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Australian Government
Bureau of Meteorology



In reply, please quote:
Twin Creek wind farm

14 February 2024

Ms. section 22: remove by consent
DNV Australia Pty Ltd
Section 22: remove by consent
Section 22: remove by consent

Dear section 22: remove by consent

The Bureau has carried out a technical assessment of the potential effects of the proposed Twin Creek wind farm development on the Adelaide (Buckland) weather radar, located 62 km northeast of the proposed development.

The assessment found that any wind farm built at the proposed Twin Creek site would pose a high risk of interference to a segment of the Adelaide (Buckland Park) weather radar.

This high-risk rating is due to the following factors:

- The proximity to a meteorological radar that serves a capital city (Adelaide),
- Turbines with a 220 m tip height will potentially affect a segment of the Adelaide radar,
- The Morgan township, with a population of around 500, lies behind the Twin Creek wind farm and will most likely lose weather radar coverage from the Adelaide (Buckland Park) radar (Figure 1).

Implications

The proximity of the Twin Creek wind farm to the Buckland Park radar (62 km) is likely to compromise the Bureau's ability to evaluate the severity of thunderstorms in the wind farm area, which in turn is likely to affect the evaluation of rainfall, wind and hail produced by these storms, impacting the accuracy of severe thunderstorm warnings. The warnings for severe weather caused by systems other than thunderstorms will be less impacted by the proposed development.

Ideally the wind farm should be placed at a distance where the tops of the blades are below the radar scan. This distance varies from site to site, depending on the height of the terrain and radar scan. For Buckland Park, we would be comfortable with a wind farm placed beyond 100 km from the radar in the northeast direction.

Melbourne Office

GPO Box 1289, Melbourne VIC 3001 Australia | T: +61 3 9669 4000 | www.bom.gov.au | ABN 92 637 533 532

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There are a few aspects of the climatology of storms affecting the Adelaide area that would allow the Bureau to continue to provide existing services on the condition that some mitigation measures are introduced (see Options). These climatologic aspects are:

- Severe thunderstorms around Adelaide are less frequent than other capital cities.
- The prevailing directions of severe thunderstorms impacting Adelaide is from the northwest, and the Buckland Park radar has an unobstructed view to them.
- Less frequently storms develop to the north and northeast of the proposed site. In these rare cases, we expect that the 62 km distance allows for the evaluation of the storm's severity once they have passed the wind farm site, once mitigation measures are put in place.

The most impacted service is likely to be the rainfall estimates that feed into hydrological services (e.g. flood forecasts) in the impacted Adelaide radar coverage area east of the Twin Creek wind farm. The impact on wind observations and forecasts cannot be neglected either.

Options

The Bureau recommends the following options to remediate the impacts on real time rainfall observations and forecasts as described above:

- East side of the wind farm, "downstream" of the radar (Figure 1), in the area around and to the east of Morgan, we recommend the installation of rain gauges, and automatic weather stations (AWS), with precise numbers and locations to be determined.
- West side of the wind farm towards Adelaide, we also recommend the installation of rain gauges and automatic weather stations, with precise numbers and locations to be determined.

The design of the network to include new rain gauges and automatic weather stations would need to be assessed.

The algorithms that are part of the Bureau's Rainfields¹ software would need to be adjusted and maintained, together with the development and provision of new layers of data in the visualization tools used by the forecasters. The costs of these measures will need proper assessment and estimates.

Even with the above mitigation measures in place, the impact on the radar's lower elevation scan (beyond 62 km) cannot be compensated. There will be rare occasions when fast moving severe thunderstorms will form directly and suddenly at the wind farm location, and the presence of the farm will impact the early detection of these cases.

¹ Rainfields is a comprehensive framework providing real-time quality controlled, quantitative precipitation estimation and quantitative precipitation forecasting for the operational Australian weather radar network.

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Continue the conversation

We would like to continue the conversation and work with you to minimise and manage the impacts of the Twin Creek wind farm project on the regional radar service.

The Bureau's Strategic Relationship Framework Agreement is a non-binding agreement for wind farm developers and the Bureau to document a commitment to work together to:

- support developers in establishing and operating wind energy projects with an impact assessment,
- minimise and manage potential impacts of wind farm projects on the Bureau's capacity to perform its functions under the Meteorology Act 1955.

We would be pleased to discuss our impact assessment further and to provide you with the agreement template for you to review.

The Bureau is committed to providing products and services that benefit the Australian community and support innovation in industry.

Please direct further correspondence to energy@bom.gov.au including Twin Creek wind farm in the subject line and let us know if you have any queries.

Yours sincerely,

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[Redacted signature block]

Bryan Hodge PSM | General Manager Observing Systems & Operations | Chief Engineer
Data and Digital Group
Bureau of Meteorology
GPO Box 1289 Melbourne VIC 3001

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Figure 1

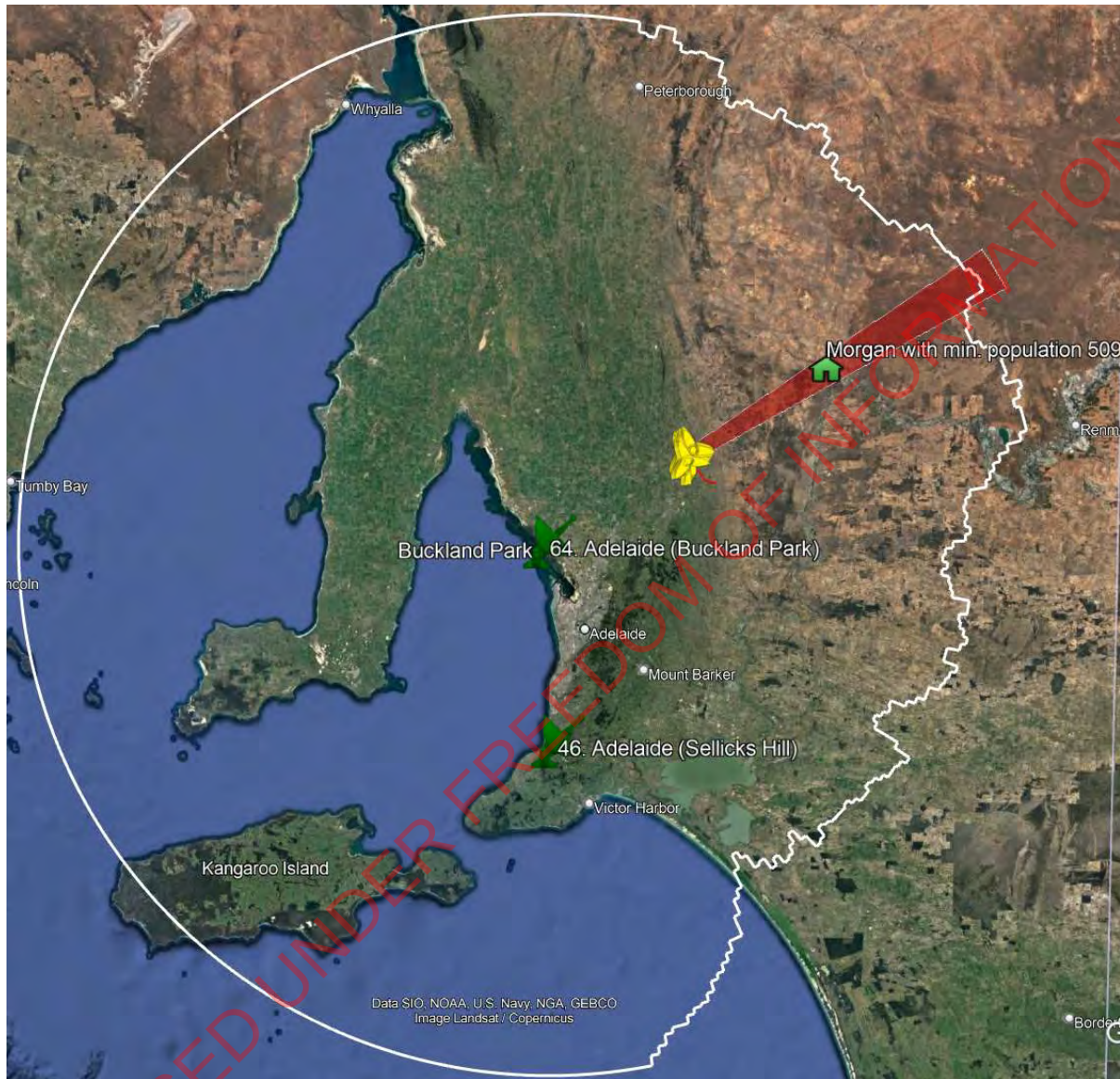


Figure 1 shows the existing coverage from the Buckland Park radar in the area enclosed by the irregular white circle. The red shaded sector shows the area in which radar coverage will be impaired by the installation of wind turbines at Twin Creek. The green house icon indicates the location of the Morgan township, being approximately 70 km from the Twin Creek development.



Guidelines for Wind Farm Inquiry

The Bureau will make any effort to quickly investigate the impact of any proposed wind farm on its radiocommunication assets including radar networks and provide the response to wind farm developers. While the Bureau's aim is not to delay such process for more than three weeks, the actual response time depends on other priorities within the Bureau.

Providing complete information, as outlined here, would accelerate such process. Please submit files requested in this form at windfarmenquiries@bom.gov.au

1. Name of wind farm, developers, and consulting company (if any).

Wind farm: Twin Creek Wind Farm

Developer: RES Pty Limited

Consultant: DNV Australia Pty Ltd

2. Contact point(s) for any further discussion (email and phone number).

Developer: **section 22: remove by consent**, **section 22: remove by consent**

Consultant: **section 22: remove by consent**, **section 22: remove by consent**

3. Approximate location (description) of proposed farm by addressing the closest city/town and respective location of the farm.

5.5 km south of Eudunda and 14 km east of Kapunda

4. Number of turbines in the proposed farm.

42

5. Maximum and Minimum elevation of land where turbines are located.

340 m minimum, 481 maximum

6. Turbines Tip Height in meters.

220 m

Guidelines for Wind Farm Inquiry

7. Turbines Hub Height in meters.

134 m

8. Turbines Blades Diameter in meters.

172 m

9. Expected year of completion of the proposed wind farm.

2026

10. Please submit following files along with the completed form at **windfarmenquiries@bom.gov.au**

- a. The coordinates (in Long and Lat) of turbines in CSV format (Given the early stage of farm design, it is understandable that turbines location might slightly change in final plan).
- b. A KML file showing the turbine location highlighted on map with a unique turbine ID.
- c. A KML file showing boundary of the windfarm.

