Appendix 03-05 Flue Management

Fuel Management – Best Practice

Delivery and Management of Fuel across our Sites

Contents

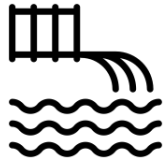
Diesel storage guidelines

Storing petrol, diesel, or any other fuel at home or in the workplace represents a potential risk. Fuel gives off vapours which are extremely flammable and must be dealt with in the most responsible fashion. The UK's Oil Storage Regulations apply to all new domestic and commercial installations across the country. It is said that oil-related accidents account for one-quarter of all emergency incidents. This is often caused by inadequate storage of fuels above ground.

Most parts of the UK are bound by legislation to reduce pollution caused by the incompetent storage of oil:

- Control of pollution (oil storage) (England) regulations 2001
- The Water Environment (Oil Storage) (Scotland) Regulations 2006
- The Control of Pollution (Oil Storage) Regulations (Northern Ireland) 2010

The below regulations apply to anyone who stores more than 200 litres of oil in England:



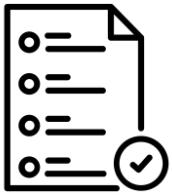
Water pollution

Any site which is deemed a potential risk of polluting surface waters and groundwater with fuels will be served an 'anti-pollution works notice', informing site owners to take immediate action. Oils are poisonous to fish and other wildlife in our environment. It is said as little as two litres of oil could pollute the size of a freshwater Olympic-sized swimming pool, so you can see exactly why the Environment Agency takes cases of contamination so seriously.

The Environment Agency are also within their rights to impose an uncapped fine on anyone who causes an oil spill.

It is therefore extremely important to store your fuels responsibly.

Bunded fuel tanks or fuel containers offer the safest and most reliable fuel storage possible



Fuel Management Responsibility

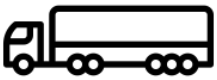
It is the responsibility of the VIRTUS Technical Management to ensure that the fuel management and control of their site/s are operated correctly by the service provider. This will need checks on delivery management, tank monitoring, PPM's, SOP's and EOP's are in place and are followed.

It is important that the management of the tank quality is followed and that any out of specification tanks are actioned quickly.

Fuel Type

Fuel type for all VIRTUS sites must be **FAME-free white diesel (see fuel specification data sheet)**

Under no circumstances that any other type of diesel can be purchased and discharged into any site storage tanks



Fuel delivery

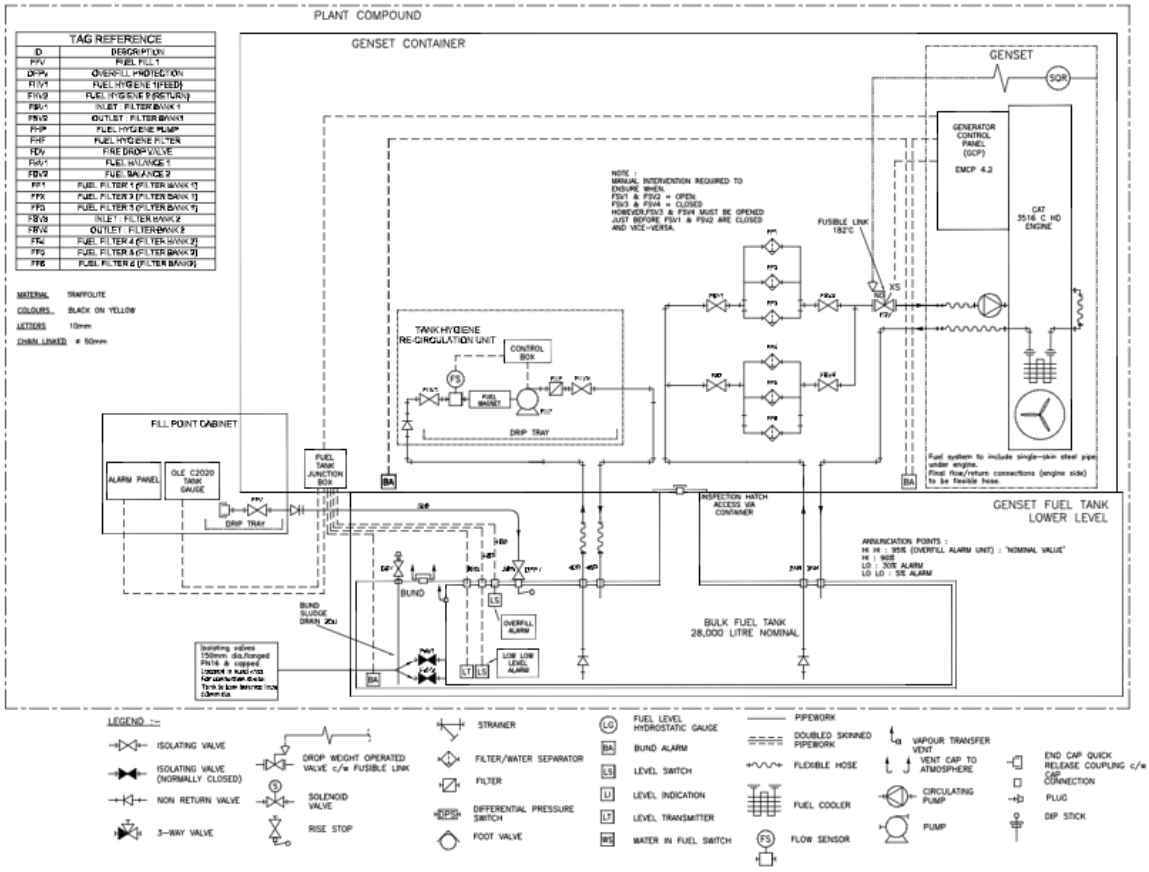
Storage tanks

All tanks that require **FAME-free white diesel** should be always greater than 80% of the total volume of the storage tank.

Example – 28,000L Tank at 88% Maximum working level, 90% is Hi Fuel level and 95% is at Hi level

Tank levels should be checked to ensure that the correct volume is correct and that the order level will allow for expansion when close to the upper limit.

No single delivery should be placed in multiple tanks. 1 delivery – 1 tank.



Tank example

Delivery Code

1. **Crown Oil** – Preferred Supplier (Retained)
   - Batch test report will be added to the delivery note for batch sample identification
     - Delivery code - 3FF – FAME Free Derv
2. **Nationwide** – Second Preferred Supplier
   a. Batch test report will be added to the delivery note for batch sample identification
   b. Delivery code - 3FF – FAME Free Derv
3. If another supplier is identified, they must be able to deliver the correct fuel type as per technical specification and to the deliver this 24/7 365, then this needs approval.

Delivery Procedure

1. Generator SOP to be followed for the tanker delivery
    a. Tanker delivery
        i. Fuel delivery site
        ii. Fuel Type - **FAME-free white diesel**
            - Material quality is within specification
2. RAMS and General works permit are completed before works commence
3. BMS/ PMS are clear of any alarms
    a. Any alarms need to be escalated before discharge can take place

Fuel Storage - Management checks

EUETS – Fuel Reading

Virtus LON - EUETS MONITORING PLAN

Oil type:
Gas oil

Return For:

To be completed by Site OPS
Calc cell, please do not alter

GENERATOR RUN DETAIL				SITE DIESEL INVENTORY						
Generator Ref	Cumulative Run Hours	Cumulative kWHrs	Cumulative fuel consumption from screen (litres)	Fuel Level at START of month (litres)	Fuel deliveries in month (litres)	Fuel disposals in month (litres)	Fuel Level at END of month (Ltrs)	Consumption (litres)	Percentage	Date readings taken
								0		
								0		
								0		
								0		
								0		
								0		
								0		
								0		
								0		
								0		
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								0		
								0		
								0		
								0		
								0		
								0		
								0		
								0		
								0		
Total	0	0	0	0	0	0	0	0		

Notes	

1. Tank level readings – EUETS as per PPM
    a. Complete this at the end of each month and remember to include the date the readings were taken.
    b. Photos at each end of month to confirm the readings
    c. Cumulative kWh via the screens located next to each generator. Add to COLUMN C
    d. Cumulative run hours via the screens located next to each generator. Add to COLUMN B
    e. The cumulative fuel consumption from the screens located next to each generator as well. COLUMN D

Column H

Column C

Column B

Column D

Virtus LON - EUETS MONITORING TEMPLATE

Oil type: Gas oil Return For: Annual Summary

Deliveries

SITE DIESEL INVENTORY - RUNNING TOTALS

Month	Opening in Month (Ltrs)	Deliveries (Ltrs)	Disposals (Ltrs)	Total after Delivery (Ltrs)	Closing in Month (Ltrs)	Consumption (Ltrs)	Consumption Cumulative (Ltrs)	Comments (run description)
Jan-21	0	0	0	0	0	0	0	
Feb-21	0	0	0	0	0	0	0	
Mar-21	0	0	0	0	0	0	0	
Apr-21	0	0	0	0	0	0	0	
May-21	0	0	0	0	0	0	0	
Jun-21	0	0	0	0	0	0	0	
Jul-21	0	0	0	0	0	0	0	
Aug-21	0	0	0	0	0	0	0	
Sep-21	0	0	0	0	0	0	0	
Oct-21	0	0	0	0	0	0	0	
Nov-21	0	0	0	0	0	0	0	
Dec-21	0	0	0	0	0	0	0	
TOTALS		0	0			0		

END OF YEAR CHECK

Run hours

Month	Cumulative Run Hours	Run Hours, sum of all	Cumulative kWHrs
Dec-20	0		0
Jan-21	0		0
Feb-21	0		0
Mar-21	0		0
Apr-21	0		0
May-21	0		0
Jun-21	0		0
Jul-21	0		0
Aug-21	0		0
Sep-21	0		0
Oct-21	0		0
Nov-21	0		0
Dec-21	0		0
TOTAL		0	

End of Year Summary

- If for some reason fuel must be removed, please keep a record of how many litres were removed and keep evidence.
- If any of the **fuel contents gauges** are recalibrated or replaced, please keep a record of the readings before and after the change.
- If any additional diesel using fixed equipment is used on site whereby fuel is provided by Virtus, including temporary equipment, please let me know.
    - keep a record of fuel used by this equipment.
        - This does not include cranes, forklifts, cherry pickers etc (as they move).
    - It would include additional Generator sets, diesel powered pumps or air compressors.
    - Equipment brought on to site by contractors who provide their own fuel does not count.

- If any new Generator sets are installed, Daniel Burgon will need to be informed.
    - Information on when the sets are handed over to Virtus operational control, and the tank contents gauge readings just before hand-over.

Diesel Tank Fuel Sample Testing

The quality of the stored fuel may be compromised by many issues including condensed atmospheric moisture and/or the ingress of rainwater, dust and dirt through poorly fitting inspection hatches and breathers. Water can be present in the fuel as a bottom layer of 'free' water or may be present as dispersed water within the fuel itself. In either case water will cause corrosion of the tank's internal surfaces and will also provide a 'home' for microbes to live and multiply whilst using the fuel as a food source, particularly when the fuel contains a biodiesel content. Fuels stored for long periods may also undergo a degree of oxidation leading to acidic by-products and varnishes which can accelerate tank corrosion and increase particulate contamination.

The first warning the fuel user may have of a problem, particularly with back up fuel systems, is when he has a complete breakdown caused by fuel starvation through blocked injectors and filters or fuel pump failure.

1. RAMS are required from the Service engineer prior to works commencing
2. The work will involve accessing the generator container diesel tank to take **two samples** for testing
3. Services engineer will remove diesel tank pipe work at the top of the tank or remove a bung union at the top of the diesel tank to gain access to the diesel tank
4. Using a diesel sample pump and sample container take **two diesel samples** from the **middle and bottom** of the diesel tank
5. In order to accurately assess the health of a fuel storage tank contents true representative samples of the fuel will be taken by Approved technicians using bespoke sampling equipment systems as specified in the ASTM Standard D4057-06.

6. It is essential to provide laboratory with samples which reflect the tank contents, fuel drawn from storage facilities post filters will give misleading analysis results.
7. Samples will be sent to a recognised laboratory for testing and results are then sent back

Sample Ref.	Appearance @15°C	Visible Particulat-es	Free Water	Density@15°C	Visc. @40°C cSt	Moisture Content	Sulph-ur	FAME	Microbial Activity	ISO Cleanliness
EN 590 FAME Free DERV	**Clear & Bright**	**No**	**No**	**0.820 – 0.845**	**2.0 – 4.5**	**200 ppm max.**	**20 ppm max.**	**<0.1 %**	**100 pg cATP/Ml max.**	**Target 18/16/13**

8. Samples are taken from the top of the tank, the middle of the tank and the bottom of the tank. Water and particulates, if present, will appear in the bottom sample, the middle sample will indicate the degree of settlement of any contaminants and the top sample provides our analysts with an indication of what may be achievable if the fuel were to be polished. Contaminants present in storage tanks which receive regular deliveries will be regularly re-dispersed throughout the fuel, contaminants present in tanks which are not in regular use will be concentrated at the bottom of the tank.
9. Analysis results will be checked and if any are outside of recommended values, this is escalated to VIRTUS Management
    a. All reports fuel oil reports must be analysed at every test, the specialist offers a RED/AMBER/GREEN status,
        i. RED – immediate incident escalation to the DCM for action to allow for replacement once system has been emptied and cleaned
        ii. AMBER – problem ticket raised and TM informed, additional testing to be undertaken at a minimum of 50% of the standard testing regime
            1. Potentially cleaning of fuel
        iii. GREEN – Continue with current monitoring regime

Fuel Specification – SDM

PRODUCT SPECIFICATION SHEET WHITE DIESEL (<0.05% FAME) EN590	
Applicable Standards:	BS EN 590 ULSD
Use:	Low sulphur road fuel, suitable for use in all road vehicles powered by a diesel engine containing <0.05% FAME
Characteristics	
Apperence	Clear and bright, free from visible sediment and water.
Colour	Yellow/clear in appearance
Odour	Merchantable
Density @ 15°C g/ml	0·820 min -15 max
Cold filter plugging point **Winter °C** **Summer °C**	 -15 max -5 max
Flash point (PMCC) °C	56 min
Cetane number	51 min

Cetane index	46 min

Viscosity cst @ 40°C	2·0 min - 4·5 max
Sulphur % Wt	0·001 max
Copper corrosion 3 hr @ 50°C	class I
Micro carbon residue:-	
Odour	Merchantable
Ash % Wt	0·01 max
Particulate matter mg/ kg	24 max
Water ppm	200 max
Fatty Acid Methyl Esters (FAME)	<0.05 Vol. %

Distillation °C	
% Vol Rec @ 250°C	65·0 max
% Vol Rec @ 345°C	85·0 min
95% Vol recovered oC	360·0
Oxidation stability mg/ 100ml	2·5 max
Polycyclic aromatic	11 max
hydrocarbons (%)	
Lubricity, Corrected water scar	460 Diameter @ oC

Diesel

R40	Limited evidence of a carcinogenic effect.
R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R65	Harmful: may cause lung damage if swallowed.
N	Dangerous for the environment
Xi	Irritant
Xn	Harmful

Sources of key data used to compile the Safety Data Sheet

European Chemicals Bureau: http://ecb.jrc.it;
CONCAWE C&L guidance (report no. 11/10R);

Further information

Not applicable

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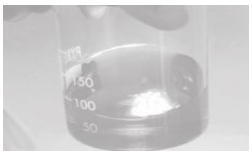
Laboratory Testing of Fuel

Appearance – ASTM D 4176-procedure 1

At standard temperature the sample is held to the light and examined for clarity and discolouration, it is then swirled and inspected for particulate contamination and free water. Clear and bright with no visual contaminants present is expected for conforming fuel.



Density @15°C & Viscosity @ 40°C – ASTM D7042 & ASTM D455

Both parameters are measured using the Anton Parr Stabinger SVM3000 test equipment. Density provides the units necessary to convert weight to volume for a given fluid at standard temperature and also indicates the aromaticity of a petroleum derived distillate of a certain viscosity. Viscosity is a measure of the fluidity of a liquid at a given temperature, each fuel type will have its own specification limits.

Dispersed Water Content – ASTM D6304

The dispersed water content is determined using the Mitsubishi Moisture meter by the coulometric Karl Fischer method. Automotive and industrial fuels are considered fit for use below 200 ppm water although typically they would contain less than 80 ppm.

Sulphur Content – ASTM D4294

Sulphur levels are determined by X-Ray Fluorescence using Oxford Instruments X-Supreme. Sulphur levels in fuels are specified at certain limits dependent upon their end use, fuel for on and off-road vehicles is limited to 10 ppm at the refinery and 20 ppm at the point of delivery. Typically, domestic heating oil contains 400 ppm, fuel for stationery generators and industrial heating oils have a maximum sulphur limit of 1,000 ppm.

Biodiesel Content (FAME) – NF EN 14078-A

Biodiesel contents are measured by fourier transform infrared spectroscopy (FTIR) accurate to within 0.01% using Agilent Technologies 4500t-FTIR. Biodiesel contents vary widely from 0% to 100% for road fuel. Standard pump fuel and Class A2 Gas Oil can have up to 7% depending upon the source of supply. Some critical applications require fuel to be essentially biodiesel free – 0.1% maximum.

The ATP test is a process of rapidly measuring actively growing microorganisms through detection of adenosine triphosphate. ATP is a molecule found in and around living cells, and as such it gives a direct measure of biological concentration and health. ATP is quantified by measuring the light produced through its reaction with the naturally occurring firefly enzyme luciferase using a luminometer. The amount of light produced (RLU) is directly proportional to the amount of ATP present in the sample.

Particle Count ISO 4406:1999

The cleanliness of a fuel sample is measured using the FS9001 Laser Particle Counter. This unit measures the number of particles per millilitre of sample at three specific sizes – 4µ, 6µ and 14µ.

The ISO cleanliness is expressed as three numbers, each representing a contaminant level code for the corresponding particle size. The code includes all particles of the specified size and larger. Each time a code increases in number the quantity of particles present doubles.

ISO Range Code	Particles per ml more than;	Particles per ml up to & including
24	80000	160000
23	40000	80000
22	20000	40000
21	10000	20000
20	5000	10000
19	2500	5000
18	1300	2500
17	640	1300
16	320	640
15	160	320
14	80	160
13	40	80
12	20	40
11	10	20
10	5	10

Filtration – Patch Test

Our 'in-house' laboratory filtration test coupled with microscopic photography provides both a visual record of the contaminants present in the fuel, and to a degree allows assessment of the type of contaminants present. Particle sizes can also be measured under high magnification. By utilising a range of filter pore sizes, we can assess which filters to use for effective polishing of a contaminated fuel.

Sample Retention

Upon completion of the analysis, sample results are logged, and a portion of the original sample submitted is retained for reference purposes and held in storage at our laboratory facility in Bury for a period of twelve months.

Appendix 03-06 Noise Assessment

Acoustic Consultancy Report

07194/3/3/2

External Plant Assessment

Report Prepared For

Norman Disney And Young Ltd
Virtus Dc6
06 October 2023

Report Author

Robert Martin MIOA (D) (E)

Checked By

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Contents

i) Executive Summary

New mechanical plant is to be installed at Unit DC6, in Stockley Park.

LCP has been commissioned to carry out an acoustic environment survey and to use the obtained data to assess the potential noise impact of the plant installation on surrounding noise sensitive receptors.

The design criterion for normal plant operation is as follows:

Day:	28 dB $L_{Aeq,T}$ at 112m, Residential properties on Denbigh Drive;
Night:	23 dB $L_{Aeq,T}$ at 112m, Residential properties on Denbigh Drive;
Day:	39 dB $L_{Aeq,T}$ at 72m, Residential properties on Nine Acres Close;
Night:	35 dB $L_{Aeq,T}$ at 72m, Residential properties on Nine Acres Close;
Commercial Day:	55 dB $L_{Aeq,T}$ at 123m, Nearest commercial property.

The design as proposed currently exceeds the required noise criteria. The assessment shows that a bespoke noise mitigation solution will be required to meet the local authority noise criteria.

The calculated rating levels from the current design are as follows:

Day:	49 dB $L_{Aeq,T}$ at 112m, Residential properties on Denbigh Drive;
Night:	41 dB $L_{Aeq,T}$ at 112m, Residential properties on Denbigh Drive;
Day:	62 dB $L_{Aeq,T}$ at 72m, Residential properties on Nine Acres Close;
Night:	51 dB $L_{Aeq,T}$ at 72m, Residential properties on Nine Acres Close;
Commercial Day:	67 dB $L_{Aeq,T}$ at 123m, Nearest commercial property.

This report concludes that the current design exceeds the noise criteria and further bespoke mitigation will be required.

ii) Document History

Issue	Date	Issue Details	Issued By	Checked By
1	12th September 2023	Initial Issue	RM	MB
2	6th October 2023	Added Generator Testing Schedule Assessment	RM	MB

1. Introduction

New mechanical plant is to be installed at Unit DC6, in Stockley Park.

LCP has been commissioned to carry out an acoustic environment survey and to use the obtained data to assess the potential noise impact of the plant installation on surrounding noise sensitive receptors.

The report details recommendations for necessary noise mitigation where necessary.

The guidance in this report is on the basis that the mechanical plant will be consistently operating over a 24 hour period.

2. Survey

2.1. Site Description

The site layout together with the measurement position is shown in the drawing contained within Appendix A.

2.2. Receiver Location

The site was surveyed to determine the location of the most affected receiver.

The nearest residential receivers to the plant area are 72m to the south and 112m towards the east of the site. The nearest commercial property to the plan area is 123m towards the southwest of the site. This is shown in the site plan in Appendix A.

2.3. Local Noise Climate

The predominant local noise sources were rail noise, aircraft noise from Heathrow and construction noise.

2.4. Measurements

The noise monitoring took place on the 4th to the 8th of August 2023. The measurement period was considered sufficient to establish the representative background sound levels corresponding to the operational period of the plant.

The weather conditions monitored during the survey are shown in the following table.

Table 1: Weather Conditions at Measurement Location

Weather	04/08/2023	05/08/2023	06/08/2023	07/08/2023	08/08/2023
Average Wind Speed	3.5m/s	3.5m/s	3m/s	3.1m/s	2.9m/s
Wind Direction	East	North	East	East	East
Cloud Cover	50%	70%	40%	10%	70%
Max. Temperature	20°C	18°C	20°C	22°C	18°C
Min. Temperature	15°C	13°C	12°C	13°C	13°C
Precipitation	None	None	None	None	None

2.5. Measurement Results

The measured statistical broad-band sound pressure levels are shown within Appendix B. The representative background sound level(s) obtained being as follows:

Table 2: Representative background sound levels, dB re $2x10^{-5}$ Pa

Measurement date	MP1 $L_{A90,}$ 15 mins Day*	MP1 $L_{A90,}$ 15 mins Night*	MP2 $L_{A90,}$ 15 mins Day*	MP2 $L_{A90,}$ 15 mins Night*
04/08/2023 – 05/08/2023	41	33	49	45
05/08/2023 – 06/08/2023	47	33	49	46
06/08/2023 – 07/08/2023	38	33	49	45
07/08/2023 – 08/08/2023	38	33	49	45
08/08/2023	50	-	59	-

* Day and Night periods are defined as between 07:00 - 23.00 and 23:00 - 07:00 respectively.

3. Evaluation of Design Criteria

3.1. Residential Design Criterion

3.1.1. BS4142:2014

BS4142:2014 states that the significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs.

Table 3: BS4142 assessment based upon rating level

Difference between background noise and rating levels	Assessment
+ 10 dB	Indication of a significant adverse impact
+ 5 dB	Indication of an adverse impact
0 dB	Indication of low impact

Certain acoustic features can increase the significance of impact. The specific sound level should be corrected if a tone, impulse or other acoustic feature is expected to be present.

Table 4: Corrections for acoustic features, subjective method

Acoustic Feature	Correction, dB		
	Just Perceptible	Clearly Perceptible	Highly Perceptible
Tonality	2	4	6

Impulsivity	3	6	9
Other Characteristics	3		
Intermittency	3		

Typically the acoustic feature correction would not be expected to exceed 10dB.

Where the level of uncertainty could affect the conclusion, take reasonably practicable steps to reduce the level of uncertainty.

3.1.2. World Health Organisation (WHO) Guidelines for Community Noise (1999)

The WHO's 'Guidelines for Community Noise' gives the following relevant noise criteria:

Table 5: Guideline values for community noise, from Guidelines for Community Noise (WHO, 1999)

Specific Environment	**$L_{Aeq,\,T}$ dB**	**Time Base (hours)**	**L_{Amax}, fast dB**
Outdoor living area (serious annoyance, daytime and evening)	55	16	-
Outdoor living area (moderate annoyance, daytime and evening)	50	16	-
Dwelling, indoors	35	16	-
Inside bedrooms	30	8	45
Outside bedrooms	45	8	60
Outdoors in parkland and conservation areas*	-	-	-

* Existing quiet outdoor areas should be preserved and the ratio of intruding noise to natural background sound should be kept low

The WHO's 'Guidelines for Community Noise' also gives the following general guidance on the expected sound insulation performance of a façade with a partly open window, it states that:

"At night, sound pressure levels at the outside facades of the living spaces should not exceed 45 dB L_{Aeq} and 60 dB L_{Amax}, so that people may sleep with bedroom windows open. These values have been obtained by assuming that the noise reduction from outside to inside with the window partly open is 15 dB."

3.1.3. BS8233:2014

The criteria offered in BS8233 for residential buildings are largely based on the recommendations made in the Guidelines for Community Noise.

Using the general guidance from above, on the expected sound insulation performance of a façade with a partly open window, the criteria shown in the table below have been adapted from the criteria offered in table 4 of BS8233 in order to obtain acceptable external noise levels.

The noise levels shown should be treated as overall noise levels, i.e., the combination of all existing noise levels at the site, and noise levels from any proposed plant or activity.

Table 6: External ambient noise levels for dwellings, based on BS8233, dB re $2x10^{-5}$ Pa

Activity	Location	Time period	
		07:00 to 23:00	23:00 to 07:00
Resting	Living Room	50 $L_{Aeq,16\ hour}$	-
Dining	Dining Room/area	55 $L_{Aeq,\ 16\ hour}$	-
Sleeping (daytime resting)	Bedroom	50 $L_{Aeq,\ 16\ hour}$	45 $L_{Aeq,\ 8\ hour}$

In addition to the above criteria, BS8233 goes on to say:

"*For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50* $L_{Aeq,\ T}$*, with an upper guideline value of 55 dB* $L_{Aeq,\ T}$ *which would be acceptable in nosier environments*."

The above criteria are in line with the recommendations made in WHO's 'Guidelines for Community Noise'.

3.1.4. Local Authority Requirements

Hillingdon Local Authority Conditions state that:

The plant shall be selected and installed, together with any associated screening, so as to minimise sound externally to a practicable minimum, such that the daytime (07:00-23:00) and night-time (23:00-07:00) cumulative rating levels, determined in accordance with BS 4142 at 1 m from any residential premises, are at least 10 dB below the relevant background sound levels. The relevant background sound levels shall be determined in accordance with BS 4142 and, as a minimum, from measurements over at least a 72-hour period, to include a weekend, at two locations in the vicinity of the nearest dwellings. The cumulative specific sound level(s) shall not exceed 55 dB (LAeq,1h) 1 m from any office space window belonging to a neighbouring commercial premises.

Prior to the first use of the site as a data centre, full and final details shall be submitted to, and approved in writing by, the Local Planning Authority relating to the standby generator plant and any associated noise control.

The plant shall be selected and installed, together with any associated screening, so as to minimise sound externally to a practicable minimum, such that the daytime (07:00-23:00) and night-time (23:00-07:00) cumulative rating levels, determined in accordance with BS 4142 at 1 m from any residential premises, are at least 5 dB below the relevant background sound levels to within a tolerance of 2 dB. The relevant background sound levels shall be determined in accordance with BS 4142 and, as a minimum, from measurements over at least a 72-hour period, to include a weekend, at two locations in the vicinity of the nearest dwellings.

3.1.5. Recommended Residential Design Rating Level

On the basis of the above the recommended residential design rating level should therefore be:

Residential Design Rating Level
Normal plant operation: Representative $L_{A90,\,15\,mins}$ - 10 dB
Emergency plant: Representative $L_{A90,\,15\,mins}$ - 5 dB

3.2. Commercial Design Criterion (BS8233:2014)

External design criteria for non-residential buildings have been derived from BS8233:2014.

Using the general guidance from WHO, on the expected sound insulation performance of a façade with a partly open window, the criteria shown in the table below have been adapted from the criteria offered in tables 2 and 6 of BS8233 in order to obtain acceptable external noise levels.

The noise levels shown should be treated as overall noise levels, i.e., the combination of all existing noise levels at the site, and noise levels from any proposed plant or activity.

Table 7: External ambient noise levels for non-domestic buildings, based on BS8233, dB re $2x10^{-5}$ Pa

Activity	**Location**	**Design Level $L_{Aeq,\,16\,hr}$**
Speech or telephone communications	Department store, cafeteria, canteen, kitchen	70
	Concourse, corridor, circulation space	70
Study and work requiring concentration	Library, gallery, museum	65
	Staff/meeting room, training room	60
	Executive office	55
	Open plan office	65
Listening	Place of worship, counselling, meditation, relaxation	50

3.3. Design Rating Levels

The design levels to be adopted for this project are set out in the table below.

Table 8: Design rating levels, dB re $2x10^{-5}$ Pa

Receiver Premises	Approximate Distance (m)	Design Level (Day) $L_{Aeq,\ 16\ hr}$	Design Level (Night) $L_{Aeq,\ 8\ hr}$
Residential properties on 34 Denbigh Drive	112	28	23
Residential properties on 30 Nine Acres Close	72	39	35

3.4. Emergency Plant Design Rating Levels

The design levels to be adopted for this project are set out in the table below.

Table 9: Design rating levels, dB re $2x10^{-5}$ Pa

Receiver Premises	Approximate Distance (m)	Design Level (Day) $L_{Aeq,\ 16\ hr}$	Design Level (Night) $L_{Aeq,\ 8\ hr}$
Residential properties on 34 Denbigh Drive	112	33	27
Residential properties on 30 Nine Acres Close	72	44	40

3.5. Commercial Design Rating Levels

The design levels to be adopted for this project are set out in the table below.

Table 10: Design rating levels, dB re $2x10^{-5}$ Pa

Receiver Premises	Approximate Distance (m)	Design Level (Day) $L_{Aeq,\ 16\ hr}$	Design Level (Night) $L_{Aeq,\ 8\ hr}$
Nearest commercial property	123	55	-

4. Review of Current Design

4.1. Current Design

The proposed plant shall be located within a 3-storey gantry on the west facing façade of the property. 16 x Airedale DCF132D2R-28T2E2E20 chillers will be installed on the top level of the gantry. The gantry will be surrounded by a weather louvre on the west facing facade and a solid 100mm acoustic panel on the south and north facing façades.

The chillers will operate continuously over a 24hour period.

In addition to the chillers on the roof there will also be 16 x Finning Cat Emergency Generators that will be installed at ground level outside of the louvred gantry. The generators will be fully enclosed within acoustically treated containers. The intake ducts for the generators will be at ground level and the outlet ducts will be located at the top level of the gantry behind the gantry louvres. Attenuators will be installed on both the inlet and outlet ducts which will be supplied by the manufacturer.

The emergency generators will operate in emergency only and be tested periodically throughout the year. Only one unit will be tested at a time and only during daytime periods.

4.2. Calculated Results

Calculations of the predicted noise levels have been carried out using the acoustic modelling software Cadna A with the appropriate corrections for geometric attenuation, barrier effect, reflective surfaces and multiple source addition.

