AIR QUALITY ASSESSMENT

Centrica Energy Storage Limited,
Singleton Birch, Melton Ross Quarries,
Barnetby, North Lincolnshire, DN38 6AE

ECL Ref: CENT.39.01/AQA
Version: Issue 1
September 2025

TABLE OF CONTENTS

1. INTRODUCTION **1**

1.1. Project Outline 1

1.2. The Applicant 2

1.3. Existing Site 2

1.4. Scope of the Study - Overview 2

1.5. Air Quality Standards for the Protection of Human Health 2

1.6. Background Air Quality 3

1.7. Construction Phase – Fugitive Dust Emissions 4

1.8. Vehicle Exhaust Emissions 5

1.9. Vented Emissions 9

2. CONCLUSIONS **10**

2.1. Scope 10

2.2. Construction Dust 10

2.3. Vehicle Emissions 10

2.4. Vented Emissions 10

2.5. Summary 10

LIST OF FIGURES

Figure 1: Indicative Site Location **1**

LIST OF TABLES

Table 1: Air Quality Standards for the Protection of Human Health **3**

Table 2: Nearest Background DEFRA Data to the Application Site **4**

APPENDICES

Appendix I – Proposed Layout Plan

ACRONYMS / TERMS USED IN THIS REPORT

AADT	Annual Average Daily Traffic
Application Site	Area in which this planning application relates
AQA	Air Quality Assessment
AQMA	Air Quality Management Area
AQS	Air Quality Standard
Centrica/CES+	Centrica Energy Storage Limited
DEFRA	Department for Environment, Food and Rural Affairs
DT	Diffusion Tube
EA	Environment Agency
EPUK	Environmental Protection UK
HDV	Heavy Duty Vehicle
HPF	Hydrogen Production Facility
IAQM	Institute of Air Quality Management
LDV	Light Duty Vehicle
MWe	Megawatt Electric
NGR	National Grid Reference
NLC	North Lincolnshire Council
NO_2	Nitrogen Dioxide
NOx	Oxides of nitrogen
$PM_{2.5}$	Particulate matter with a diameter of 2.5µm or less
PM_{10}	Particulate matter with a diameter of 10µm or less
Proposed Development	Installation of a Hydrogen Production Facility
SAC	Special Area of Conservation
SO_2	Sulphur Dioxide
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
The Applicant	Centrica Energy Storage Limited

1. INTRODUCTION

1.1. Project Outline

1.1.1. This Air Quality Assessment ("AQA") has been prepared on behalf of Centrica Energy Storage Limited ("the Applicant") to accompany the planning application for the proposed Hydrogen Production Facility ("HPF") (hereafter also referred to as the "Proposed Development").

1.1.2. The Proposed Development will consist of a 10 MWe electrolyser and associated equipment (inclusive of but not limited to; compressors, chillers, transformers and a series of pumps) to produce green hydrogen.

1.1.4. The Proposed Development will be located at Singleton Birch Limited, Melton Ross Quarries, Barnetby, North Lincolnshire, United Kingdom, DN38 6AE and will be centred approximately on National Grid Reference ("NGR") TA 08789 11301.

1.1.5. The indicative site location (outlined in red – i.e., the "Application Site") is provided in Figure 1. The blue line represents the additional land ownership boundary, the green line represents the pipeline and the brown shading represents the maintenance track. A detailed plan may be found in Appendix I.

Figure 1: Indicative Site Location

1.2. The Applicant

1.2.1. Centrica Energy Storage Limited ("CES+") are part of the infrastructure area of the Centrica family.

1.2.2. CES+, on behalf of their client Singleton Birch Limited, are offering green[1] hydrogen production as an alternative fuel source to decarbonise on-site energy generation.

1.3. Existing Site

1.3.1. The existing use of the Application Site is industrial and falls within the ownership boundary of Singleton Birch's Melton Ross Quarries. Humberside Airport is located to the southeast, with the wider site setting largely agricultural.