11. Any additional information.

Document 3

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From: [REDACTED]
Sent: Thursday, 11 January 2024 3:29 PM
To: [REDACTED]
Subject: RE: Requesting details of FWN station around Twin Creek wind farm South Australia for EMI Assessment [SEC=OFFICIAL]

Hi [REDACTED]

I have just checked our records here and I cannot see any sites that run through the proposed windfarm site. Hansborough sends its data to the north to Mt Horrocks repeater and Mt Rufus & Kapunda sends theirs to the south to Mount Lofty.

Cheers,

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Data & Digital, Adelaide Observation Hub

Section 22: remove by consent

www.bom.gov.au



The Bureau of Meteorology acknowledges the Traditional Custodians of Australia and their continuing connection to land, sea and community.

Important: This message may contain confidential or legally privileged information. If you think it was sent to you by mistake, please delete all copies and advise the sender.

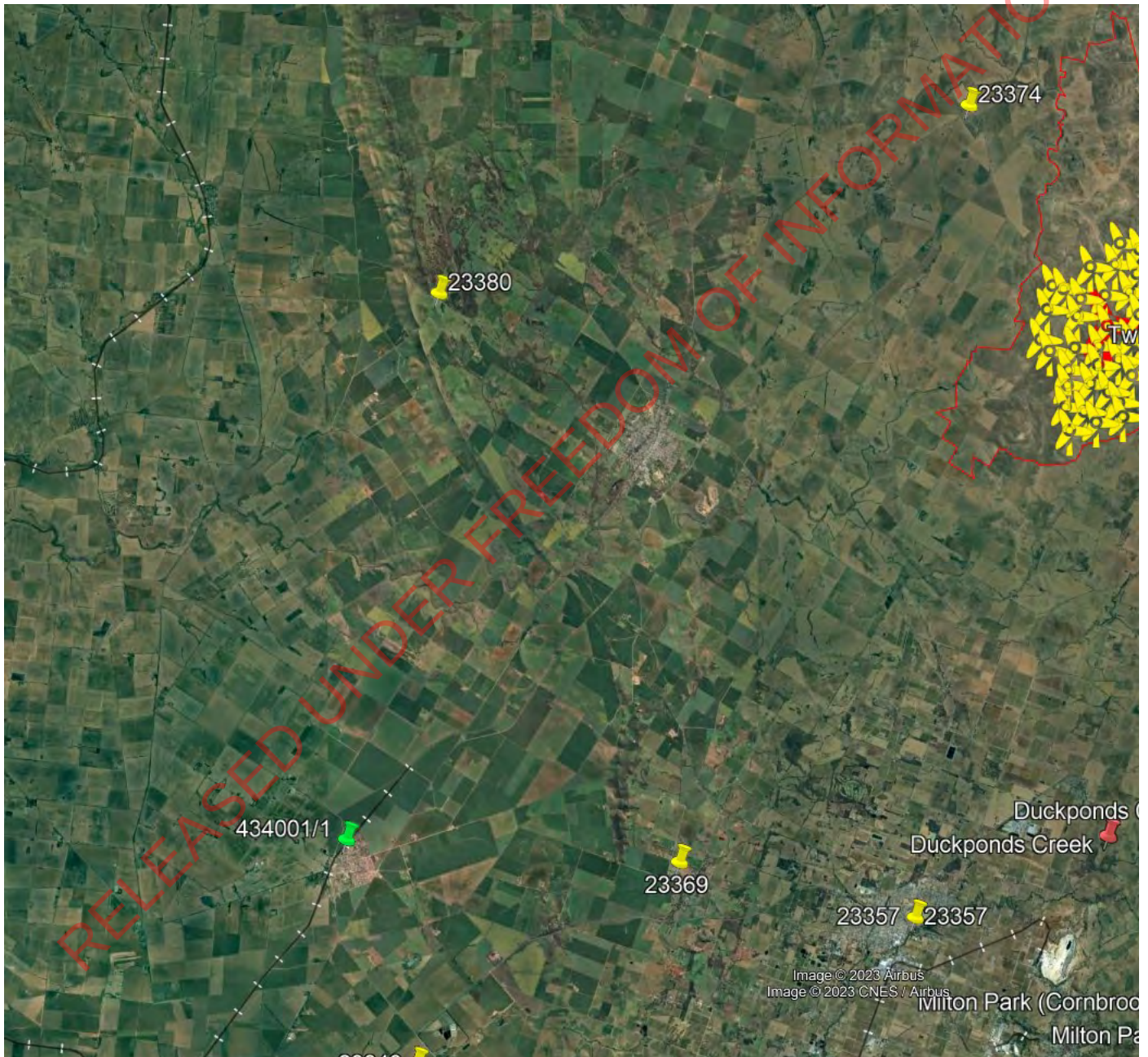
From: section 22: remove by consent
Sent: Monday, January 8, 2024 9:26 AM
To: section 22: remove by consent OOHA Flood Warning Lead <OOHA.floodwarn@bom.gov.au>
Cc: section 22: remove by consent
Subject: Requesting details of FWN station around Twin Creek wind farm South Australia for EMI Assessment [SEC=OFFICIAL]

Hi [REDACTED]

Happy new year and hope you had a nice break!

I was working on the assessment of a proposed Twin creek wind farm about 15 km east of the Kapunda (.KML of the turbine location and the boundary of the wind farm are attached for reference). There are few stations of FWN around the Twin creek wind farm, which are listed and shown in the image below.

- 23379 MOUNT RUFUS (DUTTON)
- 23374 HANSBOROUGH
- 23380 KAPUNDA WEST (KAPLEE)



Could you please check if any of our radio links pass through the wind farm and maybe impacted by the development. The two critical stations, depending on the locations of the terminals they are connecting to, from the above image are #23379 and #23380. In case there is a radio link passing through the wind farm, please share the coordinate of the stations and their antenna height so we can investigate this further and coordinate with the developers.

Regards,

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Observing Systems & Operations, Data and Digital Group

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Document 4

From: [REDACTED]
To: [REDACTED]
Subject: Twin Creek - service evaluation [SEC=OFFICIAL]
Date: Monday, 12 February 2024 4:05:51 PM
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)

Hi [REDACTED]

Here is an evaluation of services impact with the Twin Creek development.

The Bureau uses the Buckland Park radar data to provide:

- warnings for severe thunderstorms (hail, winds, rainfall)
- detailed warnings for severe thunderstorms (for the metro area near capital cities).
- warnings for severe weather (rainfall and winds produced by other systems than thunderstorms)

The technical evaluation of the impact of the proposed location of the wind farm on the quality of the radar data concludes that it represents "extreme-risk".

The main reason of this high impact is due to the proximity to **a high tier radar that serves a capital city**. This short distance allows the wind turbines to introduce **clutter** in the radar data, which can compromise the quantitative evaluation of severity of thunderstorms that will develop in the wind farm area, which in turn impacts the evaluation of the severity of rain, wind and hail produced by these storms, impacting the accuracy of severe thunderstorms warnings and in particular the detailed warning. The warnings for severe weather (rainfall and winds produced by other systems than thunderstorms) will be less impacted by the proposed development.

Ideally the wind farm should be placed at a distance where the tops of the blades are below the radar horizon. This precise distance varies from site to site, depending on the height of the terrain and radar technical capabilities. For Buckland Park, we would be comfortable with a wind farm placed beyond 100 km in the NE azimuth.

However, there are few aspects of the specific climatology of storms that impact the city of Adelaide that would allow the provision of the service with the condition of some mitigation measures. These climatologic aspects are:

1. Severe thunderstorms around Adelaide are less frequent than other capital cities.
2. The prevailing directions of severe thunderstorms that track towards Adelaide metro area are in the NW quadrant (eg they form somewhere northwest of Adelaide and the Buckland Park radar has unobstructed view to them).
3. The less frequent quadrants that might be impacted by the proposed site, are the North and North East. For these rare cases, it is expected that the 61 km

distance from the radar is long enough to give sufficient time to evaluate the severity of the storms once the storms have passed the farm site, if some mitigation measures are put in place.

Mitigation:

A number of rain gauges could be installed in the area of the wind farm, about 15 km apart. This would allow correction of the estimated rain produced by the thunderstorms that cross the windfarm or form behind the windfarm.

A small number of automated weather station could be installed near the wind farm, ideally one upwind and one downwind relative to the azimuth Buckland Park to the wind farm.

The design of the network of new rain gauges and automatic stations is still to be assessed.

Software development to customize the applications currently used by the Bureau to provide the warnings based on radar data. As examples, the algorithms that are part of the Rainfields software would need to be adjusted and maintained, together with the development and provision of new layers of data in the visualization tools used by the forecasters. The costs of these measures will need proper assessment and estimates.

Worth mentioning that even with these mitigation measures in place, the impact on the dual polarimetry data in the lower elevations cannot be compensated, and also, there will be rare occasions when fast moving severe thunderstorms will form directly and suddenly at the farm location, and the presence of the farm will impact the early detection of these cases.

All the best,

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Community Services Group | Severe Weather Prediction Services
Australian Bureau of Meteorology
GPO Box 1289 Melbourne VIC 3001

Section 22: remove by consent | www.bom.gov.au



[Chat on teams!](#)

I acknowledge all traditional custodians of country throughout Australia, their continuing connection to land, sea and community, and pay my respects to Elders both past and present.





The Bureau
of Meteorology

Twin creek wind farm - EMI Assessment WR 679

OTE & Radar Engineering

Spectrum and Radiation Hazards

Initial request date: 30 Nov 2023

RES Pty Limited/DNV Australia Pty Ltd

Assessment

The investigations suggested that the proposed wind farm can potentially impact first three scans of the Buckland park radar, which is a major impact on radar quality, and is thus assessed to be an **Extreme-risk** development.