The design rating levels to be adopted for this project, together with the predicted noise levels, are set out in the table below.

Table 11: Design and predicted rating levels, dB re $2x10^{-5}$ Pa

Receiver Premises	Approximate Distance (m)	Design Level (Day) $L_{Aeq,\ 16\ hr}$	Design Level (Night) $L_{Aeq,\ 8\ hr}$	Predicted Level (Day) $L_{Aeq,T}$	Predicted Level (Night) $L_{Aeq,T}$
Residential properties on Denbigh Drive	112	28	23	49	41
Residential properties on Nine Acres Close	72	39	35	62	51
Nearest commercial property	123	55	-	67	-

Plant noise level data used in this assessment are contained within Appendix C.

Cadna A model is shown within Appendix D.

4.3. Calculated Emergency Plant Results

The emergency generators have been assessed as a worst-case scenario with all generators operating at the same time at 100% capacity. The results are shown in the table below.

Table 12: Design and predicted rating levels, dB re 2x10-5 Pa

Receiver Premises	Approximate Distance (m)	Design Level (Day) $L_{Aeq,\ 16\ hr}$	Predicted Level (Day) $L_{Aeq,T}$
Residential properties on Denbigh Drive	112	33	36
Residential properties on Nine Acres Close	72	44	55
Nearest commercial property	123	55	56

4.4. Calculated Emergency Plant Results During Routine Testing

The emergency generators will be tested periodically throughout the year. Only one unit will be tested at a time and only during daytime periods.

The testing regime for the generators is shown in the table below.

Table 13:Generator testing regime

Scenarios	Operating Profile	Description
Scenario 1: Monthly	Off-load testing / maintenance – 10% load for 15 minutes	Each generator is tested one at a time, one per month (for 11 months)
Scenario 2: Annual	Mains failure testing – 100% load for 20 minutes followed by 75% load for 120 minutes	Each generator is tested one at a time in the 12th month

The results below show the worst-case noise levels at receivers while the emergency generators are being tested individually during scenario 1. The noise data for the generators operating at 10% is not available, therefore as a worst-case scenario, the results below have been based on one generator being tested while operating at 100% for 15 minutes.

Table 14: Testing scenario 1 design and predicted rating levels, dB re 2x10-5 Pa

Receiver Premises	Design Level (Day) $L_{Aeq,\ 16\ hr}$	Predicted Level (Day) $L_{Aeq,T}$
Residential properties on Denbigh Drive	33	23
Residential properties on Nine Acres Close	44	41
Nearest commercial property	55	41

The results below show the worst-case noise levels at receivers while the emergency generators are being tested individually during scenario 2.

Table 15: Scenario 2 design and predicted rating levels, dB re 2x10-5 Pa

Receiver Premises	Design Level (Day) $L_{Aeq,\ 16\ hr}$	Predicted Level (Day) $L_{Aeq,T}$
Residential properties on Denbigh Drive	33	29
Residential properties on Nine Acres Close	44	47
Nearest commercial property	55	47

5. Noise Mitigation Options

As the plant installation has been assessed to be over the required criteria at the surrounding noise sensitive receptors, one of the following options shall be applied in order that noise emissions are reduced to acceptable levels.

Should the plant installation be redesigned after consideration of the mitigation options, the installation shall be re-assessed to ensure compliance to the specification has been achieved.

5.1. Reselection of Plant

The first suggested form of mitigation is that the chiller plant be reselected to the limiting noise levels shown in the table below.

Table 16: Replacement plant limiting sound power levels, dB

Plant	Distance (m)	Octave Band Centre Frequency (Hz)								L_{PA}
		63	125	250	500	1k	2k	4k	8k	
Airedale DCF132D2R-28T2E2E20 chiller Daytime operation	10	30	36	39	47	42	39	24	23	47
Airedale DCF132D2R-28T2E2E20 chiller Night operation	10	26	31	34	42	37	34	28	18	42

5.2. Noise Mitigation Scheme

The second suggested mitigation measure is the introduction of a suitable noise mitigation scheme by means of a combination of acoustic enclosures, screens, and attenuators to be applied to the chillers and an acoustic screen to be applied around the generator enclosure.

Should this option be implemented, the design of the mitigation will need the services of a noise control company specialising in bespoke solutions to non-standard situations.

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Such a company would visit the site, and attempt to arrive at an economic solution, taking into account all the parameters of this particular situation.

The problems of air flow, pressure drop etc, applicable to this equipment will all need to be taken into account.

Such a company is:

Company	Address	Telephone	Email/Web
Caice	Riverside House 3 Winnersh Fields Winnersh Wokingham RG41 5QS	0118 918 6470	enquiries@caice.co.uk www.caice.co.uk

The manufacturer/supplier of any attenuators shall ensure that the air volumes through all attenuators and the configurations of the attenuators will not create regenerated noise. Alternative configurations may have to be selected.

It is recommended that all attenuator performances are verified by test data in accordance with ISO 7235.

It is important to note that as the criteria is a single figure dB(A) value, the performance of any enclosure, screen or attenuator at each individual frequency can vary from those shown above and still meet the single figure dB(A) value.

5.3. Mitigated Results

The design rating levels to be adopted for this project, together with the predicted noise levels inclusive of the mitigation detailed in Section 5, are set out in the table below.

Table 17: Design and predicted mitigated rating levels, dB re $2x10^{-5}$ Pa

Receiver Premises	Approximate Distance (m)	Design Level (Day) $L_{Aeq,\ 16\ hr}$	Design Level (Night) $L_{Aeq,\ 8\ hr}$	Predicted Level (Day) $L_{Aeq,T}$	Predicted Level (Night) $L_{Aeq,T}$
Residential properties on Denbigh Drive	112	28	23	28	23
Residential properties on Nine Acres Close	72	39	35	39	35
Nearest commercial property	123	55	-	42	-

Plant noise level data used in this assessment are contained within Appendix C.

Cadna A model is shown within Appendix D.

5.4. Calculated Emergency Plant Results

The emergency plant also currently exceeds the noise criteria given by the local authority. This exceedance is due to the level of breakout noise from the containers that the generators are installed in.

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Due to the chiller plant being the dominate noise source, mitigation for the generators will be dependent on the outcome of the selected mitigation for the chiller plant. Once the chiller mitigation has been finalised the mechanical plant will need to be reassessed and further mitigation will be selected for the generator plant if required.

Plant noise level data used in this assessment are contained within Appendix C.

Cadna A model is shown within Appendix D.

UNDER REVIEW - DESIGN IN PROGRESS

6. Conclusion

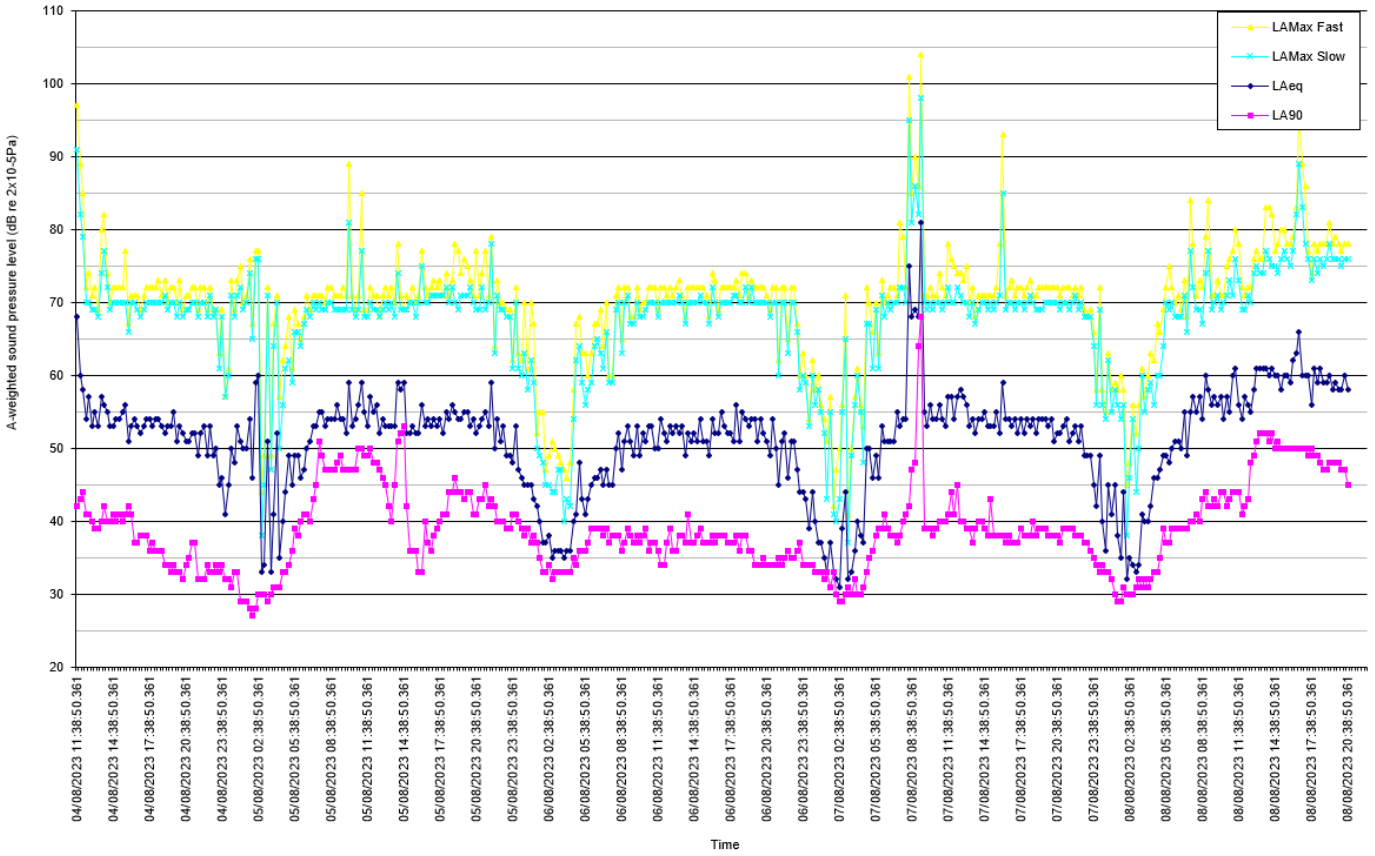
An environmental noise survey has been undertaken in order to establish the representative background sound levels local to the site generally in accordance with the method contained within BS4142: 2014.

Calculations have been carried out to determine the noise levels at the nearest receiver premises. The calculations show that bespoke noise mitigation will be required to meet the local authority noise criteria.

Appendix A: Site Plan

Appendix B: Measurement Data

MP1:

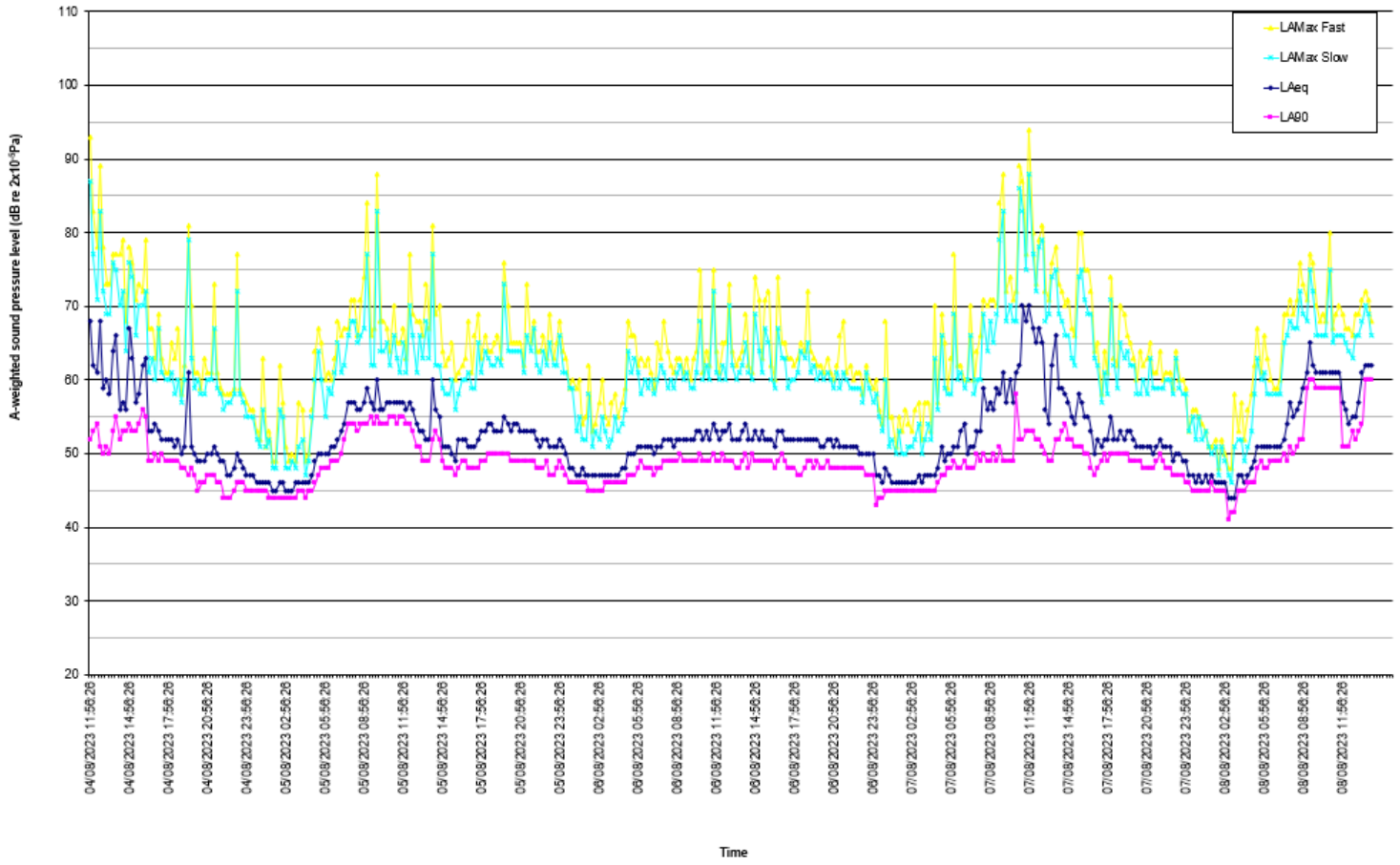


Sound pressure level measurements were obtained using the following instrumentation complying with the Class 1 specification of BS EN 61672:2003

- Svantek 959 Sound Level Meter S/N: 92925 (next cal due 02/06/25) Start gain -0.49 End gain -0.71.
- Svantek pre-amplifier SV12L S/N: 106525 with GRAS microphone capsule 40AE S/N: 376416

Calibration checks were made prior to and after completion of measurements using a Svantek SV30A calibrator, S/N: 10980 (next cal due 18/01/24) complying with Class 1 specification of BS EN 60942:2003, calibration level 114.0 dB @ 1.0 kHz. All acoustic instrumentation carried current manufacturer's certificates of conformance.

MP2:



Sound pressure level measurements were obtained using the following instrumentation complying with the Class 1 specification of BS EN 61672:2003

- Svantek 959 Sound Level Meter S/N: 11207 (next cal due 26/07/25) Start gain 1.50 End gain 1.67.
- Svantek pre-amplifier SV12L S/N: 49860 with GRAS microphone capsule 40AE S/N: 215511.

Calibration checks were made prior to and after completion of measurements using a Svantek SV30A calibrator, S/N: 10980 (next cal due 18/01/24) complying with Class 1 specification of BS EN 60942:2003, calibration level 114.0 dB @ 1.0 kHz. All acoustic instrumentation carried current manufacturer's certificates of conformance.

Appendix C: Plant Data

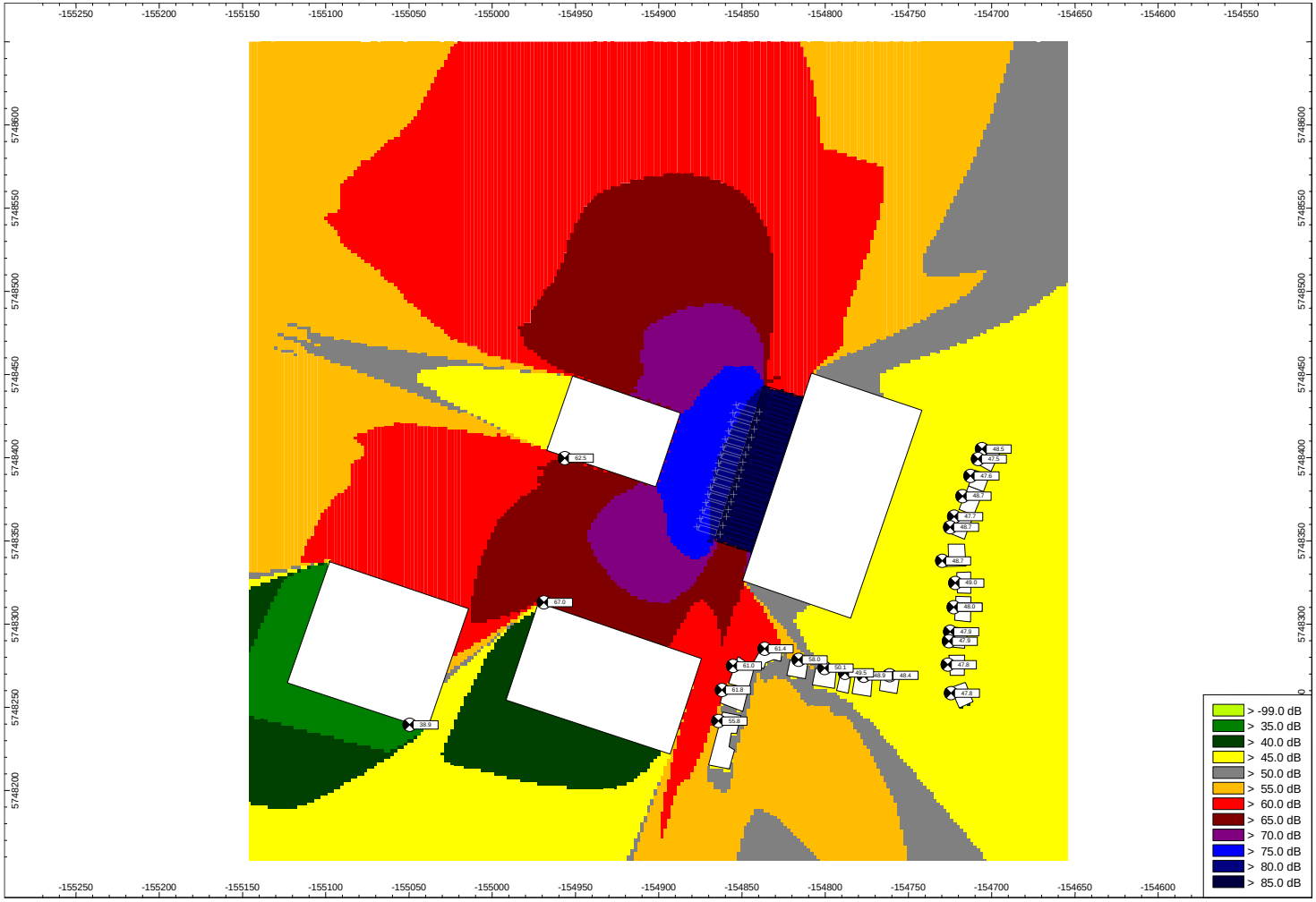
Plant noise data used in the preceding assessment follow.

Table 18: Manufacturer's plant sound pressure data, dB re $2x10^{-5}$ Pa

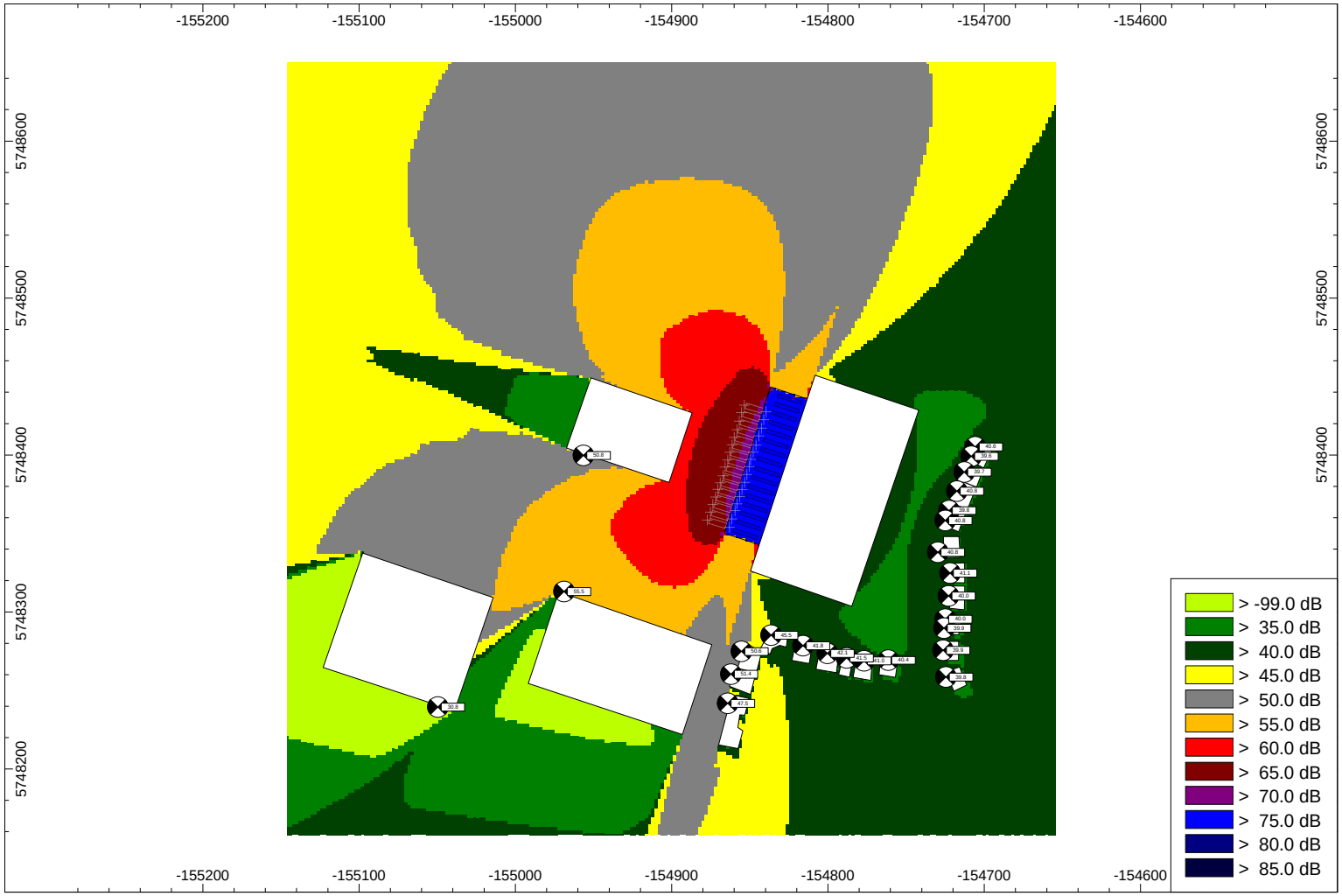
Plant	Distance (m)	Octave Band Centre Frequency (Hz)								L_{PA}
		63	125	250	500	1k	2k	4k	8k	
Airedale DCF132D2R-28T2E2E20 chiller Daytime operation	10	51	57	60	68	63	60	45	44	68
Airedale DCF132D2R-28T2E2E20 chiller Night operation	10	44	49	52	60	55	52	46	36	60
Finning Cat Emergency Generator break out	1	68	72	57	46	38	35	31	34	74
Finning Cat Emergency Generators Intake	1	66	72	57	48	47	45	41	50	73
Finning Cat Emergency Generators Outlet	1	62	69	61	58	59	59	64	64	73

Appendix D: Cadna A model

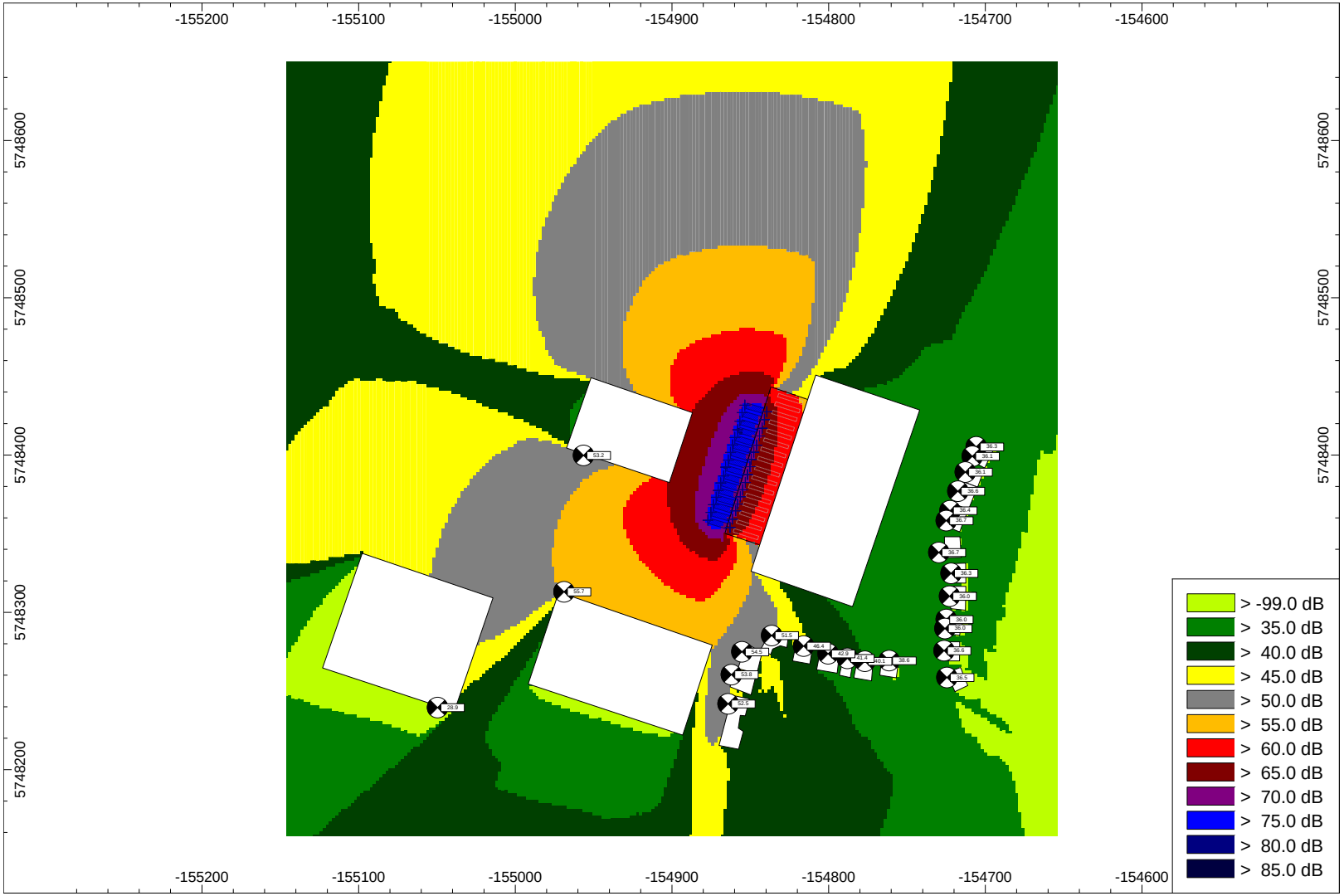
Current design daytime:



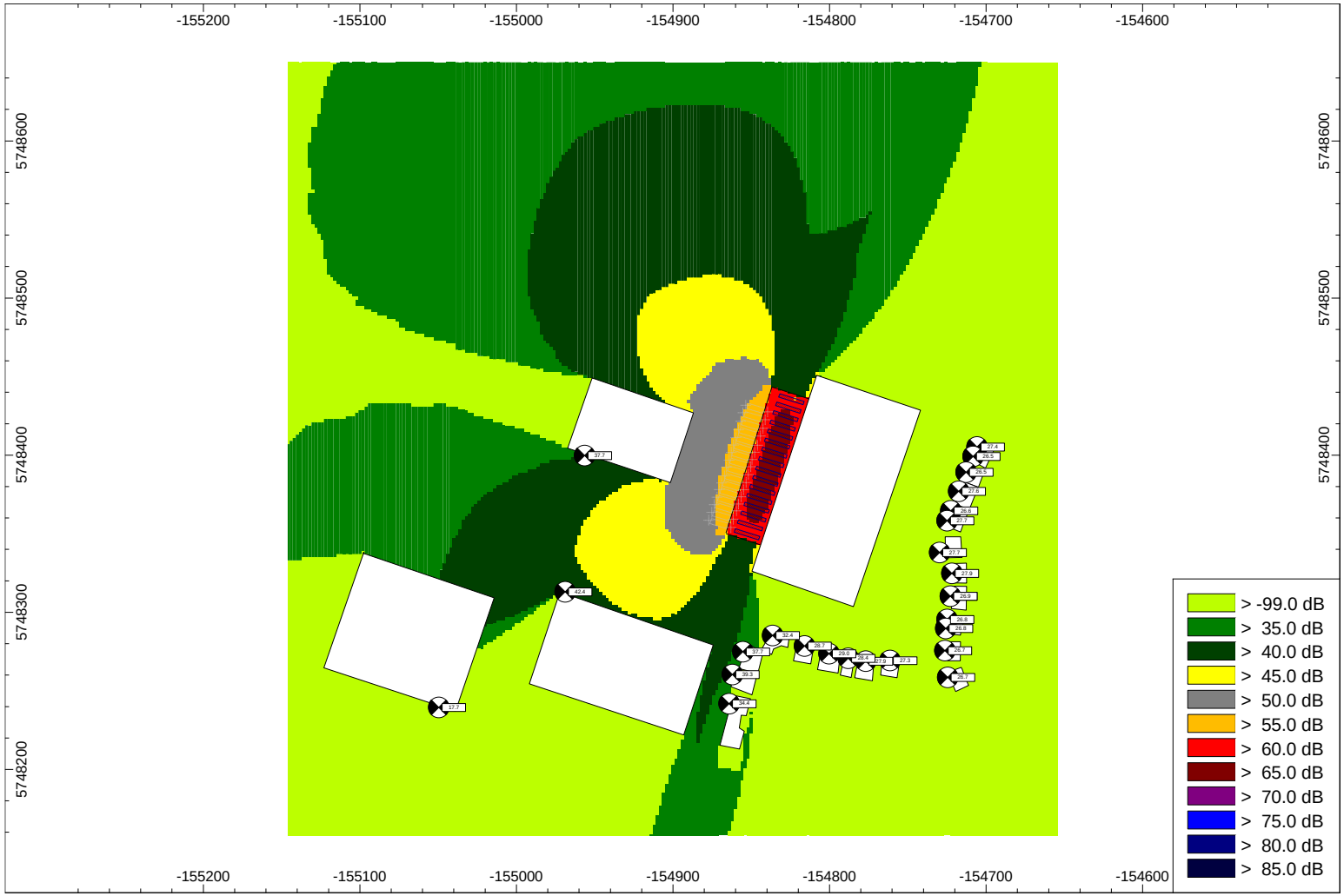
Current design night-time:



