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Owner:
Head of Treatment

Odour Management Plan

1. Odour Management

1.1 Chalton WRC

The site is located off Chalton Water Recycling Centre, Luton Road, Chalton, Luton, LU4 9UG, its location is shown in Appendix A Figure 1.

National grid reference: NGR TL 02923 27061

This OMP is available to all site staff and those involved in the cake storage / delivery operations, there are copies on site in the blue box and in an operational document folder on SharePoint.

1.2 Guidance for preparation of Odour Management Plans

Table 8 of the IAQM Guidance on Odours and Planning provides recommended content for the preparation of an OMP, it suggests the main areas to be covered are:

- essential site details,
- routine controls under normal conditions,
- abnormal conditions and additional controls,
- triggers for additional controls, and
- management good practice.

The relevant table from the IAQM guidance is reproduced in Appendix B, which also provides details on the expected content for each section. This structure and content have been followed to produce the details of the OMP.

The OMP has been produced in accordance with the Environment Agency's H4 Odour management guidance published in April 2011 (<https://www.gov.uk/government/publications/environmental-permitting-h4-odour-management>).

The Appendices to this OMP are as follows:

Appendix A:

Figure 1 Site location plans including sensitive receptor locations (Source Google Earth)

Figure 2 Main process areas at WRC

Figure 3 Windroses for WRC

Figure 4 Routine monitoring location

Figure 5 Maintenance requirements for odour control units including daily/weekly/monthly/annual checks and servicing (links to log books and check sheets to be included)

Appendix B – for information:

Table from IAQM Guidance

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2. Site

2.1 Essential Site Details

The site is an operational wastewater treatment works which can be split into distinct areas:

- Inlet
- Storm handling
- Primary settlement

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- Biological Treatment
- Secondary settlement
- Sludge storage (from on site WRC activities and not the proposed operations under the waste permit)
- Cake storage (digested and raw) from external sites

These main processes areas are shown in Figure 2 of Appendix A. It is important to recognise the areas of the site likely to produce the highest amounts of odour are those associated with treating fresh sewage (i.e. the inlet works) or where sludge might be handled.

Table 1 Contribution of main source categories to odour emissions

Process area	Percentage of total odour emitted*
Cake storage (EWC code 19 06 06 and 19 02 06)	10
Final Tanks	0.5
Primary tanks	15
Sludge feed tanks	40
Inlet Works	30

*not totaling 100% – miscellaneous sources not included

2.1.2 Cake import export and storage

Digested cake EWC code 19 06 06 or Raw cake (19 02 06) will be imported to the Chalton WRC cake storage facility. The maximum tonnage of cake the cake storage area can hold is 300 tonnes and there are no bays or separate areas as only one type of cake will be stored at any one time.

Cake will be imported and exported using rigid bulker lorries which are sheeted.

Days of operation for cake receipt are variable throughout the year and are needs based depending on land bank availability and storage capacity, Spring and Autumn are peak periods for imports and exports of cake.

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2.2 Odour Modelling

The frequency of wind direction and the distance to the nearest properties are key factors in determining likely odour impacts.

2.2.1 Sensitive Receptors

Receptors sensitive to odour include users of the adjacent land, which may vary in their sensitivity to odour. The level of sensitivity will be defined using the Institute of Air Quality Management guidance²

- High sensitivity receptors e.g. residential dwellings, hospitals, schools/education and tourist/cultural.
 - users can reasonably expect enjoyment of a high level of amenity; and
 - people would reasonably be expected to be present here continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.
- Medium sensitivity receptor e.g. places of work, commercial/retail premises and playing/recreation fields.
 - users would expect to enjoy a reasonable level of amenity, but wouldn't reasonably expect to enjoy the same level of amenity as in their home; or
 - people wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.
- Low sensitivity receptor e.g. industrial use, farms, footpaths and roads.
 - the enjoyment of amenity would not reasonably be expected; or
 - there is transient exposure, where the people would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.

The magnitude of risk relates to:

- Frequency: How often an individual is exposed to odour
- Intensity: The individual's perception of the strength of the odour
- Duration: The overall duration that individuals are exposed to an odour over time
- Odour unpleasantness: Odour unpleasantness describes the character of an odour as it relates to the 'hedonic tone' (which may be pleasant, neutral or unpleasant) at a given odour concentration/ intensity. This can be measured in the laboratory as the hedonic tone, and when measured by the standard method and expressed on a standard nine-point scale it is termed the hedonic score.
- Location/Receptor sensitivity: The type of land use and nature of human activities in the vicinity of an odour source. Tolerance and expectation of the receptor. The 'Location' factor can be considered to encompass the receptor characteristics, receptor sensitivity, and socio- economic factors.

There are a number of receptors in relative close proximity to the site. The sensitive receptors 750m of the site are identified in the table 2 below, and the location plans in Appendix 1 figure 2.

The closest residential areas are those on Luton Road around 560m to the South of the cake storage area.