Outline

- Contact details
- Wind farm (WF) parameters
- Geographical location
- Neighbouring Bureau systems (radars and communications)
- Affected Bureau assets
- Impact analysis
 - 3dB-beamwidth contamination
 - Power-level simulations
- Summary and assessment



Contact

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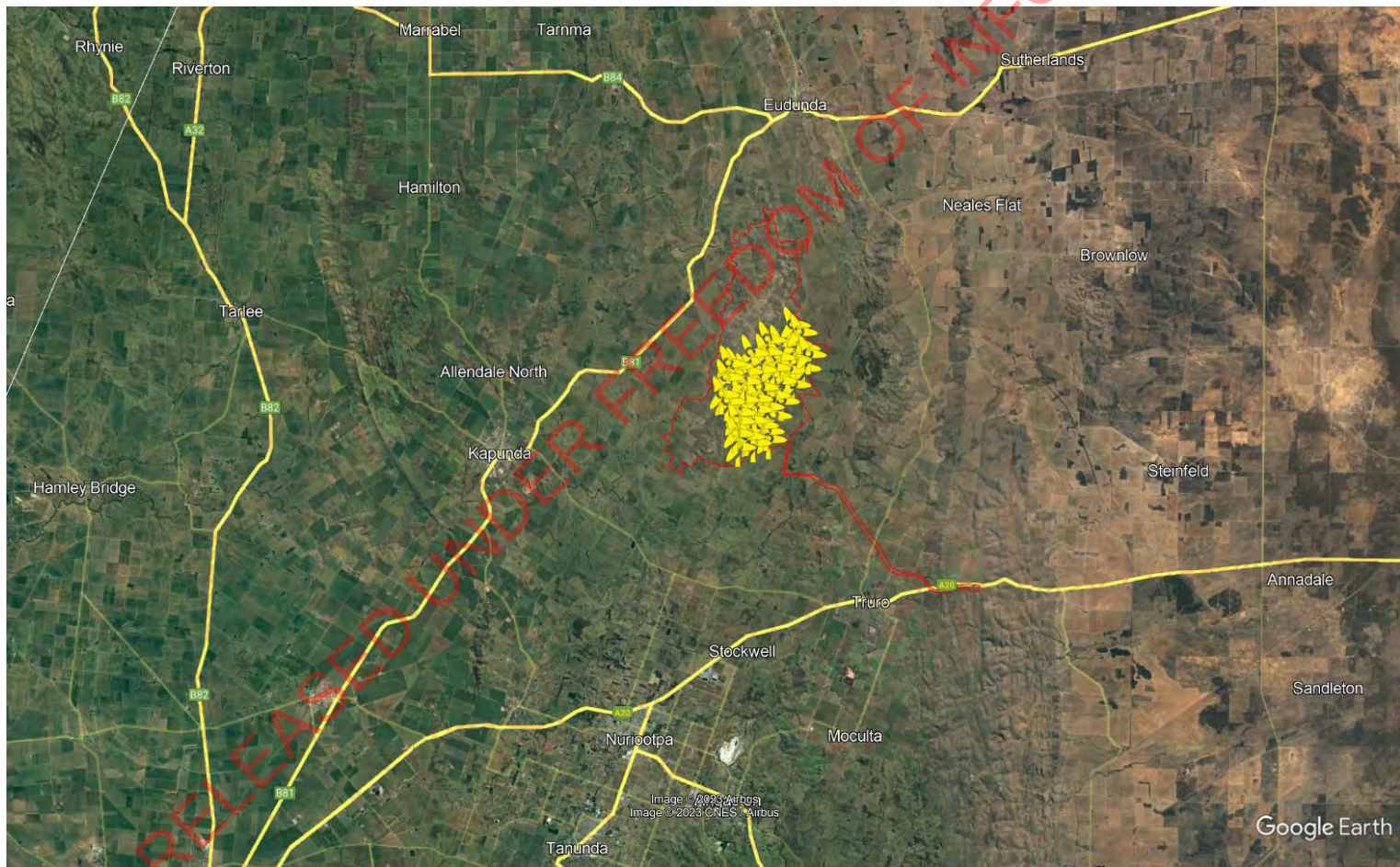
Wind farm parameters

Number of turbines	42
Turbine Tip height (m)	220
Turbine Hub height (m)	134
Turbine Blade diameter (m)	172
Expected year of completion	2026
Maximum elevation (m)	340
Minimum elevation (m)	481



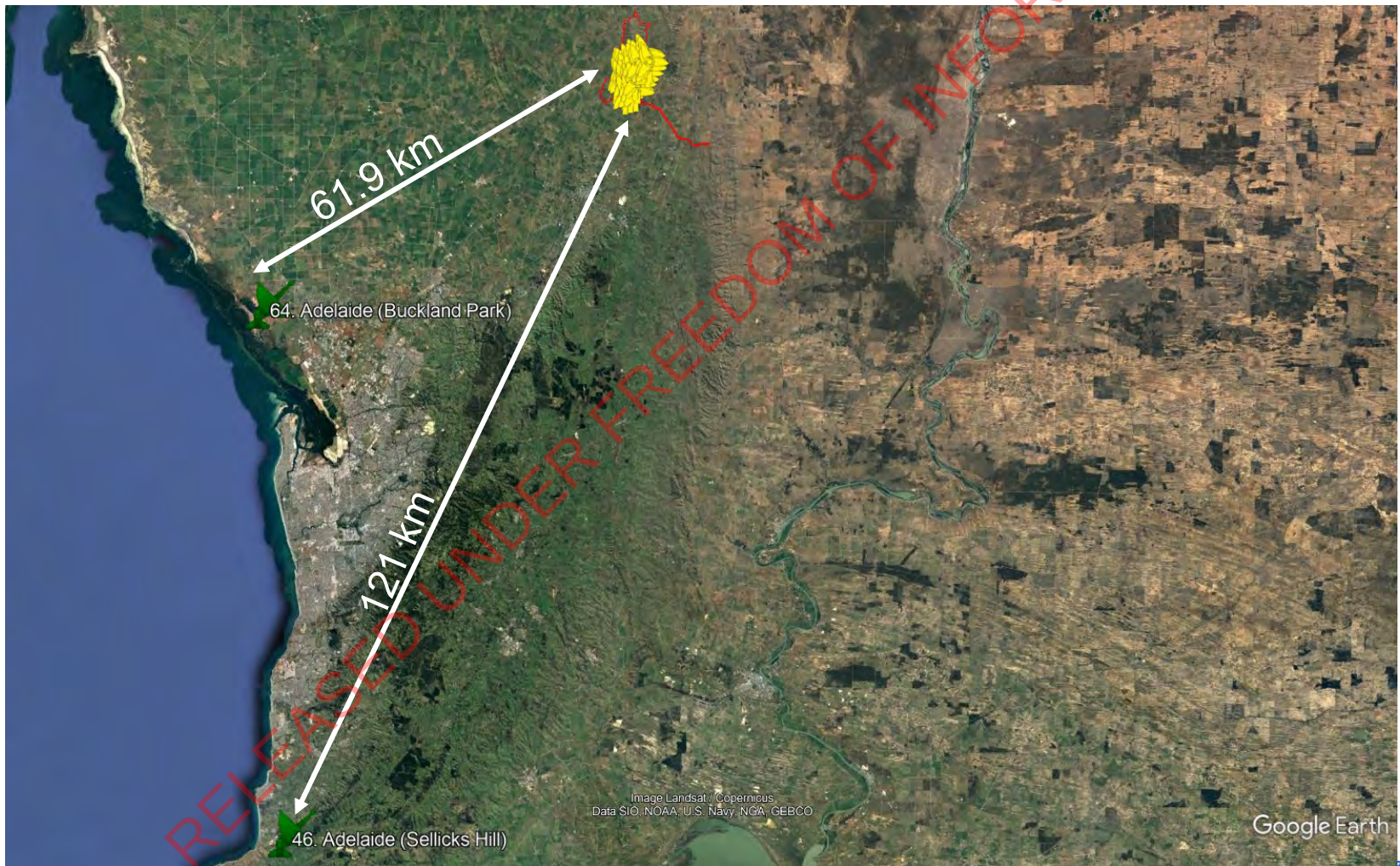
Geographical location

5.5 km south of Eudunda and 14 km east of Kapunda.



Neighbouring Bureau systems

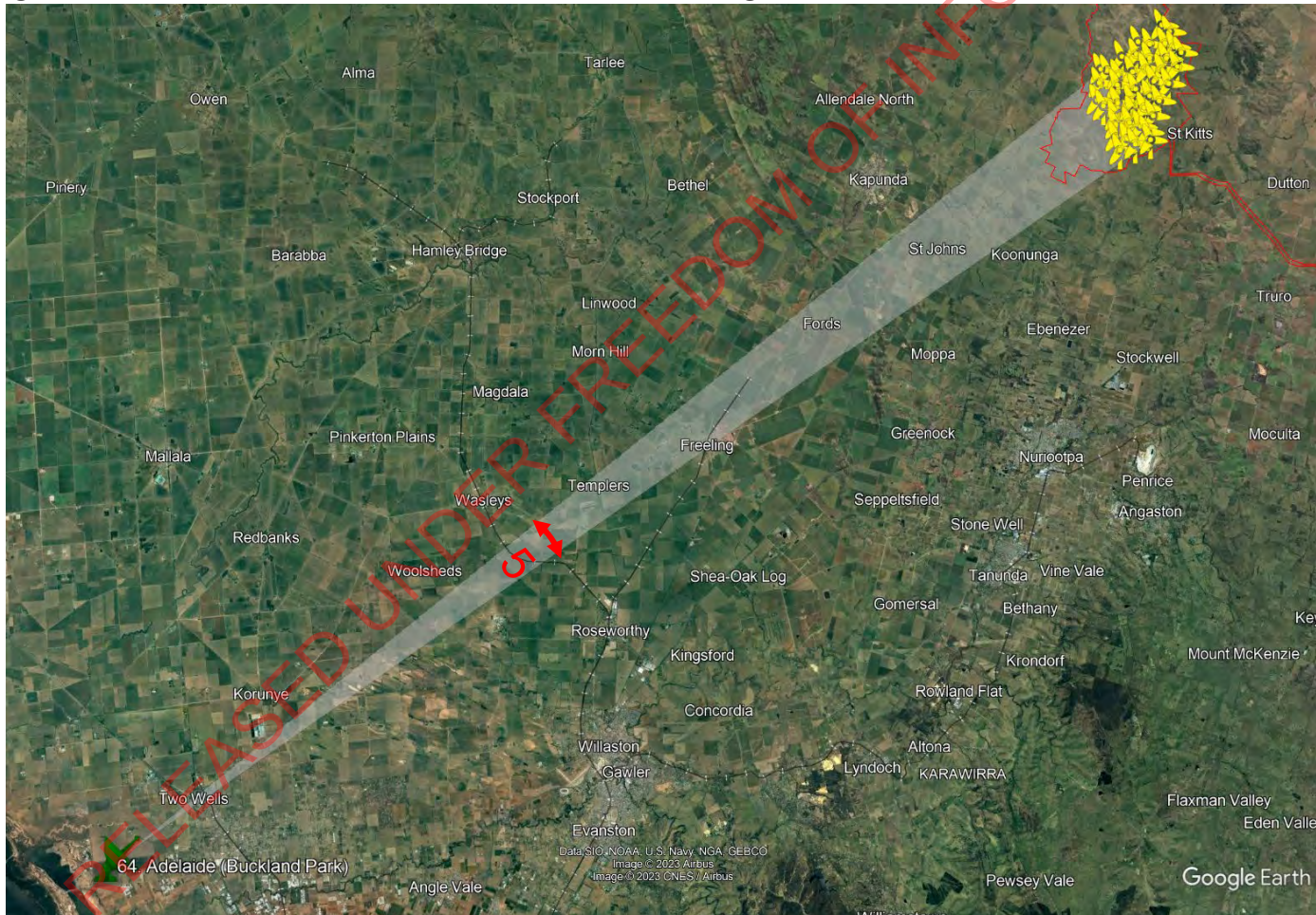
Bureau's closest weather radars are Buckland Park and Sellicks Hill in Adelaide. No P2P or PMP licenced station close to the wind farm.