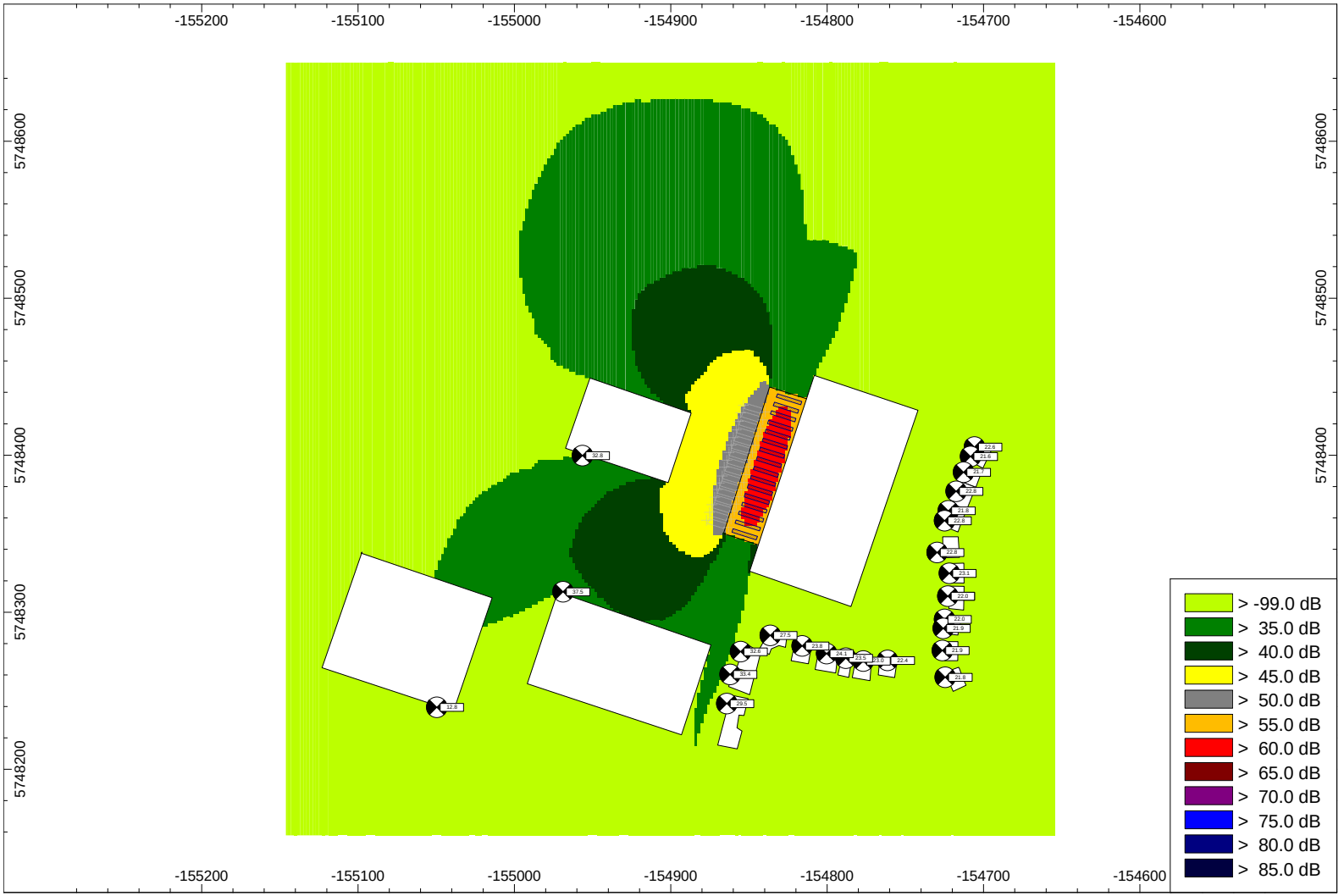
Generators daytime:



Chillers with limiting noise levels applied daytime:



Chillers with limiting noise levels applied night-time:



Partial results 100% operation:

Source			Partial Level Day																								
Name	M.	ID	Com 1	Com 2	Com 3	Res 1	Res 2	Res 3	Res 4	Res 5	Res 6	Res 7	Res 8	Res 9	Res 10	Res 11	Res 12	Res 13	Res 14	Res 15	Res 16	Res 17	Res 18	Res 19	Res 20	Res 21	Res 22
Gen Exhaust 16	+		8.7	20.1	0.3	11.2	10.1	10.1	11.1	9.9	10.8	10.7	11.1	9.9	9.9	9.8	9.8	9.8	8.9	8.7	9.2	9.7	9.2	11.7	16.8	16.9	13.6
Gen Exhaust 15	+		8.9	20.3	0.5	11.1	10.0	10.0	11.1	9.9	10.8	10.7	11.1	10.0	9.9	9.9	9.9	9.9	9.0	9.0	9.5	10.0	9.6	12.2	17.2	17.2	14.0
Gen Exhaust 14	+		9.2	20.6	0.6	11.1	10.0	10.0	11.1	9.9	10.9	10.8	11.2	10.1	10.0	10.0	9.9	10.0	9.1	9.4	9.9	10.4	10.0	12.6	17.5	17.5	14.3
Gen Exhaust 13	+		9.4	20.8	0.7	11.0	9.9	10.0	11.1	9.9	10.9	10.9	11.3	10.1	10.1	10.0	10.0	10.0	9.5	9.7	10.3	10.8	10.4	13.1	17.9	17.9	14.7
Gen Exhaust 12	+		9.7	21.1	0.9	10.9	9.9	9.9	11.0	9.9	10.9	10.9	11.3	10.2	10.2	10.1	10.1	10.1	9.6	10.2	10.7	11.2	10.9	13.7	18.4	18.3	15.1
Gen Exhaust 11	+		10.0	21.4	1.1	10.8	9.8	9.8	10.9	9.8	10.9	11.0	11.3	10.3	10.2	10.2	10.1	10.2	9.7	10.5	11.1	11.6	11.4	14.3	18.8	18.7	15.5
Gen Exhaust 10	+		10.2	21.6	1.2	10.7	9.7	9.8	10.9	9.8	10.9	11.0	11.4	10.3	10.2	10.2	10.2	10.2	9.8	10.9	11.5	12.1	11.9	14.9	19.2	19.1	18.5
Gen Exhaust 9	+		10.5	21.8	1.3	10.7	9.6	9.7	10.9	9.8	11.0	11.0	11.4	10.4	10.3	10.3	10.3	10.3	10.2	11.3	11.9	12.5	12.3	15.4	19.6	19.4	18.8
Gen Exhaust 8	+		10.8	22.1	1.5	10.6	9.5	9.6	10.9	9.8	11.0	11.1	11.5	10.4	10.4	10.4	10.5	10.5	10.6	11.7	12.3	13.0	12.9	16.1	20.1	19.9	19.2
Gen Exhaust 7	+		11.3	22.3	1.7	10.5	9.5	9.6	10.8	9.8	10.9	11.1	11.5	10.6	10.6	10.5	10.6	10.6	11.1	12.2	12.8	13.5	13.6	16.8	20.7	20.3	19.6
Gen Exhaust 6	+		12.0	22.6	1.8	10.5	9.4	9.5	10.8	9.7	10.9	11.1	11.5	10.6	10.6	10.6	10.7	10.7	11.5	12.7	13.3	14.1	14.2	17.7	21.2	20.8	20.0
Gen Exhaust 5	+		13.5	22.8	2.0	10.4	9.3	9.4	10.7	9.7	10.9	11.2	11.6	10.6	10.7	10.7	10.7	10.8	12.0	13.2	13.9	14.7	14.9	18.5	21.8	21.3	20.5
Gen Exhaust 4	+		24.8	23.1	2.1	10.3	9.2	9.4	10.6	9.6	10.8	11.2	11.6	10.7	10.7	10.7	10.8	10.8	12.5	13.8	14.5	15.4	15.8	19.4	22.5	21.9	21.0
Gen Exhaust 3	+		24.7	23.3	2.2	10.2	9.2	9.3	10.6	9.6	10.8	11.2	11.6	10.7	10.8	10.8	10.9	10.9	13.1	14.3	15.1	16.0	16.6	20.2	23.1	22.5	21.4
Gen Exhaust 2	+		24.8	23.6	2.4	10.1	9.1	9.2	10.5	9.5	10.7	11.1	11.6	10.7	10.8	10.9	11.0	11.2	13.9	15.2	16.0	17.1	17.9	24.4	24.1	23.3	22.1
Gen Exhaust 1	+		24.7	24.6	2.6	10.1	9.0	9.1	10.4	9.6	10.7	11.1	11.6	10.8	11.0	11.0	11.3	11.6	14.3	15.7	16.6	17.7	19.2	25.6	25.2	24.1	22.8
Gen Inlet 16	+		10.8	24.1	-1.7	8.0	7.6	7.4	7.5	7.1	7.4	7.1	6.5	6.0	5.9	5.8	5.7	5.2	6.3	6.9	7.5	8.2	8.9	12.1	15.6	16.5	16.0
Gen Inlet 15	+		11.3	24.4	0.8	7.8	7.4	7.3	7.4	7.1	7.4	7.2	6.6	6.1	6.0	5.9	5.9	5.4	6.5	7.2	7.8	8.6	9.3	12.5	16.2	17.1	16.6
Gen Inlet 14	+		11.9	24.7	-1.1	7.5	7.2	7.1	7.5	7.1	7.4	7.2	6.6	6.1	6.0	5.9	5.9	5.5	6.6	7.4	8.0	8.8	9.6	13.0	16.7	17.6	17.1
Gen Inlet 13	+		12.4	25.0	-0.9	7.3	7.0	6.9	7.4	7.0	7.4	7.2	6.7	6.2	6.1	6.0	5.8	5.6	6.8	7.6	8.3	9.1	10.0	13.4	17.3	18.2	17.7
Gen Inlet 12	+		13.1	25.3	-0.6	7.2	6.9	7.1	7.4	7.0	7.4	7.2	6.8	6.3	6.2	6.1	6.0	5.7	7.0	7.9	8.6	9.5	10.5	14.0	18.0	19.0	18.5
Gen Inlet 11	+		13.9	25.5	-0.5	7.1	6.8	7.0	7.3	7.0	7.4	7.3	6.8	6.3	6.2	6.0	6.1	5.8	7.3	8.2	8.9	9.8	10.9	14.6	18.7	19.6	19.1
Gen Inlet 10	+		14.7	25.8	-0.3	7.0	6.7	6.9	7.3	7.0	7.4	7.3	6.8	6.4	6.2	6.1	6.2	6.0	7.5	8.5	9.2	10.1	11.3	15.2	19.5	20.4	19.8
Gen Inlet 9	+		15.8	26.1	-0.2	6.8	6.7	6.8	7.2	7.0	7.3	7.3	6.9	6.3	6.2	6.2	6.4	6.1	7.8	8.8	9.6	10.5	11.8	15.9	20.3	21.1	20.4
Gen Inlet 8	+		17.1	26.4	-0.1	6.8	6.7	6.8	7.2	7.0	7.4	7.4	7.0	6.5	6.4	6.4	6.6	6.4	8.1	9.2	10.0	11.1	12.5	16.7	21.4	21.9	21.1
Gen Inlet 7	+		19.1	26.7	0.2	6.6	6.5	6.6	7.1	6.9	7.3	7.3	6.9	6.5	6.5	6.4	6.7	6.5	8.5	9.6	10.5	11.6	13.2	17.7	22.4	22.6	22.9
Gen Inlet 6	+		21.3	27.0	0.3	6.7	6.5	6.6	7.1	6.9	7.3	7.4	7.1	6.6	6.7	6.6	7.1	6.9	9.0	10.2	11.2	12.4	14.3	19.7	23.6	26.7	25.4
Gen Inlet 5	+		24.0	27.3	0.5	6.7	6.4	6.6	7.1	6.9	7.3	7.5	7.0	6.8	6.9	6.9	7.4	7.3	9.6	10.9	12.0	13.4	15.6	21.3	28.2	27.1	25.7
Gen Inlet 4	+		30.0	27.6	0.6	6.6	6.4	6.5	7.0	6.9	7.3	7.3	7.1	6.9	7.0	7.1	7.8	7.8	10.2	11.7	13.0	14.6	17.2	22.9	28.6	27.4	26.0
Gen Inlet 3	+		30.0	27.9	0.8	6.6	6.3	6.5	7.0	6.9	7.3	7.4	7.2	7.1	7.4	7.5	8.4	8.6	11.3	13.1	14.6	16.7	20.2	24.8	29.0	27.8	26.4
Gen Inlet 2	+		29.9	28.3	0.9	6.5	6.3	6.4	7.0	6.9	7.3	7.5	7.3	7.3	7.7	7.9	9.2	9.7	12.6	14.9	16.8	19.5	23.7	29.4	29.5	28.2	26.7
Gen Inlet 1	+		29.9	28.6	1.1	6.5	6.2	6.4	7.0	6.9	7.2	7.6	7.5	7.7	8.4	8.8	11.7	12.6	15.7	19.0	20.9	22.8	28.5	29.8	29.9	28.6	27.1
Chiller 1	+		53.8	51.5	27.9	35.6	34.7	34.8	36.1	35.2	36.4	36.7	37.1	36.3	36.4	36.4	36.3	36.7	39.2	40.3	40.9	41.7	41.7	48.8	53.2	52.7	49.3
Chiller 2	+		53.7	52.8	27.7	35.7	34.7	34.9	36.2	35.3	36.5	36.8	37.1	36.3	36.3	36.3	36.3	36.2	38.6	39.7	40.2	40.8	40.7	44.0	51.4	51.5	48.1
Chiller 3	+		53.7	53.1	27.6	35.8	34.9	35.1	36.3	35.4	36.6	36.8	37.1	36.3	36.2	36.2	36.2	36.1	37.9	38.9	39.6	40.2	39.9	42.8	49.8	50.2	46.5
Chiller 4	+		37.4	52.5	27.4	36.0	35.0	35.2	36.4	35.5	36.6	36.8	37.1	36.2	36.1	36.1	36.0	36.0	37.3	38.2	38.9	39.5	39.3	41.9	48.3	49.1	45.0
Chiller 5	+		35.0	52.2	27.2	36.1	35.1	35.3	36.5	35.6	36.7	36.8	37.1	36.1	36.0	36.0	36.0	35.9	36.7	37.8	38.4	39.0	38.6	41.2	47.0	48.2	43.5
Chiller 6	+		34.8	51.9	27.0	36.2	35.2	35.4	36.5	35.6	36.7	36.8	37.1	36.0	36.0	35.9	35.9	35.7	36.2	37.2	37.8	38.4	38.0	40.5	45.8	47.2	41.8
Chiller 7	+		34.6	51.7	26.8	36.3	35.3	35.4	36.6	35.7	36.7	36.8	37.0	36.0	35.9	35.8	35.7	35.7	35.7	36.7	37.2	37.8	37.4	39.8	44.5	46.3	41.0
Chiller 8	+		34.4	51.4	26.6	36.3	35.3	35.5	36.7	35.7	36.8	36.8	37.0	35.9	35.8	35.8	35.7	35.7	35.5	36.2	36.7	37.3	36.8	39.2	43.3	45.5	40.5
Chiller 9	+		34.3	51.2	26.4	36.5	35.5	35.6	36.7	35.7	36.8	36.7	36.9	35.9	35.8	35.7	35.6	35.6	35.3	35.8	36.3	36.7	36.2	38.7	42.0	44.7	39.9
Chiller 10	+		34.1	50.9	26.3	36.5	35.6	35.6	36.8	35.8	36.8	36.7	36.9	35.8	35.7	35.7	35.6	35.5	35.1	35.3	35.8	36.2	35.7	38.1	40.7	43.9	39.3
Chiller 11	+		33.9	50.7	26.1	36.6	35.7	35.7	36.8	35.7	36.7	36.7	36.8	35.7	35.6	35.6	35.5	35.5	35.0	34.9	35.4	35.8	35.3	37.6	39.4	43.3	38.8
Chiller 12	+		33.7	50.5	25.9	36.7	35.7	35.8	36.8	35.7	36.7	36.6	36.8	35.7	35.5	35.5	35.4	35.4	34.9	34.5	35.0	35.4	34.8	37.2	38.1	42.5	38.3
Chiller 13	+		33.5	50.3	25.7	36.8	35.9	35.9	36.8	35.7	36.7	36.5	36.7	35.6	35.5	35.4	35.4	35.4	34.7	34.1	34.6	35.0	34.4	36.8	37.6	41.9	37.9
Chiller 14	+		33.3	50.1	25.6	36.9	35.9	35.9	36.8	35.7	36.6	36.4	36.6	35.5	35.3	35.3	35.2	35.2	34.6	33.7	34.2	34.6	34.0	36.3	37.1	41.3	37.4
Chiller 15	+		33.1	49.9	25.4	37.0	36.0	35.9	36.9	35.6	36.5	36.3	36.5	35.3	35.2	35.2	35.1	35.1	34.5	33.4	33.8	34.3	33.7	36.0	36.6	40.6	36.9
Chiller 16	+		32.9	49.7	25.2	37.1	35.8	35.7	36.7	35.5	36.4	36.2	36.5	35.3	35.2	35.2	35.1	35.1	34.4	33.1	33.5	34.0	33.3	35.6	36.3	39.8	36.5

Partial results 100% operation:

Gen Break Out 1	+		46.5	45.5	17.9	22.9	23.3	23.3	23.9	23.9	24.4	24.8	24.7	24.9	25.5	25.8	28.0	28.7	31.7	34.2	36.1	38.3	43.7	46.3	47.1	45.9	44.3
Gen Break Out 2	+		46.6	45.2	17.7	23.3	23.2	23.3	23.9	23.9	24.4	24.7	24.5	24.5	24.9	25.0	26.1	26.4	29.1	30.9	32.4	34.4	37.7	43.4	45.6	44.8	43.4
Gen Break Out 3	+		46.6	44.9	17.6	23.4	23.2	23.7	24.0	23.9	24.4	24.6	24.4	24.3	24.5	24.5	25.3	25.3	27.8	29.3	30.5	32.0	34.3	39.6	43.9	43.6	42.3
Gen Break Out 4	+		45.0	44.6	17.3	23.5	23.2	23.5	24.0	23.9	24.3	24.6	24.3	24.1	24.2	24.2	24.8	24.6	26.9	28.2	29.3	30.6	32.5	37.7	41.8	42.2	41.2
Gen Break Out 5	+		40.9	44.3	17.1	23.6	23.3	23.5	24.0	24.0	24.3	24.5	24.2	23.9	24.0	23.9	24.4	24.2	26.4	27.5	28.5	29.7	31.4	36.1	39.6	40.8	40.0
Gen Break Out 6	+		38.6	44.0	17.0	23.7	23.4	23.6	24.1	24.1	24.3	24.5	24.1	23.8	23.8	23.7	24.1	23.9	25.9	27.0	27.8	28.9	30.5	34.7	38.4	38.9	38.5
Gen Break Out 7	+		36.6	43.8	16.8	23.7	23.4	23.6	24.1	24.2	24.4	24.4	24.0	23.7	23.6	23.6	23.8	23.5	25.4	26.5	27.3	28.3	29.7	33.6	37.3	37.7	36.9
Gen Break Out 8	+		34.8	43.5	16.6	23.8	23.6	23.7	24.1	24.2	24.6	24.3	23.9	23.6	23.5	23.4	23.6	23.3	25.0	26.0	26.8	27.8	29.0	32.8	36.4	36.9	36.1
Gen Break Out 9	+		33.4	43.2	16.3	24.0	23.7	23.8	24.2	24.2	24.6	24.3	23.9	23.5	23.3	23.3	23.4	23.1	24.7	25.7	26.4	27.3	28.5	32.2	35.6	36.1	35.4
Gen Break Out 10	+		32.2	43.0	16.2	24.1	23.8	23.9	24.3	24.3	24.6	24.4	23.9	23.4	23.3	23.2	23.3	23.0	24.5	25.4	26.1	27.0	28.1	31.6	35.0	35.5	34.8
Gen Break Out 11	+		31.3	42.7	16.1	24.2	24.0	24.0	24.4	24.3	24.6	24.4	23.8	23.4	23.2	23.1	23.2	22.9	24.3	25.1	25.8	26.7	27.7	31.1	34.4	34.9	34.3
Gen Break Out 12	+		30.5	42.4	16.0	24.3	24.1	24.1	24.4	24.2	24.4	24.3	23.7	23.3	23.1	23.0	23.0	22.7	24.0	24.8	25.5	26.3	27.2	30.5	33.8	34.3	33.7
Gen Break Out 13	+		29.8	42.2	15.9	24.5	24.2	24.2	24.5	24.1	24.4	24.3	23.7	23.2	22.9	22.9	22.9	22.5	23.8	24.5	25.2	26.0	26.8	30.0	33.2	33.8	33.2
Gen Break Out 14	+		29.2	41.9	15.7	24.7	24.4	24.3	24.5	24.1	24.4	24.1	23.3	23.1	22.9	22.8	22.8	22.4	23.7	24.3	24.9	25.7	26.5	29.6	32.7	33.3	32.7
Gen Break Out 15	+		28.7	41.6	15.8	24.9	24.6	24.4	24.6	24.2	24.4	24.1	23.3	23.0	22.8	22.7	22.7	22.3	23.5	24.1	24.7	25.4	26.1	29.2	32.3	32.9	32.3
Gen Break Out 16	+		28.1	41.4	16.1	25.1	24.8	24.6	24.7	24.2	24.4	24.0	23.3	22.5	22.6	22.5	22.5	22.1	23.3	23.8	24.4	25.1	25.8	28.8	31.8	32.4	31.8

Partial results 10% operation:

Source			Partial Level Day																								
Name	M.	ID	Com 1	Com 2	Com 3	Res 1	Res 2	Res 3	Res 4	Res 5	Res 6	Res 7	Res 8	Res 9	Res 10	Res 11	Res 12	Res 13	Res 14	Res 15	Res 16	Res 17	Res 18	Res 19	Res 20	Res 21	Res 22
Gen Exhaust 16	+		2.7	14.1	-5.7	5.2	4.1	4.1	5.1	3.9	4.8	4.7	5.1	3.9	3.9	3.8	3.8	3.8	2.9	2.7	3.2	3.7	3.2	5.7	10.8	10.9	7.6
Gen Exhaust 15	+		2.9	14.3	-5.5	5.1	4.0	4.0	5.1	3.9	4.8	4.7	5.1	4.0	3.9	3.9	3.9	3.9	3.0	3.0	3.5	4.0	3.6	6.2	11.2	11.2	8.0
Gen Exhaust 14	+		3.2	14.6	-5.4	5.1	4.0	4.0	5.1	3.9	4.9	4.8	5.2	4.1	4.0	4.0	3.9	4.0	3.1	3.4	3.9	4.4	4.0	6.6	11.5	11.5	8.3
Gen Exhaust 13	+		3.4	14.8	-5.3	5.0	3.9	4.0	5.1	3.9	4.9	4.9	5.3	4.1	4.1	4.0	4.0	4.0	3.5	3.7	4.3	4.8	4.4	7.1	11.9	11.9	8.7
Gen Exhaust 12	+		3.7	15.1	-5.1	4.9	3.9	3.9	5.0	3.9	4.9	4.9	5.3	4.2	4.2	4.1	4.1	4.1	3.6	4.2	4.7	5.2	4.9	7.7	12.4	12.3	9.1
Gen Exhaust 11	+		4.0	15.4	-4.9	4.8	3.8	3.8	4.9	3.8	4.9	5.0	5.3	4.3	4.2	4.2	4.1	4.2	3.7	4.5	5.1	5.6	5.4	8.3	12.8	12.7	9.5
Gen Exhaust 10	+		4.2	15.6	-4.8	4.7	3.7	3.8	4.9	3.8	4.9	5.0	5.4	4.3	4.2	4.2	4.2	4.2	3.8	4.9	5.5	6.1	5.9	8.9	13.2	13.1	12.5
Gen Exhaust 9	+		4.5	15.8	-4.7	4.7	3.6	3.7	4.9	3.8	5.0	5.0	5.4	4.4	4.3	4.3	4.3	4.3	4.2	5.3	5.9	6.5	6.3	9.4	13.6	13.4	12.8
Gen Exhaust 8	+		4.8	16.1	-4.5	4.6	3.5	3.6	4.9	3.8	5.0	5.1	5.5	4.4	4.4	4.4	4.5	4.5	4.6	5.7	6.3	7.0	6.9	10.1	14.1	13.9	13.2
Gen Exhaust 7	+		5.3	16.3	-4.3	4.5	3.5	3.6	4.8	3.8	4.9	5.1	5.5	4.6	4.6	4.5	4.6	4.6	5.1	6.2	6.8	7.5	7.6	10.8	14.7	14.3	13.6
Gen Exhaust 6	+		6.0	16.6	-4.2	4.5	3.4	3.5	4.8	3.7	4.9	5.1	5.5	4.6	4.6	4.6	4.7	4.7	5.5	6.7	7.3	8.1	8.2	11.7	15.2	14.8	14.0
Gen Exhaust 5	+		7.5	16.8	-4.0	4.4	3.3	3.4	4.7	3.7	4.9	5.2	5.6	4.6	4.7	4.7	4.7	4.8	6.0	7.2	7.9	8.7	8.9	12.5	15.8	15.3	14.5
Gen Exhaust 4	+		18.8	17.1	-3.9	4.3	3.2	3.4	4.6	3.6	4.8	5.2	5.6	4.7	4.7	4.7	4.8	4.8	6.5	7.8	8.5	9.4	9.8	13.4	16.5	15.9	15.0
Gen Exhaust 3	+		18.7	17.3	-3.8	4.2	3.2	3.3	4.6	3.6	4.8	5.2	5.6	4.7	4.8	4.8	4.9	4.9	7.1	8.3	9.1	10.0	10.6	14.2	17.1	16.5	15.4
Gen Exhaust 2	+		18.8	17.6	-3.6	4.1	3.1	3.2	4.5	3.5	4.7	5.1	5.6	4.7	4.8	4.9	5.0	5.2	7.9	9.2	10.0	11.1	11.9	18.4	18.1	17.3	16.1
Gen Exhaust 1	+		18.7	18.6	-3.4	4.1	3.0	3.1	4.4	3.6	4.7	5.1	5.6	4.8	5.0	5.0	5.3	5.6	8.3	9.7	10.6	11.7	13.2	19.6	19.2	18.1	16.8
Gen Inlet 16	+		4.8	18.1	-7.7	2.0	1.6	1.4	1.5	1.1	1.4	1.1	0.5	-0.0	-0.1	-0.2	-0.3	-0.8	0.3	0.9	1.5	2.2	2.9	6.1	9.6	10.5	10.0
Gen Inlet 15	+		5.3	18.4	-5.2	1.8	1.4	1.3	1.4	1.1	1.4	1.2	0.6	0.1	-0.0	-0.1	-0.1	-0.6	0.5	1.2	1.8	2.6	3.3	6.5	10.2	11.1	10.6
Gen Inlet 14	+		5.9	18.7	-7.1	1.5	1.2	1.1	1.5	1.1	1.4	1.2	0.6	0.1	0.0	-0.1	-0.1	-0.5	0.6	1.4	2.0	2.8	3.6	7.0	10.7	11.6	11.1
Gen Inlet 13	+		6.4	19.0	-6.9	1.3	1.0	0.9	1.4	1.0	1.4	1.2	0.7	0.2	0.1	-0.0	-0.2	-0.4	0.8	1.6	2.3	3.1	4.0	7.4	11.3	12.2	11.7
Gen Inlet 12	+		7.1	19.3	-6.6	1.2	0.9	1.1	1.4	1.0	1.4	1.2	0.8	0.3	0.2	0.1	0.0	-0.3	1.0	1.9	2.6	3.5	4.5	8.0	12.0	13.0	12.5
Gen Inlet 11	+		7.9	19.5	-6.5	1.1	0.8	1.0	1.3	1.0	1.4	1.3	0.8	0.3	0.2	0.0	0.1	-0.2	1.3	2.2	2.9	3.8	4.9	8.6	12.7	13.6	13.1
Gen Inlet 10	+		8.7	19.8	-6.3	1.0	0.7	0.9	1.3	1.0	1.4	1.3	0.8	0.4	0.2	0.1	0.2	-0.0	1.5	2.5	3.2	4.1	5.3	9.2	13.5	14.4	13.8
Gen Inlet 9	+		9.8	20.1	-6.2	0.8	0.7	0.8	1.2	1.0	1.3	1.3	0.9	0.3	0.2	0.2	0.4	0.1	1.8	2.8	3.6	4.5	5.8	9.9	14.3	15.1	14.4
Gen Inlet 8	+		11.1	20.4	-6.1	0.8	0.7	0.8	1.2	1.0	1.4	1.4	1.0	0.5	0.4	0.4	0.6	0.4	2.1	3.2	4.0	5.1	6.5	10.7	15.4	15.9	15.1
Gen Inlet 7	+		13.1	20.7	-5.8	0.6	0.5	0.6	1.1	0.9	1.3	1.3	0.9	0.5	0.5	0.4	0.7	0.5	2.5	3.6	4.5	5.6	7.2	11.7	16.4	16.6	16.9
Gen Inlet 6	+		15.3	21.0	-5.7	0.7	0.5	0.6	1.1	0.9	1.3	1.4	1.1	0.6	0.7	0.6	1.1	0.9	3.0	4.2	5.2	6.4	8.3	13.7	17.6	20.7	19.4
Gen Inlet 5	+		18.0	21.3	-5.5	0.7	0.4	0.6	1.1	0.9	1.3	1.5	1.0	0.8	0.9	0.9	1.4	1.3	3.6	4.9	6.0	7.4	9.6	15.3	22.2	21.1	19.7
Gen Inlet 4	+		24.0	21.6	-5.4	0.6	0.4	0.5	1.0	0.9	1.3	1.3	1.1	0.9	1.0	1.1	1.8	1.8	4.2	5.7	7.0	8.6	11.2	16.9	22.6	21.4	20.0
Gen Inlet 3	+		24.0	21.9	-5.2	0.6	0.3	0.5	1.0	0.9	1.3	1.4	1.2	1.1	1.4	1.5	2.4	2.6	5.3	7.1	8.6	10.7	14.2	18.8	23.0	21.8	20.4
Gen Inlet 2	+		23.9	22.3	-5.1	0.5	0.3	0.4	1.0	0.9	1.3	1.5	1.3	1.3	1.7	1.9	3.2	3.7	6.6	8.9	10.8	13.5	17.7	23.4	23.5	22.2	20.7
Gen Inlet 1	+		23.9	22.6	-4.9	0.5	0.2	0.4	1.0	0.9	1.2	1.6	1.5	1.7	2.4	2.8	5.7	6.6	9.7	13.0	14.9	16.8	22.5	23.8	23.9	22.6	21.1