1.4. Scope of the Study - Overview

1.4.1. The Proposed Development could have potentially detrimental impacts on the surrounding air quality due to both the construction and operational phase of the HPF. Consequently, various screening assessments have been undertaken to ascertain whether any detailed air quality assessments will need to be carried out. The various screening assessments, as well as the relevant legislation and guidance, are discussed in the ensuing sections and will consider the following:

- construction phase fugitive dust emissions;
- vehicle exhaust emissions; and
- vented emissions.

1.5. Air Quality Standards for the Protection of Human Health

1.5.1. The UK Air Quality Standards Regulations 2010[2] outline the air quality target values, long-term objectives and legally binding limit values for concentrations of major air pollutants that impact public health in the UK. The air quality standards ("AQSs") relevant to vehicle emissions are detailed in Table 1.

[1] Green hydrogen is produced by splitting hydrogen from oxygen through the electrolysis of water, using electricity generated by renewable energy sources. This process produces zero carbon dioxide emissions.
[2] Available online via: https://www.legislation.gov.uk/uksi/2010/1001

Table 1: Air Quality Standards for the Protection of Human Health

Pollutant	Averaging Period	AQS (mg/m^3)	Comments
Nitrogen Dioxide ("NO_2")	annual	40	N/A
	1-hour	200	Not to be exceeded more than 18 times per annum, equivalent to the 99.79th percentile of 1-hour means
Particulate Matter with a diameter of 2.5 µm or less ("$PM_{2.5}$")	annual	20	N/A
Particulate Matter with a diameter of 10 µm or less ("PM_{10}")	annual	40	N/A
	24-hour	50	Not to be exceeded more than 35 times per annum, equivalent to the 90.41st percentile of 24 hour means

1.6. Background Air Quality

1.6.1. Background air quality data has been acquired for the various pollutants of interest to demonstrate the current baseline.

1.6.2. North Lincolnshire Council ("NLC") undertake automatic monitoring for NO_2, $PM_{2.5}$, PM_{10} and sulphur dioxide ("SO_2") throughout the council[3]. The nearest automatic monitoring site to the Application Site is CM6, Killingholme School – which is sited approximately 7.8km to the northeast and monitors for NO_2, PM_{10} and SO_2. Of the pollutants relevant to this study, CM6 possessed a 2023 NO_2 concentration of 13 $\mu g/m^3$ (33% of the relevant AQS) and a 2023 PM_{10} concentration of 17 $\mu g/m^3$ (43% of the relevant AQS).

1.6.3. In addition, NLC undertake diffusion tube ("DT") monitoring for NO_2. Of these DT monitoring locations[3], the nearest DT to the Application Site, DT ID 13, Ulceby Road Killingholme, is sited approximately 7.4km to the northeast and possessed a 2023 NO_2 concentration of 14.2 $\mu g/m^3$ (or 36% of the relevant AQS).

1.6.4. Background air quality data is also available from the Department for Environment, Food and Rural Affairs ("DEFRA") for the latest year (2023 at the time of writing) background pollution maps, at a resolution of 1x1km. The four grid squares encapsulating the Application Site have been identified and are presented in Table 2.

[3] Further information available online via: https://northlincolnshire.moderngov.co.uk/documents/s21729/Air+Quality+Status+Report+-+Appendix.pdf (accessed July 2025).

Table 2: Nearest Background DEFRA Data to the Application Site

ECL Reference	Pollutant	Annual Mean Concentration (µg/m³) [a]	(X) [a]	(Y) [a]	Distance (m) [b]	Heading (°)
DEFRA1	NO_2	8.06	508500	411500	351	305
	$PM_{2.5}$	6.81				
	PM_{10}	15.68				
DEFRA2	NO_2	6.47	509500	411500	738	74
	$PM_{2.5}$	6.79				
	PM_{10}	14.68				
DEFRA3	NO_2	5.87	508500	410500	852	200
	$PM_{2.5}$	6.73				
	PM_{10}	14.43				
DEFRA4	NO_2	6.44	509500	410500	1,071	138
	$PM_{2.5}$	6.59				
	PM_{10}	12.85				

Notes to Table 2
(a) Information obtained from the latest (2023 at the time of writing) DEFRA background pollution maps[4].
(b) Distances are measured as the crow flies to on-site NGR: TA 08789 11301.

