

Aviation Risk Assessment

SSE Plc

Overhead Lines LT: Beauly-Loch Buidhe

August 2025

PLANNING SOLUTIONS FOR:

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ADMINISTRATION PAGE

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EXECUTIVE SUMMARY

Background

Pager Power has conducted an aviation risk assessment for the proposed overhead line network between Beaully and Loch Buidhe, Scotland, to determine its potential impact upon aviation activity.

The risk assessment has been assessed based on the tower heights with the highest tower at 69.87m above ground level (agl).

Overall Conclusions

The proposed development is likely to proceed, subject to consultation with the stakeholders identified. The assessment conclusions and recommendations are presented in the following sections.

Licensed Airports and Radar

Inverness Airport

Sections of the proposed development are within line-of-sight to the Inverness Airport Primary Surveillance Radar (PSR). The towers are not predicted to cause a significant technical impact (i.e. radar clutter due to false returns) compared to wind turbines and buildings, due to not featuring a rotating blade or large areas of flat uniform surfaces (causing reflection or shadowing effects).

Consultation with the safeguarding team at Inverness Airport is recommended to confirm their position on the proposed development.

Ministry of Defence (MoD)

Low Flying Zones

The proposed development is located within areas of regular and high priority for military low flying concerns. Consultation with the MoD should be undertaken at the earliest opportunity.

Aviation Lighting

There is no legal requirement for the proposed development to be lit, in accordance with the guidance. However, the proposed development is within regular and high priority areas for low flying and therefore likely required to be lit. Consultation with the MoD is recommended to confirm the lighting requirement.

Civil Airfields

In general, the proposed development will be less easily visible to pilots flying visually (i.e. no navigation aids).

Eskadale Airfield

The proposed development is located 300m laterally from the extended runway centreline and 2.0km from the runway threshold. At this point, aircraft are predicted to be vertically clear of the proposed development. The proposed development also lies within the recommended distance for consultation. Consultation with the airfield is recommended to confirm their position on the proposed development.

Knockbain Farm Airfield

The proposed development is located 300m laterally from the extended runway centreline and 5.8km from the runway threshold. At this point, aircraft are predicted to be vertically clear of the proposed development. The proposed development also lies within the recommended distance for consultation. Consultation with the airfield is recommended to confirm their position on the proposed development.

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ABOUT PAGER POWER

Pager Power is a dedicated consultancy company based in Suffolk, UK. The company has undertaken projects in 62 countries within Europe, Africa, America, Asia and Australasia.

The company comprises a team of experts to provide technical expertise and guidance on a range of planning issues for large and small developments.

Pager Power was established in 1997. Initially the company focus was on modelling the impact of wind turbines on radar systems. Over the years, the company has expanded into numerous fields including:

- Renewable energy projects.
- Building developments.
- Aviation and telecommunication systems.

Pager Power prides itself on providing comprehensive, understandable and accurate assessments of complex issues in line with national and international standards. This is underpinned by its custom software, longstanding relationships with stakeholders and active role in conferences and research efforts around the world.

Pager Power's assessments withstand legal scrutiny and the company can provide support for a project at any stage.

1 INTRODUCTION

1.1 Overview

Pager Power has conducted an aviation risk assessment for the proposed overhead line network between Beaully and Loch Buidhe, Scotland, to determine its potential impact upon aviation activity.

The risk assessment has been assessed based on the tower heights with the highest tower at 69.87m above ground level (agl).

The report includes:

- Identification of relevant aviation infrastructure including:
 - Aerodromes (licensed, unlicensed and military);
 - Radar;
 - Radio navigation aids.
- Overview of relevant safeguarding assessment distances;
- Radio line-of-sight assessment for the relevant infrastructure, including:
 - Radar installations;
 - Radio navigation aids.
- Overall risk and key issues.

The aim is to identify and assess the aviation risks associated with achieving planning permission and construction of the proposed development.