Partial results 10% operation

Gen Break Out 1	+		40.5	39.5	11.9	16.9	17.3	17.3	17.9	17.9	18.4	18.8	18.7	18.9	19.5	19.8	22.0	22.7	25.7	28.2	30.1	32.3	37.7	40.3	41.1	39.9	38.3
Gen Break Out 2	+		40.6	39.2	11.7	17.3	17.2	17.3	17.9	17.9	18.4	18.7	18.5	18.5	18.9	19.0	20.1	20.4	23.1	24.9	26.4	28.4	31.7	37.4	39.6	38.8	37.4
Gen Break Out 3	+		40.6	38.9	11.6	17.4	17.2	17.7	18.0	17.9	18.4	18.6	18.4	18.3	18.5	18.5	19.3	19.3	21.8	23.3	24.5	26.0	28.3	33.6	37.9	37.6	36.3
Gen Break Out 4	+		39.0	38.6	11.3	17.5	17.2	17.5	18.0	17.9	18.3	18.6	18.3	18.1	18.2	18.2	18.8	18.6	20.9	22.2	23.3	24.6	26.5	31.7	35.8	36.2	35.2
Gen Break Out 5	+		34.9	38.3	11.1	17.6	17.3	17.5	18.0	18.0	18.3	18.5	18.2	17.9	18.0	17.9	18.4	18.2	20.4	21.5	22.5	23.7	25.4	30.1	33.6	34.8	34.0
Gen Break Out 6	+		32.6	38.0	11.0	17.7	17.4	17.6	18.1	18.1	18.3	18.5	18.1	17.8	17.8	17.7	18.1	17.9	19.9	21.0	21.8	22.9	24.5	28.7	32.4	32.9	32.5
Gen Break Out 7	+		30.6	37.8	10.8	17.7	17.4	17.6	18.1	18.2	18.4	18.4	18.0	17.7	17.6	17.6	17.8	17.5	19.4	20.5	21.3	22.3	23.7	27.6	31.3	31.7	30.9
Gen Break Out 8	+		28.8	37.5	10.6	17.8	17.6	17.7	18.1	18.2	18.6	18.3	17.9	17.6	17.5	17.4	17.6	17.3	19.0	20.0	20.8	21.8	23.0	26.8	30.4	30.9	30.1
Gen Break Out 9	+		27.4	37.2	10.3	18.0	17.7	17.8	18.2	18.2	18.6	18.3	17.9	17.5	17.3	17.3	17.4	17.1	18.7	19.7	20.4	21.3	22.5	26.2	29.6	30.1	29.4
Gen Break Out 10	+		26.2	37.0	10.2	18.1	17.8	17.9	18.3	18.3	18.6	18.4	17.9	17.4	17.3	17.2	17.3	17.0	18.5	19.4	20.1	21.0	22.1	25.6	29.0	29.5	28.8
Gen Break Out 11	+		25.3	36.7	10.1	18.2	18.0	18.0	18.4	18.3	18.6	18.4	17.8	17.4	17.2	17.1	17.2	16.9	18.3	19.1	19.8	20.7	21.7	25.1	28.4	28.9	28.3
Gen Break Out 12	+		24.5	36.4	10.0	18.3	18.1	18.1	18.4	18.2	18.4	18.3	17.7	17.3	17.1	17.0	17.0	16.7	18.0	18.8	19.5	20.3	21.2	24.5	27.8	28.3	27.7
Gen Break Out 13	+		23.8	36.2	9.9	18.5	18.2	18.2	18.5	18.1	18.4	18.3	17.7	17.2	16.9	16.9	16.9	16.5	17.8	18.5	19.2	20.0	20.8	24.0	27.2	27.8	27.2
Gen Break Out 14	+		23.2	35.9	9.7	18.7	18.4	18.3	18.5	18.1	18.4	18.1	17.3	17.1	16.9	16.8	16.8	16.4	17.7	18.3	18.9	19.7	20.5	23.6	26.7	27.3	26.7
Gen Break Out 15	+		22.7	35.6	9.8	18.9	18.6	18.4	18.6	18.2	18.4	18.1	17.3	17.0	16.8	16.7	16.7	16.3	17.5	18.1	18.7	19.4	20.1	23.2	26.3	26.9	26.3
Gen Break Out 16	+		22.1	35.4	10.1	19.1	18.8	18.6	18.7	18.2	18.4	18.0	17.3	16.5	16.6	16.5	16.5	16.1	17.3	17.8	18.4	19.1	19.8	22.8	25.8	26.4	25.8

Appendix E: Glossary

The list below details the major acoustical terms and descriptors, with brief definitions:

'A' Weighting	
Weighting applied to the level in each stated octave band by a specified amount, in order to better represent the response of the human ear. The letter 'A' will follow a descriptor, indicating the value has been 'A' weighted. An 'A' weighted noise level may also be written as dB(A).	
Airborne Noise	
Noise transmitted through air.	
Ambient Noise	
The total noise level including all 'normally experienced' noise sources.	
dB or Decibel	
Literally meaning 'a tenth of a bel', the bel being a unit devised by the Bell Laboratory and named after Alexander Graham Bell. A logarithmically based descriptor to compare a level to a reference level. Decibel arithmetic is not linear, due to the logarithmic base. For example:	
30 dB + 30 dB ≠ 60 dB	30 dB + 30 dB = 33 dB
$D_{nTw}+C_{tr}$	
The weighted, normalised difference in airborne noise levels measured in a source room (L1) and a receive room (L2) due to a separating partition.	
D	Is simply L1 – L2.
D_{nT}	Is the normalisation of the measured level difference to the expected (in comparison to the measured) reverberation time in the receiving room.
D_{nTw}	Is the weighted and normalised level difference. This value is the result of applying a known octave band weighting curve to the measured result.
C_{tr}	Is a correction factor applied to the D_{nTw} to account for the known effects of particular types of noise, such as loud stereo music or traffic noise.
Frequency (Hz)	
Measured in Hertz (after Heinrich Hertz), and represents the number of cycles per second of a sound or tone.	
Insertion Loss, dB	
The amount of sound reduction offered by an attenuator or louvre once placed in the path of a noise level.	
$L_{A90, T}$	
The 'A' weighted noise level exceeded for 90% of the time period T, described or measured. The '90' can be substituted for any value between 1 and 99 to indicate the noise level exceeded for the corresponding percentage of time described or measured.	
$L_{Aeq, T}$	
The 'A' weighted 'equivalent' noise level, or the average noise level over the time period T, described or measured.	
L_{Amax}	
The 'A' weighted maximum measured noise level. Can be measured with a 'slow' (1 sec) or 'fast' (0.125 sec) time weighting.	
L_{Amin}	

The 'A' weighted minimum measured noise level.

NR

Noise Rating (NR) level. A frequency dependent system of noise level curves developed by the International Organisation for Standardisation (ISO). NR is used to categorise and determine the acceptable indoor environment in terms of hearing preservation, speech communication and annoyance in any given application as a single figure level. The US predominantly uses the Noise Criterion (NC) system.

Octave

The interval between a frequency in Hz (f) and either half or double that frequency (0.5f or 2f).

Pa

Pascals, the SI unit to describe pressure, after physicist Blaise Pascal.

Reverberation Time, T_{mf}, RT60, RT30 or RT20

The time taken in seconds for a sound to diminish within a room by 1,000 times its original level, corresponding to a drop in sound pressure of 60 dB. When taking field measurements and where background noise levels are high, the units RT20 or RT30 are used (measuring drops of 20 or 30 dB respectively). Sometimes given as a mid-frequency reverberation time, T_{mf} which is the average of reverberation time values at 500Hz, 1kHz and 2kHz.

R_w

The sound reduction value(s) of a constructional element such as a door, as measured in a laboratory, with a known octave band weighting curve applied to the result.

Sound Power Level

A noise level obtained by calculation from measurement data, given at the face of an item of plant or machinery. Referenced to 10^{-12} W or 1pW.

Sound Pressure Level

A noise level measured or given at a distance from a source or a number of sources. Referenced to $2x10^{-5}$ Pa.

Subjective Effect of Changes in Sound Pressure Level

The table below details the subjective effects of variations in sound pressures (adapted from Bies and Hansen).

Difference between background noise and rating levels	Increase in ambient noise level in 'real terms'	Change in apparent loudness
+ 10 dB	+ 10 dB	Twice as loud
+ 5 dB	+ 6 dB	Clearly noticeable
0 dB	+ 3 dB	Just perceptible
-10 dB	0 dB	No change

W

Watts, the SI unit to describe power, after engineer James Watt.

Appendix 03-07 ISO 14001

Certificate of Registration

This is to certify that the Management System of:

VIRTUS Holdco Limited t/a VIRTUS Data Centres
2nd Floor Kent House, 14-17 Market Place, London, W1W 8AJ

And as detailed on the annex of this certificate

has been approved by Alcumus ISOQAR and is compliant with the requirements of:

ISO 14001: 2015

Certificate Number:	**16390-EMS-001**
Initial Registration Date:	07/05/2015
Previous Expiry Date:	07/05/2021
Recertification Date:	25/03/2021
Re-issue Date:	07/05/2021
Current Expiry Date:	07/05/2024

Scope of Registration:

The design, build and ongoing operation of mission critical Tier III data centre facilities.

Signed:
Alyn Franklin, Chief Executive Officer
(on behalf of Alcumus ISOQAR)

This certificate will remain current subject to the company maintaining its system to the required standard. This will be monitored regularly by Alcumus ISOQAR. Further clarification regarding the scope of this certificate and the applicability of the relevant standards' requirement may be obtained by consulting Alcumus ISOQAR

Alcumus ISOQAR Limited, Cobra Court, 1 Blackmore Road, Stretford, Manchester M32 0QY.
T: 0161 865 3699 E: isoqarenquiries@alcumus.com W: alcumus.com/isoqar
This certificate is the property of Alcumus ISOQAR and must be returned on request.

Appendix 03-08 VIRTUS OHSE Management System

Chapter 6

Occupational Health & Safety and Environmental Management

Contents

6.1. Introduction

This chapter describes the VIRTUS Data Centres Occupational Health & Safety and Environmental (OHSE) Management System.

6.2. Purpose

This chapter has been developed as a singular source for all of VIRTUS's OHSE requirements, guidance, processes and documentation. As a company that operates in the United Kingdom, we are accountable for the health & safety of our staff, and those who work on our behalf across our sites, and the environmental impacts of our operations, services and processes.

6.3. Scope

This chapter is applicable throughout VIRTUS Data Centres, all VIRTUS staff, and all staff who work on our sites who we owe Duty of Care to:

Role	Reason for Duty of Care	Activities Conducted
External Facilities Management teams	Engineers, supervisory staff, and account managers operating from VIRTUS sites and handling VIRTUS equipment	Operation and maintenance control of VIRTUS Data Centres
External maintenance sub-contractors	Engineers conducting maintenance activities on VIRTUS equipment on VIRTUS sites	Maintenance of VIRTUS equipment and site
External security contractors	Security staff operating from VIRTUS sites	Shift-pattern 24 hour manned guarding
External cleaning contractors	Cleaning staff operating from VIRTUS sites	Cleaning of VIRTUS sites
Visitors	Temporary visits to VIRTUS sites	Site tours and meetings

6.4. Definitions

6.4.1. VIRTUS Staff

An individual who works part-time or full-time under a contract of employment with VIRTUS, whether oral or written, express or implied, and has recognised rights and duties

6.4.2. Facilities Management Teams

The company responsible for the maintenance of VIRTUS's buildings and equipment under contract.

6.4.3. Sub-Contractors

A firm or person that carries out work as part of the larger goal of maintaining VIRTUS sites.

6.4.4. Duty of Care

A moral or legal obligation to ensure the safety or well-being of others.

6.4.5. Hazard

A hazard is any source of potential damage, harm or adverse health effects on something or someone

6.4.6. Risk

A probability or threat of damage, injury, liability, loss, or any other negative occurrence that is caused by external or internal vulnerabilities, and that may be avoided through pre-emptive action

6.4.7. Risk Assessment

A systematic process of evaluating the potential risks that may be involved in a projected activity or undertaking.

6.4.8. Health & Safety Accident/Incident

An unplanned and uncontrolled event in which the action or reaction of an object, substance, person or radiation results in personal injury or the probability thereof

6.4.9.Near Miss

An accident that does not result in an injury is a near miss

6.4.10. Environmental Incident

A specific occurrence of pollution, contamination or degradation in the quality of the environment related to a specific event and of limited geographical scope.

6.4.11. Pressurised System

A system comprising one or more pressure vessels of rigid construction, any associated pipework and protective devices. The pipework with its protective devices to which a transportable pressure receptacle is, or is intended to be, connected. A pipeline and its protective devices

6.4.12. Confined Space

A confined space is a place which is substantially enclosed (though not always entirely), and where serious injury can occur from hazardous substances or conditions within the space or nearby (e.g. lack of oxygen)

6.5. Management System Elements

6.5.1. Occupational Health & Safety Policy

VIRTUS maintain an Occupational Health & Safety Policy that is reviewed annual by the Compliance Manager. Any changes to this policy are approved by the Senior Management Team and it is the duty of the Compliance Manager to adequately communicate this policy to all interested and affected parties.

6.5.2. Compliance Policy

VIRTUS maintain a Compliance Policy that is reviewed annual by the Compliance Manager. Any changes to this policy are approved by the Senior Management Team and it is the duty of the Compliance Manager to adequately communicate this policy to all interested and affected parties.

6.5.3. Roles, Responsibilities & Accountabilities

The VIRTUS Senior Management Team (SMT) are committed to the development and implementation of the OHSE Management System and will continually improve its effectiveness by:

1. Taking overall accountability of its effectiveness;
2. Ensuring that the company policies are established and are compatible with the context and strategic direction of the company;
3. Promoting the use of the process approach and risk-based thinking for OHSE matters;
4. Ensuring that the resources needed for the OHSE Management System are available;
5. Communicating the importance of effective OHSE Management and of conforming to standard and statutory requirements;
6. Ensuring that the OHSE Management System achieves its intended results;
7. Engaging, directing and supporting persons to contribute to the effectiveness of OHSE Management;
8. Promoting improvement;
9. Supporting other relevant management roles to demonstrate their leadership as it applies to their areas of responsibility.

Roles and responsibilities are defined below for the different levels within the company.

Senior Management Team (SMT)

- Participate in Management Review Meetings
- Participate in company Risk Treatment (Review and allocation of resources)
- Ensure availability of resources for the implementation, maintenance and endurance of the OHSE Management System
- Ensure VIRTUS maintain OHSE competence

Compliance Manager

- Reporting OHSE trends to the SMT
- Reporting of RIDDOR Accidents / Incidences to the Health and Safety Executive (HSE)
- Reporting significant Environmental Incidentces to the Environment Agency (EA)
- Ensuring Legal Compliance
- Administration of the Internal Audit Programme
- Be the Health & Safety Representative for VIRTUS Data Centres
- Administer the OHSE awareness programme
- Play a leading role in OHSE communications

Head of Department / Risk Manager

- Enforcement of the OHSE Management System within their respective departments
- Report any OHSE and statutory deviations/omissions to the Compliance Manager
- Actively identify, evaluate and manage VIRTUS risks with involvement from subject mattter experts

Nominated Fire Marshalls

- Maintenance of Emergency Evacuation Plans
- Play a leading role in the fire evacuation process and reporting

Nominated First Aiders

- Prompt response to First Aid
- (Ensure) Maintenance of First Aid Equipment/AED

All Staff

- Comply with the requirements of the OHSE Management System
- Participate in Internal Audits when requested
- Aid in identifying opportunities to improve the workplace safety and environmental protection
- Notify First Aider of Accidents / Incidents or Near Misses
- Notify Compliance Manager of Environmental Incidences

6.5.4.Specific Scopes of Duty of Care

Managing	Responsibility for complying with the requirement for the respective site and all persons on the site
Self-Managing	Responsibility for complying with the requirement for directly employed staff
Audited	Falls under the scope of VIRTUS Compliance Auditing

Requirement	VIRTUS Operational Control (**Data Centres and/or** 20 Balderton Street)	Facilities Management Team Operational Control (**Data Centres**).	Facilities Management Company Operational Control (20 Balderton Street).
The Provision and Use of Work Equipment Regulations 1998 (S.I. 2306)	Self-managing	Self-managing. Audited	Self-managing.
The Lifting Operations and Lifting Equipment Regulations 1998 (S.I. 2307)		Managing. Audited	Managing. Audited
The Health and Safety (First-Aid) Regulations 1981 (S.I. 917)	Managing		
The Health and Safety (Display Screen Equipment) Regulations 1992 (S.I. 2792)	Self-managing	Self-managing	
The Work at Height Regulations 2005 (S.I. 735)		Managing. Audited	
The Dangerous Substances and Explosive Atmosphere Regulations 2002 (S.I. 2776)	Managing		
The Notification of Cooling Towers and Evaporative Condensers Regulations 1992 9S.I. 2225)	Managing		Managing. Audited
The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (S.I. 1471)	Self-managing	Self-managing. Audited	
The Pressure Systems Safety Regulations 2000 (S.I. 128)		Managing. Audited	Managing. Audited
The Confined Spaces Regulations 1997 (S.I. 1713)		Managing. Audited	
The Control of Substances Hazardous to Health (COSHH) Regulations 2002 (S.I. 2677)		Managing. Audited	
The Personal Protective Equipment at Work Regulations 1992 (S.I. 2966)	Self-managing	Self-managing. Audited	
The Personal Protective Equipment Regulations 2002 (S.I. 1144)	Self-managing	Self-managing. Audited	
The Health and Safety (Safety Signs and Signals) Regulations 1996 (S.I. 341)	Managing		Managing
The Electricity at Work Regulations 1989 (S.I. 635)		Managing. Audited	
The Manual Handling Operations Regulations 1992 (S.I. 2793)	Self-managing	Managing. Audited	
The Environmental Protection (Disposal of Polychlorinated Biphenyls and other Dangerous Substances) (England and Wales) Regulations 2000 (S.I. 1043)		Managing. Audited	
The Employment of Women, Young Persons and Children Act 1920	Self-managing	Self-managing. Audited	
The Smoke-free (Premises and Enforcement) Regulations 2006 (S.I. 3368)	Managing		Managing

The Smoke-free (Signs) Regulations 2012 (S.I. 1536)	Managing		Managing
Commission Regulation EC/1497/2007 of 18 December 2007 establishing, pursuant to Regulation EC/842/2006, standard leakage checking requirements for stationary fire protection systems containing certain fluorinated greenhouse gases		Managing. Audited	Managing. Audited
Commission Regulation EC/1516/2007 establishing, pursuant to Regulation EC/842/2006, standard leakage checking requirements for stationary refrigeration, air conditioning and heat pump equipment containing certain fluorinated greenhouse gases		Managing. Audited	Managing. Audited
Regulation EC/1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (CLP)		Managing. Audited	
The Lifts Regulations 1997 (S.I. 831)		Managing. Audited	Managing. Audited
The Working Time Regulations 1998 (S.I. 1833)	Self-managing	Self-managing. Audited	
The Health and Safety (Consultation with Employees) Regulations 1996 (S.I. 1513)	Self-managing	Self-managing. Audited	
The Regulatory Reform (Fire Safety) Order 2005 (S.I. 1541)	Self-managing	Managing. Audited	Managing. Audited
The Hazardous Waste (England and Wales) Regulations 2005 (S.I. 894)		Managing. Audited	Managing. Audited
The Trade Effluents (Prescribed Processes and Substances) Regulations 1989 (S.I. 1156)		Managing. Audited	
The Control of Noise at Work Regulations 2005 (S.I. 1643)	Managing		
The Water Resources (Abstraction and Impounding) Regulations 2006	Managing		
The Construction (Design and Management) (CDM) Regulations 2015 (S.I. 51)	Managing		
The Waste Batteries and Accumulators Regulations 2009 (S.I. 890)		Managing. Audited	
Sulphur content of liquid fuels (England and Wales) Regulations 2007 (S.I. 79)		Managing. Audited	
The CRC Energy Efficiency Scheme Order 2010 (S.I. 768)	Managing		
The Waste (England and Wales) Regulations 2011 (S.I. 988)		Managing. Audited	
The Fluorinated Greenhouse Gases Regulations 2015 (S.I. 310)		Managing. Audited	Managing. Audited
The Control of Electromagnetic Fields at Work Regulations 2016 (S.I. 588)		Managing. Audited	

6.5.5.Occupational Health, Safety and Environmental Communications

Effective communications is an important aspect of good occupational OHSE governance. Considering that workplaces where staff are involved in taking decisions about OHSE are safer and healthier, VIRTUS members of staff have the power to influence such decisions through their own actions. They are often the best people to understand the risks in the workplace, and listening to them will enhance:

- The identification of joint or different solutions to problems,
- The development of a positive OHSE culture,- breakdown. Enhance further
- The reduction of accidents, injury, and ill health,
- The identification of improvements in overall efficiency, quality and productivity,
- Company credibility,
- Compliance to legal requirements.
- Monthly Health & Safety forum for each site with Interested party/Stakeholder attendance
- Safety bulletin
- Safety meeting minutes/Management review
- PIR communication tool

6.5.5.1. Responding to Statutory Visits/Inspections

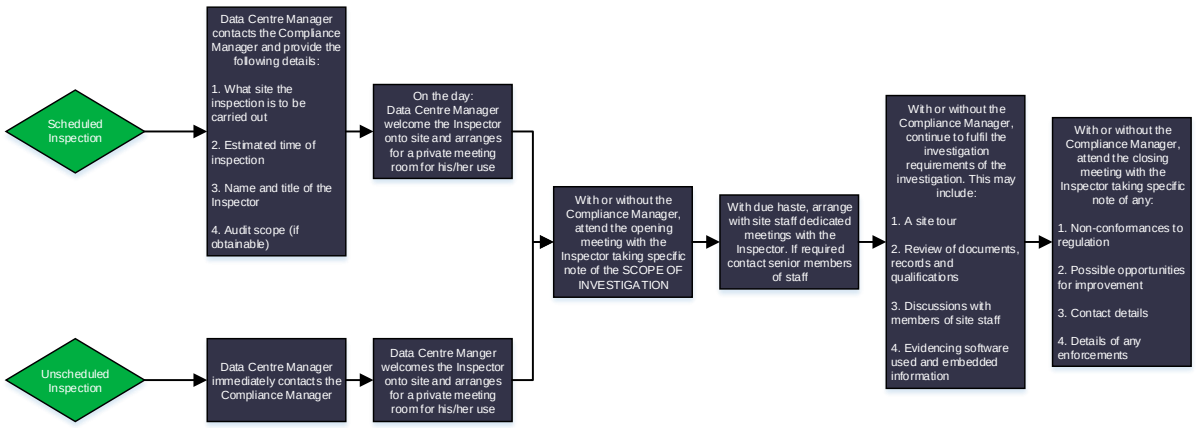
Environmental Health Officers (EHO's), Fire Officers and Health and Safety Executive (HSE) Representatives may visit VIRTUS at any time. They are legally obliged to ensure that workplaces adhere to all applicable health and safety, fire and environmental legislation. In order to do so, they have been granted the following powers:

Powers Granted to Inspectors	
1.	To enter any premises at any reasonable time
2.	To take a police constable with him/her
3.	To take with him any other person authorised by the enforcing authority and any equipment or materials required
4.	To make examinations and investigation as necessary
5.	To direct that a premises or part of it is left undisturbed
6.	To take measurements, photographs or records
7.	To take samples of articles or substances
8.	Dismantle, treat or test any article or substances likely to cause danger to health and safety
9.	Take possession of an article or substance likely to cause danger
10.	Require any person to answer and sign a declaration of truth
11.	Require the production of, inspect and take copies or any books or documents
12.	Require such facilities or assistance as necessary
13.	Exercise any other power necessary to carry out his responsibility

This document further details what to expect when a Health and Safety Inspector intends to conduct an investigation:

HSE – What to expect when a health and safety inspector calls

The process that VIRTUS staff should follow in the event of an inspection is as follows:



Inspection Visit Process Visio Flow.p

6.5.5.2. Occupational Health, Safety and Environmental Awareness

Continual OHSE awareness and communications is vital for promoting a company that is healthier, safer and more considerate to the environment. To achieve this, VIRTUS maintain an awareness programme that seek to communicate the following:

1. The company policies ensuring they are adhered to,
2. VIRTUS staff roles, responsibilities and accountabilities in regards to OHSE, BS EN ISO14011:2015 and BS EN ISO50001:2011.
3. The highest OHSE risks to all VIRTUS staff at the different levels in the company and the controls in place to ensure safe working practices and to minimise environmental damage,
    a. Generic workplace hazards
        i. Electricity at work
        ii. Provision and use of work equipment
        iii. Slips, trips and falls
        iv. Use of visual display units (VDU's)
    b. Substances hazardous to health and the environment(COSHH)
    c. Emergency preparedness
    d. Emergency response
    e. Working from height
    f. Confined spaces
    g. Manual handling
    h. Lone working
4. The importance and best practice methods for Manual Handling
5. The importance of the display screen equipment (DSE) annual self-assessment questionnaire,
6. The importance to complete Dynamic Risk Assessments where required
7. The importance for cross-company participation enabled through the respective forums
8. Emergency procedures across the VIRTUS portfolio
9. Key points of contact for OHSE
10. The importance to maintain all necessary records or documented information controlled by the OHSE Management System
11. Duties of site First Aiders
12. OHSE signs, labels and warnings
13. Site inspection procedure
14. Duties of site Fire Marshals

15. General housekeeping practices

The primary tools used to achieve the OHSE awareness programme are VIRTUS staff inductions, readily available power point presentations, annual toolbox talks, site sign in screens, and the use of the Occupational Health & Safety and Environmental Forum.

6.5.5.3. Occupational Health, Safety and Environmental Forum

The VIRTUS Compliance Manager chairs the Occupational Health & Safety and Environmental Forum at least two times a year to enable the cross-company communication of all OHSE matters. All VIRTUS staff are welcome to attend and provide input as part of VIRTUS staff participation system. These forums are scheduled in advance to allow for the best possible departmental representation.

6.5.5.4. Sub-Contractor Occupational Health, Safety and Environmental Communications

All sub-contractors permitted to work on VIRTUS sites are subjected to site inductions managed by the Facilities Management Teams. The induction process ensures all hazards, emergency evacuations procedures, emergency contacts and environmental procedures are effectively communicated. The Facilities Management Teams maintain records of site inductions.

6.5.5.5. Compliance with Applicable Legislation and Other Requirements

Preserving compliance to all applicable law and legislation is a key element in supporting the VIRTUS OHSE Management System, the safety of all staff under duty of care, and the environmental performance of the company.

Legislation is used as a performance indicator, and as legislation changes and amendments are introduced, VIRTUS seek to obtain compliance in the most effective and clear approach possible.

By means of biennial legal compliance auditing, VIRTUS seek the following:

- Review the existing register of applicable law and legislation against key legal sources to ensure applicability of current compliance and to complement latest directives.
    - www.legislation.gov.uk
    - www.gov.uk/government/organisations/environment-agency
    - europa.eu
    - www.hse.gov.uk
    - In-house legal competence and expertise
    - Guidance from external consultants
    - Interactions between industry bodies and regulatory bodies
- Assisting Senior Management with identifying and prioritising legal gaps that need attention and focus.
- Testing current controls for legal compliance to verify whether controls are working as designed.
- Reporting on legal compliance to provide observations and recommendations to improve processes and controls.
- Enhance the VIRTUS-contractor relationship through mutual legal understanding and direction.
- Identify, evaluate and control the OHSE risks facing the business.
- Minimise the potential for statutory penalties
- Build customer trust in demonstrating competence
- Comply with the ‘fulfil all compliance obligations’ requirements of BS EN ISO50001:2011, BS EN ISO14001:2015 and OHSAS18001:2007

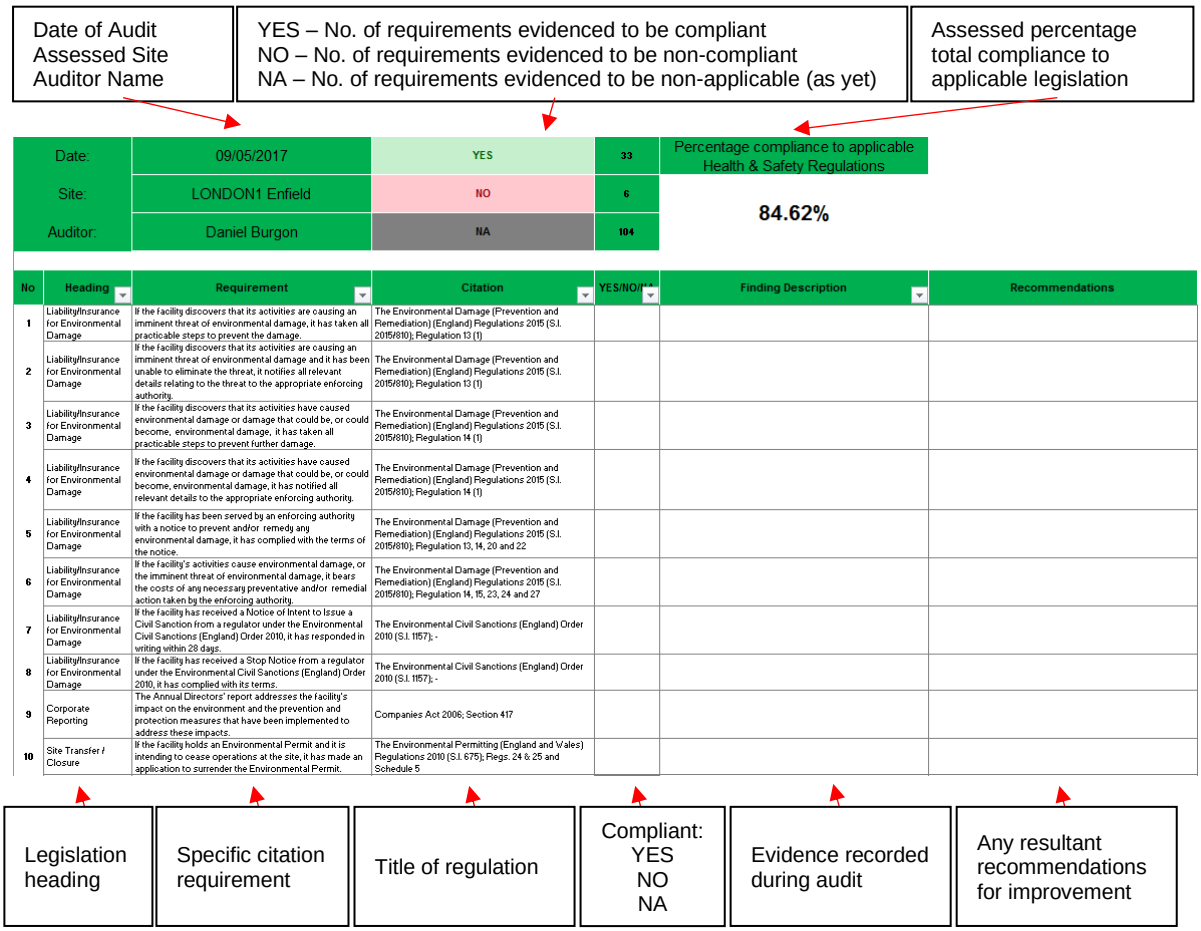
It is the responsibility of the Compliance Manager to conduct biennial audits of the register of applicable law and legislation ensuring the latest directives are identified, evaluated against current operations and that designed controls are working as intended. Furthermore, the Compliance Manager is also responsible for conducting biennial legal compliance audits at all VIRTUS sites against the latest rendition of the register of applicable law and legislation. This ensures the following:

1. Applicable regulations are assessed twice a year, including impending regulations,
2. Any amendments to regulation are captured and controls are tested during the site compliance audits,
3. Sites are individually assessed twice a year for compliance
4. Controls are tested twice a year ensuring suitability and effective management thereof,
5. Multilateral cooperation for compliance between VIRTUS, the Facilities Management Teams and sub-contractors is transparent and that non-conformances against regulation are appropriately closed out,
6. The VIRTUS Senior Management Team are up-to-date with the level of compliance across the VIRTUS portfolio.

It is the responsibility of all VIRTUS staff to make available all necessary resources (when required) to partake in the compliance auditing. A minimum of 2 weeks' notice will be given to all relevant staff of the impending audits, alongside the requirements under which they will be audited against.

Legal compliance auditing is a planned activity. The schedule for legal compliance auditing is retained in the Internal Audit Schedule, owned and maintained by the Compliance Manager.