1.6.5. It can be seen from the data in Table 2 that all pollutant background concentrations are low across the Application Site when compared with their respective AQSs. These background concentrations will be considered in the following sections to help further gauge the sensitivity of the area to any potentially negative impacts on human health.

1.7. Construction Phase – Fugitive Dust Emissions

1.7.1. There is the potential for fugitive dust emissions to occur as a result of construction phase dust soiling activities. Construction dust is typically emitted during the preparation of the land (i.e., via earth movement works, for example) and during construction (i.e., via the movement, storage and installation of materials etc).

1.7.2. An initial screening assessment has been undertaken in accordance with the Institute of Air Quality Management ("IAQM") *Guidance on the assessment of dust from demolition and construction* (Version 2.2, published 2024[5]).

1.7.3. Assessment of dust impacts is normally required if there are any human and/or ecological receptors within:

- 250m of the Application Site boundary;
- within 50m of the route(s) used by construction vehicles on the public roads; and

[4] Available online via: https://uk-air.defra.gov.uk/data/pcm-data
[5] Available online via: https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf

- up to 250m from the entrance(s) to the Application Site.

1.7.4. The IAQM construction dust guidance defines a human receptor as:
"*any location where a person or property may experience the adverse effects of airborne dust or dust soiling, or exposure to particulate matter over a time period relevant to the air quality objectives, as defined in the Government's technical guidance for Local Air Quality Management. In terms of annoyance effects, this will most commonly relate to dwellings, but may also refer to other premises such as buildings housing cultural heritage collections (e.g. museums and galleries), vehicle showrooms, food manufacturers, electronics manufacturers, amenity areas and horticultural operations (e.g. salad or soft-fruit production)*".

1.7.5. The IAQM construction dust guidance defines an ecological receptor as:
"*any sensitive habitat affected by dust soiling. This includes the direct impacts on vegetation or aquatic ecosystems of dust deposition, and the indirect impacts on fauna (e.g. on foraging habitats). For locations with a statutory designation, e.g. Special Areas of Conservation ("SACs") and Sites of Special Scientific Interest ("SSSIs"), consideration should be given as to whether the particular site is sensitive to dust and this will depend on why it has been designated. Some non-statutory sites (i.e. local wildlife sites) and/or locations with very specific sensitivities may also be considered if appropriate.*"

1.7.6. Ecological searches were conducted for SACs, Special Protection Areas ("SPAs"), SSSIs, Ramsar sites and local wildlife sites.

1.7.7. No relevant ecological receptors have been identified within 250m of the Application Site boundary (the nearest ecological receptor is Kirmington Pits SSSI sited approximately 1.3km to the east).

1.7.8. In regard to potentially sensitive human receptors within 250m of the Application Site, a residential property is sited approximately 200m to the south. However, it is considered that as this receptor is bounded by the A18 road immediately north, businesses and Humberside Airport immediately east, arable land immediately west and quarry activities to the north – the construction phase of the Proposed Development is unlikely to significantly add to the ambient background dust levels experienced to the south of the Application Site (refer to DEFRA3 and DEFRA4 in Table 2, for further information on the latest available DEFRA background $PM_{2.5}$ and PM_{10} concentrations).

1.7.9. Furthermore, it is anticipated the construction vehicle movements (refer to Section 1.8 for details) on the public highway are not considered to be significant dust sources, due to both the nature of the materials and the low number of vehicle movements.

1.7.10. Consequently, it is considered that detailed assessment of construction dust can therefore be screened out.

1.8. Vehicle Exhaust Emissions

1.8.1. Significant additional volumes of vehicle movements associated with the construction and operation of a project or development have the potential to generate exhaust emissions,

such as oxides of nitrogen ("NO_X") and particulate matter (typically assessed as $PM_{2.5}$ and PM_{10}).