2 PROPOSED DEVELOPMENT INFORMATION

2.1 Proposed Development Details

The coordinates (Eastings and Northings as per British National Grid) and heights above ground level of towers assessed are presented in Appendix A. The proposed overhead line network, indicated in red, is shown on to aerial imagery in Figure 1 below.



Figure 1 Proposed overhead line network

3 AVIATION RISK ASSESSMENT

3.1 Risk Assessment Results

Figure 2 and Table 1 on the following pages present the aviation risk assessment chart and identified risks.

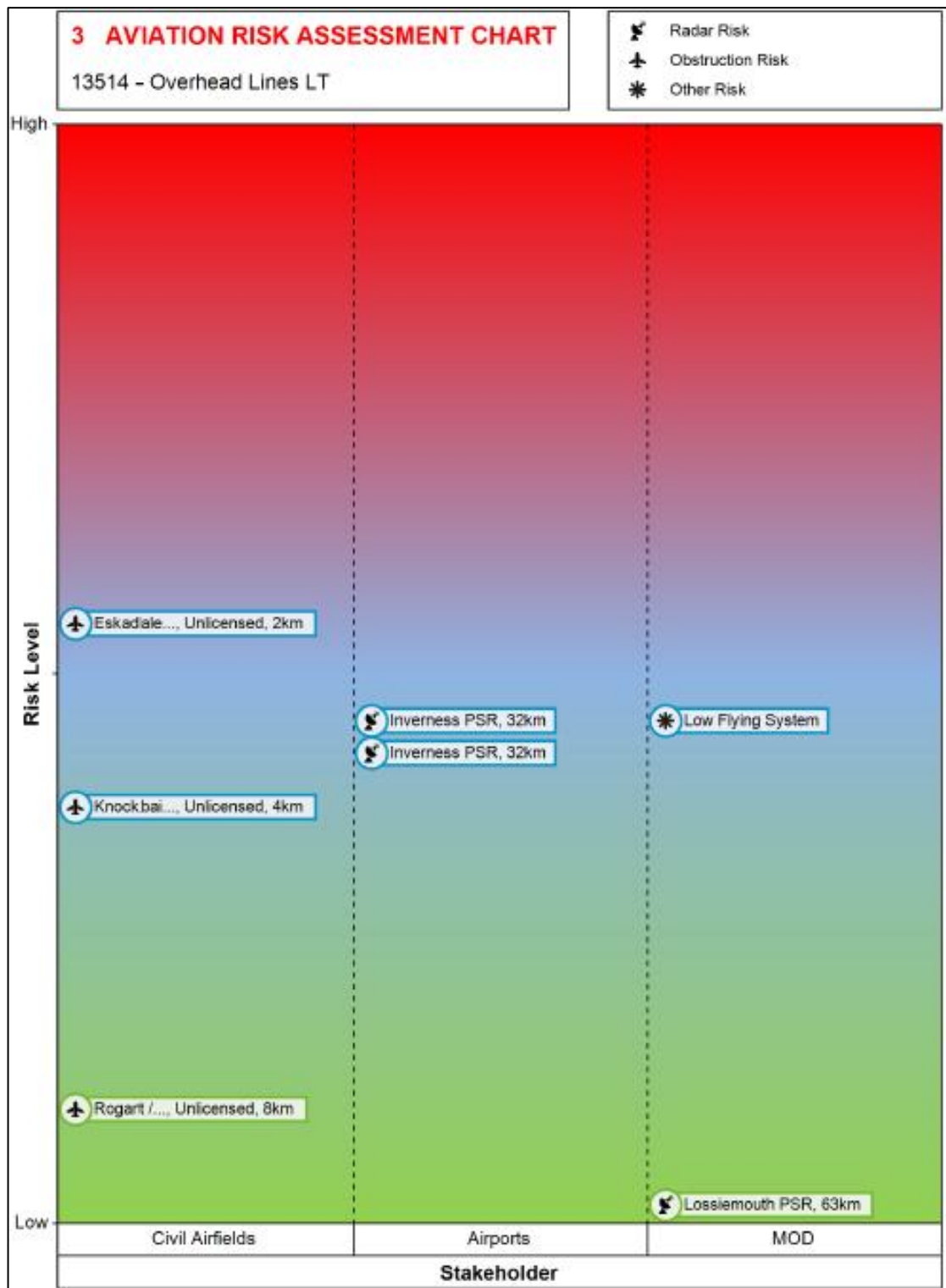


Figure 2 Risk assessment results

Stakeholder	Aviation Risk	Distance	Risk Level
Met Office	None identified		
Licensed Airports and Radar	Inverness Primary Surveillance Radar (PSR)	32.5km	Medium
NATS En-Route Limited (NERL)	None identified		
Ministry of Defence (MoD)	Low flying system	-	Medium
	Lossiemouth PSR	62.7km	Low
Unlicensed Civil Airfields	Eskadale	2.0km	Medium
	Knockbain Farm	4.3km	Medium

Table 1 Identified aviation risks

4 AVIATION RISK ASSESSMENT DISCUSSION

4.1 Overview

The following section presents the results and discussion of the medium and high risks as identified by the risk assessment.

The approach taken for the radar installations is as follows:

- Radar line of sight assessment for the most significant radar and tower;
- Consideration of the distance from the radar;
- Sensitivity of the location in which the development is situated.

Further information regarding the methodology or the additional line-of-sight charts can be provided upon request.

4.2 Licensed Airports and Radar

4.2.1 Radar Line-of-Sight Assessment

The radar line-of-sight analysis has been completed for the proposed development to determine the extent of the visibility to the Primary Surveillance Radar (PSR) at Inverness Airport.

Figure 3 on the following page presents the line-of-sight chart from the Inverness Airport PSR to the most visible tower. The box labelled 'certainty' provides the distance (in metres) by which the proposed development is within line-of-sight to the assessed radar.