The register of applicable law and legislation is an embedded register actively assessed in a scorecard format:



Date:	09/05/2017	YES	33	Percentage compliance to applicable Health & Safety Regulations
Site:	LONDON1 Enfield	NO	6	
Auditor:	Daniel Burgon	NA	104	84.62%

No	Heading	Requirement	Citation	YES/NO/NA	Finding Description	Recommendations
1	Liability/Insurance for Environmental Damage	If the facility discovers that its activities are causing an imminent threat of environmental damage, it has taken all practicable steps to prevent the damage.	The Environmental Damage (Prevention and Remediation) (England) Regulations 2015 (S.I. 2015/810); Regulation 13 (1)			
2	Liability/Insurance for Environmental Damage	If the facility discovers that its activities are causing an imminent threat of environmental damage and it has been unable to eliminate the threat, it notifies all relevant details relating to the threat to the appropriate enforcing authority.	The Environmental Damage (Prevention and Remediation) (England) Regulations 2015 (S.I. 2015/810); Regulation 13 (1)			
3	Liability/Insurance for Environmental Damage	If the facility discovers that its activities have caused environmental damage or damage that could be, or could become, environmental damage, it has taken all practicable steps to prevent further damage.	The Environmental Damage (Prevention and Remediation) (England) Regulations 2015 (S.I. 2015/810); Regulation 14 (1)			
4	Liability/Insurance for Environmental Damage	If the facility discovers that its activities have caused environmental damage or damage that could be, or could become, environmental damage, it has notified all relevant details to the appropriate enforcing authority.	The Environmental Damage (Prevention and Remediation) (England) Regulations 2015 (S.I. 2015/810); Regulation 14 (1)			
5	Liability/Insurance for Environmental Damage	If the facility has been served by an enforcing authority with a notice to prevent and/or remedy any environmental damage, it has complied with the terms of the notice.	The Environmental Damage (Prevention and Remediation) (England) Regulations 2015 (S.I. 2015/810); Regulation 13, 14, 20 and 22			
6	Liability/Insurance for Environmental Damage	If the facility's activities cause environmental damage, or the imminent threat of environmental damage, it bears the costs of any necessary preventative and/or remedial action taken by the enforcing authority.	The Environmental Damage (Prevention and Remediation) (England) Regulations 2015 (S.I. 2015/810); Regulation 14, 15, 23, 24 and 27			
7	Liability/Insurance for Environmental Damage	If the facility has received a Notice of Intent to Issue a Civil Sanction from a regulator under the Environmental Civil Sanctions (England) Order 2010, it has responded in writing within 28 days.	The Environmental Civil Sanctions (England) Order 2010 (S.I. 1157); -			
8	Liability/Insurance for Environmental Damage	If the facility has received a Stop Notice from a regulator under the Environmental Civil Sanctions (England) Order 2010, it has complied with its terms.	The Environmental Civil Sanctions (England) Order 2010 (S.I. 1157); -			
9	Corporate Reporting	The Annual Directors' report addresses the facility's impact on the environment and the prevention and protection measures that have been implemented to address these impacts.	Companies Act 2006; Section 417			
10	Site Transfer / Closure	If the facility holds an Environmental Permit and it is intending to cease operations at the site, it has made an application to surrender the Environmental Permit.	The Environmental Permitting (England and Wales) Regulations 2010 (S.I. 675); Regs. 24 & 25 and Schedule 5			

Included in the legal compliance auditing are reviews of statutory assessments, and the consequential control of assessment findings. Statutory assessments completed by external competent parties include:

1. Annual Regulatory Reform (Fire Safety) Order fire risk assessments
2. Annual Approved Code of Practice (ACOP) L8 Legionella risk assessment
3. Annual Lifting Operations and Lifting Equipment Regulations reports of thorough examination (non-person carrying)
4. Biennial Lifting Operations and Lifting Equipment Regulations reports of thorough examination (person carrying)
5. Annual Pressure Systems Safety Regulations reports of thorough examination
6. 5-yearly Energy Performance of Buildings TM44 – Air conditioning efficiency reports
7. 5 yearly Electricity at Work fixed wiring test reports
8. Provision and Use of Work Equipment portable appliance testing (PAT) reports

6.5.5.6. Occupational Health, Safety and Environmental Competence

VIRTUS realise the importance of employing competent persons to maintain the OHSE Management System. The following members of staff possess appropriate professional qualifications supplemented by professional subscriptions and professional experience:

1. Compliance Manager (OHSE Subject Matter Expert)
2. Chief Technical Officer
3. Operations Director
4. Engineering Director
5. Construction Director
6. People Team Manager

As all VIRTUS staff have responsibilities towards OHSE Management (detailed in 6.5.3), continual awareness is sustained (detailed in 6.5.5) to complement the professional qualifications, subscriptions and experiences of the competent persons.

6.6. VIRTUS Occupational Health & Safety

6.6.1. Risk Assessments

OHSE risks to the company are controlled under Chapter 4 – Risk Management. In summary, OHSE risks are controlled under an active risk management system that:

- Has a process that determines risk sources
- Has parameters used to analyse and categorise risks
- Has a process used to establish and maintain the strategy
- Has a process used to evaluate and categorise risks using defined parameters
- Has a process that develops risk mitigation plans
- Has a process that periodically monitors the status of each risk
- Ensures adequate resources for performing risk management
- Has assigned roles, responsibilities and authorities
- Has provided adequate training where and when required
- Will involve relevant stakeholders as planned
- Reviews the results of risk mitigation

6.6.2.Fire Prevention and Control

Site	Fire suppression system	Fire detection system	Fire extinguishers	Fire doors	Dry risers
Balderton Street (head office)	Water sprinkler system; active fire protection method, consisting of a water supply system, providing adequate pressure and flowrate to a water distribution piping system, onto which fire sprinklers are connected.	Zoned fire detection (smoke and heat)	Fire extinguishers are available at strategic points around the site used to extinguish or control small fires in emergencies. The site maintains extinguisher types specific to the activities, process and equipment within individual rooms. Fire extinguisher frequency, location and type is annually re-evaluated during the fire risk assessment	Fire doors are managed by the Facilities Management Company	Dry risers are managed by the Facilities Management Company
Maintenance	*6 monthly servicing*	*6 monthly servicing*	*Annual servicing & inspection*	*N/A*	*N/A*
LONDON1	Water mist fire suppression system. A water mist system is a fire protection system that uses very fine water sprays (i.e. water mist). The small water droplets allow the water mist to control, suppress or extinguish fires by: 1. cooling both the flame and surrounding gases by evaporation 2. displacing oxygen by evaporation 3. attenuating radiant heat by the small droplets themselves VIRTUS fire suppression systems are localised to contained areas (i.e. individual rooms)	Each compartment has a manual call point and 2 smoke/heat detectors. Two detectors need to be activated within the zone to engage fire suppression after a 32-second delay.	Fire extinguishers are available at strategic points around the site used to extinguish or control small fires in emergencies. The site maintains extinguisher types specific to the activities, process and equipment within individual rooms. Fire extinguisher frequency, location and type is annually re-evaluated during the fire risk assessment	Fire resistant doors are heavily used to compartmentalise the site as part of a passive fire protection system. This is to reduce the spread of fire and smoke and to enable safe egress from the building.	No dry risers on site

Maintenance	*6 monthly servicing*	*3 monthly servicing & inspection*	*Annual servicing & inspection*	*Annual inspection*	*N/A*
LONDON2	Water mist fire suppression system. A water mist system is a fire protection system that uses very fine water sprays (i.e. water mist). The small water droplets allow the water mist to control, suppress or extinguish fires by: 1. cooling both the flame and surrounding gases by evaporation 2. displacing oxygen by evaporation 3. attenuating radiant heat by the small droplets themselves VIRTUS fire suppression systems are localised to contained areas (i.e. individual rooms)	Each compartment has a manual call point and 2 smoke/heat detectors. Two detectors need to be activated within the zone to engage fire suppression after a 32-second delay.	Fire extinguishers are available at strategic points around the site used to extinguish or control small fires in emergencies. The site maintains extinguisher types specific to the activities, process and equipment within individual rooms. Fire extinguisher frequency, location and type is annually re-evaluated during the fire risk assessment	Fire resistant doors are heavily used to compartmentalise the site as part of a passive fire protection system. This is to reduce the spread of fire and smoke and to enable safe egress from the building.	An empty pipe that is externally connected to a pressurised water source used to fight fires by emergency services. The site maintains (number) dry risers.
Maintenance	*6 monthly servicing*	*3 monthly servicing & inspection*	*Annual servicing & inspection*	*Annual inspection*	*Annual inspection*
LONDON3	Water mist fire suppression system. A water mist system is a fire protection system that uses very fine water sprays (i.e. water mist). The small water droplets allow the water mist to control, suppress or extinguish fires by: 4. cooling both the flame and surrounding gases by evaporation 5. displacing oxygen by evaporation 6. attenuating radiant heat by the small	Each compartment has a manual call point and 2 smoke/heat detectors. Two detectors need to be activated within the zone to engage fire suppression after a 32-second delay.	Fire extinguishers are available at strategic points around the site used to extinguish or control small fires in emergencies. The site maintains extinguisher types specific to the activities, process and equipment within individual rooms. Fire extinguisher frequency, location and type is annually re-evaluated during the fire risk assessment	Fire resistant doors are heavily used to compartmentalise the site as part of a passive fire protection system. This is to reduce the spread of fire and smoke and to enable safe egress from the building.	No dry risers on site

	droplets themselves VIRTUS fire suppression systems are localised to contained areas (i.e. individual rooms)				
Maintenance	*6 monthly servicing*	*6 monthly servicing & inspection*	*Annual servicing & inspection*	*Annual inspection*	*N/A*
LONDON3/4	IG55 Inert Gas (50% argon; IG-01 and 50% nitrogen; IG-100) and Water mist fire suppression systems. IG-55 is a non-corrosive, colourless and no-global warming effect gas. VIRTUS fire suppression systems are localised to contained areas (i.e. individual rooms) where the release of IG-55 reduces the oxygen level from 21% to between 13% - 11% sufficient enough to stop combustion, yet safe for persons in that room.	Each compartment has a manual call point, 1 heat detector and 2 smoke detectors. Two detectors need to be activated within the zone to engage fire suppression after a 32-second delay.	Fire extinguishers are available at strategic points around the site used to extinguish or control small fires in emergencies. The site maintains extinguisher types specific to the activities, process and equipment within individual rooms. Fire extinguisher frequency, location and type is annually re-evaluated during the fire risk assessment	Fire resistant doors are heavily used to compartmentalise the site as part of a passive fire protection system. This is to reduce the spread of fire and smoke and to enable safe egress from the building.	No dry risers on site
Maintenance	*6 monthly servicing*	*6 monthly servicing & inspection*	*Annual servicing & inspection*	*Annual inspection*	*N/A*
LONDON5	Water mist fire suppression system. A water mist system is a fire protection system that uses very fine water sprays (i.e. water mist). The small water droplets allow the water mist to control, suppress or extinguish fires by: 7. cooling both the flame and surrounding gases by evaporation 8. displacing oxygen by evaporation 9. attenuating radiant heat	Each compartment has a manual call point and 2 smoke/heat detectors. Two detectors need to be activated within the zone to engage fire suppression after a 32-second delay.	Fire extinguishers are available at strategic points around the site used to extinguish or control small fires in emergencies. The site maintains extinguisher types specific to the activities, process and equipment within individual rooms. Fire extinguisher frequency, location and type is annually re-evaluated during the fire risk assessment	Fire resistant doors are heavily used to compartmentalise the site as part of a passive fire protection system. This is to reduce the spread of fire and smoke and to enable safe egress from the building.	No dry risers on site

	by the small droplets themselves VIRTUS fire suppression systems are localised to contained areas (i.e. individual rooms)				
Maintenance	*6 monthly servicing*	*6 monthly servicing & inspection*	*Annual servicing & inspection*	*Annual inspection*	*N/A*
LONDON6	Water mist fire suppression system. A water mist system is a fire protection system that uses very fine water sprays (i.e. water mist). The small water droplets allow the water mist to control, suppress or extinguish fires by: 10. cooling both the flame and surrounding gases by evaporation 11. displacing oxygen by evaporation 12. attenuating radiant heat by the small droplets themselves VIRTUS fire suppression systems are localised to contained areas (i.e. individual rooms)	Each compartment has a manual call point and 2 smoke/heat detectors. Two detectors need to be activated within the zone to engage fire suppression after a 32-second delay.	Fire extinguishers are available at strategic points around the site used to extinguish or control small fires in emergencies. The site maintains extinguisher types specific to the activities, process and equipment within individual rooms. Fire extinguisher frequency, location and type is annually re-evaluated during the fire risk assessment	Fire resistant doors are heavily used to compartmentalise the site as part of a passive fire protection system. This is to reduce the spread of fire and smoke and to enable safe egress from the building.	No dry risers on site
Maintenance	*6 monthly servicing*	*6 monthly servicing & inspection*	*Annual servicing & inspection*	*Annual inspection*	*N/A*
LONDON7	Water mist fire suppression system. A water mist system is a fire protection system that uses very fine water sprays (i.e. water mist). The small water droplets allow the water mist to control, suppress or extinguish fires by:	Each compartment has a manual call point and 2 smoke/heat detectors. Two detectors need to be activated within the zone to engage fire suppression after a 32-second delay.	Fire extinguishers are available at strategic points around the site used to extinguish or control small fires in emergencies. The site maintains extinguisher types specific to the activities, process and equipment within individual rooms.	Fire resistant doors are heavily used to compartmentalise the site as part of a passive fire protection system. This is to reduce the spread of fire and smoke and to enable safe egress from the building.	No dry risers on site

	13. cooling both the flame and surrounding gases by evaporation 14. displacing oxygen by evaporation 15. attenuating radiant heat by the small droplets themselves VIRTUS fire suppression systems are localised to contained areas (i.e. individual rooms)		Fire extinguisher frequency, location and type is annually re-evaluated during the fire risk assessment		
Maintenance	*6 monthly servicing*	*6 monthly servicing & inspection*	*Annual servicing & inspection*	*Annual inspection*	*N/A*
LONDON8	Water mist fire suppression system. A water mist system is a fire protection system that uses very fine water sprays (i.e. water mist). The small water droplets allow the water mist to control, suppress or extinguish fires by: 16. cooling both the flame and surrounding gases by evaporation 17. displacing oxygen by evaporation 18. attenuating radiant heat by the small droplets themselves VIRTUS fire suppression systems are localised to contained areas (i.e. individual rooms)	Each compartment has a manual call point and 2 smoke/heat detectors. Two detectors need to be activated within the zone to engage fire suppression after a 32-second delay.	Fire extinguishers are available at strategic points around the site used to extinguish or control small fires in emergencies. The site maintains extinguisher types specific to the activities, process and equipment within individual rooms. Fire extinguisher frequency, location and type is annually re-evaluated during the fire risk assessment	Fire resistant doors are heavily used to compartmentalise the site as part of a passive fire protection system. This is to reduce the spread of fire and smoke and to enable safe egress from the building.	No dry risers on site
Maintenance	*6 monthly servicing*	*6 monthly servicing & inspection*	*Annual servicing & inspection*	*Annual inspection*	*N/A*
LONDON9	Water mist fire suppression system. A water mist system is a fire protection system	Each compartment has a manual call point and 2 smoke/heat detectors. Two detectors need	Fire extinguishers are available at strategic points around the site used to extinguish or control small	Fire resistant doors are heavily used to compartmentalise the site as part of a passive fire protection	No dry risers on site

	that uses very fine water sprays (i.e. water mist). The small water droplets allow the water mist to control, suppress or extinguish fires by: 19. cooling both the flame and surrounding gases by evaporation 20. displacing oxygen by evaporation 21. attenuating radiant heat by the small droplets themselves VIRTUS fire suppression systems are localised to contained areas (i.e. individual rooms)	to be activated within the zone to engage fire suppression after a 32-second delay.	fires in emergencies. The site maintains extinguisher types specific to the activities, process and equipment within individual rooms. Fire extinguisher frequency, location and type is annually re-evaluated during the fire risk assessment	system. This is to reduce the spread of fire and smoke and to enable safe egress from the building.	
Maintenance	*6 monthly servicing*	*6 monthly servicing & inspection*	*Annual servicing & inspection*	*Annual inspection*	*N/A*
LONDON10	Water mist fire suppression system. A water mist system is a fire protection system that uses very fine water sprays (i.e. water mist). The small water droplets allow the water mist to control, suppress or extinguish fires by: 22. cooling both the flame and surrounding gases by evaporation 23. displacing oxygen by evaporation 24. attenuating radiant heat by the small droplets themselves VIRTUS fire suppression systems are localised to contained areas (i.e. individual rooms)	Each compartment has a manual call point and 2 smoke/heat detectors. Two detectors need to be activated within the zone to engage fire suppression after a 32-second delay.	Fire extinguishers are available at strategic points around the site used to extinguish or control small fires in emergencies. The site maintains extinguisher types specific to the activities, process and equipment within individual rooms. Fire extinguisher frequency, location and type is annually re-evaluated during the fire risk assessment	Fire resistant doors are heavily used to compartmentalise the site as part of a passive fire protection system. This is to reduce the spread of fire and smoke and to enable safe egress from the building.	No dry risers on site

Maintenance	*6 monthly servicing*	*6 monthly servicing & inspection*	*Annual servicing & inspection*	*Annual inspection*	*N/A*
LONDON11	Water mist fire suppression system. A water mist system is a fire protection system that uses very fine water sprays (i.e. water mist). The small water droplets allow the water mist to control, suppress or extinguish fires by: 25. cooling both the flame and surrounding gases by evaporation 26. displacing oxygen by evaporation 27. attenuating radiant heat by the small droplets themselves VIRTUS fire suppression systems are localised to contained areas (i.e. individual rooms)	Each compartment has a manual call point and 2 smoke/heat detectors. Two detectors need to be activated within the zone to engage fire suppression after a 32-second delay.	Fire extinguishers are available at strategic points around the site used to extinguish or control small fires in emergencies. The site maintains extinguisher types specific to the activities, process and equipment within individual rooms. Fire extinguisher frequency, location and type is annually re-evaluated during the fire risk assessment	Fire resistant doors are heavily used to compartmentalise the site as part of a passive fire protection system. This is to reduce the spread of fire and smoke and to enable safe egress from the building.	No dry risers on site

The maintenance and scheduling of inspections of fire prevention and control systems is managed by the Facilities Management Team at Data Centre sites. Fire suppression, fire alarms, fire doors and dry risers are maintained by the Facilities Management Company at Kent House with VIRTUS having maintenance control over the fire extinguishers.

6.6.3.Fire Safety and Emergency Arrangements

Fire safety and prevention is of the utmost importance in any building. VIRTUS is responsible for ensuring all sites meet all required health and safety standards and regulations.

6.6.3.1. Fire Marshals

A Fire Marshal's roles and responsibilities fall broadly into two categories:

- Proactive day to day duties
- Reactive emergency duties

While workplace fire wardens must not put themselves at risk while carrying out their duties, they are essentially there to carry out many elements of a fire risk assessment, to increase the chances of preventing a fire in the first place.

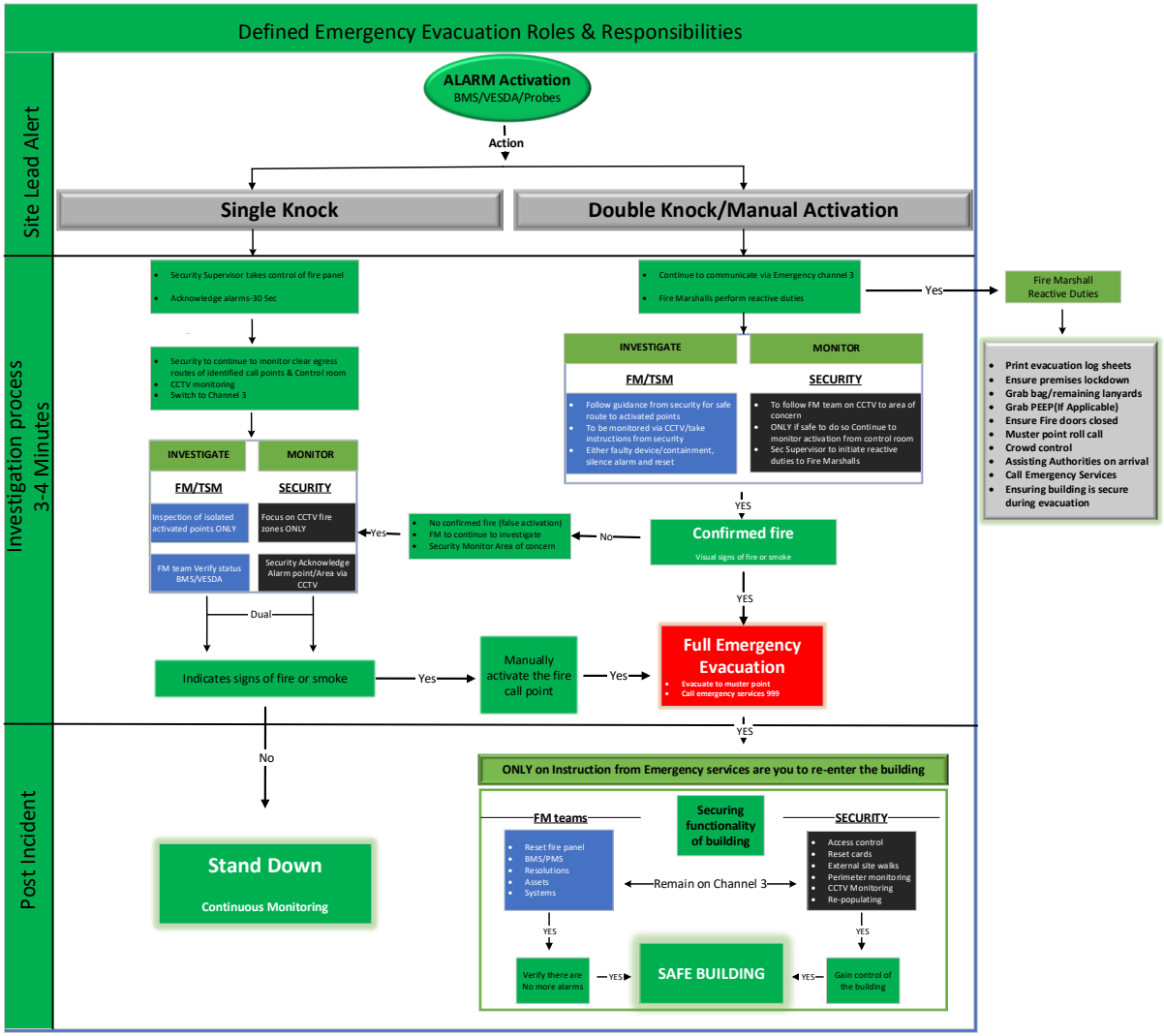
Proactive Fire Warden duties in the work place include:

- All fire exits and routes must remain free from obstruction and available at all times.
- Break glass call points are visible and have a break glass point sign and emergency fire action notice adjacent to them.
- General housekeeping is in good order; i.e. paper storage and waste controlled. No room with a fixed source of ignition or heat is to be used for the storage of combustible materials.
- Smoking areas are controlled i.e. kept clean regularly and smoking receptacles emptied on a regular basis.
- Rubbish is disposed in adequate containers and is not allowed to collect in excessive amounts

Reactive Fire Warden duties in the work place include:

- Fighting fires / use of fire extinguishers for safe egress
- Raising alarm / call the emergency services.
- Directing staff to safe available exit routes.
- Sweeping all rooms where safe to do so ensuring toilets and places like walk in cupboards are checked.
- Assisting disabled people during evacuations
- Ensuring final fire doors are closed.
- Taking a lead role in the roll call at the assembly point.
- Reporting to the fire service on their arrival.

VIRTUS ensures that sites are covered with suitably competent fire marshals that have received regular training, qualification and guidance on the importance of fire safety and all applicable regulations.



Emergency Evacuation defined roles and responsibilities

Building management is our responsibility and needs to be suitably maintained and managed. All rooms within the building have a 1-hour fire rating/containment, additionally plant rooms have a 2-hour fire rating containment. Our buildings are designed for fires not to spread

Single Knock

Alarm will alert fire panels within the security control room initiated through the VESDA

Security supervisor (Chief fire marshal) will take control of fire panel

Security supervisor will acknowledge the alarm within 30 seconds

Security are to identify and monitor a clear egress route of identified call points and control room via CCTV monitoring

All persons such as Facility Management teams, security, Customer security, fire marshals are to switch over to channel 3

Once security have verified the alarm, this will extend the inspection from 3 to 4 minutes

FM/TSM's teams are to initiate an inspection of the isolated activated points only, security are to focus on CCTV fire zones only

FM/TSM's teams are to verify the status of BMS/VESDA, Security will acknowledge the alarm point/area via CCTV

As a combined acknowledgement both FM and Security teams shall verify any indications of fire or smoke

If there is no confirmed fire, then this will be comminated and all teams are to Stand Down with continuous monitoring of areas and panels

Double Knock

Switch/or continue to communicate via channel 3

Fire Marshals are to perform reactive duties

- **Print evacuation log sheets**
- **Ensure premises lockdown**
- **Grab bag/remaining lanyards**
- **Grab PEEP(If Applicable)**
- **Ensure Fire doors closed**
- **Muster point roll call**
- **Crowd control**
- **Assisting Authorities on arrival**
- **Call Emergency Services**
- **Ensuring building is secure during evacuation**

FM/TSM's team are to continue to Investigate are by following guidance from security for safe route to activated points, FM team will be monitored via CCTV

Security are to follow FM team via CCTV to area of concern, ONLY if safe to do so continue to monitor activation from control room

Security supervisor to initiate reactive duties to fire marshals, if either a faulty device/containment silence the alarm and reset

If there is **NO CONFIRMED** fire, then it will be identified as a false activation, FM team continue to investigate, security monitor area of concern.

If there is **CONFIRMED** fire, manual activation of the fire alarm is required, this will then initiate a FULL EMERGENCY EVACUATION.

ALL Persons are to evacuate to designated muster point, Security are to call emergency services on 999.

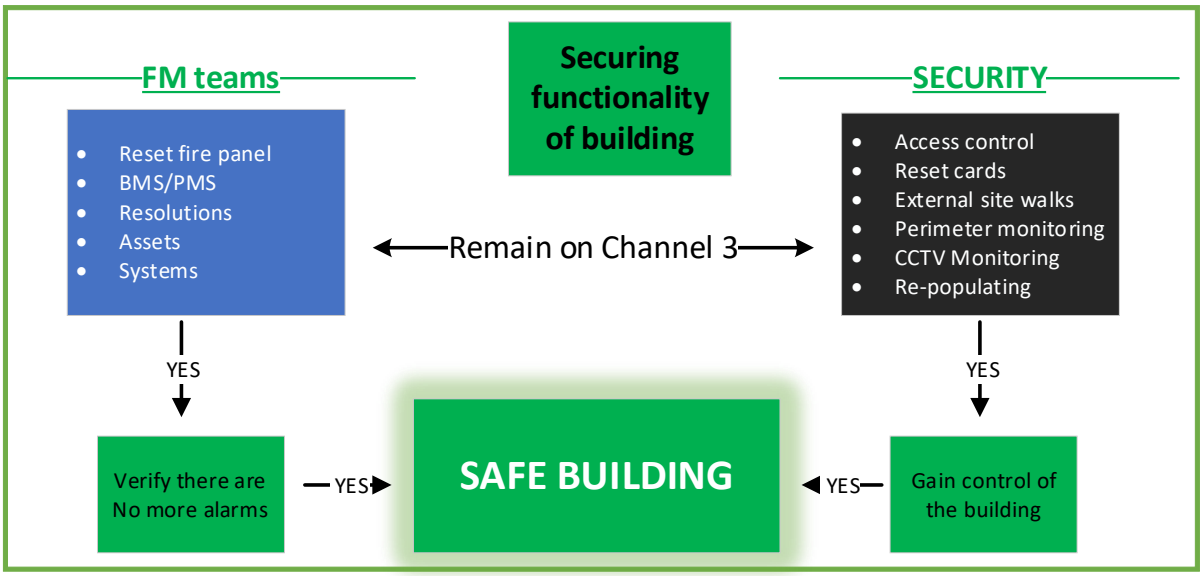
All fire marshals should be appointed their reactive duties by the security supervisor, once at the muster point, it is the fire marshal's responsibility to gain crowd control followed by a roll call following the printed roll call log, this will identify any missing persons which will need to be given to the emergency services should they arrive

NO ONE is to leave the muster point at any time and are to remain under instruction from the Fire Marshals.

ONLY under direct instruction from the emergency services is any personal to re-enter the building, only in a rare circumstance if there is scope or containment of the fire shall the emergency services return into the security control room with the security supervisor.

If there is a confirmed false activation, then under instruction of the fire marshals are personal allowed to re enter the building, provided there is building access control

Post incident once it is safe to do so will the building be populated following the correct protocols identified in the process flow chart



6.6.3.2. Emergency Signs and Signals

VIRTUS safeguards the health and safety of all staff and visitors by ensuring compliance with the Health and Safety (Safety Signs and Signals) Regulations 1996 and the Building Regulations 1991 in regards to emergency exit signs.

In order to comply with the requirements of the Building Regulations 1991, every doorway or other exit providing access to a means of escape, other than exits in ordinary use, are presented with an exit sign. Installation of signs conforming to British Standard 5499-10:2006 satisfy both the Building Regulations 1991 and the Health and Safety (Safety Signs and Signals Regulations) 1996.

In general, these Regulations will not require any changes where existing fire safety signs containing symbols that comply with BS 5499. This is because the signs in BS 5499, although different in detail to those specified in the Regulations, follow the same basic pattern and are therefore considered to comply with the Regulations.

A typical sign in these regulations. Often referred to as the 'Euro-Sign'.	
A typical sign in BS5499: These signs usually contain words such as 'Fire Exit' as well.	

When installing new emergency exit signs, as a result of a fire risk assessment or a physical change in the site's layout, VIRTUS ensures that the following standards are adhered to in the purchase of new signs:

BS 5499-10:2006 Safety signs, including fire safety signs. Code of practice for the use of safety signs.

BS5378: Part 2: 1980 Safety signs and colours. Specifications for colorimetric and photometric properties of materials.

BS EN 60598-2-22:1998 and **BS EN 60598-2-22:1999** Luminaries. Particular requirements for emergency lighting.

Where evacuation from buildings is needed, the Regulations require a fire alarm signal to be continuous. Fire alarms conforming to BS5839-1:2002+A2:2008 are installed across VIRTUS sites and are regularly maintained & inspected by external specialist contractors.

6.6.3.3. Emergency Evacuation (drills)

A fire drill is a simulated emergency procedure that aims to emulate the processes that would be undertaken in the event of a fire or other similar emergency. It involves creating a situation that replicates what would happen if a real fire were to occur, usually with the inclusion of fire alarms, and requires all persons within your property at the time, to evacuate.

Intended to make an evacuation in the event of a fire as simple, efficient and effective as possible, it involves running all persons through the evacuation procedures, ensuring they are familiar with the plan and are able to get out quickly and safely. It is also intended to make sure relevant fire wardens know exactly what they are doing and can act as incredibly beneficial practice if their expertise is ever really needed.

Fire drills are also an important evaluation of the evacuation procedures. An ideal opportunity to test how effective emergency plans are, fire drills enable the quick identification of any flaws or weaknesses which may be present and then make any changes as a result.

At VIRTUS Data Centres, fire evacuation drills are conducted every 6 months at a minimum, supervised by the site security teams and VIRTUS fire marshals. Records of fire drills are maintained on site, and recorded deficiencies are acted on in a timely manner.