1.8.2. To establish the likelihood of the Proposed Development leading to a significant effect on air quality, indicative traffic change criteria detailed in the IAQM & Environmental Protection UK ("EPUK") *Land-Use Planning & Development Control: Planning For Air Quality* (published 2017) guidance[6] has been used to flag the possibility of any significant effects, and therefore the requirement to carry out detailed assessment.

1.8.3. The applicable traffic change criteria are as follows:

- a change of Light Duty Vehicle ("LDV") flows of more than 100 Annual Average Daily Traffic ("AADT") within or adjacent to an Air Quality Management Area ("AQMA") or more than 500 AADT elsewhere;
- a change of Heavy Duty Vehicle ("HDV") flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- realignment of roads where the change is 5m or more and the road is within an AQMA; or
- introduction of a new junction or removal of an existing junction near to relevant receptors.

1.8.4. The Application Site and the local road network is not located within or adjacent to an AQMA (the approximate nearest AQMA, namely Scunthorpe Town AQMA, is sited circa 13.8km west of the Application Site and has been declared by NLC for 24-hour PM_{10} emissions). Consequently, the less stringent vehicle screening criteria should be applied.

1.8.5. The construction period of the Proposed Development is anticipated to take 4 – 8 months. During this period, there would be trips associated with the arrival and departure of construction staff and project personnel, as well as the delivery of construction materials and equipment.

Construction Phase

1.8.6. The construction phase is anticipated to take up to 8 months to complete and will include the following:

- site surveys and site investigation works;
- laying out the temporary arrangements to facilitate construction activities;
- the preparation of the area(s) affected by early works;
- piling, excavations, foundations, bases and drainage works;
- the main structural work; and
- commissioning activities.

1.8.7. It is proposed that the following vehicles and equipment will be used during the construction phase:

- a 6 tonne excavator;
- a 4 tonne dumper;

[6] Available online via: https://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf

- a vibrating plate compactor;
- an impact/screw pile drive;
- a tracked skid steer; and
- a telehandler.

1.8.8. The anticipated vehicle trip generation during the construction phase will be:

- movement and delivery of construction vehicles, equipment and materials – approximately four HDV round trips assumed as a worst case; and
- project personnel arriving to and departing from the Application Site – up to 16 LDV daily round trips (or 32 vehicle movements, when accounting for both directions of travel).

1.8.9. The AADT for the construction phase (when assuming two-way movements, five days a week) is as follows:

- HDV – 2 AADT;
- LDV – 23 AADT

Operational Phase

1.8.10. In terms of vehicle movements, it is anticipated that one car will visit the site once a week during the operational phase for maintenance purposes. The AADT for the operational phase (when assuming two-way movements, one day a week), when rounded up to the nearest vehicle movement, is therefore expected to be as follows:

- LDV – 1 AADT.

Summary

1.8.11. Based on the construction and operational phase of the Proposed Development and the DEFRA modelled background concentrations (see Table 2), potential air quality impacts associated with vehicle exhaust emissions are expected to be negligible. The findings of the vehicle emissions assessment are summarised in Table 4 against the screening criteria detailed in the IAQM & EPUK guidance.

Table 4: Specific Screening Criteria for Air Quality Screening Assessment

The Development Will:	Indicative Criteria to Proceed to an Air Quality Assessment	Significance
1. Cause a significant change in LDV traffic flows on local roads with relevant receptors.	A change of LDV flows of: - more than 100 AADT within or adjacent to an AQMA - more than 500 AADT elsewhere.	The Application Site or surrounding area is not located within an AQMA. The AADT for LDVs for the Phase with the highest AADT is 23. **Not significant**
2. Cause a significant change in HDV flows on local roads with relevant receptors.	A change of HDV flows of: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere.	The Application Site or surrounding area is not located within an AQMA. The AADT for HDVs for the Phase with the highest AADT is 2. **Not significant**
3. Realign roads, i.e. changing the proximity of receptors to traffic lanes	Where the change is 5m or more and the road is within an AQMA.	There is no realignment of roads. **Not relevant**
4. Introduce a new junction or remove an existing junction near to relevant receptors	Applies to junctions that cause traffic to significantly accelerate /decelerate, e.g. traffic lights, or roundabouts	No new junctions or changes near to relevant receptors are proposed. **Not relevant**

Note to Table 4
LDV = cars and small vans less than 3.5 tonnes gross vehicle weight
HDV = vehicles greater than 3.5 tonnes gross vehicle weight

1.8.12. Table 4 shows that the air quality impacts, according to the detailed IAQM screening criteria, are not significant or are not relevant.