Affected Bureau assets

Adelaide (Buckland Park) Denial

- Existing at 62 km in radials between 56 – 61 deg around Buckland Park radar.



Affected Bureau assets

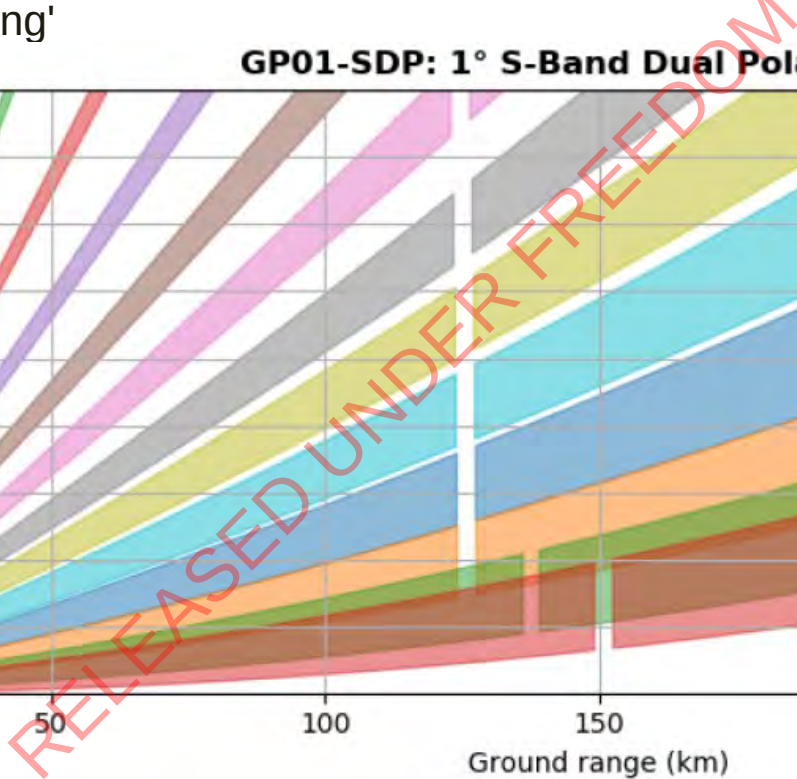
Adelaide (Buckland Park)

Radar	Adelaide (Buckland Park)
Type	Meteor1500SDP
Lat/Long	-34.616962/138.468366
Radar altitude (m)	7
Licence No.	1329003/2
Power (kW)	850
Antenna Height (m)	25
Frequency (MHz)	2860
Beamwidth (deg.)	1.0



Buckland Park – Scan Configuration

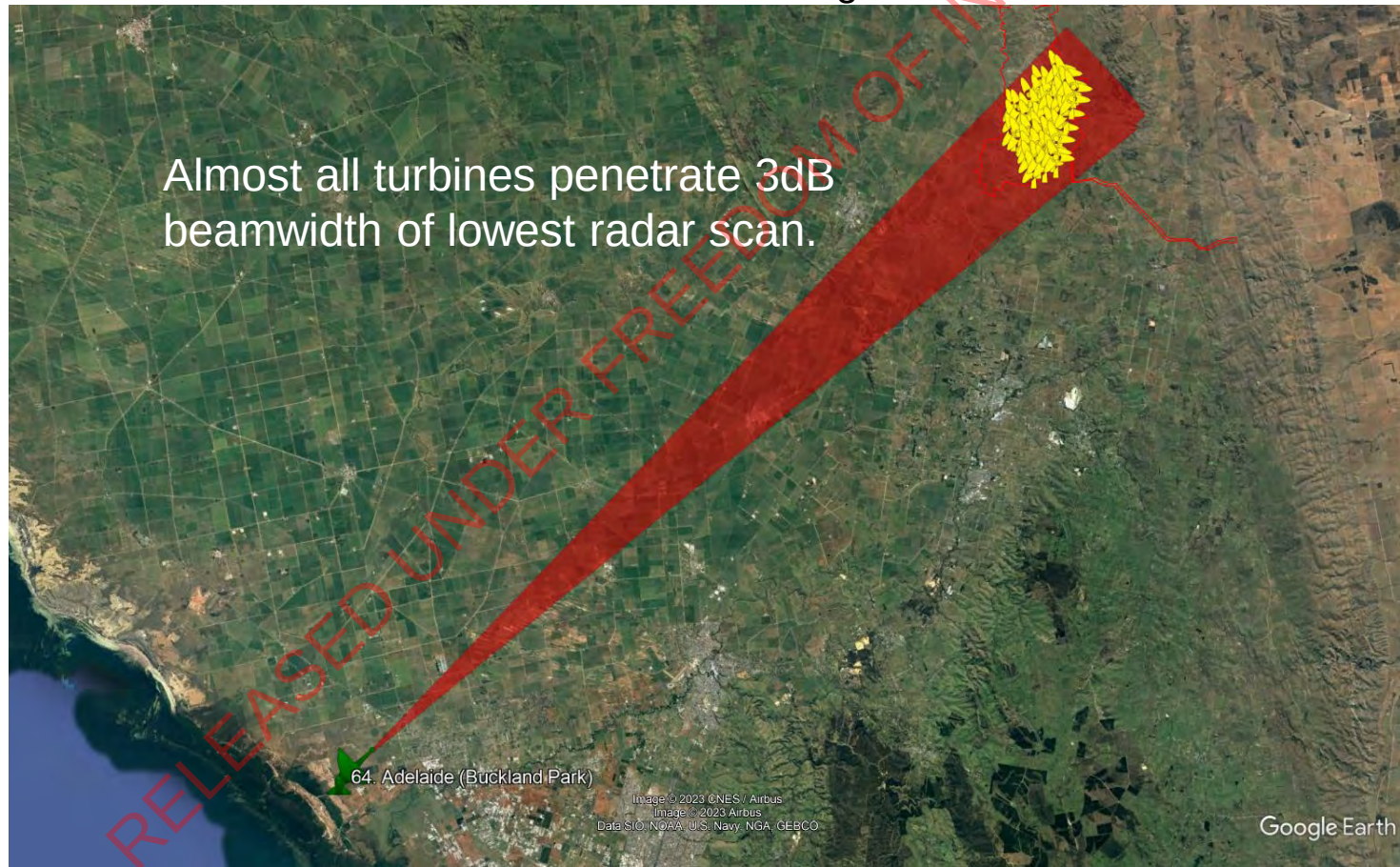
- **Buckland Park** follows "VCP-GP02-SDP" scan strategy, below image for indication.
- Lower angle beams have larger ground range from the radar and are more useful for 'nowcasting'



Affected Bureau assets

Buckland park – 3dB-beamwidth contamination

- 3dB Beamwidth contamination of first scan: 0.5 deg.



Affected Bureau assets

Buckland park – 3dB-beamwidth contamination

- 3dB Beamwidth contamination of second scan: 0.8 deg.

Almost half of the turbines penetrate 3dB beamwidth of second radar scan.

64 Adelaide (Buckland Park)

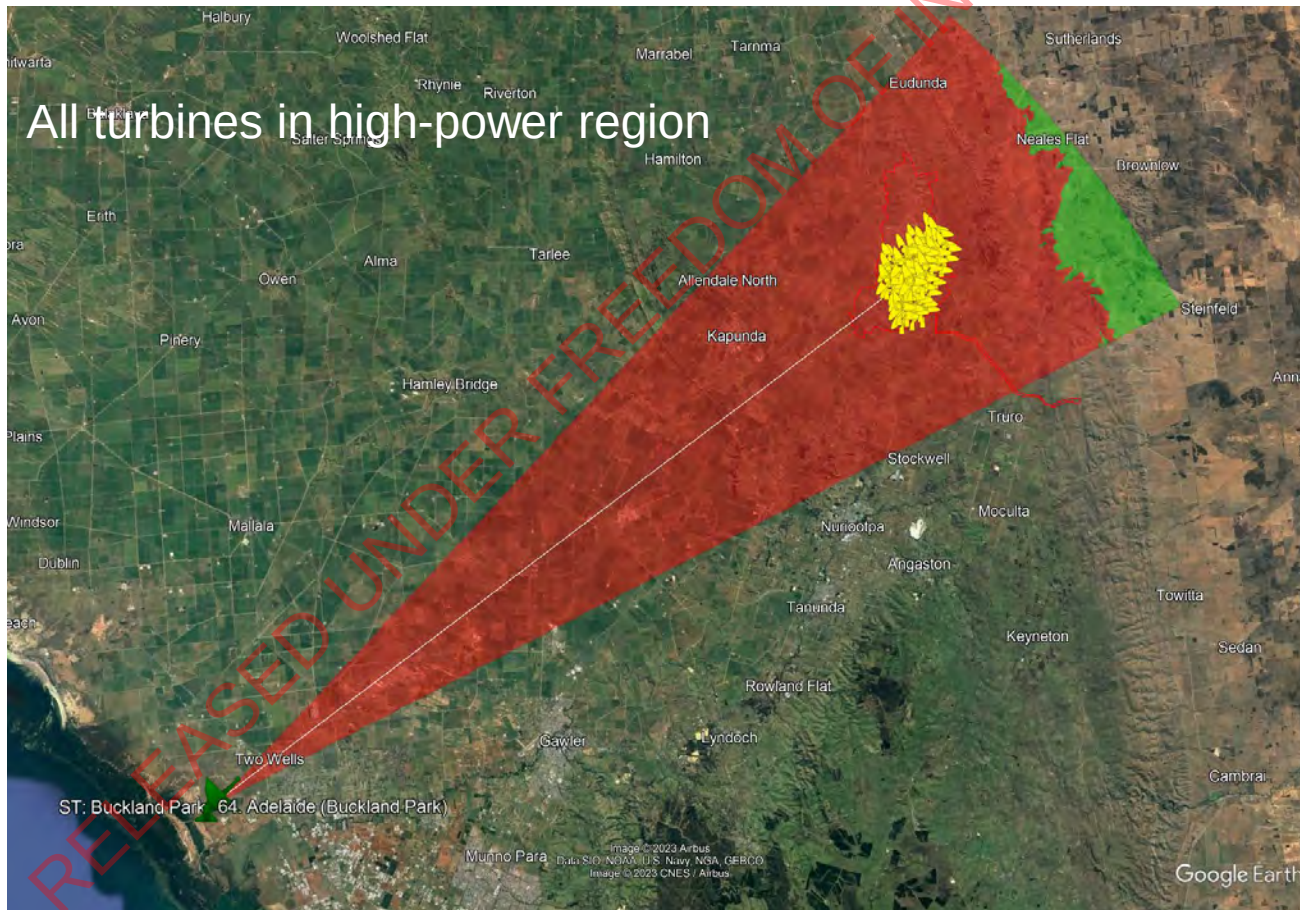
Image © 2023 CNES / Airbus
Image © 2023 Airbus
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Google Earth

Affected Bureau assets

Buckland park – Power-level simulations

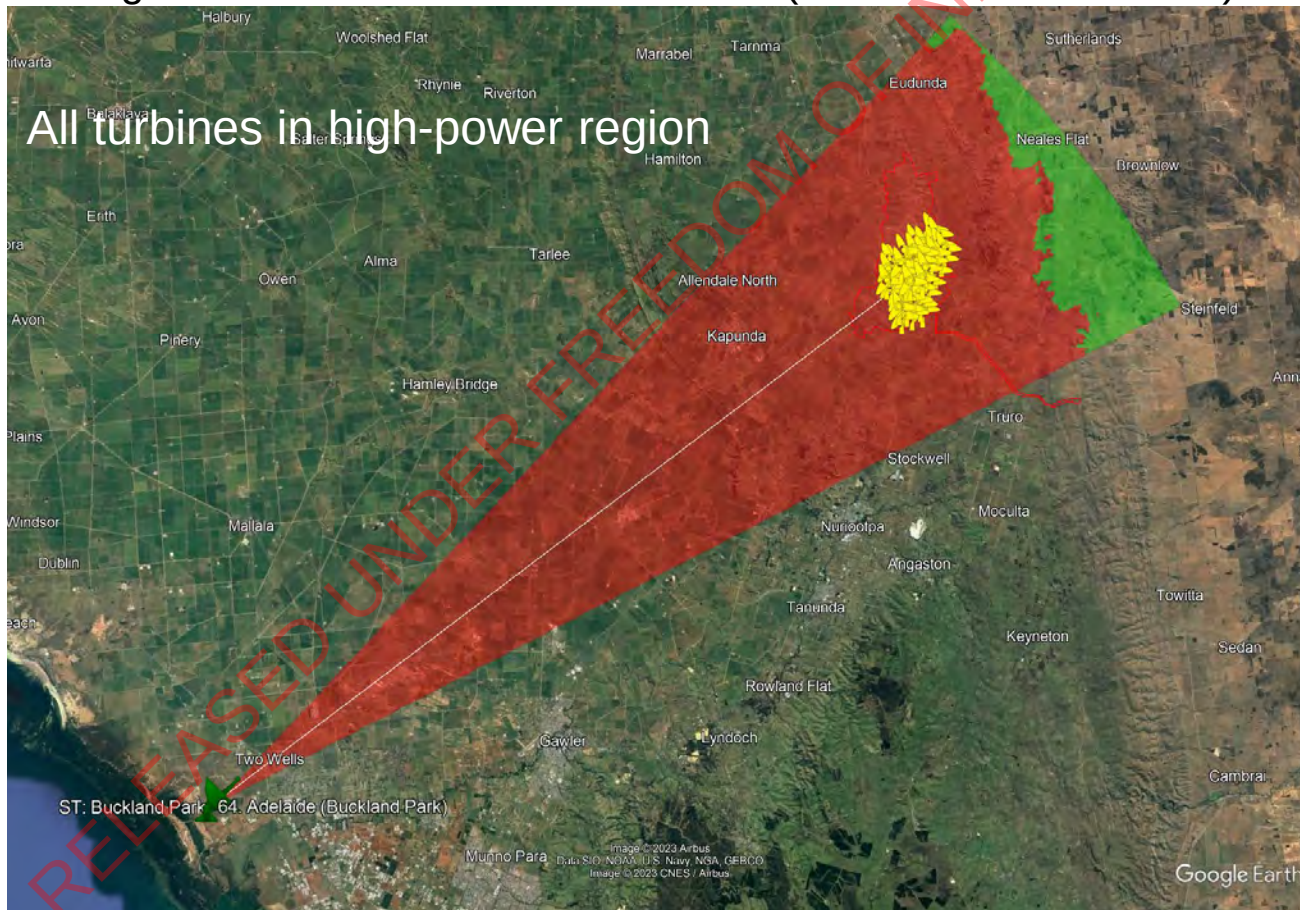
- First 0.5 deg Scan: Power Threshold -45 dBm (red shaded > -45 dBm)



Affected Bureau assets

Buckland park – Power-level simulations

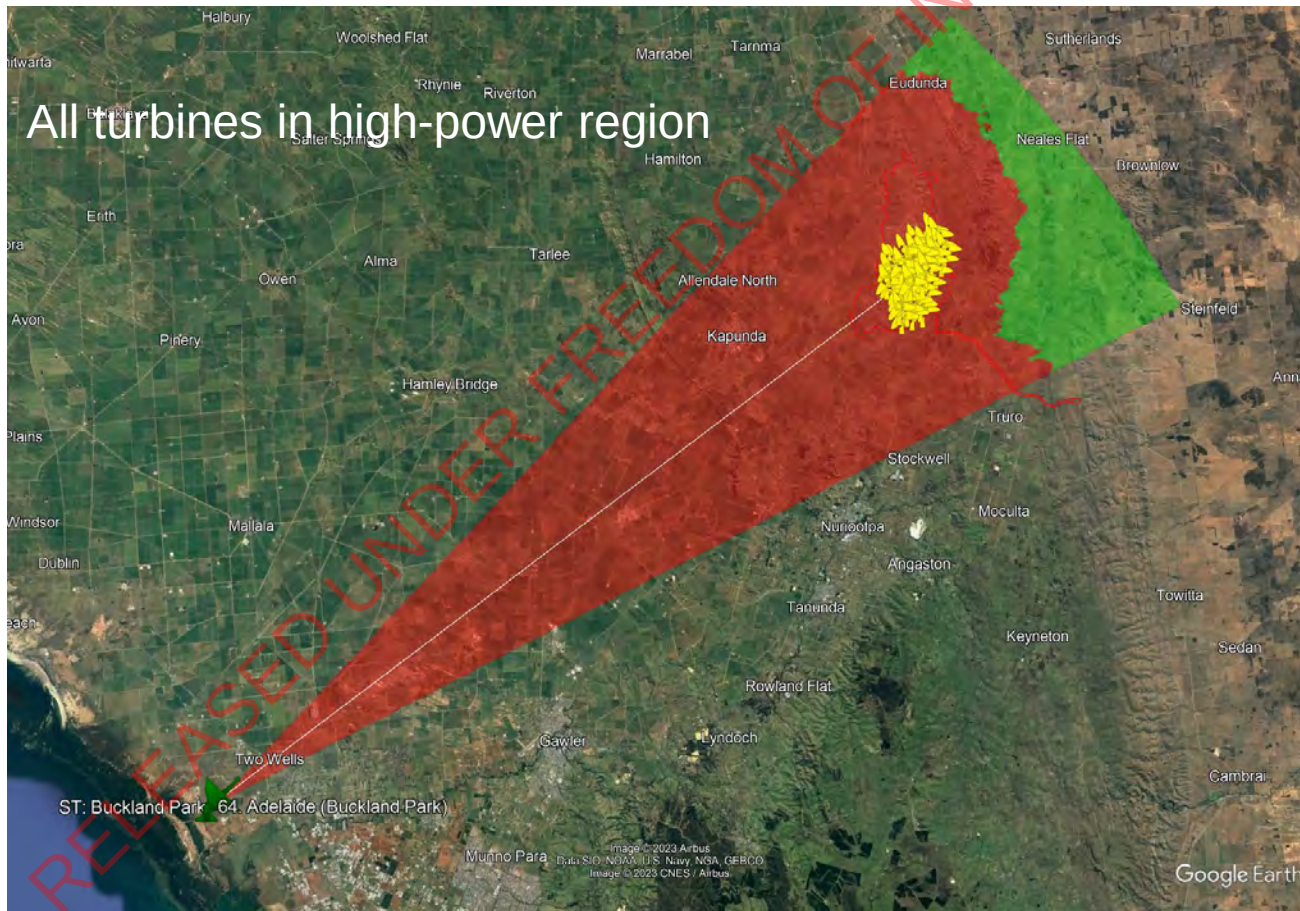
- Second 0.8 deg Scan: Power Threshold -45 dBm (red shaded > -45 dBm)



Affected Bureau assets

Buckland park – Power-level simulations

- Third 1.4 deg Scan: Power Threshold -45 dBm (red shaded > -45 dBm)



Affected Bureau assets

Adelaide (Sellicks Hill)

Radar	Adelaide (Sellicks Hill)
Type	WSR81C
Lat/Long	-35.329542/138.502498
Radar altitude (m)	379
Licence No.	433985/1
Power (kW)	250
Antenna Height (m)	9.3
Frequency (MHz)	5625
Beamwidth (deg.)	1.7

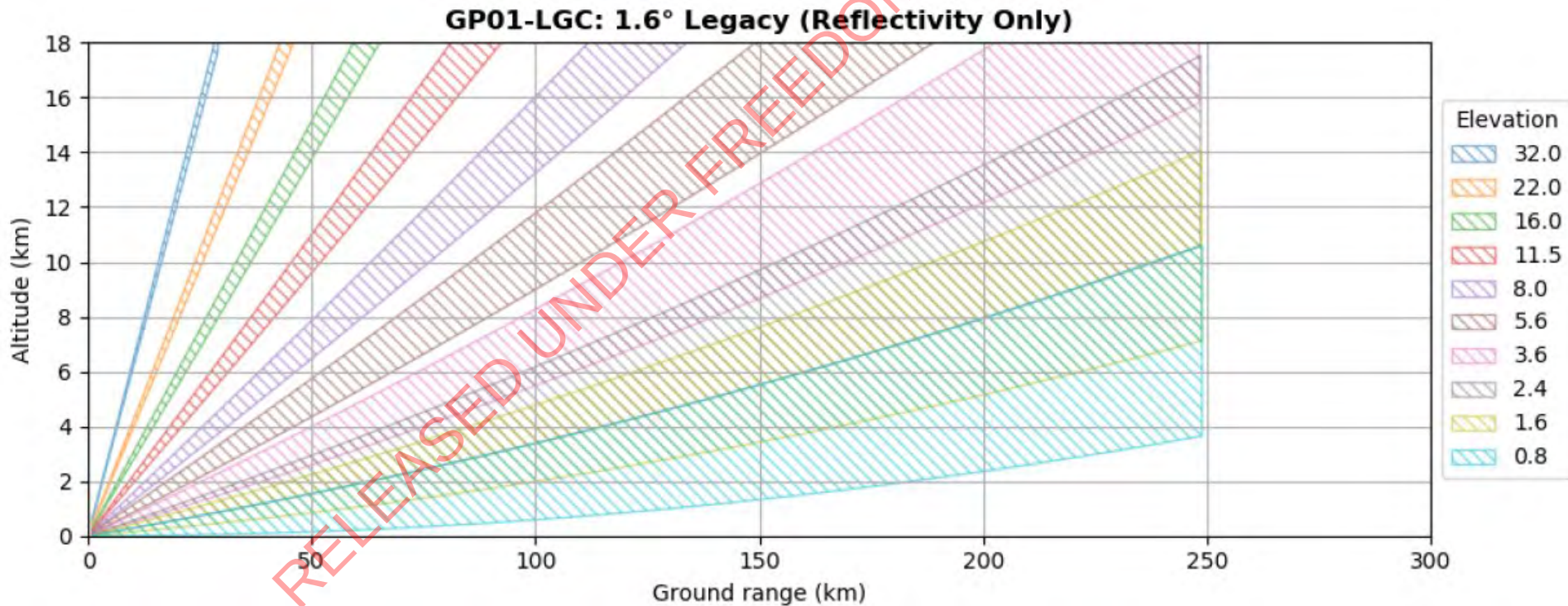


Affected Bureau assets

Selicks Hill – Scan Configuration

Radar Scanning Configuration

- **Selicks Hill** follows "VCP-GP01-LGC" scan strategy, below image for indication.
- Lower angle beams have larger ground range from the radar and are more useful for 'nowcasting'

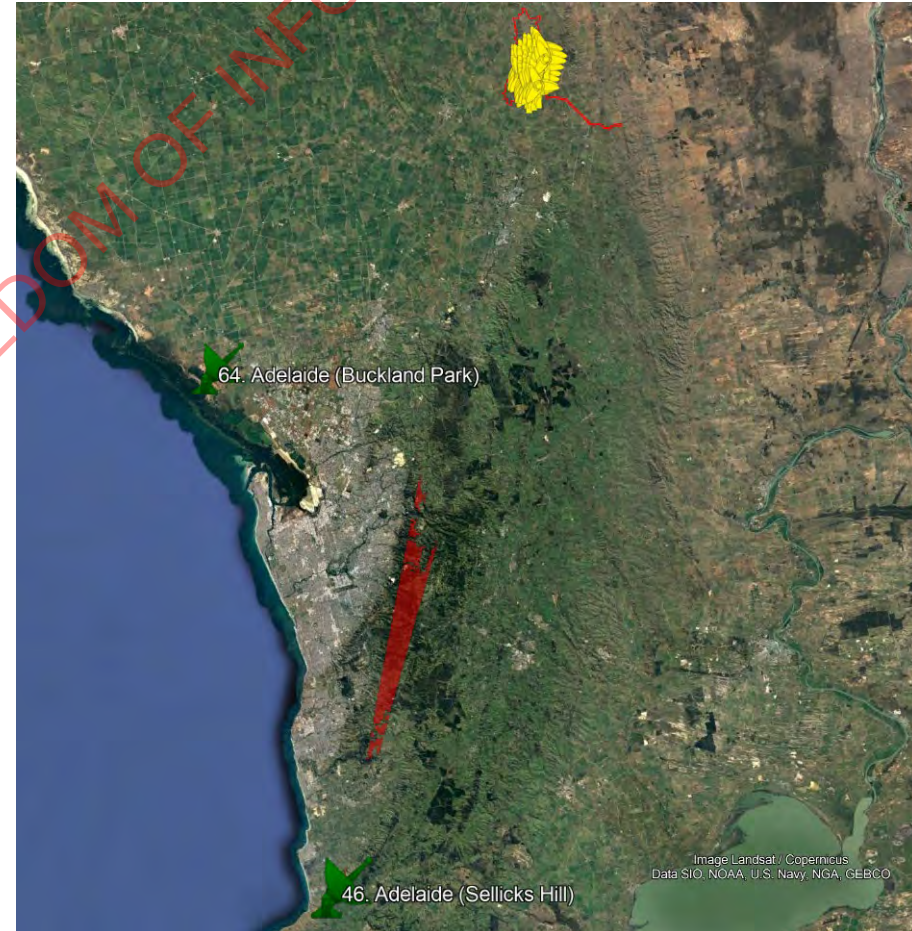


Affected Bureau assets

Selicks Hill – 3dB-beamwidth contamination

3dB Beamwidth contamination of lowest scan: 0.8 deg

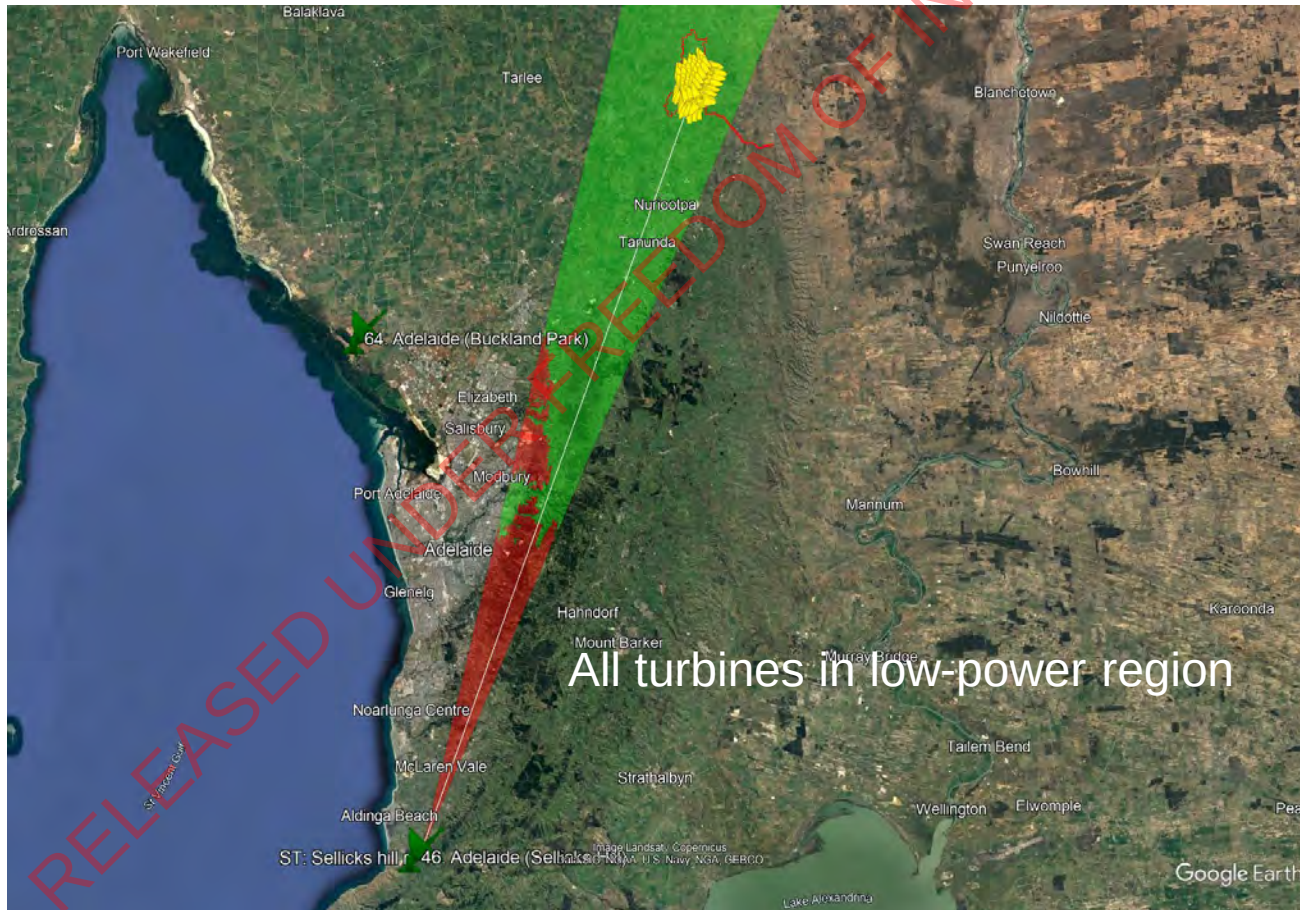
- Turbines of the proposed wind farm are not within 3dB beamwidth of the radar's lowest beam.



Affected Bureau assets

Selicks hill – Power-level simulations

- First 0.8 deg Scan: Power Threshold -45 dBm (red shaded > -45 dBm)



Summary and assessment

- The proposed Twin creek wind farm is about 62 km Northeast of the Buckland park radar.
- The two types of simulations (slide 10 - 15) indicate that the wind farm potentially impact at least first three scans of the Buckland park radar.
- The other closest weather radar at Sellicks hill is not affected by the wind farm, as detailed in slides 18 and 19.
- None of licensed FWN radio links are affected by the wind farm.
- The wind farm because of its ability to affect first three scans of the Buckland park radar is considered to have major impact on the radar quality and is thus assessed as **extreme-risk** development.





The Bureau
of Meteorology

Thank you!

windfarmenquiries@bom.gov.au

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Other wind farms assessed by Bureau in the area

- Bureau has previously assessed Palmer wind farm as **high-risk** for the Buckland park radar.
- Palmer azimuth from Buckland:
 - o 108 – 118.8 deg
 - o Distance 62 km.



Statement of impact

Proposed Twin creek wind farm area in SA is comprised of 42 turbines that are located at **62 km** Northeast of **Adelaide (Buckland) radar**. The azimuthal denial of wind farm is 5 deg between angles 56 and 61 deg.

Based on the 220 m tip height of the turbines, most of turbines will potentially **affect the first three scans of the Buckland park radar** and hence is **extreme risk**.

Morgan is a small town with +500 population behind the Twin-creek wind farm that most likely loses the weather radar coverage.



From: [REDACTED]
To: windfarmenquiries
Cc: [REDACTED]
Subject: Twin Creek Wind Farm - Bureau of Meteorology
Date: Thursday, 30 November 2023 10:30:19 AM
Attachments: [image001.png](#)
[RE Bureau of Meteorology - Twin Creek wind farm query SECUNCLASSIFIED.msg](#)
[BoM wind farm information form - Twin Creek.docx](#)
[Twin Creek proposed turbine locations.csv](#)
[Twin Creek proposed turbine layout.kml](#)
[Twin Creek site boundary.kml](#)

Hello,

I'm writing to follow up on some correspondence we had with the Bureau in 2017 regarding the proposed Twin Creek Wind Farm, near Kapunda in South Australia.

Since we were last in touch, the wind farm developer has:

- reduced the number of turbines from 49 to 42
- changed the proposed turbine locations
- increased the maximum rotor diameter to 172 m and the maximum proposed tip height to 220 m.

I've attached our original email correspondence, which indicated that the Bureau was cautious about potential impacts on the performance of the Buckland Park radar but was comfortable with the proposed turbine locations at the time. However, I realise that your assessment procedures for proposed wind farms has changed somewhat since then. Therefore, I've also attached:

- a completed Bureau of Meteorology information form for the wind farm
- KML files showing the current proposed turbine layout and site boundary
- a CSV file containing the current proposed turbine locations and elevations.

As previously, we're seeking your feedback regarding the potential for the proposed wind farm to interfere with your radiocommunication assets in the vicinity of the wind farm site – particularly your nearby weather radars and point-to-multipoint licences. We'd therefore appreciate your comments on:

- the potential for the proposed wind farm to interfere with your assets and services
- the required clearances from your assets to avoid or minimise interference
- possible mitigation measures to avoid or minimise the risk of interference.

Feel free to get in touch if you have any questions. I look forward to hearing from you soon.

Best regards,

[REDACTED]

[REDACTED]

[REDACTED]

DNV Australia Pty Limited

[REDACTED]

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DNV email logo



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Guidelines for Wind Farm Inquiry



The Bureau will make any effort to quickly investigate the impact of any proposed wind farm on its radiocommunication assets including radar networks and provide the response to wind farm developers. While the Bureau's aim is not to delay such process for more than three weeks, the actual response time depends on other priorities within the Bureau.

Providing complete information, as outlined here, would accelerate such process. Please submit files requested in this form at windfarmenquiries@bom.gov.au

1. Name of wind farm, developers, and consulting company (if any).

Wind farm: Twin Creek Wind Farm

Developer: RES Pty Limited

Consultant: DNV Australia Pty Ltd

2. Contact point(s) for any further discussion (email and phone number).

Developer: **section 22: remove by consent** **section 22: remove by consent**

Consultant: **section 22: remove by consent** **section 22: remove by consent**

3. Approximate location (description) of proposed farm by addressing the closest city/town and respective location of the farm.

5.5 km south of Eudunda and 14 km east of Kapunda

4. Number of turbines in the proposed farm.

42

5. Maximum and Minimum elevation of land where turbines are located.

340 m minimum, 481 maximum

6. Turbines Tip Height in meters.

220 m

Guidelines for Wind Farm Inquiry

7. Turbines Hub Height in meters.

134 m

8. Turbines Blades Diameter in meters.

172 m

9. Expected year of completion of the proposed wind farm.

2026

10. Please submit following files along with the completed form at windfarmenquiries@bom.gov.au

- a. The coordinates (in Long and Lat) of turbines in CSV format (Given the early stage of farm design, it is understandable that turbines location might slightly change in final plan).
- b. A KML file showing the turbine location highlighted on map with a unique turbine ID.
- c. A KML file showing boundary of the windfarm.

11. Any additional information.

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TurbID	x	y	z_mean
T25	139.0453	-34.3151	340
T19	139.0445	-34.304	343
T14	139.0499	-34.2985	345
T24	139.0423	-34.3121	347
T13	139.0463	-34.2976	349
T20	139.0543	-34.3058	353
T30	139.0513	-34.3204	357
T15	139.0554	-34.3012	364
T34	139.051	-34.3244	367
T26	139.0535	-34.3144	373
T8	139.0586	-34.2926	382
T39	139.0502	-34.3303	383
T35	139.0585	-34.324	390
T40	139.0564	-34.3315	391
T16	139.0634	-34.3003	393
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T22	139.0746	-34.3056	408
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T31	139.0609	-34.319	410
T42	139.0515	-34.3366	411
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T11	139.0828	-34.2954	412
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T37	139.0676	-34.3292	412
T38	139.0689	-34.333	413
T27	139.0611	-34.3139	418
T36	139.0643	-34.3263	422
T17	139.0712	-34.2995	423
T5	139.0831	-34.2883	428
T33	139.0719	-34.3219	428
T23	139.0826	-34.3075	431
T29	139.0762	-34.3151	431
T28	139.0712	-34.3124	437
T32	139.0675	-34.3177	438
T2	139.0862	-34.2831	443
T10	139.0736	-34.2946	443
T6	139.0878	-34.2904	445
T4	139.0746	-34.2881	447
T3	139.0683	-34.2864	449
T1	139.0824	-34.2796	452
T12	139.0884	-34.2998	460
T7	139.0913	-34.2934	481

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RELEASED UNDER FREEDOM OF INFORMATION

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RELEASED UNDER FREEDOM OF INFORMATION

Dear [REDACTED] I am very well thank you, and I hope the same with you. We would be very pleased to meet with you and the developer of the Twin Creek wind farm to discuss the results of the Bureau's analysis and the potential mitigation options. Unfortunately the necessary attendees from the Bureau are not available this Friday, and an alternative date and time is being arranged. As requested I have attached the Bureau's Strategic Relationship Framework agreement for your consideration. I look forward to meeting with you and the developer. Thank you and best regards, [REDACTED]

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From: **section 22: remove by consent** Sent: Tuesday, February 27, 2024 3:13 PM To: **section 22: remove by consent** Cc: windfarmerquiries <windfarmerquiries@bom.gov.au>; **section 22: remove by consent** Energy <energy@bom.gov.au>; **section 22: remove by consent** >Subject: RE: Twin Creek Wind Farm - Bureau of Meteorology [SEC=OFFICIAL]

Hi [REDACTED] I hope you're doing well. Regarding the proposed Twin Creek wind farm, we have spoken to the developer, and they are interested in having a meeting altogether to discuss the results of your analysis and the potential mitigation options. Are you and your colleagues available this Friday at 10:30am (Melbourne time) for a half an hour call? Additionally, please can you forward a copy of The Bureau's Strategic Relationship Framework Agreement template? I look forward to hearing from you.

Kind regards, **section 22: remove by consent**

[REDACTED] Australia DNV Australia Pty Limited **section 22: remove by consent** | LinkedIn
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From: **section 22: remove by consent** Sent: Thursday, February 15, 2024 9:23 AM To: **section 22: remove by consent** >Cc: windfarmerquiries <windfarmerquiries@bom.gov.au>; **section 22: remove by consent** Energy <energy@bom.gov.au>; **section 22: remove by consent** >Subject: RE: Twin Creek Wind Farm - Bureau of Meteorology [SEC=OFFICIAL]

Hi [REDACTED] Thank you for your response, I have passed the attached letter on to the developer. Kind regards, **section 22: remove by consent**
Australia DNV Australia Pty Limited **section 22: remove by consent** | LinkedIn DNV | LinkedIn

From: **section 22: remove by consent** > Sent: Wednesday, February 14, 2024 4:17 PM To: **section 22: remove by consent** Cc: windfarmerquiries <windfarmerquiries@bom.gov.au>; **section 22: remove by consent** Energy <energy@bom.gov.au>; **section 22: remove by consent** >Subject: RE: Twin Creek Wind Farm - Bureau of Meteorology [SEC=OFFICIAL] Caution: This email originated from outside of the DNV Organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear [REDACTED] Please find enclosed the Bureau's response to your request for a technical assessment of the proposed Twin Creek wind farm. Our assessment has found that any wind farm built at this location would pose a risk of interference to a segment of the Adelaide (Buckland Park) weather radar located approximately 62km from the Twin Creek wind farm. We would be pleased to discuss our assessment

further, and look forward to continuing this discussion and working with you to minimise and manage the potential impacts of this development on the services provided by the Bureau in the area. Yours sincerely, **section 22: remove by consent**

section 22: remove by consent | www.bom.gov.au The Bureau of Meteorology acknowledges the Traditional Custodians of Australia and their continuing connection to land, sea, and community. Important: This message may contain confidential or legally privileged information. If you think it was sent to you by mistake, please delete all copies and advise the sender.