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Table 2: Receptors within 750m of potential emission sources from the cake storage operation at the Site

Receptor Type	Receptor (a)	Potential emission source to receptor	Process	Distance (m) from nearest potential emission source ^(c)	Direction of receptor from closest emission source
Sensitive receptors near the Site (places of work, amenity areas)	Sundon NG Power Station	Cake Storage Area (b)	Cake storage imports and exports	230 m (d)	East
	Industrial site West of Luton Road			490 m	North West
	Threads Creatives			540 m	South East
Residential properties near the Site (residential)	Properties on Luton Road	Cake Storage Area (b)	Cake storage imports and exports	560 m (d)	South
	Properties on Water End Lane			630 m	South East
	Rawlings Ley property on Luton Road			685 m	North West
	Properties on Forge Close			700 m	South
	Ashbrook property on Luton Road			710 m	North West
	Properties on Blacksmiths Common			720 m	South
Amenity area near the Site	Fancott Woods and Meadows	Cake Storage Area (b)	Cake storage imports and exports	110 m (d)	North West
	Chalton Village Hall			695 m	South East

- a) For the location of the sensitive receptors please see Appendix A figure 1
- b) For the location of the cake storage area please see Appendix A figure 2
- c) Distance from source to receptor is rounded to the nearest 5m
- d) Value in bold represents the nearest potential sensitive receptor within that receptor type

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2.3 Routine Controls

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2.3.1 General Controls

All equipment on-site is serviced regularly to ensure correct operation of the works. There are staff onsite who inspect the site every routine visit (3-5 days per week of 1-2 hours per visit) and who would identify if any malfunction had occurred. In addition to this a standby shift operates to ensure availability of resource as required.

General housekeeping measures are in place across the whole site to keep surfaces clean and clear of odorous materials to reduce odour risk.

Before any major planned works on the site that may result in unusually elevated odour emissions, our impact plan procedures must be followed.

2.3.2 Inlet works/Storm tanks

Incoming raw sewage can have higher levels of odour if allowed to become septic. Therefore collaboration with our networks teams is required to ensure the catchment is being managed as required to reduce septicity and to reduce the time raw sewage is entrained within the system before reaching Chalton WRC.

Trade effluent is regulated to ensure discharges reduce the risk of odour release, where the waste composition is likely to be highly odorous it is not accepted at the site. Anglian Water consents multiple parameters on trade effluent discharges to minimise the impact of odour on the receiving sewer network and WRC. The following are considered for inclusion in the permit:

- TON (Total Oxidised Nitrogen) to protect crude sewage levels at the WRC inlet
- pH to minimise hydrogen sulphide production in the receiving sewer and WRC
- Temperature will be lowered from standard consent limits if there is an increased odour risk
- Sulphide where odour is an issue in the receiving catchment
- Sulphate to limit the production of hydrogen sulphide

Where limits are set these are monitored through the routine Trade Effluent sample programme.

The skips at the inlet works can be potential sources of odour if the contents are stored for long period or contain waste material that is unusually odorous. These skips are changed regularly to reduce the potential for odour emissions, and they are inspected daily by site staff to determine if any further action is required, such as immediate removal of the contents by contractor.

Regular servicing of the screens and compactors is undertaken to ensure that the equipment is operating at optimum performance.

In normal operation the storm tanks are automatically emptied and cleaned as soon as is practical after use.

Storm tanks used in heavy rainfall conditions. If they are required to enable planned maintenance, EA permission will be sought, and impact plans written to mitigate all risks including odour.

2.3.3 Primary settlement tanks

Primary settlement tanks (PSTs) contain screened raw sewage and collect primary sludge that can be odorous if not removed regularly. Daily sludge removal (auto) is undertaken to maintain a consistent low volume of sludge within the PSTs. PST sludge blanket target is 2m for optimum operation.

Regular tank inspections are carried out and there is a maintenance plan to keep the equipment operating at its expected performance levels.

Sludge depth testing is carried out 1x minimum times a week. Extra manual de-sludging of a specific PST is carried out if a high level is recorded in that tank.

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2.3.4 Trickling filters

The trickling filters are used to treat settled sewage with a biomass growing on the surface of the stone media in the filters. This is an aerobic low-rate process with a low potential for odorous emissions. Visual inspection of the filters will be undertaken daily to identify if there is any process malfunction and corrective action taken if required.

2.3.5 Cake Storage

Limited storage time that cake would be stored for. The maximum storage time of 12 months is to ensure that the maximum period of potential storage is covered this would be from one growing season to the next. Normal circumstances would see cake stored for 6 to 8 months. Storage time is dependent on landbank availability. It is endeavored to source landbank outlets that could accept all of the cake stored and would ensure that the building is emptied at least annually.

In order to minimise odour during all cake movements by the front end loader the bucket is kept as low as possible to the ground and a narrow working face as possible is maintained. When loading cake into vehicles with a loading shovel tipping is done at the lowest safe minimum height possible to minimise the release of odour. Cake is moved after each load is tipped by the driver of the vehicle delivering the cake to site.

Monitoring of the cake storage area is by monthly cake storage facility inspections, cake stocks are monitored weekly and cake is emptied at least annually.

On site capacity is monitored to ensure storage capacity is not exceeded. Cake deliveries and on site storage capacity is managed through Water Recycling Operational Logistics (WROL) by the use of spreadsheets which track the amount of cake already delivered, the amount of cake removed from site to land and thus the total available on site capacity based on the capacity of the building.