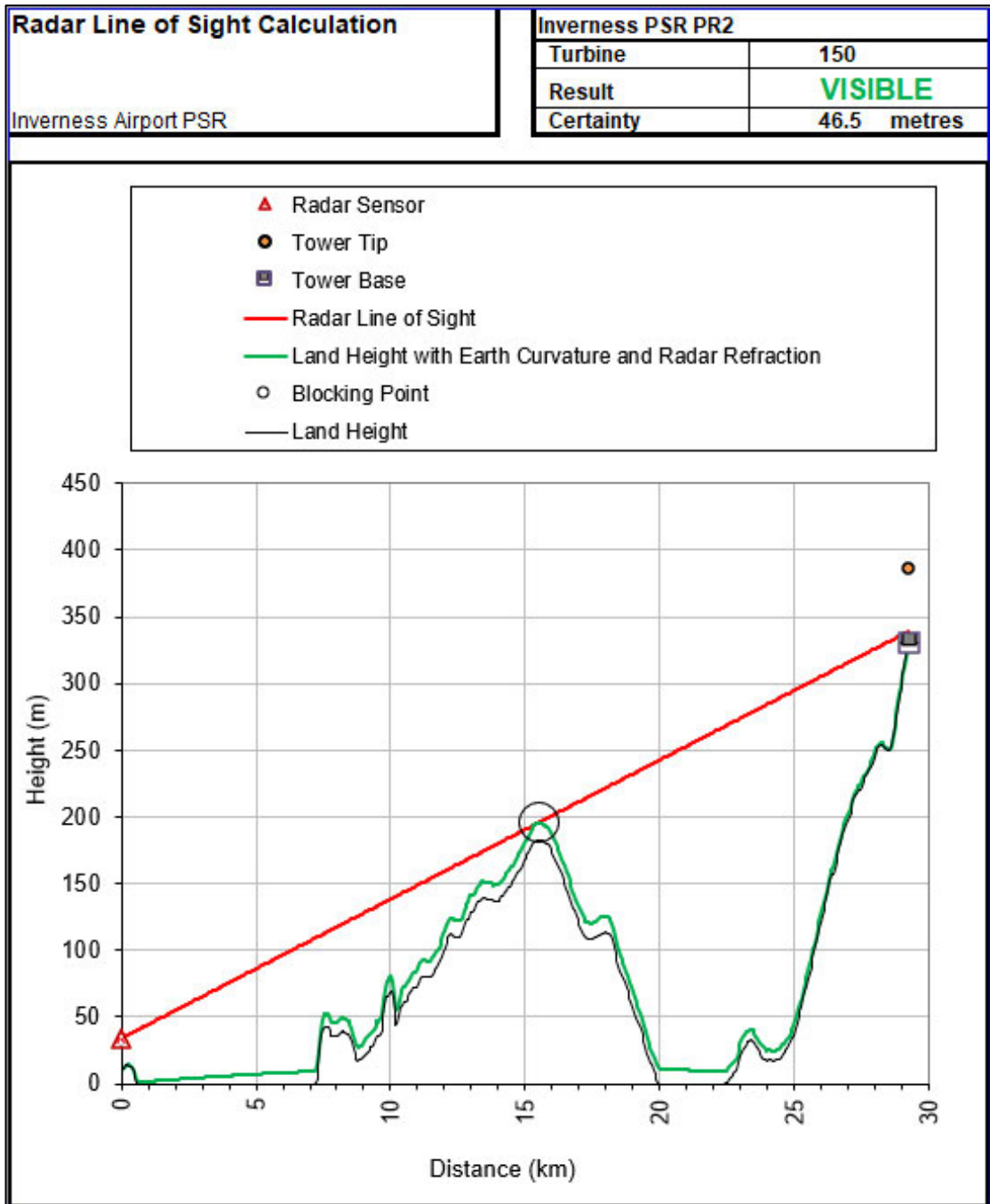


Figure 3 Line-of-sight chart for Inverness PSR

Static obstructions such as the proposed towers for this proposed development are less likely to cause an impact upon radar compared to wind turbines and buildings. The rotating blades of wind turbines move at speeds similar to some aircraft that most Doppler radar are designed to detect, which will not be a feature of the proposed towers. Buildings can impact a radar in two ways:

- Reflections – reflections from a structure can potentially result in genuine aircraft returns being plotted in the wrong place as a result of the structure reflecting signals in a specular (mirror-like) way; and
- Shadowing – large obstructions within a radar's area of coverage can have a 'shadowing' effect, reducing the signal strength immediately behind them.

The proposed towers will not feature a rotating blade or large areas of flat uniform surfaces, and therefore are not predicted to cause reflection or shadowing effects. No significant impact upon the PSR at Inverness Airport is predicted. Consultation with the safeguarding team at Inverness Airport is recommended to confirm their position.

4.3 Ministry of Defence (MoD)

4.3.1 Military Low Flying

Military low flying can take place throughout the UK. The MoD has published a map indicating areas within the UK where military low flying activities are the most likely to cause an objection. The map is colour coded as follows:

- Green – Area with no military low flying concerns;
- Blue – Low priority military low flying areas less likely to raise concerns;
- Amber – Regular military low flying area where mitigation may be necessary to resolve concerns;
- Red – High priority military low flying area likely to raise considerable and significant concerns.

The location of the proposed line network (white outline) relative to the military low flying zones is shown in Figure 4 on the following page. The figure shows that the proposed line network is located within the 'amber' and 'red' zones, which is an area with high priority for military low flying concerns.