1.8.13. It should be noted that, in the interest of calculating worst-case scenario figures, the AADT calculations are based on the Phase with the highest vehicle movements – i.e. the construction phase. Consequently, as the worst-case scenario figures screen out, no further assessment is required.

1.9. Vented Emissions

1.9.1. In regard to vented emissions, these would consist solely of hydrogen and water saturated oxygen. Vented emissions will be adequately separated to prevent any mixing.

1.9.2. It should be noted that, under normal operating circumstances, there would not be any purging of the system using nitrogen. Purging could be required to support electrolyser stack replacement activities (circa once every 10 years as a minimum). It is anticipated that this purging would require a nitrogen quad[7] in order to purge an approximate volume of 844m^3 of nitrogen.

1.9.3. The estimated amount of oxygen anticipated to be vented from the Proposed Development has been calculated as approximately 24,766 tonnes per annum.

1.9.4. As none of the vented releases are harmful to human or environmental health in the quantities emitted, detailed assessment of air quality impacts during the Proposed Development's operational phase can be screened out.

[7] Example available via: https://aloffshore.com/wp-content/uploads/2017/06/Product-Datasheet-Offshore-Q64.pdf

2. CONCLUSIONS

2.1. Scope

2.1.1. An AQA has been undertaken to screen the potential air quality impacts associated with the construction and operational phases of the Proposed Development.

2.1.2. IAQM and EPUK guidance has been used as the basis of whether more detailed assessments are required or not.

2.2. Construction Dust

2.2.1. Detailed assessment of construction dust has been screened out as no ecological receptors have been identified within 250m of the Application Site boundary and, whilst a residential property is located circa 200m to the south, any fugitive dust emissions from the construction phase of the Proposed Development on this human receptor are considered to be negligible. Furthermore, it is anticipated the construction vehicle movements on the public highway are not considered to be significant dust sources, due to both the nature of the materials and the low number of vehicle movements.

2.3. Vehicle Emissions

2.3.1. Detailed assessment of vehicle exhaust emissions has been screened out as the potential air quality impacts are expected to be negligible in accordance with the guidance.

2.4. Vented Emissions

2.4.1. Detailed assessment of vented emissions has been screened out as, based on the anticipated quantities emitted, these are not considered to pose any harm to human or environmental health.

2.5. Summary

2.5.1. In summary, therefore, it can be concluded that any dust, vehicle exhaust and vented emissions associated with the construction and operation of the Proposed Development are not considered to be significant and are therefore unlikely to have a detrimental impact on local air quality.

APPENDIX I
PROPOSED LAYOUT PLAN

Notes:

1. All dimensions to be confirmed on site prior to installation.
2. All dimensions are indicative only and in m unless otherwise specified.

Legend:

- Site boundary
- Additional land ownership
- Maintenance track
- Pipeline

REV	DATE	DESCRIPTION	DRN	CAD QA	CHK	APP
2	5/9/2025	Site boundary and road updated	GS			
1	4/9/2025	Site boundary updated	GS			
0	1/9/2025	First issue	GS			

centrica
energy storage+

Millstream
Maidenhead Rd, Windsor
SL4 5GD
Tel: +44 (0) 175 349 4000
CentricaBusinessSolutions.com

PROJECT: Singelton Birch

TITLE: Proposed Layout Plan

ADRESS:

DATE	01/09/25	SCALE	1:1500	SHEET	A1	CBS-W
				STATUS: S0		REV: 2

DRG-NUMBER: