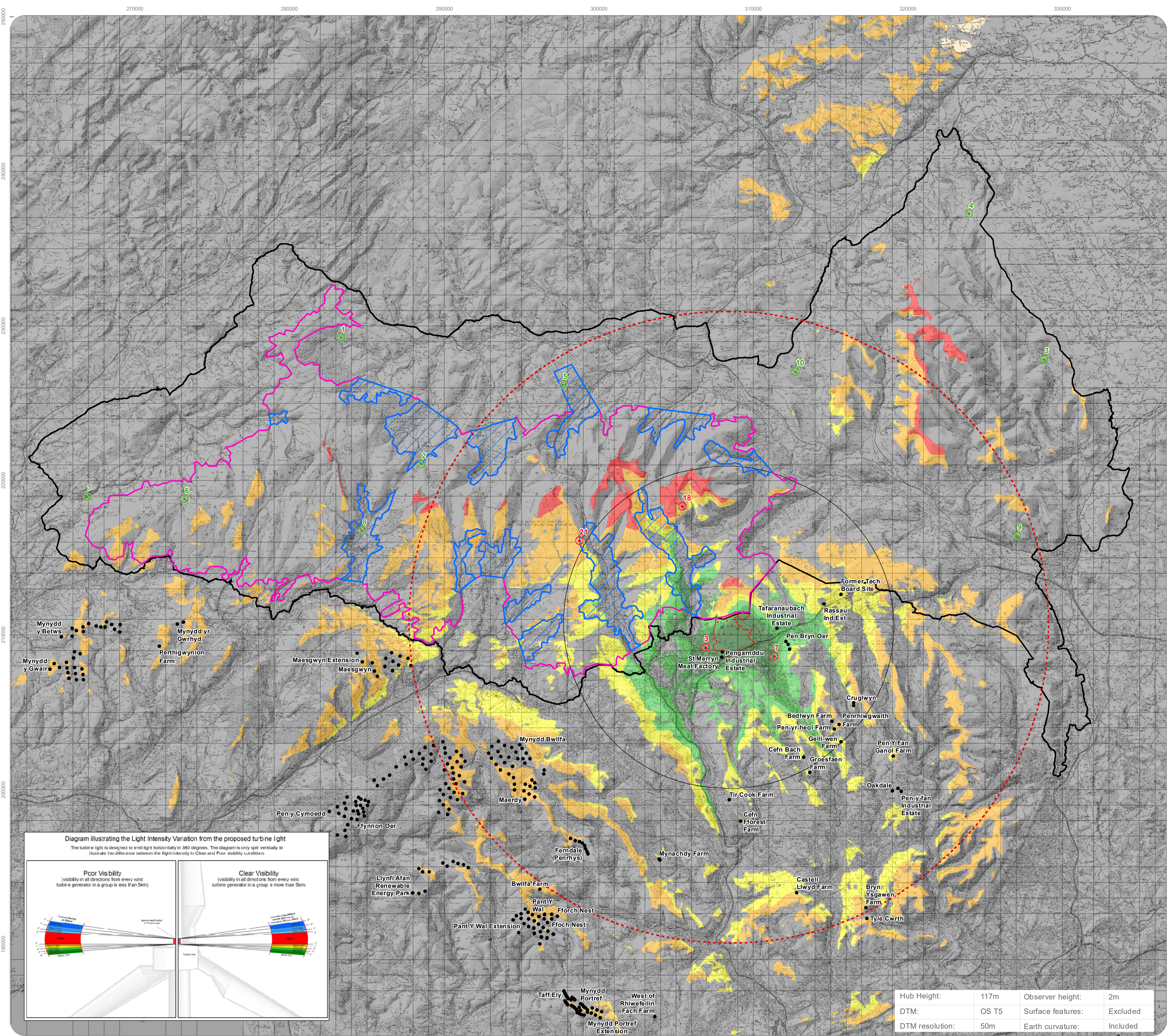




### Legend

- Proposed Turbines
- Site Boundary
- 10km Radius
- 20km Radius
- Cumulative Wind Farm Status
  - Operational
- Bannau Brycheiniog National Park (Dark Sky Reserve)
- Dark Sky Reserve Core
- Dark Sky Reserve Critical Buffer Zone
- LVIA Viewpoint
  - 3 - Pant, Merthyr Tydfil (NCN46)
  - 7 - Rhymney
  - 18 - Brecon Beacons Way (Craig Y Fan Ddu)
  - 21 - A4059
- Stargazing Locations in Brecon Beacons Dark Sky Reserve
  - 1 - Usk Reservoir
  - 2 - Crai Reservoir
  - 3 - Llanthony Priory
  - 4 - Hay Bluff
  - 5 - National Park Visitor Centre (Mountain Centre)
  - 6 - Pen Rhiw Ddu
  - 7 - Carreg Cennen
  - 8 - Craig-y-nos Country Park and Craig Y Nos Castle
  - 9 - Sugar Loaf Mountain
  - 10 - Llangorse Lake

Intensity of Turbine Light shown in Candelas (cd)

| Vertical Angle | Turbine Lighting Intensity |               |
|----------------|----------------------------|---------------|
|                | 2000cd light               | 200cd light   |
| 0° to 3°       | 2000cd                     | 200cd         |
| 0° to -1°      | 2000cd to 750cd            | 200cd to 75cd |
| -1° to -2°     | 750cd to 80cd              | 75cd to 8cd   |
| -2° to -3°     | 80cd to 40cd               | 8cd to 4cd    |
| -3° to -4°     | 40cd to 10cd               | 4cd to 1cd    |
| Below -4°      | Below 10cd                 | Below 1cd     |

**Notes**

- Reduced intensity turbine lighting (200cd) based on 'Air Navigation Order 2016 (CAP393) Article 223 (8)' which allows the 2000cd turbine light to be 'reduced to not less than 10% of the minimum peak intensity specified' i.e. 200cd 'if visibility in all directions from every wind turbine generator in a group is more than 5km'.
- The lighting intensity for each of the vertical angles shown is based on information provided by an aviation warning light bulb manufacturer. See Appendix 6.2.
- Perception of theoretical candelas intensity does not take account of distance.
- ZTV calculations do not take into account surface features such as forestry or buildings.
- ZTV calculations for turbine lighting intensity based on visible aviation lighting mounted on the turbine hub.
- The ZTV calculates the degree of vertical angle from the study area shown to each of the proposed Development turbines.
- ZTV calculations represent a worst case situation where predicted lighting intensity may be as a result of only one turbine in the layout.
- No landform within the study area is above 3 degrees from the height of the turbine lighting.

02.5510 Km

## PEN MARCH TECHNICAL APPENDIX

Figure TA5.5-4  
Hub Lighting Intensity ZTV (Dark Sky Reserve)

|         |           |               |    |         |            |
|---------|-----------|---------------|----|---------|------------|
| Ref No: | 201516    | Created By:   | SH | Rev No: | 2          |
| Scale:  | 1:120,000 | Drawing Size: | A1 | Date:   | 14/06/2023 |

Coordinate System: BNG OS GB 1936 Datum

