EA Template Air Quality Management Action Plan (AQMP) Aggregated Diesel Standby 30/11/21 DRAFT

This is the publically accessible procedure portion.

1-1 PURPOSE & SCOPE

Scope
This procedure covers the evaluation, ongoing impacts assessment, notification and engagement in the event of a major, unplanned power loss at the facility resulting in the requirement that a significant number of standby diesel generators are required to run on the site. ***This procedure is separate to any H&S related emergency operating procedures (EOP) and risk assessments.*** *The AQ procedure also contains useful* ***assessment tools should a planned maintenance event similarly require a significant number of standby diesel generators to operate****. Key information for the outage is provided at the beginning of the form to best enable coordination and assessment. It is possible that the protocol could be initiated by external bodies like the EA or local authority before the action plan itself has been enacted locally.*

1-2 SITE INFORMATION

Permit Number	EPR/ VP3235DJ
Address	Cody Park
	Old Ively Road
	Farnborough
Postcode	GU14 0LH
OS – grid coordinates	484045, 154335

1-3 HEADLINE SCALE OF STANDBY ON SITE

MW Elec – Fully deployed 84 Generators (future)	134.64	MW elec
Permitted MW thermal – Fully deployed 84 Generators (future)	372.61	MWth
Site MVA	90	MVA
Installed number of standby engines	73	n
Resilience provision for the engines	Mixed 2n, n+1, n+2 per data hall	
Site location	Suburban; Campus	
Stack Arrangement (indicative or average height + characteristic)	<10m Containerised	m
Primary Grid connection description	4 Nr 33kV DNO feeds with 4 to make 3 Distributed (N+1) Redundancy	
Minimum distance to other large data centres or aggregated standby which could share the same Primary Grid connection.	None	m
Standby Cluster? – estimated number of any off-site standby engines within 500m radius that would likely operate in a national black-start scenario	N/A	n
Nearest sensitive/residential receptor	128 Old Ively Road	m
Local Authority AQ management Zone	No	

This is the publically accessible procedure portion.

1-4 HIERARCHY OF ENGINE NUMBERS AND ASSOCIATED OUTAGE DURATIONS OF CONCERN

If this is a multi-site campus based data centre the following table can be sub-divided or repeated separately for each as appropriate

Criteria	Realistic Outage Scenarios based on a review of the way the site could reasonably be expected to react to a range of modes of power loss – delete/add as appropriate	MWelec (number of gens)	Run duration (hours)	Outage duration to notify as soon as possible the EA and/or local authority if event is likely to exceed[1]
1 (required)	Worst case, realistic whole site loss of power *e.g. Maximum number of engines and/or load operating for SHORT period where concern could start*. AEGL risk	134.64MW (84 Generators)	18 - Theoretical maximum based on extreme worst-case meteorological conditions	EA to be advised within 1 hour if outage duration is expected to exceed 18 hours
2	Reasonable next subdivision of site plant or specific site buildings *i.e. accounting for various HV circuits A & B and/or worst case single data hall – NB this accounts for elective standby to support maintenance activities. Assumes outage on the two Bramshot Lane substation supplies.*	50.64MW (24 Generators A104 & A105)	120	EA to be advised within 1 hour if outage duration is expected to exceed 24 hours - Although, low potential risk of 1-hour NO_2 exceedences
3	Worst case partial site number of generators *e.g. this might be a minimum number of engines and/or load operating for a reasonable LONG period where concern could start. Assumes outage on the two Enterprise substation supplies*	84MW – (60 Generators -A101, A102, and A103)	18- Theoretical maximum based on extreme worst-case meteorological conditions	EA to be advised within 1 hour if outage duration is expected to exceed 18 hours
4	Specific data hall(S) locations: *Minimum part load or number of generators for named part of site due to proximity of receptors*	36.4MW (18 Generators - A105)	N/A	Post event reporting only - no predicted AQO exceedences
5 (required)	Indicative maximum number of engines below which there is minimal outage impact for the local Air Quality *i.e. ambient NOx 200ug/m3 is not exceeded at all*	86.64MW (59 - excluding A103)	unlimited	Post-event reporting only
6	Other site specific representative outage			

Note1 The usual permit condition is to notify the EA within 24 hours of "Number of generators operating initially and the number then operating two hours after the outage" started. The duration in this column is the pre-agreed predicted duration and scale of an ongoing outage notified as soon as possible i.e. when 'within 24 hours' really means as soon as practical. The significant majority of outages will be small scale or short duration brown-outs, these need only be post-event reported to the local EA officer alone.