6.6.3.4. Fire Risk Assessments

A fire risk assessment of VIRTUS sites are carried out annually by external service professionals. The resultant reports may detail improvement actions, which are controlled by the Facilities Management Team. The reports are kept on site by the Facilities Management Team. The following key factors are used when conducting a fire risk assessment:

1. Identification of the potential fire hazards
2. Identification of the people at risk (the disabled and elderly are especially vulnerable)
3. Act on the findings
4. Record – Records of the findings, emergency plans and fire safety training must be retained.
5. Review – The fire risk assessment must be carried out regularly, with all findings updated and recorded.

Through compliance auditing, VIRTUS ensure that all sites are assessed within a 12-month period, any reported findings are completed and controlled accordingly and that fire prevention measures are adequately maintained in accordance with applicable standards, orders and legislation.

Any issues relating to fire safety and prevention should be directed to the Compliance Manager, who ensures appropriate controls for improvement are applied across multiple parties.

6.6.3.5. Facilities Management Teams Fire Safety and Emergency Responsibilities

In support of the duties of VIRTUS fire marshals, the Facilities Management Teams have a responsibility to prevent the risk of fire by doing the following in line with their site inspections (6.6.14):

- Ensuring Fire extinguishers are in their correct place, serviced, signed and stowed above floor level
- General housekeeping is in good order; i.e. paper storage and waste controlled. No room with a fixed source of ignition or heat is to be used for the storage of combustible materials
- Electrical safety checks / PAT testing of all portable appliances within scope.
- Emergency lighting is tested monthly, and that all related systems are maintained in accordance to best practice planned, preventative maintenance schedules, and that failed tests are corrected in a timely manner
- Fire alarm checks tested weekly
- Sub-contractor fire/evacuation inductions
- Fire door checks on a monthly basis
- Working with the fire risk assessment and correcting and reported findings
- Managing all checks / paperwork / compliance documentation.
- Hot works management / issuing hot works permits and control of contractors through the permit to work system
- Exit sign surveys

6.6.3.6. DSEAR (Dangerous Substances and Explosive Atmospheres Regulations)

DSEAR requires employers to assess the risks of fires and explosions that may be caused by dangerous substances in the workplace. From June 2015 DSEAR also covers the risk caused by gases under pressure and substances that are corrosive to metals. This is to allow for changes in the EU Chemical Agents Directive the physical hazards aspects of which are enacted in Great Britain through DSEAR. These risks must then be eliminated or reduced as far as is reasonably practicable. The aim is to protect employees and other people who may be put at risk, such as visitors to the workplace and members of the public. The Regulations complement the requirement to manage risks under the Management of Health and Safety at Work Regulations 1999 (SI 1999 No 3242). - HSE

The requirement to conduct a DSEAR risk assessment is due to the below:

Storage of Gas Oil (Diesel) in sufficient quantities to pose a potential fire risk.

For the purpose of CLP Regulation, As per table 2.6.1 in annex I of the CLP Guidance notes, category 3 flammable liquids are qualified for fuels with a flashpoint from 23°C up to 75°C. This encompasses **Diesel**, Gas Oil, Kerosene and other Light heating oils.

The storage tanks and dispensing solutions are all engineered from the outset to address all requirements of CLP and DSEAR (Dangerous Substances and Explosive Atmosphere Regulations) to ensure a safe and efficient handling solution for category 3 flammable liquids.

An initial DSEAR risk assessment is to be conducted by an external professional body followed by bi-annual internal DSEAR risk assessments. Any significant changes to the design, use or fuel type will be accompanied by a risk assessment conducted by an external professional body.

6.6.3.6.1. DSEAR Risk Assessment

It is the duty of the Compliance Manager to complete the following risk assessment every two years if there have been no operational changes as per 6.6.3.6.

VIRTUS Data Centres

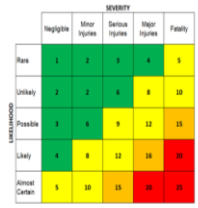
DSEAR Risk Assessment

Substance:	**Gas Oil (Diesel)** 	**Location:**	
		Date prepared:	

1. Substance Information	
Hazard Pictograms	
Hazard Statements	Danger Harmful if inhaled Causes skin irritation May cause cancer Suspected of damaging unborn child May be fatal if swallowed May cause damage to organs through prolonged or repeated exposure
Flashpoint (°C)	>62
Autoignition Temperature (°C)	210
Lower Flammability Limit (%vol)	0.6
Upper Flammability Limit (%vol)	7.5
Category	FLAMMABLE
Storage Quantity (L)	
COMAH (Tonnes)	
COMAH Control	
Substance can be:	Neither eliminated nor substituted

2. Usage	
Primary Use	Fuel supply for emergency standby power generators.
Secondary Use	N/A
Annual average amount used (L)	
Storage Information	

3. Ignition Sources	
Static build up from metallic container	
Hot works around belly tanks	
Fuel contamination potentially increasing flash point	
Fuel spill resulting in inadvertent lighting	

4. Risk					
					
Criteria	**Yes/No**	**Threat & Controls**	**Severity**	**Likelihood**	**Risk**
Bulk storage of flammable liquids	No				
Flammable liquid in containers	No				
Hand painting with flammable liquids	No				
Permit to work	No				
5. Control / CLP Evidence					

6.6.4. Accident Reporting

VIRTUS sites maintain a physical accident book. In addition to this, VIRTUS maintain a reportable Accident Incident Reporting Form, used in the event of all accidents, incidences and near misses. The following responsibilities and reporting structures for accidents & incidences at Data Centre sites are defined in the table below:

Party	Step 1	Step 2	Step 3
	→	→	→
VIRTUS Staff	Contact/report to site security	Site security complete site accident book. Site security complete *VIRTUS Accident Incident Reporting Form* and issue to Compliance Manager	Compliance Manager reviews *VIRTUS Accident Incident Reporting Form* and conducts further investigation to prevent further injury
Site Security Staff (dedicated first aiders)	Site security complete site accident book. Site security complete *VIRTUS Accident Incident Reporting Form* and issue to Compliance Manager	Compliance Manager reviews *VIRTUS Accident Incident Reporting Form* and conducts further investigation to prevent further injury	
Facilities Management Teams	Facilities Management Team completes internal site accident form and issues to the Compliance Manager	Compliance Manager completes *VIRTUS Accident Incident Reporting Form*	Compliance Manager reviews *VIRTUS Accident Incident Reporting Form* with Facilities Management Company and conducts further investigation to prevent further injury
Sub-contractors	Contact/report to site security	Site security complete site accident book. Site security complete *VIRTUS Accident Incident Reporting Form* and issue to Compliance Manager	Compliance Manager reviews *VIRTUS Accident Incident Reporting Form* and conducts further investigation to prevent further injury
Visitors to site	Contact/report to site security	Site security complete site accident book. Site security complete *VIRTUS Accident Incident Reporting Form* and issue to Compliance Manager	Compliance Manager reviews *VIRTUS Accident Incident Reporting Form* and conducts further investigation to prevent further injury

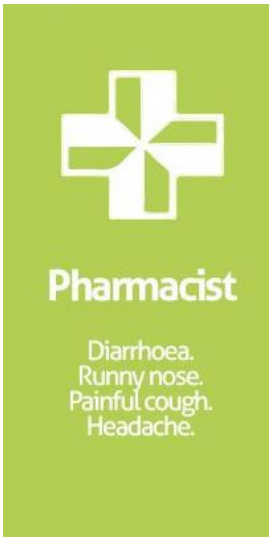
6.6.5. First Aid Arrangements

All VIRTUS sites maintain First Aid kits located in strategic positions, and are readily available for use in the event of an injury. First aid kits are assessed for completeness during the site compliance audits. All site First Aid kits are also security sealed to prevent un-recorded use of contents.

VIRTUS staff also maintain competencies for a complement of First Aiders in addition to qualified site First Aiders. At the Data Centres, the Security Staff are the qualified First Aiders, as the sites are manned 24-hours.

All VIRTUS staff, Facilities Management Teams, Sub-contractors and visitors must report to Data Centre Security (as per 6.6.4) in order to report the event. At all sites, a qualified First Aider may only administer First Aid.

In the event that a First Aid kit is deemed inadequate for the sustained injuries, Security staff are to call emergency services at data centres, and any VIRTUS staff are to call emergency services at Kent House. The following options are to be displayed at all VIRTUS sites:

			
Accident Report Needed: **NO**	Accident Report Needed: **YES**	Accident Report Needed: **YES**	Accident Report Needed: **YES**
Use First Aid Kit: **NO**	Use First Aid Kit: **IF REQUIRED**	Use First Aid Kit: **YES**	Use First Aid Kit: **IF REQUIRED**
Response: **Visit pharmacy for reprieve**	Response: **First Aider to dial 111**	Response: **First Aider to administer First Aid**	Response: **First Aider to dial 999**

Automatic External Defibrillators (AED)

Automatic external defibrillators are portable battery powered pieces of equipment which are designed to restore the normal electrical heart rhythm in an emergency situation when a person has suffered a sudden cardiac arrest. When used in conjunction with the delivery of cardiopulmonary

resuscitation (CPR) from a trained person, they substantially increase the chance of survival following such an event. Sooner lifesaving first aid and a defibrillator are used on a casualty, the better the outlook for survival and recovery. Survival rates when effective CPR is given are between 2 and 5%. If a defibrillator is used within ten minutes this figure increases to around 75%.

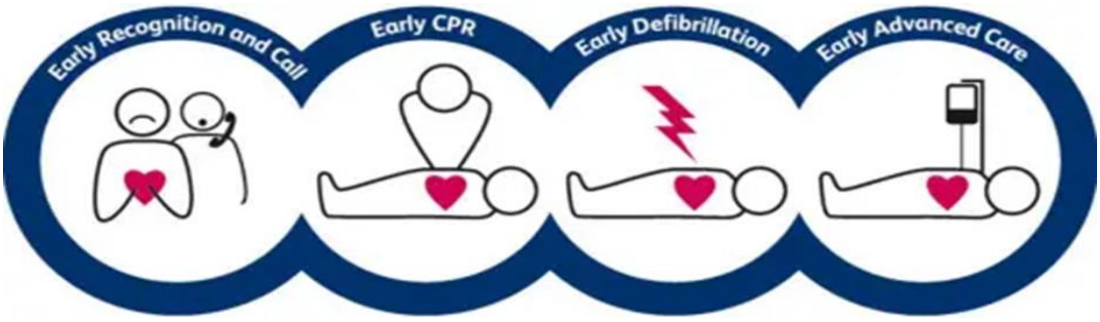


Figure 1. The chain of survival, emphasising the importance of recognising cardiac arrest, calling for help, starting CPR and using a defibrillator without delay.

The decision on whether to provide defibrillators across VIRTUS data centre shall be taken on the basis of a risk assessment. This should take in to account the number of people who routinely work in or use the work area, the age profile of those people, and any specified high-risk activity (e.g. working around electricity). An increased risk in any one of these factors would necessitate the provision of a defibrillator.

Purchase policy

The Compliance Team should be contacted if you are considering buying an AED(s) for your Data Centre. This will allow you to find out about the models which are recommended. Consistency in the models purchased simplifies training and guidance.

Minimum AED specifications:

1. Must be a portable unit
2. Must be self-powered, not requiring to be plugged into a power socket or extension cable
3. Must be automatic, and conducive to manual CPR
4. Must use verbal/audible instructions

Purchasing the correct number of AEDs depends on the size & complexity of a data centre and availability of manpower. As a minimum, data centres should procure 3 devices to be placed in strategic, easily accessible areas (*please see Siting of AEDs*). Larger, more complex data centres should consult the Compliance Team to determine the correct number and placement.

Registering of AEDs

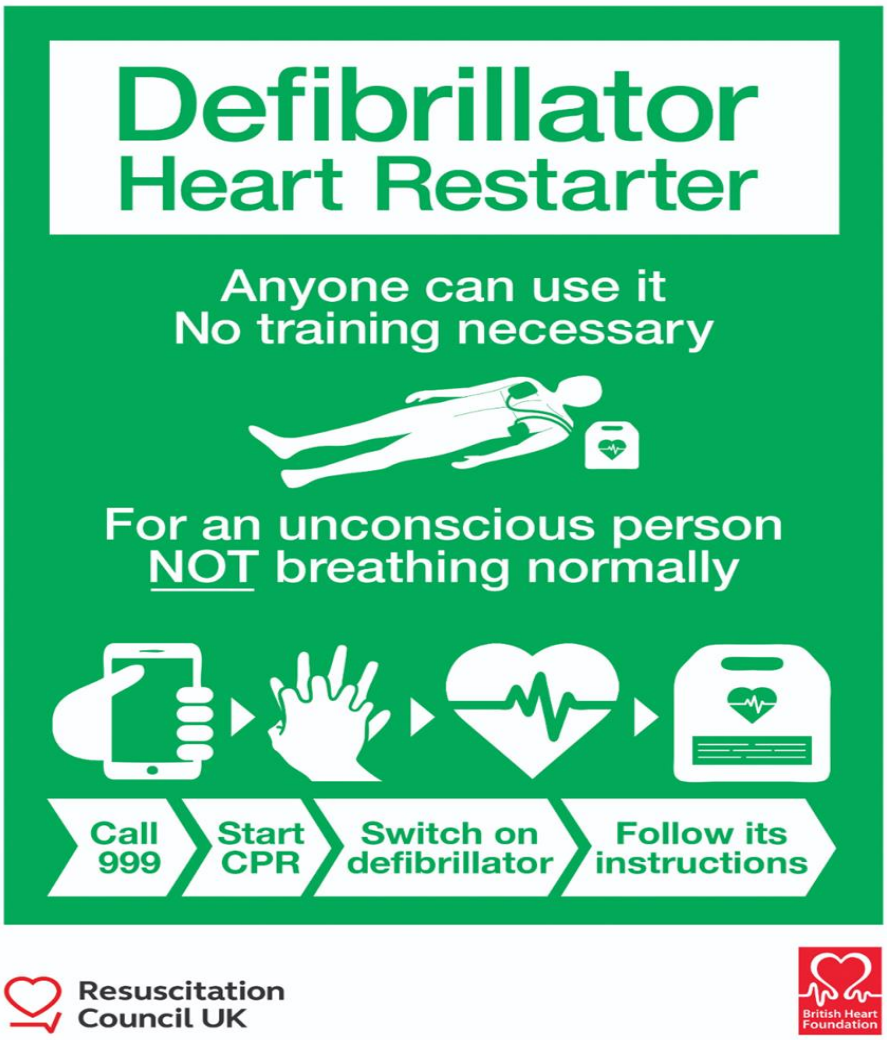
Each VIRTUS data centre will register their AED devices with the local ambulance service. The Compliance Team can be used to assist.

Siting of AEDs

AEDs should be kept in easily accessible places, strategically located to assist facilitation of use. Staff, customers, and contractors should all be made aware of AED locations supported by signage. Advice and guidance on the siting of AEDs is available from Compliance team.

Minimum siting requirements:

1. 1 unit placed in/near reception/common areas
2. 1 unit placed in/near egress routes to critical infrastructure
3. 1 unit placed in/near Security Control Room



Maintenance

Defibrillators need little in the way of routine maintenance, and all currently available defibrillators perform regular self-checks, and indicate if a problem has been detected. Defibrillator batteries and

electrode pads have a limited shelf life. Batteries should be replaced approximately every five years (when indicated), and electrode pads every two. The system for checking equipment, and changing electrode pads and batteries should be managed by the First Aid team as per OEM guidance.

Further information and guidance

- A guide to Automated External Defibrillators (AEDs)

(https://www.resus.org.uk/publications/a-guide-to-aeds/)

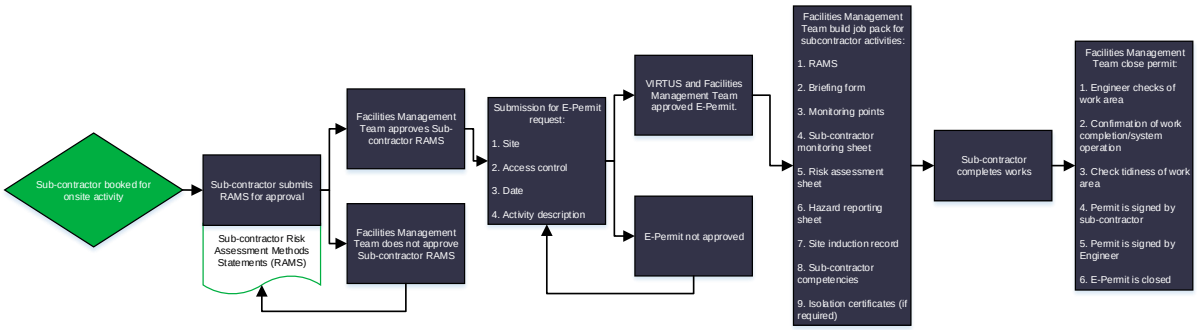
- Adult basic life support and automated external defibrillators (https://www.resus.org.uk/resuscitation-guidelines/adult-basic-lifesupport-and-automated-external-defibrillation/)

- How to do CPR

https://www.bhf.org.uk/how-you-can-help/how-to-save-a-life/how-to-do-cpr

6.6.6.Sub-contractor Management and E-Permit/Permit to Work

The Facilities Management Team are responsible for the administration and management of sub-contractor activities at VIRTUS Data Centres. The primary tool used to accomplish this is the E-Permit system. The below process details the controlling steps enabling a sub-contractor to conduct work/maintenance activities on a VIRTUS site.



E-Permit Process (Basic) Visio Flow.pc

6.6.7. Hot Works

VIRTUS staff do not conduct hot works such as welding, heat cutting, heat gouging or pressure blasting. Hot works on VIRTUS sites are controlled through the permit to work system, managed by the Facilities Management Company.

6.6.8. Electricity

VIRTUS staff do not conduct works requiring appropriate controls under the Electricity at Work Regulations 1989. All electrical works are conducted by the Facilities Management Teams and specialist sub-contractors. The types of activities conducted by the Facilities Management Teams include:

- High Voltage Switching
- Low Voltage Switching
- Infrastructure isolations for general maintenance (e.g. filter changes in chillers)
- Changing of lightbulbs.

The Facilities Management Teams are audited against the requirements of the Electricity at Work Regulations 1989 during the biennial VIRTUS compliance audits which evaluate competencies, electrical certificates, risk assessments work procedures and emergency procedures.

All new electrical installations will have corroborative electrical installation certificates assessed during the VIRTUS compliance audits. The VIRTUS compliance audits also assess regulatory maintenance/inspections of fixed electrical systems.

6.6.9. Control of Substances Hazardous to Health (CoSHH)

VIRTUS ensure that all work processes involving the use of substances hazardous to health shall be assessed, monitored and controlled in accordance with the Control of Substances Hazardous to Health Regulations 2002 as amended.

VIRTUS staff are instructed on the nature and risks of substances they may use which can be hazardous to health and are provided with details of the necessary precautions they should take in their use, disposal and clearing up after a spillage.

All substances hazardous to health shall be recorded in a CoSHH Register including details of:

- the product's name and possible trade names
- necessary storage and control measures
- what they are for, how to use them,
- clearing up procedures
- special markings etc.
- emergency procedures
- environmental considerations for use, disposal and spillages
- Whether a risk assessment for its use is needed to determine;
    - personal protective clothing
    - exposure monitoring
    - health monitoring

The storage, use and supply of the chemicals is also assessed against;

- Highly Flammable Liquids and Liquefied Petroleum Gasses Regulations 1972

1. All containers holding flammable liquids and other hazardous substances such as chemicals must have their lids replaced as soon as they are not in use. Only small quantities should be used at any one time with the bulk of the flammable liquid/chemicals kept in an approved store.
2. Empty containers must be removed as soon as possible and arrangements made for their safe disposal.
3. “No Smoking" and other appropriate warning signs must be displayed wherever highly flammable liquids are stored or used.
4. Flammable and other hazardous liquids must not be discharged onto the ground or into water drains where they can cause pollution or an explosion.

- Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures, and amending Directive 67/548/EEC and Regulation (EC) No 1907/2006
    1. Ensuring that the hazards presented by chemicals are clearly communicated to staff through classification and labelling of chemicals.
    2. The availability of compliant Chemical Safety Data Sheets (SDS)
    3. All chemical/substance container is labelled according to harmonised classification

- The Dangerous Substances and Explosive Atmospheres Regulations 2002
    1. Implemented measures to reduce the risk from fires, explosions and other energy releasing events arising from the use of dangerous chemical substances.

It is the responsibility of the Compliance Manager to register all substances hazardous to health and communicate the hazards to all relevant VIRTUS members of staff. Training for the proper use of chemicals is completed through awareness training of chemical properties, chemical signage and how to interpret a Material Safety Data Sheet (MSDS).

Chemical Signage	Type	Hazard Code	Statement
	Dangerous to the environment	H400	Very toxic to aquatic life
		H401	Toxic to aquatic life
		H402	Harmful to aquatic life
		H410	Very toxic to aquatic life with long lasting affects
		H411	Toxic to aquatic life with long lasting effects
		H412	Harmful to aquatic life with long lasting effects
		H413	May cause long lasting harmful effects to aquatic life
	Toxic	H300	Fatal if swallowed
		H301	Toxic if swallowed
		H310	Fatal in contact with skin
		H311	Toxic in contact with skin
		H330	Fatal if inhaled
		H331	Toxic if inhaled
	Gas under pressure	H280	Contains gas under pressure; may explode if heated
		H281	Contains refrigerated gas; may cause cryogenic burns or injury
	Corrosive	H290	May be corrosive to metals

		H314	Causes severe skin burns and eye damage
		H318	Causes serious eye damage
	Explosive	H200	Unstable explosive
		H201	Explosive; mass explosion hazard
		H202	Explosive; severe projection hazard
		H203	Explosive; fire, blast or projection hazard
		H204	Fire or projection hazard
		H205	May mass explode in fire
		H240	Heating may cause an explosion
		H241	Heating may cause a fire or explosion
	Flammable	H220	Extremely flammable gas
		H221	Flammable gas
		H222	Extremely flammable aerosol
		H223	Flammable aerosol
		H224	Extremely flammable liquid and vapour
		H225	Highly flammable liquid and vapour
		H226	Flammable liquid and vapour
		H227	Combustible liquid
		H228	Flammable solid
		H241	Heating may cause fore or explosion
		H242	Heating may cause a fire
		H250	Catches fire spontaneously if exposed to air
		H251	Self-heating; may catch fire
		H252	Self-heating in large quantities; may catch fire
		H260	In contact with water releases flammable gases which may ignite spontaneously
		H261	In contact with water releases flammable gas
	Caution – used for less serious health hazards	H302	Harmful if swallowed
		H303	May be harmful if swallowed
		H312	Harmful in contact with skin
		H313	May be harmful in contact with skin
		H315	Causes skin irritation
		H316	Causes mild skin irritation
		H317	May cause allergic skin reaction
		H319	Causes serious eye irritation
		H320	Causes eye irritation
		H332	Harmful if inhaled
		H333	May be harmful if inhaled
		H335	May cause respiratory irritation
		H336	May cause drowsiness or dizziness
		H420	Harms public health and the environment by destroying ozone in the upper atmosphere
	Oxidising	H270	May cause or intensify fire; oxidiser
		H271	May cause fire or explosion; strong oxidiser
		H272	May intensify fire; oxidiser
	Longer term health hazards such as carcinogenicity	H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled
		H340	May cause genetic defects
		H341	Suspected or causing cancer
		H350	May cause cancer
		H351	Suspected of causing cancer

		H360	May damage fertility or the unborn child
		H361	Suspected of damaging fertility or the unborn child
		H362	May cause harm to breast-fed children
		H370	Causes damage to organs
		H371	May cause damage to organs
		H372	Causes damage to organs through prolonged or repeated exposure
		H373	Causes damage to organs through prolonged or repeated exposure

All sub-contractors using chemicals hazardous to health are controlled using the permit to work system, managed by the Facilities Management Teams.

6.6.10. Working at Height

The Working from Height Regulations 2005 is to prevent death and injury caused by a fall from height. VIRTUS seek to comply with this regulation by VIRTUS staff not undertaking work from height activities and by regulating all contractors and sub-contractors against the requirements for control.

How VIRTUS ensure multilateral compliance:

VIRTUS actively audit the Facilities Management Teams and the Kent House Facilities Management company for compliance against Working from Height Regulations 2005 thereby ensuring duty of care and the safe use of such equipment.

The following key assessment/inspections are reviewed biennially:

- Ladder inspection records
- Ladder inspection tags
- Insurance reports
- Lifting Operations and Lifting Equipment 1998 reports of thorough examination
- Data Centre permit to work systems
- Site risk assessment and method statements (RAMs) for subcontractors

All sub-contractors conducting working from height activities are controlled using the permit to work system, managed by the Facilities Management Company.

The following sites maintain ladders that fall outside of scope of control of the Facilities Management Teams:

Site	Ladder Types and Quantities
Kent House	None
LONDON1	None
LONDON2	None

LONDON3	None
LONDON4	2 x mobile platform ladders with manual assisted brakes 3 x mobile platform ladders with weight induced brakes
LONDON5	None
LONDON6	None
LONDON7	None
LONDON8	None
LONDON9	None
LONDON10	None
LONDON11	None

VIRTUS conduct monthly ladder inspections indicated by a ladder tag on individual units.

Rules for Use:

1. Units that are damaged or weakened from any cause are not to be used until repairs are completed. Units that are damaged subsequent to their receipt and/or are worn beyond repair must be removed from service and destroyed.

2. General maintenance of a Mobile Ladder Stand or Platform includes cleaning, lubrication, painting and the replacement of on-product labels and markings as well as wheels, casters and rubber pads.

3. Climbing a damaged Ladder Stand or Ladder Stand Platform is not permitted.

4. Ladder Stands and Ladder Stand Platforms must never be moved while occupied.

5. Units must not be loaded beyond their Rated Load capacity.

6. Materials and/or equipment must not be stored on the Steps or Platform of a unit.

7. Additional height must not be gained by the addition of any type of extension or object being placed upon the unit.

8. Users must remove foreign materials, such as mud or grease, from their shoes prior to climbing or mounting.

9. Handrails, when provided, should be used while ascending or descending. The user must face the steps while ascending or descending except when the slope of the steps is 50 degrees or less above the horizontal.

10. When electrical lines are present, proper safety measures to avoid contact with energized conductors, insulated or un-insulated, must be taken to avoid electrical shock or electrocution.

11. Occupied units must not be placed in front of a door unless the door is secured in an open position, locked, attended or barricaded.

12. Overreaching while on a unit can cause instability and result in a fall. Always place the unit in close proximity to the work. Descend from the unit and relocate it to avoid overreaching.

13. Use Ladder Stands and Ladder Stand Platforms only on level surfaces. They are not to be used on uneven or sloping surfaces.

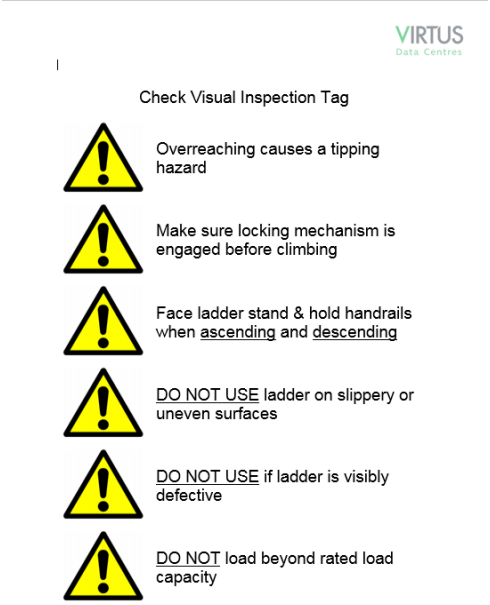
14. Access to or egress from a Step or Platform from any other elevated surface is prohibited unless the unit has been positively secured against movement.

15. Users are not permitted to stand on components of the unit other than the Steps or Platform. On-Product Labels and Markings

16. Each unit must be marked with the manufacturers' product data information including:

    - Manufacturers or distributors name or logo;
    - Month and year of manufacture;
    - and Maximum Rated Load

17. In addition, the following safety topics must also be addressed by the labels and markings:



6.6.11. Display Screen Equipment (DSE)

The Health and Safety (Display Screen Equipment) Regulations 1992 apply to 'Users' of Visual Display Units (VDUs). A 'User' is defined as somebody who uses a VDU as a significant part of his or her normal work (e.g. uses a computer for continuous spells of an hour or more on a daily basis).

VIRTUS seek to comply with DSE Regulations by conducting an annual Display Screen Equipment (DSE) Self Assessment of all VIRTUS staff. All staff are required to complete the form and return it to the Compliance Manager for review and acting on raised findings where needed.

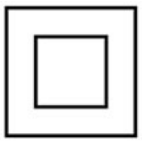
VIRTUS ensures that any significant findings are confidentially registered, investigated and treated to promote comfortable and safe workstation practices and to eliminate staff discomfort.

Outside of the annual self assessment, it is the responsibility for any VIRTUS staff who experiences ill-health, which may be caused by the use of VDUs, must complete an Accident Incident Reporting Form to be issued to the Compliance Manager.

6.6.12. Portable Appliance Testing (PAT)

Portable appliance testing (PAT) is the term used to describe the examination of electrical appliances and equipment to ensure they are safe to use. Most electrical safety defects can be found by visual examination but some types of defect can only be found by testing. However, it is essential to understand that visual examination is an essential part of the process because some types of electrical safety defect can't be detected by testing alone.

Classifications of electrical appliances:

Class	Features	Label	Examples
'0'	Single level of insulation that means a fault could cause an electric shock to its user or at the very least cause a spark that can easily escalate to a fire. Such products were intended for use in very dry areas and have been banned in the UK since 1975.	N/A	No longer available under the Low Voltage Electrical Equipment (Safety) Regulations 1989
'0I'	Similar to '0' but has a power supply cord with no earthing conductor. The plug itself has no earthing contact. Class '0I' products are often specialist equipment and are not for common everyday use.	N/A	No longer available under the Low Voltage Electrical Equipment (Safety) Regulations 1989
'I'	Have an earth circuit built in and an earth wire in the plug. Metal parts of the products could potential cause a hazardous voltage if the basic insulation fails. **All require PAT testing.**		Kettles, Washing Machines, Toasters, Microwaves, Electric Heaters, Fridges and Freezers.
'II'	These products will have no earth circuit and no earth wire in the plug. Class 2 products are commonly known as 'double insulated'. **All require PAT testing**.		Televisions, monitors lamps, hand held power tools, charging cables.
'III'	Appliances that operate at SELV (Separated Extra Low Voltage). This means the device cannot produce enough voltage to risk the user getting an electric shock.		Mobile phones, laptops.

PAT testing of all relevant appliances at VIRTUS sites is completed by external specialist sub-contractors. The responsibility for scheduled testing and defective appliance quarantine is determined by who owns the appliance/equipment. PAT testing is not regimented to annual tests, as long as test are conducted every three years at a minimum.

All VIRTUS employees including all contractors and any visitors shall not be permitted to bring any personal appliances for use exceeding an output voltage of 12 volts. The scope includes all colocations and head offices. All appliances under PUWER regulations shall have calibration testing within VIRTUS premises as any colocation held assets.

6.6.13. Manual Handling

It has been assessed that the following activities necessitate manual handling techniques on all VIRTUS sites:

- Movement of racks
- Lifting floor tiles
- Cable pulling
- Installation and removal of rack mounted equipment
- Movement of stationary and furniture

The Facilities Management Teams maintain manual handling risk assessments and training records for the above list, as they are the operators. VIRTUS staff are not the operators of the activities, however they do from time to time take part in the activities. It was deemed superfluous to conduct manual handling risk assessment for the activities. Instead, all applicable VIRTUS staff are subjected to manual handling training and awareness as detailed below:

Introduction

This Procedure establishes VIRTUS Data Centre requirements to ensure that manual handling operations are carried out in a safe manner on all sites.

