LAND AT HILLTHORN FARM, WASHINGTON

SUNDERLAND RENEWABLE ENERGY CENTRE

PREPARED BY PEGASUS GROUP | OCTOBER 2017
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PRELIMINARY FIRE RISK ASSESSMENT

Pegasus Group

ROLTON KILBRIDE
POWERING THE FUTURE™

Sunderland Renewable Energy Centre

Preliminary Fire Risk Assessment

Rolton Kilbride

Date 10/10/2017

ASTUTEFIRE

FIRE ENGINEERING CONSULTANTS

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1. Introduction

1.1. Introduction

1.1.1. Astute Fire has been appointed by Rolton Kilbride to provide a preliminary Fire Risk Assessment for the proposed Renewable Energy Centre (gasification plant) on land at Hillthorn Farm, Washington, Sunderland.

1.1.2. The main objectives of this report are to:

- Outline and address fire risk management for the development;
- Outline the provisions to be put in place such as equipment / structures that are to be installed in respect of fire risk management;
- Discuss the proximity of key receptors such as the commercial premises and adjacent railway land as this affects profile of fire risk profile of the development;
- Provide fire safety advice using relevant guidance and other supporting documentation setting out how fire risk and safety will be approached (overview principles at this stage for planning);
- Set out the approach to Fire Risk Assessment considerations that will be developed as the detailed design progresses, taking into account the requirements associated with the Environmental Permit process.

1.1.3. The report outlines the fire safety provisions that will be considered in this development for compliance with the functional requirements of the Building Regulations 2010[2] and development of a suitable Fire Risk Assessment for the Environmental Permitting stage of the development.

1.2. Overview of Regulation Updates - 2017

1.2.1. The new Environmental Permitting (England and Wales) Regulations 2016 came into force on 1st January 2017.

1.2.2. Whilst there are no major changes as a result of the new regulations, they provide a consolidated system of environmental permitting in England and Wales and transpose provisions of fifteen EU Directives which impose obligations requiring delivery through permits or which are capable of being delivered through permits.

1.2.3. The new Regulations revoke the Environmental Permitting (England and Wales) 2007 (and amendments) as well as the Environmental Permitting (England and Wales) Regulations 2010. They also amend a wide number of acts including Control of Pollution Act 1974, Water Industry Act 1991, Clean Air Act 1993 and Goods Vehicles (Licensing of Operators) Act 1995. One hundred and twenty-one Statutory Instruments also have amendments made under these Regulations.

1.3. Environmental Permit

1.3.1. The Environmental Permitting Regulations (England and Wales) 2016 requires some facilities such as energy form waste facilities to obtain an environmental permit, to:

- protect the environment so that statutory and Government policy environmental targets and outcomes are achieved;
- deliver permitting and compliance with permits and certain environmental targets effectively and efficiently in a way that provides increased clarity and minimises the administrative burden on both the regulator and the operators;
- encourage regulators to promote best practice in the operation of facilities; and
- continue to fully implement European legislation.

1.3.2. The Environment Agency publishes general guidance documents (*Develop a management system: environmental permits and Control and 'Monitor emissions for your environmental permit'*) which describes the standards and measures that businesses are expected to take in order to control the risk of pollution from the most frequent situations in the waste management and process industries. The EA also produce sector guidance "The Incineration of Waste (EPR 5.01)" which details specific guidance to obtain an environmental permit for an Energy from Waste Plant.

1.3.3. EPR 5.01 will be important in achieving compliance with the Environmental Permitting Regulation (England and Wales) 2016.

1.3.4. The facility will follow Best Available Techniques in limiting the risk from fire following the intent of the EPR 5.01 and other relevant fire risk guidance documents.

1.3.5. An EP is a permit to operate a facility governed by the requirements of the Environmental Permitting (England and Wales) Regulations 2016 (EPR). In order for the scheme to operate the EP is essential to be in place. This will be issued, monitored and enforced independently by the Environment Agency. As part of the EP process, it is required to carry out a range of risk assessments, including a Fire Risk Assessment to identify the associated risks of the site and clearly define the control measures that are being provided. The Fire Risk Assessment will be carried out as part of the detailed technical design following planning.

2. Description Proposed Development

2.1. Background

2.1.1. The site selected for the scheme is part of the Hillthorn Farm, in Washington, Sunderland. The below plan shows the proposed site layout.

2.1.2. This document support the planning application for the site for a new Renewable Energy Centre with associated works.

Figure 1 Site Layout (indicative only subject to detailed design)

2.2. Onsite Facilities / Buildings

2.2.1. The ancillary facilities that are to be part of the main building include:

- Turbine Hall;
- Education centre/offices;
- Electrical MCC/distribution room;
- Transformer rooms;
- Emergency generator rooms;
- Workshops (electrical/instrumentation/lab/mechanical);
- Cooling/fuel/ UREA BOP (BoP stands for Balance of Plant – so covers all the other unlisted systems such as water treatment, compressed air, etc);
- Slag and tramp and clean metal removal;
- Shredder and dirty metals removal;
- RDF Bunker;
- Waste Bunker;
- Intake area.

2.2.2. There will be separate buildings to the main building and these include the following facilities;

- Transformer (and substation);
- ACC;
- Fire- water tank and pump;
- Gatehouse;
- Lime storage silos;
- Carbon storage silo;
- APC (fly ash) silos.

2.3. Proposed Development Overview

2.3.1. The Renewable Energy Centre will use clean, safe and proven cutting-edge gasification technology, currently deployed in Norway, to produce energy from waste after recycling has taken place. The facility will be capable of generating 27 MW of electricity. Annual throughput of the facility will be in the region of 215,000 tonnes.

2.3.2. The storage capacity of the pit areas are

- 4 days supply can be over the two (waste and RDF) bunkers.
- The waste bunker should be at 6m deep from the tipping apron to the base to allow for offloading walking floor trailers.
- Bunker capacity should be based on 250kg/m3 density of waste and capacity at the “water line.” The RDF bunker is above ground and immediately alongside.
- Shredder inlets will be at a similar level to the top of the RDF bunker so the waste bunker will have 3 elevated sides which will allow additional waste capacity by stacking the waste.

2.3.3. The facility will employ up to 35 full time equivalent operators, maintenance technicians, engineers and managers.

2.3.4. The Renewable Energy Centre will offer energy security for local organisations at a competitive rate and has the potential to offer lower cost energy, providing a secure, predictable and sustainable energy source for local businesses.

2.4. Built Development

2.4.1. The proposed facility will have the capacity to process 215,000 tonnes of non-hazardous residual waste per annum; that is waste left following the practicable removal of recyclable materials (i.e. pre-treated waste) and that would otherwise be disposed of at a landfill site or exported to a similar facility abroad. The residual waste feedstock will predominantly be in the form of a Refuse Derived Fuel (RDF) which is a waste product that following pre-treatment is shredded, dehydrated and/or compressed into a pellet, brick-shape or baled; the RDF feedstock would be supplemented by other non-hazardous pre-treated commercial and industrial waste (C&I) and pre-treated municipal solid waste (MSW).

2.4.2. Unlike incineration, the facility will employ an Advanced Conversion Technology (ACT), known as 'gasification', that heats the residual waste to very high temperatures, causing the materials to break down whilst also generating a gas which when burnt off in a boiler creates steam, which in turn drives a steam turbine to generate electricity or exported as heat.

2.4.3. The proposed facility will have capacity to produce circa 27MW of energy.

3. Site Fire Spread Considerations

3.1. Site Boundary and Adjacent Developments

3.1.1. The proposed site is bounded by a mixture of industrial and commercial uses. The proposed application site has adjacent facilities that have to be considered from a risk perspective in the event of a fire, these include the following key receptors:

- Business park on adjacent land;
- Enterprise zone;
- Nissan car plant.

3.1.2. The adjacent areas to the site include a business enterprise park, vacant land and also a disused railway track that all need to be assessed in detail when the development enters into warrantable work packages for design and development.

3.1.3. In relation to fire risk, it is essential that the site, in the event of a fire, has suitable control measures in place to avoid impacting upon areas outside of the site boundary. As part of the detailed technical design, fire risk mitigation, including external fire spread prevention through active (suppression) and passive (fire rated construction and separation distances) measures will be incorporated into the design in order to prevent adjacent areas being affected in the event of a fire.

3.1.4. A detailed assessment of all boundary conditions and relevant fire protection to facades will be carried out during detailed design to ensure appropriate protection is afforded to the site (where applicable).

3.1.5. Suitable protection will be provided where required to deal with distance to boundary conditions as well as any identified key receptors on adjacent sites.

Figure 2 Site Layout

4. Fire Risk Management Approach

4.1. Introduction

4.1.1. This section sets out the fire safety management considerations that will be incorporated and within the Sunderland site as part of the detailed technical design.

4.2. Fire Safety Management

4.2.1. For the proposed Sunderland site, a level "2" management regime is proposed. Full details of what this level of management entails is given in Appendix A.

4.2.2. A Fire Safety Plan for the facility will be drawn up and notified and agreed with the relevant authorities. The Fire Safety Plan for the operational period of the contract will be agreed prior to the commencement of the service and implemented from the Services Commencement Date.

4.2.3. The Fire Safety Plan will include procedures for:

- Emergency actions in the event of a fire;
- The management of fires on site;
- Testing of fire safety equipment;
- The use of personal protective equipment;
- Regular inspection of the facilities;
- Good housekeeping; and
- Record-keeping.

4.2.4. Appropriate risk assessments will be undertaken and safe operating procedures developed and implemented to reduce the risk of fire on-site. Arrangements for staff training will be included in the Fire Safety Plan including plans for regular training reviews and updates. The Fire Safety Plan will be continually reviewed and will be updated annually and following any fire related incident to reflect experience and at the request of the Fire Safety Officer or other relevant statutory body.

4.3. Risk Assessment Process

4.3.1. As part of the risk assessment process that will be carried out includes but will not be limited to the following:

- Identify the hazards;
- Decide who might be harmed and how;
- Evaluate the risks and decide on control measures;
- Record the findings and implement them to ensure risks are mitigated/ minimised during the design process; and
- Review the results of the assessment and update the design where necessary.

4.3.2. A detailed risk assessment for the site will be carried out for the Environmental Permitting stage of the development.

4.4. Fire Safety Risk Considerations

4.4.1. There are a number of factors that will be taken into consideration for the development. During the design development the following will be established for risk:

- the location of the proposed site;
- identify which and how many receptors including schools, hospitals, major transport infrastructure, others businesses, shops, residential areas, rivers, canals and protected habitats are within the vicinity of the proposed Sunderland application site;
- the type and quantity of materials that will be contained on site;
- what would happen to these materials in a fire;
- the potential causes and likelihood of fire;
- the water supplies and fire fighting options (including consultation with fire service);
- environmental pathways;
- the measures to be considered in the design for firewater containment facilities (including reference to *PPG 18 Managing Fire-water and major spillages* [10]*);*
- prevailing wind direction and where required what measures will be taken to mitigate any identified risks e.g. bunds and wind-breaks.

4.5. Fire Prevention Plan

4.5.1. A site Fire Prevention Plan is a document that will be required and enforced by the Environment Agency as a condition of an Environmental Permit. The Plan requires to be a detailed document and management system used by site operators to effectively manage site fire risk and its impact on the environment.

4.5.2. The Fire Prevention Plan is intended to provide a management framework to:

- Prevent fires;
- Identify and restrict the size and duration of fires;
- Deal with situations that have the potential to cause fires (such as fire risks from plant);
- Respond effectively and appropriately to fires on site in liaison with the fire service; and
- Protect the environment from the impact of fires; normally the environmental impact firewater run off (which is typically highly polluting).

4.5.3. A comprehensive Fire Prevention Plan will be developed for the site at the detailed technical design stage progresses.

4.6. Offsite Risk

4.6.1. As identified within section 3.3 of this report, the proposed design will identify and fully mitigate the risks to neighbouring properties. As part of the detailed technical design, potential hazards resulting from both incidents on site and within adjacent properties will be considered. Suitable fire prevention and risk management measures will be an essential part of the design process.

5. Fire Safety Control Measures

5.1. Overview

5.1.1. The following considers the range of fire safety control measures that will be considered during the detailed technical design phase for the development.

5.1.2. The detailed design of the Facility is to be progressed following the determination of the EP. Therefore, at this stage, only outline information on the methods to be utilised can be provided. This Section includes detail of the fire-fighting water, automated fire suppression equipment, compartmentation and control of site drainage (including fire water run off).

5.2. Fire Fighting Equipment

Automatic fire suppression systems.

5.2.1. Fire hazards are specific to the various parts of the process and will be dealt with on an individual basis. The areas where suppression may be adopted will be established during the detailed technical design phase with a suitable design specification developed.

5.2.2. As part of this detailed design phase, the appropriate type of fire suppression system to each area will be provided according to the supplier recommendations (e.g. water sprinklers, foam water sprinklers, Clean Agent Gas suppression). Suppression will be provided to areas including, but not limited to:

- Waste bunker;
- Office Amenity;
- Slag and Waste Area;
- Intake Area;
- Cooling fuel area / BOP;
- Turbine Room;
- Shredders / Metal Removal area;
- Electrical building.

5.2.3. The inclusion of sprinklers / deluge systems are predominantly an industry and regulator based requirement. Such systems are anticipated to be required to satisfy the EA, as part of property protection and potentially to satisfy insurer needs.

5.2.4. A sprinkler design specialist will be consulted to provide the necessary design detailing applicable for the system as a whole i.e. system coverage, tank sizing and elements applicable to each specific area within the premises.

Water Monitors (Cannons)

5.2.5. Water monitors (cannons) will likely be provided to any waste areas including RDF bunker and will be designed to furnish a minimum of 946 lpm at 6.89 bar at the tip. Monitors should be located so as to allow for coverage of all pit areas (or similar) with at least two (2) streams operating simultaneously.

5.2.6. Oscillating monitor nozzles with manual override facilities will be provided and the monitors should be capable of remote operation from the central Control Room. The fire water monitors should not be installed in any area where they can affect the operation or maintenance of the refuse machinery and should be protected by steel frameworks to avoid damage. This will be clearly stated as part of the detailed design.

Portable Fire Fighting Equipment

5.2.7. Portable fire fighting equipment including hose reels should be provided for use when the buildings are manned (assessment of internals of each area will be carried out during detailed design).

5.2.8. Extinguishers of an appropriate type should be located near to specific risk areas wherever practicable, at final exits and to provide coverage that meets or in some cases exceeds the requirements of BS: 5306 Part 8.

5.2.9. A dry powder and water extinguisher should be provided in the delivery bay.

5.2.10. Water and Co2 extinguishers should be provided by the exit doors to outside from occupied areas.

5.2.11. Extinguishers should be sited in accordance with the requirements of BS5306.

5.2.12. As a general rule, extinguishers should be sited at a fire point that comprises an fire extinguisher(s), fire alarm call point and a fire action notice. An emergency light and normal lighting will be provided in close proximity to adequately illuminate the fire point.

Fire Service Operations

5.2.13. Facilities provided for the fire service are intended to assist the fire fighters in their rescue and fire fighting operations. It is important to ensure during the detailed design that provision is made to:

- Ensure a rapid response to notify the fire service.
- Provide good access for fire fighters and their equipment.
- Provide the fire fighters with adequate supplies of water or other materials to be able to tackle fires.
- Prevent the spread of smoke to facilitate rescue and fire fighting attempts.

Fire Service Vehicle Access.

5.2.14. The road system in the neighbourhood of the building will be adequate to accommodate fire-fighting and rescue vehicles in accordance with the recommendations of Section 16 of the Approved Document B (ADB) – this is the Building Regulations guidance document for England and Wales.

5.2.15. Site and perimeter access to all of the development will be checked as part of design development and consultation will take place with the local fire service.

5.3. Fire Compartments

5.3.1. Subject to the location of key equipment, the facility will be segregated into fire compartments. For example, certain specific Fire Compartments, such as the waste bunker and the boiler house, will be separated from each other by fire barriers with a minimum of 2-hour fire resistance rating, by spatial separation or by other approved means. Fire compartments will be provided per fire risk assessment to identify appropriate fire detection and protection systems, in association with appropriate civil work design principles, to control risk of fire propagation, spread of fumes and smoke and fire water flooding.

5.4. Fire-Water Control

Risk of Fire-Water

5.4.1. Industries routinely store and use large quantities which in the event of a fire can potentially cause pollution. In case of a spillage and particularly in the case of a fire, these substances could reach a local water course where severe pollution may occur.

5.4.2. Therefore, in line with many insurer and government agency requirements it is important to develop a site emergency plan that considers the actions to be taken to control run-off of water used to fight any fire on the proposed Sunderland application site.

5.4.3. The proposed Sunderland development has a responsibility to make arrangements for managing any water that used to fight fires on the site.

5.4.4. Fire fighting run-off has the potential to pollute the local environment through water discharge due to the materials on site in the event of a fire.

Mitigation

5.4.5. The following will be carried out during the detailed design phase:

- assess the likely route of any run off from the site;
- calculate the likely volumes of fire water, looking at likely worst case scenario fire incidents

5.4.6. The above will need to be carried out alongside the Environment Agency and local Water Company in order to seek advice on the likely routes to surface and groundwater's. A Flood Risk Assessment has been carried out and this will link in with the mitigation measures in dealing with fire water run off through the sites drainage strategy. A summary of the water drainage strategy is provided below.

5.4.7. The Fire Service will also be consulted for their input obtaining the most accurate estimation on water volumes. This will inform the development of the volume of containment required, based on fire-fighting best practice.

Attenuation Systems

5.4.8. Fire fighting water containment will be considered during detailed technical design and through consultation as outlined above with relevant stakeholders.

5.4.9. Reference is made to the Flood Risk Assessment provided by PFA Consulting and summary below that sets out the drainage strategy for the site.

5.4.10. The attenuation tanks are referenced within the PFA Consulting report (September 2017) which show the Indicative Surface Water Drainage Arrangements Plan, Drawing Number K123/03 contained in Appendix 8 of their report indicates the location and sizes of the required storage facilities to serve the various development areas and are subject to detailed design.

Summary of Surface Water Drainage Strategy

5.4.11. A sustainable drainage strategy, involving the implementation of SuDS, is proposed for managing the disposal of surface water runoff from the proposed development on the site.

5.4.12. Reference is made to the PFA Consulting report for a summary of the proposed drainage strategy (section5).

5.5. Summary

5.5.1. The above list is not exhaustive but highlights the considerations that are being incorporated and that suitable protection measures are being provided to ensure that fire-water run off is dealt with on site to avoid environmental contamination.

5.5.2. As part of the detailed technical design for the site, all measures will be provided in order to ensure that appropriate provisions are made and that all risks are adequately addressed. This will include incorporating the outcomes of discussions with all stakeholders, including the Fire and Rescue Service.

6. Fire Detection and Alarm Systems

6.1. Automatic Fire Detection and Alarm System

6.1.1. The detailed design of the Renewable Energy Centre facility is to be progressed following the determination of the Environmental Permit (EP). Therefore, at this stage, the below is indicative only and will be subject to a detailed design review at a later stage.

6.1.2. The site will incorporate a fire detection and alarm system installed in accordance with BS 5839, Pt 1 and amendments to give category L1 coverage or equivalent. The objective of a category L1 system is to offer the earliest possible warning of fire so as to minimise the time between ignition and the arrival of the fire-fighters. A category L1 system will provide fire detection in all areas. The type of detection used will be designed so as not to frequently provide false alarms.

6.1.3. Consideration will be given to an infrared thermal imaging camera system as part of the automatic fire detection system, particularly for the bunkers, as a means of identifying hot spots.

6.1.4. The type of detection used, which will be selected during the detailed technical design stage and will be one that can be programmed and designed so as not to frequently provide false alarms.

6.1.5. Manual call points and sounders will be installed around the Facility to meet the guidance within the relevant British Standard for positioning.

7. Conclusions

7.1.1. This document sets out the measures that are being made in relation to site fire safety. The information within this report forms the basis of what will be considered during the course of detailed technical design development and as part of the Fire Risk Assessment submissions that will be required for the Environmental Permitting stage.

7.1.2. Risks associated with the site processes will be identified and mitigating features put in place in order to ensure that the developed design has incorporated a robust fire safety strategy, as a result of on-going risk assessments.

7.1.3. This document demonstrates that there is a robust structure in place to identify risks, incorporate deliverable fire risk prevention and management measures and that the entire process will be audited, permitted, maintained and enforced by the EA under The Environmental Permitting Regulations 2016.

8. References

1. **BS 9999:2008** - *Code of practice for fire safety in the design, management and use of buildings*

2. **The Building Regulations 2010**. *Statutory Instruments 2010 No. 2214.*

3. **Approved Document B** - *Vol 2. Fire safety. 2006 Edition.* DCLG

4. **BS 7974:2001** - *Application of fire safety engineering to the design of buildings - Code of practice.*

5. **BS 5839-1: 2013** - *Fire detection and alarm systems for buildings. Code of practice for system design, installation, commissioning and maintenance.*

6. **BS 5266 – 1: 2011** - *Emergency lighting. Code of practice for the emergency escape lighting of premises.*

7. **BS ISO 3864 – 1: 2011** - *Graphical symbols. Safety colours and safety signs. Design principles for safety signs and safety markings.*

8. **BS EN 12845:2004+A2:2009** - *Fixed firefighting systems. Automatic sprinkler systems. Design, installation and maintenance.*

9. **BR 187** - *External fire spread: Building separation and boundary distances.* BRE 1991.

10. **PPG 18** *Managing Fire-water and major spillages.*

Appendix A - Development Drawings

Gasification and Melting Facility

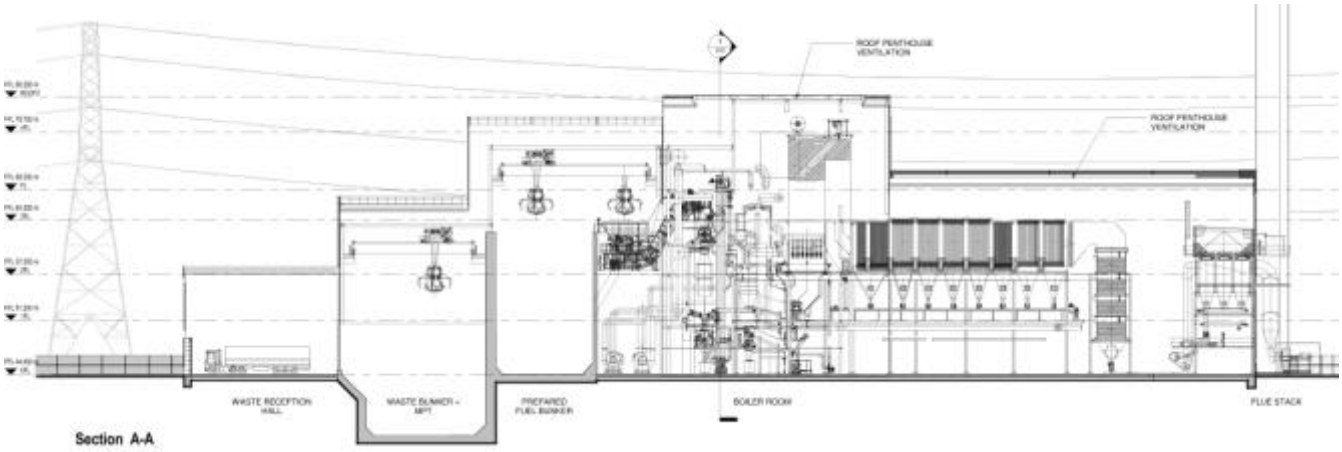

Figure A1: Main building sections

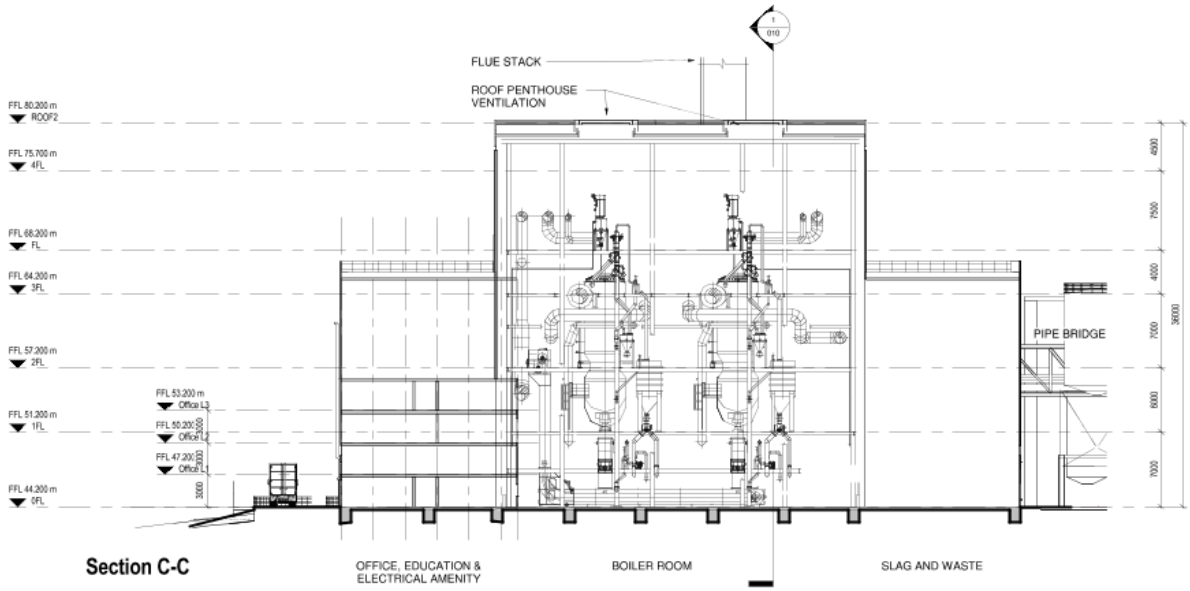

Figure A2: Main building sections

Appendix B - Management Duties

Factors used in assessing management levels	Explanation	Level 1	Level 2	Level 3
Planning for changes in risk profile	Management systems should include procedures for anticipating and taking into account, either on a permanent or a temporary basis, changes to the occupancy and/or fire growth characteristics of the building and its contents over the life cycle of the building. These procedures should form part of the overall audit and review process for the fire safety strategy and should be able to determine whether any such changes will necessitate alterations to the fire precautions provided, including the management systems, and to put any such alterations into effect.	A level 1 system anticipates and proactively identifies the impact of any proposed changes, including changes to the occupancy, periods of abnormal occupancy, and fire growth characteristics. The system identifies any alternative protection and management measures that will be required as a result, and ensures that they are implemented.	A level 2 system identifies and reacts to any changes as they occur, including changes to the occupancy, periods of abnormal occupancy, and fire growth characteristics. The system identifies any alternative protection and management measures that will be required as a result, and ensures that they are implemented.	A level 3 system reviews any changes on a periodic basis. The system then identifies any alternative protection and management measures that will be required as a result, and ensures that they are implemented.
Resources and authority	For the management of fire safety to be effective, the fire safety manager(s) needs to be empowered and able to command sufficient resources to maintain the systems.	In a level 1 system, the manager(s) with responsibility for fire safety are empowered to ensure that legislative requirements are met; initiate testing, initiate maintenance or repair, and, where necessary, have direct control of staff responsible for these tasks. Such powers are supported by the necessary, sufficient and appropriate resources, including funds.	In a level 2 system, the responsibility for fire safety, and the necessary supporting staff and resources, is likely to be divided over a number of different individuals, departments or even companies. It is likely that the implementation of any necessary changes will require approval of those not directly responsible for the routine management of fire safety within the premises.	In a level 3 system, the managers determined as being responsible for fire safety are likely to have limited or no power or resources, and are thus unlikely to be able to ensure that the fire safety systems are kept fully functional without reference to a third party.

Factors used in assessing management levels	Explanation	Level 1	Level 2	Level 3
Fire training	Training of staff and others for action in the event of a fire is an essential element of fire safety management.	In a level 1 system, the training ensures that there are sufficient numbers of staff trained in all aspects of fire prevention, fire protection and evacuation procedures, and able to use the appropriate extinguishing equipment (and media), so as to provide full coverage of the building, with provision for contingencies, sickness or holiday absences.	In a level 2 system, the training ensures that there are sufficient numbers of staff trained in all aspects of fire prevention, fire protection and evacuation procedures, and able to use the appropriate extinguishing equipment (and media), so as to provide full coverage of the building, but has no contingency provision.	In a level 3 system, general training is provided on a periodic basis.
Staffing level (staff-occupant ratio)	The role of staff is an important element of the fire safety package provided. The appropriate staffing level (for fire safety purposes) for a particular building is influenced by the use of the building and fire growth characteristics; the types of occupant; the fire safety systems in place; and the roles and levels of the staff concerned in ensuring the fire safety of the occupants.	In a level 1 system, the staffing level provided is specifically appropriate to the building concerned, including the use of the building, the nature of the occupants, the management systems in place, and the active and passive systems provided. It also includes sufficient trained personnel to ensure that all occupants are assisted, or supported, to make their way out of the building effectively in an emergency – where necessary, e.g. in the case of elderly or disabled persons, or children, this might include making appropriate additional arrangements to ensure their safe evacuation. A level 1 system may include arrangements for security such as regular patrols, perimeter controls, entry control systems, and staff able to respond to an intrusion. A level 1 system will also provide for contingencies such as training, sickness, and other unexpected absences etc.	In a level 2 system, there will not be any arrangements for contingencies such as training, sickness, and other unexpected absences, etc., nor will there be provision for security such as regular patrols, perimeter controls, entry control systems, or staff able to respond to an intrusion.	In a level 3 system, the staffing levels and systems provided do not routinely and specifically address the issues identified above.

Factors used in assessing management levels	Explanation	Level 1	Level 2	Level 3
Work control (e.g. Repairs to structure)	Management systems should control work on site, e.g. repairs to structure, and in particular hot work.	A level 1 work control system is developed proactively with clear lines of responsibility; a permit system; logging and audit processes and routine checking and supervision.	A level 2 work control system is developed reactively to work required on site to include clear lines of responsibility; a permit system; and logging and audit processes.	A level 3 work control system is reactive to work required on site.
Communications procedures	Communications procedures include means of being alerted to a fire; communications between management, and between management and staff; messages to occupants; and communications with the fire and rescue service in the event of a fire.	A level 1 communications system is able to ensure that all of those involved, or potentially involved, in an incident are informed rapidly and effectively, of relevant information. In addition the systems make use of alternative formats as necessary, with contingency plans for when systems fail.	A level 2 communications system will provide information to all those involved, with alternative formats as necessary, but will not have contingency arrangements.	A level 3 communications system is one that provides the necessary information, but does not allow for alternative formats or contingency arrangements.
Maintenance and testing of fire safety systems	Maintenance and testing is essential to ensure that fire safety systems will operate correctly in the event of a fire.	A level 1 maintenance system is one where there is dynamic monitoring of the fire safety systems, and the equipment is kept fully functional at all the times the building is in use. There will also be alternative procedures, etc., identified for those times when systems, equipment and other arrangements are not available or not functioning correctly.	A level 2 maintenance system is one where there is monitoring of the fire safety systems, and the equipment is kept fully functional at all the times the building is in use. When systems, equipment and other arrangements are not available or not functioning correctly, alternative procedures, etc., are determined reactively.	A level 3 maintenance system will not have a predetermined regime of maintenance and testing in place.

Factors used in assessing management levels	Explanation	Level 1	Level 2	Level 3
Liaison with fire and rescue service	A good relationship with the fire and rescue service will have benefits for both the occupier and the fire and rescue service. In particular it will ensure that the fire and rescue service are able to have an appropriate pre-determined response strategy for the premises concerned and will enable the occupier to seek advice where appropriate on: how to prevent fires and restrict their spread in their buildings and other property; the means of escape from buildings and other property in case of fire.	In a level 1 system, the liaison is proactive in nature and includes effective arrangements for notifying the fire and rescue service of changes to the occupancy, periods of abnormal occupancy, fire growth characteristics, and other relevant factors. The arrangements will also allow for routine meetings with the fire and rescue service, and additional meetings where a change in the building or its occupancy is proposed.	In a level 2 system, the liaison includes arrangements for notifying the fire and rescue service of changes to the occupancy, periods of abnormal occupancy, fire growth characteristics, and other relevant factors. However, the arrangements are unlikely to provide for routine meetings with the fire and rescue service or where a change in the building or its occupancy is proposed.	In a level 3 system, the liaison is likely to be either non-existent or spasmodic.
Contingency planning	Contingency plans need to include preparation and response to a wide range of foreseeable events.	A level 1 planning system is proactive, and takes into account a wide range of possible emergencies and incidents. These are likely to include planning for logistical issues such as the provision of shelter, communications, transport, the weather, time of day, time of week, time of year (holidays, etc.) and traffic-related issues, as well as scenarios such as power failures or floods.	A level 2 system takes into account a narrow range of possible emergencies and incidents. These are likely to include planning for logistical issues such as the provision of shelter, communications, transport, the weather, time of day, time of week, time of year (holidays, etc.) and traffic-related issues, as well as scenarios such as power failures.	A level 3 system does not have effective pre-planning, and is unlikely to secure ongoing business continuity in the event of an emergency or incident.

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