1-5 EXTRACTS AND REVIEW OF AIR QUALITY MODEL FOR NO_2

Criteria	Predicted Environmental Concentration NO_2		
A	Conservative peak NO_2 under worst scenario {ambient AQ or AEGL}	424.61[(a)]	ug/m^3
B	Indicative or likely typical during prolonged outage	255.49[(b)]	ug/m^3
C	Guidance distance that could be affected (radius) for the above figures	215[(c)]	m
	Headline realistic figures (for A max above)		
D	Site load on full outage	93	MWelec
E	Fuel rate per hour (for A max above)	20.65	t/hr
F	Average NOx emission rate per generator	6.1	kg/hr
G	Total NOx emission rate on full site outage (for A max above)	511	kg/hr
	Key Risk Factors identified		
	Times of day	The receptors are residential properties and therefore use is likely to be similar on a daily and annual basis and assumptions on dates or	
	Seasonal		

		times of high or lower sensitivity would not be appropriate
	Area prone to poor QA alerts	No

Comments:-

(a) Maximum predicted 1-hour mean NO_2 concentration at any receptor based on all meteorological data records.
(b) Maximum predicted 90.40th %ile 1-hour mean NO_2 concentration at any receptor based on 120-hour grid outage.
(c) Maximum distance from site boundary affected by 90.40th %ile 1-hour mean NO_2 concentrations above 200µg/m^3 during 120-hour grid outage.

This is the publically accessible procedure portion.

1-6 RESPONSIBILITIES

Name	Company	Description
Ark Service Desk	Ark Data Centres Limited	Co-ordination of Incident Management and associated client communications.
Technical Operations Manager (Meridian Park)	Ark Data Centres Limited	Co-ordination and management of site activities - Technical
Head of Energy & Sustainability	Ark Data Centres Limited	Incident support and regulatory reporting – Technical & Compliance
Head of Compliance	Ark Data Centres Limited	Incident support and regulatory reporting – Compliance
Major Incident Operations Team (MIOT)	Ark Data Centres Limited	Co-ordination of activities in the event a major incident is declared (ties into Business Continuity arrangements)

1-7 RELATED DOCUMENTATION

Document	Title	Notes
6029-T-Emergency Gen Run	Notification template as part of permit ref	Readings to be taken and sent to the Environment Agency
5207-B-EPR Permit Reporting	IED/EPR Reporting Process	Covers all relevant reporting activities including emergency reporting activities.
	AQ model report supplied for permit determination	3700-1r2 (January 2022)
	Pre-prepared Public engagement materials & leaflet	N/A
5215-F-EPR Reporting CP	Reporting Forms	

1-8 PROCEDURES

1-8-1 THE FOLLOWING STEPS ARE TO BE FOLLOWED IN THE EVENT OF A POWER FAILURE EITHER ON-SITE LOCALLY OR UK POWER NETWORKS.

Actions
Process flow chart or diagram: 1. EMS Notification – DNO (SSEPD) Supplies out of tolerance, Generators start. 2. Trigger Ark Incident and Escalation Process – captures start of incident date and time. 3. Contact SSEPD to determine likely cause of supply failure and anticapted duration of outage.