Statutory requirements are set out in the Manual Handling Operations Regulations 1992 (as amended 2002). The Regulations require employers to avoid manual handling tasks which may give rise to injury and, where such manual handling cannot be avoided, to make an assessment and to take appropriate measures to remove or reduce the risk of injury.

More than a third of all over-three–day injuries reported each year to the Health and Safety Executive (HSE) are caused by manual handling and back injuries from manual handling are a major cause of occupational ill health in the UK.

Scope

This Procedure applies to all VIRTUS staff on all sites.

This Procedure does not apply in emergencies, or where actions intended to save life are being undertaken, for example first aiders moving an injured person.

The Facilities Management team are responsible for assessing their own manual handling risks and as appropriate, documenting their significant manual handling assessments.

Responsibilities

Manual handling regulations include the transportation or supporting of a load i.e. lifting, lowering, pushing, pulling, carrying, or moving: by hand or bodily force.

VIRTUS shall:

- So far as reasonably practicable, avoid the need for staff to undertake any manual handling operations at work, which involve a risk of being injured
- Make a suitable and sufficient assessment of all such manual handling operations that cannot be avoided
- Take appropriate steps to reduce the risk of injury to staff arising out of their undertaking any such manual handling operations to the lowest level reasonably practicable.

VIRTUS staff must:

- Follow appropriate systems of work laid down for their safety
- Make proper use of equipment provided for their safety
- Cooperate with their employer on health and safety matters
- Inform the employer if they identify hazardous handling activities
- Take care to ensure that their activities do not put others at risk

Use of Manual Handling mechanical aids

Manual handling should be avoided where possible. Consider if you need to move the item or can the activity be carried out where it is? (e.g. wrapping, unpacking).

Use mechanical aids provided such as (where applicable):

- Conveyors
- Pallet trucks
- Lift truck

Good handling techniques

- Bend the knees so that the hands when grasping the load are as nearly level with the waist as possible. But do not kneel or over flex the knees.
- Keep the back straight, maintaining its natural curve (tucking in the chin while gripping the load helps).
- Lean forward a little over the load if necessary to get a good grip.
- Keep shoulders level and facing in the same direction as the hips.

6.6.14. Site Inspections

The following site inspection take place at all VIRTUS Data Centres:

How is it Inspected	What is Inspected	Who Inspects
Daily Security patrol	Manned patrol of all areas noting fire escapes, fire doors, alarm points, inadequate storage of equipment, spill kits, waste levels in the bins and the building perimeter	Site Security Team
Twice daily shift walk-around	All areas for general health & safety checks; lighting, alarms, hazards, waste, cleanliness.	Shift technician from site Facilities Management Team
Monthly equipment checks	PPE, ladders, work equipment, L8 water hygiene checks	Shift technician from site Facilities Management Team

All VIRTUS staff are instructed to assist in keeping office areas safe and healthy working environments by advocating good housekeeping practices such as removing tripping hazards, keeping fire routes free from obstacles and blockages and reporting anything which could be unsafe to the Compliance Manager.

6.6.15. Pressure Systems

VIRTUS retains regulatory inspected pressure equipment at our Data Centres that includes:

Pressure Equipment	Description of Use	Inspection Period
Expansion vessels in chillers	Used to pressurise the chilled water system	Annual
Transportable pressure vessels for the fire suppression system	Gas filled vessels installed to be released in the event of a fire (suppression)	Annual
Expansion vessels for water circulation	Used to pressurise the hot water circulation system	Annual

External assessors are contracted to conduct regulatory inspections on all applicable pressure vessels. The resultant reports of examination are maintained by the Facilities Management Teams and retained for a minimum of 3 years.

VIRTUS offices at Kent House do not have operational control over the pressure system used in heating, ventilation and cooling and water circulation.

VIRTUS actively audit the Facilities Management Teams and the Kent House Facilities Management company for compliance against Pressure Systems Safety Regulations 2000 thereby ensuring duty of care and the safe use of such equipment.

6.6.16. Lifting Operations and Lifting Equipment (LOLER)

VIRTUS retains regulatory inspected lifting equipment at our Data Centres that includes:

Lifting Equipment	Description of Use	Inspection Period
Passenger lifts	A system for carrying passengers from one level of a building to another	6 monthly
Goods lifts	A system for carrying goods from one level of a building to another	6 monthly
Pallet trucks	A tool intended to be used to lift and move medium to light pallets	Annual
Dock levellers	A height adjustable platform used to transition goods between two flooring levels	Before operational use then Annual
Air circuit breaker lifters	Transport and lifting device designed to aid in the removal of circuit breakers and roll-out assemblies from the upper compartment in two-high switchgear	Annual
CCTV winch	A cranking devices used to replace high CCTV cameras	Annual
Server lifters	Device used in lifting communication devices for installation in data cabinets or racks	Annual

External assessors are contracted to conduct regulatory inspections on all lifting equipment. The resultant reports of examination are maintained by the Facilities Management team and retained for a minimum of 3 years.

VIRTUS offices at Kent House do not have operational control over the passenger lifts.

VIRTUS actively audit the Facilities Management Teams and the Kent House Facilities Management company for compliance against Lifting Operations and Lifting Equipment Regulations 1998 thereby ensuring duty of care and the safe use of such equipment.

6.6.17. Lone Working

Working alone can introduce or enhance hazards, e.g. lack of assistance, first aid cover, emergency situations, violent attack, etc. Inevitably, there are tasks where staff will work by themselves especially at night and at weekends.

VIRTUS acknowledges that there may be an increased risk to the health and safety of its employees and contractors when working alone. VIRTUS will ensure lone working situations are identified, appropriate risk assessments undertaken, additional control measures introduced and staff are provided with the necessary information, instruction and training.

Dynamic risk assessments have been undertaken to identify risks to the lone worker and measures to be introduced to minimise those risks. Where possible, our aim is to avoid lone working altogether. Where lone working is required, the site security must be informed and an agreed regular contact plan set up.

6.6.18. Personal Protective Equipment (PPE)

Personal protective equipment is provided free of charge to staff and temporary workers to protect them from identified hazards during work activities. When the needs arises, a VIRTUS member of staff can requisition specific PPE items from the results of a specific risk assessment prior to works taking place.

VIRTUS staff are made aware of the importance of PPE, and any doubts/queries should be directed to the Compliance Manager. VIRTUS staff have also been made aware of the requirement to not use and re-requisition PPE when current PPE (safety shoes, high-visibility vests and hard hats) are not fit for purpose (broken, damaged, not designed as intended).

The Facilities Management Teams are responsible for the issue, control and maintenance of PPE for their staff. They also approve the use of adequate PPE used by customer sub-contractors.

VIRTUS actively audit the Facilities Management team for compliance against control of Personal Protective Equipment thereby ensuring duty of care.

6.6.19. The Workplace

All VIRTUS sites provide the following to ensure compliance with general occupational health & safety requirements:

- Adequate toilet facilities including hand basins, soap and towels or hand dryers;
- Potable drinking water not sourced from the mains
- A place to store clothing and adequate changing facilities
- Somewhere clean to rest and eat meals.
- Good ventilation- a supply of fresh, clean air drawn from outside or a ventilation system;
- Reasonable working temperature
- Suitable lighting for the work being carried out
- Adequate space and suitable workstations & seating;
- A clean, serviced workplace with appropriate waste containers.

VIRTUS staff who are concerned with the adequacy of the above are encouraged to contact the Compliance Manager, respective Data Centre Manager or Office Manager (Kent House) for investigation.

6.6.20. Confined Spaces

Work in confined spaces in controlled through the permit to work system, managed by the Facilities Management team. Staff directly employed by VIRTUS are not permitted to work in confined spaces without a completed risk assessment, and adequate supervision.

6.6.21. General Housekeeping

Poor standards of housekeeping contributes to accidents by causing unnecessary hazards. VIRTUS Staff are required to keep areas clean and tidy and to keep walkways free from bags and coats. Customers and customer subcontractors are also required to keep their work areas free from hazard-causing materials.

Below is an example list of potential accidents and injuries that may be caused from poor standards of housekeeping:

Hazard	Potential accident/injury	Severity
Bags in walkway	Trips and falls	Injury to limbs and head
Exposed data cables	Trips and falls	Injury to limbs and head
Exposed electrical cables	Trips, falls and electrocution	Injury to limbs, head and possible death by electrocution
Lifted carpets, floor tiles	Trips and Falls	Injury to limbs and head
Untidy, un-serviced kitchen	Slips, lacerations, burns, poisoning (bacteria), electrocution	Injury to limbs, head, lacerations and possible death by electrocution, poisoning
Un-serviced general waste bins	Attraction of vermin, disease, poisoning (bacteria), dizziness from the smell, nausea	Poor working conditions, multiple day sicknesses

The Facilities Management Teams are responsible for maintaining good standards of housekeeping across their activities and the activities of sub-contractors. Sub-contractors working under a permit to work system are assessed after completion of works for tidiness/cleanliness and clean up.

6.6.22. Noise

Full noise assessments have been carried out on VIRTUS Data Centres to identify areas where there may be potential for risk from noise.

In areas where noise levels are greater than 80db VIRTUS has provided hearing protection and provides instruction and information where staff and visitors request this. The use of hearing protection is not mandatory, but is highly recommended.

Hearing protection zones are designated areas where noise levels exceed 85db. These zones are identified by signage and warning notices. The use of hearing protection is mandatory.

	Mandatory	Hearing protection must be worn	Wear hearing protection. No excuses

VIRTUS conducts noise assessments at least once annually to ensure exposure limits are not met. VIRTUS seek to:

- Identify where there may be a risk from noise and who is likely to be affected
- Contain a reliable estimate of staff and visitors' exposures, and compare the exposures with the exposure action values and limit values
- Identify what VIRTUS need to do to comply with the law
- Identify any staff and/or visitor who needs to be provide with health surveillance and whether any are at particular risk

Constant loud, and even aggravating noise should be reported directly to the Compliance Manager for assessment and control.

The Facilities Management Teams are responsible for the health & safety of their staff and the provision of hearing protection. Sub-contractors working under the permit to work system are required to submit risk assessment method statements (RAMS) prior to the commencement of works, which stipulate the hearing protection requirements. The Facilities Management Teams apply subcontractor control through the permit to work system. VIRTUS actively audit the Facilities Management Teams for compliance against control of Noise at work thereby ensuring duty of care.

6.6.23. Signage

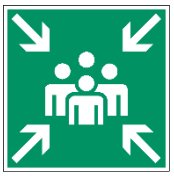
Signage or pictograms are used to provide warnings or advise of hazards as prescribed in the Health & Safety (Safety Signs and Signals) Regulations 1996.

To ensure that staff and visitors get adequate notice of hazards that may cause harm, appropriate warning or mandatory signage is in place at all VIRTUS sites, in prominent positions.

Some examples of signage used on VIRTUS sites can be observed below:

Signage / Pictogram	Type	Description	Guidance
	Prohibition	No smoking	No smoking is permitted on site. Only in designated areas
	Prohibition	No eating or drinking	No food or drink is permitted in data halls

	Prohibition	No cameras permitted No photography permitted	No photography is permitted in security rooms or certain data halls
	Prohibition	No mobile phones permitted Do not use mobile phones	The use of mobile phones is not permitted is certain data halls
	Prohibition	No unauthorised access	Only authorised person(s) are allowed access, such as to chiller gantry areas
	Warning	High voltage	Do not touch unless competent to do so. Ignoring the warnings could lead to electrocution and possible death
	Warning	Flammable liquid	Certain chemicals may be flammable. Use with caution and refer to the chemical material safety data sheet
	Warning	Compressed gas	Do not work around this warning, as the contents are under high pressure
	Warning	Corrosive	Certain chemicals may be corrosive. Use with caution and refer to the chemical material safety data sheet
	Warning	General caution	When in the vicinity of the warning, be alert and cautious
	Mandatory	Hearing protection must be worn	Wear hearing protection. No excuses

	Mandatory	Fire door keep shut	Do not keep this door open (temporarily or permanently). May only be used for access
	Mandatory	High visibility clothing must be worn	Wear high visibility vest/jackets. No excuses
	First aid		First aid box is located here
	Emergency exit		Follow these signs to locate the nearest final exit in the event of an emergency
	Emergency evacuation point		Gather here in the event of an emergency requiring evacuation. No excuses

6.6.24. Smoking

Smoking of tobacco products or vapour products is not permitted anywhere on the premises of VIRTUS, other than in designated areas. This also applies to company vehicles.

Contravening this directive is a reportable security offense. A security incident will be raised with a contiguous Post Incident Report. Banning from site may arise as a result from such an incident.

6.6.25. Drug and Alcohol Use

Alcohol and drugs are not permitted on any of VIRTUS's sites. The only drugs permitted are for prescribed medication purposes. No person is permitted to work under the influence of alcohol or drugs. Under the guise of the Misuse of Drugs Act 1971, any person found to be in possession of or under the influence of Class A, Class B or Class C controlled/illegal drugs on site will be reported to the authorities.

Class	Included Drugs (not limited)
Class A	Heroin (diamorphine), cocaine (including crack), methadone, ecstasy (MDMA), LSD and magic mushrooms
Class B	Amphetamines, barbiturates, codeine, cannabis, cathinones (including mephedrone) and synthetic cannabinoids
Class C	Benzodiazepines (tranquilisers), GHB/GBL, ketamine, anabolic steroids and benzylpiperazines (BZP)

Any person found to be significantly under the influence of alcohol will be asked to stop all works and leave the site by security.

Working under the influence of illegal/controlled drugs and/or alcohol is a reportable security offense. A security incident will be raised with a contiguous Post Incident Report. Banning from site may arise as a result from such an incident.

6.6.26. Water Quality and Legionella Management (L8)

Water checks have to be made on the water system at each data centre by the Facilities Management team to ensure the water does not indicate inadequate temperatures, contain high levels of chemicals, minerals, metals or bacteria such as Legionella pneumophila so as to reduce exposure and protect staff, visitors to the data centres and neighbouring areas.

These water systems consist of cooling towers, evaporative condensers, hot and cold water systems, humidifiers, firefighting water systems and computer room air conditioning and handling units (CRAC, CRAH) which have all been identified to be maintained and treated to reduce potential harm and is safe to use.

The Facilities Management Teams are tasked with sourcing an external assessor to conduct regulatory L8 assessments of all applicable water storage and holding systems at our data centres. Subsequently, any findings raised in the L8 assessment reports are to be actioned in a controlled and reportable manner through Problem ticket management.

Each site will have a register of the below information as required by policy and risk assessment.

VIRTUS Statutory Duty Holder	**Neil Cresswell (CEO)**
Address:	
Contact Number:	
VIRTUS Appointed Responsible Person	**(Compliance Director)** **Site Competent Representative – [Data Centre Manager]**
Address:	
Contact Number:	
Maintenance Contractor	**[FM Company]**
Address:	
Responsibilities:	
Name / Position:	
Contact Number:	
Email:	
Water Treatment Company	**[Water Treatment Company]**
Address:	
Responsibilities:	
Name / Position:	
Contact Number:	

Email:	
Local Authority	**[Local Authority]**
Address:	
Name / Position:	
Contact Number:	
Email:	

6.6.27. Water Quality and Legionella Management (L8) - Roles

Statutory Duty Holder:

- Ultimate responsibility for full implementation of the Legionella Policy.
- Appointing a responsible person to manage risk on a day-to-day basis.
- Ensure that sufficient resources are provided for satisfactory control
- Ensure a written scheme is produce and up to date

Responsible Person:

- Ensure only competent contractors who are fully aware of the duties and responsibilities assigned to them are used on site
- Ensure that the record system is kept up to date
- Be fully aware of the status of the sites water systems which represent a risk to the health of anyone who may come into contact with them
- Coordinate corrective actions when emergency action is needed
- Review management system and improve aspects through a review process
- Ensure the water hygiene risk assessment is valid and available for inspection at all times.

6.6.28. Water Quality and Legionella Management (L8) – Escalation Plan

The water hygiene escalation plan with follow the requirements of; VIRTUS Operations Manual Chapter 2 – Incident Management aligning to the emergency escalation contacts for the:

1. Water Treatment Company (maintained at site level)
2. Local Authority (maintained at site level)

6.6.29. Water Quality and Legionella Management Policy Statement

VIRTUS(we) will do all that is reasonably practicable to protect employees, visitors and neighbours from hazards arising from the use and distribution of water services in all our owned or leased premises.

This will be achieved through full compliance with all statutory requirements of current relevant legislation, British and European standards, codes of practice and guidance notes.

To achieve the effective implementation of this policy, we will carry out a risk assessment for the operation of our water services and ensure that any legionella risks are either prevented or adequately controlled. We will take action where the level of control requires improvement. The risk assessment will be reviewed regularly or whenever there is any reason to suspect that it is no longer valid.

We will consider removing or replacing equipment or facilities that may present a legionellosis risk as preventative action. Where it is impracticable to eliminate all risk by removing or replacing the equipment or facility, we will implement suitable precautionary measures. We will document and regularly monitor these measures to ensure the risks are minimised. This we regard as control action.

We will specify that contractors only use products registered under the following schemes within our water systems.

Water Regulations Advisory Scheme (WRAS) http://www.wras.co.uk/

Fittings that bear the relevant British Standards Kitemark

Products from companies who are on the BSI register of “Firms of Assessed Capability" and assessed to the relevant part of ISO 9000.

A water management system will be implemented that takes into account the risk assessment and any relevant best practice guidelines. The monitoring tasks required, and their frequencies will be found within this system.

We will ensure that all employees and contractors are aware of their legal responsibilities and duties, and training will be provided to ensure that this is communicated. The implementation of this policy is a mutual objective for management and all employees in our premises.

References

Health and Safety at Work etc Act 1974 (HSWA)

Control of Substances Hazardous to Health Regulations (COSHH)

Management of Health and Safety at Work Regulations (MHSWR)

Approved Code of Practice & Guidance on Regulations (L8): "Legionnaires' Disease: The control of legionella bacteria in water systems"

6.6.30. Managing Stress

Managing stress at work is a complex subject. Stress can often be a combination of multiple issues triggered by something resulting in a negative reaction. It can be beneficial to share issues that you are concerned about with you immediate Line Manager or Human Resources to explain issues that are causing concern.

Due to the nature of stress, its sources and its triggers it is too complex and sometimes too personal to formally capture related risks in a risk assessment. VIRTUS therefore have implemented a clear & confidential communication policy with Line Manager and Human Resources to ensure stress is dealt with appropriately.

As one of many sources of stress, the use of visual display units (PC's and monitors) in a desk setting may cause stress to VIRTUS staff. As a result, the annual Display Screen Equipment (DSE) self-assessment questionnaire is used help combat risks at the workstation to minimise undue stress. Any DSE issues falling outside of the annual questionnaire can be brought directly to the Compliance Manager.

6.6.31. Working from Home

As technology advances there are more possibilities to working from home. The same rules apply when working from home as they would at work, as this is just unsupervised working. VIRTUS attempt to control risks arising from the home environment through a working from home risk assessment, that when completed, guides the home worker in creating a safe, risk-free environment. The results of this document are not forcibly regulated by the Compliance Manager.

6.6.32. Winter Preparation

In preparation for the winter season, VIRTUS prepares the site to preserve a safe workplace. In order to do so, all sites must complete a Winter Preparation Checklist prompting them to evaluate key areas that may be affected during winter.

SITE

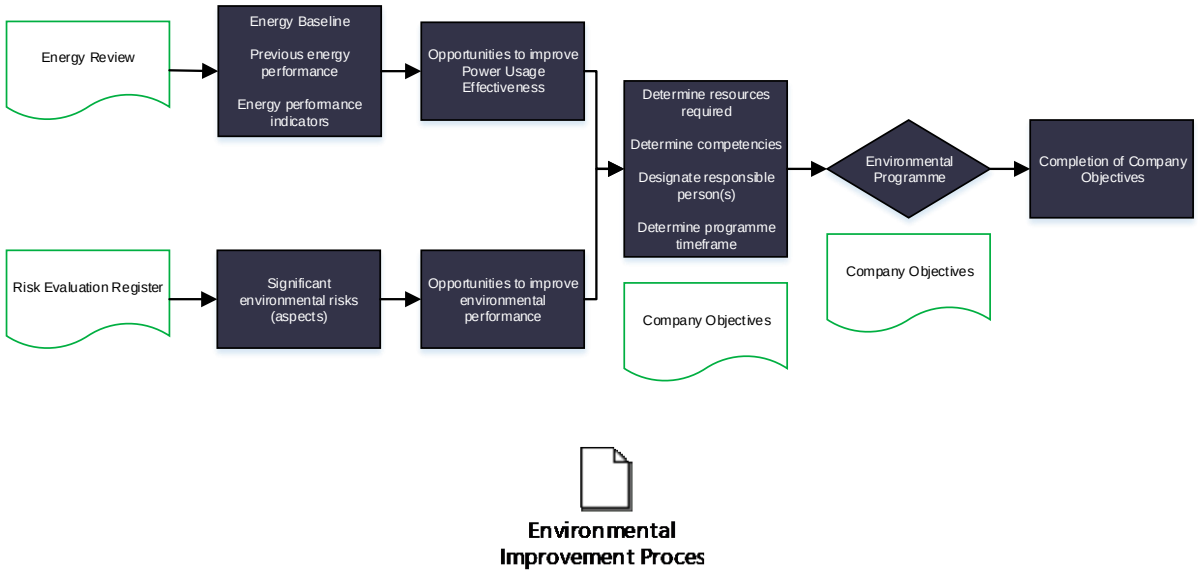
Infrastructure	
Insulation on external water pipework check	
CHW	<date>
HWR	<date>
CHW glycol levels check	<date>
Process water storage check	
Circulation pumps check (serviced within last 3 months)	<date of ppm>
Site	
Stores of grit/salt	<date>
Equipment check	
Shovels	<date>
Headlights	<date>
-	
-	
Stored bottled water check (1 bottle per 10 site users)	<date>
Unforced invacuation communications check	
Incident management	<date>
Visible signage/notices at reception	<date>
Mains water incomer check	
External pipework	<date>
Boiler units check (serviced within last 3 months)	<date of ppm>
Pressurisation units check (serviced within last 3 months)	<date of ppm>
Staffing	
Security staff rota and adverse condition plans	<date>
FM staff rota and adverse condition plans	<date>
Travel - VIRTUS Staff	
Preparation to communicate adverse driving conditions	<date>
Communication of minimum travel safety equipment	
Non-perishable foods	<Date, strategy and responsibility>
Torch/Headlights and spare batteries	
Full bottle of water	
Cash money	
Mobile phone and car charger	
Blankets (optional)	

6.7. VIRTUS Environmental

6.7.1.Environmental Improvement Process

VIRTUS maintain a Risk Evaluation Register controlled under the Risk Management Process (Chapter 4). The register details evaluated environmental risks deemed environmental aspects facing the company.

Alongside the energy review (6.7.8), environmental risks are evaluated for opportunities to improve energy/environmental improvement also termed environmental programmes, which in turn, foster the completion of company objectives.



6.7.2.Environmental Incident Reporting

Environmental Incidences follow the same route of identification, impact assessment, escalation and action as detailed in the Incident Management Process (Chapter 2) primarily controlled by a single mechanism; the VIRTUS Service Management Centre.

All environmental incidences are reported to the Compliance Manager in the form a Post Incident Report (PIR) for effectiveness assessment and updating of procedures and/or escalating to a business continuity plan, where necessary.

VIRTUS sites have identified, and have applied adequate controls (which are tested/audited at least once annually, where applicable), potential environmental incidences, not including those deemed environmental emergencies (major, adverse events resulting from natural processes of the Earth) controlled under the Business Continuity System.

Environmental Incident	Incident Category	Response Time	Restoration Point Objective
Diesel spill	P2 High	15 minutes from observation	1 hour
Glycol spill	P2 High	15 minutes from observation	30 minutes
Closed circuit chilled water leak (containing glycol/inhibitor)	P2 High	15 minutes from observation	2 hours
Significant, accidental release of refrigerant gases for any Fgas-containing equipment. *(Significant meaning more than 25% of container volume within a 24 hours period)*	P2 High	15 minutes from observation	4 hours
Accidental/deliberate contamination of controlled hazardous wastes *(Mixing, combining, disposing together of multiple waste streams, with at least one being hazardous)*	P2 High	1 hour from observation	2 hours
Inadequate documentation retention of Hazardous Waste Consignment Notes	P2 High	24 hours from observation	4 days

6.7.3.Spill Response Process

All chemicals such as glycol and antifreeze are kept on drip trays and are kept in conditions in accordance with chemical material safety data sheets. Should a minor spillage occur, spill kits and granules are available to ensure the spill can be contained.

Should a major spillage of diesel occur, the site would initiate a High; P2 incident and both Incident Management Process & Pollution Incident Response Plans initiated in order to directly contain the spillage to prevent leakage entering local drains and watercourses and indirectly communicate to all relevant parties (*please see 6.7.11 Generator Environmental Controls*).

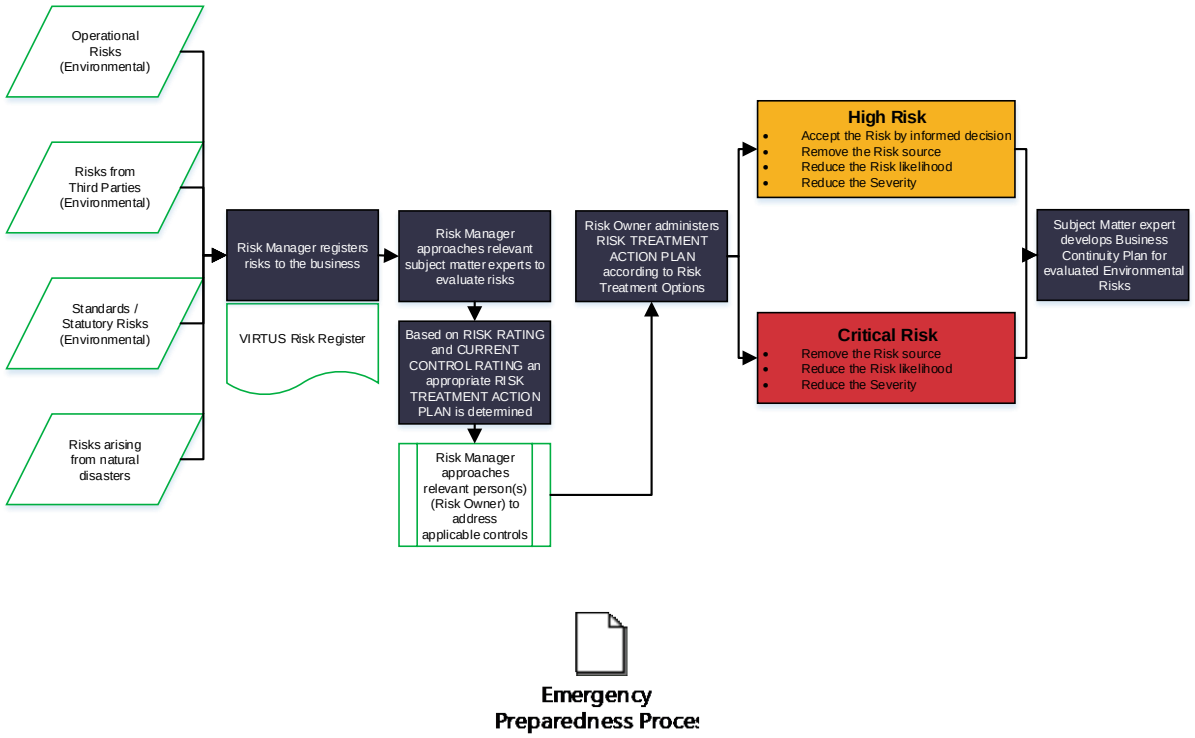
Spill testing takes place at least once annually to ensure response times and actions are assessed for effectiveness. Where necessary the Environment Agency will be informed of the incident and customers advised using the Post Incident Report (PIR) document.

6.7.4.Environmental Emergency Preparedness

At VIRTUS, there are several types of environmental risk that could occur and whilst all efforts are made to reduce these to tolerable levels, VIRTUS is powerless against environmental risks resulting from natural disasters, which are major, adverse events resulting from natural processes of the Earth.

Therefore, VIRTUS has elected to prepare for the worst than react to the worst in an attempt to avert a disaster.

Using the Emergency Preparedness Process, defined below, VIRTUS attempt to evaluate environmental risks, identify and apply adequate controls and control the actual emergency response through our Business Continuity System.



6.7.5.Compliance to Regulation (UK ETS)

Registered Entities:

Union Registry Account No.	Name	Account Holder Name	Installation Operator Identifier	Site
EU-100-5022961-0-78	Virtus Holdco Limited	Virtus Holdco Limited	206178	LONDON4
EU-100-5025119-0-55	VIRTUS	Virtus Hayes Limited	207922	LONDON2
EU-100-5027628-0-23	Stockley Park LON5	Virtus LONDON 5 Limited	210484	LONDON5

The UK emissions trading system is a cornerstone of the EU's policy to combat climate change and its key tool for reducing greenhouse gas emissions cost-effectively. It is the world's first major carbon market and remains the biggest one.

The UK ETS works on the 'cap and trade' principle. A cap is set on the total amount of certain greenhouse gases that can be emitted by installations covered by the system. The cap is reduced over time so that total emissions fall.

Within the cap, companies receive or buy emission allowances which they can trade with one another as needed. They can also buy limited amounts of international credits from emission-saving projects around the world. The limit on the total number of allowances available ensures that they have a value.

After each year a company must surrender enough allowances to cover all its emissions, otherwise heavy fines are imposed. If a company reduces its emissions, it can keep the spare allowances to

cover its future needs or else sell them to another company that is short of allowances. It is the duty of the Compliance Manager, upon direction from the third party specialist (Inspired Energy), to login into the Union Registry; https://unionregistry.ec.europa.eu/euregistry/GB/index.xhtml in order to confirm the surrender of allowances.

Trading brings flexibility that ensures emissions are cut where it costs least to do so. A robust carbon price also promotes investment in clean, low-carbon technologies.

VIRTUS utilise a third-party specialist (Inspired Energy) to apply for, administer and monitor VIRTUS's fuel-combustion activities. As a data centre, the only source of combustion currently utilised is the combustion of red diesel for the application and testing of our standby generators.

Every month, the site FM Teams take meter readings of the fuel storage systems and record them in a per-formed spreadsheet. Along with photographs of the fuel monitoring stations (as below), this information is issued to the specialist on the last day of every calendar month.

Virtus SLOUGH - EUETS MONITORING PLAN

Oil type: Gas oil | Return For: Nov-18 | To be completed by Site OPS

GENERATOR RUN DETAIL			SITE DIESEL INVENTORY					
Generator Ref	Cumulative Run Hours	Cumulative kWHrs	Fuel Level at START of month (litres)	Fuel deliveries in month (litres)	Fuel disposals in month (litres)	Fuel Level at END of month (Ltrs)	Consumption (litres)	Date readings taken
HV Gen 1	86.29		32,830			32,794	36	01/12/18
HV Gen 2	89.02		20,350	9005		29285	70	01/12/18
HV Gen 3	84.55		30,136			30063	73	01/12/18
HV Gen 4	45.32		29,204			29169	35	01/12/18
HV Gen 5	11.22		29,499			29499	0	01/12/18
LV Gen 6 (Gen 4.13)	8.7		25,070			25060	10	01/12/18
LV Gen 7 (Gen 4.12)	0.7		25,070			25050	20	01/12/18
LV Gen 8 (Gen 4.11)	13.4		24,880			24860	20	01/12/18
LV Gen 12 (Gen 3.1)	7.4		24,970			24950	20	01/12/18
LV Gen 13 (Gen 3.2)	8.6		24,210			24130	80	01/12/18
LV Gen 14 (Gen 3.3)	7.3		24,940			24980	-40	01/12/18
LV Gen 15 (Gen 3.4)	7.2		25,050			24970	80	01/12/18
LV Gen 16 (Gen 3.5)	7		11,280	10160		21720	-280	01/12/18
Total	377	0	327,489	19,165	0	346,530	124	

Notes

Aside from the reporting and surrendering of allowances, the UK ETS mechanism is administered and controlled by the EU Commission Monitoring and Reporting Regulations 2012 (MRR), and the Greenhouse Gas Emission Trading Scheme Regulations 2012. Locally, each site that applies to any of the following must have a Greenhouse Gas Permit reporting into the UK ETS Union Registry for the procurement and surrender of allowances.