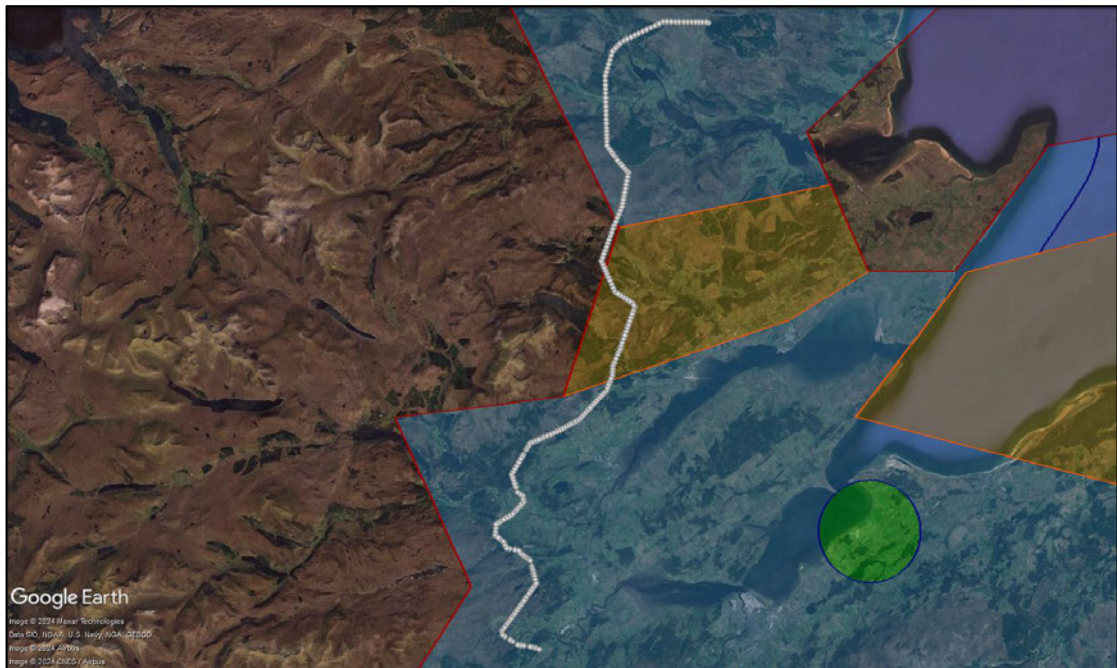


Figure 4 Military low flying zones relative to proposed development

The proposed development is located within areas of regular and high priority for military low flying concerns. Consultation with the MOD should be undertaken at the earliest opportunity.

4.4 Aviation Lighting

The guidance for lighting and marking of a fixed obstacle is outlined by the Civil Aviation Publication (CAP) 168, Air Navigation Order (ANO) 222, and the Ministry of Defence (Royal Air Force) – Obstruction Lighting Guidance. Obstacle lights should be used on obstacles between 45m and less than 150m in height, and mandatory for obstacles greater than 150m. Additionally, if a structure is considered an 'aerodrome obstacle', it is the aerodrome licence holder/operator that will assess the potential lighting and marking requirement.

There is no legal requirement for the proposed development to be lit, in accordance with the guidance. However, the proposed development is within regular and high priority areas for low flying and therefore likely required to be lit. Consultation with the MoD is recommended to confirm the lighting requirement.

4.5 Civil Airfields

Unlicensed civil airfields, such as Eskadale Airfield and Knockbain Farm Airfield as identified in the risk assessment, do not have officially safeguarded Obstacle Limitation Surfaces like licensed aerodromes. Unlicensed aerodromes should take steps to protect their operations from the effects of possible adverse developments.

The most sensitive location for an obstruction is typically along the extended runway centreline. Figures 5 and 6 on the following page shows the proposed development relative to the extended runway centrelines for Eskadale Airfield and Knockbain Farm Airfield respectively. The extended runway centreline is shown as the red line within the figure.



Figure 5 Proposed development relative to Eskadale Airfield extended runway centreline



Figure 6 Proposed development relative to Knockbain Farm extended runway centreline

The lateral clearance between the closest tower and the extended centreline, and the distance to the runway threshold at this point is presented in Table 2 below. Aircraft are predicted to be vertically clear of the tallest proposed tower, considering the distance to the runway threshold.

Airfield	Minimum Clearance Between Closest Tower and Extended Runway Centreline	Distance to Runway Threshold
Eskadale Airfield	300m	2.0km
Knockbain Farm Airfield	213m	5.8km

Table 2 *Minimum clearance between towers and extended runway centrelines for unlicensed civil airfields*

The proposed development also lies within the recommended distance for consultation¹ and is therefore recommended to consult with the airfield to confirm their position on the proposed development.

¹ Based upon the guidance laid down in CAA Publication CAP 764 Policy and Guidelines on Wind Turbines, Version 6 dated February 2016; Civil Aviation Authority (2019), CAP 168 Licensing of Aerodromes, Edition 11; Civil Aviation Authority (2018), CAP 777 Licensing of Aerodromes, Version 5; ICAO (2006), Procedures for Air Navigation Services, Aircraft Operations, Volume II Construction of VISUAL AND Instrument Flight Procedures, Fifth Edition and NATS AIP (digital resource, various publication dates).

5 OVERALL CONCLUSIONS AND RECOMENDATIONS

5.1 Licensed Airports and Radar

5.1.1 Inverness Airport

Sections of the proposed development are within line-of-sight to the Inverness Airport Primary Surveillance Radar (PSR). The towers are not predicted to cause a significant technical impact (i.e. radar clutter due to false returns) compared to wind turbines and buildings, due to not featuring a rotating blade or large areas of flat uniform surfaces (causing reflection or shadowing effects).

Consultation with the safeguarding team at Inverness Airport is recommended to confirm their position on the proposed development.

5.2 Ministry of Defence (MoD)

5.2.1 Low Flying Zones

The proposed development is located within areas of regular and high priority for military low flying concerns. Consultation with the MoD should be undertaken at the earliest opportunity.

5.2.2 Aviation Lighting

There is no legal requirement for the proposed development to be lit, in accordance with the guidance. However, the proposed development is within regular and high priority areas for low flying and therefore likely required to be lit. Consultation with the MoD is recommended to confirm the lighting requirement.

5.3 Civil Airfields

In general, the proposed development will be less easily visible to pilots flying visually.

5.3.1 Eskadale Airfield

The proposed development is located 300m laterally from the extended runway centreline and 2.0km from the runway threshold. At this point, aircraft are predicted to be vertically clear of the proposed development. The proposed development also lies within the recommended distance for consultation. Consultation with the airfield is recommended to confirm their position on the proposed development.

5.3.2 Knockbain Farm Airfield

The proposed development is located 300m laterally from the extended runway centreline and 5.8km from the runway threshold. At this point, aircraft are predicted to be vertically clear of the proposed development. The proposed development also lies within the recommended distance for consultation. Consultation with the airfield is recommended to confirm their position on the proposed development.

APPENDIX A – TOWER COORDINATES

The coordinates (Easting and Northings as per British National Grid) and heights above ground level of towers are presented in the table below.

Reference	Easting	Northing	Height (m agl)
2C-V1-001	264928.92	897553.207	68.42
2C-V1-010	262024.524	897729.167	57.566
2C-V1-020	258434.453	896717.834	60.566
2C-V1-030	256012.742	894198.003	69.566
2C-V1-040	255602.228	890447.999	63.566
2C-V1-050	255562.526	887004.212	66.22
2C-V1-060	257378.491	884551.295	60.22
2C-V1-070	256568.041	881257.037	66.566
2C-V1-080	255226.52	878084.488	57.566
2C-V1-090	255439.281	875098.228	69.566
2C-V1-100	257512.538	872683.631	66.22
2C-V1-110	256360.574	869686.716	60.566
2C-V1-120	255358.731	866756.692	54.02
2C-V1-130	253378.223	864540.313	57.566
2C-V1-140	250577.615	862775.577	57.566
2C-V1-150	247911.368	861032.514	57.22
2C-V1-160	246423.628	858618.439	60.566
2C-V1-170	247131.075	856104.344	51.566
2C-V1-180	245139.981	854056.879	57.02

Reference	Easting	Northing	Height (m agl)
2C-V1-190	245392.929	852038.312	54.566
2C-V1-200	247676.393	850177.957	69.866
2C-V1-210	247259.355	847682.661	64.52
2C-V1-220	245519.709	845416.937	51.566
2C-V1-230	246368.018	843211.128	54.566
2C-V1-235	248077.268	842800.097	56.42

Tower coordinates and heights



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