4. If the anticpated duration of outage is likely to be more than 18 hours, instigate SOP to close the Enterprise/Bramshot substation interconnector.
5. Once the interconnector is closed and the campus 11kV networks are stable, instigate EOP to rationalise the number of generators in operation against available circuits and data centre demand.
6. Instigate regular update calls with SSEPD Control Room.
7. Report the outage using the permit reporting template to the EA (5215-F-EPR Reporting CP, Part A), initially to the permitting officer and if unavailable the EA National Customer Help Line, advising that the AQA modelling work for the Permit indicates that even if all 84 generators need to run for 18 hours NO_2 concentrations at the nearest sensitive receptors are unlikely to exceed 200µg/m^3.
8. Continue to assess anticipated duration of outage and number of generators in operation, if outage is going to exceed 18 hours with more than 60 generators in operation, notify occupants of Old Ively Road Cottages that there is an ongoing generator incident and to close all windows.
9. Update the EA with any material changes to the nature of the outage and confirm notifcation affected stake holders.
10. Once the mains supplies are restored advise the occupants of the Old Iveley Road that the incident is over and windows can be re-opened, apologising for any inconvenience caused.
11. The above process is an extract from a the wider IED/EPR Reporting Process (5207-B-EPR Permit Reporting).

1-9 NEAREST AMBIENT AIR QUALITY MONITORING STATIONS

1	No relevant continuous air quality monitoring stations within vicinity of site.		

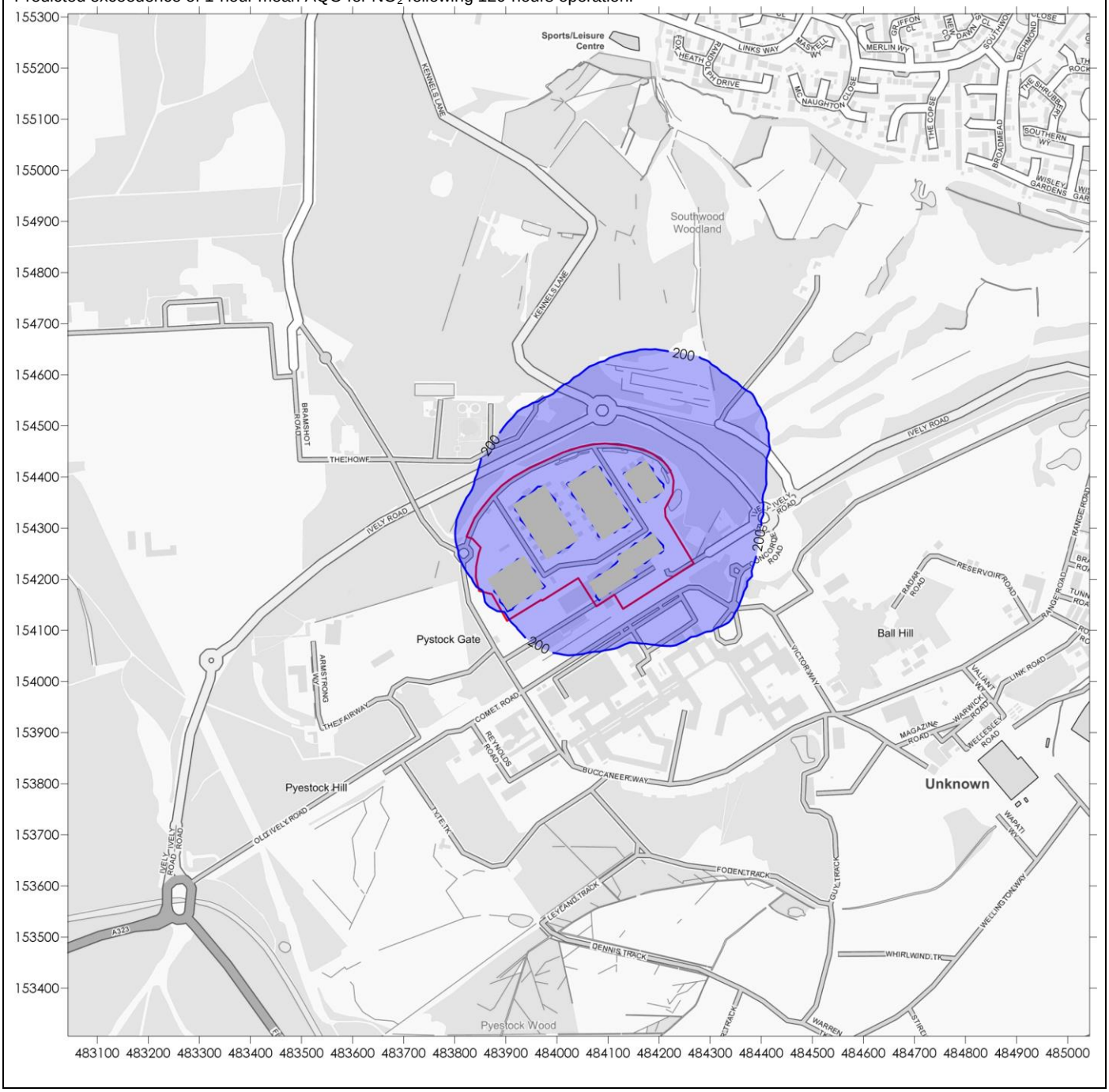
Access to current readings at: https://uk-air.defra.gov.uk/latest/currentlevels?view=site

This is the publically accessible procedure part.

1-10 RECEPTOR PLAN AND SURVEILLANCE ROUTE

AQ receptor plan and marked surveillance circuit

Predicted exceedence of 1-hour mean AQO for NO_2 following 120-hours operation:



This is the publically accessible procedure part.

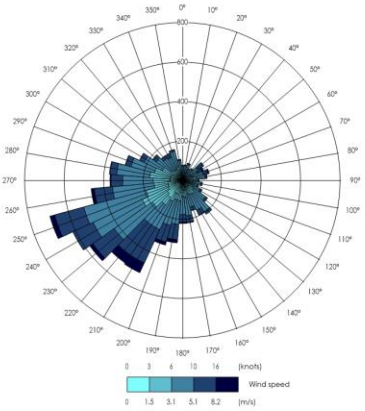
1-11 RECEPTOR LIST

Location ref	Type of receptor	NGR (m)	
		X	Y
R1	Peartree Cottages - Residential	484481	154759
R2	Southwood Golf Club - Leisure	485284	154771
R3	25 Wisley Gardens - Residential	484969	154950
R4	Busy Bees Nursery - Nursery	483512	154031
R5	16 Marlborough Close - Residential	482782	153912
R6	128 Old Ively Road - Residential	484325	154289
R7	Cody Sports and Social Club - Leisure	483663	154047

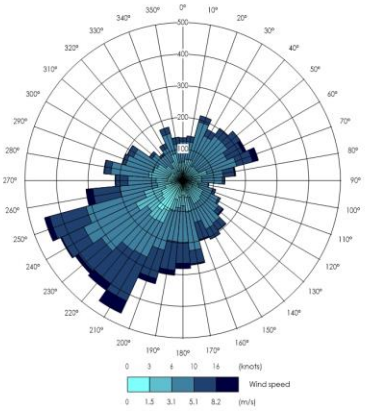
Location ref	Type of receptor	NGR (m)	
		X	Y
R8	Hartland Village - Residential	483412	154201
R9	Hartland Village - Residential	483640	154347
The list is not to identify or assess individuals or organisations – it is only a generic profile for the locale. Are there any receptors who need to be expressly visited directly (see 1-17 Specific private contacts (GDPR Considerations)		Y	

1-12 WIND-ROSE

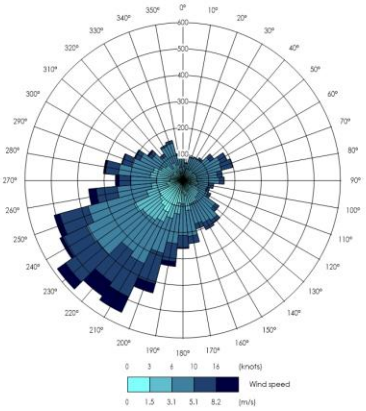
Preferred Weather source
https://www.bbc.co.uk/weather/2649672
Wind rose for the site (from AQ model)