The European Union Emissions Trading System applies to the following business activities:

- combustion installations with a rated thermal input exceeding 20 megawatts e.g. operating boilers, electricity generators and combined heat and power (CHP) schemes
- metal ore (including sulphide ore) or sintering installation
- iron and steel businesses
- mineral oil refineries
- coke ovens
- the mineral industry (cement, glass, ceramics, lime production)
- production of pulp from timber or other fibrous materials
- paper and board with a production capacity greater than 20 tonnes per day
- nitric acid production

Each UK ETS reporting year, VIRTUS are subjected to an UK ETS verification audit that covers all the sites that hold a Greenhouse Gas Permit. This serves to verify the reporting data and

methodology and to provide a verification report that is required in order to report against the permit and to surrender annual allowances.

Surrendering UK ETS allowances are subjected to an approved, established and regularly reviewed set of procedures as required by the Greenhouse Gas Permit and the EU Commission Monitoring and Reporting Regulations 2012 (MRR), detailed below:

Assignment of Responsibilities:

The responsibility for UK ETS monitoring and reporting lies with the Operations Director and the Compliance Manager of VIRTUS Data Centres.

Competency for this role is assessed at the time of initial induction into the Company and is based on qualifications and experience. On-going competence is assessed as part of performance reviews with line management.

Monitoring Plan Appropriateness:

The appropriateness of the Monitoring Plan shall be considered whenever changes occur at the installation that involves combustion or emissions to atmosphere.

A review meeting will be initiated once per year by the Operations Director to complete the following tasks:

- Check the list of emissions sources and source streams, ensuring completeness of the emissions and source streams and that all relevant changes in the nature and functioning of the installation is included in the monitoring plan
- Check compliance with the uncertainty thresholds for applicable activity data for the applied tiers for each source stream and emission source
- Investigate potential measures for improvement of the monitoring methodology applied.

Data Flow Activities

Source stream F1, gas/diesel oil. Source S1

Site	Description of Activities
LONDON2 Greenhouse Gas Permit No. **UK-E-IN13366**	Gas/diesel oil is the only fuel used by the standby generators. Gas/diesel oil is stored in six 18,000 litre tanks that supply the day tank of each individual generator. The volume of gas/diesel oil combusted per month is obtained from a stock balance using the bulk tank gauges, and taking into account deliveries, and possible removals of fuel. The stock and delivery/removal information is recorded in a spreadsheet used specifically for UK ETS monitoring. No account is taken of the volume of day tanks. The approach to obtaining activity data is regarded as a “no tier” method, so the uncertainty is not assessed.
LONDON4 (3) Greenhouse Gas Permit No. **UK-E-IN-13387**	Gas/diesel oil is the only fuel used by the standby generators. Gas/diesel oil is stored in four 32,000 litre tanks (sets 1 – 4) and three 28,950 litre tanks (sets 6 – 8, 12 - 15) that supply the day tank of each individual generator. The volume of gas/diesel oil combusted per month is obtained from a stock balance using the electronic tank gauges, and taking into account deliveries, and possible removals of fuel. The stock and delivery/removal information is recorded in a spreadsheet used specifically for UK ETS monitoring. No account is taken of the volume of day tanks. The approach to obtaining activity data is regarded as a “no tier” method, so the uncertainty is not assessed.
LONDON5 Greenhouse Gas Permit No. **UK-E-IN-13625**	Gas/diesel oil is the only fuel used by the standby generators. Gas/diesel oil is stored in a dedicated 29,000 litre tank underneath each gen set (belly tank). There are no day tanks. The volume of gas/diesel oil combusted per month is obtained from a stock balance using the bulk tank gauges, and taking into account deliveries, and possible removals of

	fuel. The stock and delivery/removal information is recorded in a spreadsheet used specifically for UK ETS monitoring. The approach to obtaining activity data is regarded as a “no tier” method, so the uncertainty is not assessed.

Calculation & Recording Methodology

The density for converting from litres of fuel to tonnes is obtained from the latest publication of Dukes Digest of UK Energy Statistics.

Net calorific value (NCV) and emissions factor (EF) obtained from DECC published factors for the relevant reporting year, and corresponding to the latest UK national inventory as reported to the UNFCCC (tier 2a).

Emissions are calculated:
tCO2 = activity data x NCV x EF x OF
The oxidation factor to be used in the above emissions calculation is OF = 1.0 (tier 1)
A dedicated excel workbook is used for reporting all bulk tank readings plus cumulative hours run for each gen set. Fuel deliveries and removals are also recorded in this workbook. Photographic evidence of the readings is to be taken and retained. See appendices. Records of fuel delivery notes/invoices and/or fuel removal notes, shall be retained.

In the event of failure of one of the bulk tank gauges, a back-up approach will be used. The approaches available are, in order:

- Use the run hours for the gen set having the failed gauge (set X), plus the run hours and bulk tank gauge readings from any gen set (set Y) that has a working bulk tank gauge and having an identical technical specification. The approach will be fuel combusted in set X = run hours set X x fuel combusted in set Y (via bulk tank gauge readings) / run hours set Y

- Use the run hours for the set having the failed gauge multiplied by the fuel consumption of the gen set from technical literature in litres/hour

<u>Source stream F2, gas/diesel oil. Source S2 (Small or temporary diesel fired equipment)</u>

If diesel fuelled equipment is brought onto site, a no tier approach will be applied to the activity data (fuel used) using one of the following approaches:

- If fuel stock records are available for the unit(s), this will be used as per the main approach described above for source S1

- Run hours of the equipment and max consumption per hour from technical literature, or estimated from the rating of the unit(s).

The method of determining CO2 emissions from fuel density, NCV, EF and OF will be as described above for source S1.

Newly Installed Generator Sets

When new generating sets are installed, having a dedicated bulk fuel tank, the consumption of fuel in these sets will be effective from the date when operational control for the new sets is handed over by the installation and commissioning contractor to VIRTUS. On this date site staff shall take photographic evidence of the bulk tank gauges and the cumulative run hours. This will effectively be an opening reading for the set(s) concerned. Fuel deliveries/removals to the new gen set bulk tanks shall be recorded from this date onwards.

Generating sets removed

If generator sets are removed, the bulk tank level and other readings for the set are to be recorded on the date when it is disconnected (and will consume no more fuel). Photographic evidence is to be taken, as above. This will effectively be a closing reading for the set(s) concerned.

Assessing and Controlling Risks

This is referring to the risk of misreporting emissions or the risk of non-compliance with the GHG Permit or the Monitoring and Reporting Regulations 21 June 2012.

The following table should be used to assess risks, which should be used and adjusted if necessary, as part of an annual review:

No	Risk Description	Inherent level of risk in terms of error in CO2 reporting. H, M, L	Control Activities	Level of risk after taking in into account effectiveness of control activities.
1	Diesel/gas oil: Possible error with stock recording	H, 100% of emissions from gas oil	Check for consistency with stock records vs known deliveries and gas oil combusted. Investigate and correct stock recording anomalies Record run hours, and use manufacturer stated fuel consumption in the event of non-recoverable stock recording errors (e.g. failure of level meter). Notify Environment Agency.	L
2	Diesel/gas oil: Possible errors with delivery	H, 100% of emissions from gas oil	Check that all fuel deliveries are included. Investigate possible miss-reporting identified in monthly stock balance. Obtain statements from fuel suppliers as back-up data	L
3	Diesel/gas oil: Emissions calculations - errors	H, 100% of emissions from gas oil	Prepare spreadsheet calculations such that inputs can be easily checked against evidence / references Compare emissions with previous years Check ETSWAP auto calculations with installation reference calculations Engage verifier to double check calculations	L
4	Failure to monitor or report emissions due to changes in personnel	H	Ensure that more than one senior manager is aware of this procedure and of UK ETS responsibilities. Engage contractors where appropriate who are aware of these responsibilities	L

Quality Assurance of Metering/Measuring Equipment

Gas/diesel oil (F1):

Consumption is taken from the stock balance from month end stock readings and records of deliveries (and removals if applicable). If tank level indicators are believed to be suspect, then an alternative method of establishing stock volumes shall be implemented based on generator hours run.

The fuel delivery meter on the road tanker is not under VIRTUS operational control, and delivery data stated in invoices will in general be accepted at face value.

The uncertainty of gas/diesel oil measurement is not undertaken.

The volume of fuel in day tanks is not included in the stock records.

Quality Assurance of Information used for Data Flow Activities

Data from readings of tank stocks and from supplier invoices/delivery notes are maintained in an excel workbook.

The workbook is held on an internal Company server with normal commercial arrangements in place for data back-up.

Access to the workbook is restricted to appropriate VIRTUS technical staff.

Internal Reviews and Validation of Data

An UK ETS internal review will be carried out at least once per year in order to assess on-going compliance with the UK ETS GHG permit, the Monitoring and Reporting Regulations (21 June 2012) and with requirements stated in procedure.

The internal review will be organised by Compliance Manger, and will cover the following items:

- Check that responsibilities assigned are correct. Update and record as necessary
- Check that the Monitoring Plan is appropriate for the current and predicted activities of the installation. Make or plan changes to the Monitoring Plan as required.
- Check that the data flow activities as described in this procedure accurately reflect the current requirements and installation operations. Make changes as appropriate.
- Carry out the risk assessment and identify greatest risks of miss-reporting (and deal with them).
- Check for any changes that have taken place, or changes that are planned, that could affect the activity level or capacity of the installation. If so inform the Regulator and instigate required changes to the Monitoring Plan, data reporting systems etc.

Before submitting the annual emissions report the input data and calculations will be reviewed by Compliance Manager and the Appointed Agent.

This review will cover the following:

- That the data used is consistent, e.g. by comparing gas supplier invoices with in-house meter reading records.
- That the data is complete
- That the data is comparable with previous years, with an explanation for any substantial change
- That evidence to back up declared activity data is complete – e.g. full set of in house reading records
- That the default factors used for calculations such as fuel NCV and EF are correct for the reporting year in question
- Check that if any activity data is not acceptable for use in calculations, reasons are recorded, and if necessary the Regulator informed of an alternative method (see Risk Assessment). Criteria for rejection of data are anticipated to be self-explanatory e.g. estimated meter readings on gas invoices, not backed-up by regular in-house meter reads

Corrections and Corrective Actions

If registered risks or other malfunctions occur then the cause of the malfunction shall be identified, and measures put in place in order to correct the malfunction. It may also be necessary to inform the Regulator of a temporary or permanent change in the methodology for reporting a percentage of the installations' emissions, depending on the nature of the malfunction.

If malfunctions occur the nature of the malfunction and the corrective action put in place shall be recorded.

Malfunctions will be identified as part of on-going checks on data, or as part of an UK ETS specific review of data or compliance.

Control of Outsourced Activities

The main outsourced activity associated with UK ETS monitoring and reporting is the appointment of a third-party verifier for annual verification. VIRTUS shall ensure that the verifier appointed has the appropriate UKAS accreditation.

The Compliance Manager shall ensure that any other individuals or organisations that may provide assistance to VIRTUS for UK ETS related work, or who carry out UK ETS related tasks on behalf of VIRTUS, are competent to carry out the work requested.

Record Keeping and Documentation

VIRTUS shall retain UK ETS related data for a period of at least 10 years following the end of the calendar year associated with the information concerned.

Data and information shall be held in electronic format wherever possible.
The data and information shall be made available to the verifier or to the Regulator as required.

All pertinent documentation shall be controlled under the requirements of ISO/IEC 27001:2013; classification, labelling and handling procedures.

Changes in Operation

Planned or effective changes to the installation capacity level or activities shall be reviewed and validated.

The Operations Director should report such changes to the Regulator by 31st December of the reporting year in question.

6.7.6.Compliance to Regulation (CCA)

Climate change agreements (CCA) are voluntary agreements made by UK industry and the Environment Agency to reduce energy use and carbon dioxide (CO2) emissions. In return, operators receive a discount on the Climate Change Levy (CCL), a tax added to electricity and fuel bills. The Environment Agency administers the CCA scheme on behalf of the whole of the UK.

For operators who hold a CCA, the CCL will be reduced by:

90% on electricity bills
65% on other fuels

VIRTUS maintain the following CCAs:

Site	CCA Registration	CCA Agreement
LONDON1	DATC/T00010	DATC_T00010 Underlying Agreeme
LONDON2	DATC/T00051	DATC_T00051 Underlying Agreeme
LONDON3/4 (Slough)	DATC/T00072	DATCT00072 Underlying Agreeme
LONDON5	DATC/T00073	DATCT00073 Underlying Agreeme
LONDON6	DATC/T00116	DATCT00116 Underlying Agreeme
LONDON7	DATC/T00117	DATCT00117 Underlying Agreeme
LONDON8	N/A	
LONDON9	DATC/T00129	DATCT00129 Underlying Agreeme
LONDON10	DATC/T00119	DATCT00119 Underlying Agreeme
LONDON11	N/A	

As previously stated, CCAs are voluntary, however the cost reduction benefits from a 90% elimination of Climate Change Levies (CCL) has proven to be a significant cost-effective measure. Compliance to CCAs are achieved through annual-reported improvements in data centre Power Usage Effectiveness (PUE) against agreed targeted reduction percentages (as detailed in Schedule 6 of the Underlying Agreement).

VIRTUS utilise third-specialists Inspired Energy to administer, monitor and report against the CCA agreement requirements.

Annually, VIRTUS are required to report energy performance data to the specialist consisting of:

- Monthly Site kW (Load)
- Monthly Site kWh (Consumption)
- Monthly IT Load kW (Load)
- Monthly IT kWh (Consumption)
- Monthly Site Power Usage Effectiveness (PUE)

6.7.7.Compliance to Regulation (CRC)

Organisations which participate within the Carbon Reduction Commitment (CRC) Scheme are required to monitor their energy use and report their energy supplies annually. The Environment Agency's reporting system applies emissions factors to calculate participants' carbon dioxide (CO2) emissions on the basis of this information.

Participants must purchase and surrender allowances for their emissions. Allowances can either be bought at annual fixed-price sales or traded on the secondary market. One allowance must be surrendered for each tonne of CO2 emitted.

Site	CRC Registration
LONDON1	CRC7639656

VIRTUS utilise third-specialists Inspired Energy to administer, monitor and report against the CRC reporting requirements.

The CRC covers any gas, electricity and fuel oil that is not already covered by UK ETS or CCAs.

6.7.8.Generator and Fuel Environmental Controls

Integrity of Systems

VIRTUS and Business Partners ensure that both generators and fuel storage systems are maintained and inspected in line with best practice (SFG20). The below table details the activities ensuring the integrity of both systems.

Requirement	Description
Generator maintenance – Major service	Once annually using OEM or OEM approved service provider with servicing reporting as standard.
Generator maintenance – Minor service	Twice annually using OEM or OEM approved service provider with servicing reporting as standard.
Fuel maintenance – Fuel polishing assessments/testing	Quarterly fuel samples taken from each bulk tank with servicing reporting as standard.
Fuel maintenance – Fuel polishing service	Once annually using OEM or OEM approved service provider with servicing reporting as standard.
Fuel maintenance – Fuel storage inspections	Visual inspections carried out daily to confirm integrity of bulk storage tanks and to identify any unsafe conditions, leaks and/or smells.

Oil/Fuel Delivery Procedures

Following a fuel refill request the following safe system of work will be invoked:

1. A trained member of the FM Team will take a gauge reading and cross reference this with Monthly Log. Where accuracy is in doubt cross refer to the secondary fuel gauges.

2. All personnel must be aware of the maximum capacity of the generator fuel tanks:

Site	Fuel Tank Capacity (L)
LONDON1 (Enfield) MCPD (part B) <50MWth	18,000
LONDON2 (Hayes) IED (part A) >50MWth	20,000
LONDON3 (Slough) MCPD (part B) <50MWth	18,000
LONDON4 LV (Slough) IED (part A) >50MWth	25,000
LONDON4 HV (Slough) IED (part A) >50MWth	33,000
LONDON5 (Stockley Park) IED (part A) >50MWth	29,000
LONDON6 (Stockley Park) IED (part A) >50MWth	26,000

LONDON7 (Stockley Park) IED (part A) >50MWth	26,000
LONDON9 (Slough) IED (part A) >50MWth	28,500
LONDON10 (Slough) IED (part A) >50MWth	24,300
LONDON11 (Slough) IED (part A) >50MWth	28,000

3. The tanks must not be filled more than 95% of their capacity. The supplier must be given an accurate reading. Any concerns over the accuracy of the readings must be reported to the FM Team Contract Manager or Supervisor and VIRTUS.

4. The FM Team shall inform both VIRTUS and site security that the fuel delivery is to take place.

5. Where necessary the local area will be appropriately cordoned off using barriers and cones. The tanker and its crew must be supervised at all times. Permit to work process applies.

6. Any 'at risk' drains must be covered to prevent any illegal discharges and spill kits must be positioned nearby. Any concerns over the quality of the spill kits or drain covers must be reported to FM Team Contract Manager and VIRTUS. Delivery of fuel must not be carried out until any remedial actions are conducted.

7. The FM Team must ensure that all combustible materials, flammables and naked lights and mobile phones are removed or switched off within the fuel delivery area and immediate vicinity.

8. All FM Team employees must ensure that they wear the correct level of PPE, including hi-visibility jackets/tabards, hard hats and safety footwear. Rubber gauntlet gloves, safety goggles and disposable respiratory protection must also be available and worn in the event of a spillage.

9. The FM Team are to obtain delivery receipts/reports indicating the exact amount of fuel delivered to individual fuel storage tanks.

Spillage Leakage Action

In the event of a spillage or leakage of fuel the following procedures must be invoked:

1. FM Team personnel must ensure that no third party in the vicinity is at risk.

2. Act to summon help covered under the Pollution Incident Response Plan (FM Team document). Providing it is safe to do so and does not present a risk to health, contain the spillage if trained in the correct procedure which includes use of spillage kits and the use of the required PPE. If not, barrier off the area and await assistance. Continue to follow the Nine Point Fuel/Chemical Spill Procedure:

Nine Point Fuel/Chemical Spill Procedure:

1. **Assess the Situation**
   - How big is the spill? What is the spill material?
   - What are the risks? Can you deal with it on your own? Do you need emergency Services?
   - Can fuel reach the drains and potentially go down the sewers to a river, or sewage treatment plant?

2. **Control Access**
   - Limit access to the area.
   - Where possible isolate the area of the spillage with tape or warning signs to prevent staff and members of the public accessing the area.

3. **Protect Yourself**
   - If you think it's safe to stop the spill, don the appropriate PPE that has been made available. Be aware of increased slip hazards.
   - In an enclosed space there may be a small ignition risk – stop any hot works, extinguish any naked flames e.g. smoking material and don't access the area.
   - DO NOT access a confined space without following correct procedure and having formed an escape plan in case overcome by fumes. If in doubt – stay out!
   - Request clean-up assistance using the radio or mobile a safe distance from the spillage.

4. **Contain the Spill**
   - If it is safe and you are wearing PPE stop the source – do you need to turn off valves, taps or patch holes?
   - Contain the spill using the equipment provided within the spill kit.
   - Always cover the drains first to protect the environment.

5. **Raise the Alarm**
   - Raise the alarm if you feel it's necessary.
   - Where the spill is substantial advise accordingly and request a clean up crew.
   - The local Fire Brigade is to be informed that there has been a major fuel spillage or threat to local drainage.

6. **Absorb the Spill**
   - Once you have the incident contained you can use the equipment in the spill kit to absorb the spilt fuel.
   - Where the spill is substantial ensure that the area is cordoned off and the spill contained and await assistance.

7. **Dispose of Pollutants**
   - DO NOT throw used spill materials in the waste bin - arrange for hazardous waste disposal.

8. **Refill Spill Kit**
   - After the incident order new materials to refill your spill kit.

9. **Record the incident**
   - Record the incident and in cases where there has been ingress into the drainage system the local Water Authority and the Environmental Agency must be informed. Undertake any actions to ensure such incidents do not re-occur.

3. Contact VIRTUS site staff and depending on the severity of the spill/leakage request the VIRTUS SMC to raise an incident ticket to record information, actions and time scales.

Disposal of Oil/Fuel Hazardous Waste

Following the containment of spill/leaked material, The FM Team, will arrange for a controlled clean up and disposal, including any remaining substances, its packaging and any absorbent medium used in the containment and clean-up process.

Hazardous substances/materials are disposed of via Contractors who are registered with the Environmental Agency or the Scottish Environmental Protection Agency.

The FM Team will obtain a complete Hazardous Waste Consignment Note and retain the certificate for a minimum of 5 years.

Expended spill kits shall be replenished at the soonest convenience.

Maintenance of Spill Kits

VIRTUS data centre sites maintain numerous spill kits according to the type of liquid present in a specific area.

Diesel/Oil Spill Kit	Located in areas where fuel oil is stored or delivered such as generator rooms/compounds.
Chemical Spill Kit	Located in areas where water and or water infused with chemicals (such as glycol) including pump rooms, corridors with water circulation pipes, hi-fog pump rooms.

It is the responsibility of the FM Team to manage the controlled use, defect reporting, replacement and replenishing of all spill kits on site. To prevent misuse of spill kits, each container is security tagged. Such tags can be easily broken in the event of a spill but acts as a deterrent for misuse.

6.7.9.Generator and Fuel Monitoring

Monitoring Requirement	Monitoring Information	Reason for Monitoring
Generator Planned Preventative Maintenance	Service sheets	SFG20, best practice PPM and adherence to manufacturer's recommendations / warranty requirements
Fuel Storage Inspection	FM Team daily inspections	Condition of storage tanks, clearances for fire protection / environmental hazards, line conditions, availability of spill kits
Fuel Polishing Maintenance	Service sheets	Maintenance of highest quality fuel for generator usage
Fuel Quality	Testing records	Maintenance of highest quality fuel for generator usage Verification of Sulphur Content
Generator Run Hours	Monthly hours run per gen set	UK ETS mandatory reporting
Fuel Levels	Monthly litres per gen set storage tank	UK ETS mandatory reporting
Fuel Deliveries	Fuel delivery notes. Storage tank recharge data	UK ETS mandatory reporting

Fuel Disposals	Waste consignment notes/certificates.	UK ETS mandatory reporting. Duty of Care under Hazardous Waste Regulations

6.7.10. Compliance to Regulation (Water Abstraction)

VIRTUS operates a water abstraction licence for LONDON2 (Hayes). The abstraction of water directly from a ground-sourced aquifer is used in process cooling administered through the Evaporative Indirect Coolers (EIC) units.

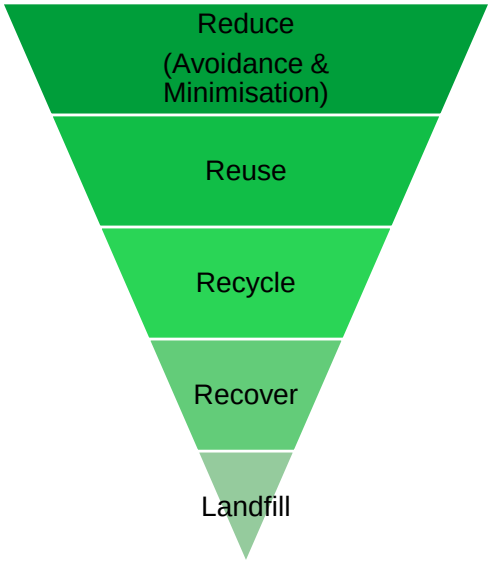
Registered Entity: VIRTUS Hayes Limited
Customer No: 225350 – T88895778A
Licence No: TH/039/0036/013

Compliance requirements:

Monitoring & Metering	All ground-sourced aquifer water must be metered. Meters reading are recorded monthly.
Annual Reporting	Upon notification from the Environment Agency, the site must report annual consumption information obtained through metering. The site must not exceed licence consumption thresholds.
Payment of Charges	Following annual consumption reporting, the Environment Agency will invoice the site including: Standard Unit Charge Compensation Charge EIUC Source Charge

6.7.11. Compliance to Regulation (Waste)

VIRTUS recognises that our activities and operations produce different types of waste as a by-product. Where possible, the company will apply the waste hierarchy to produce as little waste as possible. VIRTUS sites employ waste segregation techniques to ensure waste types are separated at source.



VIRTUS ensures adequate control of waste service providers through annual compliance auditing of our directly contracted waste service providers and those controlled by the Facilities Management Teams. Both VIRTUS and the Facilities Management Teams maintain waste stream registers listing:

- Waste stream codes (EWC codes of waste types)
- Waste service providers details (name, Waste Licence registration number, and secondary suppliers)
- Waste hierarchy option

Annual monitoring of waste types and amounts (weights) is conducted by VIRTUS to determine how much waste is being directed to landfill.

All waste management matrices across VIRTUS sites for waste must be recognised by appropriate EWC-codes. This is a six-digit code (e.g. 20-03-01) indicating the type of waste that can be checked on the corresponding waste management license of the location that receives the waste to ensure that they are permitted to treat the respective waste. EWC-codes marked with an asterisk (*) are considered dangerous and should be handled as hazardous.

Where possible, VIRTUS will recycle instead of sending waste to landfill. VIRTUS employ recycling centres for the following waste streams:

Waste Type	Waste Code	Process
Mixed Municipal Waste	EWC 20-03-01	All mixed municipal wastes are to be disposed of in particular containers and collected by an authorised company
Paper and cardboard packaging	EWC 15-01-01	All paper and cardboard packaging wastes are to be disposed of in particular containers and collected by an authorised company
Paper and cardboard (secure)	EWC 20-01-01	All confidential paper waste are to be disposed of in provided containers for collection by specialist company

6.7.12. Hazardous Waste

Waste Type	Waste Code	Process

Fluorescent Light Tubes	EWC 20-01-21	Used fluorescent tubes are classified as hazardous and must be safe be stored in a place where they do not can break. Each site will have a tube coffin for this purpose. Removal of fluorescent tubes must be controlled by a company that has a license to transport and dispose of Hazardous waste. The Facilities Management Team have operational control over this process.
Lead Batteries UPS	EWC 16-06-01*	Lead Batteries must be removed and disposed by the maintenance contractor who is responsible for maintaining the UPS Equipment.
Printer cartridges and toner	EWC 08-03-17	Used toner and ink cartridges from printers are saved and recycled. Removal of used toners and cartridges must be arranged with a company that has a license for transporting and disposing of hazardous waste. Toner and Print Cartridges can be disposed of in the bins provided.
Waste electrical and electronic equipment WEEE	EWC 20-01-35	Electronic equipment, such as printers, PCs and monitors, will be recycled. Removal should be arranged with a company that has a license for transporting and disposing of hazardous waste.
Chemicals	EWC 16-01-15*	All waste chemicals such as glycol and (lubricating) oil shall be handled and collected by competent parties
Fuel oil and diesel	EWC 13 07 01*	All waste diesel, or items containing diesel (such as used spill kits) must be collected and handled by competent and registered parties.
Used Filters	EWC 16-01-17	Used filters originating from air conditioning and power generation systems are to be treated as hazardous waste (oil containing). Removal should be arranged with a company that has a license for transporting and disposing of hazardous waste.
Polychlorinated Biphenyl	EWC 16-01-09	PCB's originating from components of air conditioning systems oil shall be handled and collected by competent parties
Refrigerant Gases (R134a, R410a)	EWC 14-06-01*	All works conducted on refrigerant gas-containing equipment shall be completed by specialists who have the necessary competencies/qualifications to control the release of greenhouse gases (Fgas). All refrigerant gases removed off site will include type, weight and bottle number.
Voltage switchgear (SF_6)	EWC 16-05-04*	All works conducted on SF_6- containing switchgear shall be completed by specialists who have the necessary competencies/qualifications to control the release of SF_6.

6.7.13. Waste Monitoring

In order to fulfil waste management duty of care, VIRTUS seek to control waste generation, handling and final disposal as part of our ongoing commitment to positively affect our sphere of influence.

Waste monitoring is in direct response to the following regulations:

The Producer Responsibility Obligations (Packaging Waste) Regulations 2007 (S.I. 871)	The handling of 50 tonnes or more of packaging material. **VIRTUS are not obligated as activities conducted are not listed:** • raw material manufacture – produce raw materials for packaging manufacture

	• packaging conversion – convert raw materials into packaging • packing/filling – put goods into packaging or put packaging around goods • selling – supply packaged goods to the end user • importing – import packaged goods or packaging materials from outside the UK; this includes raw materials that will become packaging, for example, plastic pellets used to make bottles • service provider – a business that supplies packaging by hiring it out or lending it Continued monitoring for best practice or in response to possible legislation changes.
The Hazardous Waste (England and Wales) Regulations 2005 (S.I. 894	The production or storage of 500kg of hazardous waste per year. **No longer a requirement to register, VIRTUS do not produce in excess of 500kg hazardous waste.**

The Data Centre FM Teams are responsible for maintaining a register of waste service providers (Waste Duty of Care) further detailing:

- Individual waste streams and codes
- Process/activity which produces the waste streams
- Name of Waste Contractor/Broker and licence number
- Waste Contractor who receives waste from Waste Contractor/Broker
- Waste carrier licences
- Name and address of transfer site
- Waste management licence of the transfer site
- Waste management option

Monitoring of waste records by VIRTUS is conducted during the legal compliance reviews. Missing waste documents such as Hazardous Waste Consignment Notes, Waste Disposal Certificates, will be reinstated by the FM Team directly from the Waste Contractor/Broker and stored in accordance with waste record management and regulatory requirements (5 years or more).

6.7.14. Energy Procurement

As a data centre colocation provider, the provision of power is a key service deliverable. VIRTUS is responsible for satisfying customer contractual power through securing power contracts with utility suppliers. In addition to securing power in general, VIRTUS undertake to secure 100% renewably sourced power for our data centres; this means energy from a source that is not depleted when used such as wind, solar, tidal, hydro electrical and geothermal.

The process for power procurement is covered in the VIRTUS Operations Manual Chapter 17 – Power Procurement Management.

Contracted utility providers are to provide annual REGO certificates proving the purchase of renewable energy.

6.7.15. ISO 50001 Energy Management & Monitoring

The Compliance Manager is responsible for an ongoing assessment of energy usage and consumption across the portfolio of data centres. The result is a continuously updated energy review example below:

The following information is provided to the Compliance Manager on a monthly basis in order to update the energy review:

- Forecast PUE
- Actual Average PUE
- Forecast IT Load (kW)
- Actual Average IT Load (kW)
- Forecast Site Usage (kW)
- Actual Average Site Usage (kW)
- Actual Average Non-IT Load (kW)
- Total Secured (Budgeted Power) (MWh)
- Total Monthly (kWh)
- Total Monthly Billing (£)
- Diesel Consumption (Litres)
- Maximum Monthly Tmax (°C)
- Minimum Monthly Tmin (°C)