The cake storage facility will be inspected monthly, during monthly cake storage facility inspections the following will be checked:

- That the storage walls are intact.
- Make sure that the drainage is still working and not blocked.
- Make sure stored cake is pushed up and stockpiled correctly.

Once a year carry out maintenance on cake storage facility.

All information from monthly and annually inspections is stored on M2i (a performance management database) and reported to relevant persons with a monthly report now going to FLM and senior management board.

2.4 Reasonably Foreseeable Abnormal Conditions

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The following have been identified as conditions that could give rise to increased levels of odour and the proposed mitigation is detailed:

Potential abnormal condition	Mitigation
Unable to desludge Primary Tanks	Tanker direct from PST & utilise mobile thickener
Extended storage of cake	Bio resource team to manage removal. Only digested cake to be stored which is less odorous
Unusually septic sewage arriving at WRC	Escalate to networks and catchment quality
PST scraper failure	Tankers can be used to skim the tanks.

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Storm tanks full for prolonged period	Manual empty and clean, tankers utilised to assist with emptying and cleaning. Emptied and cleaned as soon as is practical
Inlet screenings skip and associated compactor identified as potential source of odour when weather hot	Changed regularly to minimise impact of odour. Waste management to ensure no contamination occurs. Regular servicing of screens and compactors to ensure operating to optimal performance.
Activated sludge (AS) Plant – aeration lanes. Surface aeration agitates flows and mixed liquors which can give rise to some minor odours. Failure of aeration equipment.	Routine maintenance regime for RAS and SAS removal. Maintenance of mixed liquors. Staff briefed to act immediately on high odour levels. Keep PST sludge as fresh as possible.
Septic liquors being returned. Failure of sludge dewatering plant.	Sludge return has been moved from the inlet to just before the primary tanks reducing the potential for odour. Significant benefits have been seen when combined with improvements in the dewatering equipment. Cake to be removed from site as soon as practicable
Unable to process sludge	Centrifuge operate duty standby meaning there is a back up process stream in case of any failure or malfunction of equipment. An urgent M&E job will be raised to address any plant break down or malfunction. In an emergency un-thickened sludge can be tankered away from site from the buffer tank.

2.5 Triggers for Additional Controls

Investigation of the need for additional controls will be triggered if any of the following occurs:

- More than three validated complaints from different locations being received over a one week period.
- Routine odour monitoring with the Jerome monitor carried out by staff indicates levels of odour are present at sensitive receptors are likely to result in complaint.
- Period where the average ambient temperature exceeds 27C for more than five days.
- Equipment breakdown on the site that leads to treatment process becoming more odorous.

2.6 Routine Monitoring

To manage the day-to-day fluctuations in odour and operations the site has dedicated work technicians who assess for odours as part of routine operations. Any highlighted issues will be escalated and mitigated where possible.

The site has access to, and uses the following methods to assess the odours detected on site:

- Operational staff detecting differences in odours compared with normal operation
- Routine odour surveillance completed by site staff

It is acknowledged that at times it is difficult for operational staff to detect odour changes, however where this occurs, or where the routine investigation highlights an issue, or a complaint is received, the site personnel will investigate. A works technician would attend site to investigate - carry out sniff tests and consider wind direction along with other local sources of odour. Odour detection findings would be recorded and rectifications if required. All odour reports will be shared with the EA on the incident reporting line – 0800 80 70 60.

If the issue is on-going, the Senior Modeller would be contacted to potentially carry out odour surveys.

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2.7 Odour Complaints

There are 3 routes through which complaints may be received:

- Customer call into the AWS Operational Management Centre (OMC) on 08457 145145 (24hr emergency contact).
- Customers report odour complaints electronically; via a mailbox (CustomerReports@anglianwater.co.uk), via the Anglian water website or via social media.
- In person on site treatment manager contacted direct by customers via telephone, mail or verbally at property.

Complaints received through any of these routes will be handled in the same manner using the following procedures.

2.7.1 Action taken to resolve complaint

The complaint will be initially logged in the AWS SAP database, this system holds records of all customer jobs/complaints received by the company and allows a history of actions taken. The treatment manager will be contacted and will investigate the issue and report back to customer care team or direct to the customer.

Complaints are regularly monitored by the Treatment Manager and compared to actions being undertaken on the site or in the local network.

The treatment manager will be responsible for reporting odour complaints to the Environment Agency in line with the permit conditions and by sharing them with the EA on the incident reporting line 0800 80 70 60.

Should continuing odour complaints be received then this is a trigger for consideration of further odour controls. The results will be noted in the site odour log book, the complainant will be informed of the outcome of the investigation and any steps required to mitigate the odours.

2.8 Management Responsibilities

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Responsibility for the implementation and updating of this OMP lies with the Treatment Manager.

This OMP will be reviewed annually and whenever there are major changes in the process. Where new information regarding odours becomes available (for instance through new odour surveys and modelling) the OMP will be reviewed and updated to reflect this information.

Any significant changes, including process changes, plan changes or increase in complaints or odours detected will result in this plan being reviewed.

This plan will be stored on Sharepoint.

2.7.1 Business management systems

There are various documents and processes within the business management systems for AWS that address odour and the management of complaints. The list below details some of the key processes and how they can be found on Lighthouse:

- POSWASTE – Odour Control holds all the standard documents relating to managing odour.
- Where further investigation is required the Odour Modeller and Process Science team will support with root cause analysis and next steps.
- The current odour model can be obtained from the modelling team, contact Omid Shafibeik.

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2.9 Community Engagement

We will communicate planned activities with the potential to cause odours and any other identified issues on-site, to the following:

Organisation	Contact name	Email
Environmental Health	Central Bedfordshire Council	0300 300 8302
Environment Agency	General Enquires	enquiries@environment-agency.gov.uk
Anglian Water Customer Service	Customer Issues	CustService@anglianwater.co.uk

2.10 Training of Staff

All staff who have responsibilities under this plan will receive training from the Treatment Manager and an odour elearning module will be completed by relevant staff when available. This will be updated annually or whenever there are significant changes to the OMP.

2.11 Keeping of Records

A site logbook is on site and any details of site visits for odour specific reasons will be documented within the site logbook.

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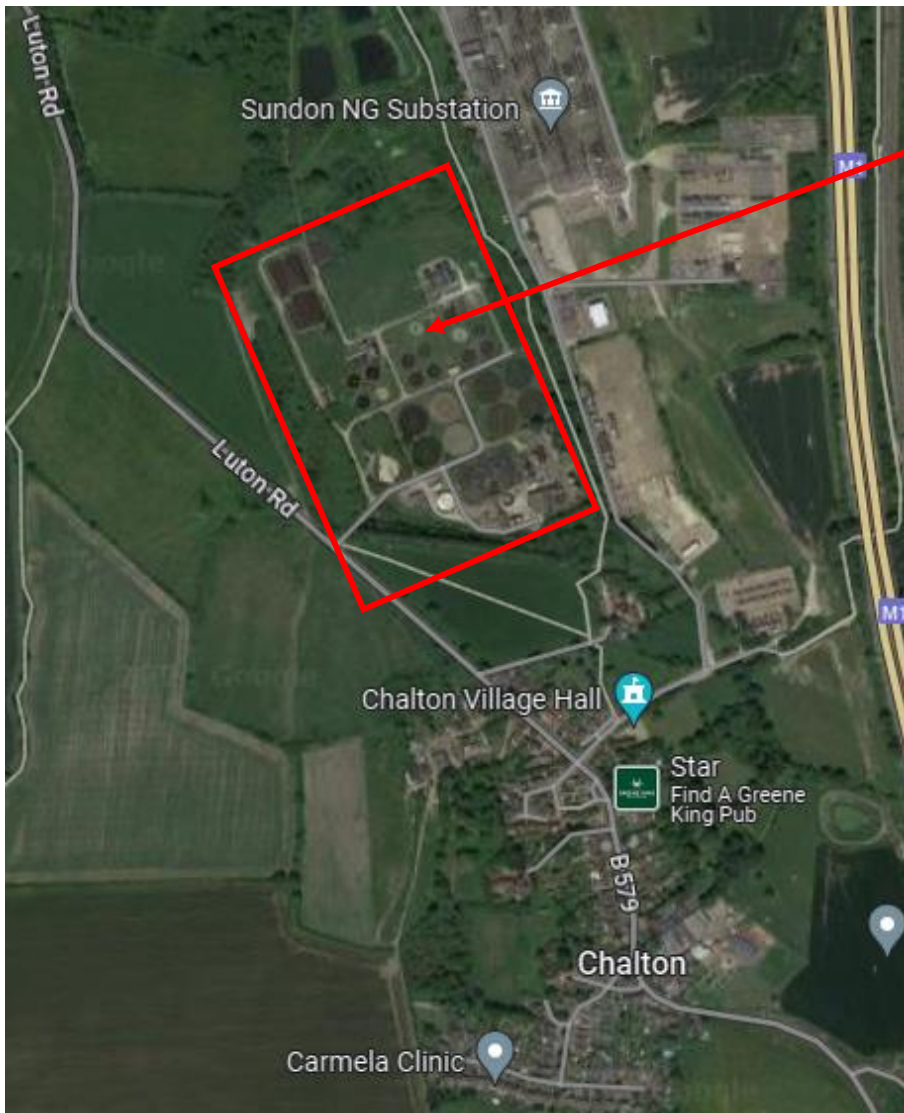
Appendices

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Appendix A:

Figure 1 Site location plans (Source = Google Earth):

Location Plan showing Chalton WRC



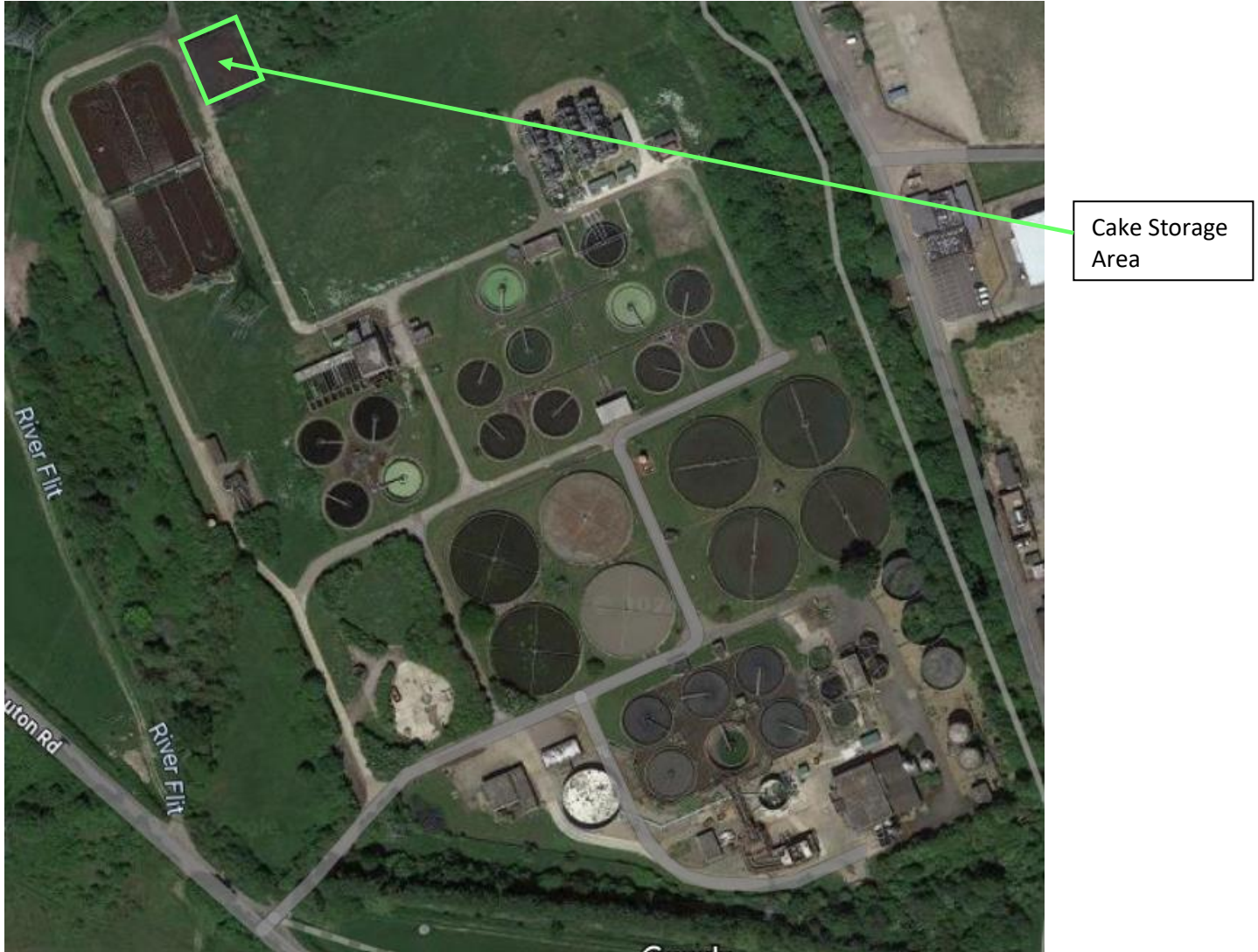
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Site Location Plan with cake storage area marked



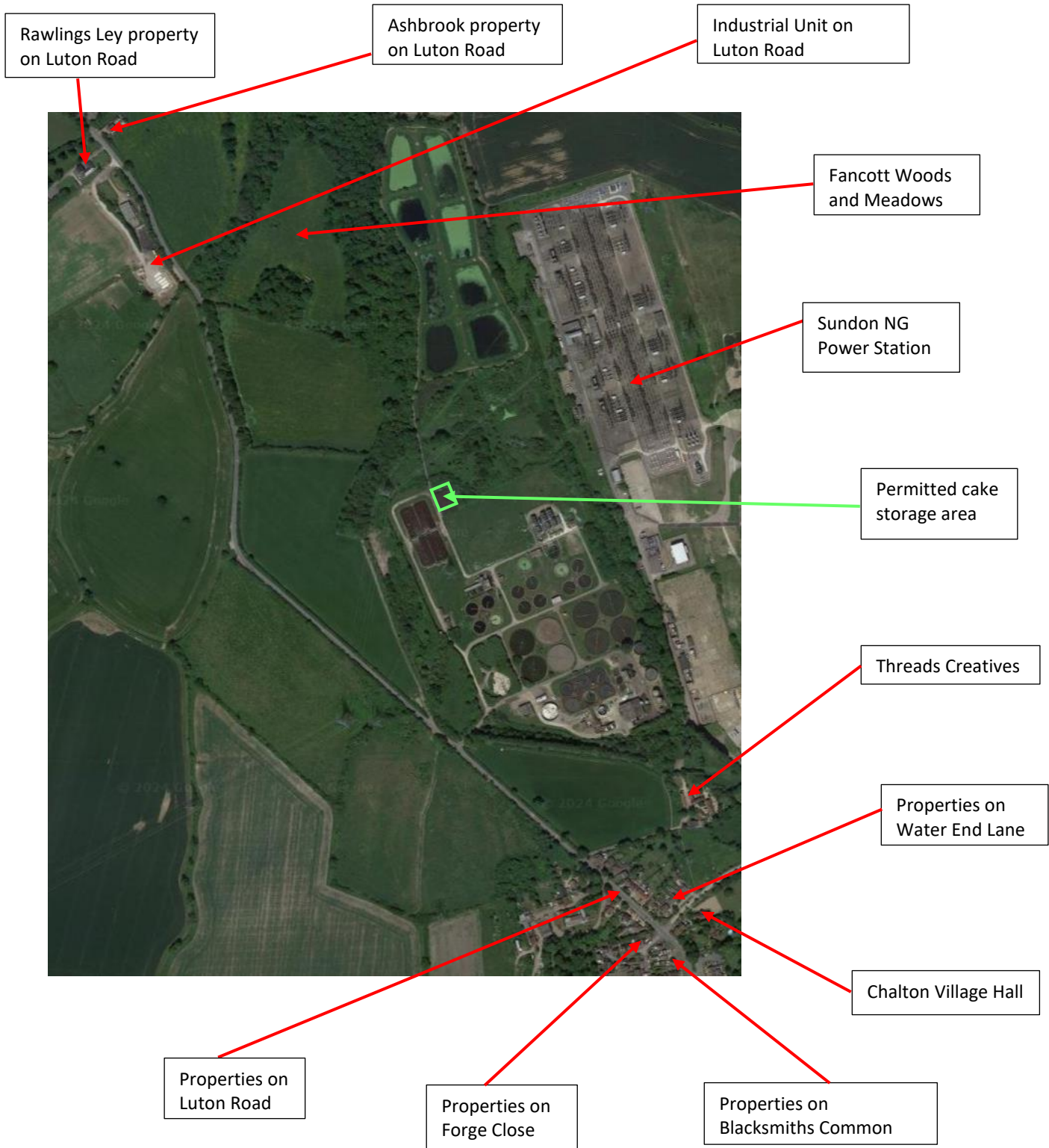
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Site location Plan with sensitive receptors identified



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Figure 2 Main process areas at WRC:



Number	Main Process Areas
1	Cake pad
2	2 aeration lanes
3	30 sand filters and nitrifying sand filter standby generator
4	3 final tanks
5	4 secondary humus tanks
6	4 primary humus tanks
7	4 secondary filters
8	4 primary filters
9	6 primary tanks
10	Sludge feed tanks
11	Inlet
12	2 picket fence thickeners
13	2 centrifuges

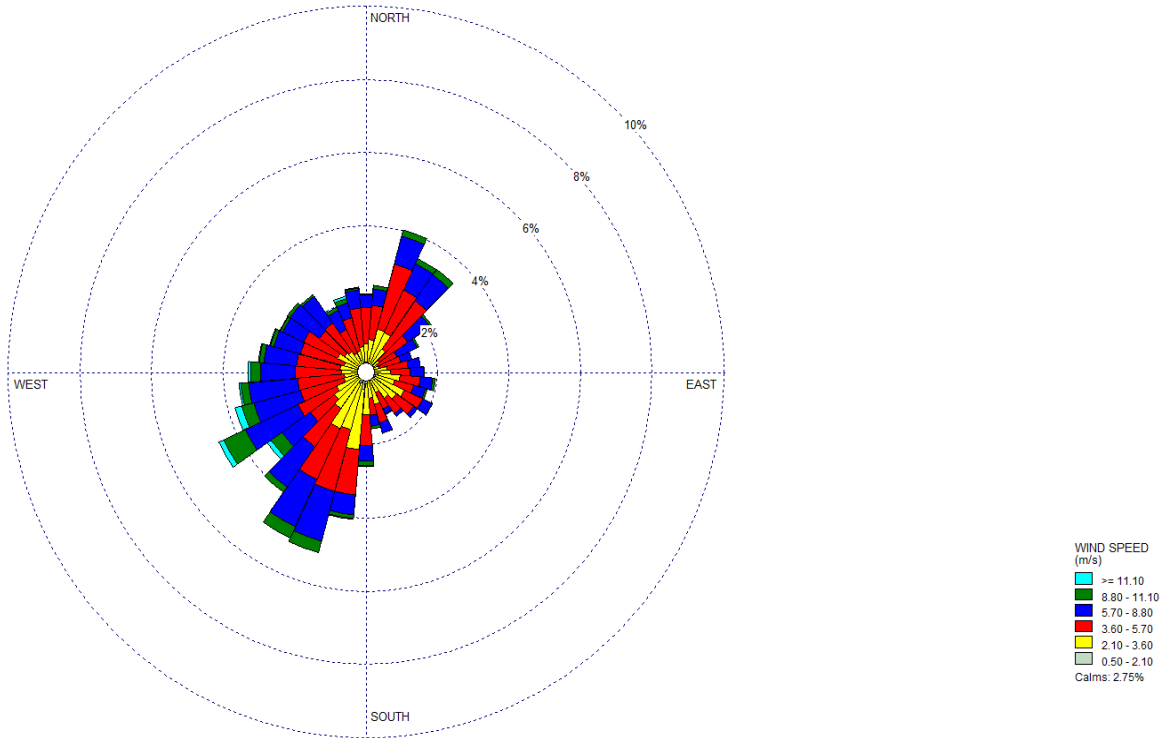
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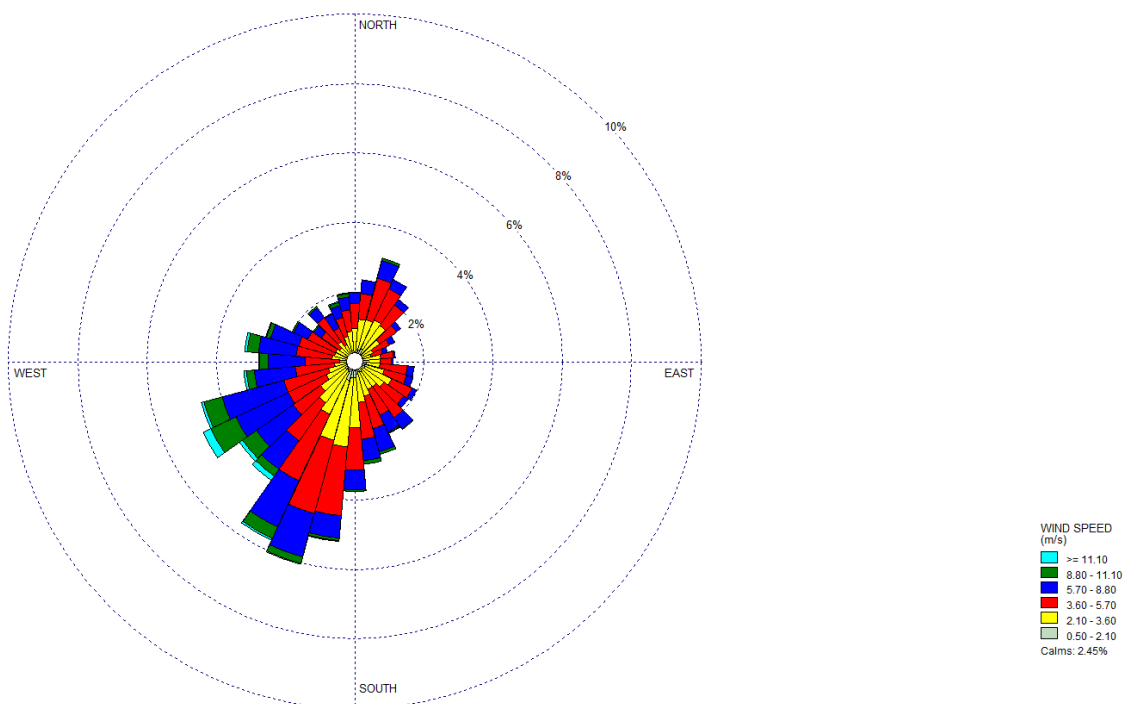
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Figure 3 Windroses for WRC

2013 wind rose for Luton Airport Meteorological Station



2014 wind rose for Luton Airport Meteorological Station

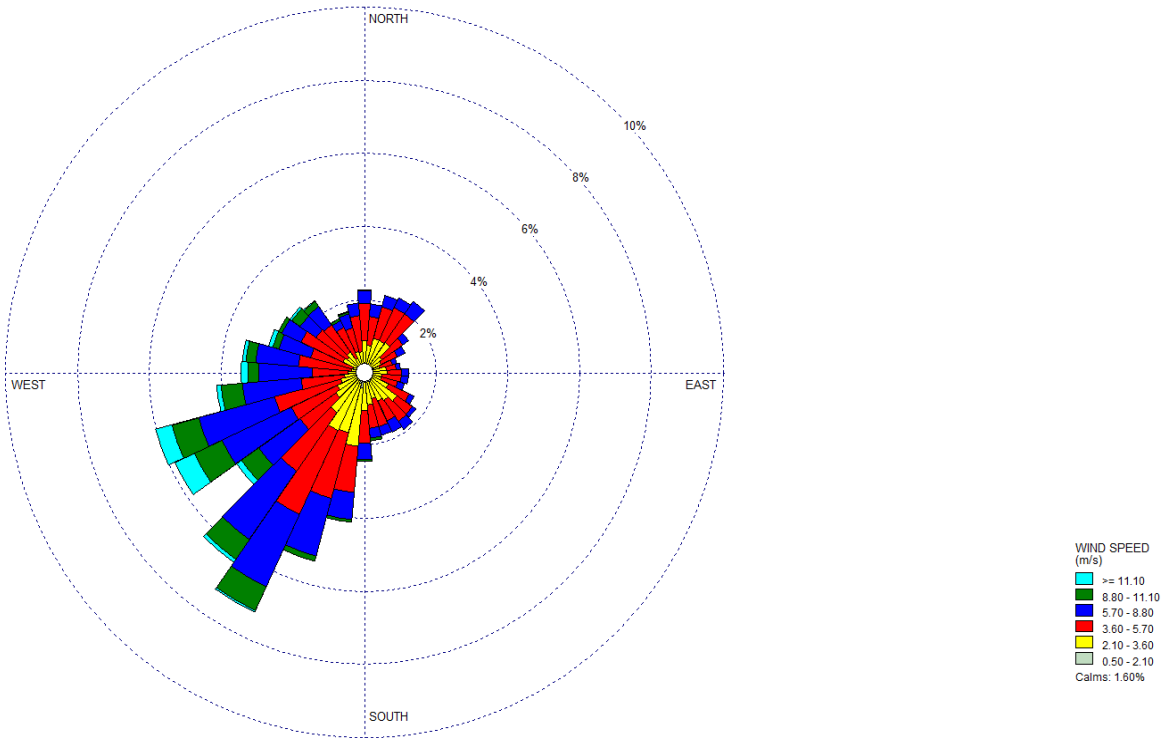


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2015 wind rose for Luton Airport Meteorological Station



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Figure 4 Routine odour monitoring locations:

To manage the fluctuations in odour and operations the site has dedicated work technicians who assess for odours when on site which is a minimum of 3 days per week. This is carried out as part of their routine activities and any highlighted issues will be escalated and mitigated where possible. The site has access to, and uses the following methods to assess the odours detected on site:

- Operational staff detecting differences in odours compared with normal operation

It is acknowledged that at times it is difficult for operational staff to detect odour changes, however where this occurs, or where the routine investigation highlights an issue, or a complaint is received, the site personnel will investigate and if the issue is on-going, the Senior Modeller would be contacted to potentially carry out further odour surveys. During routine operations the below areas are checked for changes in odour and escalated where applicable.

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Figure 5 Maintenance requirements for odour control units including daily/weekly/monthly/annual checks and servicing (links to log books and check sheets to be included)

Not applicable as there are no odour control units at the site.

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Appendix B: Extract from IAQM Guidance

IAQM ► GUIDANCE
Odour

Table 8: Recommended content of an OMP for planning purposes

ESSENTIAL SITE DETAILS
A process description, particularly describing odorous, or potentially odorous, activities or materials used (inventory)
Identification of all the release points for each of the activities (plan/map)
Identification of the sensitive receptors within the area of influence that could be impacted (plan/map)
A description of the meteorological conditions prevailing at the site, especially wind direction. A wind rose (from a nearby representative meteorological station or from site sensors if installed) is an ideal format.
ROUTINE CONTROLS UNDER NORMAL CONDITIONS
A description of the <i>routine</i> mitigation/control measures that would be used day-to-day under normal operating conditions in the absence of any unusual risk factors. Examples of routine control measures include receipt, inspection, acceptance/rejection of materials, storage, containment, handling, treatment and timing of activities.
A list of the actions in detail and who is responsible for carrying them out.
REASONABLY FORESEEABLE ABNORMAL CONDITIONS AND ADDITIONAL CONTROLS
Identification of possible risk factors (e.g. adverse weather conditions) and anticipation of reasonably foreseeable odour-related incidents and accidents (e.g., abnormal situations, spillages, power failure, breakdown of doors, equipment or abatement) and a listing of the consequences for odours of these risk factors.
A description of the <i>additional</i> measures (e.g. additional control measures and modifications to site operations, such as diverting odorous waste loads to facilities with less sensitive surroundings during adverse weather conditions) that will be applied during these periods to deal with these risks and any reasonably foreseeable incidents and accidents. It should be stated that if all the measures are shown not to be sufficient, then they will need to be tightened further or else, possibly ceasing/reducing odorous operations.
A list of the actions in detail and who is responsible for carrying them out
TRIGGERS FOR ADDITIONAL CONTROLS AND CHECKS ON EFFECTIVENESS
A description of what would trigger this further action/additional measures, such as: <ul style="list-style-type: none"> – the results of planned routine checks/inspections/surveys on site; – the results of on-site measurements of process parameters and surrogate measurements for odour (e.g. pH, temperature, oxygen, etc) exceeding defined trigger levels; – other metrics, such as particular meteorological conditions (e.g. temperature above a certain value, wind blowing in a particular direction, or calms); and – odour monitoring on- and/or off-site, including: <ul style="list-style-type: none"> • odour complaints monitoring (which should be carried out for all sites); • monitoring carried out on-site, showing non-compliance with any emission limit values (ELVs) set for controlled point source releases; and • monitoring carried out off-site (e.g. by sniff testing, odour diary surveys, etc), showing non-compliance with any action levels for ambient odour levels.
MANAGEMENT GOOD PRACTICE
A description of: <ul style="list-style-type: none"> - the roles and responsibilities of personnel on site (e.g. organisational chart); and - the training and competence of staff in odour-critical roles
Details of how the following will be carried out, and who has been assigned managerial and operational responsibilities for them: <ul style="list-style-type: none"> – implementing and maintaining the OMP; – responding to odour-related incidents and any elevated odour levels from the aforementioned checks/inspections/surveys, monitoring, or on receipt of complaints of odour nuisance; including carrying out investigations and taking appropriate remedial action to prevent recurrence; – planned maintenance and repair and the keeping of essential odour-critical spares; – regular review (at least once per year) of the effectiveness of odour controls - including the OMP itself – taking account of complaints, monitoring results, inspections, surveys and other information and feedback received. This interval may be shorter if there have been complaints or relevant changes to your operations or infrastructure; – engaging with your neighbours and communicating with relevant interested parties (e.g. local community and local authority) to provide necessary information and minimise their concerns and complaints, including methods used, content and frequency of communication; and – keeping records of all activities and actions relating to odour and the OMP.