              |              |               |
|              |              |               | 20°35'34.50" | 32°56'40.40" | 1141          |              |              |               |
|              |              |               | 20°34'46.05" | 32°57'45.19" | 1246          |              |              |               |
|              |              |               | 20°35'31.94" | 32°58'58.40" | 1160          |              |              |               |

| Soetwater    |              |               | Karusa       |              |               |
|--------------|--------------|---------------|--------------|--------------|---------------|
| Longitude    | Latitude     | Elevation [m] | Longitude    | Latitude     | Elevation [m] |
| 20°42'02.34" | 32°44'33.40" | 1420          | 20°37'51.20" | 32°46'50.73" | 1310          |
| 20°41'15.97" | 32°44'03.45" | 1395          | 20°37'43.61" | 32°46'58.09" | 1310          |
| 20°40'51.47" | 32°43'54.06" | 1408          | 20°38'45.89" | 32°47'29.63" | 1315          |
| 20°40'28.05" | 32°43'46.64" | 1410          | 20°38'38.17" | 32°47'36.42" | 1340          |
| 20°40'25.19" | 32°43'55.65" | 1394          | 20°38'30.19" | 32°47'42.67" | 1333          |
| 20°40'10.60" | 32°43'58.52" | 1390          | 20°38'13.19" | 32°47'44.41" | 1309          |
| 20°40'05.60" | 32°44'06.40" | 1390          | 20°37'58.00" | 32°47'49.47" | 1231          |
| 20°39'54.17" | 32°44'10.83" | 1384          | 20°37'43.41" | 32°47'52.40" | 1241          |
| 20°39'38.74" | 32°44'12.97" | 1370          | 20°37'29.87" | 32°47'55.90" | 1260          |
| 20°39'23.12" | 32°44'14.92" | 1347          | 20°37'18.09" | 32°48'00.65" | 1256          |
| 20°39'05.72" | 32°44'15.58" | 1360          | 20°37'09.37" | 32°48'17.43" | 1250          |
| 20°38'58.76" | 32°44'30.92" | 1316          | 20°37'05.78" | 32°48'29.30" | 1250          |
| 20°38'53.65" | 32°44'38.90" | 1310          | 20°37'03.39" | 32°48'38.68" | 1263          |
| 20°38'44.38" | 32°44'44.99" | 1320          | 20°37'01.31" | 32°48'48.00" | 1286          |
| 20°38'34.41" | 32°44'50.65" | 1320          | 20°37'05.58" | 32°49'00.08" | 1280          |
| 20°38'24.65" | 32°44'56.35" | 1310          | 20°37'08.81" | 32°49'11.83" | 1238          |
| 20°38'13.37" | 32°45'12.42" | 1293          | 20°37'05.55" | 32°49'39.38" | 1212          |
| 20°37'59.92" | 32°45'15.87" | 1290          | 20°37'01.28" | 32°49'47.88" | 1244          |
| 20°37'43.52" | 32°45'17.59" | 1320          | 20°36'57.13" | 32°49'56.41" | 1270          |
| 20°37'32.83" | 32°45'22.59" | 1314          | 20°36'54.97" | 32°50'05.91" | 1260          |
| 20°37'36.62" | 32°45'34.30" | 1308          | 20°36'49.90" | 32°50'14.04" | 1260          |
| 20°37'40.40" | 32°45'46.10" | 1330          | 20°36'46.66" | 32°50'23.60" | 1264          |
| 20°44'16.41" | 32°46'12.27" | 1364          | 20°36'30.49" | 32°50'48.94" | 1240          |
| 20°43'52.03" | 32°46'28.21" | 1308          | 20°36'18.84" | 32°50'53.80" | 1206          |
| 20°42'34.39" | 32°47'23.36" | 1150          | 20°36'03.62" | 32°51'32.40" | 1226          |
| 20°41'47.31" | 32°47'53.19" | 1189          | 20°35'52.88" | 32°51'37.49" | 1246          |
| 20°41'50.47" | 32°48'08.06" | 1213          | 20°35'42.80" | 32°51'43.27" | 1227          |
| 20°41'40.83" | 32°48'13.55" | 1237          | 20°37'48.68" | 32°52'51.08" | 1230          |
| 20°41'54.15" | 32°44'39.15" | 1379          | 20°38'12.30" | 32°52'52.82" | 1211          |
| 20°38'48.16" | 32°44'16.36" | 1360          | 20°38'31.47" | 32°52'50.99" | 1210          |
| 20°38'21.03" | 32°45'05.39" | 1300          | 20°38'38.54" | 32°52'43.53" | 1213          |
| 20°37'50.74" | 32°46'02.55" | 1275          | 20°38'41.70" | 32°52'33.65" | 1180          |
| 20°43'50.02" | 32°45'45.80" | 1370          | 20°38'45.44" | 32°52'24.46" | 1160          |
| 20°43'37.55" | 32°45'51.04" | 1370          | 20°38'47.29" | 32°52'14.22" | 1150          |
| 20°44'18.42" | 32°46'02.09" | 1390          | 20°37'32.90" | 32°46'24.23" | 1301          |
| 20°43'56.76" | 32°46'06.28" | 1366          | 20°37'34.92" | 32°46'36.21" | 1304          |
| 20°42'26.69" | 32°47'33.01" | 1212          | 20°38'00.19" | 32°47'11.17" | 1339          |
| 20°42'19.71" | 32°47'39.68" | 1243          | 20°37'58.80" | 32°47'21.36" | 1347          |
| 20°42'11.23" | 32°47'45.05" | 1248          | 20°39'43.02" | 32°47'33.21" | 1285          |
| 20°41'58.19" | 32°47'48.04" | 1208          | 20°39'36.53" | 32°47'40.47" | 1326          |

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| Soetwater    |              |               | Karusa       |              |               |
|--------------|--------------|---------------|--------------|--------------|---------------|
| Longitude    | Latitude     | Elevation [m] | Longitude    | Latitude     | Elevation [m] |
| 20°41'33.74" | 32°48'20.42" | 1250          | 20°39'29.70" | 32°47'47.63" | 1333          |
| 20°41'21.77" | 32°48'22.99" | 1267          | 20°39'12.94" | 32°47'45.63" | 1321          |
| 20°41'15.33" | 32°48'30.06" | 1270          | 20°37'09.81" | 32°48'06.67" | 1240          |

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4<sup>th</sup> September 2018

Mr. S. Taylor  
Savannah Environmental (Pty) Ltd  
PO Box 148  
Sunninghill  
2157

Dear Mr Taylor

**REDUCTION OF WIND TURBINES – WITBERG WIND ENERGY PROJECT**

As per our recent correspondence, I have been informed that the developer of the above project wishes to further reduce the number of turbines from 27 to 25 turbines.

I had modelled the noise impacts in August 2018 based on the 27 turbine layout. This further reduction in turbines will thus reduce the noise impacts from that which was modelled in August.

Yours sincerely



Dr Brett Williams