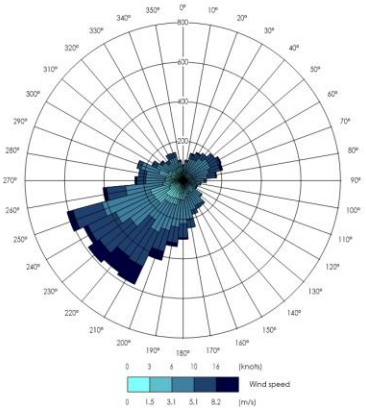
2017 Meteorological Data



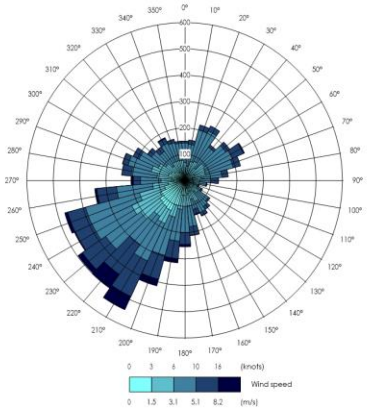
2018 Meteorological Data



2019 Meteorological Data



2020 Meteorological Data



2021 Meteorological Data

This is the publically accessible procedure part.

1-13 PUBLIC ACCESS CONTACTS

Index	Operator Contact		
1	**Ark Data Centres**	Service Desk	Phone: 01225 818999 Email: ASD@arkdatacentres.co.uk
	External Contacts		
	Local Council – Rushmoor Borough Council	Environnemental Health	Phone on 01252 774421 Email: eh@hart.gov.uk
	Environment Agency	**Incident hotline**	Phone: 0800 80 70 60 Email: Incident_Communication_Service@environment-agency.gov.uk
	Local Emergency services		999
List of public receptors who need to be contacted directly is held separately under GDPR			

1-14 REPORTING FORMAT FOR EA, LOCAL AUTHORITY ETC (SCRIPT)

Script for 'Data Centre Service Desk' to Environment Agency 'Customer Hotline ' Incident Communication Service <Incident_Communication_Service@environment-agency.gov.uk>
Part A, Section A of the attached will be used.  EPR Reporting Forms CP.docx

1-15 DOCUMENT INFORMATION

EOP/SOP Ref	Procedure Name
EOP.01.007	**Standby Generator Operation and reduction to N+1 for Operating Load**
SOP	**Operation of the Enterprise/Bramshot Substation Interconnector**

System / Equipment:	Location / Area	Rev	Status	Next review date

1-16 CHANGE HISTORY

Document ID		8071-D-CP AQM Plan	Document Title	Air Quality Management Plan (AQMP) Cody Park		
Document Owner		Tim Bate	Document Approver	Pip Squire		
DATE	Version	DESCRIPTION OF	SECTIONS / PAGES	AUTHOR	REVIEWED	DATE

		CHANGES	UPDATED		BY	
10/11/2021	1.0	Initial AQMP under ref 6022-D-CP AQM Plan	New Document	POS	JT/LM	11/11/2021
01/2/2022	1.1	Migrated contents to new AQMP template, updated throughout and allocated new ID for Tech Ops.	All	POS	SP (EHS)/LM	01/02/2022

This is the GPRS, private procedure part.

1-17 SPECIFIC PRIVATE CONTACTS (GDPR CONSIDERATIONS)

Use this separate annex to retain private contacts that should **not** be provided for public access in the event of a prolonged outage.

Index	Operator Contact		
1	**Ark Data Centres**	Service Desk	Phone: 01225 818999 Email: ASD@arkdatacentres.co.uk
	External Contacts		
	Local Council – Rushmoor Borough Council	Environnemental Health	Phone on 01252 774421 Email: eh@hart.gov.uk
	Environment Agency – EPR Permitting Officer *(Guy Elliott)*	Site Regulator	Phone: 07770 792762 Email: guy.elliot@environment-agency.gov.uk
	Environment Agency	Incident Hotline	Phone: 0800 80 70 60
	Emergency services		Phone: 999
	Private Sensitive receptors to be directly contact as determined and agreed in advance		
List of public receptors who need to be contacted directly is below or held separately under GDPR if necessary			

This is the publically accessible procedure portion.

FILL IN GUIDE

PURPOSE & SCOPE

Edit the text in this section to expand on or explain how the procedure is being used locally

It is envisaged that the production of the AQMP would be best done as part of any new permit application during detailed AQ modelling.

HEADLINE SCALE OF STANDBY ON SITE

This key information summarises the site. It starts the form to enable clustering and scale of multiple data centres at an early stage. Resilience is important to indicate clarify that all plant wouldn't be required to meet site loads.

Campus sites – ones where multiple buildings are incorporated on to the same EA permit. Indicate how each of the site campuses is named and ensure the site plan includes them.

Campus sites will best be sub-divided into separate 1.4 and 1.5 tables (or clearly headed sections) for each. Initially it is suggested that the table indicates how each campus within the group will be affected. Ideally AQ actions and surveillance under table 1.8 to 1.11 inclusive can be common to all but if appropriate have separate routes etc as necessary.

HIERARCHY OF ENGINE NUMBERS AND ASSOCIATED OUTAGE DURATIONS OF CONCERN

Realistic Outage Scenarios based on a review of the way the site could reasonably be expected to react to a range of modes of power loss – edit the table as appropriate.

If this is a multi-site campus based data centre the following table can be sub-divided or repeated separately for each as appropriate.

The site may be able to bus couple between HV connections, or internally switch engines manually onto alternative circuits or stay-on load due to customer during 'heightened awareness' risk status which will affect the ability to manage the risk/load/run durations. The following are guidance scenarios edit accordingly. Line A should be the headline minimum load/duration event that triggers the AQMP and notifications: Outage Durations of concern – enter the approximate run time after which receptors downwind, or building downwash, theoretically could start to significantly exceed the AQS of NO2 200ug/m3 somewhere during the outage These hours are also the levels before which notifications are provided to EA or local authority – if you know the outage will exceed these hours notifications should be made soonest.

Important outcome is at least 2 rows one to indicate the scale of outage where no immediate reporting to the EA is required relying only on post event reporting as per permit Schedule 5 – Notification; and one for the worst case, realistic whole site loss of power. In essence row #1 is the pre-agreed 'need to know' duration of outage and #5 is the' outage of no concern.

RELATED DOCUMENTATION

It is not envisaged that the local community needs to receive any direct contact in deriving the AQMP. Public engagement materials need only be produced ready for a prolonged outage resulting in risk of poor AQ. It is just providing explanation, advice, contacts etc ready. Only in exceptional circumstances should it be necessary to identified sensitive receptors and advise they are listed in 1-17 and to be contacted directly

PROCEDURES

Edit and amend the indicative steps as appropriate

RECEPTOR PLAN AND SURVEILLANCE

It would not be unreasonable to try-out the route during a routine planned whole-site black building test to gain a sense of the background AQ etc.

In the urban setting exhaust fumes will be very close and around the locale regardless of wind direction due to wind shear effects around tall buildings. Ensure the route considers very local receptors and those downwind at the time too.

RECEPTOR LIST

Indicate if these are in order of a route, or on a priority basis. Remember the receptors can change – this list should be reviewed regularly. IT IS NOT ENVISAGED THAT RECEPTORS NEED TO BE IDENTIFIED OTHER THAN BY GENERIC LOCALE. RECEPTORS DO NOT NEED TO BE PRE-WARNED OR DETAILS ACTIVILY SORT IN ADVANCE OF DEVELOPING THIS AQMP.

ONLY IN EXCEPTIONAL CIRCUMSTANCES DO PRIVATE SENSITIVE RECEPTORS NEED TO BE LOGGED AND CONTACTED {SUCH MAY ALREADY BE THOSE WHO ARE ADVISED OF TESTING DUE TO NOISE OR FUMES ETC}

NEAREST AMBIENT AIR QUALITY MONITORING STATIONS

Indicate is the station falls within the likely zone of ambient emissions. Also indicate if the site has installed its own continuous monitoring station(s). Can mobile monitoring stations be provided at short notice.

SPECIFIC PRIVATE CONTACTS (GDPR CONSIDERATIONS)

Use this separate annex to retain private contacts that should not be provided for public access in the event of a prolonged outage.