From: **section 22: remove by consent** Sent: Wednesday, February 7, 2024 10:38 AM
 To: **section 22: remove by consent** Cc: windfarmenquiries
 <windfarmenquiries@bom.gov.au>; **section 22: remove by consent** Energy
 <energy@bom.gov.au>; **section 22: remove by consent** Subject: RE:
 Twin Creek Wind Farm - Bureau of Meteorology [SEC=OFFICIAL]

Hi **section 22: remove by consent** Thank you for providing an update and some insight into the process. We look forward to hearing from you next week. Kind regards, **section 22: remove by consent**

section 22: remove by consent Australia DNV Australia Pty
 Limited **section 22: remove by consent** | LinkedIn DNV | LinkedIn

From: **section 22: remove by consent** Sent: Wednesday, February 7, 2024 10:18 AM
 To: **section 22: remove by consent** **section 22: remove by consent**
 >Cc: windfarmenquiries <windfarmenquiries@bom.gov.au>;
section 22: remove by consent Energy <energy@bom.gov.au> Subject: RE: Twin Creek
 Wind Farm - Bureau of Meteorology [SEC=OFFICIAL] Caution: This email originated from outside of the
 DNV Organization. Do not click links or open attachments unless you recognize the sender and know
 the content is safe.

Dear **section 22: remove by consent** I hope that you are well. **section 22: remove by consent** team has completed the technical assessment and now our severe weather team is working through what we call the service impact assessment which informs the mitigation options relevant to this development. We appreciate your patience at this time of severe weather, as we rely on operational teams to provide the service impact assessments. I am expecting to have this information provided to me by the end of this week, with a response to you early next week. Please do not hesitate to contact me if you would like to discuss further. Best regards, **section 22: remove by consent**

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From: **section 22: remove by consent** Sent: Tuesday, February 6, 2024 4:26 PM To:
section 22: remove by consent
 >Cc: windfarmenquiries <windfarmenquiries@bom.gov.au>; **section 22: remove by consent**
 ; Energy <energy@bom.gov.au> Subject: RE: Twin Creek Wind
 Farm - Bureau of Meteorology [SEC=OFFICIAL]

Hi **section 22: remove by consent** and **section 22: remove by consent** Just a note to follow up on my email below. Have you had the chance to investigate the potential mitigation options for the proposed Twin Creek wind farm? We look forward to hearing from you. Kind regards, **section 22: remove by consent**

Section 22: remove by consent Australia DNV Australia Pty Limited section 22: remove by consent
 LinkedIn DNV | LinkedIn

From: section 22: remove by consent Sent: Monday, January 22, 2024 11:37 AM To: section 22: remove by consent
 Cc: windfarmenquiries <windfarmenquiries@bom.gov.au>;
 section 22: remove by consent
 Energy <energy@bom.gov.au>Subject: RE: Twin Creek Wind Farm - Bureau of Meteorology
 [SEC=OFFICIAL]

Hi section 22: remove by consent Thank you for the initial update. We look forward to hearing from you soon. Kind
 regards, section 22: remove by consent
 Australia DNV Australia Pty Limited section 22: remove by consent LinkedIn DNV | LinkedIn

From: section 22: remove by consent Sent: Friday, 12 January 2024
 8:44 PM To: section 22: remove by consent Cc: windfarmenquiries
 <windfarmenquiries@bom.gov.au>; section 22: remove by consent
 Energy <energy@bom.gov.au>Subject: RE: Twin Creek Wind Farm -
 Bureau of Meteorology [SEC=OFFICIAL] Caution: This email originated from outside of the DNV
 Organization. Do not click links or open attachments unless you recognize the sender and know the
 content is safe.

Hi section 22: remove by consent This is to kindly update you on the result of our analysis for the proposed Twin Creek WF in
 SA. Our analysis shows that at least three scans of the Adelaide weather radar (Buckland park) will be
 impacted by the proposed twin creek WF and as such this wind farm is categorised as extreme-risk. The
 Business solution of the Bureau will be in contact with you on further steps that both sides may consider
 to manage the risk on the weather radar network of the Bureau. Any further correspondence is to be
 made with section 22: remove by consent with a copy to
 energy@bom.gov.au. Regards section 22: remove by consent
 www.bom.gov.au

From: section 22: remove by consent Sent: Thursday, January 11, 2024 9:09 AM To:
 section 22: remove by consent
 >Cc: windfarmenquiries <windfarmenquiries@bom.gov.au>; section 22: remove
 Subject: RE: Twin Creek Wind Farm - Bureau of Meteorology
 [SEC=OFFICIAL]

Hi section 22: remove by consent Thank you, we look forward to hearing from you. Kind regards, section 22: remove by consent
 Australia DNV Australia Pty
 Limited section 22: remove by consent LinkedIn DNV | LinkedIn

From: section 22: remove by consent Sent: Wednesday, 10 January
 2024 6:31 PM To: section 22: remove by consent
 >Cc: windfarmenquiries <windfarmenquiries@bom.gov.au>; section 22: remove
 Subject: RE: Twin Creek Wind Farm - Bureau of Meteorology
 [SEC=OFFICIAL] Caution: This email originated from outside of the DNV Organization. Do not click links
 or open attachments unless you recognize the sender and know the content is safe.

Hi section 22: remove by consent We have done our analysis and only waiting for a correspondence from our internal
 stakeholders regarding our network of Point-to-Multipoint links. Regarding to the updated layout of the
 turbines, we will consider them in the analysis and will inform you of the result hopefully

soon. Regards **section 22: remove by consent**

| www.bom.gov.au

From: **section 22: remove by consent** Sent: Wednesday, January 10, 2024 2:34 PM
 To: **section 22: remove by consent** >Cc: windfarmenquiries
 <windfarmenquiries@bom.gov.au>; **section 22: remove by consent** Subject: RE: Twin
 Creek Wind Farm - Bureau of Meteorology [SEC=OFFICIAL]

Dear **section 22** Just a note to follow up on my colleague's email below. The boundary and turbine layout of the proposed Twin Creek Wind Farm have recently been modified, specifically the location of T30. I have attached the updated boundary and turbine layout for your information. We would be grateful if you could review this information and the potential for interference on Bureau of Meteorology assets. We would appreciate hearing from you soon. Please feel free to contact me if you have any queries. Kind regards, **Section 22: remove by consent**
 Australia DNV Australia Pty Limited **section 22: remove by consent** | LinkedIn DNV | LinkedIn

From: **section 22: remove by consent** Sent: Thursday, 30 November 2023 1:58 PM To: **section 22: remove by consent** Cc: **section 22: remove by consent**
 windfarmenquiries <windfarmenquiries@bom.gov.au> Subject: RE: Twin Creek Wind Farm - Bureau of Meteorology [SEC=OFFICIAL] Caution: This email originated from outside of the DNV Organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi **section 22: r** It looks like this one got lost in the handover between **section 22: remove by** and his predecessor. We'll look into this and get back to you. The team are out of the office at the moment, but we'll get back to you as soon as possible. Regards, **Section 22: remove by consent**

From: **section 22: remove by consent** Sent: Thursday, November 30, 2023 10:28 AM
 To: windfarmenquiries <windfarmenquiries@bom.gov.au> Cc: **section 22: remove by consent**
 Subject: Twin Creek Wind Farm - Bureau of Meteorology

Hello, I'm writing to follow up on some correspondence we had with the Bureau in 2017 regarding the proposed Twin Creek Wind Farm, near Kapunda in South Australia. Since we were last in touch, the wind farm developer has: reduced the number of turbines from 49 to 42 changed the proposed turbine locations increased the maximum rotor diameter to 172 m and the maximum proposed tip height to 220 m. I've attached our original email correspondence, which indicated that the Bureau was cautious about potential impacts on the performance of the Buckland Park radar but was comfortable with the proposed turbine locations at the time. However, I realise that your assessment procedures for proposed wind farms has changed somewhat since then. Therefore, I've also attached: a completed Bureau of Meteorology information form for the wind farm KML files showing the current proposed turbine layout and site boundary a CSV file containing the current proposed turbine locations and elevations. As previously, we're seeking your feedback regarding the potential for the proposed wind farm to interfere with your radiocommunication assets in the vicinity of the wind farm site – particularly your nearby weather radars and point-to-multipoint licences. We'd therefore appreciate your comments on: the potential for the proposed wind farm to interfere with your assets and services the required clearances from your assets to avoid or minimise interference possible mitigation measures to avoid or minimise the risk of interference. Feel free to get in touch if you have any questions. I look forward to hearing from you soon. Best regards, **Section 22: remove by consent**

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Hi section 22: remove by consent Thank you for your follow-up email. We are in the process of developing two fact sheets that are based on existing technical documentation for both rain gauges and Automatic Weather Stations. We expect to finalise and release these two fact sheets by Thursday 28 March. Best regards, section 22: remove by consent

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From: section 22: remove by consent Sent: Thursday, March 21, 2024 3:13 PM To: section 22: remove by consent >Cc: windfarmenquiries <windfarmenquiries@bom.gov.au>; section 22: remove by consent >; Energy <energy@bom.gov.au> Subject: RE: Twin Creek Wind Farm - Bureau of Meteorology [SEC=OFFICIAL]

Hi section 22: remove by consent It was good to speak with you last week. Please could you share the standard information sheet for the rain gauges and any other potential equipment? I can pass this on to section 22: remove by consent and section 22: remove by consent Kind regards, section 22: remove by consent section 22: remove by consent Australia DNV Australia Pty Limited section 22: remove by consent | LinkedIn DNV | LinkedIn

From: section 22: remove by consent Sent: Wednesday, January 10, 2024 2:34 PM To: section 22: remove by consent >Cc: windfarmenquiries <windfarmenquiries@bom.gov.au>; section 22: remove by consent Subject: RE: Twin Creek Wind Farm - Bureau of Meteorology [SEC=OFFICIAL]

Dear section 22: remove by consent Just a note to follow up on my colleague's email below. The boundary and turbine layout of the proposed Twin Creek Wind Farm have recently been modified, specifically the location of T30. I have attached the updated boundary and turbine layout for your information. We would be grateful if you could review this information and the potential for interference on Bureau of Meteorology assets. We would appreciate hearing from you soon. Please feel free to contact me if you have any queries. Kind regards, section 22: remove by consent section 22: remove by consent Australia DNV Australia Pty Limited section 22: remove by consent | LinkedIn DNV | LinkedIn

Hi section 22: remove by consent Please find attached the Automatic Weather Station (AWS) and rain gauge fact sheet that we discussed on 12 March 2024. Please note that we have combined the information into one document. Apologies for the delay in responding and please do not hesitate to contact me if you require any further information. Best regards, section 22: remove by consent

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